

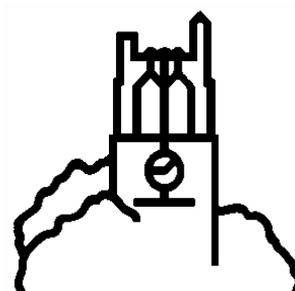
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Working Paper

Impact Evaluation of the Feed the Future Cambodia Helping Address Rural Vulnerabilities and Ecosystem Stability (HARVEST) Project

by

**Mywish K. Maredia, Murari Suvedi, Raul Pitoro, and Raju
Ghimire**



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HELPING ADDRESS RURAL VULNERABILITIES AND ECOSYSTEM
STABILITY (HARVEST) PROJECT**

by

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August 2017

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Baseline information was collected during August-October, 2012, by the Cambodia Development Resource Institute (CDRI) through funding from the Cambodia HARVEST project with technical guidelines from Michigan State University. We are grateful to Dr. Theng Vuthy for his leadership in the baseline survey. Endline data was collected during August-September 2016 by the CDRI with a subcontract from Michigan State University and technical support from the MSU team. We acknowledge the contribution of CDRI under the leadership of Sim Sokcheng for timely completion of the endline survey data collection.

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EXECUTIVE SUMMARY

The Cambodia Helping Address Rural Vulnerabilities and Ecosystem Stability (Cambodia HARVEST) 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.

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 Sample 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 match 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 1,500 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 2,100 households were revisited to complete an endline survey. However, there was an attrition of 179 households, which reduced the total number of reinterviewed households from 2,100 to 1,921. The 1,500 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 use only those households that actually participated in Cambodia HARVEST as clients. We thus use 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 (1,088 households). Sample 2 includes all client households, irrespective of whether they graduated or dropped out of the program (1,273 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 (ITT) effects.

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 become 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 (i.e., 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.

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 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 show 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 about 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 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 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: 1) the reduced sample size which lowered the statistical power to detect treatment effects; 2) non-conformity of treatment households, which lowered the intensity of treatment and significantly reduced the sample size of the treatment group; 3) contamination of control group from the presence of other similar programs and potential spillover effects of Cambodia HARVEST; 4) 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 5) the possibility the impacts are still not realized and this evaluation may have taken place too soon.

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.

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LIST OF ACRONYMS

ATE	Average treatment effect
ATT	Average treatment effect on the treated
BDM	Business Development Program
BMI	Body mass index
CRE	Correlated random effect
CDRI	Cambodian Development Resource Institute
DiD	Difference-in-difference
FAO	Food and Agriculture Organization of the United Nations
FE	Fixed effect
FHH	Female-headed households
FTF	Feed the Future
HA	Hectares
HARVEST	Helping Address Rural Vulnerabilities and Ecosystem Stability
HH	Households
IPM	Integrated pest management
ITT	Intent to treat treatment
KM	Kilometer
MAFF	Ministry of Agriculture, Forestry and Fisheries
MHH	Male headed households
MSU	Michigan State University
MT	Metric tons
NCDD	National Committee for Sub-National Democratic Development
NGOs	Non-governmental organizations
N	Number of observations
NIS	National Institute of Statistics
NN	Nearest neighbor
NTFP	Non-timber forest product
OLS	Ordinary least square
PSM	Propensity score matching
SD	Standard deviation
SE	Standard errors
TFG	Three food groups
US	United States
US\$	U.S. dollar
USAID	United States Agency for International Development
WDDS	Women dietary diversity score
ZOI	Zone of influence

1. INTRODUCTION

The U.S. government launched its presidential Feed the Future (FTF) initiative in 2010 with the goal to reduce hunger, poverty, and malnutrition taking into consideration three cross-cutting issues: gender equity, environment, and climate change.¹ The core investment areas of the initiative are women's empowerment, diet quality and diversification, agricultural productivity growth, postharvest infrastructure, high-quality inputs, and financial services. The high-level target of the initiative is to reduce the prevalence of extreme poverty (those living on less than U.S. dollars (US\$) 1.25 per day) and the prevalence of stunting among children under age 5 by 20% across all FTF focus countries over the five years in targeted geographic areas known as the zones of influence (ZOI).²

Cambodia was designated as one of the focus countries under the Feed the Future Initiative. The development hypothesis guiding the FTF-Cambodia strategy rests on the benefits of diversification for managing risks faced by farmers and the extreme poor of Cambodia. Diversifying both agricultural production and sources and timing of income for rural households helps reduce hunger and poverty (USAID 2009: Cambodia FTF Strategy 2011-2015). The Royal Government of Cambodia's development strategy to promote the growth of the agricultural sector and increase food security, environmental sustainability, and climate change resilience closely aligns with the FTF initiative.

The FTF-Cambodia program is implemented via multiple projects, of which Cambodia HARVEST (Helping Address Rural Vulnerabilities and Ecosystem Stability), implemented from December 2010 to June 2016, was the largest. Cambodia HARVEST aimed to increase incomes and improve food security for 70,000 rural Cambodian households across four provinces around Tonle Sap Lake: Battambang, Pursat, Siem Reap, and Kampong Thom. At the end of the project in 2016, HARVEST had reached over 100,000 households in the four target provinces (Fintrac 2016a). The project had developed and disseminated solutions for a variety of development challenges, including low agricultural productivity, high postharvest losses, lack of food safety regulations, constrained market access, and environmental degradation. Furthermore, the program trained over 71,400 people on nutrition and good eating practices to reduce stunting and wasting (Social Impact 2015).

Similar to the overall FTF strategy, the Cambodia HARVEST interventions were guided by the principles of linking agriculture and nutrition to achieve some of the overarching development goals related to poverty and malnutrition (FAO 2013). Over time, Cambodia HARVEST 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—and built the capacity of governments, local communities, and health workers to help families in rural areas grow, purchase and prepare more nutritious foods.

To assess whether this approach of increasing farmers' incomes by focusing on specific value chains and linking agriculture and nutrition through a comprehensive development project such as Cambodia HARVEST is effective, and to guide future program investments, USAID/Cambodia USAID/Cambodia funded Michigan State University in 2012 to conduct an independent impact evaluation of the HARVEST project using rigorous methods as part of

¹ For more information, visit www.feedthefuture.gov.

² Individual country-level targets are set against these goals and based on the conditions and context on the ground, and range between 15% and 30% in each country, averaging approximately 20% overall (see [FTF M&E Guidance Series Volume 9.1: Target Setting for Reducing the Prevalence of Poverty, 2013](#)).

its overall FTF monitoring and evaluation strategy. The distinctive feature of an impact evaluation (as opposed to a performance evaluation) is the use of a counterfactual, which identifies what would have happened to the beneficiaries in the absence of the program. This counterfactual is critical to understanding the improvements in people's lives that are directly caused by the program. An impact evaluation was deemed important because of the large amount of resources being invested by USAID in the HARVEST project and the large number of people targeted by the project. Also, at that time, Cambodia HARVEST was one of the first FTF programs based on the principle of linking agriculture to nutrition, and in general, little was known about the effects of this new approach promoted under FTF. These efforts reflected USAID/Cambodia's commitment to conducting a rigorous and independent impact evaluation of its flagship program as an integral part of the overall focus on results-driven planning and performance-based management. In general, impact evaluations aim to measure the changes in individual, household or community well-being that result from a particular project or program (in this case Cambodia HARVEST).

The HARVEST project was rolled out in phases over the 5 1/2-year period, which ended in June 2016. The Cambodia Development Resource Institute (CDRI) was sub-contracted to conduct the baseline survey (with technical input from MSU) during August-October 2012 (Vuthy et al. 2013). The purpose of this study is to report the results of the endline survey conducted in August-September 2016 and the results of the impact evaluation to measure whether the project had a discernible impact on its beneficiary population with respect to the FTF high-level goals and some key indicators. This impact evaluation analyzes the effect of Cambodia HARVEST's exposure as well as the effect of FTF-type development interventions in the target areas on a subset of villages and client farm households that represented early cohorts of project beneficiaries. The early cohorts of project beneficiaries mostly received Cambodia HARVEST interventions on home gardening, rice, and aquaculture value chains in 2012, 2013, and 2014, but some households were also receiving Cambodia HARVEST interventions until 2015. The impact analysis is based on the baseline and endline data collected in 2012 and 2016 (in the same timeframe), respectively, for this early cohort of villages that were selected in 2012.

The report is organized as follows. In the first two sections, we present the context and background for this evaluation, including the development challenges and the scope and geographic focus of the Cambodia HARVEST. The conceptual framework underlying the descriptive and impact analyses of this study is discussed in Section 3, followed by the description of data and methodology. We present the results of the descriptive analysis by tracking the project inputs, outputs and outcomes along the impact pathway, and the results of the regression analysis to assess the program effects on selected FTF indicators. The last section concludes with discussions based on the overall results, limitations of the study, and emerging lessons and proposed next steps.

2. CONTEXT AND BACKGROUND

2.1. Development Challenges in Cambodia³

Cambodia is home to more than 15 million people. It is a predominantly rural society with more than 70% of the population relying on agriculture for their livelihoods. Food production, food availability, and health indicators have improved steadily in the past decade, but challenges remain, including a relatively high incidence of rural poverty and malnutrition. For instance, in 2009, rural poverty was around 24.6% (MOP 2013)⁴, and 19% of reproductive-aged women were underweight (NIS 2010). In 2010, 40% of children under 5 years of age were stunted, 11% were wasted, and 28% were underweight (see Table 1 for some socioeconomic characteristics of the study population in the FTF provinces in Cambodia for various years since 2010). In Pursat, one of the study areas for this evaluation, the percentage of children younger than 5 that were stunted, wasted, and underweight in 2010 was as high as 45, 13, and 31, respectively (Table 1).

Cambodia's high levels of malnutrition reflect serious problems with all three dimensions of food insecurity: availability, access, and utilization of food (i.e., dietary choice and water, health, and sanitation practices). Eleven percent of Cambodia's total population is estimated to be chronically food-insecure, with an added 7% dropping into food insecurity during the lean seasons (World Food Program 2008). Despite rice production surpluses at the national level, at the household level Cambodians face poor production, storage, and availability of affordable rice and other foods. These constraints restrict the ability of farm households to maintain or increase the value of their production.

Table 1. Socioeconomic Characteristics of Population in Cambodia and the Four FTF Provinces, Various Years

Province	2014 total population of province (A)	2014 avg. HH size (A)	Children < 5 years age						Women with iron deficiency anemia (IDA) % (C)	Rice yield-MT/ha. 2014 (D)		Consumption per capita in Riel (E)	% of households below poverty line (A)
			Stunted (moderate & severe <- 2SD) % (B & C)	Underweight (moderate & severe <- 2SD) % (B & C)	Wasted (moderate & severe <- 2SD) % (B & C)	2010	2014	2010		2014	2014			Wet	Dry	2014	2015
Siem Reap	1,042,286	5.1	50.3	35.9	34.9	26.2	12.3	9.5	41.1	2.6	3.8	5,193	23.29
Kampong Thom	756,605	4.8	49.9	36.4	34.4	27.7	11.5	13	44.6	2.5	4.3	5,486	24.47
Battambang	1,173,414	4.8	26.5	24.9	22.3	18.2	14.4	7.9	42.5	2.5	3.9	5,366	23.16
Pursat	473,322	4.6	44.8	38.8	30.5	31.6	13.3	12.3	46.6	3.1	4.2	5,256	23.16
Cambodia	15,394,276	4.7	40	32	28	24	11	10	45	2.8	4.4	5,634	18.76

Source: (A) NCDD: Commune Database 2014; HH=Household; (B) NIS: Cambodia Demographic and Health Survey 2010; (C) NIS: Cambodia Demographic and Health Survey 2015; (D) MAFF: Ministry of Agriculture, Forestry and Fishery's Annual Report 2014-2015; MT= metric tons; (E) NIS: Cambodia Socio-Economic Survey 2014.

³ This section heavily borrows from the [USAID/Cambodia FTF Strategy document](#).

⁴ The new approach for estimating the poverty line, announced by the Ministry of Planning in April 2013, significantly affects poverty rate measurement in Cambodia. In 2011, Cambodia's overall poverty headcount was about 19.8%, and in 2014 it was 18.8% (see Table 1).

Poor dietary choices by Cambodians at all income levels reflect traditional beliefs and poor knowledge of nutrition, water and sanitation needs, and proper child feeding practices. Appropriate use of supplemental, weaning, or complementary foods for infants and small children is also low. The country also faces the problems of lack of clean water and appropriate sanitation practices. The United Nations estimates that up to 50% of malnutrition could be eliminated in places like Cambodia if water and sanitation issues were adequately addressed. However, this requires persuading households to make the choice to invest in affordable water and sanitation by educating them on the health, nutrition, and economic benefits of using these practices.

The agricultural sector in Cambodia suffers from low productivity and high postharvest losses, particularly in rice and vegetables (Vuthy et al. 2013). The majority of Cambodia's agricultural production is dependent on rain and highly vulnerable to both flood and drought. Despite these risks, most food-insecure farming households in Cambodia rarely diversify production from wet-season rice and fish. Food and income shortages in the lean season force labor migration to the urban areas, which reduces the workforce needed to maintain farms. Overall household poverty increases the likelihood that male labor migration will take place and thus increases the number of poor, female-headed households, which make up 69% of rural poor households. The labor constraint created by this shift decreases women's time to participate in training or other activities designed to improve farm production and sales.

Under the FTF initiative, USAID made genuine efforts to address some of these challenges by engaging closely with the Royal Government of Cambodia. Studies have shown that families that have a diversified portfolio of production and income sources tend to be better able to withstand economic or climatic shocks to their farms and households. Thus, diversification is considered critical for reducing poverty and malnutrition in Cambodia's rural areas, and this was one of the principles underlying the 'comprehensive' approach promoted under Cambodia HARVEST. The project strategy toward development is described below.

2.2. Cambodia HARVEST: Scope, Scale, and Achievements

Funded at US\$56.8 million and implemented by Fintrac, Inc., Cambodia HARVEST was a 5½-year (2010-2016) development project focused on improving food security for more than 124,000 rural Cambodian households as part of the U.S. government's Feed the Future and Global Climate Change initiatives. The project targeted three primary sectors: agriculture, fisheries, and forestry, and took a comprehensive approach in promoting three value chains—rice, horticulture, and aquaculture. It developed sound, agriculture-focused solutions to address some of the challenges noted above, such as poor productivity, postharvest losses, malnutrition, lack of market access, environmental degradation, and the effects of climate change on vulnerable rural populations.

A midterm performance evaluation of Cambodia HARVEST was undertaken in 2013, after 35 months of program implementation (Gray et al. 2013). The evaluation indicated that Cambodia HARVEST placed major emphasis upon increasing the availability of food (component I), and considerable effort went into the development of commercial horticulture, in particular. Rice and fishery activities tended to contribute to increased income. Home gardens were viewed primarily as sources of cash rather than additional food. Their direct impact on improved food consumption appeared to be less than might be expected.

The midterm performance evaluation also indicated that component 2 (increased food access through rural income diversification) was less effectively addressed. Few of the off-farm income-generating activities were making a significant impact on incomes, and beneficiaries reported that their time was better spent in other activities.

The midterm evaluation also reported that the nutritional aspect of Cambodia HARVEST had been well developed within the constraints of available resources, and a reasonable degree of coverage of beneficiaries had been achieved. The utilization component of food security had been addressed through nutritional training, but more needed to be done in this area.

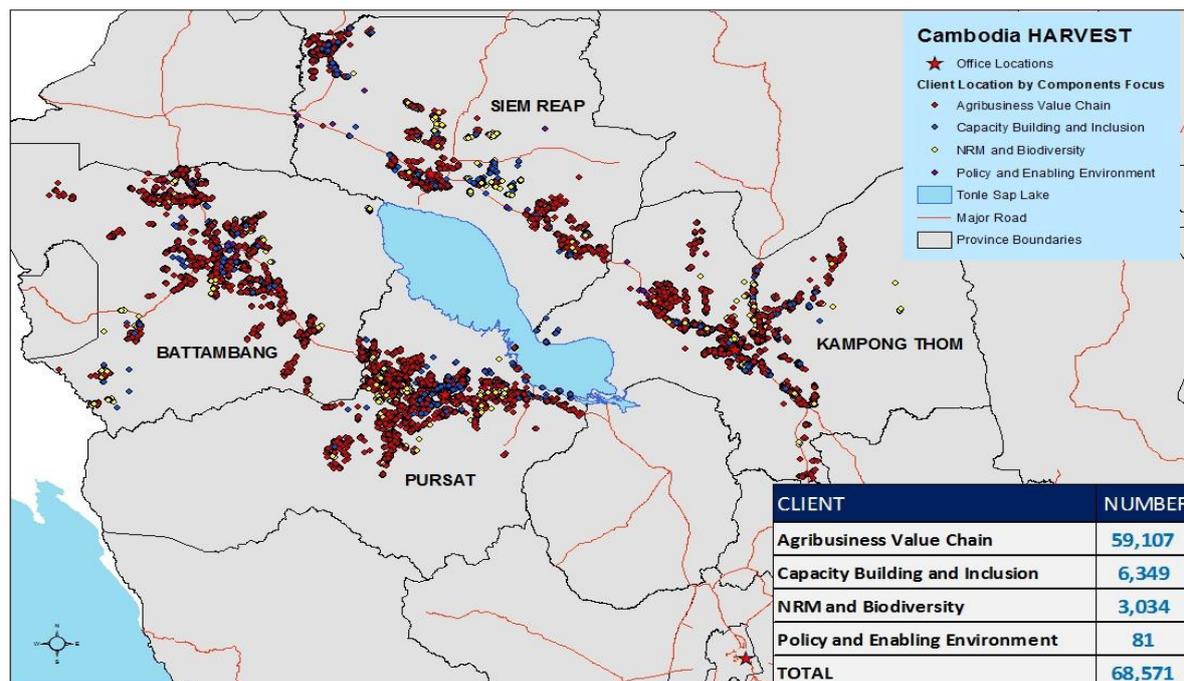
The midterm evaluation made the following recommendations to improve the program's effectiveness and impacts:

- Cambodia HARVEST interventions were not well-suited to benefit the ultra-poor or extreme poor, poor youth, illiterate, and elderly effectively. Thus, separate interventions should be developed for the poorest households.
- Sustainable, market-oriented, self-financing community forestry and community fisheries should be developed in ways that provide equitable sharing of benefits and costs by the poorest segments of fishing communities.
- The program should proactively seek out and develop alternative options for the provision of technical assistance to growers and producers once Cambodia HARVEST is completed.
- The program should increase inclusion of youth in its recruitment of participating clients and other forms of beneficiary identification.
- A more effective working relationship between the Royal Government of Cambodia and Cambodia HARVEST staff members was needed at all levels.

On the basis of recommendations from the midterm performance evaluation, the Cambodia HARVEST team modified and/or adjusted some of its implementation strategies. Overall, Cambodia HARVEST's strategy remained focused on providing technical assistance and training to farmers, input suppliers, processors, and traders throughout the value chain. Program clients⁵ from 1,476 villages across four provinces (Battambang, Pursat, Siem Reap, and Kampong) around the Tonle Sap Lake received training in production practices, postharvest value addition, business skills and marketing, natural resource management, and improved health and nutrition practices. Figure 1 shows the geographic distribution of Cambodia HARVEST target villages. In each project village, Cambodia HARVEST formed farmers' groups for commercial-scale rice production, high-value commercial horticulture, and the promotion of kitchen gardens. In certain communities, HARVEST also targeted aquaculture (low-input and high-input ponds), fisheries, and forestry sectors using similar client household groups as the primary intervention mechanism. The program also incorporated cross-cutting activities on social inclusion (women, youth, and the extreme poor), nutrition, and the environment. Table 2 gives an overview of the number of villages, clients, groups, and total beneficiary households affected by the project over the life of the project by types of activities.

⁵ The HARVEST project defined the following types of program clients who received different types and intensities of project interventions: demonstration client—farmer or individual who demonstrated program techniques and technologies to nearby farmers under a co-investment agreement; partner client—communities or agribusinesses assisted by the program; producer group—a number of farmers who come together to leverage market options; beneficiary—farmers or individuals who receive indirect technical assistance from the program; participants—farmers or individuals who attend trainings (Fintrac 2016a).

Figure 1. Cambodia HARVEST Clients



Source: Cambodia Helping Address Rural Vulnerabilities and Ecosystem Stability (HARVEST) Program, Final Report–2010-2016. Fintrac Inc. (2016a).

Using a comprehensive and intensive extension methodology to deliver hands-on technical assistance to smallholder farmers (including women and youth) and other program clients, Cambodia HARVEST aimed to: increase food availability by increasing productivity through the introduction of improved technologies and practices; increase food access through rural income diversification; improve natural resource management and resilience to climate change by working with local governments and other partners to manage protected areas and natural resources and to implement climate-smart agricultural technologies; and expand the capacity of public, private, and civil society to address food security and climate change challenges. According to Fintrac (2016b), during the life of the project, the Cambodia HARVEST team collaborated with six government ministries, 99 other government entities, 20 donor organizations, five educational institutions, and 705 private sector firms.

Overall, more than 345,000 people received training in agriculture and food security through these various interventions. According to the project’s final report, Cambodia HARVEST was able to meet or exceed nearly every program target, including the development of a burgeoning domestic horticulture industry. The infographic in Annex 1 presents a summary of selected indicators of program achievements based on the project’s internal monitoring and evaluation data.

Table 2. Number of HARVEST Target Villages and Clients by Sector Focus and Types of Activities (As of December 31, 2015)^a

Type of sector/activity/ intervention	Number of target villages	Number of client households	Number of partner clients	Type of client beneficiary
1. Horticulture	712	14,581	–	Households
2. Rice	531	44,526	–	Households
3. Fish	222	1,654	–	Households
4. Forestry	56	1,333	–	Households
5. Community fishery	23	–	15	Partner groups
6. Community forestry	51	–	32	Partner groups
7. Fish processing	9	287	–	Households
8. Business development service	246	–	505	Partner groups
9. School garden	127	–	144	Schools
10. Commune food security/nutrition	77	–	77	Groups
11. Health center	96	–	96	Health centers
12. Rice miller	47	–	50	Rice mills
13. Branch of micro- finance institution	23	–	31	MFI branches
14. Food security and nutrition group	218	5,240	218	Groups/member households
15. Savings fund group	146	2,662	146	Groups/member households
16. Mobile kitchen	1,054	–	–	Village members
TOTAL	1,476		104,584	Households

a. Source: Cambodia HARVEST Final Report (Fintrac 2016a) and data shared by the project in March 2016 (Ith Kallyan, Monitoring and Evaluation Manager, Cambodia HARVEST, personal communication).

3. CONCEPTUALIZING PATHWAYS FROM HARVEST INTERVENTIONS TO IMPACT ON FTF GOALS

Cambodia HARVEST was the flagship project of USAID/Cambodia under FTF. Therefore, it is useful to review the Feed the Future results framework and how Cambodia HARVEST contributed to the overall FTF goals and objectives. The FTF results framework highlights two main objectives: inclusive agriculture sector growth and improved nutritional status for women and children.⁶ Cambodia HARVEST aimed to contribute toward these two FTF objectives by integrating nutrition as one of the cross-cutting components in its agriculture-focused interventions. This approach is guided by the belief that mutually supporting programs of nutrition and agriculture will be more effective in improving nutritional status than either of the components on its own.

In Figure 2, we present the pathways through which the comprehensive strategy of Cambodia HARVEST is conceptualized to influence the agricultural growth and nutritional outcomes in the context of farm households of the type targeted by the project. The four types of project interventions are conceptualized to influence individual and farm household behavior change, adoption of practices, and women's empowerment, which can lead to agricultural growth (as reflected in increased productivity, diversification, input availability, sales of produce, and storability, safety, and quality of food), increased production and income, and ultimately improved food security and nutrition outcomes through increased expenditures and adequate and diverse food intake. This framework also highlights the causal linkages between various types of results (or FTF indicators focused on by this evaluation) along the pathways from agriculture to improved nutrition.

A variety of approaches are used in the literature to conceptualize causal pathways from agriculture to nutrition and health (see Webb 2013, for a review). Most of these approaches are based on conceptual frameworks that build on the understanding that agriculture can influence nutrition and health through multiple pathways (direct and indirect), and that food alone is not enough. For example, Headey, Chiu, and Kadiyala (2011) and Gillespie, Harris, and Kadiyala (2012) talk of seven pathways, which include agriculture as the direct and indirect (via income) source of food at the household level. Other pathways include macro-level agricultural policy as a driver of prices and agriculture as an entry point for enhancing women's control over resources, knowledge, and status. The frameworks by Hawkes, Turner, and Waage (2012) and Chung (2012) elaborate on elements not frequently highlighted, such as micronutrient deficiency versus anthropometry, nutrient quality/bioavailability, food value chains, and demand creation for health services through knowledge and nutrition education.

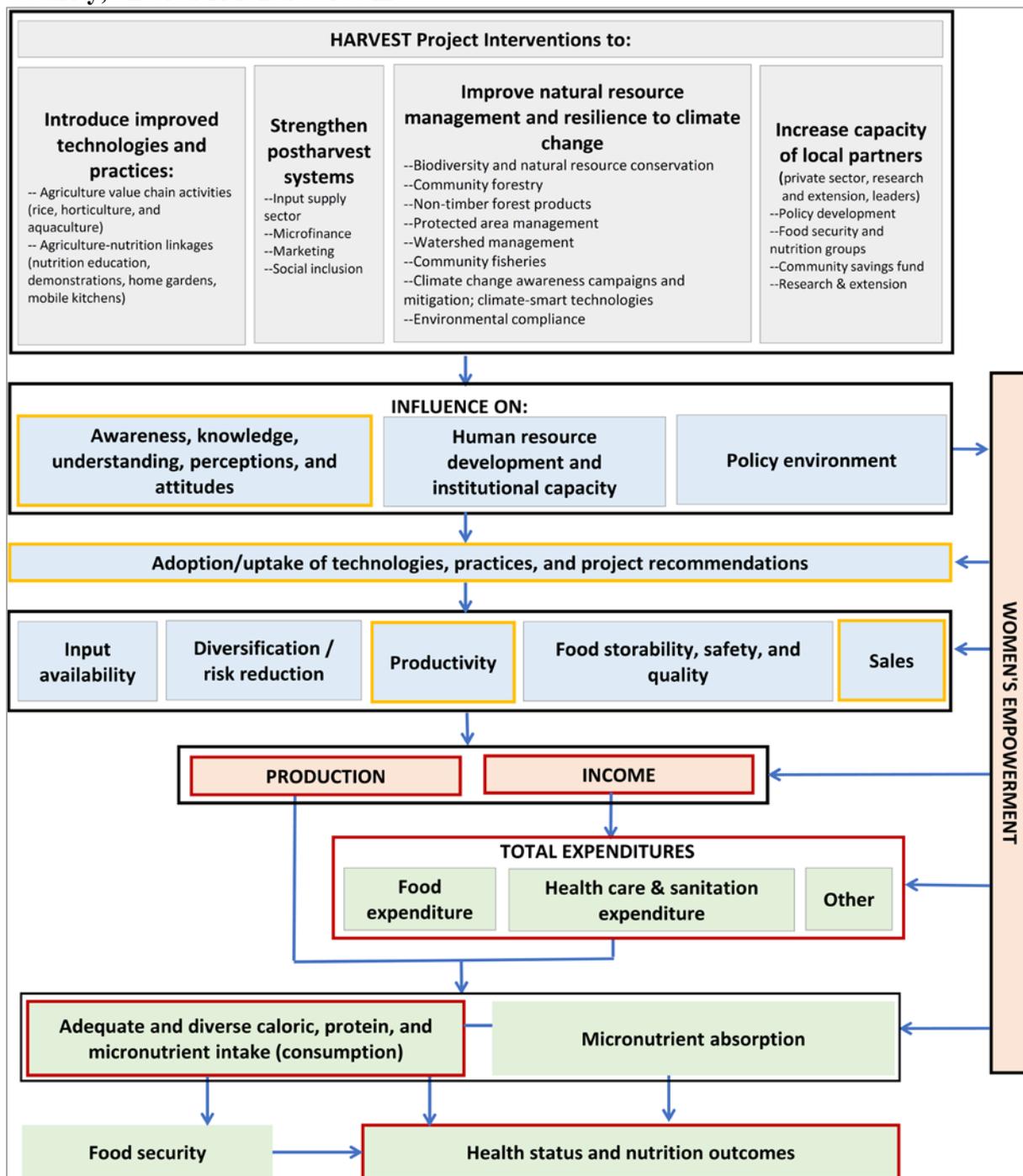
The framework presented in Figure 2 highlights three main pathways linking agriculture to nutrition: food production, agricultural income, and women's empowerment (depicted as pink boxes in Figure 2).⁷ *Food production* affects a household's nutritional status through the type, quantity, and seasonality of food available for consumption (Chung 2012; Herforth and Harris 2014). That is, the broader food market environment influences a household's decision of what to produce and consume. If a preferred food is not available or affordable in the local market, a household may instead choose to grow that crop on their farm (Herforth and Harris 2014). As a second pathway, an increase in *agricultural income* could result in increases in food expenditure, which could result in higher levels of dietary diversity and more food consumption and food security overall. More income could also translate into higher non-

⁶ See [Feed the Future Results Framework](#)

⁷ A fourth pathway not depicted or discussed in this paper is food prices, which can affect net purchasing power of households depending on whether they are net buyers or net sellers of food (Carletto et al. 2015).

food expenditure, including expenditure on health care, which could directly raise a household's nutritional status. This pathway is based on the assumption that income and nutrition are related. For example, the quality, quantity, and diversity of food consumed is usually better and child nutrition is more adequate in wealthier households than in poorer ones. However, the correlation is not always linear and as strong as might be expected.

Figure 2. Pathways of Effects of Cambodia HARVEST Interventions on Income, Food Security, and Nutritional Outcomes



Source: Authors' compilation.

The realization of this pathway rests on several assumptions about the intrahousehold dynamics and external conditions (i.e., food markets, social norms, infrastructure, institutions, etc.) that influence behavior of individuals and their decisions on how they use income. In general, evidence suggests that this pathway alone will likely have modest impacts on malnutrition unless it is also accompanied by improved health and education outcomes (Carletto et al. 2015; World Bank 2007; Bhagowalia, Headey, and Kadiyala 2012; FAO 2013; Ecker, Breisinger, and Pauw 2011).

Women's empowerment, as a third pathway, emphasizes women's combined roles in agriculture, dietary choices, and healthcare, and their influence on nutritional outcomes for both child and mother (Malapit et al. 2015) (Figure 2). The emphasis on women's empowerment in these pathways is supported by the evidence that suggests that income controlled by women has a greater positive effect on children's nutrition than that controlled by men (Herforth, Jones, and Pinstrip-Andersen 2012). Empowering women through targeted agricultural interventions can thus have a strong positive effect on child nutrition and household food security (Hawkes and Ruel 2008).

As a comprehensive and nutrition-focused development project, Cambodia HARVEST interventions were designed to influence all three pathways linking agriculture to improved food and nutrition security—food production, crop income, and women's empowerment. Higher crop productivity caused by the adoption of new technologies and practices promoted by Cambodia HARVEST would make more food available for sale and consumption, thus potentially influencing both production and income pathways. Moreover, a production system that includes a greater variety of foods, as encouraged by Cambodia HARVEST, provides households a greater diversity of food for their consumption. For example, the study by Jones, Shrinivas, and Bezner-Kerr (2014) indicates that a more diverse production system (measured with a simple crop count, a crop and livestock count, and a Simpson's index) was positively and significantly correlated with dietary diversity indices and with the number and frequency of legumes, fruits, and vegetables consumed.

Within the framework shown in Figure 2, we explore some of these effects of the Cambodia HARVEST through this impact evaluation, albeit controlling for the confounding factors that can potentially influence or constrain these linkages. The interventions specifically focused on in this evaluation are the first two sets of activities described in Figure 2. These interventions encompass promotion of improved technologies and practices within the rice, horticulture and fish value chains, agriculture-nutrition linkages, and access to credit and marketing assistance. Specifically, the impact evaluation focuses on Cambodia HARVEST clients that participated in the home garden, rice, or aquaculture value chain activities who could also have received indirect technical assistance from the program or participated in other training programs (e.g., nutrition education, cooking demonstration, savings fund program, community forestry, etc.). We examine the status of and change over time in selected FTF indicators that represent various nodes along this pathway (depicted by the solid red line in Figure 2). They include: production and income (measured by gross margins), expenditure, diversity of food intake, and nutritional outcomes. Specifically, we test the following hypotheses:

Farm households that participated as clients and received Cambodia HARVEST interventions (i.e., technical assistance, extension services, training, field demonstrations, etc.) would have:

- 1) Greater availability of food as measured by total production (food production pathway).

- 2) More income from production as measured by net income and total expenditures (income pathway).
- 3) More diverse diets and improved nutritional outcomes for children and women (a combination of production, income, and women's empowerment pathways).

The objectives of this independent evaluation report are to:

- 1) Present the results of the endline survey conducted in Cambodia HARVEST targeted villages (to promote rice, horticulture, and fish value chains, and nutrition programs) 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
- 2) Present 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.

Methodology and data for the descriptive analysis (objective 1) and impact analysis (objective 2) are described next, followed by the presentation of results and discussion.

4. DATA AND METHODOLOGY

4.1. Data Sources and Impact Evaluation Strategy

In anticipation of the impact evaluation to be done at the end of the Cambodia HARVEST project, a baseline survey was conducted in 2012⁸ by the Cambodia Development Resource Institute (CDRI), a leading independent development policy research institute with extensive experience in survey research, data entry, and data analysis.⁹ Data were collected from 1500 farm households representing 60 Cambodia HARVEST villages selected randomly from a list of villages provided by the Cambodia HARVEST team that were to receive project interventions as clients or demonstration leaders. This sample of 1500 households forms the definition of *treatment group* for this evaluation. According to impact evaluation design, an additional 600 households representing 24 comparison villages that were projected not to receive any Cambodia HARVEST intervention were to be surveyed to represent the comparison group (Suvedi 2012). The village list for the comparison group was also provided by Cambodia HARVEST, but CDRI researchers developed the list of households for sample selection. The sample selection strategy for the 2012 survey is detailed in the baseline report and summarized in Annex 2 (Vuthy et al. 2013). From each selected treatment village, 25 households were randomly selected from the list of households identified by Cambodia HARVEST as client households targeted to participate in rice, home garden, or aquaculture activities. Table 3 shows the composition of sampled households by the type of Cambodia HARVEST interventions they were targeted to receive.

The 60 Cambodia HARVEST villages (15 per province) selected for the survey in 2012 represented approximately 15,000 households targeted to receive direct interventions from Cambodia HARVEST on rice, horticulture (mostly home gardens), and fish value chains, nutrition education and demonstration programs, and exposure to credit access and marketing services. At the time the baseline survey was conducted in August-October 2012, the project had only a list of villages that were already reached in 2011 and 2012 and villages to be targeted in 2013. In selecting the treatment villages for the baseline survey, all the villages that had already received interventions that would have affected the 2011–12 agricultural production cycle were dropped. The project did not have a list of villages to be targeted beyond 2013. The sample of treatment villages selected for the impact evaluation, thus, represents only the early cohort of intervention villages. Over the 5½-year, the Cambodia HARVEST’s strategy had evolved in response to the midterm review and other internal learning that happens in scaling up project activities. Unfortunately, the sample of villages selected in 2012 for this evaluation does not capture this evolution of the Cambodia HARVEST’s strategy and focus over time.

Table 3. Number of Treatment Households Selected in the Baseline Survey by Type of Intervention

Number of client households targeted to receive interventions:			
Home garden	Rice	Aquaculture	Total
1,018	406	235	1,500 ^a

Source: Authors for tables unless otherwise specified.

a. Total across the column does not add up to 1,500 because some households were targeted to receive multiple interventions.

⁸ Referred to as Cambodia HARVEST Impact Evaluation Baseline Survey.

⁹ It should be noted that Cambodia HARVEST had already sub-contracted CDRI for the baseline survey and MSU’s role was limited to providing technical assistance.

Six comparison villages from each province (total 24 villages) were randomly selected from a list of villages provided by Cambodia HARVEST. These comparison villages were located near Cambodia HARVEST districts and villages that were not being considered for Cambodia HARVEST interventions but had similar socioeconomic characteristics, crop and fishery operations, road infrastructure, and soil and climatic conditions. Twenty-five households within the treatment and comparison villages were randomly selected to represent rice, vegetable, or fish farming households. However, one of the villages selected as a member of the comparison group eventually received Cambodia HARVEST interventions. This necessitated classifying this village as a treatment village in the analysis presented in this report.

GPS coordinates data obtained from CDRI in 2016 for the comparison villages indicate their close proximity to treatment villages selected for the evaluation (see Figure 3), which is both good and bad. Close proximity to treatment villages ensures comparability on several socioeconomic and agroclimatic factors that can influence outcomes, but it also increases the potential for contamination from spillover effects of project interventions from treatment to control villages (Bloom 2007). On the basis of the GPS coordinates data obtained in 2016, we estimated that the average distance between the comparison villages and the closest selected treatment villages was 4.2 kilometers (km), and the distance between the comparison villages with the closest Cambodia HARVEST intervention village was 1.4 km. This close proximity of comparison villages from the Cambodia HARVEST treatment villages raises concerns about spillover effects, which can dilute the potential program effect.¹⁰

In 2016, the same 2,100 households were revisited to complete an endline survey (Cambodia HARVEST Impact Evaluation Endline Survey) around the same time frame as the baseline survey was conducted four years before (i.e., August-October). However, attrition of 179 households (124 HHs in the treatment group and 55 HHs in the comparison group) reduced the total number of reinterviewed households from 2,100 to 1,921 (Table 4).¹¹

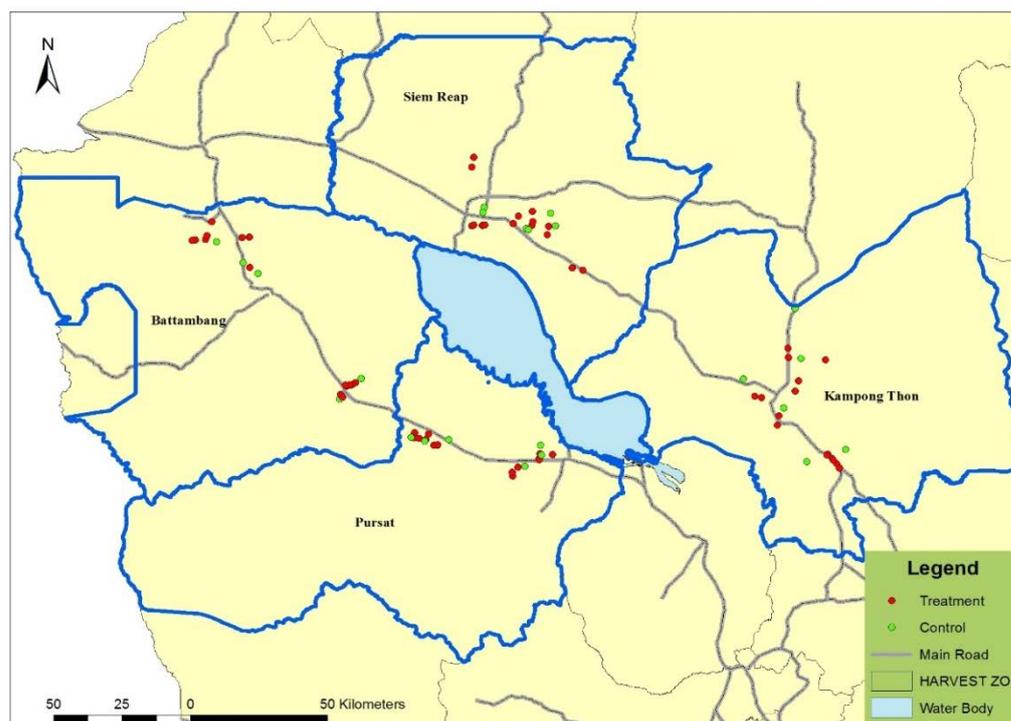
To take into account some expected attrition of the original sample and to increase the sample size, especially of children under 5 years of age, an additional 407 households (307 HHs in treatment and 100 HHs in comparison group villages) were also included in the 2016 survey.¹² These additional households were randomly selected from the same 84 villages from a list of households that met the following criteria: households that were not surveyed in 2012, had children less than 5 years age, and were either beneficiaries or met the Cambodia HARVEST eligibility requirements (i.e., grew rice or horticulture crops or was involved in aquaculture). Thus, for the 2016 survey, we have data for 2,328 households (Table 4).

¹⁰ The guidance from MSU (Suvedi 2012) on the selection of comparison village was to avoid selecting villages in close proximity to the treatment villages to avoid spillover effects and potential contamination (which occur when the outcomes for some program participants influence those for other participants or for people who are not participating in the program (Bloom 2005)). The guidance given by MSU was that villages adjoining Cambodia HARVEST activity villages or where interaction between treatment and comparison villages took place on a regular basis should not be selected as comparison group villages. However, it seems that this guideline was not followed when the comparison villages were selected in 2012 or later when the HARVEST project expanded its activities and subsequent cohorts of villages were selected for interventions (see Figure 1), which reduced the average distance between the comparison and closest treatment village to only 1.4 km.

¹¹ Sixty-nine of these 179 households were replaced in Battambang Province, and the other 110 households were replaced in Pursat, Siem Reap, and Kampong Thom. The highest replacement per village was six households. The most common reason for replacement was migration of the whole family to other places, or the migration of all adult members. Only for three households was the reason for replacement their refusal to be reinterviewed.

¹² This includes 179 replacement households and 228 new households to increase the sample size (three households per treatment group villages and two households per comparison group villages).

Figure 3. Impact Evaluation Sample Villages



Source: Generated by authors based on GPS data obtained by Vuthy et al. 2016.

Table 4. Number of Households Surveyed from Treatment and Comparison Villages in 2012 and 2016 and Attrition Rate

	Treatment villages ^a	Comparison villages	Total
Number of HHs surveyed in 2012	1,524	576	2,100
Attrition of baseline sample in 2016	124	55	179
Number of HHs resurveyed in 2016 (panel HHs)	1,400	521	1,921
Number of new households added in 2016	307	100	407
Total number of HHs surveyed in 2016 (cross-sectional data)	1,707	621	2,328

a. Includes households from villages that were originally under the comparison group but had received HARVEST interventions after the 2012 survey.

The household survey questionnaire included modules that required collecting food consumption and anthropometrics data, and other food/nutrition-related information from all women 15-49 years of age and required measuring the height and weight of all children less than 5 years of age. Table 5 shows the number of women and children for whom we have individual-level data as against the number of all eligible women (some households have more than one eligible woman) and children reported in the household roster in 2012 and 2016 surveys. The response rate of women was about 83-84% in 2012 and increased slightly to 87-88% in 2016. The main reason for the missing data for women was their unavailability (or absence) at the time of the interview. Most eligible children (i.e., children less than 5 years age) were present for height and weight measurements, and data on their food consumption were collected from their caregivers.

Table 5. Number of Eligible Women of Reproductive Age (15-49 Years) and Eligible Children with Anthropometrics Data and Their Response Rates in the Two Surveys

	2012		2016	
	Treatment	Comparison	Treatment	Comparison
Women of reproductive age (15-49 years)				
Number of eligible women (as per the HH roster)	2,145	878	2,570	962
Number of eligible women interviewed	1,733	711	1,894	727
Average eligible women response rate (%)	83.9	84.8	86.8	87.8
Children under 5 years of age				
Number of eligible children	684	338	777	316
Number of children with anthropometrics data	678	332	755	313
Average eligible children response rate (%)	99.0	98.7	98.9	99.8

Both the 2012 and 2016 surveys were conducted by CDRI. Technical assistance on the sampling strategy and questionnaire design for both the surveys was provided by Michigan State University.¹³

Several features of this dataset and how it relates to the actual Cambodia HARVEST implementation need to be highlighted because they have implications on the impact evaluation strategy used (or not used) in this study. First, the survey data on which the impact analysis is based were collected from villages and households that were not randomly assigned to receive or not receive the Cambodia HARVEST interventions. Thus, they represent observational data rather than experimental data. Simple mean comparison of outcome indicators between the two groups will give biased estimates of project impacts. Thus, we employ several econometric estimation strategies to control for placement and selection bias. The evaluation design basically takes a quasi-experimental evaluation approach using the panel dataset (2012 and 2016) from the treatment and comparison villages.

Second, by the time the 2012 survey was planned, only 149 villages were identified by Cambodia HARVEST to receive interventions, and the selection of treatment villages for this evaluation was restricted to this list of 149 villages provided by the project. By the time the project ended in 2016, a total of 1,476 villages were reported as having received project interventions (Fintrac 2016b). The data used for this impact analysis is thus only representative of the first and second cohorts of villages targeted by Cambodia HARVEST. The project strategy (types of intervention) evolved over the five-year period, which is not captured in the village sample selected for this evaluation. For example, the emphasis on commercial horticulture increased in subsequent cohorts of villages, and home gardens were deemphasized. Caution must be used in generalizing the results to all Cambodia HARVEST intervention villages.

¹³ Questionnaires used in the 2012 and 2016 surveys along with the anonymized dataset will be soon available at the USAID Development Data Library (DDL) website.

Third, many government and donor-funded programs were active in the four provinces of Cambodia targeted by Cambodia HARVEST (i.e., the FTF zone of influence), and there was a high chance of exposure to other types of interventions by households in the comparison villages.

Fourth, after about 18 months of operation, Cambodia HARVEST activities were suspended in three districts in Siem Reap Province because these districts were targeted to receive similar services through another donor-funded project.

Further, Cambodia HARVEST clients received technical assistance on rice production, home gardens, and/or aquaculture for a period of 18 to 24 months, and the project staff moved to the next set of target villages. After the Cambodia HARVEST activities were concluded, the households might also have received services from other NGOs. This means that the intervention and comparison villages are not truly *treatment* and *control* villages in the experimental sense. This necessitated controlling for this potential exposure effect (from other interventions) in both the treatment and the comparison groups.

Finally, treatment households in the baseline survey were selected from a list of households provided by Cambodia HARVEST that were targeted to receive interventions in 2012 or 2013. However, not all the households selected in the baseline survey actually received the interventions as intended or graduated from the program as planned. To make sure that only those households that actually received and had completed the Cambodia HARVEST interventions are included in the analysis (i.e., to estimate the average treatment effect on treated, rather than the intent to treat treatment effects), the list of surveyed household members was compared with the list of Cambodia HARVEST clients and beneficiaries, obtained from USAID/Cambodia. On the basis of the comparison of the project participant list and the baseline survey list for panel households, a total of 1,381 households were matched (Table 6). Out of these 1,381 households, 108 households had participated only as activity participants in Cambodia HARVEST, and not as clients. In addition, the status of 185 client households was reported as *inactive* as of September 2015. For future program design implications and investment guidelines and to evaluate the effects the project had on the client beneficiaries, it makes sense to estimate the average treatment effect on the treated (ATT) on only the households that actually participated in Cambodia HARVEST or did not become inactive. We thus use two analytical samples to estimate the ATT as noted in Table 6.

Sample 1 includes only client households that were active or had graduated from the Cambodia HARVEST interventions as of September 2015, and it can be considered the true treatment sample. However, 312 household samples from the treatment group were dropped from the analysis, which can potentially reduce the statistical power for detecting an impact within a reasonable margin of error and a high confidence level. Thus, to increase the sample size, in sample strategy 2 we include all the client households irrespective of whether they graduated or dropped out of the program. This increases the sample size of the treatment group from 1,088 in sample 1 to 1,273 in sample 2. The estimation of average treatment effect based on sample 2 will tend to underestimate the true effect of the program. Note that the treatment effects estimated using samples 1 and 2 both suffer from placement or selection bias. We describe below the methodology used to estimate these effects and the identification strategies used to address the bias issues.

Table 6. Results of Matching Sampled HHs with Cambodia HARVEST List of Beneficiaries and Sample for Analysis for Two Strategies

	Treatment villages	Comparison villages	Total
Number of HHs resurveyed in 2016 (panel HHs)	1,400	521	1,921
Number of panel HHs that matched with HARVEST client list	1,381	0	1,381
Number of panel HHs that did not match	19	–	19
Number of panel HHs that matched and participated in the following activities			
Client or demonstration leader for home garden	876	–	876
Client or demonstration leader for rice	611	–	611
Client or demonstration leader for aquaculture	240	–	240
Number of matched HHs that had not participated in HARVEST activities as either clients or demonstration leaders	108	–	108
Number of matched HHs that had dropped out of the HARVEST program (i.e., client HHs that did not graduate or were inactive as of Sept 2015)	185	–	185
Sample for Analysis			
Sample 1 – Panel HHs that participated in HARVEST interventions as clients or demo leaders and were either active or graduated as of September 2015 (excludes 185 inactive HHs) (stringent definition of treatment)	1,088	521	1,609
Sample 2 – Panel HHs that participated in HARVEST interventions as clients or client demo leaders (excludes 108 other types of beneficiary HHs)	1,273	521	1,794

4.2. Identification Strategy

The purpose of conducting this impact evaluation was to determine the extent to which the Cambodia HARVEST activities in the selected villages actually caused any observed changes in outcomes along the impact pathway noted in Figure 2. The monitoring data collected by Cambodia HARVEST or the baseline and endline survey data analysis for the treatment group reported in this study in the descriptive section are important tools to track the performance indicators. However, comparing data on performance indicators for the beneficiaries against the baseline values demonstrates only whether change has occurred, with very little information about what actually caused the observed change. Analysis based on such data can only indicate the direction of change in outcome and whether the program is correlated with those changes, but it cannot confidently attribute that change to Cambodia HARVEST. This impact evaluation was thus designed to assess whether and how much the client households that participated in the rice, aquaculture, and home garden value chain experienced a change in productivity, sales, income, expenditures, poverty status, dietary diversity, and nutritional outcomes as a result of Cambodia HARVEST. Unlike general evaluations, which can answer many types of questions, this impact evaluation was structured around one particular type of question: what are the impacts (or causal effects) of Cambodia HARVEST on client households that participated in at least one of the targeted value chains

(rice, aquaculture, or home gardens) on outcomes of interest? For example, did the technical assistance programs on rice, home gardens, and aquaculture value chains in the targeted districts in Cambodia cause gross margins to increase, expenditures to go up or poverty rate to go down? Did these interventions in combination with the nutrition-focused activities cause an increase in dietary diversity or reduce the prevalence of stunting, wasting, and underweight among children younger than 5 years of age?

To measure these causal effects, we planned to compare the outcomes of the targeted group in the presence of the program (i.e., treatment group) relative to the outcomes if the program had not been implemented. In other words, the basic principle that guided our evaluation approach is the comparison between situations with the project activities and without the project activities, also known as *treatment effect*. This is as opposed to merely comparing beneficiaries before and after the project implementation (i.e., assessing the change in the situation of the beneficiary between before and after or simply assessing the difference between participants and non-participants). Unfortunately, it is not possible to compare the same population in both the states—with and without program exposure.

Practically, to address this problem, we estimated the average impact of the program on a group of individuals by comparing them to a similar group of individuals not directly affected by the program. Therefore, one critical step of any impact evaluation exercise is to establish a credible comparison group. A number of empirical approaches have been employed to establish the credible comparison group (or control group). The most robust approach is randomization—the treatment group and the control group are randomly selected from all the eligible sampling units (either clusters or individuals). A randomized experiment guarantees that there are no differences in the observed and unobserved characteristics (on average) between the treatment and control groups, and thus a statistically significant difference in outcomes between the two groups can be attributed to the program. However, as noted before, this strategy was not feasible or compatible with the implementation strategy of Cambodia HARVEST.

Thus, we adopted the quasi-experimental strategy of comparing the treatment and comparison groups (based on the propensity score matching [PSM] method) and estimating the difference-in-difference (DiD) estimator for effect identification..

4.2.1. PSM-DiD Approach

Under the PSM-DiD approach, units of observations (i.e., households) from the treatment villages are matched to units of observations from the comparison villages (those not targeted by Cambodia HARVEST), and outcomes are compared between these two groups before and after the intervention. Examining how outcomes change for households in the comparison group that were not exposed to Cambodia HARVEST will inform us about how those outcomes would have differed in the absence of the intervention for the treatment group. This approach is used for two definitions of treatment sample—the treatment sample that included only those households in the panel sample that had graduated or were active as of September 2015 (sample 1); and the treatment group that included all the client households, including those that started with the program but became inactive (sample 2).

The DiD approach essentially measures the difference of outcome indicators between beneficiaries (treatment group) and non-beneficiaries (comparison group) before and after program intervention. In the context of panel data, DiD is a common and valid method to

estimate the impact of an intervention if the assumption that unobserved heterogeneity is time invariant and uncorrelated with the treatment effect is satisfied. While the main advantage of DiD is its ability to allow for selection on unobserved factors, its assumption of constant selection bias over time may be unrealistic in practice.

Let Y be the outcome of interest (e.g., gross margins, total expenditures, poverty status, stunting, underweight, etc.). Our goal is to evaluate the impact of the Cambodia HARVEST intervention T on Y after a time period 1. Specifically, we can achieve this evaluation through DiD as

$$DD = E[Y_1^T - Y_0^T] - E[Y_1^C - Y_0^C] \quad (1)$$

where the superscripts T and C refer to treatment and control households, respectively; the subscripts 1 and 0 refer to time period 1 (after the intervention) and time period 0 (the baseline period), respectively; $T=1$ refers to treatment group. The regression counterpart of (1) is the following:

$$Y_i = \alpha + \beta T_i + \gamma t + \delta(T_i * t) + \varepsilon_i \quad (2)$$

where T_i is the dummy to distinguish treatment group ($T=1$) from control group ($T=0$), t is a time dummy ($t=0$ for before treatment and $t=1$ for after the treatment), and ε are the idiosyncratic error terms. The coefficient of interest is δ , which measures the DiD treatment effect. In (2), we can further add other control variables (X) to increase the efficiency of the estimation.

$$Y_i = \alpha + \beta T_i + \gamma t + \delta(T_i * t) + \phi X_i + \varepsilon_i \quad (3)$$

DiD is widely used in impact evaluation of development interventions, especially when the experimental data are not available (see discussion by Duflo, Glennerster, and Kremer 2007; Ravallion 2001).

In this study, we used this DiD estimation strategy to estimate the intent to treat treatment (ITT) effect, which measures the average effect of Cambodia HARVEST interventions across all the sampled households in the treatment villages irrespective of the type and intensity of participation in Cambodia HARVEST program activities compared with the effects across all the sampled households in the comparison villages. The ITT is interpreted as the effect of giving someone an opportunity to receive program interventions. The ITT is particularly relevant in assessing programs and interventions like Cambodia HARVEST where participation in various activities may be voluntary.

The treatment villages were purposively selected by the Cambodia HARVEST team, and the clients and beneficiaries from within these villages were not randomly assigned to particular interventions (i.e., participation may have been voluntary or targeted to specific households). This creates the problem of placement bias and self-selection bias. Basically, this means that the treatment and comparison groups may be different in many aspects that can influence the outcomes, and therefore, simple comparison of mean outcomes will generate biased estimates of treatment effects. To correct for this bias, at least on observable characteristics, we adopted the propensity score matching method to first create treatment and comparison groups that match on propensity score.

Propensity score matching (PSM) uses observed characteristics to construct a statistical comparison group that is based on a model of the probability of participating in the program

intervention. Households from the treatment group are then matched on the basis of this probability, or *propensity score*, to households from the comparison group. The ITT effect of the program is then calculated as the mean difference in outcomes across these two groups, before and after the interventions are implemented. The validity of PSM depends on two conditions: conditional independence (namely, that unobserved factors do not affect participation) and sizable common support or overlap in propensity scores across the treatment and comparison samples (Rosenbaum and Rubin 1983; Caliendo and Kopeinig 2008; Guo and Fraser 2010).

PSM attempts to mimic randomization by creating a sample of households that received Cambodia HARVEST interventions that is comparable on all observed covariates to a sample of households that did not receive the project interventions. The purpose of using this statistical technique is to reduce the selection bias by equating groups of households that share similar observable characteristics. Regression-based methods on the sample of program treatment and comparison households, using the propensity score as weights or including propensity scores as a covariate, can lead to more efficient estimates.

The matching is done at the household level, which means many parcel-, individual- and crop-level characteristics are converted into household-level variables. The propensity scores are estimated at the household level using a logistic equation expressed as:

$$H_i = a + bX_i + \varepsilon_i \quad (4)$$

where H can take only two possible values – 0 and 1 – and X_i is the observable characteristic of the household. Details of observable attributes incorporated in the logistic regression include demographic conditions and other household characteristics such as farm assets and household assets, and the selected X s should be unaffected by participation in the project (X should not include assessment indicators).

The regression is followed by a prediction of propensity scores expressed as:

$$p(X) = \Pr(H_i = 1 | X = x_i) \quad (5)$$

This generates a single number p between 0 and 1, which represents a household's probability of being selected for the Cambodia HARVEST intervention regardless of whether a household was in the treatment or comparison group. Each of the households in the treatment group is then paired up with one or more households from the comparison group with a similar propensity score. This matching can be conducted using various matching algorithms, such as nearest neighbor (NN), caliper and radius, stratification and interval, kernel, and local linear. In this study, we used the NN and kernel matching methods to construct the matched samples.¹⁴ Households whose propensity scores were not comparable (not in common support) were dropped from the analysis, which kept only the households that are on common support for the impact estimates in the DiD method.

The matching method described above creates two groups of households – households that were targeted to receive project interventions and households with similar propensity scores that were not targeted for the interventions. Because the propensity score weights the

¹⁴ Caliendo and Kopeinig (2008) conclude that there is no best algorithm for all situations because the choice eventually depends on the existing data and situation. The performance of different matching estimators varies case by case and depends largely on the data structure at hand (Zhao 2003).

importance of the different characteristics of the households (X), the result of the matching process is that, on average, the differences between the households from the treatment group and the matched households from the control group are much smaller than the differences actually observed between the two groups in the sample.

The quality of the matching can be assessed by two metrics: the common support region (or overlap region), which measures how well the estimated propensity scores for the treatment households and the control households overlap each other, and the degree to which the covariates are balanced between the treatment and control groups before and after matching. After matching, it is expected that there will be no significant differences in characteristics X (control variables) between groups. To assess the matching quality, we checked the standardized bias of each independent variable in the logistic regression before and after matching. Most empirical studies argue that standardized mean bias below 3% or 5% after matching is sufficient (Caliendo and Kopeinig 2008).¹⁵ The propensity scores resulting from the PSM estimations are used in the DiD regressions as one of the control variables.

The PSM-DiD models are estimated using the common fixed effects (FE) assumption that the household-specific effect is correlated with the independent variables. However, the main drawback of FE model is that it is impossible to estimate the impact of time-constant variables (e.g., the propensity score and program participation status). One way to address this limitation is to use the correlated random effect (CRE) approach proposed by Mundlak (1978) and Chamberlain (1984) which allows us to include the time-constant variables (such as propensity score and program participation status) and at the same time delivers the FE estimates on the time-varying covariates (e.g., age, gender and education of head of the household, household size, assets, land holdings, etc.). Two key assumptions for the CRE estimates to be unbiased and consistent are strict exogeneity of the covariates relative to the idiosyncratic errors and that the time-constant unobserved household-level heterogeneity be a linear function of the household time averages of the observed covariates, such that including these time averages as additional covariates in the regression effectively controls for the unobserved heterogeneity (ibid.). Thus for robustness check, in this study we estimate and report the program effects using both the CRE and the FE model assumptions.

¹⁵ The results of the PSM for the two sets of samples used to estimate the treatment effect are reported in Annex 6.

5. RESULTS: DESCRIPTIVE ANALYSIS

5.1. Type and Intensity of Program Participation by the Treatment Group

Before we discuss the characteristics of the sampled households and a summary of outcome indicators, it is important to describe the type and intensity of program participation by the treatment groups based on the two analytical samples defined in Table 6. Toward this goal, we present in Table 7 the scope and intensity of project participation by the treatment households, as defined by samples 1 and 2, by the gender of the household head. Overall, about two-thirds of the households participated as clients for home gardening, about 50% in the rice value chain, and about 20% in the aquaculture value chain. For all types of interventions, the rate of participation was higher among male-headed than female-headed households.

Cambodia HARVEST was designed to provide technical support to client members for 18 months, after which the members would graduate from the program. Although a household could participate in multiple value chains, one member could participate in only one value chain as a client. As shown in Table 7, on average, about 1.3 male members and 1.6 female members per household participated as clients of Cambodia HARVEST. The participation of members from a male-headed household was higher than the participation from female-headed households. Also, the intensity of participation was comparatively higher for male-headed households as measured by participation in the number of client and other activities, number of years participated, and average number of Cambodia HARVEST activities in which they participated.

By definition, 100% of client households in sample 1 had members who had graduated or were active Cambodia HARVEST participant as of September 2015. This percentage is about 86 for sample 2 (because it includes 185 households that started as clients but did not complete the program). About 12% of households in sample 1 and 24% of households in sample 2 had at least one client member whose status was reported as inactive as of September 2015. In sample 1, the percentage of inactive members was higher in male-headed than in female-headed households. On average, over the 3 years, a client household participated in about 1.3 to 1.4 interventions out of the three focused in this evaluation—i.e., home garden, rice and aquaculture value chain.. The households sampled for this evaluation mostly received the interventions in 2012 and 2013, but some households who were still actively participating in client activities in 2014 and 2015, even though the project was rolled out and expanded to other villages each year. Thus, for the sample of households included in this evaluation, the endline survey data collected in 2016 represents on average a lapse of about two years since HHS' participation in Cambodia HARVEST as clients. This is enough time to observe some short- to medium-term effects of the treatment they had received from Cambodia HARVEST.

5.2. Household Characteristics

Table 8 presents selected household characteristics of treatment and comparison group villages for sample 1, which uses the stringent definition of treatment group as defined in Section 4.1. These include household demographics, land ownership and use, ownership of household assets, and household income sources. The 2016 data are presented by the gender of the head of the household for panel households that were surveyed in 2012 and reinterviewed in 2016. In Table 9, we present the 2012 data for the same panel households for the same variables noted in Table 8. Similar descriptive tables for sample 2 are included in Annex 3.

Table 7. Participation in Various Types of Activities by Client Households in the Treatment Group (Samples 1 and 2) by the Gender of the Head of the Household

	Treatment group based on sample 1 (excludes inactive client HHs)			Treatment group based on sample 2 (includes inactive client HHs)		
	Male- headed (n=886)	Female- headed (n=202)	All HHs (n=1,088)	Male- headed (n=1,033)	Female- headed (n=240)	All HHs (n=1,273)
Percentage of HHs that participated in the following interventions						
Client or demonstration leader for home garden	67	64	67	69	66	68
Client or demonstration leader for rice	56	50	55	49	43	48
Client or demonstration leader for aquaculture	22	10	20	21	10	18
Average number of male household members who participated as clients in HARVEST interventions	1.42	0.82	1.31	1.37	0.78	1.26
Average number of female household members who participated as clients in HARVEST interventions	1.67	1.65	1.66	1.61	1.59	1.60
Total number of client activities that a household participated in when enrolled as a client in the HARVEST interventions (average/hh)	62	49	59	55	43	53
Total number of other HARVEST activities in which client HHs participated (average/hh)	6.6	4.8	6.3	6.3	4.5	6.0
Percentage of HHs with at least one inactive HARVEST client participant	12.5	9.4	12	25	24	25
Percentage of HHs that graduated as clients or were still active as of September 2015	100	100	100	86	84	86
Total number of activities that a HH participated in when enrolled as a client in the Cambodia HARVEST interventions, by year						
2011	0.9	0.4	0.8	0.7	0.3	0.6
2012	24	19	23	21	16	20
2013	30	25	29	27	22	26
2014	11	8	10	10	7	9
2015	2.7	1.5	2.5	2.4	1.3	2.3
Number of years that a client HH participated in HARVEST interventions as a client	3.4	3.1	3.3	3.2	3.0	3.2
Average number of HARVEST interventions a HH participated in as a client	1.5	1.2	1.4	1.4	1.2	1.3

Source: Cambodia HARVEST project beneficiary database (submitted to USAID 2016 by Fintrac, Inc.).

Table 8. Selected Sample Characteristics of Panel HHs Surveyed in 2016, Grouped by Gender of Household Head (Sample 1)

Characteristics	Treatment				Comparison				All HHs			
	MHH (n=886)		FHH (n=202)		MHH (n=424)		FHH (n=97)		Treatment (n=1,088)		Comparison (n=521)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Household demographics												
Household size (#)	6.01	1.90	5.47	2.31	6.18	2.16	5.89	2.31	5.91	1.99	6.12	2.19
No. of females per HH	2.98	1.32	2.95	1.35	2.96	1.37	3.07	1.25	2.97	1.32	2.98	1.35
Number of youth 16-35 years	2.46	1.51	2.39	1.62	2.55	1.69	2.71	1.48	2.44	1.53	2.58	1.65
Number of children 0-5 years	0.36	0.58	0.43	0.68	0.46	0.64	0.43	0.64	0.38	0.60	0.45	0.64
Number of women 15-49 years	2.35	1.27	1.96	1.31	2.46	1.31	2.33	1.30	2.28	1.29	2.44	1.31
Head's education (years of schooling)	5.88	3.19	5.00	4.09	5.10	3.00	5.13	4.42	5.74	3.36	5.11	3.27
Age of HH head (years)	49.73	11.95	55.18	11.24	46.93	11.91	51.36	12.21	50.74	12.01	47.75	12.08
Dependency ratio	0.61	0.61	0.53	0.51	0.63	0.49	0.49	0.39	0.60	0.59	0.60	0.48
Land ownership and use												
Total land area (ha)	3.02	3.06	1.88	1.69	2.97	2.98	2.01	1.92	2.81	2.89	2.79	2.84
Area under agriculture (ha)	2.24	3.02	1.27	1.57	2.38	2.90	1.40	1.82	2.06	2.83	2.19	2.76
Residential area (ha)	0.12	0.32	0.13	0.26	0.09	0.24	0.10	0.28	0.12	0.31	0.09	0.25
Ownership of household assets (% of HHs)												
Total livestock unit	1.94	2.52	1.58	1.78	1.59	2.05	1.48	1.89	1.87	2.40	1.57	2.02
Value of assets (USD)	3,979.27	5,158.09	2,067.64	2,574.34	3,711	5,624	2,018.02	3,694	3,624.35	4,841	3,395.90	5,356
Radio (% of HHs)	31.38	46.43	33.66	47.37	25.94	43.88	26.80	44.52	31.80	46.59	26.10	43.96
Television (% of HHs)	75.96	42.76	67.82	46.83	68.63	46.45	54.64	50.04	74.45	43.64	66.03	47.41
Telephone (% of HHs)	2.03	14.12	0.00	0.00	0.94	9.68	3.09	17.40	1.65	12.76	1.34	11.52
Cell phone (% of HHs)	89.84	30.23	81.68	38.78	86.79	33.90	81.44	39.08	88.33	32.12	85.80	34.94
Income sources (% of HHs)												
Farm income sources	97.97	14.12	98.02	13.97	98.58	11.83	96.91	17.40	97.98	14.08	98.27	13.04
Non-farm income sources	79.68	40.26	76.73	42.36	86.08	34.65	84.54	36.34	79.14	40.65	85.80	34.94
Non-timber forest product sources	1.92	13.73	0.99	9.93	3.30	17.89	2.06	14.28	1.75	13.10	3.07	17.27
Other income sources	47.97	49.99	51.49	50.10	45.28	49.84	56.70	49.81	48.62	50.00	47.41	49.98

Source: Cambodia HARVEST Impact Evaluation Endline Survey, 2016. MHH=Male-headed HHs, FHH=Female-headed HHs, n=Number of observations.

Table 9. Selected Characteristics of Panel HHs Surveyed in 2012, Grouped by Gender of Household Head (Sample 1)

Characteristics	Treatment				Comparison				All HHs				t-test		
	MHH (n=926)		FHH (n=162)		MHH (n=441)		FHH (n=80)		Treat. (n=1,088)		Comp. (n=521)		MHH	FHH	All
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD			
Household demographics															
Household size (#)	5.46	1.74	4.49	2.00	5.59	1.95	4.96	1.93	5.31	1.82	5.48	1.97			
No. of females per HH	2.72	1.23	2.70	1.21	2.73	1.26	2.74	1.16	2.72	1.22	2.73	1.25			
Number of youth 16-35 years	2.07	1.24	1.77	1.36	2.14	1.36	2.16	1.27	2.02	1.26	2.14	1.34		*	
Number of children 0-5 years	0.44	0.63	0.43	0.69	0.54	0.69	0.53	0.73	0.44	0.64	0.54	0.69	**		**
Number of women 15-49 years	2.25	1.23	1.83	1.18	2.36	1.25	2.05	1.18	2.19	1.23	2.31	1.24			
Head's education (years of schooling)	6.20	3.51	5.33	4.34	5.56	3.41	6.70	5.14	6.09	3.64	5.69	3.68	**		
Age of HH head (years)	46.57	11.89	53.64	10.21	43.49	12.07	47.99	10.64	47.62	11.92	44.23	12.00	**	**	**
Dependency ratio	0.60	0.60	0.55	0.51	0.62	0.48	0.51	0.46	0.60	0.59	0.61	0.48			
Land ownership and use															
Total land area (ha)	2.86	2.51	1.73	1.37	2.82	2.67	2.15	1.85	2.70	2.41	2.71	2.57		*	
Area under agriculture (ha)	2.03	2.53	1.10	1.33	2.17	2.69	1.63	1.83	1.89	2.41	2.09	2.58		*	
Residential area (ha)	0.11	0.28	0.08	0.17	0.09	0.28	0.07	0.16	0.11	0.27	0.09	0.26			
Ownership of household assets (% of HHs)															
Total livestock unit	2.74	2.90	2.24	2.29	2.27	2.47	2.12	2.21	2.66	2.82	2.24	2.43	**		**
Value of assets (USD)	1,006	1,210	403	705	893	1,250	384	673	917	1,168	813	1,193			
Radio (% of HHs)	37.47	48.43	27.78	44.93	31.52	46.51	32.50	47.13	36.03	48.03	31.61	46.54	*		
Television (% of HHs)	73.00	44.42	56.17	49.77	61.45	48.73	52.50	50.25	70.50	45.63	59.96	49.04	**		**
Telephone (% of HHs)	20.63	40.48	12.96	33.69	17.69	38.20	7.50	26.51	19.49	39.63	16.09	36.78			
Cell phone (% of HHs)	86.29	34.42	70.99	45.52	81.41	38.95	75.00	43.57	84.01	36.67	80.46	39.69	*		
Income sources (% of HHs)															
Farm income sources	99.89	3.29	100.0	0.00	99.32	8.23	100.0	0.00	99.91	3.03	99.43	7.57			
Non-farm income sources	87.37	33.24	87.65	33.00	91.38	28.09	96.25	19.12	87.41	33.19	92.15	26.93	*	*	**
Non-timber forest product sources	7.24	25.92	7.41	26.27	8.84	28.42	6.25	24.36	7.26	25.96	8.43	27.81			
Other income sources	31.86	46.62	44.44	49.84	24.72	43.19	41.25	49.54	33.73	47.30	27.20	44.54	**		**

Source: Cambodia HARVEST Impact Evaluation Baseline Survey, 2012. MHH=Male-headed HHs, FHH=Female-headed HHs, n=Number of observations; t-test: **= p<0.01, *=p<0.05.

On average, the households in our sample had five to six members, half of whom were women; 40% were women of child-bearing age (15-49 years), and about 10% were children (boys and girls) under 5 years old (Table 8 and 9). Both these demographic groups (women and children) are the target population of FTF nutrition-focused agricultural programs such as Cambodia HARVEST. The heads of the household in our sample on average had five to six years of schooling and were a little under 50 years of age. On average, a household owned about 2.7 ha of land, one to two tropical livestock equivalent units, and household assets worth US\$3,200 in 2016—up from about \$800 in 2012 (Table 9).

Tables 8 and 9 also describe the distribution of household by income sources—farming, off-farm activities, non-timber forest product (NTFP,) and other sources. Farm income came from sales of rice, livestock, vegetables, other crops, and fishing. Off-farm income sources included daily or occasional wage, salaries, self-employment, and pensions. NTFP income included only earnings from collecting and selling non-timber forest products. Other income sources included sale of assets, gifts, remittances, and other sources. In 2016, about 98% of households reported earning income from farming, 80% from non-farm income sources, 2-3% from NTFP, and about 48% from other sources. Over the previous four years, surprisingly, the percentage of households reporting incomes from non-farm and NTFP declined, but the percentage of households reporting other sources of income increased from about 30% to 48% (Tables 8 and 9). In both the years, the overall percentage of households reporting farm income was not significantly different between the two groups. However, income from other sources was significantly higher among the treatment group.

On several of these characteristics, the mean difference between the treatment and comparison households is statistically significant, such as household size, composition, ownership of livestock, types of assets, and income sources (Table 8 and 9). Also, the number of female-headed households increased from 2012 to 2016 in both the treatment and comparison villages. As can be seen from Tables 8 and 9, the female-headed households are characteristically different from male-headed households. For example, the size of the household is smaller for female-headed households than male-headed households, and the average age of the head of the household is significantly higher for female-headed households in both the treatment and comparison groups. Similarly, the ownership of land, assets, and income sources are different for female-headed households than male-headed households. This points to the need for controlling for the gender of the household head in any analysis focused on drawing causal inferences on project outcomes.

Our expectation was that, at least in the baseline, the sampled households would be similar in household characteristics, which would avoid the issue of placement and selection biases (at least those based on observable characteristics). However, this is not the case, as noted in Table 9. We thus needed to address this issue by using appropriate statistical/econometric technique in impact analysis. One way we addressed this issue was by including these characteristics as control variables to rule out attribution of any observed effect on the outcome on these inherent differences in characteristics of sampled households from the treatment and comparison groups.

5.3. Income Sources and Migration Patterns in the Study Area

To contextualize some of the demographic trends and household characteristics of the sampled households, it is important to understand the migration patterns and the changing income sources in the study area focused on by this evaluation. These can affect labor and capital availability for agricultural operations. Table 10 shows the pattern of outmigration for

sample 1 households by gender of the household head, age group, and region in the 5½-year project period. On average, 57% of the households from the treatment group had experienced outmigration of a member older than 15 years, which is much higher than the 46% of households experiencing outmigration from the comparison group. This pattern appeared to be higher among female-headed households than among the male-headed households (Table 10). In general, outmigration within the province involves people moving to urban areas. The rate of outmigration among female-headed households in the comparison group was higher than among male-headed households. For members 14 years or younger, outmigration showed a similar pattern between male- and female-headed households within the treatment and comparison groups. This pattern may affect the availability of labor in the agricultural sector and can potentially influence the uptake of Cambodia HARVEST-promoted technologies and practices.

Table 10. Percentage of Households Experiencing Outmigration in the Past 5 Years for Sample 1

Migration types and places migrated	Treatment			Comparison		
	MHH (n=886)	FHH (n=202)	Total (1,088)	MHH (n=516)	FHH (n=105)	Total (n=621)
Outmigration by 15 years or older age group	55.08	65.35	56.99	41.47	70.48	46.38
Outmigration by 14 years or younger age group	6.09	6.44	6.16	4.26	7.62	4.83
Migration within province (urban area)	9.48	17.33	10.94	9.69	14.29	10.47
Migration within province (rural area)	0.11	-	0.09	-	0.95	0.16

Source: Cambodia HARVEST Endline Survey, 2016; MHH=Male-headed household, FHH=Female-headed household; n=number of observations.

Table 11. Pattern of Occupation Change from 2012 to 2016 among Household Members More Than 10 Years of Age for Sample 1 (Percentage of Household Members)

Occupation type	2012		2016	
	Treatment (n=4,911)	Comparison (n=2,652)	Treatment (n=5,408)	Comparison (n=2,958)
Farming	58.11	61.12	44.27	44.79
Farm laborer	0.63	1.92	0.91	2.06
Non-farm laborer	3.77	5.28	7.54	9.57
Salaried employment	7.43	3.96	14.55	9.63
Self-employed (business owner)	3.30	3.36	5.47	6.49
In school	22.24	19.49	19.42	18.76
Homemaker	0.81	1.24	2.50	3.28
Disability	2.91	2.98	4.03	3.92
Other (fisheries, artisan, retired)	0.79	0.64	1.31	1.49

Source: Cambodia HARVEST Endline Survey, 2016; n=number of observations.

Patterns of occupation changed from 2012 to 2016 among members of the 10 years or older age group (Table 11). Members reporting farming as the main occupation dropped from 58% in 2012 to 44% in 2016 among treatment households. A similar drop occurred in comparison households during the same period. There was a concomitant increase in the percentage of non-farm laborer and salaried employment from 2012 to 2016 in both the treatment and comparison groups. These changes reflect the shift from agriculture to non-farm sources of livelihood that occurs with structural transformation, and it has implications for both labor and capital availability for farming operation.

5.4. Tracking the Results along the Pathway from Interventions to Outputs and Outcomes

We used the 2016 endline survey (cross-sectional) data to report on how the households that were targeted by Cambodia HARVEST compared with the households that were not targeted by the project. We followed the conceptual framework presented in Figure 2 and specifically examine the 2016 survey data to track the results along the pathway corresponding to nodes outlined in yellow. We first looked at the participation rates of surveyed households in various activities and interventions conducted by Cambodia HARVEST or other organizations, and then reviewed the results on awareness and knowledge about some of the concepts/techniques promoted by Cambodia HARVEST and the uptake and adoption of these practices by the target group. We then examined the trend or change over time in some of the production, income, and nutrition-related outcomes noted in the red outlined nodes along the pathway in Figure 2.

5.4.1. Participation in Cambodia HARVEST Activities

In the 2016 endline survey, respondents were asked about their participation in the previous four years in any programs or activities of the type offered/promoted by Cambodia HARVEST in the study areas. These included hosting and/or participating in demonstration sites for rice, corn, aquaculture/fisheries, commercial horticulture, and home gardens programs. Questions were also asked about respondents' participation in the business development training programs, forestry-related programs, nutrition field days, food security and nutrition groups, mobile kitchen program, and savings fund groups. The respondents were also asked about the main organizer of the activities/programs in which they participated and how many household members participated in each activity.

Table 12 describes the responses to these questions from all the treatment and comparison households, including the households added in 2016. The percentage of sampled households in the treatment villages that reported visiting or participating in these demonstration sites is much higher, ranging from 19% for corn demonstration to 73% for the home garden program. These farmers are referred to by Cambodia HARVEST as beneficiaries or participants and, as expected and in line with the project implementation strategy, the percentage of this type of farmer in our treatment sample is much higher than among the demonstration clients.

Participation by farmers in the treatment villages in other activities such as the business development program (BDM), forestry, nutrition, mobile kitchen, and savings group varies from 5% for BDM to 42% for nutrition field days. Again, the differential rates of participation in activities/interventions reflect the different scales at which these activities were conducted by Cambodia HARVEST (see Table 2) and possibly by other projects in the

study area. On average, 3.8 members from the sampled households in the treatment group and 1.4 members from the comparison group households participated in these types of programs and activities (Table 12).

Table 12. Households' Self-Reported Participation in Various Activities and Interventions of the Type Promoted by Cambodia HARVEST (Cross-Sectional Data for 2016)

	Treatment (n=1,707)	Comparison (n=621)	t-test
Did anyone from your household visit/participate in the following activity in the past 4 years? (% yes)			
Rice technology demonstration site	59.6	32.4	**
Corn demonstration site	19.2	2.6	**
Aquaculture and fisheries demonstration site	32.3	7.1	**
Commercial horticulture demonstration site	58.7	14.2	**
Home gardens program	72.5	23.5	**
Business development training	4.9	1.9	**
Forestry-related programs	19.7	15.8	*
Nutrition field days	42.1	14.2	**
Food security and nutrition group	13.1	3.7	**
Mobile kitchen program	28.2	5.5	**
Savings fund group	29.2	22.1	**
Other indicators of program participation and activity organizers			
Number of activities or interventions mentioned above in which a HH participated in the past 4 years (mean number/HH) (maximum number possible=11)	3.80	1.43	**
Percentage of HHs that participated in at least one activity/intervention mentioned above in the past 4 years	94.6	59.4	**
Percentage of HHs that participated in at least one activity/ intervention organized by HARVEST in the past 4 years	85.1	2.1	**
Percentage of HHs that participated in at least one activity/intervention organized by government or other NGOs in the past 4 years	60.2	59.1	
Percentage of HHs that reported HARVEST/USAID as the main organizer of a given activity (as a % of those that participated in a given activity in the past 4 years) (Note: N varies for each activity.)			
Rice technology demonstration site	66.9	4.0	
Corn demonstration site	85.3	6.3	
Aquaculture and fisheries demonstration site	80.6	0	
Commercial horticulture demonstration site	85.7	3.4	
Home gardens program	85.3	2.7	
Business development training	54.2	0	
Forestry-related programs	19.9	0	
Nutrition field days	53.3	1.1	
Food security and nutrition group	52.0	0	
Mobile kitchen program	56.2	2.9	
Savings fund group	12.0	0.0	

Source: Cambodia HARVEST- Impact Evaluation Endline Survey, 2016.
n=number of observations; t-test: **= p<0.01, *=p<0.05.

The percentages of program participating/visiting farmers in the comparison villages are significantly lower, indicating the absence of Cambodia HARVEST project activities in these villages, which is in line with the definition of *comparison group* for the impact evaluation. In fact, for some activities—such as aquaculture, forestry, BDM, food security and nutrition group, and savings fund group—none of the participant households in the comparison group reported Cambodia HARVEST as the main organizer of these projects. For other programs, the percentage of households indicating Cambodia HARVEST as the main organizer is very low, ranging from 1% to 6% (Table 12). Overall, 2% of program participating households in the comparison villages reported that Cambodia HARVEST was the main organizer.

Two observations on the results reported in Table 12 are worth noting for their implications on the impact analysis methodology and results. First, although the percentage of farmers participating in the listed interventions is significantly less in the comparison group than in the treatment group (as expected), there are still a significant number of farmers in the comparison villages who indicated either visiting or participating in activities/technical assistance programs of the type offered by Cambodia HARVEST (Table 12). This reflects potential contamination of project interventions in comparison villages that could bias the results of the impact evaluation. Second, the results point to the presence of interventions and programs offered by entities other than Cambodia HARVEST in both the treatment and comparison villages. For example, about 60% of sampled households from both these groups reported participating in at least one activity/intervention organized by the government or other NGOs in the previous 4 years (Table 12). This is potentially a source of a second type of contamination (i.e., presence of other programs in the study area), which can make attribution of effects to Cambodia HARVEST difficult to assess. The proportion of farmers reporting participation in programs other than Cambodia HARVEST is not significantly different between the treatment and comparison groups, which means that both the groups were equally affected by these other interventions and programs. These are considered exogenous effects in the program evaluation strategy and we address these types of contamination issues by controlling for households' participation in interventions offered by other entities as explanatory variables in strategies 1 and 2. However, it is possible that these exogenous influences from other interventions may be qualitatively different and could potentially influence the outcomes differently across the treatment and comparison households. Unfortunately, there is no information on the content and type of these other interventions to control for these potential qualitative differences of other interventions in the study area.

5.4.2. Awareness and Knowledge of Cambodia HARVEST among the Main Respondents

Next on the pathway, we look at the influence of project interventions on farmers' awareness, knowledge, understanding, perceptions, and attitudes about some of the concepts, ideas, and techniques promoted by Cambodia HARVEST (Figure 2). First, more than 98% of respondents from the treatment group (both male- and female-headed households) were aware of Cambodia HARVEST (Table 13). In comparison villages, about one out of three respondents had heard about Cambodia HARVEST, which may be due to the close proximity of the comparison villages to the treatment villages. The project had very good name recognition in the treatment villages and fairly good name recognition in comparison villages. Close to 30% of farmers in the study area also expressed general awareness about USAID. Name recognition for Fintrac was very low (2% to 33%), which is not surprising because the project was promoted as USAID/HARVEST or simply Cambodia HARVEST and not by the name of the main implementing partner.

The general awareness among respondents of terminologies associated with agricultural and natural resource management interventions—such as climate change, integrated pest management (IPM), and forest conservation—was statistically significantly higher among the respondents from the treatment group than those in the comparison villages, indicating a higher exposure to these ideas. Similarly, awareness about two examples of concepts/ideas promoted under the nutrition program—*Bor Bor Kab* (a nutritious porridge for young children) and the three food groups—was significantly higher among respondents from the treatment group than respondents from the comparison group. For example, 63% of farmers were aware of the three food groups, and 96% knew or had heard about *Bor Bor Kab* in the villages where Cambodia HARVEST was active, compared with 33% and 91%, respectively, in the non-intervention villages (Table 13).

As part of the general awareness-building campaign and training/capacity-building programs, Cambodia HARVEST developed several billboards and posters on the importance of forest conservation, fighting deforestation, the challenges of climate change, strategies for adaptation to climate change, environmental problems associated with chemical inputs, crop growth stages, and crop development, and the importance of a clean environment for livelihood and health. To gauge familiarity with these messages, respondents were shown copies of 10 such posters/billboards and asked if they had seen them before. The response among treatment groups (defined by sample 1) varied from 24% to 56% for various posters/billboards and was significantly higher than affirmative responses from respondents in the comparison group, which ranged from 19% to 46% (Table 14). For several of these posters/billboards, however, awareness among farmers in the comparison group was high, indicating the spillover effects of Cambodia HARVEST—the public nature of the billboards or the use of such posters by other projects/programs active in the comparison villages. Either way, these are positive effects of the project that can potentially underestimate the project effects or bias the results of the treatment effects.

Table 13. Awareness of Cambodia HARVEST and Promoted Concepts: Comparison of Treatment and Comparison Households, Sample 1, 2016

Program and activities	Treatment		Comparison		All HHs		t-test		
	MHH n=866	FHH n=202	MHH n=516	FHH n=105	Treatment n=1,088	Comparison n=621	MHH	FHH	All
	Percentage of respondents ^a								
HARVEST	98.98	98.02	33.91	29.52	98.81	33.17	**	**	**
USAID	30.93	24.26	17.05	10.48	29.69	15.94	**	**	**
Fintrac	2.82	1.49	1.94	1.90	2.57	1.93			
Climate change	71.44	62.38	61.05	54.29	69.76	59.90	**		**
IPM	58.92	49.01	38.37	40.00	57.08	38.65	**		**
Forest conservation	81.38	78.22	73.64	70.48	80.79	73.11	**		**
Bor Bor Kab	95.82	97.52	90.89	91.43	96.14	90.98	**	*	**
Three food groups	64.90	54.46	33.53	30.48	62.96	33.01	**	**	**

Source: Cambodia HARVEST Impact Evaluation Endline Survey, 2016.

MHH=Male-headed HHs, FHH=Female-headed HHs; n=number of observation; t-test: **= p<0.01, *=p<0.05.

a. Typically the respondent was the main decision maker in the household.

Table 14. Familiarity with Posters and Billboards Conveying Important Messages Promoted by Cambodia HARVEST in Sample 1^a

Posters/billboards with the following messages:	Treatment		Comparison		All HHs		t-test		
	MHH n=886	FHH n=202	MHH n=516	FHH n=105	T n=1,088	C n=621	MHH	FHH	All
percentage of respondents who reported seeing a poster/billboard in the past									
Billboard: Having forest means having hope for future	34.09	34.16	26.74	30.48	34.10	27.38	**		**
Billboard: Preserving forest is for ourselves and the next generations	24.38	23.76	18.99	20.95	24.26	19.32	*		*
Billboard: Responsibility to protect, preserve and restore the natural resources	43.00	40.59	37.40	38.10	42.56	37.52	*		*
Billboard: Adapting to climate change contributes to livelihood improvement	41.08	32.18	30.43	20.95	39.43	28.82	**	*	**
Billboard: We need to have awareness about climate change	26.52	22.28	18.80	20.95	25.74	19.16	**		**
Poster: Jointly prevent the deforestation in any aspects	48.08	41.09	38.37	36.19	46.78	38.00	**		**
Poster: Climate change adaptation strategies	34.54	26.24	27.33	21.90	33.00	26.41	**		**
Poster: Contribution to livelihood and health improvements	49.21	43.07	46.32	44.76	48.07	46.05			
Poster: Impact of chemical inputs on environment	30.36	27.23	21.51	14.29	29.78	20.29	**	**	**
Poster: Crop growth stages and crop development	57.45	51.49	40.89	40.95	56.34	40.90	**		**

Source: Cambodia HARVEST Impact Evaluation Endline Survey, 2016.

MHH=Male-headed HHs, FHH=Female-headed HHs, n=number of observation; t-test: **= p<0.01, *=p<0.05.

a. Typically the respondent was the main decision maker in the household.

In Table 15, we look at the results of the 2016 survey on the general awareness of specific practices and technologies promoted by Cambodia HARVEST in the study area among the rice and horticulture farmers, and compare the awareness, past or current adoption, and current adoption of these practices between the treatment and comparison groups in sample 1. In general, the villages where Cambodia HARVEST was active had a significantly higher percentage of farmers who were aware of new and innovative practices in rice and vegetable

production than the comparison villages where there was no Cambodia HARVEST. The difference in awareness about new practices between farmers from the treatment and comparison villages was generally higher among vegetable growers than among rice growers. Also, in general the awareness about new technologies and practices was much higher among male-headed than female-headed households. For example, among male vegetable growers in the treatment villages, 90%, 77% and 88% reported being aware of raised planting beds, plant spacing, and the practice of using plastic and straw mulch, respectively, compared with 65%, 47% and 50% of male farmers in the comparison villages. Across the two crop groups (rice and vegetables), the differences in the level of awareness between the two groups was more than double for techniques such as drip irrigation for vegetables, leaf color chart, improved rice varieties, live barriers, plastic cover nurseries, in-farm drainage, soluble fertilizers, integrated pest management (IPM), and biological control products (Table 15).

When asked if the farmer had ever used these new practices/technologies, the level of affirmative responses dropped for most of the rice technologies in both the treatment and comparison villages consistent with awareness, use and adoption rates found in other studies.¹⁶ Only for direct sowing of rice, row planting, use of short-duration improved rice varieties, and IPM practices were there at least 20% of rice farmers in the treatment group who reported ever using these techniques. The level of current use or adoption of these practices reported by the rice farmers further dropped to less than 5% for most technologies except direct sowing of rice (34% reported using that method at the time of the survey), short-duration improved rice varieties (16% reported currently using them) and IPM practices (10% reported currently adopting such a method). These findings are consistent with other studies. For example, a study conducted by Suvedi and Sarom (2017) reported that more than two-thirds of the Cambodian farmers planted traditional varieties except for dry-season, flood-recession and dry-season, lowland, irrigated rice. The current level of adoption reported by the treatment farmers was not statistically significantly different from the current level of adoption reported by farmers in the comparison villages. Only for row planting was the difference in the level of current adoption between the treatment and comparison farmers statistically significant, but the level of adoption reported was only 4% (Table 15).

The level of adoption and current adoption for most of the techniques and practices promoted among vegetable growers was significantly higher and more sustainable among the treatment villages than the levels for rice farming technologies (Table 15). A higher percentage of vegetable farmers reported adopting the new methods and techniques, and a significant percentage of farmers were still using the methods at the time of the survey. For example, 50% of vegetable farmers reported continuing to use the raised planting beds method, 44% were still using recommended plant spacing, 32% were using trellis netting, 28% were using mulch, and 23% were using compost. These findings are consistent with the results of the evaluation of commercial horticulture program of Cambodia HARVEST reported by Suvedi et al. (2017). They reported that demo clients were more interested in learning commercial horticulture technologies, given the access to technical support by the HARVEST program. A similar pattern was observed in their technology adoption. Similarly, younger farmers from the demo client group were more likely to adopt planting technologies than the training participant group.

¹⁶ This is not uncommon—the rate of awareness is always much higher than the rate of adoption of a technology. For example, Simtowe, Asfaw, and Abate (2016) found that of the 34% of farmers who were aware of an improved pigeon pea variety in Malawi, only 24% had ever used it, and only 14% were still planting it in the year the study was conducted. Similar patterns in gaps between exposure and use, and between use and continued adoption of technologies are reported by Floyd et al. (1999) for a wide range of technologies by farmers in Nepal, and Diagne (2006) for improved rice varieties in West Africa.

Table 15. Awareness and Adoption of Technologies and Improved Practices among Rice and Vegetable Growers in Sample 1, 2016

Technologies/ promoted by HARVEST program	Heard/aware of this technology? (% yes)						Have ever adopted? (%)						Currently using this technique? (% yes)					
	Treatment		Comparison		t-test		Treatment		Comparison		t-test		Treatment		Comparison		t-test	
	MHH	FHH	MHH	FHH	MHH	FHH	MHH	FHH	MHH	FHH	MHH	FHH	MHH	FHH	MHH	FHH	MHH	FHH
Rice farmers	n=785	n=177	n=454	n=85			n=785	n=177	n=454	n=85			n=785	n=177	n=454	n=85		
Direct sowing of rice	57.58	44.63	51.76	44.71	**		40.13	31.07	38.77	34.12			34.01	26.55	35.90	31.76		
Row planting	80.64	84.18	62.56	57.65	**	**	30.83	31.64	14.76	11.76	**	**	4.46	4.52	1.76	3.53	*	
Drum seeder	32.23	27.12	22.47	16.47	**		2.42	1.69	0.22	0.00	**		0.64	0.00	0.22	0.00		
Leaf color chart to check plant nitrogen status	9.94	5.08	1.32	0.00	**	*	1.15	0.56	0.22	0.00			0.13	0.00	0.22	0.00		
Short-duration improved rice varieties	46.11	35.59	40.97	37.65			23.57	15.82	22.25	18.82			16.31	9.04	17.18	12.94		
Climate-resilient improved rice varieties	14.27	9.04	5.51	7.06	**		2.42	1.13	1.98	2.35			1.27	0.56	0.88	1.18		
Improved disease- and pest-resistant rice varieties	12.61	6.78	3.96	7.06	**		1.91	0.00	1.32	1.18			0.76	0.00	0.22	1.18		
Flood-tolerant rice varieties	14.90	11.30	8.15	15.29	**		3.06	3.39	3.08	4.71			1.40	0.56	1.54	2.35		
Integrated pest management	28.54	20.34	17.40	15.29	**		13.12	6.78	8.81	4.71	*		9.81	3.39	7.27	4.71		
Horticulture farmers	(n=659)	(n=147)	(n=318)	(n=62)			(n=659)	(n=147)	(n=318)	n=62			(n=659)	(n=147)	(n=318)	(n=62)		
Raised planting beds	90.14	84.35	65.09	64.52	**	**	78.30	67.35	35.22	32.26	**	**	49.62	40.14	28.30	24.19	**	*
Plant spacing	77.39	75.51	47.17	51.61	**	**	67.37	60.54	27.67	30.65	**	**	44.31	38.78	23.90	19.35	**	**
Use of mulch (plastic and straw)	88.32	83.67	50.31	48.39	**	**	66.92	50.34	15.41	14.52	**	**	28.07	21.09	9.12	6.45	**	**

Technologies/ promoted by HARVEST program	Heard/aware of this technology? (% yes)						Have ever adopted? (%)						Currently using this technique? (% yes)					
	Treatment		Comparison		t-test		Treatment		Comparison		t-test		Treatment		Comparison		t-test	
	MHH	FHH	MHH	FHH	MHH	FHH	MHH	FHH	MHH	FHH	MHH	FHH	MHH	FHH	MHH	FHH	MHH	FHH
Use of compost	80.12	81.63	47.80	50.00	**	**	49.47	51.70	21.07	19.35	**	**	22.91	22.45	10.69	11.29	**	
Live barriers	56.30	42.86	7.23	8.06	**	**	42.94	31.97	2.52	1.61	**	**	16.08	13.61	1.26	1.61	**	**
Drip irrigation for vegetable production	69.65	65.31	18.24	9.68	**	**	45.22	32.65	3.46	3.23	**	**	11.38	3.40	1.57	1.61	**	
Plastic-covered nurseries to protect seedlings from rain	61.15	47.62	12.26	16.13	**	**	42.79	27.21	3.14	4.84	**	**	20.33	7.48	1.89	1.61	**	
Trellis netting	86.34	77.55	47.17	37.10	**	**	65.10	50.34	8.18	12.90	**	**	31.71	21.09	6.29	9.68	**	*
In-farm drainage	32.02	26.53	6.92	3.23	**	**	16.24	15.65	1.26	0.00	**	**	8.04	6.80	0.63	0.00	**	*
Soluble fertilizers	35.36	31.97	10.06	11.29	**	**	17.00	18.37	4.72	4.84	**	**	7.44	8.84	2.83	1.61	**	
Integrated pest management	37.78	31.97	12.89	12.90	**	**	21.55	16.33	5.66	6.45	**	**	12.44	9.52	4.09	3.23	**	
Biological control products	53.26	53.06	22.01	25.81	**	**	29.59	34.01	8.49	6.45	**	**	10.62	10.88	3.46	1.61	**	*

Source: Cambodia HARVEST Impact Evaluation Endline Survey, 2016.

MHH=Male-headed HHs, FHH=Female-headed HHs; n=number of observation; t-test: **= p<0.01, *=p<0.05.

For both vegetables and rice, among both the treatment and comparison groups there was a general decline in the percentage of farmers who adopted a new technology (once they become aware of it) and those that continued to use it (sustainable adoption). The project seems to have had some effect in increasing the level of awareness, uptake rate, and current use among the treatment villages for several of the new technologies promoted by the project. However, despite the project interventions, the challenges of sustainability remain the same in villages where Cambodia HARVEST was active and in villages where it was not as evident by the gap between awareness and uptake, and between uptake and current adoption. It seems that only 50% of farmers who become aware of a new technology tried it or took it up, and only 50% of those that tried it were still using the technology at the time of the endline survey. Of those that were aware of a new practice but did not adopt it, the main reasons given were non-availability of inputs (35%), labor constraints (29%), high cost (16%), and lack of technical assistance (9%).), which can provide a key to unlocking the sustainability in different types of interventions.

5.4.3. Participation, Awareness, and Knowledge of Cambodia HARVEST among Women

As a nutrition-focused FTF project, Cambodia HARVEST also implemented many activities and technical assistance programs targeted to women of childbearing age (15-49 years). Empowering women with the knowledge and tools to make decisions that affect the way time, money and other resources are spent within the household, the types of foods grown and consumed by the household, the way home cleanliness is maintained, types of foods served to children, and the ways in which food is safely prepared for the family are seen as important pathways through which the project can ultimately improve household food security and nutrition outcomes, which is the ultimate goal of the FTF Initiative under which Cambodia HARVEST was funded. Thus, we track the results of Cambodia HARVEST project interventions along the pathway by presenting the results of the participation, awareness, knowledge, and adoption of some of the nutrition, hygiene, and food preparation practices promoted by the project to women aged 15- 49 who are mothers, caregivers, or the main food preparers in the households surveyed.

Tables 16 and 17 present the comparison of some of these indicators of participation, awareness, and adoption measures between women respondents in the treatment and the comparison groups based on the endline survey data collected in 2016. More than 80% of women in sample 1 that were interviewed in Cambodia HARVEST villages had heard about Cambodia HARVEST, 36% had attended some kind of nutrition-related training program in the previous four years, 29% had participated in mobile kitchen, cooking demonstration, food safety, and hygiene-related training activities, and 47% had participated in training on home and school gardening, planting fruit trees, postharvest handling, and storage (Table 16). About 40% of women reported having received in the previous four years seedlings of Moringa, a tree with many nutritional and health benefits, promoted by the project. Fourteen percent of women in treatment villages reported that they were currently or in the past four years had been members of a food security and nutrition group, and 30% reported being members (currently or in the past four years) of a savings fund group (Table 16). On all these measures, the level of project awareness and participation was significantly higher among women in treatment villages than women in the comparison villages, as expected (Table 16). The positive levels of awareness about Cambodia HARVEST and participation in some of these programs reported by women in the comparison group indicate either spillover effects of the Cambodia HARVEST activities or the presence of other government organizations or NGOs promoting similar programs in the comparison villages.

The women were also shown five posters related to concepts of hygiene and nutrition that were developed and used by Cambodia HARVEST in various training programs to gauge their familiarity with these visual aids. As shown in Table 16, there was a high level of awareness and familiarity with these posters among both the Cambodia HARVEST intervention villages and the comparison villages. In the treatment group, 65% to 84% of women reported having seen these posters before, and 55% to 71% of women in the comparison group reported having seen the sample posters (Table 16). The level of familiarity with these posters was much higher among women in the treatment group than among women in the comparison group, as expected.

Table 17 reports the comparison of knowledge and adoption of practices promoted by the project among women in the treatment and comparison groups, especially those that identified themselves as caregivers of a child or the main food preparer in the households surveyed. On some of the hand washing practices, there were significantly more women reporting the correct method and timing of hand washing in the treatment group than in the

Table 16. Awareness and Participation in Cambodia HARVEST Activities by Women Aged 15-49: Comparison of Treatment and Comparison Groups in Sample 1, 2016

	Treatment			Comparison			t-test
	N	Mean	SD	n	Mean	SD	
Awareness about HARVEST and participation in programs (percentage of women)							
Heard about the Cambodia HARVEST project	1,027	82.38	38.12	637	23.23	42.27	**
Attended any nutritional training programs or nutrition field days in the past 4 years	1,031	35.50	47.87	639	11.11	31.45	**
Participated in any mobile kitchen, cooking demonstration, food safety, and hygiene training activities in the past 4 years	1,031	28.71	45.26	639	5.79	23.37	**
Participated in any training on home gardening, school gardening, planting of fruit trees, postharvest handling, and storage in the past 4 years	1,031	46.56	49.91	639	14.55	35.29	**
Currently or in the last 4 years, member of any food security and nutrition group	1,031	14.36	35.08	639	6.73	25.07	**
Currently or in the past 4 years, member of any savings fund group	1,031	29.29	45.53	639	21.13	40.85	**
Received Moringa seedlings from anyone in the past 4 years	1,031	39.96	49.01	639	5.79	23.37	**
Percentage of women who had seen the following posters prior to the interview							
Provision of extra food to kids aged 6-24 months	983	77.72	41.63	610	68.52	46.48	**
Foundation of hygiene	983	82.50	38.01	610	70.82	45.50	**
The issue of malnutrition and the importance of addressing this issue	983	64.90	47.75	610	55.41	49.75	**
Key determinants of good nutrition and health in a family	983	81.99	38.44	610	71.15	45.34	**
Three food groups	983	83.93	36.75	610	67.70	46.80	**

Source: Cambodia HARVEST Impact Evaluation Endline Survey, 2016.
n=number of observation; t-test: **= p<0.01, *=p<0.05.

comparison group except for the practice of using soap or ash, which was reported by 98% of women in the comparison group but only by 96% of women in the treatment group. A higher percentage of women in the treatment group than women in the comparison group reported washing hands after defecation (72% in the treatment group and 64% in the comparison group) and before eating (91% in the treatment group and 89% in the control group), rubbing hands three times (19% in the treatment group and 14% in the comparison group), and drying hands hygienically (37% in the treatment group versus 28% in the comparison group).

Table 17. Use and Practice of Important Nutrition- and Hygiene-Related Concepts among Women Aged 15-49: Comparison of Treatment and Comparison Groups in Sample 1, 2016

	Treatment			Comparison			t-test
	n	Mean	SD	n	Mean	SD	
Percentage of women who follow the practice of washing hands							
After defecation	983	71.62	45.11	610	64.26	47.96	**
After cleaning baby's bottom	983	17.40	37.93	610	21.64	41.21	*
Before food preparation	983	75.28	43.16	610	74.26	43.75	
Before eating	983	90.95	28.71	610	89.18	31.09	
Before feeding a child	983	10.48	30.64	610	12.79	33.42	
Percentage of women who use following hand washing practices							
Use water	983	88.40	32.04	610	86.72	33.96	
Use soap or ash	983	96.03	19.53	610	98.03	13.90	*
Wash both hands	983	51.48	50.00	610	48.36	50.01	
Rub hands together at least 3 times	983	18.92	39.19	610	14.10	34.83	*
Dry hands hygienically by air drying or with a clean cloth	983	36.52	48.17	610	28.36	45.11	**
Awareness and adoption of nutrition related concepts and practices							
Owens or manages a home garden plot	983	69.48	46.07	610	57.70	49.44	**
Heard about Bor Bor Kab Kroup Kroeung (enriched porridge)	739	96.35	18.77	469	92.11	26.99	**
Has ever made Bor Bor Kab for her child	712	35.25	47.81	432	29.17	45.51	*
Knows that adults should eat 3 meals per day	983	96.68	17.81	610	94.81	22.09	
Knows about the three food groups	983	39.06	48.81	610	23.44	42.40	**
Knowledge about the three food groups (percentage of women who could name foods from a given group)							
Food for energy	983	34.59	47.59	610	19.51	39.66	**
Food for growth	983	34.69	47.62	610	18.69	39.01	**
Food for immune system	983	33.16	47.10	610	19.34	39.53	**
Serves at least one item from each of the 3 food groups in all the meals (percentage who responded "yes, all the time")	983	72.74	44.55	610	67.38	46.92	*

Source: Cambodia HARVEST Impact Evaluation Endline Survey, 2016.
n=number of observations; t-test: **= p<0.01, *=p<0.05.

The women in the treatment group also reported having a higher level of knowledge than women in the comparison group about some of the food consumption practices for children and adults and of the concept of three food groups. There was also a high prevalence of women owning or managing a home garden plot (69%), making *Bor Bor* (enriched porridge) for children (35%), and serving at least one of the items from each of the three food groups in all the meals (72%) (Table 17). On all these measures reported in Tables 16 and 17, women in the Cambodia HARVEST intervention villages had a higher level of awareness, knowledge, and practice related to good hygiene and the importance of nutritional foods than women in villages where Cambodia HARVEST did not intervene. However, whether this higher level of knowledge and practice translates into better quality of food consumption (as measured by dietary diversity), adoption of good infant and young child feeding practices, and improvements in nutritional outcomes (as reflected in stunting, wasting, and underweight among children under 5) is yet to be seen. This is the topic of investigation for the impact analysis presented in Section 6. Here it is worth noting the qualitative study by Chung, Lopez, and Bora (2017) that examined some of the recommended complementary and transitional feeding practices promoted by Cambodia HARVEST. In this study, the authors focused on two child feeding practices promoted by Cambodia HARVEST: the use of enriched porridge and the inclusion of the three food groups (TFG) in child meals. The main finding of that study was that there was little evidence that households were using enriched porridge. It was also reported that the TFG was not applied in an intentional way by caretakers. Young children were more likely to receive TFG when meals for the rest of the family included dishes with the TFG.

5.4.4. Comparison of Outcomes before and after and between Treatment and Comparison Villages

It is expected that awareness, knowledge, and adoption of practices promoted by the project would lead to improvement in productivity, income, expenditure, consumption, quality of dietary intake, and ultimately in nutritional outcomes as measured by stunting, wasting, and underweight among children and underweight among women of reproductive age (15-49 years). These are some of the indicators of outcomes and impacts expected to be influenced by the project as depicted in Figure 2. We thus track the results and outcomes by examining the changes that have taken place—or not—in some of these indicators along the pathway by comparing the estimated values in 2012 with those in 2016 between the treatment and comparison households.

Table 18 shows changes in the following outcome indicators along the pathway for treatment and comparison groups by the gender of the head of the household: crop productivity, value of production, crop sales, crop income (as measured by net income per household)¹⁷, per capita expenditures, poverty, hunger (an indicator of food security), dietary diversity among women and children, prevalence of underweight among women, and prevalence of stunting, wasting, and underweight among children younger than 5 years.

Table 18 illustrates the trends in these indicators for sample 1 households from the beginning of Cambodia HARVEST (2012) to the end of the project (2016). Average rice yield for farmers in the treatment group was higher than average yields in the comparison group in both those years, though both groups showed an increasing trend from 2012 to 2016.

¹⁷ Value indicators for all crops are reported in real 2012 Riels. Values for 2016 were adjusted using consumer price index to derive values in 2012-equivalent Riels.

Table 18. Summary of Selected Indicators along the Impact Pathway for Households in Sample 1 (2012–2016)

	2012						2016						t-test (all T and C HHs bet. 2012-2016)	
	Treatment		Comparison		All HHs		Treatment		Comparison		All HHs			
	MHH	FHH	MHH	FHH	T	C	MHH	FHH	MHH	FHH	T	C	T	C
Rice outcomes	n=799	n=131	n=373	n=59	n=930	n=432	n=773	n=174	n=366	n=76	n=947	n=442		
Area (ha)	3.25	1.78	3.03	2.08	3.05	2.90	6.15	3.43	6.08	3.93	5.65	5.71	**	**
Yield (ton/ha)	2.17	1.90	1.87	1.69	2.13	1.84	2.34	2.09	2.14	1.84	2.29	2.09	**	**
Production (ton)	7.37	3.31	6.01	3.93	6.80	5.73	15.66	7.55	14.39	7.77	14.17	13.25	**	**
Value of production (million Riels)	47.98	21.70	37.33	23.63	44.19	35.39	87.69	43.47	76.83	41.71	79.59	70.68	**	**
Sales (million Riels)*	0.89	0.35	0.94	0.52	0.82	0.90	0.76	0.31	0.65	0.24	0.68	0.58		
Net rice income (million Riels)	2.68	1.25	1.95	1.38	2.47	1.87	5.11	2.37	4.50	2.34	4.61	4.12	**	**
Vegetable outcomes	n=611	n=102	n=183	n=35	n=713	n=218	n=585	n=129	n=175	n=42	n=714	n=217		
Area (ha)	0.09	0.06	0.07	0.01	0.09	0.06	0.10	0.05	0.05	0.01	0.09	0.04		
Value of production (million Riels)	0.45	0.36	0.16	0.08	0.44	0.14	0.78	0.49	0.22	0.09	0.73	0.20	*	
Sales (million Riels)**	0.45	0.35	0.36	0.07	0.43	0.30	0.86	0.60	0.37	0.10	0.81	0.31	*	
Net vegetable income (million Riels)	0.07	0.09	0.08	0.05	0.07	0.08	-0.22	-0.06	-0.10	0.18	-0.19	-0.08	*	*
Fish outcomes					n=110	n=9					n=43	n=6		

	Treatment		2012				Treatment		2016				t-test (all T and C HHs bet. 2012-2016)	
	Comparison		All HHs		Treatment		Comparison		All HHs		T		C	
	MHH	FHH	MHH	FHH	T	C	MHH	FHH	MHH	FHH	T	C	T	C
Fish Production (ton)	NE	NE	NE	NE	0.158	0.104	NE	NE	NE	NE	1.234	1.547	**	*
Value of production (million Riels)	NE	NE	NE	NE	0.604	0.487	NE	NE	NE	NE	4.564	6.495	**	
Net income (million Riels)	NE	NE	NE	NE	-0.017	-0.071	NE	NE	NE	NE	3.141	5.683	**	
Income, poverty and food security	n=926	n=162	n=441	n=80	n=1,088	n=521	n=886	n=202	n=424	n=97	n=1,088	n=521		
Poverty (%)	8.86	13.58	12.70	13.75	9.56	12.86	3.16	6.44	3.77	12.37	3.77	5.37	**	**
Per capita expenditure (USD)	549.47	535.04	533.05	459.60	547.32	521.77	623.68	567.13	592.18	513.8	613.18	577.6	**	**
Hunger (%)	0.11	0.00	0.45	1.25	0.09	0.58	0.11	0.50	0.24	1.03	0.18	0.38		
Dietary diversity (women)	n=1136	n=173	n=562	n=94	n=1,309	n=656	n=934	n=200	n=570	n=108	n=1,134	n=678		
Women's dietary diversity (mean # of food groups consumed in the past 24 hours)	4.67	4.67	4.60	4.55	4.67	4.59	4.51	4.25	4.46	4.46	4.46	4.46	**	
Diet-related indicators (children)	n=110	n=23	n=81	n=16	n=133	n=97	n=91	n=23	n=81	n=12	n=111	n=93		
Prevalence of children 6-23 months receiving	32.41	33.33	30.38	60.00	32.56	35.11	28.41	43.48	33.33	58.33	31.53	36.56		

	Treatment		2012 Comparison		All HHs		Treatment		2016 Comparison		All HHs		t-test (all T and C HHs bet. 2012-2016)	
	MHH	FHH	MHH	FHH	T	C	MHH	FHH	MHH	FHH	T	C	T	C
	a minimum acceptable diet (%)													
Prevalence of children 6-23 months meeting minimum dietary diversity (%)	49.09	52.17	35.80	68.75	49.62	41.24	62.64	65.22	50.62	75.00	63.16	53.76	*	
Nutrition outcomes for women	n=1090	n=162	n=540	n=89	n=1252	n=629	n=821	n=173	n=513	n=97	n=994	n=610		
Prevalence of underweight women (%)	15.32	13.58	17.59	7.87	15.10	16.22	14.25	21.39	13.26	11.34	15.49	12.95		
Nutrition outcomes for children (<5 years)	n=404	n=70	n=240	n=42	n=474	n=282	n=312	n=84	n=268	n=45	n=396	n=313		
Prevalence of stunted children (%)	43.07	48.57	49.58	45.24	43.88	48.94	31.09	35.71	30.60	35.56	32.07	31.31	**	**
Prevalence of wasted children (%)	11.39	11.43	10.00	4.76	11.39	9.22	8.33	10.71	16.04	4.44	8.84	14.38		
Prevalence of underweight children (%)	27.23	30.00	34.58	30.95	27.64	34.04	16.99	22.62	20.90	11.11	18.18	19.49	**	**

Source: Cambodia HARVEST Impact Evaluation Surveys, 2012 and 2016. Indicators are reported at household level; n=number of observation; t-test: **= p<0.01, *=p<0.05.

Among the treatment households, rice yield increased from 2.1 tons/ha per household in 2012 to 2.3 tons/ha per household in 2016. Average rice yields in the comparison group increased from 1.8 tons/ha to 2.1 tons/ha during the same period. Rice net income per household also increased from 2.5 million Riels to 4.6 million Riels (in 2012 Riels) among treatment households during the 2012-2016 period, and increased from 1.9 to 4.1 million Riels among comparison households. Not surprisingly, male-headed households experienced higher levels of outcomes on all counts of productivity, sales, and crop income than female-headed households.

We also track and report the area, value of production, sales, and net income for vegetable crops, given the focus of Cambodia HARVEST on promoting home gardens and horticulture value chains. As expected, value of production and sales of vegetable crops significantly increased during the project period for the treatment group. Total value of vegetable sales per household doubled among treatment households; the incremental rate among comparison households was lower than the rate among the treatment households (Table 18). However, the net household income from vegetable production declined significantly for both the treatment and comparison groups from 2012 to 2016. Only the female-headed households in the comparison group saw an increase and a positive level of net income from vegetable production (Table 18).

For fish production, the number of observations is not adequate to do mean comparisons by the gender of the head of the household. For the overall sample, the results suggest a positive trend in the total quantity of fish production, value of production, and net income in the treatment group. However, the sample size for the comparison group (only nine observations) is too low to conduct any impact analysis for this outcome indicator in the subsequent sections. Although we are not able to explore this further in this study because of small sample size, it should be noted that the case study conducted by Richardson et al. (2017) points to potential for aquaculture technology to contribute to household income, food security, and nutrition. That study suggests that adoption of small-scale aquaculture systems in rural Cambodia as promoted by Cambodia HARVEST was limited by several factors, including access to water, prices of commercial fish feed, selling price of fish in markets, and concerns about profitability. Access to fingerlings was identified as a major barrier. Limited provision of extension services, market access, land access, and off-farm employment opportunities were identified as other barriers to effective development of community fisheries.

Next we track the trends in some of the FTF indicators along the impact pathway that the project is hypothesized to influence through its income-focused value chain programs and nutrition-focused technical assistance programs: the prevalence of poverty, hunger, and malnutrition among the targeted population. Table 18 shows the changes in per capita expenditures and the prevalence of poverty and hunger among treatment and comparison households from 2012 to 2016. The prevalence of poverty was measured as the percentage of people living on less than US\$1.25 a day measured in 2005 US\$ purchasing power parity (PPP). Among the villages targeted for Cambodia HARVEST interventions in 2012-2013, the poverty rate significantly had decreased from 10% to 4% in the four years leading up to the endline survey. A similar pattern is also observed in the comparison group, with the prevalence of poverty observed to have decreased from 13% to 5% between 2012 and 2016. The 6% to 8% drop in the poverty rate observed in the impact evaluation study area in both the treatment and the comparison villages is of a much larger magnitude than the roughly 4% reduction in the poverty rate from 2009 to 2015 reported for the entire zone of influence (i.e., the four targeted provinces) in Cambodia by the 2015 Interim Assessment Report (Social Impact 2015).

Annual per capita expenditure on food and non-food items (excluding housing) increased among both treatment and comparison groups between 2012 and 2016, but the rate of increment appeared to be higher among treatment households (US\$548 to US\$618) than in the comparison group (US\$522 to US\$578). The prevalence of households with moderate to severe hunger (defined as a score of 2 or higher on the 0-6 household hunger scale) differed between treatment and comparison groups. The treatment group had a much lower percentage of households with hunger in 2012, but the comparison group improved at the endline, reducing the gap between the two groups during the project period. However, in both the groups, the prevalence of hunger was extremely low in the study area (less than 1%), and the magnitude of changes in the treatment and comparison groups is insignificant and inconsequential. We want to point out that the estimated prevalence of hunger among our study population in 2016 (~0.2-0.3%) is significantly lower than the estimated prevalence of hunger in the ZOI a year earlier (8.6%) as reported in the Interim Assessment Report (Social Impact 2015). This large discrepancy in the prevalence of hunger could be either a reflection of the different study populations (much narrower geographic focus of this impact evaluation study area versus the entire ZOI) or the different time frames over the 12-month period captured in the two surveys (i.e., the season/month the survey was undertaken), or it could be the year effect (i.e., weather variability), which could have reduced food availability in 2015 (due to drought) more than in 2016.

Table 18 also presents the status of dietary diversity and prevalence of underweight women of childbearing age (15-49) among the treatment and comparison households in 2012 and 2016. Women's dietary diversity score (WDDS) captures how many out of nine food groups an individual consumed in the past 24 hours: grains, roots, and tubers; legumes and nuts; dairy products; organ meat; eggs; flesh food and small animal protein; vitamin A-rich dark green leafy vegetables; other vitamin A-rich vegetables and fruits (including orange-fleshed sweet potatoes); and other fruits and vegetables. The mean number of food groups consumed by women is tabulated by averaging the number of food groups consumed across all women of reproductive age in the sample with data available on dietary diversity.

If we compare the number of food groups consumed by women (Table 18), there appears to be no difference between treatment and comparison groups in the baseline and endline periods. The mean number of food groups consumed by women is similar across the two groups (about 4.5), with a statistically significant but small decline observed between 2012 and 2016 for the treatment group. This estimated mean number of food groups consumed by women in the study area is similar to the mean number of food groups consumed by women (4.3) in the zone of influence in the Interim Assessment Report (Social Impact 2015). The prevalence of underweight women in both treatment and comparison groups went down over the project period, but the percentage change from 2012 to 2016 was relatively smaller in the treatment group than in the comparison group. During the project time frame, the percentage of underweight women in the treatment group was almost constant, whereas it declined by three percentage points (i.e., from 16% to 13%) in the comparison group from 2012 to 2016. A perplexing fact to note is that the prevalence of underweight women found in the study area in 2016 (13% to 15%) is statistically significantly higher than the prevalence of underweight women (12%) estimated for the entire ZOI in 2015.¹⁸

Table 18 also shows the minimum acceptable diet and dietary diversity for children and changes from 2012 to 2016 in three anthropometric measurements of undernutrition among

¹⁸ One reason for this difference could be the rural focus of this evaluation, whereas the 2015 survey included both rural and urban population in the ZOI.

children under 5 years: stunting (based on height-for-age z-scores), wasting (based on weight-for-height z-scores) and underweight (based on weight-for-age z-scores). It also shows the percentage of children 6-23 months of age in the Cambodia HARVEST intervention and the comparison groups receiving a minimum acceptable diet. Stunting is an indicator of linear growth retardation, most often due to prolonged exposure to an inadequate diet and poor health. Wasting is an indicator of acute malnutrition. Children with wasting have extremely low weight for their height and have a much greater risk of mortality than children without wasting. Underweight is a weight-for-age measurement and a reflection of acute and/or chronic undernutrition because it is a composite index of weight-for-height and height-for-age. Weight-for-age (i.e., underweight) is an overall indicator of a population's nutritional health (WHO 2006). Reducing the prevalence of these conditions among children, particularly from birth to 23 months (i.e., the first 1000-day window of opportunity) is important because height and weight growth deficits accrued early in life are associated with cognitive impairments, poor educational performance, and decreased work productivity among adults. These are, therefore, considered to be important indicators for tracking the progress of the Feed the Future initiative across countries and are expected to be influenced by nutrition-focused development investments in the ZOI.

The results indicate the prevalence of stunting, wasting, and underweight among children younger than 5 to be, respectively, in the range of 30%, 10%, and 20%, respectively, among the treatment group in 2016. At least for the treatment group, the prevalence of these three indicators of malnutrition declined between 2012 and 2016. The results are, however, mixed for children in the comparison group. Overall, across the treatment villages, 44% of all children under 5 were stunted in 2012. This percentage was significantly reduced to 32% in 2016. Among comparison households, there was a similar reduction in the percentage of stunted children during this period. Percentage of wasted children also went down in the treatment group (from 11% to 9%), but it increased in the comparison group (9% to 14%) between 2012 and 2016. Prevalence of underweight children in 2012 differed between the two groups. Across treatment households, 28% of children were underweight; this went down to 18% in 2016. A similar pattern was observed in the comparison group during the same period. The estimated rates of stunting, wasting, and underweight among children younger than 5 in the study area were similar in magnitude for the ZOI—i.e., 34% stunting, 10% wasting and 25% underweight (Social Impact 2015).

The percentage of children ages 6-23 months receiving a minimum acceptable diet fell from 33% to 32% among treatment households but increased from 35% to 37% among comparison households from 2012 to 2016. Compared with estimates for the ZOI, the percentage of children 6 to 23 months of age receiving a minimum acceptable diet in 2016 is about 10 percentage points higher in the study area than the estimated percentage in 2015 by the Interim Assessment Report for the entire ZOI (Social Impact 2015). Also, not surprisingly, male-headed households are better off than female-headed households on all counts of poverty, expenditure, dietary diversity, and nutrition outcomes. This reinforces the importance of controlling for this confounding factor in the impact analysis to assess the causal effects of Cambodia HARVEST.

Another potential confounding factor in influencing the outcome indicators could be the location. We thus compare the mean values of these outcome indicators by treatment and comparison groups across the four provinces. Results are presented in Table 19 for the crop-specific outcomes and in Tables 20 and 21 for downstream effects on poverty, expenditure, dietary diversity, and nutritional outcomes for women and children younger than 5 years.

The four provinces vary significantly in the relative values for area devoted, production per household, value of production, and sales per household across the three focused commodities (Table 19). For rice, the size and scale of area and production are much smaller in Siem Reap and Kampong Thom than in Battambang and Pursat. Similarly, the values for productivity indicators (e.g., yield, sales, net crop income) are smaller for Siem Reap and Kampong Thom than for the other two provinces. For rice, except for sales, most provinces saw a significant increase in the values of these indicators from 2012 to 2016.

In the case of vegetables, the area, production, value, and sales are much higher in Siem Reap compared with other provinces (Table 19). In trend over time, Siem Reap is the only province that experienced a significant increase in the value of production and sales from 2012 to 2016. Similar positive and significant trends are also observed in Siem Reap (but not in other provinces) for total quantity of fish production and value of production (Table 19). The four targeted provinces also differ in the prevalence of poverty (Table 20). The percentage of people living on under US\$1.25 per day was highest in Siem Reap (11% in the treatment group and 15% in the comparison group) in 2012; but that province saw the steepest decline in poverty rate in the treatment group over the four years (Table 20). The same relative difference and trends are observed across the four provinces for per capita expenditures by the treatment group. The only exception is Battambang, where the increase in per capita expenditures from 2012 to 2016 was not significant in either the treatment or the control group. The prevalence of hunger is relatively low across all the provinces and did not change significantly over the four years from 2012 to 2016 (Table 20).

Table 21 shows the outcomes on women's dietary diversity, minimum acceptable diet for children, and prevalence of underweight, stunting, and wasting among the targeted population using sample 1 as the definition of treatment group. Battambang and Kampong Thom saw a statistically significant but small decline in the women dietary diversity score from 2012 to 2016, but no significant change in the prevalence of underweight women occurred in all four provinces. All four provinces also saw a decline in the prevalence of stunting and underweight children in both the treatment and comparison groups. However, the comparison groups in Kampong Thom, Pursat, and Siem Reap all witnessed an increase in the prevalence of wasted children from 2012 to 2016, although this was not statistically significant. The indicators on children's dietary diversity and adequacy show more or less similar status and positive trends for the treatment and comparison groups across the four provinces. The exception is with the exclusively breast-fed children under 6 months of age. In general, the percentage of children exclusively breast-fed in the treatment group declined in Battambang, Pursat, and Siem Reap from 2012 to 2016. But over the same period, the value for this indicator either remained the same or increased for the comparison group. Whether this reflects the changing role of women in the farming operations in the treatment group triggered by Cambodia HARVEST activities or it is due to some other changing social or cultural practices needs further investigation.

Table 19. Summary of Agricultural Indicators along the Impact Pathway for Households in Sample 1 by Province (Comparison in Trend from 2012 to 2016)

Province	2012		2016		t-test (2012 and 2016)	
	Treatment	Comparison	Treatment	Comparison	Treatment	Comparison
Rice area (ha)						
Battambang	5.25	5.51	8.64	9.31	**	**
Kampong Thom	2.01	2.12	3.82	4.36	**	
Pursat	3.10	1.97	6.36	4.54		
Siem Reap	1.78	2.02	3.43	4.51	**	
Rice yield (ton/ha)						
Battambang	2.48	2.29	2.91	2.59	*	
Kampong Thom	1.35	1.27	1.55	1.64	*	**
Pursat	2.61	2.16	2.48	2.40		
Siem Reap	1.93	1.68	2.22	1.78	**	
Rice production (ton)						
Battambang	12.23	12.67	25.12	25.33	**	**
Kampong Thom	2.45	2.55	6.32	8.12	**	**
Pursat	8.72	4.65	16.83	11.98	**	**
Siem Reap	3.03	3.21	7.25	7.64	**	**
Rice value of production (million Riels)						
Battambang	78.00	73.24	136.72	128.53	**	**
Kampong Thom	17.22	14.61	35.93	39.62	**	**
Pursat	55.82	31.57	94.60	69.26	**	**
Siem Reap	20.94	22.31	45.26	46.37	**	**
Rice sales (million Riels)						
Battambang	1.19	1.16	1.08	0.99		
Kampong Thom	0.48	1.79	0.29	0.32		
Pursat	0.97	0.64	0.76	0.61		
Siem Reap	0.25	0.19	0.26	0.20		
Rice net income per household (million Riels)						
Battambang	4.24	3.71	8.17	7.76	**	**
Kampong Thom	0.86	0.70	1.96	2.05	**	**
Pursat	3.24	1.83	5.14	3.95	**	**
Siem Reap	1.27	1.26	3.02	2.75	**	**
Vegetable area (ha)						
Battambang	0.066	0.046	0.136	0.071	*	
Kampong Thom	0.067	0.015	0.069	0.015		
Pursat	0.081	0.013	0.053	0.008		
Siem Reap	0.146	0.133	0.132	0.056		
Vegetable value of production (million Riels)						
Battambang	0.457	0.297	1.270	0.256		
Kampong Thom	0.355	0.075	0.494	0.127		
Pursat	0.368	0.075	0.362	0.111		
Siem Reap	0.661	0.107	0.926	0.271	*	*
Vegetable sales (million Riels)						
Battambang	0.455	0.323	1.635	0.474		
Kampong Thom	0.354	0.058	0.502	0.139		
Pursat	0.339	0.064	0.368	0.175		
Siem Reap	0.674	0.756	0.981	0.397	*	
Vegetable net income (million Riels)						
Battambang	0.124	0.183	0.147	-0.033		
Kampong Thom	0.089	0.046	-0.226	0.004	**	
Pursat	-0.024	0.016	-0.211	0.033	**	
Siem Reap	0.132	0.042	-0.590	-0.265	*	

Province	2012		2016		t-test (2012 and 2016)	
	Treatment	Comparison	Treatment	Comparison	Treatment	Comparison
Fish production (ton)						
Battambang	0.357	0.026	2.500	.		
Kampong Thom	0.095	0.060	0.680	0.280		
Pursat	0.084	.	0.762	0.520		
Siem Reap	0.115	0.250	0.732	2.733	**	
Fish value of production (million Riels)						
Battambang	1.418	0.085	10.297	.		
Kampong Thom	0.361	0.385	2.690	1.438		
Pursat	0.319	.	2.125	1.202		
Siem Reap	0.380	1.193	2.921	11.631	**	

t-test: **= p<0.01, *=p<0.05; missing value means no observation in fish production.

Table 20. Summary of Poverty, Expenditure, and Hunger Indicators for Households in Sample 1 by Province (Comparison in Trend from 2012 to 2016)

Province	2012		2016		t-test (2012 and 2016)	
	Treatment	Comparison	Treatment	Comparison	Treatment	Comparison
Poverty (percentage)						
Battambang	9.74	11.36	3.75	3.03	**	**
Kampong Thom	9.57	14.39	4.96	6.06	*	*
Pursat	8.54	9.92	3.35	4.13	**	
Siem Reap	10.90	15.44	2.84	8.09	**	
Per capita expenditure (USD)						
Battambang	554.41	547.98	569.86	560.91		
Kampong Thom	545.69	499.45	614.29	577.94	**	
Pursat	547.82	546.15	607.70	618.85	**	
Siem Reap	539.74	496.30	675.05	556.73	**	*
Hunger (percentage)						
Battambang	0.00	0.00	0.75	1.52		
Kampong Thom	0.35	1.52	0.00	0.00		
Pursat	0.00	0.00	0.00	0.00		
Siem Reap	0.00	0.74	0.00	0.00		

t-test: **= p<0.01, *=p<0.05.

Table 21. Summary of Dietary Diversity and Nutritional Indicators for Women and Children in Sample 1 by Province (Comparison in Trend from 2012 to 2016)

Province	2012		2016		t-test (2012 and 2016)	
	Treatment	Comparison	Treatment	Comparison	Treatment	Comparison
Women's dietary diversity (mean number of food groups consumed in the past 24 hours)						
Battambang	4.87	4.93	4.50	4.76	**	
Kampong Thom	4.66	4.47	4.24	4.12	**	
Pursat	4.60	4.50	4.71	4.32		
Siem Reap	4.54	4.48	4.35	4.53		
Prevalence of underweight women (percentage)						
Battambang	17.72	20.89	15.38	16.67		
Kampong Thom	16.79	15.79	16.59	8.87		
Pursat	12.77	17.60	13.71	17.95		
Siem Reap	13.31	11.86	16.80	11.11		
Prevalence of stunted children under 5 years age (percentage)						
Battambang	46.23	46.27	42.06	37.70		
Kampong Thom	45.69	43.28	25.86	21.28	**	*
Pursat	36.30	51.92	30.30	34.62		
Siem Reap	48.72	53.13	29.73	26.39	**	**
Prevalence of wasted children under 5 years age (percentage)						
Battambang	12.26	11.94	8.41	8.20		
Kampong Thom	13.79	5.97	8.62	12.77		
Pursat	9.63	17.31	10.10	25.00		
Siem Reap	10.26	5.21	8.11	8.33		
Prevalence of underweight children under 5 years age (percentage)						
Battambang	24.53	31.34	16.82	21.31		
Kampong Thom	32.76	32.84	18.10	14.89	**	*
Pursat	25.93	36.54	19.19	26.92		
Siem Reap	27.35	35.42	18.92	8.33		**
Prevalence of children 6-23 months receiving a minimum acceptable diet (percentage)						
Battambang	31.03	48.28	31.03	43.48		
Kampong Thom	33.33	27.78	27.03	27.27		
Pursat	34.38	35.29	39.13	43.75		
Siem Reap	31.03	26.67	31.82	30.00		
Prevalence of children 6-23 months meeting minimum dietary diversity (percentage)						
Battambang	46.88	48.28	68.97	65.22		
Kampong Thom	46.15	27.78	60.53	54.55		
Pursat	59.38	55.56	64.00	62.50		
Siem Reap	46.67	34.38	59.09	40.00		
Exclusive breast-fed children age 0-5 months (percentage)						
Battambang	92.31	66.67	73.33	66.67		
Kampong Thom	57.14	28.57	71.43	70.0		
Pursat	84.62	66.67	77.78	100.0		
Siem Reap	83.33	83.33	50.00	85.71		

t-test: **= p<0.01, *=p<0.05.

In summary, the results presented in Tables 18-21 indicate that, on all the counts 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 (baseline of the project) to 2016 (endline of the project). These are quite encouraging results. However, 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.

In light of these findings, the purpose of this impact evaluation is to assess the extent to which these changes observed among the treated households can be attributed to Cambodia HARVEST interventions (i.e., to rule out other confounding factors that may have caused these changes). This question is the focus of the impact analysis presented in the following section. The results of this descriptive analysis point to some significant differences in the level and trend of the outcome indicators by the gender of the head of the household and across provinces. Thus, all the analyses that address these questions are presented in the next section not only for the overall sample but also disaggregated by provinces and the gender of the household head.

6. RESULTS: IMPACT ANALYSIS

6.1. PSM-DiD Methodology Results

We used the PSM-DiD methodology outlined in Section 4 to estimate the average treatment effect on the treated (sample 1) and the intent to treat treatment (ITT) effect (sample 2) of Cambodia HARVEST in the study area. This methodology compares the matched samples of households from the treatment and comparison groups (matched on the basis of pretreatment characteristics) and then uses the pre- and post-treatment survey data from the same households across the treatment and comparison groups to assess whether the mean difference in the change in outcome variable in the two time periods is statistically significantly different between the treatment and comparison groups after we take into account other confounding factors that could also potentially affect the change in outcomes. This analysis includes all the observations from the two analytical samples defined in Table 6, irrespective of which value chain or other Cambodia HARVEST activities each household participated in. It should be noted that the estimated impact based on sample 2 (ITT) is conservative because of dilution due to some households not graduating as Cambodia HARVEST clients. This type of effect estimation Sample 1s also more prone to type 2 errors (false negatives).

We estimated the impact of Cambodia HARVEST for the following outcome indicators along the pathway conceptualized in Figure 2: crop yields per hectare, volume, value, sales, and net income per household for rice and vegetables, expenditure per capita, poverty status, women's dietary diversity score, prevalence of underweight women, minimum acceptable diet for children younger than 5 years, and prevalence of stunting, wasting, and underweight among children under 5 years.

We present in Tables 22-25 the summary results of the PSM-DiD regression models for the agricultural outcome variables noted above (Tables 22 and 24) plus some downstream outcome indicators along the impact pathway (Tables 23 and 25). For the outcomes based on anthropometrics data, results are presented for both the status outcome (binary variable) as well as the z-scores (continuous variable). For each outcome indicator, we include the results of the PSM-DiD model for both the samples in the same table (i.e., sample 1 and 2). For robustness check, we estimated the models on the basis of two propensity score matching methods – nearest neighbor and kernel, as explained in Section 4. For brevity, however, only the results of the nearest neighbor matching method using the propensity scores as a control variable are reported in these tables. For all indicators, the model is estimated for the overall sample 1 and sample 2, as well as disaggregated samples for each provinces and the gender of the head of the household. Results based on the correlated random effects (CRE) estimator are presented in Tables 22 and 23, and those based on the household fixed effects (FE) estimator are presented in Tables 24 and 25. Full results of these regression models are included in Annex 4 for CRE and in Annex 5 for FE.

Values reported in Tables 22-25 are the coefficients for the DiD variable (i.e., δ in equation 3), which are the Cambodia HARVEST program effects net of the time trend (i.e., changes between 2012 to 2016 due to time varying factors), differences between the treatment and comparison groups, and observed differences among households within the sample (i.e., other covariates included in the regression). For example, the results indicate that, keeping all things constant, the program effect on rice yield was -0.09 t/ha, ranging from -0.02 t/ha among female-headed households to -0.12 t/ha among male-headed households. Across provinces, the program effect was negative and statistically significant in Pursat (-0.27 t/ha) to positive but not statistically significant in Siem Reap (0.09 t/ha) (Table 22).

Table 22. Summary of Regression Results Based on PSM-Did Estimator: Correlated Random Effects Results for Samples 1 and 2

	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Sample 1 (excludes dropouts)							
Rice yield (t/ha)	-0.022 (0.15)	-0.118 (0.13)	-0.268* (0.13)	0.090 (0.13)	-0.087 (0.07)	-0.115 (0.07)	-0.022 (0.21)
Wet-season rice yield (t/ha)	-0.036 (0.16)	-0.110 (0.12)	-0.252 (0.14)	0.107 (0.13)	-0.100 (0.07)	-0.126 (0.07)	-0.020 (0.21)
Dry-season rice yield (t/ha)	-- ^a	1.554 (1.04)	-0.635 (0.46)	-0.401 (0.84)	-0.248 (0.38)	-0.473 (0.39)	--
Volume of rice production per household (tons)	-0.495 (2.25)	-1.034 (1.01)	1.329 (1.22)	-0.128 (0.68)	0.470 (0.74)	0.491 (0.86)	0.379 (1.16)
Value of rice production per household (in million Riels)	3.025 (10.96)	-3.066 (4.91)	3.918 (7.08)	0.063 (4.60)	3.889 (3.81)	4.092 (4.41)	3.745 (6.33)
Rice net income per household (in million Riels) ^b	-0.091 (0.89)	-0.149 (0.35)	-0.114 (0.55)	0.157 (0.38)	0.055 (0.30)	0.095 (0.34)	0.177 (0.49)
Value of rice sales (in million Riels)	-0.113 (0.15)	2.127 (2.36)	-0.363** (0.11)	-0.020 (0.04)	0.185 (0.38)	-0.112 (0.12)	0.119 (0.13)
Value of vegetable production (in million Riels)	0.137 (0.68)	0.135 (0.08)	-0.012 (0.05)	0.108 (0.12)	0.197 (0.13)	0.226 (0.15)	0.159* (0.08)
Sales of all vegetables per household (in million Riels)	0.323 (1.25)	0.102 (0.10)	-0.024 (0.10)	0.146 (0.28)	0.355 (0.26)	0.455 (0.34)	0.346 (0.19)
Vegetable net income per household (in million Riels)	-0.133 (0.51)	-0.28** (0.10)	-0.184* (0.09)	-0.437 (0.34)	-0.144 (0.12)	-0.132 (0.16)	-0.108 (0.11)
Sample 2 (includes dropouts)							
Rice yield (t/ha)	-0.007 (0.15)	-0.152 (0.13)	-0.273* (0.13)	-0.024 (0.12)	-0.114 (0.07)	-0.138 (0.07)	-0.057 (0.20)
Wet-season rice yield (t/ha)	-0.023 (0.16)	-0.142 (0.11)	-0.258 (0.13)	0.048 (0.12)	-0.114 (0.07)	-0.140 (0.07)	-0.027 (0.19)
Dry-season rice yield (t/ha)	--	1.198 (0.99)	-0.596 (0.49)	-0.658 (0.58)	-0.339 (0.38)	-0.520 (0.39)	2.802 (17.62)
Volume of rice production per household (tons)	-0.778 (2.19)	-0.962 (0.99)	1.210 (1.19)	-0.492 (0.66)	0.043 (0.71)	0.072 (0.82)	0.147 (1.08)
Value of rice production per household (in million Riels)	1.381 (10.54)	-2.476 (4.90)	3.258 (6.89)	-1.647 (4.46)	1.967 (3.62)	2.276 (4.19)	0.961 (0.97)
Rice net income per household (in million Riels)	-0.192 (0.87)	-0.134 (0.35)	-0.174 (0.53)	-0.018 (0.37)	-0.073 (0.28)	-0.036 (0.33)	0.090 (0.46)
Value of rice sales (in million Riels)	-0.110 (0.15)	2.059 (2.24)	-0.341** (0.11)	-1.864 (2.29)	-0.352 (0.70)	-0.088 (0.12)	0.220 (0.16)
Value of vegetable production (in million Riels)	0.201 (0.62)	0.131 (0.07)	-0.023 (0.05)	0.078 (0.12)	0.189 (0.13)	0.220 (0.14)	0.132 (0.08)
Sales of all vegetables per household (in million Riels)	0.383 (1.16)	0.097 (0.09)	-0.045 (0.09)	0.186 (0.34)	0.362 (0.26)	0.470 (0.34)	0.307 (0.17)
Vegetable net income per household (in million real Riels)	-0.108 (0.47)	-0.236* (0.09)	-0.190* (0.09)	-0.456 (0.30)	-0.163 (0.12)	-0.150 (0.15)	-0.157 (0.11)

* $p < 0.05$, ** $p < 0.01$. Standard errors are in parentheses. Standard errors are clustered at the village level.

Source: Cambodia HARVEST Impact Evaluation Surveys, 2012 and 2016.

Note: PSM-DiD Sample 1s based on nearest neighbor-4 matching method. Sample 1 uses stringent definition of treatment households that excludes households with all program dropout members. Sample 2 includes households with members that started as clients but later became inactive.

a. Model cannot be estimated because of few observations or model failed to converge.

b. All the values in Riels are adjusted for inflation and reported in real terms in 2012 Riels.

Similar size and direction of effects are observed for wet- and dry-season rice yields across provinces, for the overall sample, and for male- and female-headed households. The program effect on total rice production, value of production, sales, and net income per household is positive for the overall sample.

Similarly, the effect on the value of vegetable production and sales is positive, but the effect on vegetable net income is negative (-0.14 million Riels/household). But none of these effects are statistically significantly different from zero for the overall sample. These results are consistent between the two analytical samples used to define the treatment group and for both the CRE and FE model estimations (Tables 23 and 25). The only exception is the significant program effect on overall rice yield and wet-season rice yield in the FE model for sample 2. Using the FE model and the larger sample that includes 185 households that were enrolled as clients but later became inactive gives an estimate of the program effect to be -0.13 t/ha (Table 24). Most of these negative effects are associated with male-headed households (-0.17 t/ha) and with the Pursat Province (-0.30 t/ha).

In differential program effects by the type of household or its location, we found few statistically significant robust effects on agricultural outcomes in addition to the effects on rice yield noted above. One such effect of Cambodia HARVEST is the positive effect of increasing the value of vegetable production by female-headed household by 0.16 million Riels. In three out of four sample by model combinations, this effect was found to be statistically significant at $p < 0.05$. Another robust but negative effect observed across both sample 1 and 2 and in CRE and FE models is the program effect on vegetable net income in Kampong Thom and Pursat provinces. In these two provinces, Cambodia HARVEST client households experienced a decrease in net vegetable income of 0.20 million to 0.30 million Riels compared with households in the comparison group (Tables 22 and 24).

Moving down the pathway, we estimate that the program increased per capita annual expenditures by US\$3 to \$4 and reduced the percentage of people living on less than US\$1.25/day by 0.2%. However, effects are negligible and weren't found to be statistically significant effects of program participation. Also, the results across the various models and sample strategies used for robustness check found no significant effects of the program—in either magnitude or in the statistical sense—on the indicators of dietary diversity among women and children and nutritional outcomes for women as measured by percentage of women who are underweight.

The only nutritional indicators for which the program showed a significant effect, at least for the CRE models, are the prevalence of wasting and underweight among children under 5 years of age. Results indicate that the program contributed to about a 9% reduction in wasted children. On the other hand, the program effect is opposite for underweight children when the sample includes non-active client households (i.e., sample 2). The program is estimated to increase the prevalence of underweight children by about 9% in sample 2 (Table 23). Both these positive and negative effects on child nutrition observed under the CRE models are not present, however, when the analysis is based on household FE estimator and the time constant variables are excluded in the regression (Table 25). Interestingly, the program effects are not found to be statistically significant across provinces and gender of the household head for any of the downstream indicators across both the CRE and FE models and both the analytical samples of the households.

Table 23. Summary of Regression Results Based on PSM-Did Estimator: Correlated Random Effects Results for Samples 1 and 2

	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Sample 1 (excludes dropouts)							
Poverty and expenditure outcomes							
Poverty (1=poor household) ^b	-- ^a	--	--	--	0.003 (0.02)	--	--
Per capita annual expenditures (US\$)	-6.784 (15.36)	-6.435 (23.69)	-10.550 (22.55)	24.700 (19.01)	4.035 (10.16)	7.833 (11.54)	-7.370 (22.96)
Outcomes on dietary diversity and adequacy							
Number of food groups consumed by women in the past 24 hours (range 0-9) ^c	-0.255 (0.25)	-0.089 (0.23)	0.328 (0.27)	-0.252 (0.22)	-0.059 (0.12)	-0.227 (0.26)	-0.381 (0.30)
Prevalence of children 6-23 months receiving minimum acceptable diet ^b	0.052 (0.15)	-0.108 (0.16)	-0.086 (0.24)	-0.296 (44.66)	-0.042 (0.09)	-0.055 (0.10)	--
Prevalence of exclusive breast-fed children under 6 months ^b	--	--	--	--	-0.299 (0.54)	--	--
Nutritional outcomes for women							
1= woman is underweight ^b	0.019 (.)	0.088 (0.05)	-0.025 (0.04)	0.060 (.)	0.031 (0.02)	0.032 (0.02)	--
Woman's body mass index	0.202 (0.39)	-0.340 (0.30)	0.681* (0.29)	0.089 (0.28)	0.153 (0.15)	0.196 (0.17)	-0.216 (0.36)
Nutritional outcomes for children <5 years age							
1=child is stunted ^b	0.045 (0.42)	0.023 (0.28)	0.121 (.)	0.108 (0.09)	0.085 (0.05)	0.120* (0.06)	-0.108 (39.39)
1=child is wasted ^b	--	--	--	--	-0.094* (0.04)	--	--
1=child is underweight ^b	--	--	--	--	0.085 (2.83)	--	--
z-scores--height for age (stunting)	0.806 (1.52)	-0.210 (0.57)	-0.109 (0.47)	-0.458 (0.34)	0.935 (0.82)	1.205 (1.02)	-0.291 (0.52)
z-scores—weight for height (wasting)	-1.005 (2.26)	0.510 (0.48)	1.422 (1.65)	0.584 (0.45)	0.323 (0.80)	-0.276 (2.79)	0.352 (0.56)
z-scores—weight for age (underweight)	-0.107 (0.33)	0.253 (0.38)	-0.267 (0.27)	-0.093 (0.22)	0.020 (0.17)	0.054 (0.19)	0.017 (0.47)
Sample 2 (excludes dropouts)							
Poverty and expenditure outcomes							
Poverty (1=poor household)	-- ^a	--	--	--	0.002 (0.02)	--	--
Per capita annual expenditures (US\$)	-9.022 (15.38)	-4.102 (23.26)	-10.765 (22.20)	18.631 (16.34)	2.747 (9.80)	5.528 (11.08)	-4.482 (22.35)
Outcomes on dietary diversity and adequacy							
Number of food groups consumed by women in the past 24 hours (range 0-9) ^c	-0.265 (0.24)	-0.122 (0.23)	0.370 (0.27)	-0.176 (0.19)	-0.044 (0.12)	0.013 (0.13)	-0.314 (0.28)
Prevalence of children 6-23 months receiving minimum acceptable diet ^b	0.094 (0.16)	-0.057 (0.17)	-0.177 (3.23)	-0.134 (173.85)	-0.069 (0.09)	-0.071 (0.10)	0.086 (0.12)
Prevalence of exclusive breast-fed children under 6 months ^b	--	--	--	--	-0.187 (0.16)	--	--

	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Nutritional outcomes for women							
1= woman is underweight ^b	0.025 (0.05)	0.080 (0.05)	-0.009 (0.04)	--	0.032 (0.02)	0.038 (0.02)	-0.005 (0.07)
Woman's body mass index	0.282 (0.38)	-0.302 (0.29)	0.685* (0.29)	0.139 (0.25)	0.172 (0.15)	0.212 (0.16)	-0.154 (0.35)
Nutritional outcomes for children <5 years age							
1=child is stunted ^b	0.237 (0.31)	0.046 (0.37)	-0.063 (0.46)	0.444 (0.30)	0.793 (0.71)	1.054 (0.90)	-0.102 (0.50)
1=child is wasted ^b	--	--	--	--	-0.087* (0.04)	--	--
1=child is underweight ^b	--	--	--	--	0.090* (0.04)	--	--
z-scores--height for age (stunting)	0.627 (1.38)	-0.185 (0.55)	-0.063 (0.46)	-0.419 (0.30)	0.793 (0.71)	1.054 (0.90)	-0.132 (0.49)
z-scores—weight for height (wasting)	-1.310 (2.17)	0.478 (0.46)	1.480 (1.64)	0.599 (0.42)	0.241 (0.71)	-0.696 (2.59)	0.374 (0.53)
z-scores—weight for age (underweight)	-0.178 (0.32)	0.235 (0.37)	-0.243 (0.26)	-0.106 (0.22)	0.001 (0.15)	0.053 (0.19)	0.007 (0.47)

* $p < 0.05$, ** $p < 0.01$. Standard errors are in parentheses. Standard errors are clustered at the village level.

Source: Cambodia HARVEST Impact Evaluation Surveys, 2012 and 2016.

Note: PSM-DiD Sample 1s based on nearest neighbor 4 matching method. Sample 1 uses stringent definition of treatment households that excludes households with all program dropout members. Sample 2 includes households with members that started as clients but later became inactive.

a. indicates that model cannot be estimated because of few observations or model failed to converge.

b. Marginal effects are reported.

c. Based on Negative Binomial CRE Model.

Table 24. Summary of Regression Results Based on PSM-DiD Estimator: Fixed Effects Results for Samples 1 and 2

	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Sample 1 (excludes dropouts)							
Rice yield (t/ha)	-0.024 (0.15)	-0.154 (0.13)	-0.324* (0.13)	0.077 (0.13)	-0.108 (0.07)	-0.150* (0.07)	-0.114 (0.20)
Wet-season rice yield (t/ha)	-0.027 (0.16)	-0.166 (0.12)	-0.312* (0.13)	0.087 (0.13)	-0.124 (0.07)	-0.167* (0.07)	-0.119 (0.19)
Dry-season rice yield (t/ha)	0.585** (0.00)	1.052 (1.01)	0.051 (0.37)	-0.297 (0.76)	-0.158 (0.37)	-0.279 (0.40)	--a
Volume of rice production per household (tons)	-0.373 (2.07)	-0.907 (1.09)	1.057 (1.14)	0.384 (0.57)	0.718 (0.70)	0.623 (0.83)	0.318 (1.05)
Value of rice production per household (in million Riels)	3.686 (9.85)	-2.603 (5.33)	2.421 (6.60)	3.251 (3.78)	5.045 (3.55)	4.863 (4.14)	3.555 (5.74)
Rice net income per household (in million Riels)	0.066 (0.81)	-0.101 (0.39)	-0.228 (0.51)	0.412 (0.32)	0.144 (0.27)	0.180 (0.32)	0.144 (0.45)
Value of rice sales (in million Riels)	-0.157 (0.15)	3.536 (2.94)	-0.314** (0.11)	-0.019 (0.04)	0.187 (0.35)	-0.213* (0.09)	0.206 (0.14)
Value of vegetable production (in million Riels)	0.097 (0.62)	0.137 (0.07)	-0.021 (0.05)	0.097 (0.11)	0.175 (0.11)	0.271 (0.15)	0.149* (0.07)
Sales of all vegetable per household (in million Riels)	0.138 (1.52)	0.141 (0.09)	-0.131 (0.11)	-0.058 (0.21)	0.158 (0.22)	0.329 (0.29)	0.388 (0.20)
Vegetable net income per household (in million Riels)	-0.112 (0.44)	0.277** (0.10)	-0.186* (0.08)	-0.437 (0.32)	-0.143 (0.12)	-0.136 (0.16)	-0.104 (0.10)
Sample 2 (includes dropouts)							
Rice yield (t/ha)	-0.024 (0.15)	-0.177 (0.13)	-0.308* (0.13)	-0.045 (0.12)	-0.129* (0.06)	-0.170* (0.07)	-0.146 (0.19)
Wet-season rice yield (t/ha)	-0.028 (0.15)	-0.177 (0.12)	-0.295* (0.13)	0.017 (0.12)	-0.132* (0.07)	-0.180* (0.07)	-0.112 (0.18)
Dry-season rice yield (t/ha)	0.585** (0.00)	1.099 (0.87)	0.030 (0.39)	-0.332 (0.63)	-0.232 (0.37)	-0.355 (0.42)	2.802 (3.64)
Volume of rice production per household (tons)	-0.807 (2.02)	-0.904 (1.06)	1.095 (1.19)	-0.204 (0.59)	0.203 (0.68)	0.084 (0.80)	0.057 (1.01)
Value of rice production per household (in million Riels)	1.780 (9.58)	-2.346 (5.15)	2.624 (6.57)	0.191 (3.93)	2.922 (3.41)	2.732 (3.98)	1.060 (0.92)
Rice net income per household (in million Riels)	-0.103 (0.78)	-0.108 (0.37)	-0.209 (0.51)	0.124 (0.33)	0.008 (0.26)	0.036 (0.31)	0.088 (0.44)
Value of rice sales (in million Riels)	-0.133 (0.14)	2.965 (2.60)	-0.307** (0.11)	-3.956 (4.15)	-0.656 (0.93)	-0.181* (0.09)	0.220 (0.13)
Value of vegetable production (in million Riels)	0.164 (0.57)	0.135* (0.06)	-0.024 (0.05)	0.060 (0.12)	0.173 (0.11)	0.279 (0.15)	0.174* (0.07)
Sales of all vegetable per household (in million Riels)	0.286 (1.39)	0.128 (0.08)	-0.136 (0.11)	-0.101 (0.24)	0.168 (0.22)	0.358 (0.29)	0.451* (0.19)
Vegetable net income per household (in million Riels)	-0.091 (0.42)	0.242** (0.09)	-0.183* (0.08)	-0.455 (0.29)	-0.165 (0.12)	-0.149 (0.16)	-0.147 (0.10)

* $p < 0.05$, ** $p < 0.01$. Standard errors are in parentheses. Standard errors are clustered at the village level.

Source: Cambodia HARVEST Impact Evaluation Surveys, 2012 and 2016.

Note: PSM-DiD Sample 1s based on nearest neighbor 4 matching method. Sample 1 uses stringent definition of treatment households that excludes households with all program dropout members. Sample 2 includes households with members that started as clients but later became inactive.

a. Model cannot be estimated because of few observations or model failed to converge.

b. All the values in Riels are adjusted for inflation and reported in real terms in 2012 Riels.

Table 25. Summary of Regression Results Based on PSM-DiD Estimator: Fixed Effects Results for Samples 1 and 2

	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Sample 1 (excludes dropouts)							
Poverty and expenditure outcomes							
Poverty (1=poor household) ^b	2.583 (3.79)	2.403 (3.92)	1.043 (3.35)	-2.773 (3.60)	1.296 (1.85)	2.331 (1.95)	-2.892 (6.08)
Per capita annual expenditures (US\$)	-3.669 (15.16)	-2.585 (21.72)	-10.116 (21.89)	28.884 (17.97)	4.396 (9.90)	6.882 (11.50)	-4.802 (23.97)
Outcomes on dietary diversity and adequacy							
Number of food groups consumed by women in the past 24 hours (range 0-9) ^a	-- ^a	--	--	--	--	--	--
Prevalence of children 6-23 months receiving minimum acceptable diet ^a	--	--	--	--	--	--	--
Prevalence of exclusive breast-fed children under 6 months ^a	--	--	--	--	--	--	--
Nutritional outcomes for women							
1= woman is underweight ^b	-0.000 (0.00)	0.000 (0.00)	-0.001 (0.00)	0.018 (8.05)	0.000 (0.00)	0.015 (0.08)	--
Woman's body mass index	0.018 (0.34)	-0.397 (0.27)	0.480 (0.26)	-0.069 (0.26)	-0.006 (0.14)	0.054 (0.15)	-0.154 (0.37)
Nutritional outcomes for children <5 years age							
1=child is stunted ^b	0.000 (0.03)	0.009 (0.06)	0.009 (2.34)	0.015 (0.18)	0.076 (0.19)	0.008 (0.04)	0.000 (0.00)
1=child is wasted ^b			-0.213 (284.15)	-0.000 (0.00)	-0.003 (0.02)	-0.000 (0.00)	
1=child is underweight ^b	0.000 (0.00)	0.103 (38.85)	0.000 (0.11)	0.010 (21.60)	0.008 (0.04)	0.000 (0.00)	0.136 (13.74)
z-scores--height for age (stunting)	-0.462 (0.47)	0.080 (0.39)	-0.225 (0.32)	-0.017 (0.24)	-0.034 (0.19)	0.084 (0.22)	-0.223 (0.45)
z-scores—weight for height (wasting)	-2.249 (1.68)	0.442 (0.45)	1.273 (1.87)	0.714 (0.41)	0.277 (0.82)	0.392 (0.99)	0.312 (0.48)
z-scores—weight for age (underweight)	-0.462 (0.47)	0.080 (0.39)	-0.225 (0.32)	-0.017 (0.24)	-0.034 (0.19)	0.084 (0.22)	-0.223 (0.45)
Sample 2 (excludes dropouts)							
Poverty and expenditure outcomes							
Poverty (1=poor household)	2.539 (3.73)	2.548 (3.87)	1.104 (3.33)	-3.333 (3.48)	0.967 (1.83)	2.289 (1.93)	-3.589 (6.06)
Per capita annual expenditures (US\$)	-7.266 (14.94)	1.488 (21.61)	-11.575 (21.75)	22.545 (15.76)	4.116 (9.59)	6.673 (11.12)	2.889 (22.76)
Outcomes on dietary diversity and adequacy							
Number of food groups consumed by women in the past 24 hours (range 0-9) ^a	--	--	--	--	--	--	--
Prevalence of children 6-23 months receiving minimum acceptable diet ^a	--	--	--	--	--	--	--
Prevalence of exclusive breast-fed children under 6 months ^a	--	--	--	--	--	--	--

	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Nutritional outcomes for women							
1= woman is underweight ^b	0.002 (0.03)	0.000 (0.00)	-0.001 (0.00)	0.000 (0.00)	0.000 (0.00)	0.002 (0.01)	-0.003 (0.00)
Woman's body mass index	0.083 (0.34)	-0.421 (0.27)	0.476 (0.26)	0.090 (0.23)	0.036 (0.13)	0.083 (0.15)	-0.206 (0.36)
Nutritional outcomes for children <5 years age							
1=child is stunted ^b	0.000 (0.00)	0.008 (0.06)	0.008 (0.90)	0.017 (0.16)	0.050 (0.15)	0.003 (0.02)	0.000 (0.00)
1=child is wasted ^b	--	--	-0.210 (521.95)	-0.002 (0.34)	-0.002 (0.01)	-0.000 (0.00)	--
1=child is underweight ^b	-0.000 (0.00)	0.010 (25.25)	0.000 (0.11)	0.000 (0.01)	0.009 (0.04)	0.000 (0.00)	0.136 (13.74)
z-scores--height for age (stunting)	0.310 (2.27)	-0.282 (0.50)	0.107 (0.64)	-0.738* (0.37)	0.557 (0.78)	0.899 (0.99)	-0.668 (0.55)
z-scores—weight for height (wasting)	-2.110 (1.55)	0.407 (0.44)	1.253 (1.85)	0.693 (0.40)	0.282 (0.74)	0.392 (0.91)	0.341 (0.48)
z-scores—weight for age (underweight)	-0.521 (0.45)	0.076 (0.38)	-0.193 (0.32)	0.028 (0.23)	-0.023 (0.19)	0.095 (0.21)	-0.115 (0.46)

* $p < 0.05$, ** $p < 0.01$. Standard errors are in parentheses. Standard errors are clustered at the village level.

Source: Cambodia HARVEST Impact Evaluation Surveys, 2012 and 2016.

Note: PSM-DiD Sample 1s based on nearest neighbor 4 matching method. Sample 1 uses stringent definition of treatment households that excludes households with all program dropout members. Sample 2 includes households with members that started as clients but later became inactive.

a. . indicates that model cannot be estimated because of few observations or model failed to converge.

b. Marginal effects are reported.

c. Based on Negative Binomial CRE Model.

The full results presented in Annex 4 and 5 show several interesting and expected associations between the outcome variables and several covariates included in the model to control for sample differences. For example, rice production (value and quantity) and net income are positively associated with the household head being a male and wealthy households (as indicated by value of assets and land holding) and negatively associated with cost of inputs, owning tractor, and household engaged in growing dry-season rice. At least in the CRE models, rice production and net income are also positively associated with the number of years the HH participated in the Cambodia HARVEST interventions. Rice productivity (as measured by yield) is negatively associated with operated area but positively with input use (as represented by input cost variable) and assets owned (indicator of HH wealth) (Annex 4 and 5).

For vegetables, the only statistically significant correlations are with the input cost (positive for value of production and sales but negative for net vegetable income) (Annex 4 and 5). For the downstream impacts on household welfare, the results also indicate that household expenditures are significantly lower as the household size increases but significantly higher as the percentage of household heads who attended school goes up. Household expenditures are also positively associated with ownership of a cell phone and value of assets.

At the individual level of outcomes, the women's dietary diversity was found to be positively correlated with the amount of money spent on food consumption per person per day. The number of food groups a woman ate in the past 24 hours was also found to be higher if she was the caretaker of a child in the household. Surprisingly, the women's dietary diversity scores were negatively correlated with a household's participation in the HARVEST program

as a client in home garden and rice value chains. No statistically significant correlations were detected between child-level nutritional indicators and the child- or household-level characteristics. Perhaps this could be due to the smaller sample size for some of these indicators in restricted samples 1 and 2 used in this analyses.

6.2. Discussion of PSM-DiD Results

The analysis presented in this section failed to detect statistically significant and robust results of Cambodia HARVEST on most of the key outcome variables as measured by the intent to treat treatment effects (sample 2) or the average treatment effects (sample 1). In other words, comparing the before and after intervention data between the treatment and comparison villages and controlling for potential confounding factors reveal no statistically significant effect of the program in changing the average values of some key indicators across all the sample households included in the treatment and comparison villages. These results are consistent across provinces and male- and female- headed households.

The reasons for being unable to detect any program effect (i.e., coefficients significantly different from zero) across the various model specifications could be threefold. One plausible reason could be that the sample size was not large enough to detect the treatment effect. This is especially the case for sample 1, which is based on 1609 household observations, which is almost 500 observations less than the initial sample size. This represents a significant loss of statistical power in detecting smaller treatment effects. Although 179 households were lost to sample attrition (i.e., households no more living in the same village), a significantly large number of households from the treatment villages (312) were dropped from the analysis because either they did not participate or had become inactive clients in Cambodia HARVEST, even though they were selected to receive the interventions at the time of the sample selection in 2012. Both these types of sample attrition problems represent practical challenges to conducting rigorous impact evaluations of development projects that require panel data analysis. Unlike clinical trials, in which people assigned to a treatment receive the treatment, in development interventions such as those promoted by Cambodia HARVEST, there is no guarantee that people selected for a treatment will indeed be treated. The high rate of non-compliance that was observed among the treatment group in this study necessitated dropping both the non-participating and inactive households from the analyses to estimate the average treatment effect on the treated households (sample 1) or only dropping the non-participating households to estimate the intent to treat treatment effect (sample 2). However, the reduced sample size under both these strategies lowered the statistical power of the analysis and thus lowered the ability to detect the effect sizes significantly different from zero.

A second potential reason could be the positive spillover effects of Cambodia HARVEST or other similar programs in the comparison villages. As noted in the descriptive analysis, there were other programs organized by NGOs, government organizations or other donors that were active in the study areas, and many in the comparison villages reported having received similar interventions in the past four years. Moreover, the average distance between a comparison village and the closest Cambodia HARVEST intervention village was only 1.4 km. This close proximity of comparison villages to a treatment village also implies a high probability of messages, techniques, practices, and inputs promoted by Cambodia HARVEST reaching and influencing farmers' behavior in the comparison villages nearby. Given these two sources of potential contamination—the spillover effects from Cambodia HARVEST and other similar programs—it is difficult to defend the comparison group for this evaluation as a true control group. This is another practical challenge of conducting rigorous impact

evaluations of development projects like Cambodia HARVEST, where households from the comparison group can self-select to receiving similar interventions. This contamination of the comparison villages threatens the integrity of the evaluation design, as is likely the case in this study.

A third plausible reason for inability to detect any significant effects could be the fact that the program was not the cause of the net changes observed over time and between the treatment and comparison groups for the indicators evaluated. In other words, the observed positive changes in the outcome indicators observed in the treatment group before and after Cambodia HARVEST were not caused by Cambodia HARVEST alone but by some other factors that may or may not include the Cambodia HARVEST project as one of the change agents. The results do not indicate is that the project was the cause of any negative effects on the beneficiaries' production, income, poverty, and other welfare indicators. The failure to detect statistically significant program effect implies that the study is inconclusive, (about the cause of the observed change in outcomes, rather than a proof that the project was ineffective.

7. CONCLUSION AND EMERGING LESSONS

As a flagship project under the Feed the Future initiative, Cambodia HARVEST aimed to contribute toward the two FTF objectives of agricultural sector growth and improved nutritional status for women and children by integrating nutrition as one of the cross-cutting components in its agriculture-focused interventions. Cambodia HARVEST adopted a comprehensive strategy to influence individual and farm household behavior change, adoption of practices, and women's empowerment, which can lead to agricultural growth (as reflected in increased productivity, diversification, input availability, sales of produce, and storability, safety, and quality of food), increased production and income, and ultimately to improved food security and nutrition outcomes through increased expenditures and adequate and diverse food intake.

With this income-focused agriculture-nutrition linkage framework as a backdrop, this study was designed to assess project outcome status on some key indicators along the impact pathway and to evaluate the impacts of project interventions using rigorous impact evaluation methodologies. Through these two sets of analytical approaches (descriptive and rigorous impact analysis), the study aimed to test the following hypothesis: farm households that participated in or received Cambodia HARVEST interventions (i.e., technical assistance, extension services, training, field demonstrations, etc.) would have greater availability of food as measured by total production (quantity and value) (food production pathway); increased income from production as measured by net income (from rice, vegetables and fish) and total expenditures (income pathway); and more diverse diets and improved nutritional outcomes for children and women (a combination of production, income, and women's empowerment pathways).

The descriptive analysis points to the project's success in influencing several targeted outputs and outcomes along the impact pathway. The general awareness and knowledge about concepts, terminologies and practices promoted by the project was significantly higher among households from Cambodia HARVEST-targeted villages than in the comparison villages where Cambodia HARVEST did not intervene. The women in the treatment group also reported having a higher level of knowledge than women in the comparison group about some of the food consumption practices for children and adults, the concept of three food groups, and practices related to good hygiene. Although these are not surprising findings, they confirm this immediate result of Cambodia HARVEST as testified by the farmer survey.

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. For example, a significantly higher percentage of women in the treatment villages reported owning or managing a home garden plot, making *borbor* (enriched porridge) for their children, and serving at least one of the items from each of the three food groups in all meals compared with women in villages where Cambodia HARVEST was not implemented. 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 seeding, row planting, and use of drought-resistant varieties, and for vegetables such as raised planting beds, plant spacing, trellis netting, plastic and straw mulch, use of compost, etc. So on these subintermediate result indicators of uptake and adoption—which are necessary conditions for achieving higher level impacts on productivity, income, and nutrition—Cambodia HARVEST villages did better than comparison villages, as reflected in a significantly higher percentage of farmers in HARVEST villages reporting having used or

tried some of the practices and techniques aimed at enhancing both food production and consumption.

Beyond adoption and uptake of improved practices, the results of descriptive analysis also indicate that on all the counts 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), implying that Cambodia HARVEST beneficiaries were better off in 2016 than in 2012. The impact analysis was intended to determine whether these improvements can be attributed to Cambodia HARVEST interventions (i.e., to rule out other confounding factors that may have caused these changes). We used the restricted sample of treatment households that had participated as clients in the rice, home garden, and aquaculture value chain activities of Cambodia HARVEST to estimate the average treatment effects and the intent to treat treatment effects based on the PSM-DiD CRE and FE estimation models. We found that between 2012 and 2016, outcomes for households in the comparison group had improved as much as those of project beneficiaries. The analyses thus failed to detect any robust and statistically significant differences between the levels of improvements in the two groups. 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 positive effect of the program in changing the average values of some key indicators, such as gross income, total expenditures, poverty status, dietary diversity, and nutritional outcomes as reflected in stunting, wasting, and underweight of children under 5 years of age, and underweight among women of childbearing age. However, because other donors and government programs were active in the study area in both treatment and comparison villages, and treatment and comparison villages were an average of 1.4 km apart increasing the chances for spillover, this study cannot arrive at any conclusions about the relative effectiveness of Cambodia HARVEST, other donor programs, or no interventions.

We offer the following thoughts on some of the limitations of this study and lessons learned. Some of these limitations reinforce the potential reasons mentioned above for the overall inconclusive results.

7.1. Limitations of Sampling Methodology

Several features of the sampling methodology used for impact evaluation were less than ideal and did not conform to the impact evaluation design proposed for this study (Suvedi 2012). First, the actual sample size selected for the study deviated from the proposed impact evaluation design. For example, the proposed sample size based on power calculation was proposed to be 2,700 households, with treatment villages to be selected from Phase I and Phase II targeted villages. However, because the list of clients for Phase II were not finalized at the time of the baseline survey, the actual sample size was reduced to 2,100 households, which lowered the statistical power of the impact evaluation design to detect small effects. At the time of the endline survey, we also discovered that one of the comparison villages was intervened by HARVEST, which necessitated classifying it as a treatment village. That further reduced the sample size for the comparison group and the statistical power of the analyses.

Second, the actual sample of households used for the impact analysis presented in this paper was further reduced because of sample attrition (from baseline to endline survey) and non-conformity issues. For example, several hundred households that were selected from the list

of clients targeted to receive direct Cambodia HARVEST technical assistance were found (after the endline survey) to have either not participated in the program or eventually dropped out. As a result, the final sample size of panel households was 1,609, i.e., 1,088 for treatment group and 521 for the comparison group. This smaller sample size further reduced the statistical power of the analysis to detect the program effect.

Third, the comparison villages selected for the evaluation were geographically located in close proximity to the treatment villages. When the treatment and comparison villages were selected in 2012 for the baseline survey, the average distance between a comparison village and the closest treatment village in the sample was about 4.2 km. However, over the three years after the baseline survey was conducted, the Cambodia HARVEST program interventions were extended to other villages in the same area. That reduced the average distance between a comparison village and any Cambodia HARVEST treatment village to only 1.4 km. So although the comparison villages were not intervened by HARVEST as per the design, selecting other treatment villages closer to the comparison villages potentially increased the spillover effects of treatment and reduced the ability to detect program effects.

7.2. Project Setting

Cambodia HARVEST coverage was limited to selected districts and villages in four target provinces (FTF zone of influence). This formed the definition of the study area for this evaluation. However, according to the survey, farmers in comparison villages within the study area reported receiving interventions from other NGO-funded projects and by the government. These other development interventions were promoting similar technologies or innovations—i.e., new rice varieties, home gardens, and nutrition education. The lack of discernible impacts could be due to the presence of these other interventions in comparison villages, which may have diluted the net program effects that can be attributed to Cambodia HARVEST.

7.3. Project Implementation Approach

It is also worth noting the way that Cambodia HARVEST was implemented to provide a context to the results. First, the service delivery approach of Cambodia HARVEST included providing intensive technical assistance to clients for a period of 18 to 24 months, then graduating them and moving on to other villages and clients. Over the five years, the project's implementation strategy had evolved (as it should) on the basis of internal reflections and an external midterm review. However, the sample of farmers selected for this evaluation predominantly represented the first cohorts of Cambodia HARVEST beneficiaries. This means that the results of this evaluation may not reflect some of the evolution and improvements in the Cambodia HARVEST project implementation that may have taken place in the later years.

The service delivery approach that included intensive technical assistance to clients also had its own limitations that could have contributed to the lack of program effect on key indicators. Cambodia HARVEST as a project hired its own extension workers and did not utilize or collaborate with extension officers of the Royal Government of Cambodia. As a result, clients had no contact with extension service providers after their participation in Cambodia HARVEST ended. The project moved to other districts/villages after one or two crop cycles, so there was no reinforcement for sustainable adoption of new technology.

As indicated by the survey results, there was a huge increase (after 2011) in the awareness and uptake of some of the technologies promoted by the project, and this can be attributed to the Cambodia HARVEST (and other) program interventions in the study area. However, from 2012 to 2016, there was also a large gap between awareness and first-time uptake, and between uptake and current adoption. It seems that only 50% of farmers who become aware of a new technology made a decision to try it, and only 50% of those that tried it continued to use the technology a few years later. Of those who were aware of a new practice but did not adopt it, the main reasons given were non-availability of inputs, labor constraints, high cost, and lack of technical assistance. At least two of these constraints—availability of inputs and technical assistance—and potentially a third one (cost) are issues that Cambodia HARVEST could have addressed if it had had an exit strategy that didn't leave a void once a village was graduated. To be fair, we note that the project offered training to local suppliers to fill this void. But anecdotal evidence indicates that many did not start a business or discontinued their business and migrated to cities or neighboring countries for employment. More qualitative studies focused on the sustainability of these businesses or input suppliers and farmer surveys focused on technology adoption behavior after graduating from Cambodia HARVEST as a client would have been important to shed some light on the reasons for low rates of adoption of these technologies promoted by the project.

7.4. Time Lags in Influencing Impact Indicators along the Pathway

The focus of this impact evaluation was to assess whether and by how much the project activities contributed to higher income, expenditures, better quality of food consumption (as measured by dietary diversity), adoption of good infant and young child feeding practices, and improvements in nutritional outcomes as reflected in stunting, wasting, and underweight in children under 5 years of age, and underweight among women of childbearing age. The main pathways by which the project was expected to influence these outcomes were production (i.e., technology adoption), consumption (nutrition education and programs), and policy changes. The lack of discernible effects of these efforts on the impact indicators examined along the pathways could be due to the low magnitude of effects, which were not adequate to trigger cascading effects down the pathways and generate sustainable changes in farm practices, food preparation practices, food consumption behavior, and hygiene habits. It is also possible that this evaluation may have taken place in a time frame (recall that on average the treated household had most participated in 2013-2014, two years before the endline survey) when these impacts were still not realized. Realization of impacts on some of the downstream indicators needs consistent efforts from change agents and institutional arrangements for getting agriculture moving.

In conclusion, the reasons identified above—i.e., sample size, non-conformity of treatment households, contamination of control group due to spillover effects, evolving nature of a program, time lags, etc.—are common issues that pose practical challenges in conducting rigorous impact evaluations that require pre- and post-treatment data from both treatment and comparison groups. Large-scale and comprehensive development projects such as Cambodia HARVEST rarely have all the five years of their program mapped out in year 1, when the treatment and comparison groups need to be identified, and baseline data need to be collected. Such projects are often designed to tackle complex development challenges using multipronged approaches, which makes it difficult to define the treatment that should be the focus of such evaluation. The strategy and geographic scale of such projects also evolve and expand over time. These complexities make it difficult to come up with an adequate sample

of treatment group and comparison group that would be representative of the project's changing strategy and focus over time.

Rigorous impact evaluation can yield strong evidence of the causal effects of a program. But this Sample 1s not practical in all settings. The issues and challenges identified in this study should provide some guidance on the appropriateness of rigorous impact evaluations of such large-scale, comprehensive development projects. In a setting where it will be difficult to maintain a comparison group free of contamination (as was the case in this study setting), rigorous impact evaluations based on treatment and control group comparisons at a program level should be avoided. Perhaps employing rigorous impact evaluations focused on answering specific questions about the effectiveness of alternate approaches (especially, if they have cost implications for scaling up) for achieving a targeted result would be more appropriate than designing such rigorous large-scale impact evaluations to examine the effects of a complex program as a whole. One example of a rigorous impact evaluation focused on a specific question in the context of this study is testing the effectiveness of minimum type (i.e., length, intensity) of support required to ensure continued use of improved technologies by farmers after they graduate as program clients.

This study also points to the importance of identification and early involvement of impact evaluators in all aspects of the evaluation design and decision making on critical aspects that can affect the integrity of the design. This includes involvement by evaluators in sample selection (especially of the comparison group), periodic updates from project implementers on any changes in the project design or approach, and opportunity for evaluation partners to participate in discussions with the project implementation team to ensure future expansion of project activities does not compromise the buffer zone needed around the selected comparison group to minimize contamination.

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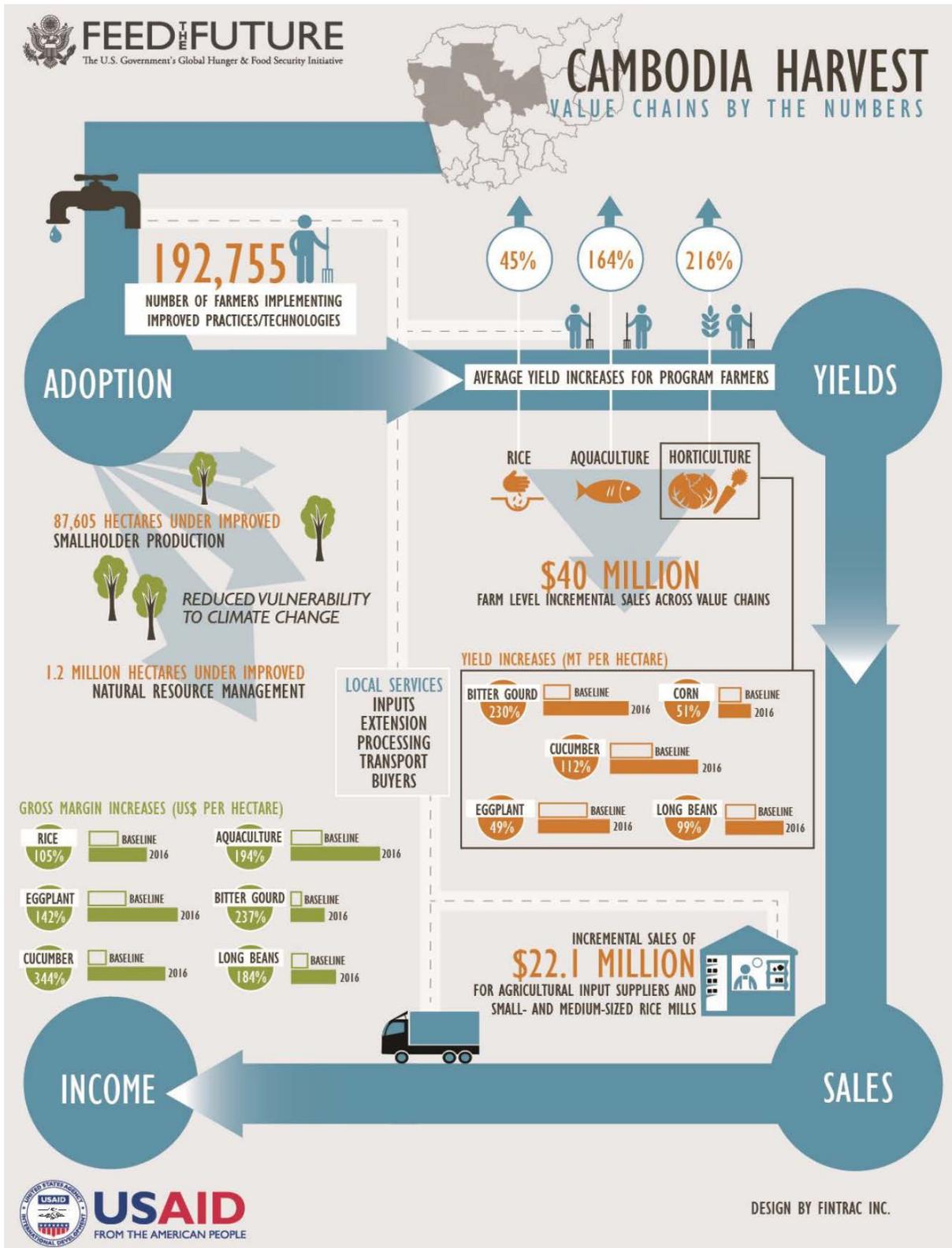
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ANNEX 1. SUMMARY OF CAMBODIA HARVEST ACHIEVEMENTS



Source: Cambodia HARVEST: Final Report (Fintrac 2016a).

ANNEX 2. SAMPLING METHOD AND APPROACH USED TO COLLECT BASELINE DATA IN 2012

A2.1. Population and Sampling Frame

Cambodia HARVEST program targeted to work with 70,000 households i.e., 22,610 households receiving direct technical assistance and 47,390 households receiving indirect assistance in the same areas. Of these populations, 15,000 households located within 150 villages of the four target provinces of Pursat, Battambang, Siem Reap and Kampong Thom were targeted to receive agriculture extension services training (on home gardens, commercial horticulture, fish ponds, rice), nutrition training, and credit and marketing assistance. The remaining 7,610 households were targeted to receive direct assistance from other HARVEST interventions such as forestry, fishery, mobile kitchen, vocational training, fish processing, Small and Medium Enterprises (SMEs) and agro-businesses.

Given the last projected program coverage, the Cambodia HARVEST impact evaluation design used a multi-stage cluster sampling approach, with households as the basic sampling unit. The sample size was designed to provide robust, accurate and precise results that minimize the burden of sampling error rate and statistically represent the study samples. In the most conservative approach, sample size of 2,100 was estimated based on a 95% confidence level (5% error) with a power of 80%, which means there is at least 80% chance of detecting changes/effects in the study samples with a 95% confidence level.

Based on feasibility and desirability, the total sample of 2,100 households was split 70:30 between treatment and comparison villages. Thus, 60 village clusters were selected for the treatment group and 24 (six per province) for the comparison group. The distribution of the sample size by provinces and by project phases (1 and 2) is outlined in Table A2.1.

A2.2. Village Sample Selection

The first step of the two-stage cluster sampling procedure was to select villages for the Cambodia HARVEST treatment and comparison group, and the second step was to randomly select households from each village cluster for the baseline and end of project impact evaluation surveys.

**Table A2.1. Sampling Framework for Cambodia HARVEST Impact Evaluation
Baseline Survey.**

Province	USAID targeted villages	HARVEST clients HHs (treatment group)					non-HARVEST HHs (comparison group)			Total sample HHs	
		ZOI-Phase I 2012	ZOI -Phase II 2013	Total sample villages	HHs per village	Total HHs	Sample villages	HHs per village	Total HHs	No. of villages	No. of HHs
Pursat	40	15	0	15	25	375	6	25	150	21	525
Battambang	46	11	4	15	25	375	6	25	150	21	525
Siem Reap	30	12	3	15	25	375	6	25	150	21	525
Kg Thom	34	10	5	15	25	375	6	25	150	21	525
Total	150	48	12	60		150	24		600	84	2100
						0					

A2.2.1. Selection of Treatment Clusters/Villages: At the time of designing the baseline survey, Cambodia HARVEST had already started interventions in 105 villages (Phase I villages) and had plans to expand their activities to another 45 villages in 2013 (Phase II villages). On average, a village comprised of 233 households and Cambodia HARVEST anticipated working directly with 50 to 100 households per village. The list of Phase I and Phase II villages with client households was obtained from the Cambodia HARVEST office. This data was used to construct the sampling frame for selecting villages or clusters for treatment group.

The impact evaluation guideline designed by MSU suggested that 50% of treatment group villages should be selected from Phase I list and 50% from phase II list. In practice, however, CDRI was not able to follow this guideline, because Fintrac did not have 30 sample villages to select Phase II villages. At the time of survey there were only 12 villages identified for Phase II that had enough Cambodia HARVEST clients for the sampling exercise, and thus all of them were selected.

For selecting Phase I village group, Fintrac provided a list of 105 villages, but some villages did not have enough Cambodia HARVEST clients for sample selection (for baseline data collection purposes, HARVEST clients that had received assistance before December 2011 were considered unqualified for sample selection). Therefore, villages that did not have enough clients were dropped and 48 villages were randomly selected from the list of remaining phase I villages. By adjusting Phase I and Phase II villages across provinces, the final sample of clusters or villages was reached in the desired proportion 25:25:25:25 percent for Pursat, Battambang, Siem Reap and Kampong Thom provinces, respectively (Tables A2.1).

A2.2.2. Comparison Clusters/Villages: The criteria for selecting comparison villages was that they had to be located near the Cambodia HARVEST project areas and were not being considered by Cambodia HARVEST expansion in the future. The comparison villages sought had similar socioeconomic characteristics, crops and fisheries, road infrastructure, and soil and climatic conditions, and were distant enough to have no spillover effects from the Cambodia HARVEST treatment villages. Fintrac provided a list of 40 villages (10 per province), which were located near the intervention villages (to ensure they were similar in characteristics as the treatment villages). Six villages per province were randomly selected from this list, giving a total of 24 comparison clusters (Tables A2.1).

A2.3. Selection of Household Samples

A2.3.1. Treatment Household Sample: The impact evaluation design prepared by MSU suggested that treatment groups be composed of rice, home garden, and fishpond client households. The client list provided by Fintrac was used to first filter out all the households that had already received technical assistance that could have impacted the 2011-12 agricultural production cycle. The list comprised mostly of home garden clients followed by rice and fishpond clients. Therefore, client households were selected using the ratio 40:30:30 percent, that is 10 home garden clients: 8 rice clients: 7 fishpond clients. In the Phase I villages, some households had received two of these three technical services, and some had received all three. Even if a household was targeted to receive two or three technical services, it was classified as one client in the sample selection. In each cluster village fishpond client households were selected first, followed by rice client households. If fishpond and/or rice clients made up less than 30% of the total clients in a village, they were all selected. In most

cases, fishpond and rice clients comprised more than 30% of total clients (25 HHs per village) per village, and home garden clients more than 50% of total clients. Therefore, the remaining household clients in each village were adjusted by adding home garden client households using systematic random sampling, though some villages had only home garden clients.

A2.3.2. Comparison Household Sample: It was not feasible to use the 2008 Census as the sample frame to select households for the comparison group because of population movements due to migration. Instead, enumerator team leaders with the help of village leaders made a list of households in each village. These village household lists were used as the sampling frame and systematic random sampling was applied to select households for the comparison group.

A2.3.3. Method of Household Selection: For villages where a list of household was available to select the desired number of households, the following method was used. First, a random number was obtained by using the last digit of the serial number on the first bank note pulled from a pocket. That number was then used to select the first household on the list and then every household at the same interval to reach the desired number of sample households for each cluster village. In all villages, both treatment and comparison, two to three households were selected as reserve households in case selected households could not be found during the field survey.

ANNEX 3. DESCRIPTIVE TABLES FOR SAMPLE 2

Annex A3.1. Selected Sample Characteristics of Panel HHs Surveyed in 2016, Grouped by Gender of Household Head (Sample 2).

Characteristics	Treatment				Comparison)				All HHs			
	MHH (n=1033)		FHH (n=240)		MHH (n=424)		FHH (n=97)		Treat. (n=1273)		Comp.(n=621)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Household Demographics												
Household size (#)	5.98	1.90	5.48	2.29	6.18	2.16	5.89	2.31	5.88	1.99	5.90	2.16
No. of females per HH	2.95	1.31	2.94	1.34	2.96	1.37	3.07	1.25	2.95	1.32	2.88	1.33
Number of youth 16-35 years	2.43	1.50	2.40	1.66	2.55	1.69	2.71	1.48	2.43	1.53	2.42	1.61
Number of children 0-5 years	0.35	0.58	0.40	0.67	0.46	0.64	0.43	0.64	0.36	0.60	0.51	0.66
Number of women (15 - 49 years)	2.34	1.26	1.96	1.30	2.46	1.31	2.33	1.30	2.27	1.28	2.36	1.30
Head's education (years of schooling)	5.78	3.22	4.85	3.99	5.10	3.00	5.13	4.42	5.63	3.37	5.19	3.33
Age of HH Head (years)	49.65	11.93	54.57	11.26	46.93	11.91	51.36	12.21	50.58	11.96	47.00	12.50
Dependency ratio	0.60	0.59	0.54	0.51	0.63	0.49	0.49	0.39	0.59	0.58	0.65	0.51
Land Ownership and Use												
Total land area (ha)	2.89	2.96	1.86	1.70	2.97	2.98	2.01	1.92	2.70	2.80	2.77	2.76
Area under agriculture (ha)	2.15	2.91	1.26	1.58	2.38	2.90	1.40	1.82	1.98	2.73	2.20	2.70
Residential area (ha)	0.12	0.31	0.12	0.25	0.09	0.24	0.10	0.28	0.12	0.30	0.08	0.24
Ownership of Household Assets (% of HHs)												
Total livestock unit	1.94	2.45	1.47	1.71	1.59	2.05	1.48	1.89	1.85	2.33	1.48	1.94
Value of assets (USD)	3813.02	4990.21	2255.13	3344.26	3711.13	5624.7	2018.02	3694.46	3519.31	4762	3165.4	5004
Radio (% of HHs)	31.56	46.50	31.25	46.45	25.94	43.88	26.8	44.52	31.5	46.47	25.28	43.50
Television (% of HHs)	74.54	43.58	65.42	47.66	68.63	46.45	54.64	50.04	72.82	44.51	64.09	48.01
Telephone (% of HHs)	1.84	13.44	0.00	0.00	0.94	9.68	3.09	17.40	1.49	12.13	1.13	10.57
Cell phone (% of HHs)	90.42	29.45	82.50	38.08	86.79	33.90	81.44	39.08	88.92	31.40	84.86	35.87
Income sources (% of HHs)												
Farm income sources	97.68	15.07	97.50	15.65	98.58	11.83	96.91	17.40	97.64	15.18	98.39	12.60
Non-farm income sources	80.54	39.61	79.17	40.70	86.08	34.65	84.54	36.34	80.28	39.80	86.15	34.57
Non timber forest product sources	2.23	14.76	0.83	9.11	3.30	17.89	2.06	14.28	1.96	13.88	2.58	15.86
Other income sources	45.98	49.86	50.42	50.10	45.28	49.84	56.70	49.81	46.82	49.92	45.89	49.87

Source: Cambodia HARVEST Impact Evaluation Endline Survey, 2016. MHH=Male-Headed HHs, FHH=Female-Headed HHs, n=Number of observations.

Annex A3.2. Selected Characteristics of Panel HHs Surveyed in 2012, Grouped by Gender of Household Head (Sample 2).

Characteristics	Treatment		Comparison				All HHs				t-test				
	MHH (n=926)		FHH (n=162)		MHH (n=441)		FHH (n=80)		Treatment (n=1,088)		Comparison (n=521)		MH H	FH H	Al l
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD			
Household Demographics															
Household size (#)	5.43	1.75	4.47	1.92	5.59	1.95	4.96	1.93	5.29	1.80	5.48	1.97			*
No. of females per HH	2.71	1.22	2.63	1.20	2.73	1.26	2.74	1.16	2.70	1.22	2.73	1.25			
Number of youth 16-35 years	2.05	1.23	1.75	1.32	2.14	1.36	2.16	1.27	2.00	1.25	2.14	1.34		*	*
Number of children 0-5 years	0.44	0.63	0.41	0.67	0.54	0.69	0.53	0.73	0.43	0.63	0.54	0.69	**		**
Number of women (15 - 49 years)	2.25	1.23	1.80	1.18	2.36	1.25	2.05	1.18	2.18	1.23	2.31	1.24			
Head's education (years of schooling)	6.13	3.53	5.41	4.44	5.56	3.41	6.70	5.14	6.03	3.67	5.69	3.68	**		
Age of HH Head (years)	46.45	11.93	52.61	10.57	43.49	12.07	47.99	10.64	47.39	11.94	44.23	12.00	**	**	**
Dependency ratio	0.60	0.59	0.54	0.49	0.62	0.48	0.51	0.46	0.59	0.58	0.61	0.48			
Land Ownership and Use															
Total land area (ha)	2.77	2.56	1.68	1.38	2.82	2.67	2.15	1.85	2.60	2.45	2.71	2.57		*	
Area under agriculture (ha)	1.97	2.55	1.06	1.34	2.17	2.69	1.63	1.83	1.83	2.43	2.09	2.58		**	*
Residential area (ha)	0.11	0.27	0.07	0.16	0.09	0.28	0.07	0.16	0.10	0.26	0.09	0.26			
Ownership of Household Assets (% of HHs)															
Total livestock unit	2.69	2.84	2.15	2.25	2.27	2.47	2.12	2.21	2.61	2.76	2.24	2.43	**		**
Value of assets (USD)	963.8	1226	446.9	774.8	893.8	1250	384.2	673	885.0	1183.5	814.0	1194			
Radio (% of HHs)	37.26	48.37	30.41	46.12	31.52	46.51	32.50	47.1	36.21	48.08	31.61	46.54	*		
Television (% of HHs)	71.46	45.18	55.15	49.86	61.45	48.73	52.50	50.2	68.97	46.28	59.96	49.04	**		**
Telephone (% of HHs)	19.00	39.25	14.95	35.75	17.69	38.20	7.50	26.5	18.38	38.75	16.09	36.78			
Cell phone (% of HHs)	85.63	35.09	71.65	45.19	81.41	38.95	75.00	43.5	83.50	37.13	80.46	39.69	*		
Income sources (% of HHs)															
Farm income sources	99.81	4.30	100.0	0.00	99.32	8.23	100.0	0.00	99.84	3.96	99.43	7.57			
Non-farm income sources	87.95	32.57	86.60	34.16	91.38	28.09	96.25	19.1	87.75	32.80	92.15	26.93		*	**
Non timber forest product sources	7.23	25.91	8.76	28.35	8.84	28.42	6.25	24.3	7.46	26.29	8.43	27.81			
Other income sources	31.33	46.40	44.85	49.86	24.72	43.19	41.25	49.5	33.39	47.18	27.20	44.54	**		**

Source: Cambodia HARVEST Impact Evaluation Baseline Survey, 2012. MHH=Male-Headed HHs, FHH=Female-Headed HHs, n=Number of observation; t-test: **= p<0.01, *=p<0.05.

Annex A3.3. Percentage of Households with Members Experiencing Out-migration in the Past 5 Years, Sample 2.

Migration types and places migrated	Treatment			Comparison		
	MHH (n=1033)	FHH (n=240)	Total (1273)	MHH (n=516)	FHH (n=105)	Total (n=621)
Out migration for 15 years or older age group	53.82	67.50	56.40	41.47	70.48	46.38
Out migration for 14 years or less age group	6.00	6.25	6.05	4.26	7.62	4.83
Migration within province (urban area)	9.68	18.33	11.31	9.69	14.29	10.47
Migration within province (rural area)	0.29	0.00	0.24	-	0.95	0.16

Source: Cambodia HARVEST Endline Survey, 2016; MHH=Male-headed household, FHH=Female-headed household; n=Number of observations.

Annex A3.4. Pattern of Occupation Change from 2012 to 2016 among Members > 10 Years Old for Sample 2 (Percentage of HHs)

Occupation	2012		2016	
	Treatment (n=5724)	Comparison (n=2652)	Treatment (n=6303)	Comparison (n=2958)
Farming	57.97	61.12	44.06	44.79
Farm laborer	0.75	1.92	0.92	2.06
Non-Farm laborer	4.04	5.28	7.62	9.57
Salaried employment	7.16	3.96	14.39	9.63
Self-employed (business owner)	3.27	3.36	5.76	6.49
In school	22.22	19.49	19.34	18.76
Home maker	0.89	1.24	2.59	3.28
Disability	2.83	2.98	3.92	3.92
Other (fisheries, artisan, retired)	0.87	0.64	1.41	1.49

Source: Cambodia HARVEST Endline Survey, 2016; n=Number of observations.

Annex A3.5. General Awareness of the HARVEST Project and Promoted Concepts among Surveyed Households in Sample 2: Comparison of Treatment and Comparison Households, 2016 (Percentage of Respondents)^a

Program and activities	Treatment		Comparison		All HHs		t-test		
	MHH (N=1033)	FHH (N=240)	MHH (N=516)	FHH (N=105)	Treatment (N=1273)	Comparison (N=621)	MHH	FHH	All
HARVEST	98.64	97.92	33.91	29.52	98.51	33.17	**	**	**
USAID	30.11	24.58	17.05	10.48	29.07	15.94	**	**	**
Fintrac	3.00	1.25	1.94	1.90	2.67	1.93			
Climate change	71.15	62.92	61.05	54.29	69.60	59.90	**		**
IPM	57.60	48.75	38.37	40.00	55.93	38.65	**		**
Forest conservation	80.54	78.33	73.64	70.48	80.13	73.11	**		**
Bor Bor Kab	95.16	96.67	90.89	91.43	95.44	90.98	**	*	**
Three food groups	63.89	52.92	33.53	30.48	61.82	33.01	**	**	**

Source: Cambodia HARVEST Impact Evaluation Endline Survey, 2016. MHH=Male-Headed HHs, FHH=Female-Headed HHs, n=Number of observation; t-test: **= p<0.01, *=p<0.05.

a. Typically the respondent was the main decision maker in the household.

Annex A3.6. Familiarity with Posters and Billboards Conveying Important Messages Promoted by the HARVEST Project in Cambodia: Comparison of Treatment and Comparison Households in Sample 2 (% of Respondents Who Reported Seeing a Poster/Billboard before the Interview)^a

Posters/billboards with the following messages:	Treatment		Comparison		All HHs		t-test		
	MHH (n=1033)	FHH (n=240)	MHH (n=516)	FHH (n=105)	T (n=1273)	C (n=621)	MHH	FHH	All
Billboard: Having forest means having hope for future	33.98	32.50	26.74	30.48	33.70	27.38	**		**
Billboard: Preserving forest is for ourselves and the next generations	24.78	23.33	18.99	20.95	24.51	19.32	**		*
Billboard: Responsibility to protect, preserve and restore the natural resources	43.18	40.42	37.40	38.10	42.66	37.52	*		*
Billboard: Adapting to climate change contributes to livelihood improvement	41.53	33.33	30.43	20.95	39.98	28.82	**	*	**
Billboard: We need to have awareness about climate change	26.62	22.08	18.80	20.95	25.77	19.16	**		**
Poster: Jointly prevent the deforestation in any aspects	47.92	40.42	38.37	36.19	46.50	38.00	**		**
Poster: Climate change adaptation strategies	34.85	25.00	27.33	21.90	32.99	26.41	**		**
Poster: Contribution to livelihood and health improvements	50.24	42.50	46.32	44.76	48.78	46.05			
Poster: Impact of chemical inputs on environment	29.72	25.00	21.51	14.29	28.83	20.29	**	*	**
Poster: Crop growth stages and crop development	56.73	50.42	40.89	40.95	55.54	40.90	**		**

Source: Cambodia HARVEST Impact Evaluation Endline Survey, 2016. MHH=Male-Headed HHs, FHH=Female-Headed HHs, n=Number of observation; t-test: **= p<0.01, *=p<0.05.

a. Typically the respondent was the main decision maker in the household.

Annex A3.7. Awareness and Adoption of Technologies and Improved Practices among Rice and Vegetable Growers in Sample 2, 2016

Improved technologies/ practices promoted by the HARVEST program	Heard/aware of this technology? (% yes)						Have ever adopted? (%)						Currently using this technique? (% yes)					
	Treatment		Comparison		t-test		Treatment		Comparison		t-test		Treatment		Comparison		t-test	
	MHH	FHH	MHH	FHH	MHH	FHH	MHH	FHH	MHH	FHH	MHH	FHH	MHH	FHH	MHH	FHH	MHH	FHH
Rice farmers	(n=914)	(n=205)	(n=454)	(n=85)			(n=914)	(n=205)	(n=454)	(n=85)			(n=914)	(n=205)	(n=454)	(n=85)	(n=914)	n=205
Direct sowing of rice	56.67	42.93	51.76	44.71			38.95	29.27	38.77	34.12			33.26	25.37	35.90	31.76		
Row planting	78.56	81.95	62.56	57.65	**	**	28.56	28.29	14.76	11.76	**	**	4.27	3.90	1.76	3.53	*	
Drum seeder	30.96	24.88	22.47	16.47	**		2.30	1.46	0.22	0.00	**		0.66	0.00	0.22	0.00		
Leaf color chart to check plant nitrogen status	10.07	4.88	1.32	0.00	**	*	1.20	0.49	0.22	0.00			0.11	0.00	0.22	0.00		
Short-duration improved rice varieties	44.86	35.61	40.97	37.65			23.19	15.61	22.25	18.82			16.19	9.76	17.18	12.94		
Climate-resilient improved rice varieties	13.24	8.29	5.51	7.06	**		2.08	0.98	1.98	2.35			1.09	0.49	0.88	1.18		
Improved disease- and pest- resistant rice varieties	12.25	6.83	3.96	7.06	**		1.86	0.49	1.32	1.18			0.88	0.49	0.22	1.18		
Flood-tolerant rice varieties	14.55	10.73	8.15	15.29	**		2.84	2.93	3.08	4.71			1.42	0.49	1.54	2.35		
Integrated pest management	27.90	19.51	17.40	15.29	**		12.47	5.85	8.81	4.71	*		9.52	2.93	7.27	4.71		
Horticulture farmers	(n=752)	(n=171)	(n=318)	(n=62)			(n=752)	(n=171)	(n=318)	(n=62)			(n=752)	(n=171)	(n=318)	(n=62)		
Raised planting beds	89.36	84.21	65.09	64.52	**	**	76.46	67.25	35.22	32.26	**	**	49.73	42.69	28.30	24.19	**	**
Plant spacing	76.60	75.44	47.17	51.61	**	**	66.09	59.65	27.67	30.65	**	**	44.68	39.77	23.90	19.35	**	**
Use of mulch (plastic and straw)	85.90	81.87	50.31	48.39	**	**	62.77	45.61	15.41	14.52	**	**	27.26	19.30	9.12	6.45	**	*
Use of compost	79.26	79.53	47.80	50.00	**	**	49.07	47.95	21.07	19.35	**	**	22.74	21.05	10.69	11.29	**	
Live barriers	53.86	43.86	7.23	8.06	**	**	39.63	29.24	2.52	1.61	**	**	15.16	11.70	1.26	1.61	**	*
Drip irrigation for vegetable production	68.75	63.16	18.24	9.68	**	**	41.22	29.24	3.46	3.23	**	**	10.64	3.51	1.57	1.61	**	

Annex A3.7 cont.

Improved technologies/ practices promoted by the HARVEST program	Heard/aware of this technology? (% yes)						Have ever adopted? (%)						Currently using this technique? (% yes)					
	Treatment		Comparison		t-test		Treatment		Comparison		t-test		Treatment		Comparison		t-test	
	MHH	FHH	MHH	FHH	MHH	FHH	MHH	FHH	MHH	FHH	MHH	FHH	MHH	FHH	MHH	FHH	MHH	FHH
Plastic-covered nurseries to protect seedlings from rain	58.38	44.44	12.26	16.13	**	**	39.76	25.15	3.14	4.84	**	**	19.15	7.60	1.89	1.61	**	
Trellis netting	84.31	76.02	47.17	37.10	**	**	60.64	47.37	8.18	12.90	**	**	30.19	20.47	6.29	9.68	**	
In-farm drainage	31.38	25.15	6.92	3.23	**	**	15.03	13.45	1.26	0.00	**	**	7.71	5.85	0.63	0.00	**	
Soluble fertilizers	33.91	29.82	10.06	11.29	**	**	15.96	16.96	4.72	4.84	**	*	6.91	8.19	2.83	1.61	**	
Integrated pest management	38.03	29.82	12.89	12.90	**	**	20.48	14.62	5.66	6.45	**		12.23	8.77	4.09	3.23	**	
Biological control products	52.26	49.12	22.01	25.81	**	**	27.53	30.41	8.49	6.45	**	**	9.97	9.94	3.46	1.61	**	*

Source: Cambodia HARVEST Impact Evaluation Endline Survey, 2016. MHH=Male-Headed HHs, FHH=Female-Headed HHs, n=Number of observation; t-test: **= p<0.01, *=p<0.05.

Annex A3.8. Awareness and Participation in Cambodia HARVEST Project Activities by Women Aged 15 to 49 Years: Comparison of Treatment and Comparison Groups in Sample 2, 2016 (Percentage of Women Respondents)

	Treatment			Comparison			t-test
	n	Mean	SD	n	Mean	SD	
Awareness about HARVEST and participation in programs (percentage of women)							
Heard about the Cambodia HARVEST project	1221	81.24	39.05	637	23.23	42.27	**
Attended any nutritional training programs or nutrition field days in the past 4 years	1225	33.80	47.32	639	11.11	31.45	**
Participated in any mobile kitchen, cooking demonstration, food safety and hygiene training activities in the past 4 years	1225	27.76	44.80	639	5.79	23.37	**
Participated in any training on home gardening, school gardening, planting of fruit trees, postharvest handling, and storage in the past 4 years	1225	44.73	49.74	639	14.55	35.29	**
Currently or in the last 4 years, member of any food security and nutrition group	1225	13.96	34.67	639	6.73	25.07	**
Currently or in the past 4 years, member of any savings fund group	1225	28.00	44.92	639	21.13	40.85	**
Received Moringa seedlings from anyone in the past 4 years	1225	35.76	47.95	639	5.79	23.37	**
Percentage of women who had seen the following posters prior to the interview:							
Provision of extra food to kids aged 6-24 months	1161	77.35	41.88	610	68.52	46.48	**
Foundation of hygiene	1161	81.91	38.51	610	70.82	45.50	**
The issue of malnutrition and the importance of addressing this issue	1161	65.55	47.54	610	55.41	49.75	**
Key determinants of good nutrition and health in a family	1161	81.48	38.86	610	71.15	45.34	**
Three food groups	1161	83.98	36.70	610	67.70	46.80	**

Source: Cambodia HARVEST Impact Evaluation Endline Survey, 2016. n=Number of observation; t-test: **= p<0.01, *=p<0.05.

Annex A3.9. Use and Practice of Important Nutrition and Hygiene Related Concepts among Women Aged 15 to 49 Years: Comparison of Treatment and Comparison Groups in Sample 2, 2016 (Percentage of Women Respondents)

	Treatment			Comparison			t-test
	n	Mean	SD	n	Mean	SD	
Percentage of women who follow the practice of washing hands:							
After defecation	1161	71.40	45.21	610	64.26	47.96	**
After cleaning baby's bottom	1161	17.40	37.93	610	21.64	41.21	*
Before food preparation	1161	74.76	43.46	610	74.26	43.75	
Before eating	1161	91.47	27.94	610	89.18	31.09	
Before feeding a child	1161	10.68	30.90	610	12.79	33.42	
Percentage of women who use following hand washing practices:							
Use water	1161	87.17	33.46	610	86.72	33.96	
Use soap or ash	1161	96.47	18.47	610	98.03	13.90	
Wash both hands	1161	51.08	50.01	610	48.36	50.01	
Rub hands together at least 3 times	1161	18.69	39.00	610	14.10	34.83	*
Dry hands hygienically-by air drying or with a clean cloth	1161	34.19	47.46	610	28.36	45.11	*
Awareness and adoption of nutrition related concepts and practices							
Owns or manages a home garden plot	1161	65.89	47.43	610	57.70	49.44	**
Heard about Bor Bor Kab Kroup Kroeung (enriched porridge)	870	96.44	18.55	469	92.11	26.99	**
Has ever made Bor Bor Kab for her child	839	34.80	47.66	432	29.17	45.51	*
Knows that adults should eat 3 meals per day	1161	96.68	17.83	610	94.81	22.09	
Knows about the three food groups	1161	39.28	48.86	610	23.44	42.40	**
Knowledge about the 3 food groups (percentage of women who could name foods from a given group)							
Food for energy	1161	34.97	47.71	610	19.51	39.66	**
Food for growth	1161	35.06	47.74	610	18.69	39.01	**
Food for immune system	1161	33.68	47.28	610	19.34	39.53	**
Serves at least one item from each of the 3 food groups in all the meals (percentage who responded "yes, all the time")	1161	71.75	45.04	610	67.38	46.92	

Source: Cambodia HARVEST Impact Evaluation Endline Survey, 2016. n=Number of observations; t-test: **= p<0.01 *=p<0.05.

Annex A3.10. Summary of Selected Indicators along the Impact Pathway for Households in Sample 2 (2012–2016)

	2012						2016						t-test (all T and C HHs bet. 2012 - 2016)	
	Treatment		Comparison		All HHs		Treatment		Comparison		All HHs			
	MHH	FHH	MHH	FHH	T	C	MHH	FHH	MHH	FHH	T	C		
Poverty and expenditure	(n=1079)	(n=194)	(n=441)	(n=80)	(n=1273)	(n=521)	(n=1033)	(n=240)	(n=424)	(n=97)	(n=1273)	(n=521)		
Poverty (%)	9.64	13.40	12.70	13.75	10.21	12.86	3.39	6.25	3.77	12.37	3.93	5.37	**	**
Per capita expenditure (USD)	545.20	537.33	533.05	459.60	544.00	521.77	619.93	566.23	592.18	513.81	609.81	577.59	**	**
Hunger (%)	0.09	0.00	0.45	1.25	0.08	0.58	0.10	0.83	0.24	1.03	0.24	0.38		
Rice outcomes	(n=921)	(n=154)	(n=373)	(n=59)	(n=1075)	(n=432)	(n=908)	(n=205)	(n=453)	(n=83)	(n=1113)	(n=536)		
Area (ha)	3.07	1.77	3.03	2.08	2.88	2.90	5.72	3.40	5.89	4.06	5.29	5.61	**	**
Yield (ton/ha)	2.13	1.95	1.87	1.69	2.10	1.84	2.28	2.10	2.13	1.83	2.25	2.09	**	**
Production (ton)	6.85	3.38	6.01	3.93	6.35	5.73	14.35	7.38	13.76	7.74	13.07	12.83	**	**
Value of production (Million Riels)	44.53	22.11	37.33	23.63	41.27	35.39	80.80	42.58	73.37	41.97	73.78	68.42	**	**
Net rice income (Million Riels)	2.49	1.24	1.95	1.38	2.31	1.87	4.75	2.38	4.50	2.38	4.32	4.12	**	**
Sales (Million Riels)*	0.84	4.35	0.94	0.52	1.33	0.90	0.72	0.31	0.63	0.25	0.65	0.57		
Vegetable outcomes	(n=696)	(n=123)	(n=183)	(n=35)	(n=819)	(n=218)	(n=668)	(n=152)	(n=175)	(n=42)	(n=820)	(n=217)		
Area (ha)	0.10	0.08	0.07	0.01	0.09	0.06	0.10	0.06	0.05	0.01	0.10	0.04		
Value of production (Million Riels)	0.48	0.42	0.16	0.08	0.47	0.14	0.78	0.51	0.22	0.10	0.73	0.20	*	
Net vegetable income (Million Riels)	0.07	0.14	0.08	0.05	0.08	0.08	-0.26	-0.08	-0.10	0.01	-0.22	-0.08	**	*
Sales (Million Riels)**	0.49	0.39	0.36	0.07	0.47	0.30	0.87	0.60	0.37	0.12	0.82	0.31	**	
Women related indicators	(n=1328)	(n=212)	(n=562)	(n=94)	(n=1540)	(n=656)	(n=1107)	(n=237)	(n=570)	(n=108)	(n=1344)	(n=678)		
Women's dietary diversity (mean # of food groups consumed in the past 24 hrs)	4.66	4.61	4.60	4.55	4.65	4.59	4.51	4.20	4.46	4.46	4.45	4.46	**	
Underweight women	(n=1273)	(n=200)	(n=540)	(n=89)	(n=1473)	(n=629)	(n=981)	(n=204)	(n=513)	(n=97)	(n=1185)	(n=610)		
Prevalence of underweight women (%)	14.85	16.00	17.59	7.87	15.00	16.22	14.68	21.08	13.26	11.34	15.78	12.95		
Children related indicators	(n=471)	(n=80)	(n=240)	(n=42)	(n=551)	(n=282)	(n=356)	(n=94)	(n=268)	(n=45)	(n=450)	(n=313)		
Stunted children < 5 years (%)	42.25	50.00	49.58	45.24	43.38	48.94	30.90	34.04	30.60	35.56	31.56	31.31	**	**
Wasted children < 5 years (%)	10.83	11.25	10.00	4.76	10.89	9.22	9.27	9.57	16.04	4.44	9.33	14.38		
Underweight children < 5 years (%)	26.54	30.00	34.58	30.95	27.04	34.04	17.98	20.21	20.90	11.11	18.44	19.49	**	**

Annex A3.10 cont.

	2012						2016						t-test (all T and C HHs bet. 2012 - 2016)	
	Treatment		Comparison		All HHs		Treatment		Comparison		All HHs			
	MHH	FHH	MHH	FHH	T	C	MHH	FHH	MHH	FHH	T	C	T	C
	(n=128)	(n=25)	(n=81)	(n=16)	(n=153)	(n=97)	(n=104)	(n=27)	(n=81)	(n=12)	(n=131)	(n=93)		
Prevalence of children 6–23 months receiving a minimum acceptable diet (%)	35.71	30.43	30.38	60.00	34.90	35.11	30.69	37.04	33.33	58.33	32.03	36.56		
Prevalence of children 6–23 months meeting minimum dietary diversity (%)	50.78	52.00	35.80	68.75	50.98	41.24	62.50	55.56	50.62	75.00	61.07	53.76		
Fish Production outcomes					(n=120)	(n=9)					(n=46)	(n=6)		
Fish Production (ton)					0.16	0.10					1.22	1.55	**	*
Value of production (Million Riels)					0.63	0.49					4.51	6.50	**	
Net income (Million Riels)					-0.13	-0.07					3.13	5.68	**	

Source: Cambodia HARVEST Impact Evaluation Surveys, 2012 and 2016. Indicators are reported at household level; n=Number of observation; t-test: **= p<0.01, *=p<0.05.

Annex A3.11. Summary of Agricultural Indicators along the Impact Pathway for Households in Sample 2 by Province (Comparison in Trend in Treatment and Comparison Groups from 2012 to 2016)

Province	2012		2016		t-test (2012 and 2016)	
	Treatment	Comparison	Treatment	Comparison	Treatment	Comparison
Rice Area (ha)	T	C	T	C		
Battambang	5.25	5.51	8.64	9.31	**	**
Kampong Thom	2.01	2.12	3.82	4.36	**	**
Pursat	3.10	1.97	6.36	4.54	**	**
Siem Reap	1.78	2.02	3.43	4.51	**	**
Rice yield (ton/ha)						
Battambang	2.48	2.29	2.91	2.59	**	
Kampong Thom	1.35	1.27	1.55	1.64	*	**
Pursat	2.61	2.16	2.48	2.40		
Siem Reap	1.93	1.68	2.22	1.78	**	
Rice production (ton)						
Battambang	12.23	12.67	25.12	25.33	**	**
Kampong Thom	2.45	2.55	6.32	8.12	**	**
Pursat	8.72	4.65	16.83	11.98	**	**
Siem Reap	3.03	3.21	7.25	7.64	**	**
Rice value of production (Million Riels)						
Battambang	78.00	73.24	136.72	128.53	**	**
Kampong Thom	17.22	14.61	35.93	39.62	**	**
Pursat	55.82	31.57	94.60	69.26	**	**
Siem Reap	20.94	22.31	45.26	46.37	**	**
Rice sales (Million Riels)						
Battambang	1.19	1.16	1.08	0.99		
Kampong Thom	0.48	1.79	0.29	0.32		
Pursat	0.97	0.64	0.76	0.61		
Siem Reap	0.25	0.19	0.26	0.20		
Rice net income per household (Million Riels)						
Battambang	3.71	4.01	7.85	7.76	**	**
Kampong Thom	0.70	0.90	2.00	2.05	**	**
Pursat	1.83	3.21	5.11	3.95	**	**
Siem Reap	1.26	1.25	2.73	2.75	**	**
Vegetable area (ha)						
Battambang	0.08	0.05	0.14	0.071		
Kampong Thom	0.06	0.01	0.07	0.015		
Pursat	0.08	0.01	0.05	0.008		
Siem Reap	0.16	0.13	0.13	0.056		

Annex 3.11. cont.

Province	2012		2016		t-test (2012 and 2016)	
	Treatment	Comparison	Treatment	Comparison	Treatment	Comparison
Vegetable value of production (Million Riels)						
Battambang	0.50	0.30	1.22	0.256	*	
Kampong Thom	0.33	0.08	0.48	0.127		
Pursat	0.37	0.08	0.36	0.111		
Siem Reap	0.72	0.11	0.94	0.271		*
Vegetable sales (Million Riels)						
Battambang	0.51	0.32	1.55	0.474		
Kampong Thom	0.34	0.06	0.48	0.139	*	
Pursat	0.34	0.06	0.36	0.175		
Siem Reap	0.72	0.76	1.02	0.397	*	
Vegetable net income (Million Riels)						
Battambang	0.169	0.183	0.124	-0.033		
Kampong Thom	0.067	0.046	-0.206	0.004	**	
Pursat	-0.024	0.016	-0.207	0.033	*	
Siem Reap	0.127	0.042	-0.621	-0.265	**	
Fish Production (ton)						
Battambang	0.342	0.026	2.500	.		
Kampong Thom	0.089	0.060	0.680	0.280		
Pursat	0.084	.	0.762	0.520		
Siem Reap	0.153	0.250	0.835	2.733	**	
Fish value of production (Million Riels)						
Battambang	1.362	0.085	10.297	.		
Kampong Thom	0.339	0.385	2.690	1.438	*	
Pursat	0.319	.	2.125	1.202		
Siem Reap	0.550	1.193	3.207	11.631	**	

t-test: **= p<0.01, *=p<0.05; missing value means no observation in fish production.

Annex A3.12. Summary of Poverty, Expenditure and Hunger Indicators for Households in Sample 2 by Province (Comparison in Trend in Treatment and Comparison Groups from 2012 to 2016)

Province	2012		2016		t-test (2012 and 2016)	
	Treatment	Comparison	Treatment	Comparison	Treatment	Comparison
Poverty (%)						
Battambang	10.67	11.36	4.33	3.03	**	**
Kampong Thom	10.12	14.39	5.52	6.06	*	*
Pursat	8.38	9.92	3.29	4.13	**	
Siem Reap	11.82	15.44	2.56	8.09	**	
Per capita expenditure (USD)						
Battambang	560.55	547.98	569.77	560.91		
Kampong Thom	539.45	499.45	611.48	577.94	**	
Pursat	547.39	546.15	604.23	618.85	*	
Siem Reap	529.25	496.30	652.38	556.73	**	*
Hunger (%)						
Battambang	0.00	0.00	0.67	1.52		
Kampong Thom	0.31	1.52	0.00	0.00		
Pursat	0.00	0.00	0.00	0.00		
Siem Reap	0.00	0.74	0.32	0.00		

t-test: **= p<0.01, *=p<0.05

Annex A3.13. Summary of Dietary Diversity and Nutritional Indicators for Women and Children in Sample 2 by Province (Comparison in Trend in Treatment and Comparison Groups from 2012 to 2016)

Province	2012		2016		t-test (2012 and 2016)	
	Treatment	Comparison	Treatment	Comparison	Treatment	Comparison
Women's dietary diversity (mean # of food groups consumed in the past 24 hrs)						
Battambang	4.87	4.93	4.51	4.76	**	
Kampong Thom	4.67	4.47	4.27	4.12	**	
Pursat	4.57	4.50	4.69	4.32		
Siem Reap	4.49	4.48	4.37	4.53		
Prevalence of underweight women (%)						
Battambang	17.84	20.89	16.09	16.67		
Kampong Thom	17.27	15.79	17.24	8.87		
Pursat	12.60	17.60	13.86	17.95		
Siem Reap	12.76	11.86	16.11	11.11		
Prevalence of stunted children under 5 years age (%)						
Battambang	43.86	46.27	42.48	37.70		
Kampong Thom	42.22	43.28	25.58	21.28	**	*
Pursat	36.96	51.92	31.37	34.62		
Siem Reap	49.39	53.13	27.36	26.39	**	**
Prevalence of wasted children under 5 years age (%)						
Battambang	13.16	11.94	9.73	8.20		
Kampong Thom	11.85	5.97	8.53	12.77		
Pursat	9.42	17.31	10.78	25.00		
Siem Reap	9.76	5.21	8.49	8.33		
Prevalence of underweight children under 5 years age (%)						
Battambang	23.68	31.34	16.81	21.31		
Kampong Thom	28.89	32.84	18.60	14.89	*	*
Pursat	26.81	36.54	19.61	26.92		
Siem Reap	28.05	35.42	18.87	8.33		**
Prevalence of children 6–23 months receiving a minimum acceptable diet (%)						
Battambang	30.00	48.28	36.36	43.48		
Kampong Thom	38.30	27.78	26.83	27.27		

Annex A3.13. cont.

Province	2012		2016		t-test (2012 and 2016)	
	Treatment	Comparison	Treatment	Treatment	Treatment	Comparison
Pursat	34.38	35.29	37.50	43.75		
Siem Reap	35.00	26.67	30.00	30.00		
Prevalence of children 6–23 months meeting minimum dietary diversity (%)						
Battambang	45.45	48.28	72.73	65.22	*	
Kampong Thom	48.94	27.78	57.14	54.55		
Pursat	59.38	55.56	61.54	62.50		
Siem Reap	51.22	34.38	53.33	40.00		
Exclusive breastfed children age 0–5 months (%)						
Battambang	0.86	66.67	0.73	66.67		
Kampong Thom	0.53	28.57	0.71	70.0		
Pursat	0.85	66.67	0.78	100.0		
Siem Reap	0.85	83.33	0.56	85.71		

t-test: **= p<0.01, *=p<0.05.

**ANNEX 4. RESULTS OF PSM-DID REGRESSIONS - CORRELATED RANDOM
EFFECTS FOR SAMPLE 1 AND 2**

Annex A4.1. Impact of Cambodia HARVEST on Volume of Rice Production per Household in Tons (CRE Models), Sample 1

Variables [Dependent variables are volume of rice production per household in tons]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	4.259 (2.43)	0.567 (1.24)	-1.477 (1.47)	1.820* (0.74)	0.231 (0.95)	0.630 (1.13)	-0.628 (1.38)
New treatment variable-excludes dropouts	-153.854** (31.75)	0.000 (.)	-94.386** (12.82)	-0.623 (1.15)	0.829 (2.96)	1.659 (3.24)	-9.457* (4.02)
Program effect (DID)	-0.495 (2.25)	-1.034 (1.01)	1.329 (1.22)	-0.128 (0.68)	0.470 (0.74)	0.491 (0.86)	0.379 (1.16)
HH head gender (1=Male)	2.704 (2.36)	1.940 (1.21)	0.861 (1.66)	1.525 (1.19)	1.713* (0.83)		
Household size (# of people)	-0.991 (0.85)	0.768 (0.50)	-0.200 (0.72)	-1.346** (0.21)	-0.262 (0.44)	-0.257 (0.44)	0.187 (0.40)
Head's age (years)	-0.022 (0.40)	0.155 (0.17)	0.118 (0.18)	-0.107 (0.10)	0.065 (0.13)	-0.039 (0.18)	0.008 (0.21)
Head's age squared	-0.002 (0.00)	-0.001 (0.00)	-0.001 (0.00)	0.000 (0.00)	-0.001 (0.00)	-0.001 (0.00)	-0.000 (0.00)
HH head education (# of years)	0.311 (0.22)	-0.020 (0.08)	0.004 (0.09)	0.008 (0.07)	0.082 (0.06)	0.097 (0.07)	0.034 (0.08)
Log of household durable assets in Riels	2.369* (1.19)	0.410 (0.54)	0.792 (0.72)	0.566 (0.36)	0.449 (0.37)	0.491 (0.43)	0.170 (0.50)
Own Tractor	-3.931* (1.72)	-1.062 (1.48)	-0.989 (0.98)	0.059 (0.43)	-1.436* (0.58)	-1.850** (0.66)	0.275 (0.83)
Log of area in hectares	22.510** (2.70)	8.901** (2.15)	13.694** (1.63)	6.978** (0.62)	15.274** (1.27)	15.735** (1.41)	9.269** (1.57)
Log of real rice input costs in Riels per hectare (Millions)	8.041** (2.31)	1.185 (0.61)	0.304 (0.71)	0.436 (0.28)	1.612** (0.50)	1.670** (0.60)	1.395* (0.55)
Total agricultural plots	0.978 (1.43)	0.349 (0.61)	-0.949 (0.79)	0.671 (0.74)	0.022 (0.41)	0.350 (0.46)	-0.764 (0.76)
Total number of plots owned by the HH	1.847 (1.65)	0.171 (0.52)	2.639* (1.12)	-0.053 (0.57)	0.421 (0.55)	0.474 (0.60)	0.275 (0.88)
1=HH grow dry season rice	-5.829* (2.76)	-1.209 (1.88)	1.218 (1.00)	0.172 (0.80)	-3.485** (1.14)	-3.572** (1.22)	1.475 (2.76)

Annex A4.1.cont.

Variables [Dependent variables are volume of rice production per household in tons]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
1=HH grow wet season rice	-1.546 (5.45)	-8.067 (4.53)	-2.267 (2.05)	-1.973 (1.73)	-3.163 (2.80)	0.586 (3.93)	-4.813 (3.05)
HH reported receiving interventions from program other than HARVEST (1=Yes)	-1.096 (1.29)	-0.042 (0.43)	-0.319 (0.76)	0.503 (0.26)	-0.598 (0.47)	-0.612 (0.52)	-0.997 (0.79)
number of male members participating in HARVEST interventions	0.436 (3.96)	0.530 (1.95)	-1.088 (1.39)	-0.502 (1.52)	0.446 (1.19)	1.100 (1.38)	1.170 (2.05)
number of female members participating in HARVEST interventions	-1.066 (4.00)	1.314 (2.04)	-1.719 (1.39)	-0.371 (1.47)	0.383 (1.19)	1.102 (1.38)	0.422 (2.20)
number of HH members who participated in HARVEST activities	0.483 (3.91)	-1.121 (2.09)	1.258 (1.34)	0.543 (1.50)	-0.499 (1.19)	-1.260 (1.37)	-0.389 (2.33)
number of HH members who participated as clients in HARVEST activities	-2.451 (4.06)	-0.560 (1.98)	0.549 (1.51)	0.475 (1.46)	-0.849 (1.25)	-1.421 (1.44)	-0.722 (2.47)
number of HH members who participated as demo leaders in HARVEST activities	-4.710 (3.98)	0.273 (1.86)	0.808 (1.57)	0.525 (1.54)	-1.282 (1.29)	-1.832 (1.47)	-0.044 (2.82)
1=HH was aquaculture client or demo beneficiary	4.106 (2.62)	-0.923 (1.09)	0.075 (1.48)	0.762 (0.60)	0.498 (1.04)	0.459 (1.12)	-1.532 (1.77)
1=HH was home garden client or demo beneficiary	3.401 (2.71)	-0.238 (0.98)	-1.553 (1.60)	-0.180 (0.46)	0.099 (0.84)	-0.453 (0.95)	0.303 (1.18)
1=HH was rice client or demo beneficiary	2.347 (2.12)	-1.275 (0.95)	-0.420 (1.43)	0.677 (0.48)	0.467 (0.81)	0.641 (0.93)	1.979 (1.21)
Number of years HH participated in HARVEST as a client	3.932* (1.91)	0.173 (0.54)	1.059 (0.88)	-0.046 (0.32)	1.174* (0.58)	0.973 (0.65)	-0.066 (0.90)
1=HH participated in HARVEST in 2011	-2.889 (3.21)	0.000 (.)	-1.365 (1.35)	3.244* (1.42)	-0.887 (1.22)	-0.651 (1.37)	0.256 (1.88)

Annex A4.1. cont.

Variables [Dependent variables are volume of rice production per household in tons]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
1=HH participated in HARVEST in 2012	-2.919 (2.86)	-0.427 (1.21)	-1.492 (2.54)	0.730 (0.59)	-0.454 (1.18)	0.165 (1.30)	4.908 (3.34)
1=HH participated in HARVEST in 2013	0.747 (4.36)	-1.609 (1.10)	-2.511 (4.06)	-0.750 (0.78)	-1.424 (1.12)	-1.965 (1.36)	-1.205 (2.24)
1=HH participated in HARVEST in 2014	-8.099* (4.10)	-0.343 (0.90)	-0.975 (1.69)	0.637 (0.50)	-1.111 (0.99)	-0.784 (1.14)	-0.387 (1.52)
Propensity scores for nearest neighbor (nn4) method	3.012 (3.75)	-2.415 (1.83)	-6.125** (2.32)	1.340 (0.84)	-1.652 (1.47)	-1.486 (1.64)	-2.126 (2.02)
Constant	0.000 (.)	0.000 (.)	0.000 (.)	-21.840** (4.75)	-61.024** (7.62)	-60.914** (8.93)	-41.294** (14.38)
Observations	626	675	761	613	2675	2245	430
R-Square	0.675	0.538	0.728	0.746	0.646	0.649	0.775
chi2-statistic	.	.	.	.	2641.319	4261.209	.
Rho	0.159	0.000	0.130	0.000	0.166	0.130	0.487

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A4.2. Impact of Cambodia HARVEST on Volume of Rice Production per Household in Tons (CRE Models), Sample 2

Variables [Dependent variables are volume of rice production per household in tons]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	3.761 (2.35)	0.444 (1.19)	-1.545 (1.41)	1.879* (0.76)	0.240 (0.90)	0.656 (1.05)	-0.263 (1.31)
New treatment variable-includes dropouts	-152.42** (29.52)	0.000 (.)	0.000 (.)	-2.366* (0.93)	0.412 (2.41)	1.103 (2.61)	-7.223* (3.02)
Program effect (DID)	-0.778 (2.19)	-0.962 (0.99)	1.210 (1.19)	-0.492 (0.66)	0.043 (0.71)	0.072 (0.82)	0.147 (1.08)
HH head gender (1=Male)	3.012 (2.40)	1.255 (1.04)	0.938 (1.41)	0.656 (0.88)	0.883 (0.72)		
Household size (# of people)	-0.867 (0.82)	0.554 (0.46)	-0.039 (0.68)	-1.267** (0.24)	-0.233 (0.39)	-0.262 (0.40)	0.290 (0.36)
Head's age (years)	-0.069 (0.40)	0.197 (0.17)	0.125 (0.17)	-0.125 (0.07)	0.042 (0.12)	-0.073 (0.16)	-0.031 (0.18)
Head's age squared	-0.001 (0.00)	-0.002 (0.00)	-0.001 (0.00)	0.001 (0.00)	-0.001 (0.00)	-0.000 (0.00)	-0.000 (0.00)
HH head education (# of years)	0.251 (0.20)	0.010 (0.07)	0.015 (0.08)	0.012 (0.05)	0.100* (0.05)	0.118 (0.06)	0.039 (0.07)
Log of household durable assets in Riels	2.463* (1.11)	0.409 (0.50)	0.695 (0.69)	0.413 (0.29)	0.355 (0.34)	0.379 (0.39)	0.236 (0.46)
Own Tractor	-4.016* (1.65)	-0.963 (1.39)	-0.991 (0.92)	0.437 (0.38)	-1.224* (0.54)	-1.690** (0.62)	0.318 (0.74)
Log of area in hectares	22.727** (2.59)	9.686** (2.17)	13.867** (1.58)	6.492** (0.58)	15.071** (1.18)	15.643* (1.31)	8.405** (1.50)
Log of real rice input costs in Riels per hectare (Millions)	7.889** (2.08)	1.103* (0.56)	0.457 (0.69)	0.536* (0.25)	1.625** (0.43)	1.597** (0.51)	1.420** (0.52)
Total agricultural plots	1.084 (1.43)	0.105 (0.60)	-0.870 (0.75)	0.620 (0.61)	-0.042 (0.38)	0.225 (0.43)	-0.561 (0.72)
Total number of plots owned by the HH	1.061 (1.63)	0.229 (0.49)	2.570* (1.05)	0.170 (0.48)	0.424 (0.51)	0.490 (0.55)	0.223 (0.81)
1=HH grow dry season rice	-6.707** (2.54)	-1.007 (1.81)	1.424 (0.92)	-0.323 (1.08)	-3.671** (1.06)	-3.917** (1.14)	1.784 (2.16)
1=HH grow wet season rice	-2.821 (5.22)	-8.296 (4.34)	-2.125 (1.77)	-1.357 (1.30)	-2.234 (2.31)	0.598 (3.11)	-1.988 (2.54)

Annex A4.2. cont.

Variables [Dependent variables are volume of rice production per household in tons]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
HH reported receiving interventions from program other than HARVEST (1=Yes)	-1.438	-0.181	-0.337	0.398*	-0.684	-0.689	-0.751
	(1.24)	(0.44)	(0.71)	(0.20)	(0.44)	(0.49)	(0.72)
number of male members participating in HARVEST interventions	0.922	0.860	-0.829	-0.507	0.920	1.406	2.445
	(4.02)	(1.66)	(1.32)	(1.47)	(1.17)	(1.37)	(1.61)
number of female members participating in HARVEST interventions	-1.668	1.997	-1.373	-0.373	0.751	1.261	2.275
	(4.06)	(1.77)	(1.31)	(1.44)	(1.11)	(1.28)	(1.77)
number of HH members who participated in HARVEST activities	0.920	-1.549	0.997	0.554	-0.812	-1.382	-1.847
	(3.96)	(1.76)	(1.27)	(1.46)	(1.11)	(1.28)	(1.74)
number of HH members who participated as clients in HARVEST activities	-2.247	-0.696	0.444	0.600	-1.028	-1.387	-2.670
	(4.09)	(1.72)	(1.48)	(1.45)	(1.17)	(1.34)	(1.90)
number of HH members who participated as demo leaders in HARVEST activities	-3.603	-0.003	0.733	0.463	-1.342	-1.722	-1.802
	(3.93)	(1.69)	(1.53)	(1.52)	(1.21)	(1.38)	(2.33)
1=HH was aquaculture client or demo beneficiary	4.476	-1.494	0.227	0.220	0.330	0.304	-1.189
	(2.36)	(1.09)	(1.37)	(0.45)	(0.89)	(0.95)	(1.46)
1=HH was home garden client or demo beneficiary	3.937	-1.061	-1.654	0.129	0.223	-0.211	1.156
	(2.57)	(1.06)	(1.52)	(0.33)	(0.74)	(0.83)	(1.08)
1=HH was rice client or demo beneficiary	2.839	-1.562	-0.067	0.253	0.481	0.476	1.886
	(2.03)	(1.24)	(1.40)	(0.37)	(0.71)	(0.81)	(1.24)
Number of years HH participated in HARVEST as a client	3.635*	0.089	0.795	0.079	1.164*	0.993	-0.480
	(1.85)	(0.55)	(0.86)	(0.26)	(0.53)	(0.59)	(0.69)
1=HH participated in HARVEST in 2011	-2.403	0.000	-0.865	2.061	-0.915	-0.759	-0.844
	(3.06)	(.)	(1.26)	(1.12)	(1.16)	(1.29)	(1.27)
1=HH participated in HARVEST in 2012	-3.680	0.068	-0.258	0.519	-0.496	-0.336	3.674
	(2.81)	(1.08)	(1.98)	(0.44)	(0.97)	(1.09)	(2.17)
1=HH participated in HARVEST in 2013	-0.889	-0.960	-3.182	-0.535	-1.278	-1.399	-0.950
	(3.71)	(0.99)	(4.19)	(0.47)	(0.84)	(0.98)	(1.38)

Annex A4.2. cont.

Variables [Dependent variables are volume of rice production per household in tons]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
1=HH participated in HARVEST in 2014	-7.176*	-1.008	-0.685	-0.248	-1.489	-1.241	-0.502
	(3.41)	(0.91)	(1.59)	(0.40)	(0.84)	(0.95)	(1.15)
Propensity scores for nearest neighbor (nn4) method	6.516	-1.596	-5.728**	1.976**	0.183	0.410	-0.552
	(4.14)	(1.81)	(2.21)	(0.75)	(1.49)	(1.64)	(1.86)
Constant	0.000	0.000	0.000	-6.699**	-58.662**	-56.348**	-41.060**
	(.)	(.)	(.)	(3.82)	(7.41)	(8.45)	(13.76)
Observations	674	737	811	807	3029	2541	488
R-Square	0.683	0.535	0.726	0.731	0.644	0.648	0.761
chi2-statistic	.	.	.	.	2578.655	4395.383	.
rho	0.166	0.019	0.142	0.000	0.184	0.142	0.502

Standard errors in parentheses, * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A4.3. Impact of Cambodia HARVEST on Rice Net Income per Household in Million Riels (CRE Models), Sample 1

Variables [Dependent variables are real net income per household in million Riels]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	0.929 (1.06)	0.053 (0.44)	-0.460 (0.61)	0.777 (0.42)	0.093 (0.41)	0.227 (0.50)	-0.718 (0.59)
New treatment variable-excludes dropouts	-21.364 (16.02)	0.000 (.)	0.000 (.)	-0.116 (0.60)	0.402 (1.11)	0.831 (1.23)	-4.055** (1.47)
Program effect (DID)	-0.091 (0.89)	-0.149 (0.35)	-0.114 (0.55)	0.157 (0.38)	0.055 (0.30)	0.095 (0.34)	0.177 (0.49)
HH head gender (1=Male)	1.302 (1.32)	0.735 (0.42)	0.706 (0.59)	0.951 (0.61)	0.824* (0.35)		
Household size (# of people)	-0.244 (0.38)	0.233 (0.17)	-0.250 (0.29)	-0.786** (0.12)	-0.272 (0.22)	-0.280 (0.22)	-0.025 (0.18)
Head's age (years)	-0.162 (0.19)	0.018 (0.07)	0.011 (0.08)	-0.054 (0.05)	-0.036 (0.06)	-0.083 (0.08)	-0.077 (0.08)
Head's age squared	0.000 (0.00)	0.000 (0.00)	-0.000 (0.00)	0.000 (0.00)	-0.000 (0.00)	0.000 (0.00)	0.001 (0.00)
HH head education (# of years)	0.106 (0.09)	-0.022 (0.03)	-0.003 (0.04)	0.003 (0.04)	0.027 (0.03)	0.024 (0.03)	0.029 (0.04)
Log of household durable assets in Riels	1.132* (0.50)	0.177 (0.22)	0.482 (0.32)	0.368 (0.20)	0.389* (0.16)	0.427* (0.19)	0.285 (0.24)
Own Tractor	-1.152 (0.75)	-0.396 (0.62)	-0.133 (0.42)	0.142 (0.24)	-0.493* (0.25)	-0.626* (0.28)	0.072 (0.37)
Log of area in hectares	6.186** (1.27)	2.298** (0.82)	3.891** (0.65)	2.289** (0.38)	4.451** (0.53)	4.562** (0.60)	3.113** (0.78)
Log of real rice input costs in Riels per hectare (Millions)	0.068 (0.97)	-0.061 (0.20)	-0.770** (0.30)	-0.316 (0.16)	-0.230 (0.19)	-0.279 (0.22)	0.072 (0.22)
Total agricultural plots	1.105 (0.73)	0.249 (0.27)	-0.270 (0.28)	0.391 (0.42)	0.162 (0.17)	0.317 (0.19)	-0.436 (0.38)
Total number of plots owned by the HH	0.670 (0.75)	0.071 (0.20)	0.821* (0.36)	0.021 (0.33)	0.172 (0.19)	0.169 (0.21)	0.386 (0.39)
1=HH grow dry season rice	-2.333 (1.22)	-0.217 (0.62)	-0.356 (0.44)	0.113 (0.44)	-1.411** (0.48)	-1.475** (0.52)	-0.035 (0.91)

Annex A4.3. cont.

Variables [Dependent variables are real net income per household in million Riels]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
1=HH grow wet season rice	-0.814 (2.16)	-3.518* (1.72)	-0.097 (0.76)	-1.111 (1.05)	-1.758 (1.08)	-0.056 (1.36)	-3.321** (1.14)
HH reported receiving interventions from program other than HARVEST (1=Yes)	-0.266 (0.63)	0.007 (0.17)	-0.067 (0.30)	0.294 (0.15)	-0.126 (0.20)	-0.107 (0.23)	-0.205 (0.30)
number of male members participating in HARVEST interventions	0.278 (1.99)	0.012 (0.74)	-0.276 (0.62)	-0.486 (0.87)	0.167 (0.51)	0.430 (0.60)	0.175 (0.83)
number of female members participating in HARVEST interventions	-0.632 (2.00)	0.244 (0.77)	-0.546 (0.61)	-0.450 (0.84)	0.082 (0.51)	0.332 (0.59)	-0.040 (0.88)
number of HH members who participated in HARVEST activities	0.222 (1.95)	-0.199 (0.78)	0.424 (0.61)	0.561 (0.85)	-0.141 (0.51)	-0.416 (0.59)	0.115 (0.93)
number of HH members who participated as clients in HARVEST activities	-1.952 (2.05)	-0.138 (0.75)	-0.026 (0.61)	0.407 (0.82)	-0.444 (0.52)	-0.705 (0.60)	0.047 (0.99)
number of HH members who participated as demo leaders in HARVEST activities	-2.476 (2.03)	0.278 (0.69)	0.134 (0.64)	0.345 (0.86)	-0.531 (0.54)	-0.771 (0.62)	0.267 (1.12)
1=HH was aquaculture client or demo beneficiary	2.300 (1.26)	-0.172 (0.43)	0.362 (0.51)	0.603 (0.35)	0.290 (0.40)	0.293 (0.43)	-0.433 (0.64)
1=HH was home garden client or demo beneficiary	2.387 (1.29)	0.153 (0.38)	-0.253 (0.58)	0.081 (0.26)	0.298 (0.32)	0.140 (0.36)	0.309 (0.47)
1=HH was rice client or demo beneficiary	1.939 (1.14)	-0.404 (0.38)	0.268 (0.49)	0.488 (0.30)	0.372 (0.31)	0.457 (0.36)	0.635 (0.46)
Number of years HH participated in HARVEST as a client	2.019* (0.85)	0.115 (0.21)	0.368 (0.37)	-0.082 (0.18)	0.537* (0.25)	0.494 (0.28)	-0.103 (0.33)
1=HH participated in HARVEST in 2011	-0.773 (1.39)	0.000 (.)	-0.305 (0.58)	0.744 (0.85)	-0.041 (0.55)	0.062 (0.62)	0.157 (0.76)
1=HH participated in HARVEST in 2012	-2.643 (1.74)	0.283 (0.53)	-0.283 (1.02)	0.383 (0.32)	-0.439 (0.57)	-0.256 (0.67)	1.945 (1.23)
1=HH participated in HARVEST in 2013	-0.868 (2.12)	-0.880 (0.59)	-1.538 (1.78)	-0.311 (0.44)	-0.526 (0.47)	-0.771 (0.58)	-0.325 (0.78)

Annex A4.3. cont.

Variables [Dependent variables are real net income per household in million Riels]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
1=HH participated in HARVEST in 2014	-4.750*	0.263	-0.632	0.379	-0.676	-0.659	-0.469
	(2.09)	(0.44)	(0.78)	(0.29)	(0.45)	(0.53)	(0.59)
Propensity scores for nearest neighbor (nn4) method	0.940	-0.959	-1.882*	0.666	-0.496	-0.452	-1.044
	(1.70)	(0.83)	(0.89)	(0.48)	(0.63)	(0.70)	(0.85)
Constant	0.000	0.000	-19.315**	-2.367	-9.549**	-8.778*	-1.640
	(.)	(.)	(4.56)	(2.65)	(3.07)	(3.62)	(4.76)
Observations	626	675	761	613	2675	2245	430
R-Square	0.550	0.405	0.599	0.634	0.536	0.537	0.709
chi2-statistic	.	.	.	.	1639.806	2970.159	.
rho	0.302	0.000	0.141	0.000	0.248	0.232	0.441

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A4.4. Impact of Cambodia HARVEST on Rice Net Income per Household in Million Riels (CRE Models), Sample 2

Variables [Dependent variables are real net income per household in million Riels]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	0.771 (1.02)	-0.055 (0.44)	-0.475 (0.59)	0.771 (0.42)	0.074 (0.39)	0.220 (0.46)	-0.580 (0.54)
New treatment variable-includes dropouts	-20.385 (14.71)	-5.805 (6.04)	0.000 (.)	-1.497** (0.51)	0.170 (0.91)	0.503 (1.01)	-3.319** (1.10)
Program effect (DID)	-0.192 (0.87)	-0.134 (0.35)	-0.174 (0.53)	-0.018 (0.37)	-0.073 (0.28)	-0.036 (0.33)	0.090 (0.46)
HH head gender (1=Male)	1.496 (1.32)	0.474 (0.37)	0.602 (0.52)	0.641 (0.45)	0.586 (0.30)		
Household size (# of people)	-0.227 (0.36)	0.162 (0.16)	-0.169 (0.28)	-0.732** (0.13)	-0.249 (0.20)	-0.273 (0.21)	0.060 (0.16)
Head's age (years)	-0.194 (0.18)	0.043 (0.07)	0.017 (0.08)	-0.064 (0.04)	-0.037 (0.05)	-0.086 (0.07)	-0.079 (0.07)
Head's age squared	0.001 (0.00)	-0.000 (0.00)	-0.000 (0.00)	0.000 (0.00)	0.000 (0.00)	0.000 (0.00)	0.001 (0.00)
HH head education (# of years)	0.090 (0.08)	-0.006 (0.03)	-0.000 (0.03)	-0.001 (0.03)	0.032 (0.02)	0.030 (0.03)	0.025 (0.03)
Log of household durable assets in Riels	1.111* (0.46)	0.176 (0.22)	0.472 (0.30)	0.251 (0.16)	0.338* (0.14)	0.359* (0.17)	0.317 (0.21)
Own Tractor	-1.163 (0.70)	-0.425 (0.60)	-0.166 (0.40)	0.294 (0.21)	-0.415 (0.23)	-0.560* (0.26)	0.099 (0.33)
Log of area in hectares	6.280** (1.21)	2.776** (0.90)	3.916** (0.63)	2.156** (0.32)	4.419** (0.49)	4.576** (0.56)	2.755** (0.69)
Log of real rice input costs in Riels per hectare (Millions)	0.120 (0.87)	-0.088 (0.19)	-0.735* (0.29)	-0.236 (0.14)	-0.188 (0.16)	-0.248 (0.19)	0.071 (0.21)
Total agricultural plots	1.118 (0.71)	0.131 (0.27)	-0.226 (0.27)	0.302 (0.34)	0.135 (0.16)	0.265 (0.18)	-0.342 (0.35)
Total number of plots owned by the HH	0.417 (0.73)	0.092 (0.19)	0.771* (0.34)	0.141 (0.27)	0.169 (0.18)	0.172 (0.19)	0.329 (0.36)
1=HH grow dry season rice	-2.751* (1.12)	-0.174 (0.59)	-0.238 (0.40)	-0.100 (0.55)	-1.509** (0.45)	-1.622** (0.49)	-0.024 (0.75)
1=HH grow wet season rice	-1.281 (2.08)	-3.665* (1.66)	-0.144 (0.68)	-0.805 (0.77)	-1.442 (0.90)	-0.248 (1.09)	-1.991 (1.34)

Annex A4.4. cont.

Variables [Dependent variables are real net income per household in million Riels]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
HH reported receiving interventions from program other than HARVEST (1=Yes)	-0.352	-0.032	-0.054	0.214	-0.179	-0.164	-0.183
	(0.60)	(0.17)	(0.28)	(0.12)	(0.18)	(0.21)	(0.27)
number of male members participating in HARVEST interventions	0.487	0.283	-0.208	-0.369	0.378	0.565	0.812
	(2.01)	(0.69)	(0.59)	(0.80)	(0.50)	(0.58)	(0.72)
number of female members participating in HARVEST interventions	-0.765	0.673	-0.445	-0.330	0.260	0.423	0.762
	(2.03)	(0.73)	(0.58)	(0.79)	(0.48)	(0.56)	(0.75)
number of HH members who participated in HARVEST activities	0.313	-0.514	0.352	0.431	-0.308	-0.504	-0.594
	(1.98)	(0.71)	(0.58)	(0.80)	(0.48)	(0.55)	(0.76)
number of HH members who participated as clients in HARVEST activities	-1.862	-0.332	-0.046	0.461	-0.505	-0.672	-0.806
	(2.08)	(0.71)	(0.59)	(0.79)	(0.50)	(0.57)	(0.81)
number of HH members who participated as demo leaders in HARVEST activities	-2.046	0.021	0.135	0.312	-0.542	-0.708	-0.470
	(2.03)	(0.70)	(0.62)	(0.82)	(0.52)	(0.59)	(0.94)
1=HH was aquaculture client or demo beneficiary	2.382*	-0.461	0.371	0.213	0.200	0.190	-0.330
	(1.15)	(0.44)	(0.47)	(0.26)	(0.34)	(0.36)	(0.53)
1=HH was home garden client or demo beneficiary	2.339	-0.193	-0.249	0.171	0.292	0.157	0.539
	(1.20)	(0.44)	(0.54)	(0.18)	(0.28)	(0.31)	(0.40)
1=HH was rice client or demo beneficiary	2.132*	-0.571	0.398	0.207	0.336	0.356	0.671
	(1.08)	(0.54)	(0.47)	(0.22)	(0.27)	(0.31)	(0.40)
Number of years HH participated in HARVEST as a client	1.937*	0.086	0.344	-0.047	0.537*	0.500*	-0.189
	(0.81)	(0.22)	(0.36)	(0.14)	(0.22)	(0.25)	(0.24)
1=HH participated in HARVEST in 2011	-0.653	0.000	-0.253	0.128	-0.127	-0.057	-0.169
	(1.32)	(.)	(0.53)	(0.64)	(0.50)	(0.56)	(0.49)
1=HH participated in HARVEST in 2012	-2.765	0.530	-0.154	0.417	-0.359	-0.333	1.394
	(1.68)	(0.49)	(0.75)	(0.22)	(0.45)	(0.53)	(0.78)
1=HH participated in HARVEST in 2013	-1.398	-0.727	-1.721	-0.210	-0.527	-0.610	-0.248
	(1.72)	(0.53)	(1.82)	(0.26)	(0.35)	(0.41)	(0.49)
1=HH participated in HARVEST in 2014	-3.917*	-0.136	-0.639	-0.039	-0.809*	-0.780	-0.381
	(1.61)	(0.46)	(0.72)	(0.22)	(0.37)	(0.42)	(0.43)

Annex A4.4. cont.

Variables [Dependent variables are real net income per household in million Riels]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Propensity scores for nearest neighbor (nn4) method	1.863 (1.87)	-0.589 (0.80)	-1.834* (0.87)	1.143** (0.42)	0.151 (0.64)	0.217 (0.70)	-0.449 (0.77)
Constant	0.000 (.)	0.000 (.)	-17.593** (4.40)	-0.312 (2.07)	-9.377** (3.07)	-8.057* (3.56)	-2.192 (4.47)
Observations	674	737	811	807	3029	2541	488
R-Square	0.561	0.396	0.596	0.614	0.535	0.539	0.697
chi2-statistic	.	.	.	.	1703.648	3253.535	.
rho	0.301	0.077	0.145	0.000	0.256	0.231	0.414

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A4.5. Impact of Cambodia HARVEST on Value of Rice Production per Household in Million Riels (CRE Models), Sample 1

Variables [Dependent variables are real value of rice production per household in million Riels]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	6.517 (12.53)	-0.483 (6.13)	-13.319 (8.35)	8.308 (4.88)	-6.061 (5.33)	-4.699 (6.41)	-10.359 (7.58)
New treatment variable-excludes dropouts	0.000 (.)	0.000 (.)	0.000 (.)	1.254 (7.63)	5.930 (17.78)	10.221 (19.37)	-54.884* (23.69)
Program effect (DID)	3.025 (10.96)	-3.066 (4.91)	3.918 (7.08)	0.063 (4.60)	3.889 (3.81)	4.092 (4.41)	3.745 (6.33)
HH head gender (1=Male)	14.142 (14.03)	9.314 (6.04)	6.223 (9.02)	11.082 (7.06)	9.745* (4.56)		
Household size (# of people)	-5.462 (4.51)	3.813 (2.48)	-1.293 (3.95)	-9.802** (1.42)	-2.556 (2.69)	-2.788 (2.72)	0.518 (2.33)
Head's age (years)	-0.332 (2.32)	0.559 (1.00)	0.744 (1.03)	-0.792 (0.61)	0.238 (0.76)	-0.387 (1.07)	-0.131 (1.13)
Head's age squared	-0.007 (0.02)	-0.002 (0.01)	-0.006 (0.01)	0.003 (0.00)	-0.006 (0.01)	-0.002 (0.01)	0.000 (0.01)
HH head education (# of years)	1.645 (1.20)	-0.293 (0.44)	0.062 (0.49)	-0.017 (0.44)	0.354 (0.31)	0.400 (0.42)	0.312 (0.44)
Log of household durable assets in Riels	12.514* (5.97)	2.492 (2.91)	5.295 (4.09)	4.357 (2.46)	3.770 (2.00)	4.178 (2.33)	2.656 (2.96)
Own Tractor	-20.569* (9.59)	-6.486 (8.44)	-4.810 (5.63)	0.376 (2.80)	-8.118* (3.34)	-10.394** (3.78)	1.069 (4.82)
Log of area in hectares	124.439** (16.20)	45.273** (11.51)	78.676** (9.23)	42.771** (4.22)	85.824** (7.38)	88.880** (8.27)	54.886** (10.47)
Log of real rice input costs in Riels per hectare (Millions)	42.833** (12.94)	7.019* (3.11)	3.379 (3.91)	3.450 (1.76)	10.176** (2.71)	10.648** (3.29)	8.089* (3.18)
Total agricultural plots	7.099 (8.22)	3.180 (3.82)	-4.851 (4.53)	4.047 (5.10)	0.539 (2.39)	2.531 (2.71)	-5.750 (4.54)
Total number of plots owned by the HH	6.743 (9.19)	0.824 (2.82)	14.882* (6.41)	0.520 (3.90)	2.456 (3.04)	2.828 (3.32)	3.432 (5.19)
1=HH grow dry season rice	-22.765 (13.79)	-3.158 (8.46)	5.615 (5.62)	-1.175 (5.01)	-13.589* (5.68)	-14.006* (6.05)	6.080 (15.09)

Annex A4.5. cont.

Variables [Dependent variables are real value of rice production per household in million Riels	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
1=HH grow wet season rice	10.069 (32.57)	-36.943* (17.98)	-6.186 (11.13)	-15.928 (12.03)	-14.423 (15.88)	11.763 (20.86)	-35.964* (17.13)
HH reported receiving interventions from program other than HARVEST (1=Yes)	-7.487 (7.80)	-0.368 (2.26)	-2.317 (4.47)	3.389* (1.72)	-3.768 (2.75)	-3.830 (3.06)	-4.809 (4.57)
number of male members participating in HARVEST interventions	-1.707 (23.12)	2.911 (10.56)	-7.084 (8.26)	-4.735 (9.50)	1.870 (6.81)	5.768 (7.97)	4.908 (11.92)
number of female members participating in HARVEST interventions	-10.911 (23.17)	6.582 (11.12)	-10.691 (8.33)	-3.811 (9.16)	1.377 (6.82)	5.571 (7.93)	-0.021 (12.78)
number of HH members who participated in HARVEST activities	7.448 (22.64)	-5.850 (11.31)	7.905 (8.00)	5.084 (9.35)	-2.124 (6.80)	-6.594 (7.90)	0.263 (13.52)
number of HH members who participated as clients in HARVEST activities	-10.467 (23.55)	-3.971 (10.72)	4.409 (9.07)	4.066 (9.03)	-4.042 (7.17)	-7.430 (8.30)	-1.334 (14.19)
number of HH members who participated as demo leaders in HARVEST activities	-22.691 (23.07)	1.312 (9.89)	5.793 (9.31)	4.198 (9.55)	-6.457 (7.41)	-9.594 (8.52)	1.780 (16.31)
1=HH was aquaculture client or demo beneficiary	21.851 (15.62)	-3.765 (5.61)	-0.855 (8.75)	5.867 (3.84)	1.892 (6.04)	1.361 (6.53)	-8.847 (9.82)
1=HH was home garden client or demo beneficiary	19.500 (16.42)	-0.412 (5.06)	-9.929 (9.67)	-1.156 (3.04)	-0.011 (4.95)	-3.107 (5.58)	1.506 (6.64)
1=HH was rice client or demo beneficiary	15.019 (13.07)	-5.903 (5.09)	-3.290 (8.54)	4.979 (3.18)	2.315 (4.81)	3.147 (5.47)	10.568 (6.96)
Number of years HH participated in HARVEST as a client	20.939 (11.47)	0.633 (3.01)	5.889 (5.12)	-0.389 (2.11)	6.454 (3.42)	5.130 (3.86)	-0.289 (5.19)
1=HH participated in HARVEST in 2011	-16.065 (19.08)	0.000 (.)	-8.552 (7.79)	14.571 (9.25)	-6.207 (7.23)	-4.568 (8.07)	1.346 (10.62)
1=HH participated in HARVEST in 2012	-13.914 (18.28)	-0.186 (6.94)	-7.264 (14.86)	4.685 (3.86)	-1.753 (7.19)	2.284 (7.99)	30.015 (19.92)

Annex A4.5. cont.

Variables [Dependent variables are real value of rice production per household in million Riels]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
1=HH participated in HARVEST in 2013	3.682 (23.73)	-7.808 (6.86)	-11.797 (22.14)	-3.357 (4.83)	-6.481 (6.33)	-8.937 (7.76)	-6.917 (12.58)
1=HH participated in HARVEST in 2014	-47.166 (25.58)	-0.315 (5.07)	-5.900 (10.02)	4.170 (3.30)	-6.120 (5.92)	-4.486 (6.81)	-3.587 (8.72)
Propensity scores for nearest neighbor (nn4) method	12.233 (22.00)	-15.347 (11.19)	-35.194* (13.85)	10.150 (5.56)	-10.114 (8.87)	-9.259 (9.73)	-15.780 (11.12)
Constant	-829.704** (180.24)	0.000 (.)	0.000 (.)	-136.813** (29.76)	-343.275** (43.78)	-345.204** (51.12)	-221.966** (80.54)
Observations	626	675	761	613	2675	2245	430
R-Square	0.673	0.530	0.729	0.740	0.656	0.658	0.781
chi2-statistic	.	.	.	.	2895.484	4559.096	.
rho	0.287	0.012	0.177	0.000	0.262	0.236	0.541

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A4.6. Impact of Cambodia HARVEST on Value of Rice Production per Household in Million Riels (CRE Models), Sample 2

Variables [Dependent variables are real value of rice production per household in million Riels]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	4.635 (12.06)	-2.407 (6.18)	-13.540 (8.05)	8.314 (5.07)	-5.998 (5.00)	-4.417 (5.92)	-1.426 (1.18)
New treatment variable-includes dropouts	-827.317** (166.70)	-212.541* (87.78)	-527.118** (71.05)	-15.693** (5.93)	3.615 (14.23)	7.407 (15.31)	-5.958** (2.20)
Program effect (DID)	1.381 (10.54)	-2.476 (4.90)	3.258 (6.89)	-1.647 (4.46)	1.967 (3.62)	2.276 (4.19)	0.961 (0.97)
HH head gender (1=Male)	16.319 (14.25)	6.142 (5.30)	5.874 (7.68)	6.152 (5.23)	5.795 (3.90)		
Household size (# of people)	-4.595 (4.30)	2.694 (2.27)	-0.352 (3.70)	-9.140** (1.70)	-2.183 (2.42)	-2.595 (2.47)	-1.083** (0.27)
Head's age (years)	-0.810 (2.31)	0.987 (1.06)	0.805 (1.01)	-0.855 (0.48)	0.117 (0.69)	-0.573 (0.96)	-0.062 (0.16)
Head's age squared	-0.001 (0.02)	-0.009 (0.01)	-0.007 (0.01)	0.005 (0.00)	-0.004 (0.01)	0.000 (0.01)	0.000 (0.00)
HH head education (# of years)	1.306 (1.10)	-0.084 (0.42)	0.157 (0.45)	-0.071 (0.33)	0.427 (0.28)	0.463 (0.36)	0.088 (0.06)
Log of household durable assets in Riels	12.480* (5.56)	2.751 (2.86)	4.741 (3.87)	3.054 (1.94)	3.090 (1.81)	3.373 (2.10)	0.560 (0.47)
Own Tractor	-20.234* (9.01)	-7.767 (8.43)	-4.822 (5.30)	2.690 (2.45)	-6.985* (3.08)	-9.510** (3.49)	0.287 (0.73)
Log of area in hectares	124.998** (15.47)	52.598** (12.62)	79.493** (8.92)	40.424** (3.74)	84.802** (6.89)	88.371** (7.71)	8.788** (1.43)
Log of real rice input costs in Riels per hectare (Millions)	42.620** (11.66)	6.698* (2.84)	4.172 (3.80)	3.803* (1.53)	10.213** (2.37)	10.251** (2.81)	1.913** (0.57)
Total agricultural plots	6.338 (7.99)	1.454 (3.84)	-4.371 (4.29)	3.238 (4.13)	0.001 (2.26)	1.615 (2.55)	-0.483 (0.62)
Total number of plots owned by the HH	4.749 (8.79)	1.101 (2.65)	14.386* (6.01)	2.015 (3.21)	2.639 (2.80)	3.083 (3.02)	0.194 (0.75)

Annex A4.6. cont.

Variables [Dependent variables are real value of rice production per household in million Riels	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
1=HH grow dry season rice	-26.187*	-2.330	6.868	-3.071	-14.224**	-15.422**	1.074
	(12.64)	(8.03)	(5.18)	(6.56)	(5.23)	(5.62)	(1.85)
1=HH grow wet season rice	4.929	-38.717*	-6.142	-11.128	-11.152	8.007	-2.207
	(31.74)	(17.53)	(9.58)	(8.76)	(12.90)	(16.64)	(2.53)
HH reported receiving interventions from program other than HARVEST (1=Yes)	-9.083	-1.164	-2.399	2.836*	-4.163	-4.111	-0.621
	(7.43)	(2.41)	(4.21)	(1.32)	(2.54)	(2.84)	(0.76)
number of male members participating in HARVEST interventions	0.873	5.288	-5.689	-4.506	4.349	7.129	0.350
	(23.24)	(9.62)	(7.82)	(8.95)	(6.73)	(7.90)	(2.20)
number of female members participating in HARVEST interventions	-13.661	11.426	-8.787	-3.613	3.534	6.425	-0.164
	(23.25)	(10.26)	(7.82)	(8.74)	(6.43)	(7.42)	(2.29)
number of HH members who participated in HARVEST activities	9.743	-9.072	6.503	4.864	-3.836	-7.087	0.277
	(22.73)	(10.11)	(7.55)	(8.88)	(6.42)	(7.40)	(2.27)
number of HH members who participated as clients in HARVEST activities	-9.373	-5.238	3.884	4.690	-5.176	-7.182	-0.626
	(23.59)	(9.90)	(8.88)	(8.81)	(6.76)	(7.76)	(2.42)
number of HH members who participated as demo leaders in HARVEST activities	-16.755	-0.972	5.435	3.571	-6.967	-8.944	-0.165
	(22.57)	(9.69)	(9.06)	(9.24)	(7.01)	(7.98)	(2.89)
1=HH was aquaculture client or demo beneficiary	22.919	-7.597	0.228	2.628	1.043	0.465	-0.384
	(14.08)	(5.94)	(8.10)	(2.89)	(5.14)	(5.56)	(2.17)
1=HH was home garden client or demo beneficiary	21.448	-5.657	-10.230	1.019	0.801	-1.749	0.304
	(15.15)	(6.19)	(9.19)	(2.13)	(4.33)	(4.84)	(1.36)
1=HH was rice client or demo beneficiary	16.955	-9.118	-1.181	2.108	2.141	1.836	0.864
	(12.43)	(7.91)	(8.38)	(2.41)	(4.25)	(4.83)	(1.26)
Number of years HH participated in HARVEST as a client	19.159	0.133	4.350	0.228	6.289*	5.130	0.275
	(11.08)	(3.21)	(5.00)	(1.67)	(3.12)	(3.48)	(0.84)
1=HH participated in HARVEST in 2011	-12.288	0.000	-5.656	6.313	-5.809	-4.642	-3.542
	(18.15)	(.)	(7.31)	(7.23)	(6.82)	(7.58)	(2.01)
1=HH participated in HARVEST in 2012	-17.965	3.117	-0.871	4.070	-1.809	-0.583	1.907
	(17.70)	(6.31)	(11.38)	(2.78)	(5.82)	(6.56)	(1.63)

Annex A4.6. cont.

Variables [Dependent variables are real value of rice production per household in million Riels	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
1=HH participated in HARVEST in 2013	-5.109 (20.98)	-5.620 (6.31)	-15.656 (22.33)	-2.366 (2.91)	-6.250 (4.77)	-6.454 (5.56)	-0.299 (1.20)
1=HH participated in HARVEST in 2014	-41.073* (20.68)	-4.429 (5.62)	-4.174 (9.41)	-1.442 (2.59)	-8.225 (4.97)	-7.007 (5.63)	-2.048 (1.30)
Propensity scores for nearest neighbor (nn4) method	32.339 (24.25)	-10.496 (10.72)	-32.964* (13.09)	14.729** (4.95)	0.720 (8.91)	1.946 (9.71)	-3.313 (2.02)
Constant	0.000 (.)	0.000 (.)	0.000 (.)	-102.223** (24.40)	-335.033** (44.54)	-324.537** (50.97)	-19.950 (11.35)
Observations	674	737	811	807	3029	2541	488
R-Square	0.682	0.516	0.727	0.726	0.652	0.656	0.777
chi2-statistic	.	.	.	.	2549.623	4755.557	.
rho	0.294	0.135	0.188	0.000	0.283	0.251	0.505

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A4.7. Impact of Cambodia HARVEST on Value of Rice Sales in Million Riels (CRE Models), Sample 1

Variables [Dependent variables are real rice sales in million Riels for all sellers]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	-0.259 (0.17)	-2.033 (2.20)	-0.277* (0.13)	-0.077 (0.05)	-0.588 (0.35)	-0.396* (0.17)	-0.495* (0.20)
New treatment variable-excludes dropouts	-9.320** (2.15)	1.181 (1.72)	-6.390** (1.21)	-0.117 (0.10)	0.686 (0.61)	0.973 (0.56)	-0.675* (0.27)
Program effect (DID)	-0.113 (0.15)	2.127 (2.36)	-0.363** (0.11)	-0.020 (0.04)	0.185 (0.38)	-0.112 (0.12)	0.119 (0.13)
HH head gender (1=Male)	0.196 (0.30)	7.257 (7.37)	-0.000 (0.17)	0.043 (0.05)	1.383 (1.37)		
Household size (# of people)	-0.130* (0.06)	-0.145 (0.29)	-0.289** (0.11)	-0.073** (0.01)	-0.149** (0.03)	-0.157** (0.05)	-0.005 (0.04)
Head's age (years)	-0.007 (0.03)	0.163 (0.22)	-0.023 (0.02)	-0.001 (0.01)	0.036 (0.03)	0.007 (0.04)	0.006 (0.02)
Head's age squared	-0.000 (0.00)	-0.002 (0.00)	0.000 (0.00)	-0.000 (0.00)	-0.000 (0.00)	-0.000 (0.00)	-0.000 (0.00)
HH head education (# of years)	-0.020 (0.02)	0.147 (0.12)	0.021 (0.01)	-0.004 (0.01)	0.029 (0.03)	0.012 (0.01)	-0.001 (0.01)
Log of household durable assets in Riels	0.274** (0.08)	0.362 (0.39)	0.117 (0.08)	-0.003 (0.03)	0.135** (0.05)	0.149** (0.05)	0.073 (0.05)
Own Tractor	-0.233 (0.12)	-1.058 (0.73)	0.019 (0.07)	0.084* (0.03)	-0.137 (0.12)	-0.219 (0.18)	0.111* (0.05)
Log of area in hectares	0.904** (0.24)	0.761 (0.51)	0.704** (0.17)	0.272** (0.06)	0.641** (0.16)	0.908** (0.21)	0.528** (0.19)
Log of real rice input costs in Riels per hectare (Millions)	0.721** (0.22)	0.581 (0.64)	0.183 (0.10)	0.081* (0.04)	0.095 (0.31)	0.465 (0.26)	0.239* (0.09)
Total agricultural plots	0.224 (0.13)	0.135 (0.40)	-0.054 (0.04)	0.001 (0.03)	0.086 (0.12)	0.149 (0.15)	-0.078 (0.05)
Total number of plots owned by the HH	-0.057 (0.13)	0.058 (0.56)	0.162* (0.08)	0.007 (0.03)	-0.033 (0.14)	-0.082 (0.17)	-0.009 (0.06)
HH reported receiving interventions from HARVEST (1=yes)	-0.083 (0.14)	-1.155 (0.88)	-0.248 (0.27)	-0.045 (0.04)	-0.335 (0.22)	-0.320 (0.22)	0.121 (0.09)

Annex A4.7. cont.

Variables [Dependent variables are real rice sales in million Riels for all sellers]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
HH reported receiving interventions from program other than HARVEST (1=Yes)	-0.013	0.653	-0.019	-0.012	-0.012	0.096	-0.068
	(0.08)	(0.79)	(0.10)	(0.02)	(0.11)	(0.18)	(0.05)
1=HH grow dry season rice	0.137	-0.964	-0.065	0.131	-0.030	-0.040	-0.116
	(0.18)	(1.04)	(0.09)	(0.11)	(0.10)	(0.10)	(0.19)
1=HH grow wet season rice	-1.101	0.412	0.377	0.094	-0.513	-0.698	-0.160
	(0.75)	(0.80)	(0.20)	(0.17)	(0.59)	(0.58)	(0.25)
number of male members participating in HARVEST interventions	-0.029	-0.683	-0.225	-0.197*	-0.078	-0.013	-0.036
	(0.27)	(0.96)	(0.16)	(0.09)	(0.11)	(0.14)	(0.24)
number of female members participating in HARVEST interventions	-0.189	-0.756	-0.245	-0.160*	-0.150	-0.036	-0.145
	(0.28)	(1.01)	(0.16)	(0.08)	(0.11)	(0.13)	(0.22)
number of HH members who participated in HARVEST activities	0.128	0.662	0.224	0.181*	0.114	0.003	0.129
	(0.27)	(1.00)	(0.15)	(0.09)	(0.11)	(0.13)	(0.24)
number of HH members who participated as clients in HARVEST activities	0.013	0.808	0.129	0.196*	0.059	-0.010	0.161
	(0.29)	(1.40)	(0.19)	(0.08)	(0.12)	(0.14)	(0.23)
number of HH members who participated as demo leaders in HARVEST activities	-0.159	0.944	0.306	0.129	0.109	0.047	0.175
	(0.29)	(1.42)	(0.17)	(0.09)	(0.12)	(0.13)	(0.26)
1=HH was aquaculture client or demo beneficiary	0.175	-0.419	-0.103	0.089	0.012	0.019	-0.047
	(0.15)	(0.60)	(0.17)	(0.07)	(0.11)	(0.12)	(0.14)
1=HH was home garden client or demo beneficiary	0.221	-0.301	-0.162	0.066	-0.037	-0.095	-0.042
	(0.17)	(0.52)	(0.14)	(0.04)	(0.09)	(0.11)	(0.08)
1=HH was rice client or demo beneficiary	0.113	0.456	0.016	0.048	0.127	0.129	-0.024
	(0.17)	(0.54)	(0.16)	(0.05)	(0.11)	(0.13)	(0.08)
Number of years HH participated in HARVEST as a client	0.190	-0.178	0.080	0.025	0.016	-0.013	0.030
	(0.14)	(0.28)	(0.09)	(0.04)	(0.10)	(0.12)	(0.07)
1=HH participated in HARVEST in 2011	-0.221	0.000	-0.041	0.178	-0.004	0.021	-0.049
	(0.21)	(.)	(0.19)	(0.11)	(0.15)	(0.17)	(0.12)

Annex A4.7. cont

Variables [Dependent variables are real rice sales in million Riels for all sellers]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
1=HH participated in HARVEST in 2012	0.028 (0.23)	-1.868 (1.38)	-0.011 (0.20)	0.012 (0.07)	-0.331 (0.25)	-0.256 (0.26)	0.231 (0.19)
1=HH participated in HARVEST in 2013	-0.056 (0.32)	1.036 (1.84)	0.005 (0.27)	-0.108 (0.07)	0.294 (0.25)	0.218 (0.32)	-0.084 (0.15)
1=HH participated in HARVEST in 2014	-0.547* (0.22)	-1.126 (1.25)	-0.310 (0.17)	-0.012 (0.06)	-0.250* (0.11)	-0.265* (0.13)	-0.191 (0.11)
Propensity scores for nearest neighbor (nn4) method	-0.051 (0.25)	0.793 (1.58)	-0.214 (0.23)	-0.047 (0.08)	0.003 (0.25)	0.190 (0.42)	-0.357 (0.24)
Constant	0.000 (.)	-8.564 (5.53)	0.000 (.)	-1.720** (0.48)	-5.906** (1.77)	-3.164 (3.42)	-1.137 (0.97)
Observations	538	329	654	383	1904	1614	290
R-Square	0.618	0.153	0.585	0.584	0.194	0.187	0.789
chi2-statistic	.	.	.	.	.	.	.
rho	0.000	0.000	0.175	0.006	0.000	0.836	0.000

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A4.8. Impact of Cambodia HARVEST on Value of Rice Sales in Million Riels (CRE Models), Sample 2

Variables [Dependent variables are real rice sales in million Riels for all sellers]	Province				Overall l	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	-0.317 (0.17)	-1.973 (2.21)	-0.287* (0.13)	5.710 (5.87)	0.410 (1.06)	-0.395* (0.17)	-0.569* (0.23)
New treatment variable-includes dropouts	-9.132** (2.02)	0.000 (.)	0.331 (0.58)	2.844 (4.78)	-0.005 (1.05)	0.872 (0.51)	-24.320 (28.89)
Program effect (DID)	-0.110 (0.15)	2.059 (2.24)	-0.341** (0.11)	-1.864 (2.29)	-0.352 (0.70)	-0.088 (0.12)	0.220 (0.16)
HH head gender (1=Male)	0.185 (0.29)	6.342 (6.37)	-0.082 (0.15)	-25.475 (25.65)	-5.345 (6.65)		
Household size (# of people)	-0.101 (0.06)	-0.174 (0.30)	-0.275** (0.10)	-1.054 (1.04)	-0.435 (0.31)	-0.149** (0.05)	-0.017 (0.04)
Head's age (years)	-0.006 (0.03)	0.135 (0.20)	-0.023 (0.02)	0.491 (0.56)	0.112 (0.10)	0.000 (0.04)	0.008 (0.05)
Head's age squared	-0.000 (0.00)	-0.002 (0.00)	0.000 (0.00)	-0.006 (0.01)	-0.001 (0.00)	-0.000 (0.00)	-0.000 (0.00)
HH head education (# of years)	-0.020 (0.02)	0.160 (0.13)	0.022* (0.01)	-0.051 (0.17)	0.021 (0.03)	0.009 (0.01)	0.007 (0.01)
Log of household durable assets in Riels	0.272** (0.08)	0.337 (0.37)	0.112 (0.07)	-4.498 (4.38)	-0.988 (1.10)	0.129** (0.04)	0.028 (0.07)
Own Tractor	-0.229 (0.12)	-0.938 (0.64)	0.025 (0.07)	0.899 (1.24)	0.344 (0.51)	-0.171 (0.16)	0.070 (0.09)
Log of area in hectares	0.923** (0.22)	0.787 (0.47)	0.694** (0.16)	-4.036 (4.54)	0.071 (0.63)	0.886** (0.19)	0.650** (0.24)
Log of real rice input costs in Riels per hectare (Millions)	0.603** (0.22)	0.470 (0.60)	0.174* (0.09)	3.254 (3.29)	0.766 (0.77)	0.412 (0.24)	0.288* (0.13)
Total agricultural plots	0.210	0.121	-0.050	-0.140	-0.001	0.140	-0.054

Annex A4.8. cont

Variables [Dependent variables are real rice sales in million Riels for all sellers]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Total number of plots owned by the HH	(0.13) -0.031	(0.37) 0.023	(0.04) 0.163*	(0.97) 0.200	(0.16) 0.006	(0.14) -0.068	(0.05) -0.120
HH reported receiving interventions from HARVEST (1=yes)	(0.14) -0.108	(0.49) -1.168	(0.07) -0.185	(1.18) -3.152	(0.16) -0.571	(0.15) -0.248	(0.11) -13.941
HH reported receiving interventions from program other than HARVEST (1=Yes)	(0.13) -0.048	(0.91) 0.556	(0.23) -0.019	(3.23) -3.846	(0.38) -0.636	(0.21) 0.062	(14.15) -10.361
1=HH grow dry season rice	(0.08) 0.109	(0.74) -0.908	(0.09) -0.067	(3.71) -0.163	(0.60) -0.179	(0.16) -0.057	(10.11) 0.151
1=HH grow wet season rice	(0.17) -1.175	(0.96) 0.368	(0.09) 0.296	(1.88) 2.601	(0.25) -0.536	(0.10) -0.675	(0.22) -0.133
HH reported receiving interventions from program other than HARVEST (1=Yes)	(0.77) 0.000	(0.72) 0.000	(0.19) 0.000	(5.30) 0.000	(0.75) 0.000	(0.46) 0.000	(0.07) 0.000
number of male members participating in HARVEST interventions	(.) 0.033	(.) -0.555	(.) -0.205	(.) -0.892	(.) -0.143	0.005	-4.706
number of female members participating in HARVEST interventions	(0.26) -0.208	(0.81) -0.561	(0.15) -0.212	(2.77) -0.817	(0.28) -0.220	(0.12) -0.033	(13.79) 0.265
number of HH members who participated in HARVEST activities	(0.26) 0.132	(0.83) 0.484	(0.15) 0.197	(2.54) 1.317	(0.29) 0.260	(0.12) 0.009	(14.39) 1.897
number of HH members who participated as clients in HARVEST activities	(0.26) -0.015	(0.82) 0.731	(0.14) 0.110	(2.76) -1.336	(0.32) -0.705	(0.12) 0.001	(15.36) -15.357
number of HH members who participated as demo leaders in HARVEST activities	(0.28) -0.143	(1.38) 0.800	(0.19) 0.282	(2.98) -2.627	(0.83) -0.789	(0.13) 0.049	(19.76) -8.170
	(0.27)	(1.39)	(0.17)	(4.09)	(0.95)	(0.12)	(15.89)

Annex A4.8. cont

Variables [Dependent variables are real rice sales in million Riels for all sellers]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
1=HH was aquaculture client or demo beneficiary	0.266 (0.17)	-0.401 (0.57)	-0.088 (0.16)	-0.318 (2.30)	0.458 (0.61)	0.010 (0.11)	14.286 (16.07)
1=HH was home garden client or demo beneficiary	0.193 (0.16)	-0.292 (0.56)	-0.159 (0.14)	4.212 (4.24)	1.308 (1.36)	-0.134 (0.12)	15.815 (16.89)
1=HH was rice client or demo beneficiary	0.167 (0.17)	0.160 (0.48)	0.051 (0.15)	-0.923 (2.25)	0.263 (0.44)	0.137 (0.11)	3.797 (9.67)
Number of years HH participated in HARVEST as a client	0.180 (0.14)	-0.125 (0.25)	0.072 (0.09)	-1.694 (1.99)	-0.195 (0.29)	-0.015 (0.09)	-13.090 (13.09)
1=HH participated in HARVEST in 2011	-0.231 (0.20)	0.000 (.)	-0.042 (0.16)	-2.129 (4.40)	0.319 (0.43)	-0.024 (0.15)	16.978 (18.05)
1=HH participated in HARVEST in 2012	-0.033 (0.22)	-1.749 (1.24)	0.021 (0.15)	1.649 (2.02)	-0.003 (0.49)	-0.191 (0.20)	6.260 (11.34)
1=HH participated in HARVEST in 2013	-0.253 (0.31)	0.728 (1.44)	0.015 (0.26)	-0.942 (1.81)	0.168 (0.51)	0.129 (0.20)	31.475 (31.80)
1=HH participated in HARVEST in 2014	-0.429* (0.21)	-0.790 (1.01)	-0.312* (0.15)	5.620 (5.61)	1.246 (1.43)	-0.196 (0.11)	33.031 (31.44)
Propensity scores for nearest neighbor (nn4) method	0.157 (0.26)	1.634 (2.09)	-0.246 (0.22)	2.978 (4.19)	0.588 (0.67)	0.419 (0.52)	32.255 (31.98)
Constant	0.000 (.)	-9.554 (5.58)	-6.613** (1.29)	-44.435 (42.89)	-13.609 (8.11)	-2.788 (3.01)	26.944 (66.67)
Observations	574	352	697	478	2101	1777	324
R-Square	0.613	0.145	0.585	0.109	0.053	0.190	0.224
chi2-statistic	.	.	.	.	950.848	.	.
rho	0.000	0.000	0.178	0.000	0.000	0.828	1.000

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$. Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A4.9. Impact of Cambodia HARVEST on Rice Yield in Tons per Hectare (CRE Models), Sample 1

Variables [Dependent variables are rice yield in tons per hectare]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	0.564** (0.16)	0.409* (0.16)	0.453* (0.19)	0.356* (0.18)	0.438** (0.08)	0.476** (0.09)	0.283 (0.24)
New treatment variable-excludes dropouts	-14.322** (2.10)	0.000 (.)	-7.790** (1.04)	-0.945** (0.32)	0.227 (0.31)	0.276 (0.34)	-0.550 (0.44)
Program effect (DID)	-0.022 (0.15)	-0.118 (0.13)	-0.268* (0.13)	0.090 (0.13)	-0.087 (0.07)	-0.115 (0.07)	-0.022 (0.21)
HH head gender (1=Male)	0.295 (0.28)	0.150 (0.19)	0.141 (0.25)	0.448 (0.26)	0.219 (0.12)		
Household size (# of people)	-0.023 (0.06)	0.123* (0.06)	-0.106 (0.08)	-0.033 (0.03)	-0.007 (0.03)	0.002 (0.03)	-0.027 (0.09)
Head's age (years)	-0.025 (0.02)	0.023 (0.02)	-0.044* (0.02)	-0.011 (0.03)	-0.011 (0.01)	-0.015 (0.01)	-0.030 (0.03)
Head's age squared	0.000 (0.00)	-0.000 (0.00)	0.000 (0.00)	0.000 (0.00)	0.000 (0.00)	0.000 (0.00)	0.000 (0.00)
HH head education (# of years)	0.004 (0.02)	-0.001 (0.02)	0.017 (0.01)	0.001 (0.01)	0.006 (0.01)	0.000 (0.01)	0.023 (0.02)
Log of household durable assets in Riels	0.111 (0.09)	-0.010 (0.08)	0.124 (0.08)	0.160 (0.09)	0.083* (0.04)	0.069 (0.04)	0.177 (0.13)
Own Tractor	-0.085 (0.12)	0.091 (0.09)	0.150 (0.09)	0.101 (0.09)	0.067 (0.05)	0.072 (0.05)	-0.004 (0.15)
Log of area in hectares	-0.350* (0.15)	-0.471** (0.17)	-0.679** (0.18)	-0.531** (0.17)	-0.485** (0.08)	-0.517** (0.09)	-0.318 (0.24)
Log of real rice input costs in Riels per hectare (Millions)	0.868** (0.14)	0.457** (0.09)	0.205 (0.12)	0.290** (0.11)	0.430** (0.06)	0.450** (0.07)	0.351* (0.15)
Total agricultural plots	0.056 (0.14)	0.062 (0.06)	0.052 (0.07)	0.249* (0.11)	0.102** (0.04)	0.114** (0.04)	0.021 (0.15)
Total number of plots owned by the HH	0.121 (0.16)	0.011 (0.07)	0.015 (0.08)	-0.162 (0.11)	-0.031 (0.04)	-0.024 (0.05)	-0.124 (0.16)
1=HH grow dry season rice	-0.147 (0.17)	0.372 (0.24)	0.014 (0.14)	0.577* (0.26)	0.064 (0.09)	0.018 (0.09)	0.735* (0.37)

Annex A4.9. cont.

Variables [Dependent variables are rice yield in tons per hectare]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
1=HH grow wet season rice	-0.212 (0.29)	-0.622 (1.58)	0.346 (0.30)	-0.527 (0.56)	-0.526 (0.49)	-0.097 (0.31)	-1.449 (0.98)
HH reported receiving interventions from program other than HARVEST (1=Yes)	-0.058 (0.08)	-0.043 (0.06)	-0.064 (0.07)	0.162* (0.08)	-0.027 (0.04)	-0.009 (0.04)	-0.173 (0.10)
number of male members participating in HARVEST interventions	0.017 (0.51)	-0.113 (0.17)	0.048 (0.19)	0.308 (0.67)	0.029 (0.15)	0.086 (0.15)	-0.812* (0.40)
number of female members participating in HARVEST interventions	-0.018 (0.51)	-0.047 (0.17)	-0.078 (0.19)	0.289 (0.67)	0.012 (0.15)	0.066 (0.16)	-0.982* (0.40)
number of HH members who participated in HARVEST activities	0.016 (0.51)	0.091 (0.17)	0.041 (0.19)	-0.310 (0.67)	-0.010 (0.14)	-0.062 (0.15)	1.015* (0.41)
number of HH members who participated as clients in HARVEST activities	-0.280 (0.52)	0.176 (0.20)	-0.019 (0.19)	-0.248 (0.68)	-0.045 (0.16)	-0.126 (0.16)	1.253** (0.44)
number of HH members who participated as demo leaders in HARVEST activities	-0.341 (0.52)	0.222 (0.21)	0.053 (0.20)	-0.157 (0.69)	0.007 (0.16)	-0.081 (0.16)	1.177** (0.45)
1=HH was aquaculture client or demo beneficiary	0.347 (0.20)	-0.221 (0.18)	-0.015 (0.11)	0.142 (0.19)	-0.007 (0.08)	0.048 (0.09)	-0.778** (0.24)
1=HH was home garden client or demo beneficiary	0.464* (0.20)	-0.217 (0.14)	0.133 (0.13)	0.059 (0.13)	0.087 (0.08)	0.093 (0.08)	-0.341 (0.20)
1=HH was rice client or demo beneficiary	0.188 (0.19)	-0.152 (0.16)	0.063 (0.11)	0.054 (0.15)	0.018 (0.08)	0.093 (0.08)	-0.500* (0.24)
Number of years HH participated in HARVEST as a client	0.209 (0.12)	0.050 (0.07)	-0.039 (0.09)	-0.083 (0.10)	-0.014 (0.05)	-0.021 (0.06)	0.034 (0.14)
1=HH participated in HARVEST in 2011	0.141 (0.18)	0.000 (.)	0.085 (0.13)	0.254 (0.35)	0.136 (0.09)	0.146 (0.10)	-0.630* (0.31)
1=HH participated in HARVEST in 2012	-0.241 (0.25)	0.124 (0.16)	0.262 (0.22)	0.185 (0.21)	0.105 (0.11)	0.096 (0.12)	0.371 (0.20)

Annex A4.9. cont.

Variables [Dependent variables are rice yield in tons per hectare]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
1=HH participated in HARVEST in 2013	-0.921 (0.56)	-0.023 (0.28)	-0.269 (0.38)	-0.003 (0.20)	-0.075 (0.14)	-0.043 (0.17)	-0.203 (0.29)
1=HH participated in HARVEST in 2014	-0.325 (0.31)	-0.144 (0.19)	-0.032 (0.16)	0.069 (0.15)	-0.016 (0.10)	0.005 (0.11)	-0.409 (0.26)
Propensity scores for nearest neighbor (nn4) method	-0.054 (0.25)	-0.059 (0.23)	-0.029 (0.20)	0.120 (0.23)	-0.030 (0.12)	-0.046 (0.13)	-0.171 (0.33)
Constant	0.000 (.)	0.000 (.)	0.000 (.)	-6.464** (1.47)	-6.351** (0.82)	-6.701** (0.94)	-1.467 (2.08)
Observations	626	675	761	613	2675	2245	430
R-Square	0.485	0.507	0.542	0.402	0.529	0.542	0.619
chi2-statistic	.	.	.	.	4143.102	12189.011	.
rho	0.116	0.033	0.041	0.000	0.073	0.080	0.000

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A4.10. The Impact of Cambodia HARVEST on Rice Yield in Tons per Hectare (CRE Models), Sample 2

Variables [Dependent variables are rice yield in tons per hectare]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	0.517** (0.16)	0.415** (0.15)	0.446* (0.18)	0.389* (0.16)	0.438** (0.08)	0.472** (0.09)	0.322 (0.23)
New treatment variable-includes dropouts	0.000 (.)	0.000 (.)	-7.686** (1.02)	-0.661* (0.27)	0.358 (0.24)	0.404 (0.26)	-0.277 (0.43)
Program effect (DID)	-0.007 (0.15)	-0.152 (0.13)	-0.273* (0.13)	-0.024 (0.12)	-0.114 (0.07)	-0.138 (0.07)	-0.057 (0.20)
HH head gender (1=Male)	0.279 (0.27)	0.104 (0.17)	0.072 (0.22)	0.316 (0.20)	0.171 (0.10)		
Household size (# of people)	-0.017 (0.06)	0.111* (0.05)	-0.087 (0.07)	-0.040 (0.03)	-0.007 (0.02)	-0.003 (0.03)	0.022 (0.08)
Head's age (years)	-0.026 (0.02)	0.021 (0.02)	-0.045* (0.02)	-0.009 (0.03)	-0.013 (0.01)	-0.018 (0.01)	-0.007 (0.03)
Head's age squared	0.000 (0.00)	-0.000 (0.00)	0.000 (0.00)	0.000 (0.00)	0.000 (0.00)	0.000 (0.00)	0.000 (0.00)
HH head education (# of years)	0.008 (0.02)	0.006 (0.02)	0.019 (0.01)	0.006 (0.01)	0.010 (0.01)	0.004 (0.01)	0.023 (0.02)
Log of household durable assets in Riels	0.116 (0.09)	0.000 (0.07)	0.121 (0.07)	0.129 (0.07)	0.074* (0.04)	0.060 (0.04)	0.128 (0.12)
Own Tractor	-0.107 (0.11)	0.125 (0.09)	0.123 (0.09)	0.116 (0.08)	0.072 (0.04)	0.070 (0.05)	0.010 (0.13)
Log of area in hectares	-0.318* (0.14)	-0.430** (0.16)	-0.646** (0.18)	-0.590** (0.16)	-0.473** (0.08)	-0.493** (0.09)	-0.453* (0.22)
Log of real rice input costs in Riels per hectare (Millions)	0.853** (0.14)	0.464** (0.08)	0.214 (0.12)	0.347** (0.09)	0.446** (0.05)	0.464** (0.06)	0.366* (0.14)
Total agricultural plots	0.105 (0.14)	0.062 (0.05)	0.065 (0.06)	0.167 (0.09)	0.101** (0.04)	0.110** (0.04)	0.058 (0.14)
Total number of plots owned by the HH	0.069 (0.15)	-0.006 (0.06)	0.004 (0.07)	-0.068 (0.10)	-0.029 (0.04)	-0.018 (0.04)	-0.145 (0.15)
1=HH grow dry season rice	-0.288 (0.17)	0.392 (0.24)	0.031 (0.13)	0.481* (0.22)	0.010 (0.09)	-0.055 (0.09)	0.747* (0.31)
1=HH grow wet season rice	-0.370 (0.28)	-0.681 (1.53)	0.263 (0.27)	-0.335 (0.48)	-0.438 (0.42)	-0.241 (0.25)	-0.718 (1.06)

Annex A4.10. cont.

Variables [Dependent variables are rice yield in tons per hectare]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
HH reported receiving interventions from program other than HARVEST (1=Yes)	-0.067	-0.008	-0.053	0.131	-0.018	-0.002	-0.125
	(0.08)	(0.06)	(0.07)	(0.07)	(0.03)	(0.04)	(0.09)
number of male members participating in HARVEST interventions	0.046	0.023	0.050	0.300	0.054	0.094	-0.328
	(0.51)	(0.17)	(0.19)	(0.69)	(0.14)	(0.15)	(0.44)
number of female members participating in HARVEST interventions	-0.011	0.101	-0.065	0.320	0.050	0.080	-0.414
	(0.52)	(0.17)	(0.18)	(0.68)	(0.14)	(0.15)	(0.44)
number of HH members who participated in HARVEST activities	0.002	-0.052	0.037	-0.313	-0.040	-0.074	0.465
	(0.51)	(0.16)	(0.18)	(0.69)	(0.14)	(0.15)	(0.44)
number of HH members who participated as clients in HARVEST activities	-0.321	0.084	-0.025	-0.256	-0.057	-0.118	0.632
	(0.54)	(0.19)	(0.18)	(0.69)	(0.15)	(0.16)	(0.45)
number of HH members who participated as demo leaders in HARVEST activities	-0.351	0.157	0.037	-0.218	-0.013	-0.085	0.646
	(0.53)	(0.20)	(0.19)	(0.70)	(0.15)	(0.16)	(0.48)
1=HH was aquaculture client or demo beneficiary	0.408	-0.342*	-0.061	0.034	-0.053	0.009	-0.575*
	(0.21)	(0.17)	(0.11)	(0.15)	(0.08)	(0.08)	(0.23)
1=HH was home garden client or demo beneficiary	0.390	-0.276*	0.123	0.117	0.070	0.078	-0.085
	(0.21)	(0.14)	(0.12)	(0.10)	(0.07)	(0.07)	(0.19)
1=HH was rice client or demo beneficiary	0.300	-0.256	0.083	0.009	0.001	0.082	-0.387
	(0.21)	(0.16)	(0.10)	(0.12)	(0.07)	(0.07)	(0.20)
Number of years HH participated in HARVEST as a client	0.187	0.038	-0.029	-0.074	-0.010	-0.021	0.029
	(0.11)	(0.07)	(0.08)	(0.09)	(0.05)	(0.05)	(0.12)
1=HH participated in HARVEST in 2011	0.130	0.000	0.035	-0.036	0.080	0.108	-0.614**
	(0.18)	(.)	(0.12)	(0.31)	(0.09)	(0.09)	(0.22)
1=HH participated in HARVEST in 2012	-0.131	0.134	0.204	0.052	0.067	0.061	0.129
	(0.24)	(0.15)	(0.17)	(0.16)	(0.09)	(0.11)	(0.18)
1=HH participated in HARVEST in 2013	-0.834*	-0.070	-0.265	0.042	-0.074	-0.060	-0.187
	(0.39)	(0.22)	(0.39)	(0.14)	(0.11)	(0.12)	(0.21)

Annex A4.10. cont.

Variables [Dependent variables are rice yield in tons per hectare]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
1=HH participated in HARVEST in 2014	-0.117 (0.24)	-0.243 (0.22)	-0.035 (0.15)	-0.044 (0.15)	-0.052 (0.09)	-0.003 (0.09)	-0.426 (0.25)
Propensity scores for nearest neighbor (nn4) method	-0.067 (0.26)	0.058 (0.22)	-0.012 (0.20)	0.335 (0.20)	0.064 (0.11)	0.063 (0.12)	0.014 (0.31)
Constant	-13.282** (1.90)	0.000 (.)	0.000 (.)	-4.127** (1.29)	-5.983** (0.78)	-6.047** (0.90)	-2.637 (1.92)
Observations	674	737	811	807	3029	2541	488
R-Square	0.483	0.507	0.541	0.353	0.514	0.525	0.605
chi2-statistic	.	.	.	.	4678.534	12968.041	.
rho	0.096	0.100	0.038	0.064	0.098	0.104	0.000

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A4.11. Impact of Cambodia HARVEST on Wet Season Rice Yield in Tons per Hectare (CRE Models), Sample 1

Variables [Dependent variables are wet season rice yield in tons per hectare]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	0.568** (0.16)	0.393** (0.15)	0.439* (0.19)	0.209 (0.19)	0.408** (0.09)	0.438** (0.09)	0.303 (0.23)
New treatment variable-excludes dropouts	0.000 (.)	0.000 (.)	-6.155** (1.05)	-1.032** (0.37)	0.228 (0.31)	0.334 (0.34)	-0.598 (0.45)
Program effect (DID)	-0.036 (0.16)	-0.110 (0.12)	-0.252 (0.14)	0.107 (0.13)	-0.100 (0.07)	-0.126 (0.07)	-0.020 (0.21)
HH head gender (1=Male)	0.256 (0.27)	0.072 (0.18)	0.278 (0.27)	0.308 (0.27)	0.212 (0.12)		
Household size (# of people)	-0.026 (0.06)	0.043 (0.05)	-0.095 (0.08)	-0.034 (0.04)	-0.025 (0.02)	-0.011 (0.03)	-0.071 (0.09)
Head's age (years)	-0.025 (0.02)	-0.008 (0.02)	-0.035 (0.02)	-0.017 (0.03)	-0.021 (0.01)	-0.026 (0.01)	-0.034 (0.03)
Head's age squared	0.000 (0.00)	0.000 (0.00)	0.000 (0.00)	0.000 (0.00)	0.000 (0.00)	0.000 (0.00)	0.000 (0.00)
HH head education (# of years)	0.007 (0.02)	-0.005 (0.01)	0.019 (0.01)	-0.009 (0.01)	0.003 (0.01)	-0.003 (0.01)	0.018 (0.02)
Log of household durable assets in Riels	0.114 (0.09)	0.003 (0.07)	0.143 (0.08)	0.095 (0.12)	0.094* (0.05)	0.078 (0.05)	0.192 (0.13)
Own Tractor	-0.137 (0.13)	0.041 (0.08)	0.139 (0.09)	0.151 (0.10)	0.042 (0.05)	0.038 (0.05)	0.006 (0.14)
Log of area in hectares	-0.312* (0.15)	-0.324* (0.15)	-0.697** (0.19)	-0.198 (0.32)	-0.410** (0.10)	-0.415** (0.11)	-0.359 (0.23)
Log of real rice input costs in Riels per hectare (Millions)	0.845** (0.14)	0.335** (0.08)	0.182 (0.12)	0.292** (0.11)	0.366** (0.05)	0.378** (0.06)	0.290 (0.16)
Total agricultural plots	0.127 (0.13)	0.003 (0.05)	0.043 (0.07)	0.204 (0.11)	0.079* (0.04)	0.092* (0.04)	0.001 (0.12)
Total number of plots owned by the HH	0.032 (0.14)	0.029 (0.06)	0.012 (0.08)	-0.175 (0.12)	-0.036 (0.04)	-0.043 (0.05)	-0.075 (0.14)
1=HH grow dry season rice	-0.176 (0.18)	-0.559** (0.22)	0.054 (0.14)	0.336 (0.24)	-0.136 (0.09)	-0.200* (0.09)	0.750* (0.33)

Annex A4.11. cont.

	-0.074	-0.019	-0.080	0.127	-0.023	-0.011	-0.085
HH reported receiving interventions from program other than HARVEST (1=Yes)							
1=HH grow wet season rice	0.000 (.) (0.08)	0.000 (.) (0.06)	0.000 (.) (0.07)	0.000 (.) (0.09)	0.000 (.) (0.04)	0.000 (.) (0.04)	0.000 (.) (0.10)
number of male members participating in HARVEST interventions	-0.008 (0.50)	-0.137 (0.16)	0.057 (0.20)	0.110 (0.61)	0.023 (0.15)	0.055 (0.15)	-0.670 (0.35)
number of female members participating in HARVEST interventions	-0.026 (0.50)	-0.113 (0.16)	-0.060 (0.19)	0.196 (0.60)	0.037 (0.15)	0.077 (0.15)	-0.795* (0.36)
number of HH members who participated in HARVEST activities	0.038 (0.50)	0.166 (0.16)	0.037 (0.19)	-0.169 (0.61)	-0.013 (0.14)	-0.045 (0.15)	0.835* (0.36)
number of HH members who participated as clients in HARVEST activities	-0.260 (0.52)	0.262 (0.20)	-0.036 (0.19)	-0.246 (0.61)	-0.082 (0.16)	-0.146 (0.16)	1.068** (0.40)
number of HH members who participated as demo leaders in HARVEST activities	-0.340 (0.51)	0.272 (0.21)	0.048 (0.20)	-0.131 (0.63)	-0.033 (0.16)	-0.109 (0.16)	1.054* (0.41)
1=HH was aquaculture client or demo beneficiary	0.363 (0.22)	-0.341 (0.19)	-0.022 (0.12)	0.229 (0.20)	-0.011 (0.09)	0.034 (0.09)	-0.759** (0.23)
1=HH was home garden client or demo beneficiary	0.480* (0.21)	-0.154 (0.17)	0.108 (0.13)	0.181 (0.15)	0.093 (0.08)	0.080 (0.09)	-0.252 (0.19)
1=HH was rice client or demo beneficiary	0.147 (0.21)	-0.136 (0.17)	0.057 (0.11)	0.006 (0.16)	0.009 (0.08)	0.081 (0.08)	-0.479* (0.22)
Number of years HH participated in HARVEST as a client	0.217 (0.12)	0.113 (0.07)	-0.016 (0.09)	0.076 (0.13)	0.085 (0.05)	0.110 (0.06)	-0.022 (0.13)
1=HH participated in HARVEST in 2011	0.136 (0.18)	0.000 (.)	0.066 (0.13)	0.457 (0.39)	0.017 (0.10)	-0.011 (0.11)	-0.526 (0.28)
1=HH participated in HARVEST in 2012	-0.213 (0.26)	0.350 (0.18)	0.233 (0.23)	-0.227 (0.29)	-0.024 (0.13)	-0.035 (0.16)	0.314 (0.19)
1=HH participated in HARVEST in 2013	-0.937 (0.54)	-0.339 (0.31)	-0.285 (0.40)	-0.091 (0.22)	-0.157 (0.15)	-0.226 (0.17)	-0.061 (0.31)
1=HH participated in HARVEST in 2014	-0.362 (0.32)	0.002 (0.21)	-0.063 (0.16)	0.026 (0.26)	-0.046 (0.12)	-0.067 (0.13)	-0.242 (0.24)

Annex A4.11. cont.

HH reported receiving interventions from program other than HARVEST (1=Yes)	-0.074	-0.019	-0.080	0.127	-0.023	-0.011	-0.085
1=HH participated in HARVEST in 2015	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
Distance to the nearest treatment village (based on all the HARVEST villages)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
Propensity scores for nearest neighbor (nn4) method	-0.134 (0.27)	0.034 (0.20)	0.008 (0.21)	-0.001 (0.24)	0.005 (0.12)	0.016 (0.13)	-0.367 (0.32)
Constant	-14.395** (2.21)	0.000 (.)	0.000 (.)	-6.191** (2.08)	-5.604** (0.97)	-5.207** (1.15)	-3.282 (2.07)
Observations	612	656	760	598	2626	2204	422
R-Square	0.481	0.372	0.514	0.324	0.519	0.528	0.620
chi2-statistic	.	.	.	.	4498.175	10775.002	.
rho	0.121	0.174	0.018	0.027	0.094	0.119	0.000

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A4.12. Impact of Cambodia HARVEST on Wet Season Rice Yield in Tons per Hectare (CRE Models), Sample 2

Variables [Dependent variables are dry season rice yield in tons per hectare]	Provinces				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	0.526** (0.16)	0.419** (0.14)	0.434* (0.19)	0.254 (0.17)	0.409** (0.08)	0.446** (0.09)	0.320 (0.22)
New treatment variable-includes dropouts	-13.441** (1.97)	0.000 (.)	0.000 (.)	0.000 (.)	0.355 (0.25)	0.422 (0.26)	-0.314 (0.42)
Program effect (DID)	-0.023 (0.16)	-0.142 (0.11)	-0.258 (0.13)	0.048 (0.12)	-0.114 (0.07)	-0.140 (0.07)	-0.027 (0.19)
HH head gender (1=Male)	0.220 (0.26)	0.042 (0.15)	0.169 (0.24)	0.215 (0.20)	0.137 (0.11)		
Household size (# of people)	-0.020 (0.06)	0.052 (0.05)	-0.079 (0.07)	-0.052 (0.04)	-0.023 (0.02)	-0.015 (0.03)	-0.025 (0.08)
Head's age (years)	-0.025 (0.02)	-0.012 (0.02)	-0.039 (0.02)	-0.016 (0.03)	-0.021 (0.01)	-0.027* (0.01)	-0.011 (0.03)
Head's age squared	0.000 (0.00)	0.000 (0.00)	0.000 (0.00)	0.000 (0.00)	0.000 (0.00)	0.000 (0.00)	0.000 (0.00)
HH head education (# of years)	0.011 (0.02)	0.003 (0.01)	0.021 (0.01)	-0.004 (0.01)	0.008 (0.01)	0.002 (0.01)	0.018 (0.01)
Log of household durable assets in Riels	0.116 (0.09)	-0.004 (0.07)	0.136 (0.08)	0.087 (0.10)	0.083* (0.04)	0.062 (0.05)	0.173 (0.12)
Own Tractor	-0.153 (0.12)	0.081 (0.08)	0.113 (0.09)	0.185* (0.09)	0.047 (0.05)	0.041 (0.05)	-0.009 (0.13)
Log of area in hectares	-0.282 (0.15)	-0.307* (0.15)	-0.653** (0.19)	-0.291 (0.24)	-0.397** (0.09)	0.395** (0.10)	-0.489* (0.21)
Log of real rice input costs in Riels per hectare (Millions)	0.831** (0.15)	0.348** (0.07)	0.192 (0.12)	0.368** (0.09)	0.389** (0.05)	0.404** (0.06)	0.308* (0.15)
Total agricultural plots	0.170 (0.13)	0.014 (0.05)	0.058 (0.07)	0.091 (0.09)	0.079* (0.04)	0.093* (0.04)	0.028 (0.12)
Total number of plots owned by the HH	-0.009 (0.14)	0.010 (0.06)	-0.002 (0.07)	-0.061 (0.11)	-0.033 (0.04)	-0.037 (0.05)	-0.068 (0.13)
1=HH grow dry season rice	-0.318 (0.17)	-0.534* (0.21)	0.083 (0.14)	0.236 (0.18)	-0.180* (0.09)	-0.264** (0.09)	0.718** (0.28)

Annex A4.12. cont.

Variables [Dependent variables are dry season rice yield in tons per hectare]	Provinces				Overall	Head's gender	
	BB	KT	PS	SR		Male	Fema
1=HH grow wet season rice	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
HH reported receiving interventions from program other than HARVEST (1=Yes)	-0.087 (0.08)	0.008 (0.06)	-0.055 (0.07)	0.106 (0.08)	-0.022 (0.04)	-0.015 (0.04)	-0.061 (0.09)
number of male members participating in HARVEST interventions	0.012 (0.50)	0.009 (0.16)	0.054 (0.19)	0.237 (0.66)	0.064 (0.14)	0.081 (0.15)	-0.245 (0.45)
number of female members participating in HARVEST interventions	-0.033 (0.51)	0.028 (0.16)	-0.049 (0.19)	0.307 (0.65)	0.073 (0.14)	0.087 (0.15)	-0.270 (0.46)
number of HH members who participated in HARVEST activities	0.034 (0.50)	0.025 (0.15)	0.037 (0.18)	-0.264 (0.66)	-0.047 (0.14)	-0.061 (0.15)	0.335 (0.46)
number of HH members who participated as clients in HARVEST activities	-0.279 (0.53)	0.163 (0.19)	-0.036 (0.19)	-0.319 (0.66)	-0.096 (0.15)	-0.142 (0.16)	0.493 (0.47)
number of HH members who participated as demo leaders in HARVEST activities	-0.332 (0.53)	0.213 (0.20)	0.037 (0.20)	-0.341 (0.68)	-0.052 (0.15)	-0.110 (0.16)	0.534 (0.49)
1=HH was aquaculture client or demo beneficiary	0.415 (0.23)	-0.444* (0.18)	-0.094 (0.11)	0.073 (0.16)	-0.055 (0.08)	-0.000 (0.08)	-0.562* (0.23)
1=HH was home garden client or demo beneficiary	0.398 (0.23)	-0.201 (0.16)	0.089 (0.12)	0.189 (0.11)	0.082 (0.07)	0.076 (0.07)	-0.016 (0.18)
1=HH was rice client or demo beneficiary	0.255 (0.22)	-0.171 (0.16)	0.076 (0.11)	-0.003 (0.14)	0.010 (0.07)	0.097 (0.07)	-0.403* (0.19)
Number of years HH participated in HARVEST as a client	0.200 (0.12)	0.090 (0.06)	-0.008 (0.08)	0.097 (0.11)	0.084 (0.05)	0.099 (0.06)	0.043 (0.12)
1=HH participated in HARVEST in 2011	0.124 (0.18)	0.000 (.)	0.024 (0.12)	-0.133 (0.34)	-0.033 (0.09)	-0.038 (0.10)	-0.592** (0.20)

Annex A.4.12. cont.

Variables [Dependent variables are dry season rice yield in tons per hectare]	Provinces				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
=HH participated in HARVEST in 2012	-0.112 (0.24)	0.329* (0.15)	0.173 (0.18)	-0.193 (0.21)	-0.047 (0.11)	-0.078 (0.13)	0.150 (0.16)
1=HH participated in HARVEST in 2013	-0.864* (0.38)	-0.339 (0.22)	-0.296 (0.41)	-0.070 (0.16)	-0.147 (0.11)	-0.166 (0.12)	-0.205 (0.21)
1=HH participated in HARVEST in 2014	-0.154 (0.25)	-0.147 (0.25)	-0.036 (0.16)	-0.137 (0.20)	-0.103 (0.10)	-0.097 (0.11)	-0.379 (0.24)
1=HH participated in HARVEST in 2015	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
Distance to the nearest treatment village (based on all the HARVEST villages)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
Propensity scores for nearest neighbor (nn4) method	-0.141 (0.28)	0.183 (0.20)	0.042 (0.21)	0.306 (0.22)	0.136 (0.11)	0.154 (0.12)	-0.116 (0.31)
Constant	0.000 (.)	-3.252 (1.86)	0.000 (.)	-4.298* (1.73)	-5.300** (0.88)	-4.873** (1.07)	-3.379 (1.96)
Observations	660	717	810	791	2973	2496	477
R-Square	0.480	0.357	0.510	0.273	0.506	0.513	0.620
chi2-statistic	.	.	.	.	5130.034	11517.352	.
rho	0.099	0.217	0.022	0.121	0.114	0.137	0.000

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A4.13. Impact of Cambodia HARVEST on Dry Season Rice Yield in Tons per Hectare (CRE Models), Sample 1

Variables [Dependent variables are dry season yield in tons per hectare]	Provinces			Overall	Head's Gender
	KT	PS	SR		Male
Year (1=2016)	-2.142 (1.14)	1.076* (0.54)	1.105 (1.23)	0.269 (0.42)	0.497 (0.43)
New treatment variable-excludes dropouts	0.000 (.)	-13.917** (4.70)	2.822 (1.45)	-0.312 (0.76)	0.255 (0.80)
Program effect (DID)	1.554 (1.04)	-0.635 (0.46)	-0.401 (0.84)	-0.248 (0.38)	-0.473 (0.39)
HH head gender (1=Male)	3.636 (3.23)	-0.973 (0.80)	0.126 (1.45)	0.416 (0.47)	
Household size (# of people)	0.543 (0.32)	-0.222 (0.16)	0.461* (0.23)	0.084 (0.12)	0.048 (0.12)
Head's age (years)	0.524 (0.27)	-0.037 (0.06)	-0.246 (0.23)	0.081 (0.04)	0.051 (0.05)
Head's age squared	-0.002 (0.00)	0.000 (0.00)	0.000 (0.00)	-0.001 (0.00)	-0.001 (0.00)
HH head education (# of years)	0.195* (0.09)	0.018 (0.04)	0.052 (0.07)	0.025 (0.03)	0.034 (0.04)
Log of household durable assets in Riels	0.654 (0.59)	0.039 (0.16)	0.443 (0.61)	0.014 (0.16)	0.077 (0.17)
Own Tractor	0.810 (0.81)	-0.267 (0.28)	-0.532 (0.45)	-0.042 (0.23)	-0.113 (0.25)
Log of area in hectares	0.045 (0.62)	-0.187 (0.36)	-1.016 (0.95)	-0.046 (0.28)	-0.160 (0.29)
Log of real rice input costs in Riels per hectare (Millions)	1.408* (0.71)	1.381* (0.54)	0.259 (0.50)	0.596* (0.25)	0.429 (0.28)
Total agricultural plots	0.279 (0.23)	0.257 (0.15)	0.473 (0.35)	0.114 (0.13)	0.118 (0.14)

Annex A4.13. cont.

Variables [Dependent variables are dry season yield in tons per hectare]	Provinces			Overall	Head's Gender Male
	KT	PS	SR		
Total number of plots owned by the HH	-0.621 (0.49)	-0.201 (0.18)	-0.247 (0.47)	-0.110 (0.16)	0.001 (0.16)
1=HH grow wet season rice	-2.027* (1.03)	-1.693 (0.91)	-1.089 (0.80)	-0.530 (0.48)	-0.537 (0.43)
HH reported receiving interventions from program other than HARVEST (1=Yes)	-1.196 (1.06)	0.185 (0.20)	-0.016 (0.39)	0.071 (0.16)	0.086 (0.17)
number of male members participating in HARVEST interventions	3.524 (2.99)	-1.634 (1.46)	2.566* (1.22)	-0.765 (0.94)	-0.479 (0.97)
number of female members participating in HARVEST interventions	2.462 (3.02)	-1.863 (1.49)	2.148* (1.07)	-0.941 (0.95)	-0.669 (0.97)
number of HH members who participated in HARVEST activities	-3.479 (2.93)	1.799 (1.50)	-1.955 (1.14)	0.900 (0.94)	0.653 (0.97)
number of HH members who participated as clients in HARVEST activities	-0.703 (3.92)	1.571 (1.45)	-2.224 (1.34)	0.831 (0.95)	0.566 (0.98)
number of HH members who participated as demo leaders in HARVEST activities	-0.863 (3.75)	1.682 (1.45)	-2.621 (1.46)	0.852 (0.93)	0.589 (0.97)
1=HH was aquaculture client or demo beneficiary	-1.689 (1.89)	-0.187 (0.32)	0.299 (1.74)	-0.129 (0.30)	0.045 (0.30)
1=HH was home garden client or demo beneficiary	-2.092 (1.85)	0.565 (0.40)	0.876 (1.00)	0.248 (0.29)	0.389 (0.30)
1=HH was rice client or demo beneficiary	-4.556 (2.56)	0.571* (0.29)	0.442 (0.94)	0.158 (0.29)	0.241 (0.30)
Number of years HH participated in HARVEST as a client	-1.680	-0.255	-0.859	-0.265	-0.367*

Annex A4.13. cont.

Variables [Dependent variables are dry season yield in tons per hectare]	Provinces			Overall	Head's Gender Male
	KT	PS	SR		
1=HH participated in HARVEST in 2011	(1.13) 0.000 (.)	(0.21) 0.181 (0.37)	(0.45) 0.000 (.)	(0.16) 0.472 (0.29)	(0.17) 0.632* (0.29)
1=HH participated in HARVEST in 2012	0.661 (2.74)	0.263 (0.55)	0.808 (0.70)	0.228 (0.37)	0.181 (0.39)
1=HH participated in HARVEST in 2013	4.543 (3.00)	-0.374 (0.88)	-0.173 (0.77)	-0.047 (0.51)	0.043 (0.52)
1=HH participated in HARVEST in 2014	4.305 (2.63)	0.196 (0.40)	0.333 (0.56)	0.193 (0.29)	0.278 (0.32)
Propensity scores for nearest neighbor (nn4) method	3.520 (2.51)	-0.005 (0.66)	0.561 (2.05)	-0.265 (0.65)	-0.701 (0.61)
Constant	-28.788** (10.56)	0.000 (.)	1.536 (7.41)	-11.402** (3.36)	-12.572** (3.74)
Observations	88	222	109	500	456
R-Square	0.742	0.480	0.509	0.324	0.336
chi2-statistic	.	.	.	.	.
rho	0.578	0.403	0.000	0.363	0.318

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A4.14. Impact of Cambodia HARVEST on Dry Season Rice Yield in Tons per Hectare (CRE Models), Sample 2

Variables [Dependent variables are dry season yield in tons per hectare]	Provinces			Overall	Head's gender	
	KT	PS	SR		Male	Female
Year (1=2016)	-2.103*	1.057*	0.892	0.305	0.497	1.028
	(1.02)	(0.54)	(0.91)	(0.41)	(0.43)	(22.18)
New treatment variable-includes dropouts	0.000	0.000	2.273*	1.274	1.669*	0.000
	(.)	(.)	(1.12)	(0.70)	(0.78)	(.)
Program effect (DID)	1.198	-0.596	-0.658	-0.339	-0.520	2.802
	(0.99)	(0.49)	(0.58)	(0.38)	(0.39)	(17.62)
HH head gender (1=Male)	5.969*	-0.449	1.128*	0.546		
	(2.34)	(0.65)	(0.48)	(0.37)		
Household size (# of people)	0.689*	-0.132	0.255	0.090	0.015	-0.804
	(0.33)	(0.17)	(0.28)	(0.11)	(0.12)	(3.28)
Head's age (years)	0.446	-0.017	0.043	0.081*	0.043	3.073
	(0.24)	(0.06)	(0.18)	(0.04)	(0.04)	(17.10)
Head's age squared	-0.002	0.000	-0.000	-0.001	-0.000	-0.027
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.16)
HH head education (# of years)	0.171	0.002	0.038	0.015	0.018	0.099
	(0.09)	(0.03)	(0.03)	(0.02)	(0.03)	(0.27)
Log of household durable assets in Riels	0.616	0.044	0.170	0.012	0.064	1.161
	(0.55)	(0.16)	(0.38)	(0.13)	(0.15)	(5.28)
Own Tractor	1.034	-0.192	-0.418	-0.067	-0.126	-2.294
	(0.71)	(0.27)	(0.32)	(0.20)	(0.21)	(13.91)
Log of area in hectares	0.083	-0.378	-1.247	-0.108	-0.162	-13.192
	(0.64)	(0.35)	(0.80)	(0.29)	(0.30)	(17.06)
Log of real rice input costs in Riels per hectare (Millions)	1.269	1.363*	0.328	0.559*	0.430	-1.032
	(0.74)	(0.54)	(0.35)	(0.23)	(0.25)	(5.31)
Total agricultural plots	0.181	0.246	0.325	0.088	0.096	-6.213
	(0.22)	(0.16)	(0.29)	(0.13)	(0.13)	(7.59)

Annex A4.14. cont.

Variables [Dependent variables are dry season yield in tons per hectare]	Provinces			Overall	Head's gender	
	KT	PS	SR		Male	Female
Total number of plots owned by the HH	-0.542 (0.44)	-0.163 (0.18)	-0.195 (0.35)	-0.102 (0.15)	-0.003 (0.15)	1.507 (4.49)
1=HH grow dry season rice	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
1=HH grow wet season rice	-2.124* (1.05)	-1.065 (0.77)	-0.353 (0.68)	-0.219 (0.45)	-0.437 (0.31)	9.477 (15.27)
HH reported receiving interventions from program other than HARVEST (1=Yes)	-0.434 (0.83)	0.084 (0.19)	0.286 (0.29)	0.079 (0.14)	0.108 (0.15)	-10.873 (122.58)
number of male members participating in HARVEST interventions	2.611 (2.84)	-1.334 (1.45)	1.185 (1.23)	-0.792 (0.86)	-0.549 (0.89)	-3.537 (57.07)
number of female members participating in HARVEST interventions	1.680 (2.99)	-1.593 (1.48)	0.527 (1.15)	-1.042 (0.86)	-0.814 (0.89)	-0.364 (22.57)
number of HH members who participated in HARVEST activities	-2.509 (2.78)	1.528 (1.49)	-0.443 (1.18)	1.004 (0.86)	0.786 (0.89)	-7.652 (35.33)
number of HH members who participated as clients in HARVEST activities	0.999 (3.77)	1.322 (1.45)	-0.620 (1.56)	0.973 (0.88)	0.727 (0.91)	6.034 (9.87)
number of HH members who participated as demo leaders in HARVEST activities	0.706 (3.55)	1.427 (1.44)	-0.839 (1.65)	0.999 (0.87)	0.736 (0.91)	0.000 (.)
1=HH was aquaculture client or demo beneficiary	-2.262 (1.74)	-0.134 (0.28)	1.185 (1.04)	-0.242 (0.26)	-0.049 (0.27)	0.000 (.)
1=HH was home garden client or demo beneficiary	-1.847 (1.69)	0.529 (0.34)	0.278 (0.66)	0.149 (0.25)	0.281 (0.26)	29.150 (254.86)
1=HH was rice client or demo beneficiary	-5.419* (1.69)	0.558* (0.34)	0.098 (0.66)	0.047 (0.25)	0.161 (0.26)	10.570 (254.86)

Annex A4.14. cont.

Variables [Dependent variables are dry season yield in tons per hectare]	Provinces			Overall	Head's gender	
	KT	PS	SR		Male	Female
	(2.59)	(0.26)	(0.66)	(0.24)	(0.25)	(69.05)
Number of years HH participated in HARVEST as a client	-1.474	-0.233	-0.490	-0.241	-0.325*	-10.030
	(1.14)	(0.20)	(0.26)	(0.14)	(0.15)	(20.65)
1=HH participated in HARVEST in 2011	0.000	0.171	0.000	0.396	0.544*	4.504
	(.)	(0.34)	(.)	(0.24)	(0.25)	(67.19)
1=HH participated in HARVEST in 2012	-14.425**	0.491	0.392	0.277	0.241	-11.691
	(5.00)	(0.55)	(0.48)	(0.30)	(0.34)	(100.03)
1=HH participated in HARVEST in 2013	-10.011	-0.408	-0.325	-0.100	-0.086	34.868
	(5.40)	(0.81)	(0.41)	(0.32)	(0.35)	(144.23)
1=HH participated in HARVEST in 2014	16.144*	-0.049	-0.050	0.142	0.281	7.428
	(6.49)	(0.37)	(0.34)	(0.24)	(0.27)	(24.04)
Propensity scores for nearest neighbor (nn4) method	2.611	-0.330	0.470	-0.426	-0.752	65.497
	(2.57)	(0.69)	(1.85)	(0.61)	(0.59)	(106.56)
Constant	0.000	0.000	-2.938	-10.540**	-12.137**	0.000
	(.)	(.)	(4.46)	(2.92)	(3.30)	(.)
Observations	93	240	142	564	503	61
R-Square	0.718	0.472	0.447	0.338	0.354	0.967
chi2-statistic	.	.	.	.	.	.
rho	0.518	0.394	0.000	0.322	0.279	0.000

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

**Annex A4.15. Impact of Cambodia HARVEST on Total Value of Vegetable Production per Household in Million Riels (CRE Models),
Sample 1**

Variables [Dependent variables are value of vegetable production per household in million Riels]	Province				Overall	Head's gender	
	KT	PS	PS	SR		Male	Female
Year (1=2016)	-0.475 (0.60)	0.058 (0.06)	0.079 (0.05)	0.153 (0.08)	0.022 (0.12)	-0.027 (0.15)	0.056 (0.08)
New treatment variable-excludes dropouts	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.605 (0.56)	0.608 (0.60)	0.397 (0.24)
Program effect (DID)	0.137 (0.68)	0.135 (0.08)	-0.012 (0.05)	0.108 (0.12)	0.197 (0.13)	0.226 (0.15)	0.159* (0.08)
HH head gender (1=Male)	-0.425 (0.38)	0.241* (0.10)	-0.108 (0.11)	-0.015 (0.26)	-0.244 (0.32)		
Household size (# of people)	-0.166 (0.17)	0.017 (0.05)	0.011 (0.04)	-0.100* (0.05)	-0.068 (0.04)	-0.067 (0.05)	-0.016 (0.04)
HH head education (# of years)	-0.016 (0.05)	-0.014 (0.01)	-0.002 (0.01)	0.008 (0.02)	-0.005 (0.01)	-0.004 (0.01)	-0.016 (0.02)
Log of vegetable area in hectares	23.014 (12.63)	2.082** (0.56)	1.341 (0.80)	1.224 (0.63)	7.711 (5.07)	8.342 (5.58)	3.925* (1.71)
Any large industrial or commercial enterprise in the village (1=Yes)	1.358 (1.50)	0.390** (0.13)	0.000 (.)	0.000 (.)	-0.073 (0.69)	-0.092 (0.78)	0.090 (0.25)
Log of vegetable production cost per hectare in Riels	-0.021 (0.03)	0.009** (0.00)	0.012** (0.00)	0.010 (0.01)	0.012** (0.00)	0.011** (0.00)	0.016** (0.00)
Log of household durable assets in Riels	0.401 (0.42)	-0.024 (0.05)	-0.023 (0.04)	0.003 (0.08)	0.133 (0.16)	0.171 (0.19)	-0.080 (0.08)
Total agricultural plots	0.065 (0.25)	0.049 (0.03)	0.042 (0.03)	0.005 (0.09)	-0.028 (0.10)	-0.043 (0.12)	-0.012 (0.06)
Total number of plots owned by the HH	-0.439 (0.42)	-0.019 (0.04)	-0.030 (0.04)	0.024 (0.10)	-0.050 (0.07)	-0.055 (0.08)	0.044 (0.07)
Own Tractor	-0.658 (0.59)	-0.067 (0.06)	0.018 (0.05)	0.235 (0.15)	-0.112 (0.17)	-0.168 (0.21)	0.157 (0.11)
HH reported receiving interventions from program other than HARVEST (1=Yes)	0.057 (0.23)	0.023 (0.05)	-0.031 (0.04)	-0.004 (0.13)	0.042 (0.09)	0.094 (0.13)	0.006 (0.06)

Annex A4.15. cont.

Variables [Dependent variables are value of vegetable production per household in million Riels	Province				Overall	Head's gender	
	KT	PS	PS	SR		Male	Female
Number of vegetable crops	-0.063 (0.06)	0.006 (0.01)	0.021** (0.01)	0.067** (0.02)	-0.006 (0.03)	0.004 (0.03)	-0.017 (0.02)
HH reported receiving interventions from program other than HARVEST (1=Yes)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
number of male members participating in HARVEST interventions	-1.566 (1.38)	0.185 (0.16)	0.075 (0.07)	-0.203 (0.37)	-0.127 (0.22)	-0.120 (0.24)	0.380 (0.29)
number of female members participating in HARVEST interventions	-1.417 (1.22)	0.176 (0.16)	0.029 (0.06)	-0.286 (0.38)	-0.017 (0.13)	0.004 (0.16)	0.371 (0.29)
number of HH members who participated in HARVEST activities	1.591 (1.32)	-0.183 (0.16)	-0.043 (0.05)	0.253 (0.38)	0.054 (0.16)	0.041 (0.18)	-0.413 (0.29)
number of HH members who participated as clients in HARVEST activities	-0.079 (0.92)	-0.207 (0.16)	-0.016 (0.07)	0.444 (0.35)	-0.139 (0.17)	-0.180 (0.21)	-0.503 (0.31)
number of HH members who participated as demo leaders in HARVEST activities	0.118 (0.90)	-0.181 (0.16)	0.046 (0.08)	0.640 (0.40)	0.041 (0.15)	0.026 (0.17)	-0.296 (0.30)
1=HH was aquaculture client or demo beneficiary	0.717 (0.87)	-0.018 (0.13)	0.087 (0.09)	-0.333 (0.28)	0.051 (0.16)	0.040 (0.19)	0.036 (0.17)
1=HH was home garden client or demo beneficiary	1.546 (1.06)	0.073 (0.11)	0.150* (0.07)	-0.516* (0.22)	0.225 (0.23)	0.272 (0.29)	0.232 (0.13)
1=HH was rice client or demo beneficiary	0.774 (0.88)	-0.002 (0.09)	-0.032 (0.06)	-0.237 (0.26)	0.003 (0.14)	-0.045 (0.16)	0.263* (0.13)
Number of years HH participated in HARVEST as a client	0.733 (0.44)	0.123* (0.06)	-0.025 (0.04)	-0.135 (0.13)	0.198 (0.12)	0.266 (0.14)	-0.048 (0.08)
1=HH participated in HARVEST in 2011	0.296 (0.60)	0.000 (.)	0.081 (0.07)	0.709 (0.56)	0.305 (0.29)	0.261 (0.30)	0.092 (0.17)
1=HH participated in HARVEST in 2012	-1.417 (0.93)	-0.218 (0.16)	-0.351** (0.12)	-0.020 (0.21)	-0.321 (0.19)	-0.426 (0.27)	-0.253 (0.14)

Annex A4.15. cont.

Variables [Dependent variables are value of vegetable production per household in million Riels	Province				Overall	Head's gender	
	KT	PS	PS	SR		Male	Female
1=HH participated in HARVEST in 2013	-0.444 (0.75)	-0.002 (0.19)	0.533** (0.15)	0.244 (0.21)	-0.041 (0.16)	0.029 (0.19)	-0.225 (0.26)
1=HH participated in HARVEST in 2014	-1.456* (0.67)	-0.357** (0.13)	0.038 (0.05)	0.290 (0.22)	-0.393 (0.20)	-0.525 (0.27)	0.060 (0.20)
Propensity scores for nearest neighbor (nn4) method	-1.967 (1.13)	0.105 (0.28)	0.212 (0.13)	-0.441 (0.45)	-1.155 (0.68)	-1.302 (0.84)	-0.231 (0.28)
Constant	0.087 (1.70)	-0.199 (0.34)	-0.243 (0.18)	0.186 (0.31)	0.259 (0.24)	-0.094 (0.48)	0.241 (0.21)
Observations	466	468	498	377	1809	1507	302
R-Square	0.466	0.466	0.587	0.492	0.270	0.277	0.721
chi2-statistic	.	.	.	.	3270.808	.	.
rho	0.000	0.057	0.000	0.286	0.005	0.000	0.000

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

**Annex A4.16. Impact of Cambodia HARVEST on Total Value of Vegetable Production per Household in Million Riels (CRE Models),
Sample 2**

Variables [Dependent variables are value of vegetable production per household in million Riels	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	-0.427 (0.57)	0.062 (0.05)	0.080 (0.05)	0.111 (0.09)	0.023 (0.11)	-0.018 (0.13)	0.042 (0.07)
New treatment variable-includes dropouts	-0.147 (1.31)	0.000 (.)	0.000 (.)	0.000 (.)	0.618 (0.47)	0.787 (0.48)	0.335 (0.31)
Program effect (DID)	0.201 (0.62)	0.131 (0.07)	-0.023 (0.05)	0.078 (0.12)	0.189 (0.13)	0.220 (0.14)	0.132 (0.08)
HH head gender (1=Male)	-0.267 (0.33)	0.214* (0.09)	-0.060 (0.10)	-0.082 (0.35)	-0.146 (0.25)		
Household size (# of people)	-0.154 (0.17)	0.007 (0.05)	0.004 (0.04)	-0.083 (0.05)	-0.058 (0.04)	-0.064 (0.04)	0.005 (0.05)
HH head education (# of years)	-0.010 (0.04)	-0.012 (0.01)	0.002 (0.01)	0.001 (0.02)	-0.007 (0.01)	-0.009 (0.01)	-0.010 (0.01)
Log of vegetable area in hectares	22.561 (12.29)	2.230** (0.55)	1.348 (0.82)	1.634* (0.68)	7.302 (4.54)	7.943 (5.01)	2.992* (1.50)
Any large industrial or commercial enterprise in the village (1=Yes)	1.483 (1.36)	0.173 (0.14)	0.000 (.)	0.000 (.)	-0.287 (0.53)	-0.439 (0.58)	0.408 (0.32)
Log of vegetable production cost per hectare in Riels	-0.020 (0.03)	0.009** (0.00)	0.010** (0.00)	0.010* (0.00)	0.012** (0.00)	0.011** (0.00)	0.017** (0.00)
Log of household durable assets in Riels	0.334 (0.37)	-0.034 (0.04)	-0.015 (0.04)	0.047 (0.08)	0.125 (0.14)	0.156 (0.17)	-0.075 (0.06)
Total agricultural plots	0.060 (0.23)	0.048 (0.03)	0.055 (0.03)	0.023 (0.09)	-0.015 (0.09)	-0.018 (0.10)	-0.024 (0.05)
Total number of plots owned by the HH	-0.428 (0.41)	-0.015 (0.04)	-0.050 (0.04)	0.068 (0.11)	-0.053 (0.07)	-0.064 (0.08)	0.035 (0.07)
Own Tractor	-0.661 (0.59)	-0.028 (0.06)	0.028 (0.05)	0.152 (0.14)	-0.092 (0.16)	-0.132 (0.19)	0.163 (0.14)
HH reported receiving interventions from program other than HARVEST (1=Yes)	0.128 (0.23)	0.015 (0.04)	-0.019 (0.04)	0.085 (0.10)	0.049 (0.08)	0.086 (0.11)	-0.011 (0.07)

Annex A4.16. cont.

Variables [Dependent variables are value of vegetable production per household in million Riels	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Number of vegetable crops	-0.054 (0.05)	0.008 (0.01)	0.024** (0.01)	0.089** (0.02)	-0.001 (0.02)	0.012 (0.03)	-0.022 (0.02)
HH reported receiving interventions from program other than HARVEST (1=Yes)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
number of male members participating in HARVEST interventions	-1.392 (1.25)	0.152 (0.15)	0.087 (0.06)	-0.098 (0.28)	-0.056 (0.18)	-0.060 (0.21)	-0.043 (0.34)
number of female members participating in HARVEST interventions	-1.269 (1.16)	0.133 (0.15)	0.064 (0.05)	-0.132 (0.27)	0.038 (0.11)	0.063 (0.13)	-0.043 (0.34)
number of HH members who participated in HARVEST activities	1.396 (1.22)	-0.147 (0.14)	-0.071 (0.05)	0.107 (0.28)	-0.011 (0.13)	-0.030 (0.15)	0.011 (0.34)
number of HH members who participated as clients in HARVEST activities	-0.050 (0.87)	-0.168 (0.15)	-0.042 (0.07)	0.328 (0.31)	-0.107 (0.15)	-0.119 (0.17)	-0.120 (0.35)
number of HH members who participated as demo leaders in HARVEST activities	0.230 (0.83)	-0.144 (0.15)	0.022 (0.07)	0.368 (0.36)	0.057 (0.13)	0.053 (0.15)	0.140 (0.36)
1=HH was aquaculture client or demo beneficiary	0.599 (0.85)	0.008 (0.11)	0.082 (0.09)	-0.256 (0.20)	0.022 (0.13)	0.017 (0.15)	0.003 (0.18)
1=HH was home garden client or demo beneficiary	1.284 (1.01)	0.054 (0.10)	0.132* (0.06)	-0.458** (0.17)	0.133 (0.19)	0.148 (0.21)	0.136 (0.16)
1=HH was rice client or demo beneficiary	0.742 (0.85)	0.011 (0.08)	-0.013 (0.06)	-0.335 (0.19)	-0.011 (0.13)	-0.081 (0.13)	0.270 (0.16)
Number of years HH participated in HARVEST as a client	0.748 (0.46)	0.104 (0.06)	-0.018 (0.04)	-0.222 (0.12)	0.154 (0.11)	0.236 (0.14)	-0.148 (0.10)
1=HH participated in HARVEST in 2011	0.127 (0.50)	0.000 (.)	0.078 (0.07)	0.852* (0.43)	0.310 (0.26)	0.260 (0.26)	0.106 (0.18)
1=HH participated in HARVEST in 2012	-1.300 (0.87)	-0.141 (0.13)	-0.229* (0.11)	-0.013 (0.18)	-0.320 (0.19)	-0.437 (0.26)	-0.188 (0.21)

Annex A4.16. cont.

Variables [Dependent variables are value of vegetable production per household in million Riels	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
1=HH participated in HARVEST in 2013	-0.415 (0.56)	-0.013 (0.15)	0.381** (0.14)	0.102 (0.15)	-0.134 (0.15)	-0.176 (0.16)	-0.100 (0.27)
1=HH participated in HARVEST in 2014	-1.338* (0.60)	-0.088 (0.16)	0.027 (0.05)	0.338 (0.19)	-0.273 (0.16)	-0.387 (0.22)	0.164 (0.19)
Propensity scores for nearest neighbor (nn4) method	-1.933 (1.43)	0.083 (0.27)	0.070 (0.13)	0.031 (0.38)	-0.682 (0.57)	-0.795 (0.72)	-0.297 (0.31)
Constant	0.000 (.)	-0.214 (0.35)	-0.145 (0.19)	-0.280 (0.32)	0.095 (0.25)	-0.019 (0.37)	0.263 (0.28)
Observations	512	515	534	501	2062	1712	350
R-Square	0.457	0.479	0.577	0.469	0.269	0.275	0.642
chi2-statistic	.	.	.	.	1210.279	.	.
rho	0.000	0.066	0.000	0.205	0.006	0.000	0.083

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A4.17. Impact of Cambodia HARVEST on Total Sales Value of All Vegetables in Million Riels (CRE Models), Sample 1

Variables [Dependent variables are total real value of vegetable sales per household in million Riels]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	-0.751 (1.19)	0.086 (0.08)	0.110 (0.09)	0.203 (0.24)	-0.114 (0.26)	-0.254 (0.35)	-0.020 (0.12)
New treatment variable-excludes dropouts	0.000 (.)	0.000 (.)	-0.244 (0.23)	0.000 (.)	0.373 (0.36)	0.251 (0.43)	0.459 (0.37)
Program effect (DID)	0.323 (1.25)	0.102 (0.10)	-0.024 (0.10)	0.146 (0.28)	0.355 (0.26)	0.455 (0.34)	0.346 (0.19)
HH head gender (1=Male)	-0.612 (0.59)	0.233 (0.12)	0.040 (0.10)	-0.100 (0.59)	-0.319 (0.45)		
Household size (# of people)	-0.164 (0.21)	0.027 (0.06)	0.002 (0.05)	-0.190 (0.13)	-0.129 (0.09)	-0.153 (0.11)	-0.009 (0.06)
HH head education (# of years)	-0.020 (0.06)	-0.014 (0.01)	0.001 (0.01)	0.002 (0.02)	-0.008 (0.01)	-0.011 (0.02)	-0.006 (0.02)
Log of vegetable area in hectares	22.706 (14.01)	1.870** (0.54)	1.244 (0.79)	1.679* (0.76)	7.378 (5.22)	7.986 (5.79)	4.405* (2.11)
Any large industrial or commercial enterprise in the village (1=Yes)	1.949 (1.64)	0.144 (0.17)	0.000 (.)	0.000 (.)	0.255 (0.60)	0.257 (0.71)	0.077 (0.35)
Log of vegetable production cost per hectare in Riels	-0.014 (0.04)	0.008* (0.00)	0.018** (0.00)	0.048 (0.03)	0.023** (0.01)	0.024** (0.01)	0.038 (0.02)
Log of household durable assets in Riels	0.367 (0.48)	-0.023 (0.05)	-0.010 (0.05)	0.019 (0.13)	0.164 (0.19)	0.213 (0.24)	-0.119 (0.12)
Total agricultural plots	-0.007 (0.34)	0.052 (0.03)	0.045 (0.04)	0.004 (0.13)	-0.046 (0.13)	-0.078 (0.16)	-0.002 (0.09)
Total number of plots owned by the HH	-0.265 (0.47)	-0.029 (0.05)	-0.041 (0.06)	-0.086 (0.15)	-0.044 (0.08)	-0.026 (0.09)	0.028 (0.10)
Own Tractor	-0.696 (0.71)	-0.097 (0.07)	-0.024 (0.07)	0.252 (0.22)	-0.153 (0.22)	-0.235 (0.28)	0.224 (0.16)
HH reported receiving interventions from program other than HARVEST (1=Yes)	-0.093 (0.28)	0.033 (0.06)	-0.051 (0.05)	0.056 (0.21)	0.053 (0.11)	0.116 (0.16)	0.016 (0.12)
number of male members participating in HARVEST interventions	-1.610 (1.65)	0.294 (0.20)	0.109 (0.09)	-0.697 (0.49)	-0.112 (0.26)	-0.114 (0.31)	0.534 (0.37)

Annex A4.17. cont.

Variables [Dependent variables are total real value of vegetable sales per household in million Riels]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
number of female members participating in HARVEST interventions	-1.269	0.269	0.054	-0.739	0.048	0.053	0.643
	(1.40)	(0.20)	(0.08)	(0.47)	(0.17)	(0.21)	(0.37)
number of HH members who participated in HARVEST activities	1.489	-0.284	-0.063	0.759	0.007	0.008	-0.645
	(1.52)	(0.20)	(0.07)	(0.50)	(0.19)	(0.23)	(0.38)
number of HH members who participated as clients in HARVEST activities	-0.042	-0.310	-0.041	0.897*	-0.219	-0.259	-0.829*
	(1.10)	(0.20)	(0.09)	(0.45)	(0.24)	(0.30)	(0.38)
number of HH members who participated as demo leaders in HARVEST activities	0.468	-0.277	0.029	1.071*	0.003	0.002	-0.513
	(1.07)	(0.20)	(0.10)	(0.49)	(0.19)	(0.23)	(0.34)
1=HH was aquaculture client or demo beneficiary	0.456	0.009	0.117	-0.347	0.087	0.087	-0.163
	(0.84)	(0.15)	(0.10)	(0.34)	(0.18)	(0.21)	(0.23)
1=HH was home garden client or demo beneficiary	1.285	0.136	0.171*	-0.520*	0.263	0.332	0.435**
	(0.93)	(0.11)	(0.07)	(0.25)	(0.26)	(0.32)	(0.15)
1=HH was rice client or demo beneficiary	0.537	-0.018	-0.033	-0.343	0.001	-0.035	0.370*
	(0.79)	(0.10)	(0.07)	(0.34)	(0.16)	(0.19)	(0.16)
Number of years HH participated in HARVEST as a client	0.662	0.123	-0.034	-0.091	0.179	0.234	0.035
	(0.58)	(0.07)	(0.04)	(0.15)	(0.13)	(0.15)	(0.16)
1=HH participated in HARVEST in 2011	0.344	0.000	0.095	0.832	0.403	0.349	0.309
	(0.74)	(.)	(0.08)	(0.68)	(0.35)	(0.36)	(0.27)
1=HH participated in HARVEST in 2012	-1.320	-0.257	-0.318**	-0.001	-0.352	-0.496	-0.225
	(1.05)	(0.17)	(0.12)	(0.29)	(0.21)	(0.31)	(0.18)
1=HH participated in HARVEST in 2013	-0.317	-0.039	0.489**	0.217	-0.026	0.132	-0.497
	(0.90)	(0.19)	(0.15)	(0.29)	(0.18)	(0.24)	(0.38)
1=HH participated in HARVEST in 2014	-1.872*	-0.379**	0.018	0.106	-0.481	-0.602	-0.148
	(0.88)	(0.13)	(0.06)	(0.28)	(0.25)	(0.32)	(0.26)

Annex A4.17. cont.

Variables [Dependent variables are total real value of vegetable sales per household in million Riels]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Propensity scores for nearest neighbor (nn4) method	-2.429 (1.69)	0.115 (0.35)	0.309 (0.18)	-0.426 (0.70)	-1.333 (0.87)	-1.561 (1.10)	-0.364 (0.48)
Constant	-0.215 (2.18)	-0.007 (0.40)	0.020 (0.23)	0.639 (0.83)	0.197 (0.37)	-0.299 (0.78)	0.212 (0.34)
Observations	360	392	387	311	1450	1209	241
R-Square	0.446	0.466	0.570	0.220	0.251	0.261	0.654
chi2-statistic	.	.	.	.	.	.	.
rho	0.000	0.000	0.000	0.807	0.000	0.000	0.000

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A4.18. Impact of Cambodia HARVEST on Total Sales Value of All Vegetables in Million Riels (CRE Models), Sample 2

Variables [Dependent variables are total real value of vegetable sales per household in million Riels]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	-0.654 (1.13)	0.091 (0.08)	0.123 (0.09)	0.089 (0.31)	-0.110 (0.25)	-0.252 (0.34)	0.010 (0.11)
New treatment variable-includes dropouts	0.403 (1.41)	0.000 (.)	-0.345 (0.22)	0.000 (.)	0.333 (0.35)	0.409 (0.39)	0.138 (0.31)
Program effect (DID)	0.383 (1.16)	0.097 (0.09)	-0.045 (0.09)	0.186 (0.34)	0.362 (0.26)	0.470 (0.34)	0.307 (0.17)
HH head gender (1=Male)	-0.410 (0.50)	0.215* (0.11)	0.092 (0.09)	0.197 (0.44)	-0.080 (0.33)		
Household size (# of people)	-0.159 (0.20)	0.018 (0.05)	-0.001 (0.05)	-0.076 (0.13)	-0.106 (0.07)	-0.130 (0.09)	0.014 (0.06)
HH head education (# of years)	-0.012 (0.05)	-0.013 (0.01)	0.004 (0.01)	-0.007 (0.02)	-0.010 (0.01)	-0.015 (0.01)	-0.003 (0.02)
Log of vegetable area in hectares	22.378 (13.61)	1.994** (0.53)	1.237 (0.81)	2.030* (0.79)	6.992 (4.67)	7.602 (5.20)	3.407* (1.71)
Any large industrial or commercial enterprise in the village (1=Yes)	2.177 (2.18)	-0.059 (0.39)	0.000 (.)	0.000 (.)	-0.087 (0.41)	-0.194 (0.44)	0.442 (0.37)
Log of vegetable production cost per hectare in Riels	-0.009 (0.03)	0.007* (0.00)	0.016** (0.00)	0.049 (0.03)	0.022** (0.00)	0.023** (0.01)	0.028 (0.02)
Log of household durable assets in Riels	0.290 (0.41)	-0.025 (0.05)	-0.002 (0.05)	0.066 (0.11)	0.161 (0.17)	0.207 (0.21)	-0.103 (0.10)
Total agricultural plots	-0.017 (0.31)	0.052 (0.03)	0.060 (0.04)	0.054 (0.12)	-0.023 (0.11)	-0.037 (0.13)	-0.006 (0.07)
Total number of plots owned by the HH	-0.285 (0.47)	-0.029 (0.04)	-0.061 (0.05)	-0.053 (0.15)	-0.057 (0.08)	-0.049 (0.09)	-0.013 (0.09)

Annex A4.18. cont.

Variables [Dependent variables are total real value of vegetable sales per household in million Riels]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Own Tractor	-0.699 (0.69)	-0.067 (0.07)	-0.021 (0.07)	0.087 (0.19)	-0.154 (0.20)	-0.207 (0.25)	0.180 (0.18)
HH reported receiving interventions from program other than HARVEST (1=Yes)	0.001 (0.27)	0.025 (0.05)	-0.035 (0.04)	0.163 (0.16)	0.060 (0.09)	0.106 (0.13)	-0.037 (0.12)
number of male members participating in HARVEST interventions	-1.410 (1.49)	0.242 (0.18)	0.113 (0.08)	-0.348 (0.35)	-0.059 (0.22)	-0.081 (0.27)	0.494 (0.37)
number of female members participating in HARVEST interventions	-1.139 (1.33)	0.219 (0.18)	0.083 (0.07)	-0.383 (0.33)	0.078 (0.15)	0.084 (0.18)	0.580 (0.38)
number of HH members who participated in HARVEST activities	1.309 (1.41)	-0.237 (0.18)	-0.088 (0.06)	0.383 (0.35)	-0.037 (0.17)	-0.035 (0.20)	-0.607 (0.38)
number of HH members who participated as clients in HARVEST activities	-0.030 (1.08)	-0.257 (0.19)	-0.067 (0.09)	0.610 (0.37)	-0.156 (0.20)	-0.142 (0.24)	-0.775* (0.37)
number of HH members who participated as demo leaders in HARVEST activities	0.533 (1.05)	-0.229 (0.19)	0.007 (0.10)	0.642 (0.42)	0.040 (0.17)	0.075 (0.20)	-0.435 (0.36)
1=HH was aquaculture client or demo beneficiary	0.344 (0.83)	0.056 (0.14)	0.119 (0.10)	-0.254 (0.25)	0.056 (0.15)	0.032 (0.18)	-0.289 (0.23)
1=HH was home garden client or demo beneficiary	1.054 (0.92)	0.111 (0.10)	0.161* (0.07)	-0.485** (0.18)	0.163 (0.21)	0.188 (0.24)	0.239 (0.19)
1=HH was rice client or demo beneficiary	0.553 (0.79)	-0.008 (0.09)	-0.009 (0.07)	-0.473* (0.23)	-0.009 (0.15)	-0.088 (0.16)	0.320 (0.17)
Number of years HH participated in HARVEST as a client	0.730 (0.56)	0.093 (0.06)	-0.019 (0.04)	-0.172 (0.13)	0.140 (0.12)	0.210 (0.15)	-0.122 (0.14)
1=HH participated in HARVEST in 2011	0.104 (0.63)	0.000 (.)	0.081 (0.07)	0.636 (0.52)	0.399 (0.32)	0.337 (0.32)	0.261 (0.24)

Annex A4.18. cont.

Variables [Dependent variables are total real value of vegetable sales per household in million Riels]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
1=HH participated in HARVEST in 2012	-1.316 (0.94)	-0.166 (0.15)	-0.217 (0.13)	0.022 (0.21)	-0.350 (0.19)	-0.451 (0.27)	-0.232 (0.23)
1=HH participated in HARVEST in 2013	-0.248 (0.61)	-0.004 (0.16)	0.356* (0.17)	0.197 (0.19)	-0.056 (0.15)	-0.123 (0.16)	0.151 (0.21)
1=HH participated in HARVEST in 2014	-1.728* (0.81)	-0.141 (0.18)	0.000 (0.06)	0.202 (0.22)	-0.309 (0.19)	-0.423 (0.24)	0.056 (0.24)
Propensity scores for nearest neighbor (nn4) method	-3.078 (2.21)	0.077 (0.33)	0.158 (0.16)	-0.046 (0.56)	-0.825 (0.72)	-0.954 (0.93)	-0.613 (0.41)
Constant	-0.228 (1.82)	0.000 (.)	0.098 (0.21)	0.133 (0.75)	0.062 (0.35)	-0.029 (0.57)	0.319 (0.33)
Observations	395	429	418	423	1665	1380	285
R-Square	0.439	0.482	0.561	0.250	0.251	0.259	0.602
chi2-statistic	.	.	.	.	.	.	.
rho	0.000	0.000	0.000	0.713	0.000	0.000	0.000

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A4.19. Impact of Cambodia HARVEST on Vegetable Net Income per Household in Million Riels (CRE Models), Sample 1

Variables [Dependent variables are vegetable net income per household in million Riels]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	-0.496 (0.48)	0.065 (0.08)	-0.003 (0.10)	-0.162 (0.20)	-0.133 (0.10)	-0.189 (0.14)	0.055 (0.10)
New treatment variable-excludes dropouts	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.948* (0.45)	0.985* (0.50)	0.337 (0.33)
Program effect (DID)	-0.133 (0.51)	-0.275** (0.10)	-0.184* (0.09)	-0.437 (0.34)	-0.144 (0.12)	-0.132 (0.16)	-0.108 (0.11)
HH head gender (1=Male)	-0.559 (0.32)	0.275 (0.19)	-0.313 (0.17)	0.305 (0.52)	-0.282 (0.22)		
Household size (# of people)	-0.248 (0.20)	-0.030 (0.06)	-0.054 (0.08)	-0.045 (0.12)	-0.106 (0.06)	-0.113 (0.07)	-0.098 (0.08)
HH head education (# of years)	0.001 (0.04)	0.019 (0.02)	0.006 (0.01)	-0.006 (0.04)	0.004 (0.01)	0.005 (0.02)	-0.006 (0.03)
Log of vegetable area in hectares	13.160 (10.96)	-0.689 (0.77)	0.784 (1.63)	-2.609 (1.91)	2.979 (3.96)	3.452 (4.41)	-0.399 (1.06)
Any large industrial or commercial enterprise in the village (1=Yes)	1.114 (0.96)	-0.152 (0.18)	0.000 (.)	0.000 (.)	0.105 (0.49)	0.169 (0.57)	-1.205* (0.61)
Log of vegetable production cost per hectare in Riels	-0.044 (0.02)	-0.010** (0.00)	-0.018** (0.00)	-0.035* (0.01)	-0.017** (0.00)	-0.020** (0.00)	-0.010* (0.00)
Log of household durable assets in Riels	0.302 (0.37)	-0.136 (0.14)	-0.025 (0.10)	-0.060 (0.16)	0.076 (0.14)	0.096 (0.17)	-0.042 (0.08)
Total agricultural plots	0.033 (0.24)	-0.015 (0.05)	0.024 (0.05)	-0.206 (0.16)	-0.085 (0.08)	-0.113 (0.09)	0.054 (0.11)
Total number of plots owned by the HH	-0.412 (0.39)	-0.002 (0.05)	-0.038 (0.08)	0.131 (0.18)	-0.007 (0.06)	0.011 (0.06)	-0.012 (0.10)
Own Tractor	-0.643 (0.50)	0.194 (0.19)	0.147 (0.09)	-0.407 (0.42)	-0.188 (0.17)	-0.214 (0.21)	-0.015 (0.18)
HH reported receiving interventions from HARVEST (1=yes)	0.357 (0.89)	0.256 (0.17)	0.196 (0.11)	0.175 (0.27)	0.088 (0.16)	-0.075 (0.16)	0.678* (0.27)
HH reported receiving interventions from program other than HARVEST (1=Yes)	-0.025 (0.28)	-0.136 (0.10)	-0.048 (0.06)	0.511 (0.48)	0.036 (0.12)	0.060 (0.15)	0.178 (0.12)

Annex A4.19. cont.

Variables [Dependent variables are vegetable net income per household in million Riels]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
number of male members participating in HARVEST interventions	-2.496 (1.60)	0.160 (0.12)	0.098 (0.14)	-0.737 (0.70)	-0.253 (0.25)	-0.261 (0.29)	0.407 (0.41)
number of female members participating in HARVEST interventions	-2.149 (1.46)	0.121 (0.10)	0.047 (0.12)	-0.948 (0.64)	-0.151 (0.20)	-0.134 (0.23)	0.226 (0.41)
number of HH members who participated in HARVEST activities	2.369 (1.55)	-0.120 (0.11)	-0.049 (0.11)	0.943 (0.69)	0.221 (0.21)	0.216 (0.24)	-0.259 (0.41)
number of HH members who participated as clients in HARVEST activities	1.209 (1.30)	-0.464** (0.17)	-0.091 (0.13)	0.767 (0.71)	-0.126 (0.24)	-0.167 (0.28)	-0.180 (0.43)
number of HH members who participated as demo leaders in HARVEST activities	1.325 (1.27)	-0.303 (0.17)	-0.133 (0.16)	1.122 (0.92)	0.035 (0.24)	0.001 (0.27)	-0.065 (0.46)
1=HH was aquaculture client or demo beneficiary	-0.017 (0.92)	0.394 (0.28)	-0.166 (0.14)	-0.037 (0.96)	-0.023 (0.26)	0.002 (0.29)	0.186 (0.29)
1=HH was home garden client or demo beneficiary	0.831 (0.86)	0.292 (0.29)	-0.175 (0.12)	0.084 (0.62)	0.283 (0.25)	0.334 (0.30)	-0.049 (0.22)
1=HH was rice client or demo beneficiary	0.359 (0.71)	0.167 (0.24)	-0.059 (0.10)	0.856 (0.48)	0.191 (0.16)	0.181 (0.18)	0.347 (0.18)
Number of years HH participated in HARVEST as a client	0.374 (0.39)	-0.192 (0.12)	0.152 (0.09)	0.598 (0.43)	0.201 (0.14)	0.305 (0.18)	-0.287* (0.14)
1=HH participated in HARVEST in 2011	0.554 (0.55)	0.000 (.)	-0.324 (0.17)	-1.595 (0.95)	0.210 (0.30)	0.162 (0.34)	-0.038 (0.24)
1=HH participated in HARVEST in 2012	-0.678 (0.73)	0.172 (0.21)	-0.239 (0.24)	-0.350 (0.30)	-0.278 (0.19)	-0.335 (0.28)	-0.051 (0.21)
1=HH participated in HARVEST in 2013	0.139 (0.77)	-0.305 (0.25)	-0.193 (0.23)	0.051 (0.41)	-0.058 (0.18)	0.021 (0.21)	0.046 (0.33)
1=HH participated in HARVEST in 2014	-1.232 (0.73)	-0.003 (0.20)	-0.072 (0.12)	-1.178 (0.71)	-0.628* (0.29)	-0.789* (0.35)	0.179 (0.30)

Annex A4.19. cont.

Variables [Dependent variables are vegetable net income per household in million Riels]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Propensity scores for nearest neighbor (nn4) method	-1.455 (0.92)	-0.590 (0.37)	-0.153 (0.23)	-0.554 (0.79)	-1.150 (0.64)	-1.243 (0.76)	-0.340 (0.39)
Constant	-0.611 (1.61)	1.893** (0.53)	0.501 (0.31)	0.411 (0.64)	0.254 (0.38)	-0.051 (0.53)	0.390 (0.36)
Observations	466	468	498	377	1809	1507	302
R-Square	0.258	0.206	0.197	0.217	0.089	0.102	0.388
chi2-statistic	.	.	.	.	159.643	168.261	.
rho	0.000	0.126	0.000	0.050	0.012	0.000	0.000

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A4.20. Impact of Cambodia HARVEST on Vegetable Net Income per Household in Million Riels (CRE Models), Sample 2

Variables [Dependent variables are vegetable net income per household in million Riels]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	-0.482 (0.45)	0.054 (0.07)	-0.010 (0.09)	-0.199 (0.19)	-0.122 (0.09)	-0.176 (0.13)	0.046 (0.09)
New treatment variable-includes dropouts	-0.248 (1.30)	0.000 (.)	0.000 (.)	1.687* (0.83)	1.324** (0.46)	1.458** (0.49)	0.531 (0.29)
Program effect (DID)	-0.108 (0.47)	-0.236* (0.09)	-0.190* (0.09)	-0.456 (0.30)	-0.163 (0.12)	-0.150 (0.15)	-0.157 (0.11)
HH head gender (1=Male)	-0.510 (0.28)	0.267 (0.18)	-0.343* (0.15)	-0.192 (0.47)	-0.379* (0.19)		
Household size (# of people)	-0.225 (0.19)	-0.029 (0.06)	-0.049 (0.08)	-0.114 (0.12)	-0.112 (0.06)	-0.125 (0.07)	-0.071 (0.08)
HH head education (# of years)	-0.003 (0.03)	0.018 (0.02)	0.004 (0.01)	0.044 (0.05)	0.013 (0.02)	0.012 (0.02)	0.010 (0.03)
Log of vegetable area in hectares	12.992 (10.60)	-0.811 (0.76)	0.717 (1.64)	-2.759 (1.59)	2.426 (3.58)	2.841 (4.00)	-0.272 (1.16)
Any large industrial or commercial enterprise in the village (1=Yes)	1.005 (1.04)	0.465 (0.37)	0.000 (.)	0.000 (.)	-0.373 (0.37)	-0.392 (0.39)	-0.729 (0.57)
Log of vegetable production cost per hectare in Riels	-0.044 (0.02)	-0.009** (0.00)	-0.017** (0.00)	-0.028* (0.01)	-0.017** (0.00)	-0.022** (0.00)	-0.006 (0.00)
Log of household durable assets in Riels	0.271 (0.32)	-0.105 (0.13)	-0.022 (0.09)	-0.020 (0.14)	0.050 (0.12)	0.073 (0.15)	-0.082 (0.09)
Total agricultural plots	0.069 (0.22)	-0.016 (0.05)	0.023 (0.05)	-0.100 (0.18)	-0.070 (0.07)	-0.093 (0.08)	0.045 (0.10)
Total number of plots owned by the HH	-0.437 (0.39)	-0.027 (0.06)	-0.036 (0.07)	-0.052 (0.21)	-0.045 (0.06)	-0.037 (0.06)	0.010 (0.10)
Own Tractor	-0.636 (0.50)	0.170 (0.17)	0.141 (0.09)	-0.125 (0.34)	-0.077 (0.16)	-0.102 (0.19)	0.083 (0.17)
HH reported receiving interventions from HARVEST (1=yes)	0.375 (0.65)	0.190 (0.16)	0.124 (0.10)	0.110 (0.19)	0.097 (0.14)	-0.037 (0.14)	0.529** (0.19)

Annex A4.20. cont.

Variables [Dependent variables are vegetable net income per household in million Riels]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
HH reported receiving interventions from program other than HARVEST (1=Yes)	0.015	-0.112	-0.035	0.265	0.028	0.054	0.109
	(0.25)	(0.09)	(0.05)	(0.35)	(0.10)	(0.13)	(0.12)
number of male members participating in HARVEST interventions	-2.363	0.138	0.061	-0.614	-0.213	-0.240	-0.092
	(1.50)	(0.11)	(0.14)	(0.57)	(0.22)	(0.26)	(0.45)
number of female members participating in HARVEST interventions	-2.109	0.083	0.043	-0.671	-0.108	-0.100	-0.238
	(1.41)	(0.10)	(0.12)	(0.54)	(0.18)	(0.21)	(0.46)
number of HH members who participated in HARVEST activities	2.276	-0.085	-0.031	0.659	0.164	0.166	0.243
	(1.47)	(0.10)	(0.11)	(0.58)	(0.19)	(0.22)	(0.46)
number of HH members who participated as clients in HARVEST activities	1.246	-0.389*	-0.041	0.418	-0.120	-0.144	0.177
	(1.29)	(0.16)	(0.13)	(0.52)	(0.22)	(0.25)	(0.48)
number of HH members who participated as demo leaders in HARVEST activities	1.387	-0.261	-0.101	0.700	0.049	0.028	0.330
	(1.24)	(0.17)	(0.16)	(0.67)	(0.22)	(0.24)	(0.50)
1=HH was aquaculture client or demo beneficiary	-0.040	0.317	-0.160	0.158	-0.034	-0.006	0.129
	(0.83)	(0.26)	(0.14)	(0.45)	(0.21)	(0.23)	(0.25)
1=HH was home garden client or demo beneficiary	0.721	0.218	-0.206	0.203	0.199	0.229	-0.019
	(0.84)	(0.27)	(0.12)	(0.34)	(0.20)	(0.23)	(0.22)
1=HH was rice client or demo beneficiary	0.343	0.191	-0.069	0.571	0.182	0.157	0.370*
	(0.68)	(0.22)	(0.10)	(0.29)	(0.14)	(0.15)	(0.18)
Number of years HH participated in HARVEST as a client	0.456	-0.100	0.117	0.460	0.205	0.320	-0.241*
	(0.38)	(0.11)	(0.09)	(0.35)	(0.13)	(0.17)	(0.12)
1=HH participated in HARVEST in 2011	0.392	0.000	-0.191	-0.185	0.245	0.165	0.081
	(0.47)	(.)	(0.16)	(0.75)	(0.27)	(0.30)	(0.21)
1=HH participated in HARVEST in 2012	-0.611	0.027	-0.078	-0.578	-0.328	-0.446	-0.134
	(0.68)	(0.16)	(0.15)	(0.31)	(0.18)	(0.26)	(0.19)
1=HH participated in HARVEST in 2013	-0.327	-0.114	-0.229	0.044	-0.106	-0.031	-0.320
	(0.54)	(0.22)	(0.15)	(0.25)	(0.16)	(0.19)	(0.31)

Annex A4.20. cont.

Variables [Dependent variables are vegetable net income per household in million Riels]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
1=HH participated in HARVEST in 2014	-1.188*	0.020	-0.060	-1.108	-0.584*	-0.757*	0.154
	(0.60)	(0.28)	(0.11)	(0.68)	(0.26)	(0.32)	(0.21)
Propensity scores for nearest neighbor (nn4) method	-1.491	-0.352	-0.085	-0.979	-0.992	-1.127	-0.414
	(1.16)	(0.37)	(0.23)	(0.74)	(0.56)	(0.69)	(0.36)
Constant	0.000	0.686	0.325	0.687	0.334	0.010	0.515
	(.)	(0.37)	(0.33)	(0.63)	(0.38)	(0.47)	(0.35)
Observations	512	515	534	501	2062	1712	350
R-Square	0.252	0.188	0.196	0.199	0.082	0.093	0.347
chi2-statistic	.	.	.	.	179.187	171.531	.
rho	0.000	0.119	0.000	0.047	0.009	0.000	0.000

Standard errors in parentheses; * p < 0.05, ** p < 0.01.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A4.21. Impact of Cambodia HARVEST on Household Poverty on Overall Sample HHs (Probit CRE Models)

Variables [Dependent variables are binary with 1=poor household and 0 otherwise]	Prevalence of poverty	
	Sample 1	Sample 2
Year (1=2016)	-0.064** (0.02)	-0.061** (0.02)
New treatment variable	0.019 (0.07)	0.061 (0.06)
Program effect (DID)	0.003 (0.02)	0.002 (0.02)
HH head gender (1=Male)	-0.018 (0.03)	0.002 (0.03)
Observations	2804	3348
Chi2-statistic	267.191	285.561
p-value of Chi2-statistic	0.000	0.000
Log likelihood	-573.823	-673.926
rho	0.105	0.113

Marginal effects; Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Note: Provinces and Head's gender did not converge.

Annex A4.22. Impact of Cambodia HARVEST on Per Capita Annual Expenditures in Real U.S. Dollars (CRE Models), Sample 1

Variables [Dependent variables are real annual per capita expenditures in \$USD]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	5.229 (16.45)	16.465 (24.93)	0.095 (22.06)	-2.913 (16.83)	3.657 (10.23)	2.923 (11.55)	-5.208 (24.01)
New treatment variable-excludes dropouts	162.307 (105.70)	0.000 (.)	0.000 (.)	-31.832 (68.42)	35.670 (42.17)	19.490 (48.23)	84.317 (97.48)
Program effect (DID)	-6.784 (15.36)	-6.435 (23.69)	-10.550 (22.55)	24.700 (19.01)	4.035 (10.16)	7.833 (11.54)	-7.370 (22.96)
HH head gender (1=Male)	40.668 (37.93)	-53.076* (23.98)	34.901 (38.37)	6.800 (33.65)	7.573 (16.43)		
Head's age (years)	2.839 (3.93)	-6.193 (5.31)	7.693** (2.68)	8.068 (4.12)	2.526 (1.96)	4.297 (2.23)	-2.412 (4.37)
Head's age squared	-0.051 (0.04)	0.050 (0.04)	-0.076** (0.03)	-0.116** (0.04)	-0.041* (0.02)	-0.054** (0.02)	0.002 (0.04)
Household size (# of people)	-35.049** (5.74)	-48.013** (8.28)	-26.709* (10.60)	-48.942** (7.77)	-43.703** (4.42)	-45.914** (5.27)	-38.867** (9.06)
percent of HH members ever attended school	1.768 (41.68)	21.649 (48.42)	141.900* (61.41)	75.283 (47.40)	62.974* (24.62)	60.268* (29.78)	71.067 (51.12)
HH owns a cell phone (1=yes)	17.148 (20.03)	15.332 (14.50)	39.511* (17.88)	-1.641 (18.64)	18.242* (8.98)	16.587 (10.34)	23.301 (20.46)
Total Livestock Units	10.403 (8.47)	1.499 (4.49)	-0.068 (6.05)	-3.234 (4.66)	2.620 (3.60)	3.275 (4.03)	-2.541 (4.86)
Total number of plots owned by the HH	6.551 (10.02)	1.189 (6.41)	12.965 (8.31)	9.854 (11.72)	9.791* (4.05)	13.672** (4.94)	3.547 (9.83)
Log of household durable assets in Riels	19.651* (8.96)	35.166* (14.96)	15.951 (11.36)	45.924** (9.70)	30.340** (5.53)	25.768** (6.27)	50.750** (13.90)
Source of cooking fuel is wood (1=yes)	39.113 (37.97)	-35.370 (29.03)	62.268 (70.62)	-58.769 (44.07)	-1.092 (23.11)	-9.866 (27.27)	27.362 (42.06)
HH reported receiving interventions from program other than HARVEST (1=Yes)	8.471 (10.75)	1.126 (14.64)	-14.000 (13.42)	6.228 (14.41)	-2.435 (6.71)	-5.138 (7.37)	9.571 (16.07)

Annex A4.22. cont.

Variables [Dependent variables are real annual per capita expenditures in \$USD]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
number of male members participating in HARVEST interventions	-0.413	-54.949	-34.705	192.984	-16.217	-16.726	55.650
	(45.00)	(42.21)	(28.09)	(117.33)	(23.16)	(24.98)	(61.49)
number of female members participating in HARVEST interventions	-29.878	-49.225	-17.230	201.263	-11.973	-15.587	79.234
	(46.87)	(39.86)	(27.73)	(115.36)	(23.14)	(24.93)	(60.43)
number of HH members who participated in HARVEST activities	12.229	51.511	16.700	-200.029	11.037	15.311	-86.180
	(45.68)	(40.52)	(26.82)	(116.21)	(22.84)	(24.42)	(61.45)
number of HH members who participated as clients in HARVEST activities	74.204	33.531	15.225	-177.576	14.371	21.283	-117.209
	(62.04)	(53.29)	(28.81)	(114.55)	(27.13)	(29.33)	(62.72)
number of HH members who participated as demo leaders in HARVEST activities	106.169	53.407	9.650	-174.958	20.171	24.125	-98.443
	(69.49)	(53.93)	(30.51)	(117.97)	(28.79)	(30.80)	(70.99)
1=HH was aquaculture client or demo beneficiary	-50.946	9.050	17.567	40.394	8.986	7.671	62.151
	(36.22)	(43.73)	(21.42)	(46.39)	(16.52)	(17.86)	(50.68)
1=HH was home garden client or demo beneficiary	-4.050	4.705	39.840	-2.667	12.998	13.293	48.506
	(37.56)	(35.81)	(22.59)	(28.72)	(15.21)	(16.81)	(31.95)
1=HH was rice client or demo beneficiary	-28.324	1.608	-3.023	37.137	10.346	8.942	27.900
	(33.30)	(31.68)	(21.42)	(29.29)	(13.98)	(15.49)	(32.06)
Number of years HH participated in HARVEST as a client	7.069	5.651	21.683	16.986	16.555	16.929	14.262
	(18.70)	(17.88)	(16.06)	(21.92)	(8.90)	(9.87)	(21.43)
1=HH participated in HARVEST in 2011	36.359	0.000	-29.460	-52.806	-0.549	2.231	30.392
	(28.04)	(.)	(22.95)	(56.99)	(15.95)	(17.61)	(37.73)
1=HH participated in HARVEST in 2012	18.583	-20.883	-75.137	-51.325	-19.004	-23.578	-4.524
	(31.95)	(49.12)	(39.61)	(41.86)	(19.62)	(22.96)	(43.04)
1=HH participated in HARVEST in 2013	-21.529	-8.170	-126.476	-22.146	-38.520	-39.253	-19.202
	(37.87)	(73.55)	(64.74)	(39.45)	(25.79)	(31.90)	(47.19)

Annex A4.22. cont.

Variables [Dependent variables are real annual per capita expenditures in \$USD]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
1=HH participated in HARVEST in 2014	-11.928 (33.13)	-44.019 (54.71)	0.643 (26.85)	-69.182* (34.04)	-43.595* (17.12)	-45.173* (19.71)	-38.874 (39.17)
Propensity scores for nearest neighbor (nn4) method	-27.508 (33.68)	9.474 (35.84)	8.937 (43.44)	-39.325 (43.37)	-1.475 (18.73)	-9.114 (20.75)	50.153 (42.67)
Constant	0.000 (.)	0.000 (.)	310.547 (144.21)	212.831* (105.57)	320.785* (59.33)	321.068* (68.94)	341.971* (152.22)
Observations	774	822	850	684	3130	2603	527
R-Square	0.395	0.338	0.303	0.422	0.317	0.314	0.515
chi2-statistic	.	.	.	.	1176.438	1990.313	.
rho	0.338	0.236	0.119	0.220	0.229	0.215	0.111

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A4.23. Impact of Cambodia HARVEST on Per Capita Annual Expenditures in Real U.S. Dollars (CRE Models), Sample 2

Variables [Dependent variables are real annual per capita expenditures in \$USD]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	4.206 (16.57)	13.411 (23.99)	-0.357 (21.49)	9.485 (15.39)	4.593 (9.88)	5.449 (11.17)	-3.902 (22.91)
New treatment variable-includes dropouts	213.504*	553.167*	0.000	0.000	10.431	-6.637	30.496
Program effect (DID)	(96.38) -9.022 (15.38)	(178.74) -4.102 (23.26)	(.) -10.765 (22.20)	(.) 18.631 (16.34)	(35.06) 2.747 (9.80)	(39.86) 5.528 (11.08)	(103.06) -4.482 (22.35)
HH head gender (1=Male)	65.617 (40.26)	-26.654 (24.00)	37.855 (32.72)	2.295 (26.38)	18.730 (14.87)		
Head's age (years)	3.413 (3.77)	-4.651 (4.84)	7.625** (2.72)	5.441 (3.70)	3.079 (1.85)	4.395* (2.10)	-1.422 (3.96)
Head's age squared	-0.053 (0.03)	0.032 (0.04)	-0.073** (0.03)	-0.081* (0.03)	-0.045** (0.02)	-0.056** (0.02)	-0.005 (0.03)
Household size (# of people)	-41.543** (6.85)	-43.868** (8.39)	-27.116** (10.23)	-55.378** (7.55)	-45.729** (4.40)	-47.575** (5.20)	-43.423** (9.18)
percent of HH members ever attended school	15.072 (42.45)	28.903 (43.70)	136.398* (59.22)	44.191 (39.64)	56.834* (22.54)	57.433* (26.69)	65.016 (48.29)
HH owns a cell phone (1=yes)	-2.439 (20.56)	14.367 (13.11)	46.929* (18.99)	1.722 (16.00)	16.092 (8.65)	10.474 (9.61)	31.809 (21.78)
Total Livestock Units	7.832 (6.82)	2.383 (4.27)	-0.177 (5.80)	-0.266 (3.82)	2.892 (3.08)	3.576 (3.43)	-4.417 (5.12)
Total number of plots owned by the HH	3.847 (9.82)	2.144 (6.17)	12.900 (8.12)	8.213 (9.96)	8.999* (3.87)	11.587* (4.68)	7.601 (9.85)
Log of household durable assets in Riels	26.071** (8.65)	38.744** (13.46)	15.628 (11.01)	39.995** (8.47)	32.280** (5.13)	26.950** (5.75)	56.557** (13.45)
Source of cooking fuel is wood (1=yes)	59.555 (37.15)	-29.841 (26.94)	55.213 (67.15)	-50.609 (35.29)	4.076 (20.65)	-3.871 (24.29)	35.393 (37.97)
HH reported receiving interventions from program other than HARVEST (1=Yes)	12.676 (10.57)	2.606 (13.84)	-10.303 (13.11)	2.420 (13.01)	-0.515 (6.22)	-2.566 (6.89)	8.119 (13.69)

Annex A4.23. cont.

Variables [Dependent variables are real annual per capita expenditures in \$USD]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
number of male members participating in HARVEST interventions	10.793	-44.353	-35.578	182.465	-16.321	-10.466	62.193
	(43.74)	(34.48)	(29.60)	(103.15)	(21.88)	(23.13)	(60.98)
number of female members participating in HARVEST interventions	-2.998	-35.694	-19.338	184.653	-11.513	-9.027	94.126
	(45.40)	(33.56)	(29.48)	(101.64)	(21.99)	(23.32)	(61.44)
number of HH members who participated in HARVEST activities	-12.847	39.627	15.678	-178.578	11.003	10.452	-102.770
	(44.19)	(32.98)	(28.29)	(102.44)	(21.47)	(22.66)	(62.78)
number of HH members who participated as clients in HARVEST activities	59.086	26.990	11.319	-167.813	15.184	20.276	-141.922*
	(59.66)	(47.21)	(29.58)	(101.89)	(24.74)	(26.66)	(69.67)
number of HH members who participated as demo leaders in HARVEST activities	91.893	43.290	4.949	-170.991	21.265	24.502	-117.670
	(65.19)	(46.98)	(31.22)	(104.74)	(26.25)	(28.02)	(76.26)
1=HH was aquaculture client or demo beneficiary	-49.074	3.958	8.124	51.952	5.388	-0.353	70.930
	(35.92)	(39.56)	(21.18)	(33.55)	(14.81)	(15.63)	(48.17)
1=HH was home garden client or demo beneficiary	-34.487	-6.977	21.937	-2.143	-4.617	-5.830	35.124
	(35.41)	(34.73)	(21.03)	(21.52)	(13.15)	(14.50)	(30.31)
1=HH was rice client or demo beneficiary	-42.822	-1.597	1.276	42.980	7.144	3.571	49.599
	(32.90)	(29.04)	(21.30)	(23.30)	(12.64)	(13.64)	(32.71)
Number of years HH participated in HARVEST as a client	9.496	6.146	18.108	11.673	14.532	16.337	6.889
	(17.71)	(16.20)	(15.39)	(17.22)	(8.17)	(9.06)	(18.00)
1=HH participated in HARVEST in 2011	26.827	0.000	-11.878	-99.549	3.320	-1.602	103.085
	(27.10)	(.)	(23.26)	(51.32)	(15.81)	(16.22)	(63.15)
1=HH participated in HARVEST in 2012	13.530	-33.489	-24.192	-23.893	-15.320	-17.274	-6.775
	(29.82)	(39.10)	(38.70)	(29.78)	(16.34)	(19.29)	(34.18)
1=HH participated in HARVEST in 2013	-21.936	24.973	-140.825*	-5.652	-8.486	-11.977	-1.250
	(31.69)	(49.41)	(70.18)	(26.15)	(18.21)	(22.93)	(29.77)

Annex A4.23. cont.

Variables [Dependent variables are real annual per capita expenditures in \$USD]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
1=HH participated in HARVEST in 2014	-22.730 (29.98)	-17.233 (41.58)	13.281 (25.97)	-43.770 (26.59)	-29.126* (14.22)	-34.069* (16.30)	15.188 (29.35)
Propensity scores for nearest neighbor (nn4) method	-20.369 (34.74)	0.685 (34.78)	2.521 (45.17)	-53.063 (40.26)	-4.896 (19.38)	-14.663 (21.10)	31.714 (49.72)
Constant	0.000 (.)	0.000 (.)	332.648* (143.63)	314.818** (98.45)	341.088** (55.81)	340.972** (65.78)	338.638* (139.44)
Observations	856	914	902	894	3566	2959	607
R-Square	0.394	0.338	0.295	0.400	0.315	0.312	0.505
chi2-statistic	.	.	.	.	1287.961	2134.832	.
rho	0.338	0.213	0.146	0.251	0.238	0.229	0.053

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A4.24. Impact of Cambodia HARVEST on Women Dietary Diversity (CRE Negative Binomial Marginal Effects), Sample 1

Variables [Dependent variables are number of food groups consumed by women]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	-0.470 (0.26)	-0.768** (0.25)	-0.639* (0.30)	0.117 (0.27)	-0.407** (0.13)	-0.452 (0.28)	-0.422 (0.32)
New treatment variable-excludes dropouts	-1.824 (1.18)	1.305* (0.65)	-1.588 (0.86)	0.564 (0.49)	0.055 (0.50)	-1.725 (1.41)	-0.010 (0.87)
Program effect (DID)	-0.255 (0.25)	-0.089 (0.23)	0.328 (0.27)	-0.252 (0.22)	-0.059 (0.12)	-0.227 (0.26)	-0.381 (0.30)
HH head gender (1=Male)	-0.246 (0.49)	0.726 (0.42)	0.378 (0.50)	-0.446 (0.42)	0.042 (0.25)		
Head's age (years)	-0.005 (0.04)	0.019 (0.05)	0.068 (0.04)	0.055 (0.04)	0.029 (0.02)	-0.028 (0.05)	0.085 (0.06)
Head's age squared	-0.000 (0.00)	-0.000 (0.00)	-0.000 (0.00)	-0.001 (0.00)	-0.000 (0.00)	0.000 (0.00)	-0.001 (0.00)
Household size (# of people)	-0.137 (0.13)	-0.172 (0.09)	-0.146 (0.17)	0.061 (0.07)	-0.074 (0.04)	-0.051 (0.13)	-0.234* (0.12)
percent of HH members who are women 15-49 years	-0.748 (1.51)	-0.682 (1.66)	-0.432 (1.42)	-0.440 (1.14)	-0.607 (0.72)	-1.055 (1.64)	-0.874 (1.67)
Log of daily per capita food consumption in Riels	0.553 (0.32)	0.986** (0.27)	0.396 (0.26)	-0.188 (0.28)	0.454** (0.14)	0.708* (0.34)	0.633 (0.44)
Total operated land (Log)	0.274 (0.33)	0.283 (0.25)	-0.049 (0.35)	-0.184 (0.28)	0.087 (0.15)	0.229 (0.36)	0.017 (0.39)
Total Livestock Units	-0.021 (0.07)	0.012 (0.04)	-0.087 (0.04)	0.003 (0.03)	-0.016 (0.03)	-0.023 (0.07)	-0.034 (0.06)
Source of water is well (1=yes)	0.279 (0.39)	-0.658 (0.46)	0.031 (0.24)	-0.212 (0.40)	-0.061 (0.19)	0.127 (0.38)	0.204 (0.62)
Asset value (Log)	0.096 (0.08)	-0.008 (0.07)	0.016 (0.07)	0.011 (0.07)	0.019 (0.03)	0.079 (0.08)	0.028 (0.10)
HH reported receiving interventions from program other than HARVEST (1=Yes)	-0.165 (0.14)	0.245 (0.14)	-0.014 (0.12)	-0.035 (0.13)	-0.018 (0.07)	-0.176 (0.15)	-0.173 (0.18)

Annex A4.24. cont.

Variables [Dependent variables are number of food groups consumed by women]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Woman's age (years)	0.012 (0.04)	-0.023 (0.05)	-0.075 (0.04)	-0.000 (0.04)	-0.025 (0.02)	0.002 (0.04)	-0.037 (0.06)
Woman's age square	-0.000 (0.00)	0.001 (0.00)	0.001* (0.00)	-0.000 (0.00)	0.001 (0.00)	-0.000 (0.00)	0.001 (0.00)
Woman is caretaker of a child (1=Yes)	0.490* (0.24)	0.938** (0.23)	0.539* (0.26)	0.052 (0.19)	0.477** (0.11)	0.399 (0.26)	0.557* (0.28)
Women is HH head (1=Yes)	0.466 (0.52)	0.026 (0.53)	0.514 (0.35)	-0.227 (0.26)	0.172 (0.21)	0.000 (.)	0.539 (0.53)
number of male members participating in HARVEST interventions	0.493 (0.51)	0.192 (0.30)	0.173 (0.33)	-0.855* (0.37)	0.168 (0.20)	0.256 (0.50)	-0.249 (0.65)
number of female members participating in HARVEST interventions	0.580 (0.52)	0.180 (0.26)	0.231 (0.31)	-0.735* (0.36)	0.209 (0.19)	0.349 (0.51)	0.170 (0.67)
number of HH members who participated in HARVEST activities	-0.548 (0.51)	-0.206 (0.26)	-0.316 (0.32)	0.738* (0.37)	-0.211 (0.19)	-0.312 (0.50)	0.060 (0.68)
number of HH members who participated as clients in HARVEST activities	-0.235 (0.61)	-0.118 (0.37)	0.061 (0.31)	0.932** (0.28)	0.063 (0.19)	-0.052 (0.61)	0.451 (0.73)
number of HH members who participated as demo leaders in HARVEST activities	-0.381 (0.61)	-0.464 (0.39)	0.068 (0.31)	1.140** (0.34)	-0.002 (0.20)	-0.270 (0.61)	0.546 (0.81)
1=HH was aquaculture client or demo beneficiary	-0.179 (0.42)	-0.394 (0.43)	-0.222 (0.17)	0.417 (0.26)	-0.182 (0.14)	-0.058 (0.43)	-0.651 (0.40)
1=HH was home garden client or demo beneficiary	-0.482 (0.36)	-0.447 (0.34)	-0.214 (0.18)	-0.185 (0.19)	-0.304* (0.12)	-0.429 (0.37)	-0.684 (0.38)
1=HH was rice client or demo beneficiary	-0.185 (0.38)	-0.678* (0.31)	-0.141 (0.16)	-0.148 (0.26)	-0.310** (0.12)	-0.119 (0.39)	-0.388 (0.41)
Number of years HH participated in HARVEST as a client	-0.329 (0.20)	-0.064 (0.16)	0.210 (0.14)	0.145 (0.16)	0.022 (0.08)	-0.343 (0.20)	-0.048 (0.22)

Annex A4.24. cont.

Variables [Dependent variables are number of food groups consumed by women]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
1=HH participated in HARVEST in 2011	0.087 (0.25)	0.000 (.)	-0.379 (0.22)	-0.010 (0.56)	-0.165 (0.14)	0.102 (0.28)	-0.060 (0.47)
1=HH participated in HARVEST in 2012	0.742 (0.41)	0.305 (0.42)	0.466 (0.61)	-0.084 (0.30)	0.219 (0.20)	0.741 (0.42)	-0.042 (0.47)
1=HH participated in HARVEST in 2013	1.891 (1.00)	0.034 (0.53)	0.667 (0.96)	-0.220 (0.26)	0.259 (0.24)	1.912 (1.28)	0.378 (0.44)
1=HH participated in HARVEST in 2014	0.598 (0.37)	-0.302 (0.39)	-0.320 (0.23)	-0.174 (0.28)	-0.028 (0.15)	0.633 (0.37)	-0.377 (0.39)
Observations	884	853	955	901	3593	802	554
Pseudo R-Square	0.018	0.033	0.021	0.017	0.015	0.018	0.050
Wald Chi2-statistic	136.450	210.211	.	.	519.283	122.653	.
p-value of Chi2-statistic	0.000	0.000	.	.	0.000	0.000	.
alpha	0.000	0.000	.	0.000	0.000	0.000	0.000

Marginal effects; Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A4.25. Impact of Cambodia HARVEST on Women Dietary Diversity (CRE Negative Binomial Models), Sample 2

Variables [Dependent variables are number of food groups consumed by women]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	-0.400 (0.26)	-0.781** (0.24)	-0.646* (0.30)	0.111 (0.24)	-0.394** (0.13)	-0.396** (0.15)	-0.346 (0.29)
New treatment variable-includes dropouts	-0.635 (0.64)	1.363* (0.55)	-1.661* (0.83)	0.422 (0.40)	0.433 (0.41)	0.470 (0.46)	0.239 (0.62)
Program effect (DID)	-0.265 (0.24)	-0.122 (0.23)	0.370 (0.27)	-0.176 (0.19)	-0.044 (0.12)	0.013 (0.13)	-0.314 (0.28)
HH head gender (1=Male)	-0.219 (0.50)	0.611 (0.45)	0.354 (0.45)	-0.269 (0.34)	0.138 (0.23)	0.000 (.)	0.000 (.)
Head's age (years)	-0.003 (0.04)	0.011 (0.04)	0.068 (0.04)	0.043 (0.03)	0.025 (0.02)	0.017 (0.02)	0.100 (0.06)
Head's age squared	-0.000 (0.00)	-0.000 (0.00)	-0.000 (0.00)	-0.001 (0.00)	-0.000 (0.00)	-0.000 (0.00)	-0.001 (0.00)
Household size (# of people)	-0.143 (0.12)	-0.161 (0.08)	-0.152 (0.16)	0.062 (0.06)	-0.070 (0.04)	-0.057 (0.04)	-0.216* (0.11)
percent of HH members who are women 15-49 years	-0.668 (1.46)	-0.715 (1.54)	-0.440 (1.40)	-0.482 (0.98)	-0.680 (0.66)	-0.903 (0.75)	-0.342 (1.48)
Log of daily per capita food consumption in Riels	0.606* (0.30)	1.041** (0.27)	0.391 (0.25)	-0.127 (0.25)	0.503** (0.13)	0.518** (0.14)	0.521 (0.42)
Total operated land (Log)	0.195 (0.33)	-0.133 (0.26)	-0.025 (0.35)	-0.077 (0.25)	-0.016 (0.15)	0.024 (0.16)	-0.072 (0.40)
Total Livestock Units	-0.024 (0.05)	0.001 (0.04)	-0.077 (0.05)	-0.005 (0.03)	-0.019 (0.02)	-0.019 (0.03)	-0.022 (0.06)
Source of water is well (1=yes)	0.239 (0.37)	-0.756 (0.41)	0.020 (0.24)	-0.049 (0.34)	-0.042 (0.18)	-0.091 (0.19)	-0.056 (0.55)
Asset value (Log)	0.084 (0.07)	0.007 (0.06)	0.013 (0.06)	0.002 (0.06)	0.016 (0.03)	0.010 (0.04)	0.004 (0.08)
HH reported receiving interventions from program other than HARVEST (1=Yes)	-0.212 (0.13)	0.252* (0.13)	0.006 (0.12)	0.060 (0.11)	0.018 (0.06)	0.011 (0.06)	-0.066 (0.16)

Annex A4.25. cont.

Variables [Dependent variables are number of food groups consumed by women]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Woman's age	0.004 (0.04)	-0.022 (0.04)	-0.079* (0.04)	-0.001 (0.03)	-0.024 (0.02)	-0.025 (0.02)	-0.012 (0.06)
Woman's age square	-0.000 (0.00)	0.001 (0.00)	0.001* (0.00)	-0.000 (0.00)	0.001 (0.00)	0.001 (0.00)	-0.000 (0.00)
Woman is caretaker of a child (1=Yes)	0.400 (0.23)	0.827** (0.22)	0.550* (0.25)	0.104 (0.17)	0.432** (0.10)	0.438** (0.11)	0.573* (0.28)
Women is HH head (1=Yes)	0.453 (0.52)	0.136 (0.46)	0.473 (0.35)	-0.241 (0.23)	0.159 (0.19)	0.000 (.)	0.755 (0.49)
number of male members participating in HARVEST interventions	0.592 (0.49)	0.213 (0.28)	0.167 (0.33)	-0.835** (0.28)	0.170 (0.19)	0.155 (0.19)	-0.354 (0.49)
number of female members participating in HARVEST interventions	0.618 (0.50)	0.195 (0.26)	0.250 (0.32)	-0.850** (0.25)	0.179 (0.18)	0.150 (0.18)	-0.006 (0.50)
number of HH members who participated in HARVEST activities	-0.609 (0.49)	-0.235 (0.25)	-0.335 (0.32)	0.813** (0.26)	-0.191 (0.18)	-0.165 (0.19)	0.115 (0.51)
number of HH members who participated as clients in HARVEST activities	-0.164 (0.57)	-0.052 (0.35)	0.079 (0.32)	0.983** (0.22)	0.067 (0.19)	0.104 (0.20)	0.536 (0.54)
number of HH members who participated as demo leaders in HARVEST activities	-0.245 (0.57)	-0.332 (0.37)	0.072 (0.32)	1.169** (0.29)	0.021 (0.19)	0.022 (0.20)	0.707 (0.65)
1=HH was aquaculture client or demo beneficiary	-0.284 (0.38)	-0.689 (0.41)	-0.290 (0.16)	0.483* (0.20)	-0.204 (0.13)	-0.211 (0.13)	-0.692 (0.42)
1=HH was home garden client or demo beneficiary	-0.534 (0.32)	-0.464 (0.32)	-0.292 (0.17)	-0.133 (0.14)	-0.266* (0.10)	-0.304** (0.11)	-0.362 (0.30)
1=HH was rice client or demo beneficiary	-0.464 (0.35)	-0.785** (0.30)	-0.179 (0.16)	-0.101 (0.18)	-0.356** (0.10)	-0.365** (0.11)	-0.572 (0.33)
Number of years HH participated in HARVEST as a client	-0.277 (0.18)	-0.128 (0.16)	0.266 (0.14)	0.072 (0.14)	-0.009 (0.08)	-0.020 (0.08)	0.219 (0.19)

Annex A4.25. cont.

Variables [Dependent variables are number of food groups consumed by women]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
1=HH participated in HARVEST in 2011	0.068 (0.23)	0.000 (.)	-0.433* (0.21)	-0.458 (0.43)	-0.108 (0.14)	-0.073 (0.14)	-0.526 (0.46)
1=HH participated in HARVEST in 2012	0.414 (0.40)	0.393 (0.34)	0.634 (0.48)	0.107 (0.22)	0.201 (0.17)	0.209 (0.20)	-0.095 (0.34)
1=HH participated in HARVEST in 2013	1.029* (0.51)	-0.281 (0.40)	0.646 (0.85)	-0.332 (0.20)	-0.021 (0.18)	0.034 (0.20)	-0.168 (0.32)
1=HH participated in HARVEST in 2014	0.399 (0.30)	-0.020 (0.32)	-0.481* (0.23)	-0.129 (0.22)	0.018 (0.13)	0.036 (0.14)	-0.713* (0.36)
Observations	962	967	1005	1164	4098	3458	640
Pseudo R-Square	0.016	0.032	0.018	0.014	0.014	0.014	0.046
Wald Chi2-statistic	140.500	234.782	249.311	.	644.529	.	.
p-value of Chi2-statistic	0.000	0.000	0.000	.	0.000	.	.
alpha	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Marginal effects; Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A4.26. Impact of Cambodia HARVEST on Underweight Women (Probit CRE Models), Sample 1

Variables [Dependent variables are binary with 1=prevalence of underweight woman and 0 otherwise]	Province				Overall	Head's gender
	BB	KT	PS	SR		Male
Year (1=2016)	-0.003 (.)	-0.142** (0.05)	0.040 (0.04)	-0.029 (.)	-0.032 (0.02)	-0.038 (0.03)
New treatment variable-excludes dropouts	-1.246 (.)	-1.119** (0.17)	-0.142 (0.20)	-0.074 (.)	0.034 (0.14)	-0.017 (0.15)
Program effect (DID)	0.019 (.)	0.088 (0.05)	-0.025 (0.04)	0.060 (.)	0.031 (0.02)	0.032 (0.02)
HH head gender (1=Male)	0.149 (.)	0.095 (0.08)	-0.027 (0.10)	0.107 (.)	0.081 (0.05)	
Observations	822	761	877	850	3310	2809
Chi2-statistic	.	278.529	64.202	.	127.541	119.705
p-value of Chi2-statistic	.	0.000	0.211	.	0.238	0.363
rho	0.313	0.342	0.404	0.267	0.378	0.356

Marginal effects; Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Note: model on female household head does not converge.

Annex A4.27. Impact of Cambodia HARVEST on Underweight Women (CRE Probit Models), Sample 2

Variables [Dependent variables are binary with 1=prevalence of underweight woman and 0 otherwise]	Province			Overall	Head's gender	
	BB	KT	PS		Male	Female
Year (1=2016)	0.011 (0.05)	-0.126** (0.05)	0.029 (0.04)	-0.025 (0.02)	-0.032 (0.03)	0.089 (0.07)
New treatment variable-includes dropouts	0.075 (0.14)	-0.197 (0.15)	-0.053 (0.20)	0.084 (0.11)	0.073 (0.12)	-0.375 (0.35)
Program effect (DID)	0.025 (0.05)	0.080 (0.05)	-0.009 (0.04)	0.032 (0.02)	0.038 (0.02)	-0.005 (0.07)
HH head gender (1=Male)	0.151 (0.11)	0.033 (0.08)	-0.017 (0.09)	0.063 (0.04)		
Observations	897	864	920	3783	3204	579
Chi2-statistic	.	60.279	62.491	136.128	132.281	143.561
p-value of Chi2-statistic	.	0.324	0.257	0.135	0.174	0.000
Rho	0.308	0.31	0.405	0.395	0.38	0.176

Marginal effects; Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Note: Model for Siem Reap does not converge.

Annex A4.28. Impact of Cambodia HARVEST on Women Body Mass Index (CRE Models), Sample 1

Variables [Dependent variables are women Body Mass Index]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	0.035 (0.42)	1.253** (0.30)	0.164 (0.32)	0.105 (0.29)	0.425* (0.17)	0.320 (0.20)	0.502 (0.36)
New treatment variable-excludes dropouts	0.000 (.)	0.000 (.)	0.000 (.)	-0.392 (1.40)	1.242 (1.23)	1.574 (1.28)	-6.745** (1.87)
Program effect (DID)	0.202 (0.39)	-0.340 (0.30)	0.681* (0.29)	0.089 (0.28)	0.153 (0.15)	0.196 (0.17)	-0.216 (0.36)
HH head gender (1=Male)	-0.083 (0.52)	0.541 (0.51)	1.477* (0.68)	-1.206 (0.92)	0.395 (0.37)		
Head's age (years)	0.044 (0.09)	0.094 (0.07)	0.181** (0.07)	0.048 (0.08)	0.087* (0.04)	0.116* (0.05)	-0.085 (0.09)
Head's age squared	-0.000 (0.00)	-0.001 (0.00)	-0.002** (0.00)	-0.000 (0.00)	-0.001 (0.00)	-0.001* (0.00)	0.001 (0.00)
Household size (# of people)	0.019 (0.14)	-0.278 (0.15)	-0.154 (0.18)	0.141 (0.09)	-0.067 (0.06)	-0.067 (0.06)	0.004 (0.12)
percent of HH members who are women 15-49 years	2.458 (2.00)	1.590 (1.77)	1.905 (1.67)	1.254 (1.64)	2.016* (0.88)	2.173* (1.04)	0.781 (2.01)
Log of daily per capita food consumption in Riels	-0.073 (0.46)	0.131 (0.31)	0.076 (0.30)	-0.059 (0.35)	0.039 (0.17)	-0.008 (0.19)	0.380 (0.40)
Total operated land (Log)	-0.513 (0.49)	-1.222** (0.39)	-0.399 (0.31)	0.202 (0.39)	-0.499* (0.22)	-0.532* (0.24)	0.761 (0.51)
Asset value (Log)	0.064 (0.12)	-0.211* (0.11)	-0.021 (0.09)	-0.040 (0.08)	-0.066 (0.05)	-0.025 (0.06)	-0.178 (0.12)
Total Livestock Units	0.078 (0.07)	0.047 (0.06)	0.114 (0.06)	0.050 (0.06)	0.064* (0.03)	0.063 (0.03)	0.031 (0.08)
Source of water is well (1=yes)	0.014 (0.49)	0.163 (0.54)	0.389 (0.38)	0.114 (0.43)	0.132 (0.22)	0.192 (0.24)	0.161 (0.55)
HH reported receiving interventions from HARVEST (1=yes)	-0.296 (0.51)	-0.042 (0.73)	-1.120 (0.77)	0.736 (0.57)	0.022 (0.31)	0.011 (0.35)	-0.112 (0.58)

Annex A4.28. cont.

Variables [Dependent variables are women Body Mass Index]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
HH reported receiving interventions from program other than HARVEST (1=Yes)	-0.586	-0.027	0.223	-0.322	-0.230	-0.271	0.314
	(0.31)	(0.34)	(0.33)	(0.36)	(0.17)	(0.19)	(0.44)
number of male members participating in HARVEST interventions	-0.018	-0.989	1.283	1.739	0.216	0.246	-1.955
	(1.00)	(0.94)	(0.84)	(1.45)	(0.56)	(0.60)	(1.72)
number of female members participating in HARVEST interventions	-0.832	-1.372	1.491	1.367	-0.093	-0.036	-1.810
	(1.01)	(0.90)	(0.88)	(1.41)	(0.57)	(0.61)	(1.73)
number of HH members who participated in HARVEST activities	0.578	1.222	-1.536	-1.645	-0.073	-0.109	1.883
	(1.00)	(0.90)	(0.84)	(1.43)	(0.56)	(0.60)	(1.75)
number of HH members who participated as clients in HARVEST activities	1.966	1.477	-1.387	-1.937	-0.002	0.076	1.153
	(1.13)	(1.10)	(0.85)	(1.32)	(0.57)	(0.60)	(1.80)
number of HH members who participated as demo leaders in HARVEST activities	2.822*	1.513	-2.030*	-2.040	-0.176	-0.132	1.403
	(1.18)	(1.12)	(0.85)	(1.52)	(0.58)	(0.61)	(2.05)
1=HH was aquaculture client or demo beneficiary	-1.851**	-0.437	0.753	-0.207	0.129	0.061	0.683
	(0.70)	(0.83)	(0.53)	(0.94)	(0.35)	(0.37)	(0.99)
1=HH was home garden client or demo beneficiary	-1.637*	1.009	-0.681	-0.753	-0.333	-0.436	0.238
	(0.69)	(0.88)	(0.47)	(0.67)	(0.32)	(0.34)	(0.70)
1=HH was rice client or demo beneficiary	-1.770*	-0.094	0.230	0.287	-0.093	-0.256	0.940
	(0.73)	(0.84)	(0.52)	(0.82)	(0.34)	(0.37)	(0.76)
Number of years HH participated in HARVEST as a client	-0.564	0.140	-0.373	-0.266	-0.329	-0.299	-1.091*
	(0.40)	(0.47)	(0.40)	(0.52)	(0.22)	(0.24)	(0.55)
1=HH participated in HARVEST in 2011	0.886	0.000	0.046	1.305	0.316	0.309	1.094
	(0.62)	(.)	(0.63)	(1.31)	(0.40)	(0.44)	(0.90)
1=HH participated in HARVEST in 2012	0.986	-0.205	-0.912	-0.310	0.274	0.329	1.372
	(0.85)	(1.12)	(1.05)	(0.94)	(0.53)	(0.63)	(0.95)
1=HH participated in HARVEST in 2013	-0.258	-1.478	4.425**	-0.097	0.191	0.440	0.220
	(1.37)	(1.32)	(1.51)	(0.87)	(0.56)	(0.70)	(0.86)

Annex A4.28. cont.

Variables [Dependent variables are women Body Mass Index]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
1=HH participated in HARVEST in 2014	-0.570 (0.83)	-1.777 (1.29)	0.722 (0.70)	1.609 (0.99)	0.517 (0.42)	0.315 (0.47)	2.470* (1.00)
Propensity scores for nearest neighbor (nn4) method	-0.623 (0.94)	-0.329 (0.98)	-1.402 (1.05)	-0.698 (0.90)	-0.644 (0.48)	-0.691 (0.54)	-0.713 (1.06)
Constant	26.863** (4.96)	0.000 (.)	0.000 (.)	12.552* (4.91)	16.539** (2.29)	16.117** (2.63)	25.481** (5.79)
Observations	822	761	877	850	3310	2809	501
R-Square	0.106	0.147	0.170	0.138	0.091	0.098	0.272
chi2-statistic	.	.	.	.	349.984	703.737	.
rho	0.426	0.476	0.409	0.366	0.424	0.441	0.270

Marginal effects; Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A4.29. Impact of Cambodia HARVEST on Women Body Mass Index (CRE Models), Sample 2

Variables [Dependent variables are women Body Mass Index]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	-0.206 (0.42)	1.163** (0.29)	0.181 (0.32)	0.034 (0.28)	0.319 (0.16)	0.232 (0.19)	0.281 (0.37)
New treatment variable-includes dropouts	-0.394 (1.49)	0.000 (.)	0.000 (.)	0.000 (.)	1.028 (0.94)	0.832 (0.96)	0.135 (4.16)
Program effect (DID)	0.282 (0.38)	-0.302 (0.29)	0.685* (0.29)	0.139 (0.25)	0.172 (0.15)	0.212 (0.16)	-0.154 (0.35)
HH head gender (1=Male)	-0.130 (0.53)	0.358 (0.50)	1.441* (0.61)	-0.604 (0.67)	0.304 (0.32)		
Head's age (years)	0.033 (0.08)	0.087 (0.07)	0.169** (0.06)	0.019 (0.07)	0.075* (0.04)	0.099* (0.05)	-0.053 (0.09)
Head's age squared	-0.000 (0.00)	-0.001 (0.00)	-0.002** (0.00)	-0.000 (0.00)	-0.001 (0.00)	-0.001 (0.00)	0.000 (0.00)
Household size (# of people)	0.162 (0.13)	-0.337* (0.14)	-0.199 (0.18)	0.121 (0.09)	-0.024 (0.06)	-0.008 (0.06)	0.036 (0.14)
percent of HH members who are women 15-49 years	2.131 (1.88)	1.358 (1.71)	1.832 (1.66)	2.609 (1.41)	2.382** (0.84)	2.499** (0.96)	1.366 (2.01)
Log of daily per capita food consumption in Riels	-0.219 (0.44)	-0.168 (0.29)	0.042 (0.29)	0.068 (0.30)	-0.059 (0.16)	-0.095 (0.17)	0.189 (0.43)
Total operated land (Log)	-0.458 (0.47)	-0.670 (0.40)	-0.272 (0.31)	0.458 (0.31)	-0.265 (0.20)	-0.263 (0.20)	0.641 (0.55)
Asset value (Log)	0.117 (0.11)	-0.168 (0.11)	-0.032 (0.09)	0.027 (0.07)	-0.022 (0.05)	0.002 (0.05)	-0.021 (0.12)
Total Livestock Units	0.085 (0.05)	0.071 (0.06)	0.111 (0.06)	0.029 (0.05)	0.065* (0.03)	0.064* (0.03)	0.012 (0.08)
Source of water is well (1=yes)	0.274 (0.45)	-0.102 (0.49)	0.399 (0.37)	-0.006 (0.37)	0.151 (0.20)	0.204 (0.22)	0.280 (0.53)
HH reported receiving interventions from HARVEST (1=yes)	-0.213 (0.45)	-0.411 (0.66)	-0.494 (0.81)	0.572 (0.42)	0.011 (0.26)	0.109 (0.29)	-0.146 (0.53)

Annex A4.29. cont.

Variables [Dependent variables are women Body Mass Index]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
HH reported receiving interventions from program other than HARVEST (1=Yes)	-0.435	-0.251	0.208	-0.108	-0.197	-0.175	0.105
	(0.30)	(0.32)	(0.32)	(0.29)	(0.15)	(0.17)	(0.39)
number of male members participating in HARVEST interventions	-0.097	-0.346	1.348	1.422	0.288	0.275	-1.119
	(0.93)	(0.80)	(0.82)	(1.19)	(0.50)	(0.54)	(1.10)
number of female members participating in HARVEST interventions	-0.727	-0.927	1.654	1.167	-0.018	-0.029	-1.104
	(0.93)	(0.78)	(0.86)	(1.14)	(0.51)	(0.55)	(1.11)
number of HH members who participated in HARVEST activities	0.558	0.654	-1.607	-1.514	-0.172	-0.151	1.028
	(0.92)	(0.77)	(0.83)	(1.16)	(0.50)	(0.54)	(1.11)
number of HH members who participated as clients in HARVEST activities	1.849	1.120	-1.381	-1.788	-0.050	0.050	0.316
	(1.07)	(0.94)	(0.82)	(1.14)	(0.52)	(0.55)	(1.12)
number of HH members who participated as demo leaders in HARVEST activities	2.503*	1.187	-2.003*	-2.120	-0.225	-0.152	0.288
	(1.10)	(0.96)	(0.83)	(1.31)	(0.53)	(0.56)	(1.43)
1=HH was aquaculture client or demo beneficiary	-1.726*	-0.785	0.605	0.080	0.099	0.025	0.239
	(0.69)	(0.75)	(0.50)	(0.71)	(0.32)	(0.33)	(0.82)
1=HH was home garden client or demo beneficiary	-1.812**	0.924	-0.488	-0.175	-0.238	-0.292	0.001
	(0.66)	(0.76)	(0.44)	(0.50)	(0.27)	(0.29)	(0.61)
1=HH was rice client or demo beneficiary	-1.691*	-0.008	0.190	0.078	-0.071	-0.196	0.901
	(0.71)	(0.75)	(0.47)	(0.57)	(0.29)	(0.31)	(0.68)
Number of years HH participated in HARVEST as a client	-0.367	0.553	-0.287	-0.069	-0.135	-0.112	-0.804
	(0.40)	(0.42)	(0.37)	(0.37)	(0.19)	(0.21)	(0.49)
1=HH participated in HARVEST in 2011	0.747	0.000	-0.259	0.514	0.049	0.071	0.292
	(0.57)	(.)	(0.58)	(1.11)	(0.36)	(0.39)	(0.83)
1=HH participated in HARVEST in 2012	0.570	-0.863	-1.303	-0.584	-0.188	-0.032	0.349
	(0.84)	(0.98)	(0.92)	(0.68)	(0.44)	(0.51)	(0.86)
1=HH participated in HARVEST in 2013	0.579	-1.097	3.984**	-0.016	0.180	0.320	0.236
	(0.95)	(0.96)	(1.53)	(0.60)	(0.41)	(0.49)	(0.78)

Annex A4.29. cont.

Variables [Dependent variables are women Body Mass Index]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
1=HH participated in HARVEST in 2014	0.409 (0.75)	-1.732 (0.99)	0.521 (0.66)	1.184 (0.64)	0.465 (0.35)	0.284 (0.39)	2.082** (0.76)
Propensity scores for nearest neighbor (nn4) method	-0.570 (0.95)	-0.149 (0.97)	-1.863 (1.05)	-0.781 (0.84)	-0.752 (0.48)	-0.777 (0.53)	-0.221 (1.05)
Constant	25.583** (4.73)	10.196* (4.36)	18.626** (4.66)	13.809** (4.36)	17.083** (2.13)	15.830** (2.43)	28.797** (5.60)
Observations	897	864	920	1102	3783	3204	579
R-Square	0.095	0.135	0.163	0.117	0.084	0.092	0.228
chi2-statistic	.	.	.	.	312.514	661.260	.
rho	0.399	0.429	0.411	0.396	0.415	0.431	0.281

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016

Annex A4.30. Impact of Cambodia HARVEST on Stunted Children under 5 Years (Probit CRE Models), Sample 1

Variables [Dependent variables are binary with 1=stunted children and 0 otherwise]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	-0.115 (1.09)	-0.207 (2.63)	-0.102 (.)	-0.277** (0.07)	-0.192** (0.04)	-0.217** (0.05)	-0.040 (14.33)
New treatment variable-excludes dropouts	-0.219 (2.10)	-0.243 (3.09)	-0.101 (.)	0.053 (0.19)	-0.036 (0.11)	-0.134 (0.12)	0.332 (122.15)
Program effect (DID)	0.045 (0.42)	0.023 (0.28)	0.121 (.)	0.108 (0.09)	0.085 (0.05)	0.120* (0.06)	-0.108 (39.39)
HH head gender (1=Male)	-0.009 (0.10)	0.005 (0.07)	-0.134 (.)	-0.002 (0.07)	-0.031 (0.04)		
Male children (1=Yes)	-0.087 (0.82)	0.013 (0.15)	-0.017 (.)	0.056 (0.07)	-0.010 (0.04)	-0.054 (0.05)	0.121 (44.36)
Observations	336	335	321	351	1343	1111	232
Chi2-statistic	65.180	66.302	48.432	68.847	201.693	180.334	.
p-value of Chi2-statistic	0.241	0.187	0.783	0.099	0.000	0.000	.
Log likelihood	-192.335	-159.416	-167.274	-179.673	-770.469	-616.528	-92.062
rho	0.000	0.000	0.448	0.000	0.008	0.056	0.000

Marginal effects; Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A4.31. Impact of Cambodia HARVEST on Stunted Children under 5 Years (Probit CRE Models), Sample 2

Variables [Dependent variables are binary with 1=stunted children and 0 otherwise]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Main							
Year	-0.212 (0.30)	-0.026 (0.40)	-0.043 (0.47)	-0.929** (0.33)	0.574 (0.43)	0.836 (0.59)	-0.477 (0.55)
New treatment variable-includes dropouts	-2.066** (0.77)	-0.582 (0.77)	0.000 (.)	-0.270 (0.59)	0.497 (1.40)	-0.817 (2.09)	-6.593** (1.50)
Program effect (DID)	0.237 (0.31)	0.046 (0.37)	-0.063 (0.46)	0.444 (0.30)	0.793 (0.71)	1.054 (0.90)	-0.102 (0.50)
HH head gender (1=Male)	-2.745* (1.28)	0.408 (0.83)	1.827* (0.82)	-0.548 (0.64)	1.906 (1.35)		0.000 (.)
Male children (1=Yes)	0.166 (0.15)	-0.159 (0.17)	-0.109 (0.20)	0.103 (0.14)	-0.666 (0.38)	-0.826 (0.49)	0.577* (0.25)
Observations	352	368	334	432	1486	1233	220
Chi2-statistic	67.073	67.009	.	87.258	136.273	144.223	.
p-value of Chi2-statistic	0.194	0.171	.	0.005	0.147	0.058	.
Log likelihood	-202.134	-180.803		-232.801			-105.406
Rho	0.000	0.000	0.000	0.003	0.145	0.064	0.000

Marginal effects; Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A4.32. Impact of Cambodia HARVEST on Underweight Children under 5 Years (Probit CRE Models)

Variables [Dependent variables are binary with 1=underweight children and 0 otherwise]	Overall sample HHs	
	Sample 1	Sample 2
Year (1=2016)	-0.096 (3.18)	-0.093* (0.05)
New treatment variable	0.104 (3.48)	0.053 (0.14)
Program effect (DID)	0.085 (2.83)	0.090* (0.04)
HH head gender (1=Male)	-0.072 (2.35)	-0.061 (0.09)
Male children (1=Yes)	0.035 (1.12)	0.038 (0.02)
Observations	1309	1476
Chi2-statistic	157.400	175.784
p-value of Chi2-statistic	0.006	0.001
Log likelihood	-654.718	-733.240
rho	0.000	0.009

Marginal effects; Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Note: Provinces and Head's gender did not converge.

Annex A4.33. Impact of Cambodia HARVEST on Wasted Children under 5 Years (Probit CRE Models)

Variables [Dependent variables are binary with 1=wasted children and 0 otherwise]	Overall sample HHs	
	Sample 1	Sample 2
Year (1=2016)	0.024 (0.04)	0.029 (0.04)
New treatment variable	0.329* (0.17)	0.298** (0.12)
Program effect (DID)	-0.094* (0.04)	-0.087* (0.04)
HH head gender (1=Male)	0.255* (0.10)	0.244** (0.09)
Male children (1=Yes)	0.016 (0.02)	0.010 (0.02)
Observations	1137	1272
Chi2-statistic	97.480	111.803
p-value of Chi2-statistic	0.635	0.331
Log likelihood	-372.975	-411.857
rho	0.000	0.000

Marginal effects; Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Note: Provinces and Head's gender did not converge.

Annex A4.34. Impact of Cambodia HARVEST on Exclusive Breastfeeding among Children under Six Months (Logit CRE Models)

Variables [Dependent variables are binary with 1= children receiving exclusive breastfeeding and 0 otherwise]	Overall	
	Sample 1	Sample 2
Year (1=2016)	0.204* (0.08)	0.166 (0.13)
New treatment variable	0.231* (0.09)	0.067 (0.24)
Program effect (DID)	-0.299 (0.54)	-0.187 (0.16)
HH head gender (1=male)	-0.090* (0.04)	0.002 (0.36)
Male children (1=Yes)	-0.148* (0.06)	-0.151 (0.14)
Observations	142	150
Chi2-statistic	.	.
p-value of Chi2-statistic	.	.
Log likelihood	-57.645	-66.043
Rho	0.967	0.000

Marginal effects; Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Note: Provinces and Head's gender did not converge.

Annex A4. 35. Impact of Cambodia HARVEST on Minimum Acceptable Diet among Children between 6 and 23 Months of Age (Probit CRE Models), Sample 1

Variables [dependent variables are binary with 1=children meeting minimum acceptable diet]	Province				Overall	Head's gender Male
	BB	KT	PS	SR		
Year (1=2016)	-0.101 (0.11)	-0.094 (0.14)	-0.144 (0.15)	-0.007 (1.56)	-0.040 (0.07)	-0.037 (0.07)
New treatment variable-excludes dropouts	-2.035** (0.19)	-3.161** (0.30)	-0.769 (0.48)	-0.561 (85.05)	-0.577** (0.20)	-0.629** (0.23)
Program effect (DID)	0.052 (0.15)	-0.108 (0.16)	-0.086 (0.24)	-0.296 (44.66)	-0.042 (0.09)	-0.055 (0.10)
HH head gender (1=Male)	-0.245* (0.11)	0.093 (0.13)	-0.472** (0.14)	-0.665 (100.78)	-0.214** (0.06)	
Male children (1=Yes)	-0.259 (0.15)	0.298 (0.16)	-0.114 (0.17)	-0.037 (10.30)	-0.049 (0.09)	-0.011 (0.09)
Observations	108	104	85	97	394	326
Chi2-statistic	.	.	22.958	180896.260	27.083	18.061
p-value of Chi2-statistic	.	.	0.778	0.000	0.567	0.925
Log likelihood	.	.	-32.747	-27.392	-217.026	-177.692
rho	.	.	0.676	0.000	0.080	0.022

Marginal effects; Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Note: Model for female head did not converge.

Annex A4.36. Impact of Cambodia HARVEST on Minimum Acceptable Diet among Children between 6 and 23 Months of Age (Probit CRE Models), Sample 2

Variables [dependent variables are binary with 1=children meeting minimum acceptable diet]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	-0.090 (0.12)	-0.102 (0.15)	-0.088 (0.62)	-0.062 (79.16)	-0.032 (0.07)	-0.029 (0.07)	-0.136 (0.09)
New treatment variable-includes dropouts	-0.043 (0.39)	-1.875** (0.43)	-0.567 (4.01)	-0.281 (371.93)	-0.452* (0.18)	-0.403* (0.21)	-2.022** (0.63)
Program effect (DID)	0.094 (0.16)	-0.057 (0.17)	-0.177 (3.23)	-0.134 (173.85)	-0.069 (0.09)	-0.071 (0.10)	0.086 (0.12)
HH head gender (1=Male)	-0.189 (0.12)	0.130 (0.10)	-0.402 (2.84)	-0.313 (413.93)	-0.158* (0.06)		
Male children (1=Yes)	-0.185 (0.15)	0.215 (0.16)	-0.109 (1.57)	-0.126 (165.42)	-0.036 (0.08)	0.019 (0.09)	-0.209 (0.19)
Observations	114	117	88	118	437	362	75
Chi2-statistic		.	.	4.406	26.078	17.450	.
p-value of Chi2-statistic	.	.	.	1.000	0.621	0.939	.
Log likelihood	.	.	-34.320	-49.419	-248.631	-202.520	-15.614
rho	.	.	0.959	0.000	0.191	0.200	0.858

Marginal effects; Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Note: For BB and KT models, we cannot compute an improvement due to discontinuous region encountered.

Annex A4.37. Impact of Cambodia HARVEST on Height-To-Age Z-Scores of Children under 5 Years (CRE Models), Sample 1

Variables [Dependent variables are height-to-age z-scores of children under 5 years]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	1.774 (1.30)	0.113 (0.65)	-0.001 (0.47)	0.955** (0.37)	0.628 (0.44)	0.879 (0.63)	-0.063 (0.51)
New treatment variable-excludes dropouts	-8.907 (12.17)	0.000 (.)	0.000 (.)	0.403 (0.87)	-1.196 (2.13)	-2.267 (3.38)	8.699** (2.57)
Program effect (DID)	0.806 (1.52)	-0.210 (0.57)	-0.109 (0.47)	-0.458 (0.34)	0.935 (0.82)	1.205 (1.02)	-0.291 (0.52)
HH head gender (1=Male)	6.406 (5.87)	-0.049 (0.99)	1.820* (0.81)	1.168 (0.91)	2.086 (1.42)		0.000 (.)
Male children (1=Yes)	-0.944 (0.80)	-0.121 (0.32)	-0.163 (0.20)	-0.178 (0.18)	-0.734 (0.42)	-0.917 (0.54)	-0.030 (0.22)
1=children was ever breastfed	6.085 (6.10)	0.909 (0.67)	0.057 (0.51)	-0.282 (0.49)	1.954 (1.87)	2.227 (2.20)	-0.150 (0.52)
Child's age in months	0.365 (0.51)	-0.077 (0.06)	-0.092** (0.03)	-0.108** (0.03)	0.046 (0.11)	0.070 (0.14)	0.000 (0.04)
Children's age squared	-0.005 (0.01)	0.001 (0.00)	0.001** (0.00)	0.001** (0.00)	-0.001 (0.00)	-0.001 (0.00)	-0.000 (0.00)
Dependence ratio (proportion)	-2.569 (2.75)	-3.437 (2.56)	0.012 (0.23)	-0.452 (0.26)	-1.361 (0.81)	-1.085 (0.85)	0.335 (0.37)
Children age 5-15 years (#)	0.492 (1.37)	0.006 (0.42)	-0.300 (0.27)	0.217 (0.31)	-0.041 (0.27)	-0.101 (0.39)	0.678 (0.42)
Log of daily per capita food consumption in Riels	-21.802 (16.32)	-0.276 (0.41)	0.293 (0.58)	-0.783 (0.51)	-4.127 (3.74)	-5.201 (4.77)	0.145 (0.52)
HH reported receiving interventions from program other than HARVEST (1=Yes)	-1.388 (1.36)	-2.532 (2.41)	0.582* (0.24)	-0.426 (0.22)	-1.068 (0.69)	-0.963 (0.77)	-0.416 (0.33)
Caregiver's age (Years)	-0.623 (0.57)	-0.088 (0.14)	-0.054 (0.07)	0.130 (0.07)	-0.274 (0.25)	-0.324 (0.28)	0.022 (0.09)
Caregiver's age square	0.005 (0.00)	0.001 (0.00)	0.000 (0.00)	-0.002* (0.00)	0.002 (0.00)	0.003 (0.00)	-0.000 (0.00)
The care giver is the HH head(1=Yes)	4.217 (4.14)	-1.106 (0.70)	1.645* (0.80)	1.015 (0.93)	1.070 (1.19)	0.642 (1.14)	0.158 (1.62)

Annex A4.37. cont.

Variables [Dependent variables are height-to-age z-scores of children under 5 years]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Caregiver ever attended school (1=Yes)	-1.149 (3.20)	0.331 (0.68)	-0.850 (0.82)	0.065 (0.56)	0.007 (0.77)	0.087 (1.11)	-0.341 (0.89)
1=migrant HH	0.138 (0.80)	-0.197 (1.58)	0.290 (0.26)	0.016 (0.20)	0.182 (0.33)	0.004 (0.48)	-0.254 (0.34)
number of male members participating in HARVEST interventions	-5.434 (4.93)	5.927 (6.23)	0.978 (0.70)	-0.524 (0.47)	-1.216 (1.00)	-1.692 (1.51)	-2.119 (1.27)
number of female members participating in HARVEST interventions	-4.277 (4.38)	4.581 (5.57)	0.822 (0.69)	-0.322 (0.42)	-0.717 (0.95)	-0.690 (1.24)	-2.153 (1.29)
number of HH members who participated in HARVEST activities	3.381 (3.62)	-8.652 (7.86)	-0.780 (0.67)	0.472 (0.44)	0.189 (0.90)	0.164 (1.23)	2.094 (1.29)
number of HH members who participated as clients in HARVEST activities	-2.693 (5.91)	-7.293 (6.78)	-0.869 (0.80)	0.027 (0.26)	-0.210 (0.89)	-0.212 (1.12)	-0.334 (1.89)
number of HH members who participated as demo leaders in HARVEST activities	-3.131 (6.08)	-3.961 (5.37)	-0.822 (0.82)	0.000 (.)	0.483 (0.93)	0.415 (1.17)	-0.105 (2.07)
1=HH was aquaculture client or demo beneficiary	8.249 (9.11)	24.168 (18.66)	0.099 (0.50)	0.568 (0.53)	4.250 (3.30)	4.323 (3.18)	1.086 (1.25)
1=HH was home garden client or demo beneficiary	7.842 (8.56)	6.906 (5.88)	-0.103 (0.49)	0.126 (0.38)	2.252 (1.93)	2.521 (2.20)	2.370 (1.32)
1=HH was rice client or demo beneficiary	6.715 (8.16)	0.501 (3.50)	-0.272 (0.47)	0.406 (0.49)	0.597 (0.85)	0.291 (1.04)	1.549 (1.09)
Number of years HH participated in HARVEST as a client	-2.077 (2.25)	-0.878 (2.23)	-0.042 (0.31)	0.024 (0.29)	0.080 (0.46)	0.099 (0.76)	-0.035 (0.43)
1=HH participated in HARVEST in 2011	3.512 (3.43)	0.000 (.)	-0.078 (0.55)	0.000 (.)	-0.036 (0.79)	0.014 (1.22)	-0.515 (0.81)
1=HH participated in HARVEST in 2012	1.258 (2.40)	4.954 (4.97)	-0.922 (1.40)	0.414 (0.49)	0.097 (0.65)	0.216 (1.14)	1.195 (0.66)
1=HH participated in HARVEST in 2013	0.584 (2.52)	-1.583 (6.15)	0.469 (1.43)	-0.325 (0.50)	-0.210 (0.88)	0.298 (1.44)	-0.539 (0.52)

Annex A4.37. cont.

Variables [Dependent variables are height-to-age z-scores of children under 5 years]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
1=HH participated in HARVEST in 2014	1.386 (2.98)	-1.882 (4.08)	-0.274 (0.56)	-0.038 (0.54)	-0.786 (0.90)	-0.924 (1.23)	0.576 (0.89)
Propensity scores for nearest neighbor (nn4) method	1.597 (3.26)	-0.064 (3.06)	-0.997 (0.59)	-0.105 (0.59)	-1.492 (1.25)	-0.965 (1.15)	-0.775 (0.81)
Constant	0.000 (.)	-27.236 (26.36)	-3.441 (3.16)	-6.354* (2.96)	-4.712 (4.91)	-4.171 (6.44)	-4.816 (3.67)
Observations	336	335	321	351	1343	1111	232
R-Square	0.146	0.228	0.233	0.304	0.114	0.137	0.564
chi2-statistic	.	.	.	.	121.113	127.904	.
rho	0.000	0.990	0.000	0.183	0.176	0.100	0.000

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A4.38. Impact of Cambodia HARVEST on Height-To-Age Z-Scores of Children under 5 Years (CRE Models), Sample 2

Variables [Dependent variables are height-to-age z-scores of children under 5 years]	Province				Overall l	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	1.642 (1.24)	0.236 (0.62)	-0.043 (0.47)	0.839* (0.34)	0.574 (0.43)	0.836 (0.59)	0.089 (0.51)
New treatment variable-includes dropouts	0.000 (.)	-28.624 (26.00)	0.000 (.)	0.745 (0.83)	0.497 (1.40)	-0.817 (2.09)	5.191** (1.99)
Program effect (DID)	0.627 (1.38)	-0.185 (0.55)	-0.063 (0.46)	-0.419 (0.30)	0.793 (0.71)	1.054 (0.90)	-0.132 (0.49)
HH head gender (1=Male)	5.826 (5.46)	-0.203 (0.93)	1.827* (0.82)	0.740 (0.76)	1.906 (1.35)		0.000 (.)
Male children (1=Yes)	-0.720 (0.70)	-0.084 (0.30)	-0.109 (0.20)	-0.133 (0.15)	-0.666 (0.38)	-0.826 (0.49)	-0.156 (0.21)
1=children was ever breastfed	5.470 (5.52)	0.666 (0.60)	0.102 (0.51)	-0.230 (0.42)	1.832 (1.68)	2.057 (1.95)	-0.380 (0.47)
Child's age in months	0.310 (0.44)	-0.082 (0.06)	-0.095** (0.03)	-0.097** (0.02)	0.034 (0.10)	0.055 (0.12)	-0.008 (0.04)
Children's age squared	-0.005 (0.01)	0.001 (0.00)	0.001** (0.00)	0.001** (0.00)	-0.001 (0.00)	-0.001 (0.00)	-0.000 (0.00)
Dependence ratio (proportion)	-2.377 (2.59)	-3.069 (2.29)	-0.042 (0.24)	-0.435 (0.24)	-1.299 (0.76)	-1.013 (0.78)	0.358 (0.32)
Children age 5-15 years (#)	0.154 (1.14)	0.009 (0.40)	-0.227 (0.27)	0.271 (0.31)	-0.003 (0.24)	-0.074 (0.35)	0.712 (0.41)
Log of daily per capita food consumption in Riels	-19.651 (15.22)	-0.278 (0.39)	0.247 (0.58)	-0.178 (0.60)	-3.765 (3.51)	-4.691 (4.42)	0.151 (0.48)
HH reported receiving interventions from program other than HARVEST (1=Yes)	-1.497 (1.36)	-2.303 (2.16)	0.520* (0.24)	-0.261 (0.18)	-0.924 (0.59)	-0.764 (0.63)	-0.393 (0.30)
Caregiver's age (Years)	-0.548 (0.50)	-0.087 (0.14)	-0.062 (0.07)	0.085 (0.07)	-0.271 (0.24)	-0.316 (0.26)	-0.026 (0.10)
Caregiver's age square	0.004 (0.00)	0.001 (0.00)	0.001 (0.00)	-0.001 (0.00)	0.002 (0.00)	0.003 (0.00)	0.000 (0.00)

Annex A4.38. cont.

Variables [Dependent variables are height-to-age z-scores of children under 5 years]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
The care giver is the HH head(1=Yes)	4.089 (4.02)	-1.017 (0.69)	1.579* (0.79)	0.806 (0.82)	1.042 (1.14)	0.466 (1.05)	0.745 (1.58)
Caregiver ever attended school (1=Yes)	-0.879 (2.86)	0.274 (0.69)	-0.763 (0.84)	0.048 (0.56)	-0.017 (0.75)	0.121 (1.01)	-0.237 (0.83)
1=migrant HH	0.331 (0.84)	0.104 (1.44)	0.304 (0.25)	0.004 (0.18)	0.144 (0.29)	0.005 (0.42)	-0.244 (0.33)
number of male members participating in HARVEST interventions	-5.641 (4.97)	5.879 (5.92)	0.941 (0.65)	0.000 (.)	-1.192 (0.94)	-1.543 (1.35)	-2.256* (1.07)
number of female members participating in HARVEST interventions	-4.454 (4.42)	4.182 (5.05)	0.772 (0.63)	-0.051 (0.15)	-0.863 (0.89)	-0.920 (1.16)	-2.170 (1.15)
number of HH members who participated in HARVEST activities	3.681 (3.83)	-8.196 (7.39)	-0.760 (0.61)	0.092 (0.13)	0.325 (0.82)	0.340 (1.10)	2.280* (1.12)
number of HH members who participated as clients in HARVEST activities	-0.163 (3.86)	-7.038 (6.45)	-0.716 (0.76)	-0.311 (0.32)	0.088 (0.78)	0.172 (1.03)	0.291 (1.47)
number of HH members who participated as demo leaders in HARVEST activities	-0.053 (3.31)	-4.157 (5.06)	-0.610 (0.78)	-0.474 (0.39)	0.711 (0.88)	0.721 (1.11)	0.629 (1.63)
1=HH was aquaculture client or demo beneficiary	5.950 (6.23)	22.425 (17.41)	-0.132 (0.50)	0.587 (0.49)	3.490 (2.72)	3.470 (2.61)	0.779 (1.02)
1=HH was home garden client or demo beneficiary	5.094 (5.25)	7.187 (6.04)	-0.084 (0.47)	0.220 (0.30)	1.879 (1.58)	2.054 (1.80)	1.885 (1.01)
1=HH was rice client or demo beneficiary	4.216 (5.44)	-0.153 (2.97)	-0.330 (0.45)	0.147 (0.33)	0.342 (0.68)	-0.079 (0.90)	1.009 (0.68)
Number of years HH participated in HARVEST as a client	-1.137 (1.79)	-1.179 (2.05)	-0.022 (0.31)	0.120 (0.23)	0.290 (0.42)	0.342 (0.66)	0.069 (0.37)
1=HH participated in HARVEST in 2011	2.495 (2.64)	0.000 (.)	-0.305 (0.53)	0.000 (.)	-0.451 (0.71)	-0.477 (1.03)	-0.658 (0.75)
1=HH participated in HARVEST in 2012	0.068 (1.77)	5.651 (5.15)	-0.921 (0.88)	0.095 (0.33)	-0.108 (0.52)	-0.055 (0.86)	0.903 (0.53)

Annex A4.38. cont.

Variables [Dependent variables are height-to-age z-scores of children under 5 years]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
1=HH participated in HARVEST in 2013	-3.046 (2.57)	0.013 (4.25)	0.289 (1.15)	-0.247 (0.35)	-0.271 (0.66)	0.167 (1.05)	-0.402 (0.50)
1=HH participated in HARVEST in 2014	1.561 (3.38)	-1.803 (3.48)	-0.295 (0.54)	-0.202 (0.42)	-0.841 (0.77)	-0.899 (1.02)	-0.622 (0.81)
Propensity scores for nearest neighbor (nn4) method	0.169 (2.27)	0.268 (2.96)	-0.848 (0.59)	-0.047 (0.52)	-1.601 (1.02)	-1.228 (0.85)	-0.611 (0.75)
Constant	-3.025 (10.14)	0.000 (.)	0.000 (.)	-4.947 (2.55)	-4.221 (4.47)	-3.819 (5.81)	-4.318 (3.50)
Observations	352	368	334	432	1486	1233	253
R-Square	0.139	0.219	0.228	0.258	0.111	0.134	0.546
chi2-statistic	.	.	.	.	136.273	144.223	.
rho	0.000	0.989	0.000	0.138	0.145	0.064	0.000

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A4.39. Impact of Cambodia HARVEST on Weight-To-Age Z-Scores of Children under 5 Years (CRE Models), Sample 1

Variables [Dependent variables are weight-to-age z-scores on children under 5 years]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	0.712*	0.030	-0.035	0.420	0.288	0.296	0.258
	(0.32)	(0.41)	(0.26)	(0.25)	(0.15)	(0.17)	(0.43)
New treatment variable-excludes dropouts	-2.498	-3.188	0.000	-0.679	-0.684	-0.657	2.316
	(2.53)	(4.06)	(.)	(0.55)	(0.65)	(0.74)	(1.87)
Program effect (DID)	-0.107	0.253	-0.267	-0.093	0.020	0.054	0.017
	(0.33)	(0.38)	(0.27)	(0.22)	(0.17)	(0.19)	(0.47)
HH head gender (1=Male)	0.573	-0.689	1.386*	0.299	0.153		0.000
	(1.21)	(0.54)	(0.59)	(0.35)	(0.40)		(.)
Male children (1=Yes)	-0.267	-0.302	-0.008	-0.062	-0.179*	-0.189	-0.099
	(0.17)	(0.22)	(0.13)	(0.12)	(0.09)	(0.10)	(0.21)
1=children was ever breastfed	1.060	0.648	0.295	-0.093	0.450	0.572	-0.262
	(0.88)	(0.42)	(0.28)	(0.25)	(0.30)	(0.34)	(0.44)
Child's age in months	0.042	-0.008	-0.001	-0.038	-0.003	-0.008	0.067
	(0.07)	(0.03)	(0.02)	(0.02)	(0.02)	(0.02)	(0.04)
Children's age squared	-0.001	-0.000	0.000	0.000	-0.000	-0.000	-0.001*
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Dependence ratio (proportion)	-0.177	-0.658	-0.078	-0.290	-0.247*	-0.238	0.356
	(0.42)	(0.35)	(0.15)	(0.17)	(0.13)	(0.13)	(0.39)
Children age 5-15 years (#)	0.092	0.011	-0.268	-0.188	-0.082	-0.085	-0.052
	(0.28)	(0.25)	(0.15)	(0.24)	(0.12)	(0.11)	(0.39)
Log of daily per capita food consumption in Riels	-3.038	0.057	-0.101	0.112	-0.587	-0.873	0.642
	(2.44)	(0.40)	(0.30)	(0.36)	(0.59)	(0.73)	(0.55)
HH reported receiving interventions from program other than HARVEST (1=Yes)	-0.149	-0.513	0.122	-0.175	-0.212	-0.196	0.210
	(0.24)	(0.38)	(0.16)	(0.15)	(0.12)	(0.14)	(0.25)
Caregiver's age (Years)	-0.147	-0.143*	-0.072	0.117*	-0.068	-0.083	0.069
	(0.09)	(0.07)	(0.04)	(0.05)	(0.04)	(0.05)	(0.08)
Caregiver's age square	0.001	0.002*	0.001*	-0.001*	0.001	0.001*	-0.001
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
The care giver is the HH head (1=Yes)	0.857	-1.041	-0.106	0.655*	0.203	-0.109	-0.779
	(0.70)	(0.60)	(0.68)	(0.29)	(0.34)	(0.41)	(1.24)

Annex A4.39. cont.

Variables [Dependent variables are weight-to-age z-scores on children under 5 years]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Caregiver ever attended school (1=Yes)	0.696 (0.86)	0.201 (0.36)	0.725 (0.39)	-0.146 (0.24)	0.306 (0.25)	0.539 (0.29)	-0.985 (0.67)
1=migrant HH	-0.271 (0.20)	-0.017 (0.27)	-0.024 (0.15)	0.020 (0.15)	-0.056 (0.08)	-0.134 (0.10)	0.300 (0.33)
number of male members participating in HARVEST interventions	-1.136 (0.83)	0.241 (0.88)	0.485 (0.66)	0.182 (0.27)	-0.436 (0.30)	-0.553 (0.36)	-2.386* (1.22)
number of female members participating in HARVEST interventions	-1.180 (0.77)	0.015 (0.81)	0.428 (0.64)	0.035 (0.27)	-0.469 (0.29)	-0.506 (0.34)	-2.583* (1.18)
number of HH members who participated in HARVEST activities	0.965 (0.65)	-0.689 (1.06)	-0.339 (0.64)	-0.053 (0.27)	0.348 (0.29)	0.391 (0.34)	2.332 (1.19)
number of HH members who participated as clients in HARVEST activities	0.331 (1.01)	-0.891 (1.05)	-0.327 (0.71)	0.044 (0.14)	0.246 (0.32)	0.339 (0.36)	1.068 (1.43)
number of HH members who participated as demo leaders in HARVEST activities	0.255 (1.03)	-0.483 (0.94)	-0.370 (0.73)	0.000 (.)	0.327 (0.33)	0.378 (0.37)	1.054 (1.65)
1=HH was aquaculture client or demo beneficiary	1.092 (1.43)	3.768 (2.42)	-0.026 (0.36)	-0.062 (0.35)	0.638 (0.49)	0.588 (0.48)	0.826 (0.82)
1=HH was home garden client or demo beneficiary	1.066 (1.31)	1.072 (0.91)	0.331 (0.34)	-0.308 (0.22)	0.336 (0.31)	0.364 (0.34)	0.922 (0.79)
1=HH was rice client or demo beneficiary	0.661 (1.26)	0.230 (0.67)	-0.071 (0.31)	0.260 (0.29)	0.080 (0.20)	0.015 (0.23)	0.932 (0.82)
Number of years HH participated in HARVEST as a client	-0.346 (0.39)	-0.098 (0.36)	0.141 (0.19)	-0.026 (0.21)	0.065 (0.11)	0.110 (0.15)	-0.003 (0.52)
1=HH participated in HARVEST in 2011	0.738 (0.58)	0.000 (.)	-0.378 (0.32)	0.000 (.)	-0.062 (0.21)	-0.178 (0.26)	0.308 (0.83)
1=HH participated in HARVEST in 2012	-0.319 (0.55)	0.502 (0.80)	-0.316 (0.45)	0.377 (0.30)	0.038 (0.20)	-0.156 (0.28)	1.051 (0.62)
1=HH participated in HARVEST in 2013	0.419 (0.55)	0.510 (0.99)	0.168 (0.48)	-0.182 (0.28)	0.143 (0.22)	0.269 (0.31)	0.361 (0.48)

Annex A4.39. cont.

Variables [Dependent variables are weight-to-age z-scores on children under 5 years]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
1=HH participated in HARVEST in 2014	0.367 (0.59)	-0.599 (0.79)	-0.053 (0.35)	0.219 (0.37)	-0.067 (0.21)	-0.101 (0.26)	0.709 (1.07)
Propensity scores for nearest neighbor (nn4) method	-0.129 (0.62)	0.031 (0.55)	-0.815 (0.53)	-0.007 (0.47)	-0.261 (0.26)	-0.049 (0.26)	-0.663 (0.80)
Constant	0.000 (.)	0.000 (.)	-1.340 (2.56)	-6.611** (2.09)	-2.290 (1.20)	-2.767 (1.55)	-1.963 (4.03)
Observations	336	335	321	351	1343	1111	232
R-Square	0.178	0.283	0.224	0.242	0.148	0.175	0.433
chi2-statistic	.	.	.	.	328.870	342.124	.
rho	0.000	0.788	0.140	0.226	0.161	0.117	0.254

Marginal effects; Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A4.40. Impact of Cambodia HARVEST on Weight-To-Age Z-Scores of Children under 5 Years (CRE Models), Sample 2

Variables [Dependent variables are weight-to-age z-scores on children under 5 years]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	0.658*	0.062	-0.045	0.438	0.254	0.302	0.272
	(0.32)	(0.38)	(0.26)	(0.25)	(0.14)	(0.17)	(0.43)
New treatment variable-includes dropouts	0.000	0.000	0.000	-0.670	-0.165	-0.680	-1.658
	(.)	(.)	(.)	(0.54)	(0.69)	(0.73)	(1.36)
Program effect (DID)	-0.178	0.235	-0.243	-0.106	0.001	0.053	0.007
	(0.32)	(0.37)	(0.26)	(0.22)	(0.15)	(0.19)	(0.47)
HH head gender (1=Male)	0.455	-0.793	1.383*	0.309	0.133		
	(1.16)	(0.49)	(0.59)	(0.35)	(0.37)		
Male children (1=Yes)	-0.231	-0.251	0.030	-0.053	-0.157*	-0.179	-0.081
	(0.16)	(0.21)	(0.13)	(0.12)	(0.08)	(0.10)	(0.20)
1=children was ever breastfed	0.944	0.487	0.309	-0.097	0.430	0.566	-0.277
	(0.81)	(0.38)	(0.27)	(0.25)	(0.27)	(0.34)	(0.44)
Child's age in months	0.036	-0.011	-0.004	-0.038	-0.003	-0.009	0.066
	(0.06)	(0.03)	(0.02)	(0.02)	(0.02)	(0.02)	(0.04)
Children's age squared	-0.001	0.000	0.000	0.000	-0.000	-0.000	-0.001*
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Dependence ratio (proportion)	-0.180	-0.599	-0.106	-0.313	-0.263*	-0.239	0.311
	(0.40)	(0.32)	(0.15)	(0.17)	(0.12)	(0.13)	(0.38)
Children age 5-15 years (#)	0.079	0.059	-0.226	-0.189	-0.049	-0.088	-0.042
	(0.25)	(0.23)	(0.15)	(0.24)	(0.11)	(0.11)	(0.39)
Log of daily per capita food consumption in Riels	-2.642	0.079	-0.136	0.111	-0.498	-0.865	0.650
	(2.33)	(0.40)	(0.31)	(0.36)	(0.56)	(0.73)	(0.55)
HH reported receiving interventions from program other than HARVEST (1=Yes)	-0.232	-0.476	0.069	-0.178	-0.210*	-0.198	0.147
	(0.24)	(0.34)	(0.16)	(0.15)	(0.11)	(0.13)	(0.24)
Caregiver's age (Years)	-0.138	-0.145*	-0.072	0.113*	-0.074	-0.085	0.059
	(0.08)	(0.07)	(0.04)	(0.05)	(0.04)	(0.05)	(0.08)
Caregiver's age square	0.001	0.002*	0.001*	-0.001*	0.001*	0.001*	-0.001
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
The care giver is the HH head (1=Yes)	0.824	-1.018	-0.140	0.648*	0.153	-0.111	-0.702
	(0.68)	(0.55)	(0.66)	(0.29)	(0.32)	(0.41)	(1.24)

Annex A4.40. cont.

Variables [Dependent variables are weight-to-age z-scores on children under 5 years]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Caregiver ever attended school (1=Yes)	0.732 (0.82)	0.186 (0.36)	0.770 (0.40)	-0.152 (0.24)	0.330 (0.24)	0.539 (0.29)	-0.967 (0.67)
1=migrant HH	-0.242 (0.20)	0.022 (0.25)	-0.022 (0.14)	0.016 (0.15)	-0.059 (0.08)	-0.137 (0.10)	0.239 (0.33)
number of male members participating in HARVEST interventions	-1.077 (0.82)	0.101 (0.82)	0.462 (0.63)	0.000 (.)	-0.361 (0.29)	-0.550 (0.36)	-2.513* (1.21)
number of female members participating in HARVEST interventions	-1.100 (0.76)	-0.129 (0.73)	0.404 (0.61)	-0.143 (0.14)	-0.456 (0.28)	-0.508 (0.34)	-2.537* (1.20)
number of HH members who participated in HARVEST activities	0.915 (0.66)	-0.542 (0.99)	-0.351 (0.62)	0.125 (0.12)	0.301 (0.28)	0.391 (0.34)	2.439* (1.19)
number of HH members who participated as clients in HARVEST activities	0.760 (0.76)	-0.750 (0.96)	-0.242 (0.69)	0.217 (0.25)	0.187 (0.30)	0.347 (0.36)	1.190 (1.43)
number of HH members who participated as demo leaders in HARVEST activities	0.730 (0.73)	-0.370 (0.85)	-0.248 (0.71)	0.180 (0.27)	0.294 (0.32)	0.391 (0.36)	1.135 (1.67)
1=HH was aquaculture client or demo beneficiary	0.665 (1.05)	3.434 (2.24)	-0.137 (0.37)	-0.060 (0.34)	0.594 (0.42)	0.585 (0.48)	0.736 (0.82)
1=HH was home garden client or demo beneficiary	0.570 (0.89)	1.130 (0.88)	0.272 (0.33)	-0.306 (0.22)	0.412 (0.26)	0.358 (0.35)	0.887 (0.79)
1=HH was rice client or demo beneficiary	0.140 (0.90)	-0.014 (0.57)	-0.085 (0.31)	0.249 (0.28)	0.047 (0.18)	0.003 (0.23)	0.719 (0.81)
Number of years HH participated in HARVEST as a client	-0.189 (0.34)	-0.135 (0.34)	0.159 (0.19)	-0.014 (0.21)	0.081 (0.10)	0.122 (0.14)	0.123 (0.51)
1=HH participated in HARVEST in 2011	0.595 (0.48)	0.000 (.)	-0.489 (0.32)	0.000 (.)	-0.144 (0.20)	-0.201 (0.24)	0.116 (0.80)
1=HH participated in HARVEST in 2012	-0.867 (0.57)	0.552 (0.78)	-0.322 (0.43)	0.371 (0.29)	-0.100 (0.18)	-0.140 (0.27)	0.681 (0.54)

Annex A4.40. cont.

Variables [Dependent variables are weight-to-age z-scores on children under 5 years]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
1=HH participated in HARVEST in 2013	-0.053 (0.62)	0.738 (0.72)	0.325 (0.49)	-0.199 (0.29)	0.197 (0.19)	0.249 (0.31)	0.329 (0.48)
1=HH participated in HARVEST in 2014	0.554 (0.61)	-0.611 (0.67)	-0.112 (0.34)	0.203 (0.37)	-0.064 (0.19)	-0.120 (0.25)	0.142 (0.86)
Propensity scores for nearest neighbor (nn4) method	-0.260 (0.53)	-0.015 (0.54)	-0.751 (0.52)	-0.088 (0.49)	-0.307 (0.24)	-0.164 (0.26)	-0.637 (0.84)
Constant	-0.894 (2.46)	0.000 (.)	0.000 (.)	-6.388** (1.99)	-1.697 (1.11)	-2.744 (1.53)	-1.899 (4.12)
Observations	352	368	334	353	1486	1122	233
R-Square	0.168	0.271	0.221	0.245	0.146	0.176	0.429
chi2-statistic	.	.	.	.	304.742	352.005	.
rho	0.000	0.776	0.144	0.223	0.141	0.112	0.248

Marginal effects; Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A4.41. Impact of Cambodia HARVEST on Weight-To-Height Z-Scores of Children under 5 Years (CRE Models), Sample 1

Variables [Dependent variables are weight-to-height z-scores of children under 5]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	3.470 (1.96)	0.486 (0.68)	0.850 (1.16)	-0.031 (0.61)	1.175* (0.51)	4.151 (2.34)	0.440 (0.62)
New treatment variable-excludes dropouts	-20.991 (21.14)	0.000 (.)	0.000 (.)	0.170 (3.20)	-2.487 (1.67)	0.000 (.)	-3.741 (2.81)
Program effect (DID)	-1.005 (2.26)	0.510 (0.48)	1.422 (1.65)	0.584 (0.45)	0.323 (0.80)	-0.276 (2.79)	0.352 (0.56)
HH head gender (1=Male)	1.469 (3.39)	-1.225 (0.68)	-0.806 (1.87)	-0.647 (0.63)	-0.435 (0.78)		
Male children (1=Yes)	0.148 (1.33)	-0.395 (0.31)	0.286 (1.26)	0.199 (0.32)	-0.210 (0.51)	0.184 (1.72)	-0.219 (0.27)
1=children was ever breastfed	0.538 (4.26)	-0.092 (0.48)	-2.867 (2.71)	0.044 (0.55)	-0.356 (1.18)	0.304 (4.58)	-0.283 (0.49)
Child's age in months	0.380 (0.24)	0.014 (0.04)	-0.002 (0.19)	-0.010 (0.03)	0.127 (0.07)	0.398 (0.26)	0.043 (0.05)
Children's age squared	-0.007 (0.00)	-0.000 (0.00)	-0.001 (0.00)	-0.000 (0.00)	-0.002* (0.00)	-0.007 (0.00)	-0.001 (0.00)
Dependence ratio (proportion)	-1.697 (1.73)	-1.219 (1.02)	0.244 (0.90)	-0.776 (0.93)	-0.709 (0.51)	-1.687 (1.96)	0.279 (0.57)
Children age 5-15 years (#)	-0.763 (0.90)	-0.139 (0.37)	1.004 (1.42)	-0.523 (0.48)	-0.079 (0.40)	-1.865 (1.41)	-0.545 (0.73)
Log of daily per capita food consumption in Riels	-5.295 (8.98)	0.098 (0.55)	-0.671 (0.90)	0.433 (0.59)	-0.856 (1.90)	-5.536 (10.18)	0.796 (0.68)
HH reported receiving interventions from program other than HARVEST (1=Yes)	1.674 (1.68)	-0.909 (1.01)	-3.541* (1.76)	1.293 (1.10)	-0.262 (0.64)	1.870 (1.85)	0.585 (0.35)
Caregiver's age (Years)	-0.419 (0.46)	-0.181* (0.09)	0.230 (0.35)	-0.049 (0.14)	-0.177 (0.16)	-0.449 (0.48)	0.057 (0.11)
Caregiver's age square	0.003 (0.00)	0.002* (0.00)	-0.003 (0.00)	0.001 (0.00)	0.001 (0.00)	0.004 (0.01)	-0.001 (0.00)
The care giver is the HH head (1=Yes)	0.561 (2.26)	-0.636 (0.67)	-0.171 (2.46)	-0.235 (0.64)	-0.016 (0.63)	0.941 (2.53)	-1.023 (1.45)

Annex A4.41. cont.

Variables [Dependent variables are weight-to-height z-scores of children under 5]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Caregiver ever attended school (1=Yes)	-0.604 (2.37)	-0.215 (0.52)	0.275 (2.53)	-0.241 (0.50)	-0.024 (0.47)	0.069 (2.67)	-0.694 (0.69)
1=migrant HH	0.617 (1.32)	0.044 (0.67)	-1.263 (1.08)	-0.861 (0.90)	-0.385 (0.48)	0.498 (1.46)	0.641 (0.47)
number of male members participating in HARVEST interventions	-9.515 (5.59)	1.775 (2.62)	1.190 (2.96)	1.610 (1.79)	-2.280 (2.06)	-12.590* (5.81)	-2.135 (1.85)
number of female members participating in HARVEST interventions	-7.991 (5.42)	1.290 (2.36)	4.615 (3.62)	1.796 (2.02)	-1.698 (2.07)	-10.459 (5.43)	-2.345 (1.92)
number of HH members who participated in HARVEST activities	8.392 (5.18)	-2.873 (3.23)	-2.706 (3.06)	-2.206 (2.15)	1.915 (2.02)	10.773* (5.17)	2.109 (1.90)
number of HH members who participated as clients in HARVEST activities	5.995 (5.24)	-2.029 (2.85)	-1.293 (3.08)	-2.840 (2.80)	1.428 (1.94)	7.709 (6.37)	2.118 (2.65)
number of HH members who participated as demo leaders in HARVEST activities	5.438 (5.35)	-0.818 (2.34)	-0.263 (2.87)	0.000 (.)	2.764 (1.97)	7.105 (6.89)	2.027 (3.09)
1=HH was aquaculture client or demo beneficiary	3.828 (4.47)	9.340 (7.45)	-0.331 (3.83)	-3.062 (3.21)	1.500 (2.04)	4.669 (5.66)	0.454 (1.42)
1=HH was home garden client or demo beneficiary	0.419 (4.06)	2.350 (2.42)	2.328 (2.33)	0.819 (1.83)	1.646 (1.19)	0.333 (5.16)	-0.616 (1.49)
1=HH was rice client or demo beneficiary	0.132 (4.44)	-0.316 (1.56)	1.954 (3.15)	-4.459 (4.32)	-0.267 (1.29)	0.663 (5.31)	0.130 (1.31)
Number of years HH participated in HARVEST as a client	-1.852 (2.41)	0.250 (0.95)	-1.066 (2.12)	-1.222 (1.46)	-1.075 (0.94)	-1.592 (2.59)	-0.106 (0.60)
1=HH participated in HARVEST in 2011	1.392 (2.11)	0.000 (.)	0.990 (2.65)	0.000 (.)	0.620 (1.06)	0.715 (2.31)	1.140 (1.00)
1=HH participated in HARVEST in 2012	1.695 (2.23)	0.896 (2.25)	-2.588 (3.85)	0.426 (1.40)	0.996 (0.94)	2.225 (2.66)	0.375 (0.87)

Annex A4.41. cont.

Variables [Dependent variables are weight-to-height z-scores of children under 5]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
1=HH participated in HARVEST in 2013	0.522 (3.41)	0.140 (2.65)	2.024 (3.56)	1.280 (1.79)	0.444 (0.86)	-1.591 (3.77)	1.092 (0.84)
1=HH participated in HARVEST in 2014	2.284 (3.05)	-1.532 (1.82)	2.056 (2.60)	3.266 (3.24)	2.240 (1.64)	1.660 (3.64)	0.933 (1.45)
Propensity scores for nearest neighbor (nn4) method	4.567 (3.43)	-0.328 (1.20)	-1.813 (3.56)	0.967 (2.00)	0.246 (1.33)	5.143 (4.03)	-0.114 (1.15)
Constant	0.000 (.)	-6.790 (10.50)	-2.534 (17.46)	11.090 (13.01)	0.472 (6.83)	-17.782 (23.68)	1.110 (5.21)
Observations	336	335	321	351	1343	287	232
R-Square	0.138	0.224	0.256	0.122	0.113	0.157	0.417
chi2-statistic	.	.	.	.	154.921	.	.
rho	0.207	0.960	0.000	0.956	0.409	0.143	0.402

Marginal effects; Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A4.42. Impact of Cambodia HARVEST on Weight-To-Height Z-Scores of Children under 5 Years (CRE Models), Sample 2

Variables [Dependent variables are weight-to-height z-scores of children under 5]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	3.280 (1.87)	0.495 (0.63)	0.716 (1.08)	0.011 (0.57)	1.117* (0.49)	4.081 (2.30)	0.487 (0.57)
New treatment variable-includes dropouts	0.000 (.)	-6.141 (10.43)	0.000 (.)	0.005 (1.90)	-1.505 (1.30)	-21.327 (22.98)	0.748 (1.62)
Program effect (DID)	-1.310 (2.17)	0.478 (0.46)	1.480 (1.64)	0.599 (0.42)	0.241 (0.71)	-0.696 (2.59)	0.374 (0.53)
HH head gender (1=Male)	1.266 (3.17)	-1.215* (0.60)	-0.713 (1.80)	-0.384 (0.56)	-0.371 (0.73)		
Male children (1=Yes)	0.175 (1.22)	-0.372 (0.29)	0.319 (1.17)	-0.018 (0.26)	-0.201 (0.45)	0.172 (1.54)	-0.192 (0.24)
1=children was ever breastfed	0.287 (3.89)	-0.143 (0.44)	-2.799 (2.67)	-0.007 (0.46)	-0.398 (1.08)	-0.082 (4.12)	-0.390 (0.46)
Child's age in months	0.345 (0.21)	0.010 (0.04)	0.002 (0.19)	-0.013 (0.03)	0.109 (0.07)	0.370 (0.23)	0.046 (0.04)
Children's age squared	-0.006 (0.00)	-0.000 (0.00)	-0.001 (0.00)	0.000 (0.00)	-0.002 (0.00)	-0.007 (0.00)	-0.001 (0.00)
Dependence ratio (proportion)	-1.577 (1.63)	-1.063 (0.91)	0.144 (0.90)	-0.484 (0.64)	-0.641 (0.48)	-1.422 (1.76)	-0.059 (0.46)
Children age 5-15 years (#)	-0.680 (0.69)	-0.106 (0.35)	0.949 (1.36)	-0.567 (0.47)	-0.068 (0.37)	-1.617 (1.06)	-0.526 (0.70)
Log of daily per capita food consumption in Riels	-4.641 (8.05)	0.108 (0.54)	-0.499 (0.87)	0.086 (0.55)	-0.775 (1.77)	-4.989 (8.93)	0.772 (0.66)
HH reported receiving interventions from program other than HARVEST (1=Yes)	1.326 (1.54)	-0.837 (0.89)	-3.223 (1.68)	1.176 (1.03)	-0.171 (0.57)	1.741 (1.71)	0.592 (0.33)
Caregiver's age (Years)	-0.403 (0.44)	-0.181* (0.08)	0.207 (0.34)	0.021 (0.13)	-0.172 (0.15)	-0.445 (0.44)	0.059 (0.10)
Caregiver's age square	0.003 (0.00)	0.002* (0.00)	-0.003 (0.00)	0.000 (0.00)	0.001 (0.00)	0.003 (0.00)	-0.001 (0.00)

Annex A4.42. cont.

Variables [Dependent variables are weight-to-height z-scores of children under 5]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
The care giver is the HH head (1=Yes)	0.659 (2.14)	-0.636 (0.61)	-0.062 (2.52)	-0.297 (0.58)	0.054 (0.60)	1.002 (2.41)	-1.082 (1.25)
Caregiver ever attended school (1=Yes)	-0.620 (2.23)	-0.206 (0.50)	0.295 (2.52)	0.000 (0.47)	-0.057 (0.46)	-0.058 (2.57)	-0.717 (0.61)
1=migrant HH	0.534 (1.26)	0.198 (0.60)	-1.205 (1.06)	-0.530 (0.57)	-0.313 (0.41)	0.448 (1.37)	0.358 (0.40)
number of male members participating in HARVEST interventions	-9.370 (5.74)	1.717 (2.45)	1.169 (2.87)	2.369 (2.29)	-2.110 (2.06)	-11.851* (5.89)	-2.696 (1.64)
number of female members participating in HARVEST interventions	-8.060 (5.57)	1.106 (2.11)	4.436 (3.49)	2.210 (2.30)	-1.604 (2.09)	-10.254 (5.65)	-3.013 (1.70)
number of HH members who participated in HARVEST activities	8.463 (5.37)	-2.661 (3.01)	-2.638 (2.97)	-2.633 (2.53)	1.750 (2.03)	10.601 (5.42)	2.785 (1.66)
number of HH members who participated as clients in HARVEST activities	5.408 (4.58)	-2.080 (2.68)	-1.279 (2.99)	-2.926 (2.94)	1.359 (1.94)	7.412 (5.15)	3.101 (2.04)
number of HH members who participated as demo leaders in HARVEST activities	4.729 (4.35)	-0.958 (2.17)	-0.512 (2.81)	0.000 (.)	2.627 (1.96)	6.838 (5.02)	3.029 (2.43)
1=HH was aquaculture client or demo beneficiary	4.760 (3.43)	8.731 (6.95)	-0.059 (3.71)	-2.329 (2.78)	1.359 (1.75)	4.745 (3.77)	-0.294 (1.02)
1=HH was home garden client or demo beneficiary	1.602 (2.35)	2.769 (2.46)	1.593 (2.17)	0.513 (0.84)	1.555 (0.98)	0.872 (2.42)	-1.001 (0.96)
1=HH was rice client or demo beneficiary	0.820 (2.96)	-0.420 (1.34)	1.397 (2.99)	-1.593 (1.88)	-0.023 (1.00)	0.862 (3.33)	-0.320 (0.78)

Annex A4.42. cont.

Variables [Dependent variables are weight-to-height z-scores of children under 5]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Number of years HH participated in HARVEST as a client	-1.406 (2.15)	-0.007 (0.86)	-1.099 (2.14)	-0.957 (0.87)	-0.852 (0.78)	-1.634 (2.46)	-0.152 (0.48)
1=HH participated in HARVEST in 2011	1.217 (1.90)	0.000 (.)	1.595 (2.71)	0.000 (.)	0.378 (0.89)	0.757 (2.18)	0.946 (0.85)
1=HH participated in HARVEST in 2012	0.104 (1.95)	1.478 (2.21)	-3.358 (2.96)	0.920 (1.00)	0.696 (0.78)	2.176 (2.46)	0.076 (0.62)
1=HH participated in HARVEST in 2013	0.442 (3.16)	0.259 (1.75)	3.354 (3.77)	1.184 (1.09)	0.696 (0.67)	1.612 (3.41)	1.221 (0.67)
1=HH participated in HARVEST in 2014	2.321 (2.54)	-1.395 (1.51)	2.281 (2.56)	2.386 (2.09)	1.665 (1.24)	1.597 (2.84)	0.634 (1.07)
Propensity scores for nearest neighbor (nn4) method	4.264 (3.55)	-0.327 (1.18)	-2.651 (3.67)	1.554 (1.84)	0.347 (1.35)	4.338 (4.16)	-0.526 (1.10)
Constant	-17.431 (19.09)	0.000 (.)	0.000 (.)	8.625 (10.13)	0.757 (5.87)	0.000 (.)	3.038 (4.94)
Observations	352	368	334	432	1486	302	253
R-Square	0.130	0.214	0.247	0.091	0.110	0.151	0.416
chi2-statistic	.	.	.	.	118.860	.	.
rho	0.194	0.958	0.000	0.950	0.388	0.131	0.334

Marginal effects; Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

**ANNEX 5. RESULTS OF PSM-DID REGRESSIONS
FIXED EFFECT MODELS FOR SAMPLE 1 AND 2**

Annex A5.1. Impact of Cambodia HARVEST on Volume of Rice Production per Household in Tons (FE Models), Sample 1

Variables [Dependent variables are volume of rice production per household in tons]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	2.734 (2.33)	0.014 (1.49)	-1.696 (1.45)	-0.129 (0.54)	-1.189 (0.98)	-1.345 (1.31)	-0.089 (1.26)
New treatment variable-excludes dropouts	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
Program effect (DID)	-0.373 (2.07)	-0.907 (1.09)	1.057 (1.14)	0.384 (0.57)	0.718 (0.70)	0.623 (0.83)	0.318 (1.05)
HH head gender (1=Male)	1.867 (2.45)	2.560 (1.44)	0.605 (1.43)	1.052 (1.15)	1.602 (0.82)		
Household size (# of people)	-1.173 (0.85)	0.780 (0.47)	-0.084 (0.68)	0.033 (0.36)	0.362 (0.36)	0.408 (0.43)	0.064 (0.37)
Head's age (years)	0.269 (0.65)	0.381 (0.41)	0.389 (0.31)	-0.273 (0.23)	0.492* (0.21)	0.255 (0.34)	0.477 (0.38)
Head's age squared	-0.003 (0.01)	-0.003 (0.00)	-0.004 (0.00)	0.003 (0.00)	-0.005* (0.00)	-0.003 (0.00)	-0.005 (0.00)
HH head education (# of years)	0.394 (0.22)	0.011 (0.08)	-0.016 (0.08)	0.012 (0.06)	0.085 (0.06)	0.132 (0.08)	0.054 (0.07)
Log of household durable assets in Riels	2.403 (1.47)	0.925 (0.80)	1.248 (0.85)	0.410 (0.39)	0.923 (0.47)	1.167* (0.58)	0.494 (0.48)
Own Tractor	-1.145 (3.00)	-4.865 (2.59)	-3.161* (1.28)	0.052 (0.69)	-3.522** (0.93)	-4.058** (1.10)	-1.059 (0.90)
Log of area in hectares	25.374** (3.10)	11.160** (2.76)	14.509** (1.80)	8.655** (0.79)	16.717** (1.51)	18.070** (1.73)	8.326** (1.40)
Log of real rice input costs in Riels per hectare (Millions)	7.771** (2.29)	1.168* (0.57)	0.864 (0.67)	0.938** (0.29)	1.944** (0.51)	2.151** (0.64)	0.816 (0.42)
Total agricultural plots	0.160 (1.40)	0.135 (0.62)	-0.909 (0.74)	0.625 (0.70)	-0.151 (0.41)	0.202 (0.47)	-0.678 (0.67)
total number of plots owned by the HH	1.373 (1.67)	0.182 (0.52)	2.518* (1.01)	-0.172 (0.54)	0.263 (0.53)	0.574 (0.58)	0.519 (0.83)

Annex A5.1. cont.

Variables [Dependent variables are volume of rice production per household in tons]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
1=HH grow dry season rice	-6.210*	-1.033	1.265	-0.288	-3.739**	-4.159**	3.621
	(2.46)	(1.71)	(0.94)	(0.69)	(1.08)	(1.14)	(2.38)
1=HH grow wet season rice	-3.049	-5.540	-3.051	-2.238	-2.578	-0.289	-1.259
	(4.83)	(4.27)	(1.91)	(1.40)	(2.40)	(3.18)	(2.62)
Constant	-138.155**	-36.464**	-37.155**	-10.612	-50.693**	-52.813**	-26.179*
	(36.59)	(14.08)	(12.26)	(7.49)	(9.91)	(14.36)	(11.46)
Observations	646	681	803	621	2751	2311	440
p-value of F-statistic	0.000	0.000	.	0.000	0.000	0.000	0.000
rho	0.499	0.519	0.562	0.467	0.518	0.518	0.746

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A5.2. Impact of Cambodia HARVEST on Volume of Rice Production per Household in Tons (FE Models), Sample 2

Variables [Dependent variables are volume of rice production per household in tons]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	2.675 (2.30)	0.016 (1.41)	-1.579 (1.27)	0.354 (0.60)	-0.821 (0.92)	-0.874 (1.21)	0.255 (1.24)
New treatment variable-includes dropouts	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
Program effect (DID)	-0.807 (2.02)	-0.904 (1.06)	1.095 (1.19)	-0.204 (0.59)	0.203 (0.68)	0.084 (0.80)	0.057 (1.01)
HH head gender (1=Male)	1.775 (2.43)	1.533 (1.21)	-0.748 (0.76)	0.666 (0.87)	0.761 (0.73)		
Household size (# of people)	-0.964 (0.83)	0.674 (0.45)	-0.349 (0.18)	-0.055 (0.29)	0.325 (0.34)	0.332 (0.40)	0.169 (0.34)
Head's age (years)	0.146 (0.63)	0.278 (0.37)	0.157 (0.16)	-0.431* (0.21)	0.326 (0.19)	0.049 (0.31)	0.481 (0.35)
Head's age squared	-0.002 (0.01)	-0.003 (0.00)	-0.002 (0.00)	0.004 (0.00)	-0.004 (0.00)	-0.001 (0.00)	-0.005 (0.00)
HH head education (# of years)	0.345 (0.20)	0.049 (0.08)	-0.056 (0.07)	0.024 (0.05)	0.104* (0.05)	0.143* (0.07)	0.074 (0.06)
Log of household durable assets in Riels	2.364 (1.39)	0.818 (0.78)	0.679 (0.64)	0.363 (0.33)	0.738 (0.43)	0.950 (0.53)	0.666 (0.45)
Own Tractor	-1.283 (2.84)	-4.508 (2.44)	-1.052 (0.92)	0.228 (0.53)	-3.006** (0.85)	-3.567** (1.00)	-1.117 (0.87)
Log of area in hectares	25.181** (3.00)	11.758** (2.72)	15.754** (1.44)	7.925** (0.74)	16.187** (1.42)	17.572** (1.63)	7.472** (1.39)
Log of real rice input costs in Riels per hectare (Millions)	8.012** (2.11)	1.008 (0.56)	2.542** (0.54)	0.891** (0.25)	1.861** (0.45)	1.966** (0.56)	0.825 (0.42)
Total agricultural plots	0.027 (1.39)	-0.061 (0.61)	-1.113 (0.84)	0.521 (0.58)	-0.231 (0.39)	0.039 (0.45)	-0.452 (0.66)
total number of plots owned by the HH	0.999 (1.63)	0.181 (0.51)	1.095 (0.78)	0.007 (0.47)	0.342 (0.50)	0.650 (0.55)	0.326 (0.81)

Annex A5.2. cont.

Variables [Dependent variables are volume of rice production per household in tons]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
1=HH grow dry season rice	-6.661** (2.40)	-0.768 (1.68)	2.091* (0.86)	-0.467 (0.95)	-3.606** (1.03)	-4.173** (1.10)	4.015* (1.96)
1=HH grow wet season rice	-3.635 (4.77)	-5.569 (4.18)	6.287* (2.55)	-1.466 (1.08)	-1.325 (2.05)	0.314 (2.63)	0.358 (2.19)
Constant	-135.958** (34.54)	-29.419* (12.76)	-56.548** (9.53)	-5.615 (6.63)	-45.149** (8.95)	-44.384** (12.92)	-27.731** (10.47)
Observations	682	739	815	809	3045	2557	488
p-value of F-statistic	0.000	0.000	.	0.000	0.000	0.000	0.000
rho	0.483	0.514	0.153	0.468	0.515	0.513	0.746

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A5.3. Impact of Cambodia HARVEST on Rice Net Income per Household in Million Riels (FE Models), Sample 1

Variables [Dependent variables are real rice net income per household in million Riels]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	0.273 (0.98)	-0.052 (0.54)	-0.471 (0.61)	-0.215 (0.30)	-0.464 (0.40)	-0.532 (0.55)	-0.613 (0.54)
New treatment variable-excludes dropouts	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
Program effect (DID)	0.066 (0.81)	-0.101 (0.39)	-0.228 (0.51)	0.412 (0.32)	0.144 (0.27)	0.180 (0.32)	0.144 (0.45)
HH head gender (1=Male)	1.202 (1.35)	1.014* (0.52)	0.578 (0.53)	0.751 (0.56)	0.785* (0.35)		
Household size (# of people)	-0.288 (0.37)	0.235 (0.15)	-0.216 (0.28)	-0.041 (0.22)	0.057 (0.15)	0.069 (0.18)	-0.061 (0.17)
Head's age (years)	-0.063 (0.30)	0.143 (0.16)	0.144 (0.13)	-0.209 (0.13)	0.111 (0.09)	0.029 (0.15)	0.063 (0.15)
Head's age squared	-0.000 (0.00)	-0.001 (0.00)	-0.001 (0.00)	0.002 (0.00)	-0.001 (0.00)	-0.001 (0.00)	-0.001 (0.00)
HH head education (# of years)	0.126 (0.09)	-0.013 (0.03)	-0.009 (0.03)	0.004 (0.03)	0.028 (0.02)	0.032 (0.03)	0.033 (0.03)
Log of household durable assets in Riels	1.216* (0.56)	0.461 (0.34)	0.664 (0.38)	0.254 (0.22)	0.580** (0.19)	0.702** (0.24)	0.455 (0.24)
Own Tractor	-0.484 (1.14)	-2.078 (1.08)	-0.854 (0.54)	0.195 (0.36)	-1.248** (0.38)	-1.416** (0.44)	-0.488 (0.45)
Log of area in hectares	7.011** (1.39)	2.936** (1.07)	4.013** (0.73)	3.145** (0.46)	4.849** (0.61)	5.188** (0.71)	2.792** (0.74)
Log of real rice input costs in Riels per hectare (Millions)	-0.245 (1.00)	-0.124 (0.21)	-0.653* (0.30)	-0.099 (0.17)	-0.181 (0.20)	-0.247 (0.25)	-0.128 (0.18)
Total agricultural plots	0.822 (0.70)	0.177 (0.27)	-0.226 (0.26)	0.368 (0.40)	0.104 (0.17)	0.270 (0.19)	-0.423 (0.34)
total number of plots owned by the HH	0.530 (0.74)	0.100 (0.20)	0.748* (0.33)	-0.033 (0.31)	0.120 (0.19)	0.217 (0.20)	0.559 (0.38)

Annex A5.3. cont.

Variables [Dependent variables are real rice net income per household in million Riels]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
1=HH grow dry season rice	-2.445*	-0.051	-0.232	-0.078	-1.447**	-1.663**	0.538
	(1.08)	(0.58)	(0.42)	(0.38)	(0.46)	(0.49)	(0.77)
1=HH grow wet season rice	-1.253	-1.674	-0.329	-1.181	-1.207	0.044	-2.627*
	(1.96)	(2.21)	(0.74)	(0.84)	(1.05)	(1.35)	(1.17)
Constant	-4.141	-6.256	1.170	4.188	-3.746	-2.625	0.469
	(15.79)	(5.16)	(5.55)	(4.39)	(3.99)	(5.88)	(4.43)
Observations	646	681	803	621	2751	2311	440
p-value of F-statistic	0.000	0.000	.	0.000	0.000	0.000	0.000
rho	0.588	0.516	0.536	0.477	0.557	0.567	0.709

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A5.4. Impact of Cambodia HARVEST on Rice Net Income per Household in Million Riels (FE Models), Sample 2

Variables [Dependent variables are real rice net income per household in million Riels]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	0.295 (0.97)	-0.108 (0.52)	-0.481 (0.60)	0.043 (0.32)	-0.360 (0.38)	-0.401 (0.51)	-0.507 (0.51)
New treatment variable-includes dropouts	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
Program effect (DID)	-0.103 (0.78)	-0.108 (0.37)	-0.209 (0.51)	0.124 (0.33)	0.008 (0.26)	0.036 (0.31)	0.088 (0.44)
HH head gender (1=Male)	1.166 (1.33)	0.613 (0.43)	0.510 (0.51)	0.674 (0.44)	0.559 (0.30)		
Household size (# of people)	-0.243 (0.36)	0.198 (0.15)	-0.185 (0.27)	-0.093 (0.18)	0.048 (0.14)	0.045 (0.17)	0.024 (0.15)
Head's age (years)	-0.128 (0.29)	0.111 (0.15)	0.142 (0.13)	-0.266* (0.12)	0.061 (0.08)	-0.025 (0.13)	0.110 (0.14)
Head's age squared	0.000 (0.00)	-0.001 (0.00)	-0.001 (0.00)	0.003* (0.00)	-0.001 (0.00)	-0.000 (0.00)	-0.001 (0.00)
HH head education (# of years)	0.115 (0.08)	0.007 (0.03)	-0.006 (0.03)	0.005 (0.02)	0.033 (0.02)	0.035 (0.03)	0.037 (0.03)
Log of household durable assets in Riels	1.154* (0.53)	0.395 (0.34)	0.668 (0.37)	0.195 (0.18)	0.493** (0.18)	0.590** (0.22)	0.566* (0.23)
Own Tractor	-0.527 (1.09)	-1.911 (1.02)	-0.839 (0.53)	0.204 (0.29)	-1.083** (0.34)	-1.268** (0.40)	-0.572 (0.44)
Log of area in hectares	6.949** (1.34)	3.291** (1.08)	3.978** (0.73)	2.805** (0.40)	4.720** (0.57)	5.081** (0.67)	2.451** (0.68)
Log of real rice input costs in Riels per hectare (Millions)	-0.031 (0.91)	-0.202 (0.21)	-0.664* (0.29)	-0.101 (0.15)	-0.174 (0.18)	-0.242 (0.22)	-0.145 (0.18)
Total agricultural plots	0.777 (0.70)	0.081 (0.27)	-0.216 (0.26)	0.270 (0.32)	0.067 (0.16)	0.201 (0.18)	-0.305 (0.33)
total number of plots owned by the HH	0.405 (0.72)	0.104 (0.19)	0.747* (0.33)	0.062 (0.26)	0.149 (0.18)	0.244 (0.19)	0.452 (0.37)

Annex A5.4. cont.

Variables [Dependent variables are real rice net income per household in million Riels]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
1=HH grow dry season rice	-2.712*	0.026	-0.186	-0.130	-1.455**	-1.711**	0.650
	(1.06)	(0.57)	(0.40)	(0.49)	(0.44)	(0.47)	(0.67)
1=HH grow wet season rice	-1.462	-1.685	-0.369	-0.820	-0.840	0.007	-1.383
	(1.95)	(2.21)	(0.71)	(0.64)	(0.88)	(1.11)	(1.32)
Constant	-4.441	-3.605	1.264	5.932	-2.544	-0.913	-1.768
	(14.82)	(4.88)	(5.53)	(3.79)	(3.60)	(5.31)	(4.11)
Observations	682	739	815	809	3045	2557	488
p-value of F-statistic	0.000	0.000	.	0.000	0.000	0.000	0.000
rho	0.575	0.504	0.537	0.480	0.554	0.561	0.707

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A5.5. Impact of Cambodia HARVEST on Value of Rice Production per Household in Million Riels (FE Models), Sample 1

Variables [Dependent variables are real value of rice production per household in million Riels]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	0.641 (11.93)	-3.451 (7.46)	-14.175 (8.16)	-4.341 (3.37)	-13.180* (5.25)	-14.734* (7.12)	-8.039 (6.91)
New treatment variable-excludes dropouts	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
Program effect (DID)	3.686 (9.85)	-2.603 (5.33)	2.421 (6.60)	3.251 (3.78)	5.045 (3.55)	4.863 (4.14)	3.555 (5.74)
HH head gender (1=Male)	11.227 (14.32)	13.141 (7.43)	4.214 (7.78)	8.674 (6.65)	9.439* (4.45)		
Household size (# of people)	-6.093 (4.45)	3.786 (2.24)	-0.601 (3.71)	-0.211 (2.48)	1.538 (1.83)	1.620 (2.18)	-0.174 (2.13)
Head's age (years)	0.304 (3.52)	1.579 (2.20)	2.409 (1.74)	-2.725 (1.44)	2.344* (1.14)	1.160 (1.87)	1.634 (1.89)
Head's age squared	-0.010 (0.03)	-0.013 (0.02)	-0.022 (0.02)	0.027 (0.02)	-0.026* (0.01)	-0.016 (0.02)	-0.016 (0.02)
HH head education (# of years)	2.076 (1.20)	-0.129 (0.43)	-0.048 (0.46)	0.000 (0.36)	0.372 (0.31)	0.558 (0.42)	0.430 (0.39)
Log of household durable assets in Riels	11.130 (6.84)	6.259 (4.50)	7.657 (4.75)	3.161 (2.62)	5.731* (2.43)	7.195* (2.98)	4.601 (2.92)
Own Tractor	-5.783 (14.69)	-27.761 (14.70)	-15.956* (7.23)	0.405 (4.43)	-17.549** (4.99)	-20.424** (5.87)	-6.811 (5.52)
Log of area in hectares	136.188** (18.00)	56.292** (14.93)	82.353** (10.06)	53.528** (5.36)	91.932** (8.56)	98.940** (9.83)	50.209* (9.63)
Log of real rice input costs in Riels per hectare (Millions)	41.976** (12.66)	7.169* (2.95)	6.303 (3.67)	6.558** (1.86)	11.792** (2.78)	13.018** (3.52)	5.480* (2.58)
Total agricultural plots	2.518 (7.99)	2.158 (3.81)	-4.534 (4.18)	3.880 (4.81)	-0.292 (2.37)	1.922 (2.71)	-5.565 (4.02)
total number of plots owned by the HH	6.202 (8.96)	0.885 (2.81)	14.107* (5.79)	-0.271 (3.68)	1.876 (2.93)	3.638 (3.18)	5.056 (5.03)

Annex A5.5. cont.

Variables [Dependent variables are real value of rice production per household in million Riels]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
1=HH grow dry season rice	-23.590 (12.21)	-2.298 (7.70)	6.124 (5.28)	-3.727 (4.24)	-14.246** (5.33)	-16.554** (5.60)	16.067 (13.07)
1=HH grow wet season rice	5.780 (29.69)	-23.571 (16.59)	-10.772 (10.36)	-17.131 (9.75)	-10.193 (13.55)	7.903 (16.61)	-18.881 (15.37)
Constant	-721.454** (208.39)	-197.401** (69.12)	-237.083** (68.86)	-50.017 (47.61)	-283.730** (54.16)	-303.499** (78.58)	-122.927* (60.51)
Observations	646	681	803	621	2751	2311	440
p-value of F-statistic	0.000	0.000	.	0.000	0.000	0.000	0.000
rho	0.558	0.525	0.583	0.493	0.562	0.567	0.763

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A5.6. Impact of Cambodia HARVEST on Value of Rice Production per Household in Million Riels (FE Models), Sample 2

Variables [Dependent variables are real value of rice production per household in million Riels]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	0.278 (11.83)	-3.968 (7.11)	-14.170 (8.12)	-1.691 (3.67)	-11.452* (4.96)	-12.461 (6.58)	-1.377 (1.13)
New treatment variable-includes dropouts	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
Program effect (DID)	1.780 (9.58)	-2.346 (5.15)	2.624 (6.57)	0.191 (3.93)	2.922 (3.41)	2.732 (3.98)	1.060 (0.92)
HH head gender (1=Male)	11.072 (14.20)	7.972 (6.13)	3.339 (7.52)	6.510 (5.12)	5.502 (3.92)		
Household size (# of people)	-5.043 (4.30)	3.199 (2.16)	-0.349 (3.62)	-0.530 (1.97)	1.405 (1.72)	1.313 (2.06)	-1.219** (0.26)
Head's age (years)	-0.334 (3.46)	1.125 (2.03)	2.394 (1.73)	-3.470** (1.30)	1.557 (1.05)	0.212 (1.71)	0.446 (0.32)
Head's age squared	-0.004 (0.03)	-0.010 (0.02)	-0.022 (0.02)	0.034* (0.01)	-0.018 (0.01)	-0.007 (0.02)	-0.004 (0.00)
HH head education (# of years)	1.773 (1.11)	0.103 (0.42)	0.059 (0.45)	0.009 (0.26)	0.451 (0.28)	0.570 (0.38)	0.121* (0.05)
Log of household durable assets in Riels	11.053 (6.51)	5.461 (4.45)	7.458 (4.68)	2.581 (2.15)	4.753* (2.23)	6.016* (2.72)	0.980* (0.48)
Own Tractor	-6.063 (13.90)	-25.772 (13.81)	-15.553* (7.10)	1.521 (3.39)	-15.116** (4.53)	-18.131** (5.34)	-0.819 (0.91)
Log of area in hectares	134.939* (17.42)	60.795** (14.96)	82.122** (9.95)	49.266** (4.69)	89.410** (8.03)	96.508** (9.28)	8.493** (1.42)
Log of real rice input costs in Riels per hectare (Millions)	43.253** (11.67)	6.175* (2.94)	6.249 (3.62)	6.070** (1.59)	11.277** (2.49)	11.963** (3.09)	1.406** (0.52)
Total agricultural plots	1.898 (7.91)	0.923 (3.80)	-4.439 (4.17)	2.800 (3.91)	-0.793 (2.29)	0.938 (2.61)	-0.446 (0.58)
total number of plots owned by the HH	4.401 (8.73)	0.890 (2.71)	14.091* (5.76)	0.908 (3.11)	2.233 (2.77)	3.916 (3.02)	0.278 (0.77)

Annex A5.6. cont.

Variables [Dependent variables are real value of rice production per household in million Riels]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
1=HH grow dry season rice	-26.545*	-0.969	6.828	-3.710	-13.931**	-16.894**	2.702
	(11.97)	(7.55)	(5.12)	(5.67)	(5.09)	(5.41)	(1.80)
1=HH grow wet season rice	2.162	-23.819	-11.388	-11.576	-5.984	6.573	-0.944
	(29.66)	(16.32)	(9.91)	(7.17)	(11.25)	(13.73)	(2.48)
Constant	-710.685**	-161.086*	-236.846**	-24.063	-254.088**	-256.936**	-26.227*
	(196.41)	(62.99)	(68.69)	(41.04)	(48.75)	(70.57)	(10.45)
Observations	682	739	815	809	3045	2557	488
p-value of F-statistic	0.000	0.000	.	0.000	0.000	0.000	0.000
rho	0.545	0.528	0.583	0.498	0.560	0.562	0.738

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A5.7. Impact of Cambodia HARVEST on Rice Yield in Tons per Hectare (FE Models), Sample 1

Variables [Dependent variables are rice yield in tons per hectare]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	0.530** (0.16)	0.473** (0.16)	0.465* (0.18)	0.293 (0.16)	0.417** (0.08)	0.431** (0.09)	0.240 (0.25)
New treatment variable-excludes dropouts	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
Program effect (DID)	-0.024 (0.15)	-0.154 (0.13)	-0.324* (0.13)	0.077 (0.13)	-0.108 (0.07)	-0.150* (0.07)	-0.114 (0.20)
HH head gender (1=Male)	0.264 (0.26)	0.153 (0.20)	0.132 (0.22)	0.384 (0.25)	0.193 (0.11)		
Household size (# of people)	-0.008 (0.06)	0.119* (0.05)	-0.095 (0.07)	-0.051 (0.08)	0.018 (0.04)	0.024 (0.04)	-0.081 (0.09)
Head's age (years)	-0.004 (0.05)	0.032 (0.05)	-0.051 (0.05)	-0.067 (0.07)	-0.008 (0.03)	-0.016 (0.04)	0.016 (0.08)
Head's age squared	-0.000 (0.00)	-0.000 (0.00)	0.000 (0.00)	0.001 (0.00)	0.000 (0.00)	0.000 (0.00)	-0.000 (0.00)
HH head education (# of years)	-0.001 (0.02)	-0.000 (0.01)	0.016 (0.01)	0.006 (0.01)	0.006 (0.01)	-0.001 (0.01)	0.026 (0.02)
Log of household durable assets in Riels	0.089 (0.09)	-0.043 (0.08)	0.094 (0.08)	0.160 (0.09)	0.080 (0.04)	0.057 (0.05)	0.222 (0.14)
Own Tractor	0.024 (0.21)	-0.002 (0.14)	0.192 (0.12)	0.170 (0.13)	0.014 (0.07)	0.046 (0.08)	0.026 (0.23)
Log of area in hectares	-0.301* (0.15)	-0.409* (0.17)	-0.594** (0.19)	-0.416* (0.17)	-0.425** (0.09)	-0.404** (0.09)	-0.339 (0.26)
Log of real rice input costs in Riels per hectare (Millions)	0.766** (0.14)	0.444** (0.09)	0.223 (0.13)	0.384** (0.11)	0.449** (0.06)	0.463** (0.07)	0.252 (0.15)
Total agricultural plots	0.013 (0.13)	0.054 (0.06)	0.065 (0.06)	0.236* (0.10)	0.103** (0.04)	0.122** (0.04)	-0.029 (0.14)
total number of plots owned by the HH	0.136 (0.15)	0.014 (0.06)	-0.011 (0.07)	-0.153 (0.10)	-0.042 (0.04)	-0.023 (0.05)	0.041 (0.17)

Annex A5.7. cont.

Variables [Dependent variables are rice yield in tons per hectare]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
1=HH grow dry season rice	-0.155 (0.16)	0.445 (0.23)	0.029 (0.13)	0.558* (0.25)	0.057 (0.09)	-0.021 (0.09)	0.893** (0.34)
1=HH grow wet season rice	-0.283 (0.28)	-1.321 (1.00)	0.311 (0.26)	-0.546 (0.56)	-0.680 (0.43)	-0.166 (0.28)	-2.568** (0.65)
Constant	-7.657** (2.10)	-4.543* (2.09)	1.227 (2.07)	-1.162 (2.19)	-2.993** (1.05)	-3.588** (1.23)	0.635 (2.87)
Observations	646	681	803	621	2751	2311	440
p-value of F-statistic	0.000	0.000	.	0.000	0.000	0.000	0.000
rho	0.514	0.499	0.617	0.413	0.568	0.598	0.596

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A5.8. Impact of Cambodia HARVEST on Rice Yield in Tons per Hectare (FE Models), Sample 2

Variables [Dependent variables are rice yield in tons per hectare]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	0.496** (0.16)	0.453** (0.15)	0.464* (0.18)	0.398* (0.16)	0.421** (0.08)	0.435** (0.09)	0.289 (0.24)
New treatment variable-includes dropouts	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
Program effect (DID)	-0.024 (0.15)	-0.177 (0.13)	-0.308* (0.13)	-0.045 (0.12)	-0.129* (0.06)	-0.170* (0.07)	-0.146 (0.19)
HH head gender (1=Male)	0.260 (0.27)	0.101 (0.17)	0.062 (0.22)	0.328 (0.20)	0.157 (0.10)		
Household size (# of people)	0.002 (0.06)	0.116* (0.05)	-0.083 (0.07)	-0.094 (0.07)	0.014 (0.03)	0.017 (0.04)	-0.026 (0.08)
Head's age (years)	-0.006 (0.05)	0.036 (0.05)	-0.051 (0.05)	-0.122* (0.06)	-0.019 (0.03)	-0.025 (0.03)	0.046 (0.08)
Head's age squared	0.000 (0.00)	-0.000 (0.00)	0.000 (0.00)	0.001* (0.00)	0.000 (0.00)	0.000 (0.00)	-0.000 (0.00)
HH head education (# of years)	0.004 (0.02)	0.005 (0.01)	0.018 (0.01)	0.008 (0.01)	0.010 (0.01)	0.002 (0.01)	0.032* (0.01)
Log of household durable assets in Riels	0.108 (0.09)	-0.015 (0.08)	0.092 (0.07)	0.131 (0.08)	0.078 (0.04)	0.057 (0.05)	0.255* (0.13)
Own Tractor	-0.090 (0.21)	0.022 (0.13)	0.196 (0.12)	0.114 (0.12)	0.007 (0.07)	0.025 (0.07)	-0.062 (0.23)
Log of area in hectares	-0.279 (0.14)	-0.390* (0.16)	-0.608** (0.19)	-0.478** (0.15)	-0.425** (0.08)	-0.409** (0.08)	-0.461 (0.24)
Log of real rice input costs in Riels per hectare (Millions)	0.804** (0.15)	0.432** (0.08)	0.216 (0.12)	0.385** (0.09)	0.452** (0.05)	0.467** (0.06)	0.223 (0.14)
Total agricultural plots	0.062 (0.13)	0.041 (0.05)	0.073 (0.06)	0.166 (0.09)	0.095* (0.04)	0.108** (0.04)	0.043 (0.14)
total number of plots owned by the HH	0.086 (0.15)	0.013 (0.06)	-0.012 (0.07)	-0.070 (0.10)	-0.030 (0.04)	-0.005 (0.04)	-0.023 (0.17)

Annex A5.8. cont.

Variables [Dependent variables are rice yield in tons per hectare]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
1=HH grow dry season rice	-0.234 (0.16)	0.467* (0.23)	0.056 (0.13)	0.506* (0.21)	0.036 (0.09)	-0.062 (0.09)	0.968** (0.34)
1=HH grow wet season rice	-0.389 (0.28)	-1.301 (0.99)	0.242 (0.26)	-0.304 (0.48)	-0.531 (0.38)	-0.288 (0.24)	-1.406 (1.09)
Constant	-8.067** (2.13)	-4.398* (1.99)	1.366 (2.06)	0.209 (1.84)	-2.894** (0.97)	-3.324** (1.15)	-1.018 (2.87)
Observations	682	739	815	809	3045	2557	488
p-value of F-statistic	0.000	0.000	.	0.000	0.000	0.000	0.000
rho	0.502	0.515	0.616	0.450	0.570	0.600	0.582

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A5.9. Impact of Cambodia HARVEST on Wet Season Rice Yield in Tons per Hectare (FE Models), Sample 1

Variables [Dependent variables are wet season rice yield in tons per hectare]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	0.539** (0.17)	0.448** (0.15)	0.451* (0.19)	0.156 (0.18)	0.400** (0.09)	0.409** (0.09)	0.204 (0.24)
New treatment variable-excludes dropouts	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
Program effect (DID)	-0.027 (0.16)	-0.166 (0.12)	-0.312* (0.13)	0.087 (0.13)	-0.124 (0.07)	-0.167* (0.07)	-0.119 (0.19)
HH head gender (1=Male)	0.189 (0.26)	0.033 (0.18)	0.238 (0.23)	0.338 (0.27)	0.169 (0.12)		
Household size (# of people)	-0.012 (0.06)	0.050 (0.05)	-0.090 (0.07)	-0.072 (0.09)	-0.013 (0.04)	-0.005 (0.04)	-0.090 (0.09)
Head's age (years)	-0.010 (0.05)	-0.015 (0.04)	-0.055 (0.05)	-0.098 (0.08)	-0.028 (0.03)	-0.041 (0.04)	-0.001 (0.08)
Head's age squared	0.000 (0.00)	0.000 (0.00)	0.000 (0.00)	0.001 (0.00)	0.000 (0.00)	0.000 (0.00)	0.000 (0.00)
HH head education (# of years)	0.004 (0.01)	-0.003 (0.01)	0.019 (0.01)	-0.003 (0.01)	0.003 (0.01)	-0.005 (0.01)	0.026* (0.01)
Log of household durable assets in Riels	0.063 (0.10)	0.008 (0.07)	0.131 (0.08)	0.066 (0.13)	0.081 (0.05)	0.054 (0.06)	0.266 (0.15)
Own Tractor	0.052 (0.22)	-0.079 (0.13)	0.161 (0.13)	0.414* (0.16)	0.044 (0.08)	0.085 (0.08)	0.000 (0.24)
Log of area in hectares	-0.249 (0.16)	-0.284 (0.16)	-0.609** (0.19)	-0.036 (0.32)	-0.345** (0.10)	-0.299** (0.10)	-0.343 (0.25)
Log of real rice input costs in Riels per hectare (Millions)	0.729** (0.15)	0.278** (0.07)	0.193 (0.13)	0.402** (0.11)	0.363** (0.05)	0.344** (0.06)	0.217 (0.15)
Total agricultural plots	0.075 (0.13)	0.017 (0.05)	0.062 (0.07)	0.168 (0.11)	0.089* (0.04)	0.106* (0.04)	-0.018 (0.11)
total number of plots owned by the HH	0.054 (0.14)	0.001 (0.06)	-0.020 (0.07)	-0.167 (0.12)	-0.067 (0.04)	-0.058 (0.05)	0.046 (0.16)
1=HH grow dry season rice	-0.193 (0.17)	-0.549* (0.21)	0.092 (0.14)	0.236 (0.23)	-0.142 (0.09)	-0.233* (0.09)	0.918** (0.33)
Constant	-7.135** (2.20)	-2.095 (1.51)	1.954 (2.12)	-1.119 (2.30)	-1.760 (0.96)	-1.335 (1.17)	-1.125 (2.88)
Observations	632	661	802	606	2701	2269	432
p-value of F-statistic	0.000	0.000	0.004	0.000	0.000	0.000	0.001
rho	0.516	0.538	0.586	0.447	0.587	0.617	0.553

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A5.10. Impact of Cambodia HARVEST on Wet Season Rice Yield in Tons per Hectare (FE Models), Sample 2

Variables [Dependent variables are wet season rice yield in tons per hectare]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	0.505** (0.16)	0.433** (0.14)	0.451* (0.19)	0.274 (0.16)	0.400** (0.08)	0.416** (0.09)	0.205 (0.23)
New treatment variable-includes dropouts	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
Program effect (DID)	-0.028 (0.15)	-0.177 (0.12)	-0.295* (0.13)	0.017 (0.12)	-0.132* (0.07)	-0.180* (0.07)	-0.112 (0.18)
HH head gender (1=Male)	0.185 (0.26)	0.007 (0.15)	0.155 (0.24)	0.225 (0.20)	0.120 (0.11)		
Household size (# of people)	-0.002 (0.06)	0.058 (0.05)	-0.080 (0.07)	-0.139* (0.07)	-0.015 (0.03)	-0.010 (0.04)	-0.054 (0.08)
Head's age (years)	-0.011 (0.05)	-0.010 (0.04)	-0.055 (0.05)	-0.144* (0.06)	-0.039 (0.03)	-0.051 (0.04)	0.024 (0.08)
Head's age squared	0.000 (0.00)	0.000 (0.00)	0.000 (0.00)	0.001* (0.00)	0.000 (0.00)	0.001 (0.00)	-0.000 (0.00)
HH head education (# of years)	0.008 (0.02)	0.004 (0.01)	0.021 (0.01)	-0.003 (0.01)	0.008 (0.01)	0.000 (0.01)	0.031* (0.01)
Log of household durable assets in Riels	0.083 (0.09)	0.018 (0.07)	0.128 (0.08)	0.071 (0.11)	0.080 (0.05)	0.047 (0.05)	0.320* (0.13)
Own Tractor	-0.060 (0.22)	-0.049 (0.12)	0.164 (0.13)	0.341* (0.13)	0.039 (0.07)	0.074 (0.08)	-0.077 (0.22)
Log of area in hectares	-0.229 (0.15)	-0.252 (0.16)	-0.620** (0.19)	-0.181 (0.24)	-0.342** (0.10)	-0.298** (0.10)	-0.422 (0.23)
Log of real rice input costs in Riels per hectare (Millions)	0.769** (0.15)	0.275** (0.07)	0.187 (0.13)	0.404** (0.09)	0.377** (0.05)	0.368** (0.06)	0.207 (0.15)
Total agricultural plots	0.123 (0.13)	0.006 (0.05)	0.070 (0.07)	0.079 (0.09)	0.082* (0.04)	0.097* (0.04)	0.006 (0.11)
total number of plots owned by the HH	0.005 (0.14)	0.003 (0.06)	-0.021 (0.07)	-0.044 (0.11)	-0.052 (0.04)	-0.039 (0.05)	0.022 (0.15)
1=HH grow dry season rice	-0.274 (0.17)	-0.535* (0.21)	0.124 (0.14)	0.224 (0.18)	-0.158 (0.09)	-0.270** (0.09)	0.764* (0.31)
Constant	-7.675** (2.21)	-2.136 (1.43)	2.028 (2.12)	0.351 (1.85)	-1.692 (0.90)	-1.454 (1.10)	-1.708 (2.76)
Observations	668	718	814	793	2988	2511	477
p-value of F-statistic	0.259	0.155	0.034	0.079	0.132	0.091	0.131
rho	0.504	0.542	0.585	0.494	0.587	0.616	0.568

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A5.11. Impact of Cambodia HARVEST on Dry Season Rice Yield in Tons per Hectare (FE Models), Sample 1

Variables [Dependent variables are dry season rice yield in tons per hectare]	Province				Overall	Head's gender Male
	BB	KT	PS	SR		
Year (1=2016)	0.416** (0.00)	-1.195 (1.24)	0.352 (0.58)	0.449 (1.18)	0.227 (0.45)	0.422 (0.48)
New treatment variable-excludes dropouts	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
Program effect (DID)	0.585** (0.00)	1.052 (1.01)	0.051 (0.37)	-0.297 (0.76)	-0.158 (0.37)	-0.279 (0.40)
HH head gender (1=Male)	10.015** (0.00)	0.000 (.)	-0.917 (0.83)	0.725 (1.58)	0.172 (0.52)	
Household size (# of people)	1.252** (0.00)	0.228 (0.40)	-0.268 (0.15)	0.280 (0.29)	0.048 (0.14)	-0.006 (0.16)
Head's age (years)	-0.251** (0.00)	0.985 (0.64)	0.008 (0.12)	-0.370 (0.51)	0.110 (0.10)	0.044 (0.13)
Head's age squared	0.000 (.)	-0.007 (0.00)	-0.000 (0.00)	0.003 (0.01)	-0.001 (0.00)	-0.001 (0.00)
HH head education (# of years)	0.000 (.)	0.267* (0.12)	-0.013 (0.04)	0.074 (0.05)	0.041 (0.03)	0.076 (0.04)
Log of household durable assets in Riels	0.000 (.)	0.739 (0.64)	0.103 (0.19)	0.424 (0.51)	0.046 (0.18)	0.156 (0.20)
Own Tractor	0.000 (.)	-0.053 (1.22)	-0.349 (0.33)	-0.593 (0.67)	-0.131 (0.36)	-0.266 (0.38)
Log of area in hectares	0.000 (.)	-0.695 (0.70)	-0.106 (0.45)	-0.911 (0.78)	-0.272 (0.37)	-0.292 (0.38)
Log of real rice input costs in Riels per hectare (Millions)	0.000 (.)	0.839 (0.57)	1.325* (0.62)	0.374 (0.43)	0.396 (0.26)	0.345 (0.29)
Total agricultural plots	0.000 (.)	0.276 (0.16)	0.210 (0.15)	0.285 (0.29)	0.109 (0.13)	0.109 (0.14)
total number of plots owned by the HH	0.000 (.)	-0.359 (0.66)	-0.164 (0.17)	-0.119 (0.46)	-0.082 (0.16)	-0.003 (0.17)
1=HH grow wet season rice	0.000 (.)	0.145 (1.68)	-1.773 (0.93)	-1.113 (0.95)	-0.239 (0.63)	0.235 (0.84)
Constant	-1.463** (0.00)	-41.029* (16.94)	-10.247 (9.12)	7.908 (14.99)	-5.062 (3.87)	-2.551 (4.93)
Observations	89	90	235	115	529	482
p-value of F-statistic	.	0.000	.	.	0.569	0.444
rho	.	0.936	0.669	0.544	0.613	0.607

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A5.12. Impact of Cambodia HARVEST on Dry Season Rice Yield in Tons per Hectare (FE Models), Sample 2

Variables [Dependent variables are dry season rice yield in tons per hectare]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	0.416** (0.00)	-1.426 (1.01)	0.471 (0.59)	0.750 (0.97)	0.310 (0.44)	0.432 (0.49)	1.028 (4.58)
New treatment variable-includes dropouts	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
Program effect (DID)	0.585** (0.00)	1.099 (0.87)	0.030 (0.39)	-0.332 (0.63)	-0.232 (0.37)	-0.355 (0.42)	2.802 (3.64)
HH head gender (1=Male)	10.015** (0.00)	0.000 (.)	-0.805 (0.82)	0.994* (0.45)	0.411 (0.46)		
Household size (# of people)	1.252** (0.00)	0.500 (0.35)	-0.186 (0.17)	0.251 (0.29)	0.100 (0.14)	-0.008 (0.16)	-0.804 (0.68)
Head's age (years)	-0.251** (0.00)	0.462 (0.50)	0.011 (0.13)	-0.340 (0.46)	0.129 (0.09)	0.098 (0.13)	3.073 (3.53)
Head's age squared	0.000 (.)	-0.002 (0.00)	-0.000 (0.00)	0.002 (0.00)	-0.001 (0.00)	-0.001 (0.00)	-0.027 (0.03)
HH head education (# of years)	0.000 (.)	0.231* (0.10)	-0.012 (0.04)	0.043 (0.03)	0.033 (0.02)	0.051 (0.03)	0.099 (0.06)
Log of household durable assets in Riels	0.000 (.)	0.508 (0.65)	0.106 (0.19)	0.281 (0.39)	0.024 (0.17)	0.124 (0.19)	1.161 (1.09)
Own Tractor	0.000 (.)	1.157 (1.13)	-0.247 (0.33)	-0.400 (0.51)	-0.126 (0.31)	-0.297 (0.35)	-2.294 (2.87)
Log of area in hectares	0.000 (.)	-0.598 (0.63)	-0.379 (0.49)	-1.492* (0.64)	-0.476 (0.37)	-0.445 (0.40)	-13.192** (3.52)
Log of real rice input costs in Riels per hectare (Millions)	0.000 (.)	0.854 (0.53)	1.198 (0.63)	0.234 (0.37)	0.322 (0.23)	0.272 (0.27)	-1.032 (1.10)
Total agricultural plots	0.000 (.)	0.190 (0.18)	0.255 (0.16)	0.275 (0.27)	0.096 (0.13)	0.073 (0.14)	-6.213** (1.57)
total number of plots owned by the HH	0.000 (.)	-0.425 (0.49)	-0.178 (0.17)	-0.201 (0.42)	-0.089 (0.16)	-0.015 (0.17)	1.507 (0.93)
1=HH grow wet season rice	0.000 (.)	0.241 (1.93)	-1.510 (0.94)	-0.034 (0.61)	0.036 (0.47)	0.097 (0.56)	9.477** (3.15)
Constant	-1.543** (0.00)	-27.881 (14.54)	-9.203 (9.10)	9.027 (13.89)	-4.933 (3.67)	-2.654 (4.97)	-41.286 (78.45)
Observations	92	95	241	144	572	511	61
p-value of F-statistic	.	0.000	.	0.000	0.251	0.447	.
rho	.	0.907	0.650	0.549	0.632	0.602	0.994

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A5.13. Impact of Cambodia HARVEST on Value of Rice Sales in Million Riels on Panel Sellers (FE Models), Sample 1

Variables [Dependent variables are real value of rice sales in million Riels]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	-0.430*	-1.291	-0.314*	-0.083	-0.673*	-0.326*	-0.564**
	(0.20)	(1.79)	(0.14)	(0.06)	(0.29)	(0.15)	(0.20)
New treatment variable-excludes dropouts	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)	(.)	(.)	(.)
Program effect (DID)	-0.157	3.536	-0.314**	-0.019	0.187	-0.213*	0.206
	(0.15)	(2.94)	(0.11)	(0.04)	(0.35)	(0.09)	(0.14)
HH head gender (1=Male)	0.063	17.852	-0.058	0.007	1.612		
	(0.30)	(14.46)	(0.17)	(0.06)	(1.59)		
Household size (# of people)	-0.132	-0.033	-0.290**	-0.067*	-0.160**	-0.155**	0.008
	(0.07)	(0.55)	(0.11)	(0.03)	(0.06)	(0.06)	(0.03)
Head's age (years)	0.060	-0.068	-0.029	-0.007	0.047	-0.046	0.008
	(0.07)	(0.43)	(0.03)	(0.02)	(0.05)	(0.05)	(0.04)
Head's age squared	-0.001	-0.004	0.000	0.000	-0.001	0.000	-0.000
	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
HH head education (# of years)	-0.014	0.092	0.021	-0.003	0.033	0.005	-0.004
	(0.02)	(0.08)	(0.01)	(0.01)	(0.03)	(0.01)	(0.01)
Log of household durable assets in Riels	0.274**	0.340	0.099	-0.029	0.140**	0.157**	0.065
	(0.10)	(0.53)	(0.06)	(0.03)	(0.05)	(0.05)	(0.06)
Own Tractor	0.137	-0.680	0.037	0.136*	-0.106	-0.207	0.048
	(0.27)	(1.28)	(0.08)	(0.06)	(0.19)	(0.20)	(0.07)
Log of area in hectares	1.175**	1.160	0.708**	0.273**	0.768**	0.989**	0.589**
	(0.32)	(0.72)	(0.18)	(0.07)	(0.24)	(0.21)	(0.21)
Log of real rice input costs in Riels per hectare (Millions)	0.571*	1.842	0.180*	0.090*	0.181	0.542*	0.274*
	(0.26)	(1.28)	(0.09)	(0.04)	(0.36)	(0.25)	(0.11)
Total agricultural plots	0.106	0.381	-0.053	0.025	0.088	0.151	-0.065
	(0.14)	(0.36)	(0.04)	(0.04)	(0.14)	(0.15)	(0.04)
total number of plots owned by the HH	0.069	-0.539	0.170*	-0.004	-0.013	-0.072	-0.100
	(0.15)	(0.47)	(0.07)	(0.04)	(0.16)	(0.16)	(0.10)
1=HH grow dry season rice	0.094	-1.828	-0.044	0.183	-0.054	-0.041	-0.039
	(0.17)	(1.53)	(0.09)	(0.13)	(0.11)	(0.10)	(0.14)
1=HH grow wet season rice	-1.213	1.941	0.309	0.000	-0.111	-0.828	0.000
	(0.79)	(1.68)	(0.21)	(.)	(0.82)	(0.58)	(.)

Annex A5.13 cont.

Variables [Dependent variables are real value of rice sales in million Riels]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Constant	-8.647*	-26.963	-1.086	-0.752	-4.513	-4.565	-3.380
	(4.27)	(21.29)	(1.82)	(0.71)	(2.60)	(2.64)	(1.95)
Observations	482	214	624	292	1612	1390	222
p-value of F-statistic	0.456	0.003	0.331	0.288	0.075	0.088	0.349
rho	0.489	0.763	0.604	0.583	0.385	0.890	0.659

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$; Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A5.14. Impact of Cambodia HARVEST on Value of Rice Sales in Million Riels on Panel Sellers (FE Models), Sample 2

Variables [Dependent variables are real value of rice sales in million Riels]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	-0.440*	-1.342	-0.305*	8.317	0.504	-0.306*	-0.569**
	(0.20)	(1.73)	(0.14)	(7.99)	(1.20)	(0.15)	(0.19)
New treatment variable-includes dropouts	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)	(.)	(.)	(.)
Program effect (DID)	-0.133	2.965	-0.307**	-3.956	-0.656	-0.181*	0.220
	(0.14)	(2.60)	(0.11)	(4.15)	(0.93)	(0.09)	(0.13)
HH head gender (1=Male)	0.071	14.420	-0.063	-34.551	-7.036		
	(0.30)	(12.06)	(0.16)	(32.39)	(8.45)		
Household size (# of people)	-0.118	-0.001	-0.282**	-3.129	-0.795	-0.147**	-0.017
	(0.07)	(0.46)	(0.11)	(2.97)	(0.64)	(0.05)	(0.03)
Head's age (years)	0.053	-0.331	-0.026	-0.213	-0.049	-0.045	0.007
	(0.07)	(0.41)	(0.03)	(1.22)	(0.14)	(0.04)	(0.04)
Head's age squared	-0.001	-0.001	0.000	0.002	0.000	0.000	-0.000
	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)
HH head education (# of years)	-0.009	0.145	0.024*	-0.092	0.032	0.004	0.007
	(0.02)	(0.12)	(0.01)	(0.26)	(0.04)	(0.01)	(0.01)
Log of household durable assets in Riels	0.266*	0.427	0.089	-5.423	-1.289	0.144**	0.029
	(0.11)	(0.49)	(0.06)	(5.00)	(1.39)	(0.04)	(0.06)
Own Tractor	0.121	-0.609	0.052	7.781	1.748	-0.192	0.070
	(0.27)	(1.15)	(0.08)	(7.11)	(1.81)	(0.19)	(0.07)
Log of area in hectares	1.155**	1.117	0.689**	-6.326	0.475	0.942**	0.651**
	(0.31)	(0.69)	(0.18)	(6.34)	(0.43)	(0.20)	(0.20)
Log of real rice input costs in Riels per hectare (Millions)	0.579*	1.524	0.165	4.076	0.951	0.514*	0.287**
	(0.23)	(1.15)	(0.09)	(3.81)	(0.86)	(0.24)	(0.11)
Total agricultural plots	0.119	0.287	-0.049	-1.436	-0.144	0.158	-0.054
	(0.14)	(0.32)	(0.04)	(1.96)	(0.28)	(0.14)	(0.04)
total number of plots owned by the HH	0.050	-0.558	0.167*	2.312	0.134	-0.082	-0.120
	(0.15)	(0.43)	(0.07)	(2.73)	(0.24)	(0.15)	(0.09)
1=HH grow dry season rice	0.061	-1.714	-0.052	-0.524	-0.452	-0.056	0.151
	(0.17)	(1.47)	(0.09)	(1.96)	(0.44)	(0.09)	(0.18)
1=HH grow wet season rice	-1.257	1.543	0.311	1.501	-0.727	-0.787	-0.131*
	(0.79)	(1.38)	(0.20)	(2.81)	(1.25)	(0.46)	(0.06)

Annex A5.14. cont.

Variables [Dependent variables are real value of rice sales in million Riels]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Constant	-8.574*	-14.292	-0.998	5.327	2.023	-4.257	-1.600
	(4.00)	(15.84)	(1.81)	(36.87)	(7.25)	(2.50)	(1.86)
Observations	498	232	634	358	1722	1476	246
p-value of F-statistic	0.000	.	.	1.000	0.083	0.000	.
rho	0.479	0.720	0.604	0.502	0.365	0.888	1.000

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A5.15. Impact of Cambodia HARVEST on Total Value of Vegetable Production per Household in Million Riels (FE Models), Sample 1

Variables [Dependent variables are real value of vegetable production per household in million Riels]	Province				Overall	Head's gender	
	KT	PS	PS	SR		Male	Female
Year (1=2016)	-0.503 (0.54)	0.065 (0.05)	0.074 (0.06)	0.196* (0.08)	0.043 (0.11)	-0.086 (0.18)	0.073 (0.08)
New treatment variable-excludes dropouts	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
Program effect (DID)	0.097 (0.62)	0.137 (0.07)	-0.021 (0.05)	0.097 (0.11)	0.175 (0.11)	0.271 (0.15)	0.149* (0.07)
HH head gender (1=Male)	-0.549 (0.46)	0.231* (0.09)	-0.071 (0.10)	-0.048 (0.26)	-0.193 (0.27)		
Household size (# of people)	-0.159 (0.16)	0.016 (0.05)	0.012 (0.04)	-0.130 (0.08)	-0.092 (0.07)	-0.131 (0.10)	0.013 (0.04)
HH head education (# of years)	-0.023 (0.04)	-0.015 (0.01)	0.002 (0.01)	0.006 (0.02)	-0.003 (0.01)	0.002 (0.01)	-0.013 (0.02)
Log of vegetable area in hectares	21.471 (11.06)	2.116** (0.53)	1.661* (0.80)	1.387* (0.61)	7.498 (4.58)	9.187 (5.54)	4.377** (1.48)
Log of vegetable production cost per hectare in Riels	0.015 (0.01)	0.009** (0.00)	0.009** (0.00)	0.016** (0.01)	0.023* (0.01)	0.024* (0.01)	0.021** (0.01)
Log of household durable assets in Riels	0.550 (0.54)	-0.057 (0.05)	-0.026 (0.04)	-0.014 (0.09)	0.167 (0.20)	0.246 (0.26)	-0.107 (0.08)
Total agricultural plots	0.114 (0.24)	0.048 (0.03)	0.045 (0.03)	-0.011 (0.08)	-0.011 (0.09)	-0.063 (0.13)	-0.029 (0.05)
total number of plots owned by the HH	-0.414 (0.38)	-0.013 (0.04)	-0.043 (0.04)	0.009 (0.10)	-0.073 (0.08)	-0.049 (0.09)	0.032 (0.07)
Own Tractor	-1.133 (0.91)	-0.008 (0.09)	0.064 (0.05)	0.290 (0.19)	-0.230 (0.26)	-0.334 (0.34)	0.214 (0.14)
Number of vegetable crop grown	-0.245 (0.18)	0.016 (0.01)	0.027** (0.01)	0.016 (0.03)	-0.064 (0.07)	-0.069 (0.09)	-0.053 (0.03)
Constant	2.676 (1.79)	-0.266 (0.32)	0.008 (0.28)	0.770 (0.60)	0.784 (0.61)	0.739 (0.60)	0.001 (0.22)
Observations	478	471	532	381	1862	1554	308
p-value of F-statistic	0.343	0.000	0.000	0.001	0.000	0.000	0.018
rho	0.434	0.458	0.466	0.571	0.360	0.388	0.439

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A5.16. Impact of Cambodia HARVEST on Total Value of Vegetable Production per Household in Million Riels (FE Models), Sample 2

Variables [Dependent variables are real value of vegetable production per household in million Riels]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	-0.440 (0.52)	0.066 (0.05)	0.075 (0.06)	0.158 (0.09)	0.037 (0.10)	-0.084 (0.16)	0.048 (0.07)
New treatment variable-includes dropouts	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
Program effect (DID)	0.164 (0.57)	0.135* (0.06)	-0.024 (0.05)	0.060 (0.12)	0.173 (0.11)	0.279 (0.15)	0.174* (0.07)
HH head gender (1=Male)	-0.346 (0.40)	0.202* (0.08)	-0.047 (0.10)	-0.093 (0.32)	-0.125 (0.23)		
Household size (# of people)	-0.151 (0.15)	0.006 (0.05)	0.012 (0.04)	-0.098 (0.09)	-0.081 (0.06)	-0.106 (0.08)	0.037 (0.04)
HH head education (# of years)	-0.014 (0.04)	-0.013 (0.01)	0.002 (0.01)	-0.003 (0.02)	-0.008 (0.01)	-0.008 (0.01)	-0.012 (0.01)
Log of vegetable area in hectares	21.032 (10.78)	2.273** (0.54)	1.653* (0.80)	1.834** (0.67)	7.116 (4.12)	8.593 (4.94)	3.299* (1.38)
Log of vegetable production cost per hectare in Riels	0.012 (0.01)	0.009** (0.00)	0.008** (0.00)	0.014** (0.01)	0.022** (0.01)	0.022* (0.01)	0.018** (0.00)
Log of household durable assets in Riels	0.447 (0.47)	-0.065 (0.05)	-0.027 (0.04)	0.046 (0.09)	0.160 (0.18)	0.227 (0.23)	-0.079 (0.06)
Total agricultural plots	0.099 (0.23)	0.046 (0.03)	0.044 (0.03)	0.008 (0.09)	-0.009 (0.08)	-0.040 (0.11)	-0.023 (0.05)
total number of plots owned by the HH	-0.388 (0.38)	-0.011 (0.04)	-0.044 (0.04)	0.049 (0.11)	-0.061 (0.07)	-0.054 (0.08)	0.027 (0.07)
Own Tractor	-0.985 (0.81)	0.039 (0.08)	0.068 (0.06)	0.119 (0.19)	-0.216 (0.24)	-0.302 (0.31)	0.063 (0.18)
Number of vegetable crops grown	-0.234 (0.17)	0.016 (0.01)	0.027** (0.01)	0.023 (0.03)	-0.060 (0.07)	-0.060 (0.08)	-0.047 (0.03)
Constant	2.278 (1.64)	-0.199 (0.30)	0.003 (0.28)	0.453 (0.62)	0.628 (0.52)	0.603 (0.53)	-0.049 (0.25)
Observations	516	517	538	503	2074	1722	352
p-value of F-statistic	0.386	0.000	0.000	0.000	0.000	0.000	0.025
rho	0.444	0.450	0.466	0.503	0.359	0.380	0.534

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A5.17. Impact of Cambodia HARVEST on Total Sales Value of All Vegetables in Million Riels (FE Models), Sample 1

Variables [Dependent variables are real value of sales of all vegetables in million Riels]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	-0.812 (1.28)	0.081 (0.08)	0.186 (0.11)	0.401* (0.16)	0.091 (0.21)	-0.124 (0.30)	-0.077 (0.17)
New treatment variable-excludes dropouts	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
Program effect (DID)	0.138 (1.52)	0.141 (0.09)	-0.131 (0.11)	-0.058 (0.21)	0.158 (0.22)	0.329 (0.29)	0.388 (0.20)
HH head gender (1=Male)	-0.512 (0.46)	0.330** (0.12)	0.106 (0.11)	-0.068 (0.55)	-0.242 (0.44)		
Household size (# of people)	-0.212 (0.23)	0.032 (0.06)	0.008 (0.05)	-0.173 (0.12)	-0.135 (0.10)	-0.185 (0.14)	0.007 (0.06)
HH head education (# of years)	-0.054 (0.06)	-0.018 (0.01)	0.006 (0.01)	0.004 (0.02)	-0.006 (0.01)	-0.001 (0.02)	-0.006 (0.02)
Log of vegetable area in hectares	23.821 (13.69)	1.977** (0.52)	1.522 (0.80)	1.684* (0.67)	7.174 (4.89)	8.963 (6.08)	4.747* (1.83)
Log of vegetable production cost per hectare in Riels	-0.002 (0.03)	0.011** (0.00)	0.018** (0.01)	0.052 (0.04)	0.026** (0.01)	0.023** (0.01)	0.050 (0.03)
Log of household durable assets in Riels	0.751 (0.79)	-0.060 (0.06)	-0.015 (0.06)	0.011 (0.13)	0.225 (0.27)	0.308 (0.34)	-0.158 (0.13)
Total agricultural plots	-0.189 (0.36)	0.056 (0.03)	0.060 (0.04)	0.010 (0.12)	-0.025 (0.14)	-0.112 (0.20)	-0.047 (0.07)
total number of plots owned by the HH	-0.288 (0.58)	-0.034 (0.05)	-0.060 (0.05)	-0.082 (0.14)	-0.062 (0.08)	-0.014 (0.11)	0.025 (0.11)
Own Tractor	-2.035 (1.69)	-0.020 (0.11)	0.033 (0.08)	0.241 (0.23)	-0.376 (0.40)	-0.489 (0.49)	0.381 (0.23)
Constant	2.480 (2.15)	-0.322 (0.43)	-0.138 (0.41)	0.877 (1.09)	0.711 (0.71)	0.720 (0.65)	-0.573 (0.59)
Observations	367	395	416	315	1493	1247	246
p-value of F-statistic	0.677	0.010	0.064	0.003	0.007	0.033	0.171
rho	0.399	0.439	0.412	0.816	0.332	0.357	0.357

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A5.18. Impact of Cambodia HARVEST on Total Sales Value of All Vegetables in Million Riels (FE Models), Sample 2

Variables [Dependent variables are real value of sales of all vegetables in million Riels]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	-0.696 (1.23)	0.080 (0.07)	0.190 (0.11)	0.365 (0.19)	0.087 (0.20)	-0.133 (0.28)	-0.133 (0.16)
New treatment variable-includes dropouts	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
Program effect (DID)	0.286 (1.39)	0.128 (0.08)	-0.136 (0.11)	-0.101 (0.24)	0.168 (0.22)	0.358 (0.29)	0.451* (0.19)
HH head gender (1=Male)	-0.339 (0.39)	0.295** (0.11)	0.126 (0.11)	0.212 (0.43)	-0.038 (0.34)		
Household size (# of people)	-0.200 (0.22)	0.023 (0.06)	0.008 (0.05)	-0.057 (0.13)	-0.113 (0.09)	-0.152 (0.12)	0.032 (0.06)
HH head education (# of years)	-0.037 (0.05)	-0.016 (0.01)	0.006 (0.01)	-0.006 (0.02)	-0.009 (0.01)	-0.013 (0.02)	-0.004 (0.01)
Log of vegetable area in hectares	23.074 (13.21)	2.081** (0.52)	1.520 (0.80)	2.057** (0.72)	6.788 (4.36)	8.330 (5.37)	3.573* (1.55)
Log of vegetable production cost per hectare in Riels	-0.012 (0.03)	0.009* (0.00)	0.018** (0.01)	0.053 (0.03)	0.025** (0.01)	0.022** (0.01)	0.037 (0.02)
Log of household durable assets in Riels	0.588 (0.67)	-0.055 (0.06)	-0.014 (0.05)	0.075 (0.11)	0.224 (0.24)	0.300 (0.31)	-0.073 (0.10)
Total agricultural plots	-0.184 (0.32)	0.051 (0.03)	0.058 (0.04)	0.067 (0.12)	-0.014 (0.11)	-0.068 (0.16)	-0.014 (0.07)
total number of plots owned by the HH	-0.276 (0.59)	-0.030 (0.05)	-0.061 (0.05)	-0.055 (0.15)	-0.058 (0.09)	-0.038 (0.10)	-0.026 (0.11)
Own Tractor	-1.608 (1.35)	-0.003 (0.10)	0.034 (0.08)	0.039 (0.22)	-0.355 (0.35)	-0.445 (0.43)	0.070 (0.28)
Constant	2.089 (2.04)	-0.252 (0.38)	-0.146 (0.41)	-0.278 (0.92)	0.390 (0.57)	0.555 (0.56)	-0.385 (0.49)
Observations	398	431	422	425	1676	1389	287
p-value of F-statistic	0.758	0.004	0.063	0.000	0.001	0.021	0.220
rho	0.399	0.434	0.415	0.755	0.331	0.349	0.355

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A5.19. Impact of Cambodia HARVEST on Vegetable Net Income per Household in Million Riels (FE Models), Sample 1

Variables [Dependent variables are real net vegetable income per household in million Riels]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	-0.565 (0.43)	0.107 (0.09)	-0.034 (0.10)	0.052 (0.18)	-0.080 (0.10)	-0.142 (0.16)	0.044 (0.09)
New treatment variable-excludes dropouts	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
Program effect (DID)	-0.112 (0.44)	-0.277** (0.10)	-0.186* (0.08)	-0.437 (0.32)	-0.143 (0.12)	-0.136 (0.16)	-0.104 (0.10)
HH head gender (1=Male)	-0.493 (0.29)	0.289 (0.19)	-0.345* (0.15)	0.236 (0.49)	-0.273 (0.20)		
Household size (# of people)	-0.280 (0.20)	-0.027 (0.06)	-0.045 (0.08)	-0.265 (0.19)	-0.159* (0.08)	-0.203 (0.11)	-0.084 (0.07)
HH head education (# of years)	-0.006 (0.04)	0.019 (0.02)	0.007 (0.01)	-0.011 (0.03)	0.004 (0.01)	0.008 (0.02)	-0.002 (0.03)
Log of vegetable area in hectares	11.934 (9.72)	-0.708 (0.71)	0.678 (1.64)	-2.590 (1.76)	2.580 (3.58)	3.302 (4.46)	-0.254 (0.88)
Log of vegetable production cost per hectare in Riels	-0.026* (0.01)	-0.011** (0.00)	-0.024** (0.01)	-0.032* (0.01)	-0.018** (0.00)	-0.020** (0.00)	-0.014** (0.00)
Log of household durable assets in Riels	0.548 (0.50)	-0.180 (0.18)	0.015 (0.09)	-0.092 (0.17)	0.085 (0.18)	0.131 (0.23)	0.015 (0.07)
Total agricultural plots	0.085 (0.22)	-0.013 (0.05)	0.011 (0.05)	-0.204 (0.13)	-0.071 (0.07)	-0.114 (0.10)	0.051 (0.09)
total number of plots owned by the HH	-0.438 (0.36)	0.000 (0.05)	-0.023 (0.07)	0.109 (0.17)	-0.010 (0.05)	0.017 (0.06)	-0.005 (0.09)
Own Tractor	-1.313 (0.84)	0.173 (0.26)	0.058 (0.12)	-0.684 (0.66)	-0.327 (0.27)	-0.395 (0.35)	-0.271 (0.20)
Constant	3.262* (1.61)	0.277 (0.31)	0.828 (0.63)	2.395* (1.19)	1.522** (0.47)	1.513** (0.51)	0.587 (0.40)
Observations	478	471	532	381	1862	1941	385
p-value of F-statistic	0.438	0.013	0.001	0.008	0.000	0.000	0.360
rho	0.421	0.432	0.355	0.427	0.376	0.314	0.438

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A5.20. Impact of Cambodia HARVEST on Vegetable Net Income per Household in Million Riels (FE Models), Sample 2

Variables [Dependent variables are real net vegetable income per household in million Riels]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	-0.529 (0.41)	0.094 (0.09)	-0.031 (0.10)	0.014 (0.19)	-0.071 (0.09)	-0.117 (0.15)	-0.002 (0.07)
New treatment variable-includes dropouts	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.308 (0.24)
Program effect (DID)	-0.091 (0.42)	-0.242** (0.09)	-0.183* (0.08)	-0.455 (0.29)	-0.165 (0.12)	-0.149 (0.16)	-0.147 (0.10)
HH head gender (1=Male)	-0.467 (0.26)	0.291 (0.17)	-0.328* (0.15)	-0.238 (0.45)	-0.358 (0.19)		
Household size (# of people)	-0.258 (0.19)	-0.024 (0.06)	-0.045 (0.08)	-0.309 (0.21)	-0.163* (0.08)	-0.204* (0.10)	-0.028 (0.02)
HH head education (# of years)	-0.008 (0.03)	0.018 (0.02)	0.005 (0.01)	0.043 (0.04)	0.013 (0.02)	0.015 (0.02)	0.006 (0.01)
Log of vegetable area in hectares	11.770 (9.44)	-0.851 (0.71)	0.669 (1.64)	-2.803 (1.52)	2.071 (3.24)	2.622 (4.02)	-0.557 (0.78)
Log of vegetable production cost per hectare in Riels	-0.028* (0.01)	-0.011** (0.00)	-0.024** (0.01)	-0.030* (0.01)	-0.018** (0.00)	-0.021** (0.00)	-0.005 (0.00)
Log of household durable assets in Riels	0.471 (0.44)	-0.131 (0.17)	0.013 (0.09)	-0.096 (0.17)	0.058 (0.16)	0.097 (0.21)	-0.037 (0.05)
Total agricultural plots	0.098 (0.21)	-0.013 (0.05)	0.013 (0.05)	-0.110 (0.17)	-0.061 (0.06)	-0.089 (0.09)	0.040 (0.10)
total number of plots owned by the HH	-0.439 (0.36)	-0.024 (0.05)	-0.027 (0.07)	-0.035 (0.19)	-0.041 (0.06)	-0.032 (0.06)	-0.053 (0.09)
Own Tractor	-1.149 (0.74)	0.108 (0.25)	0.058 (0.12)	-0.323 (0.56)	-0.215 (0.25)	-0.273 (0.32)	0.108 (0.16)
Constant	3.055* (1.51)	0.331 (0.28)	0.839 (0.63)	3.029* (1.37)	1.687** (0.48)	1.643** (0.54)	0.330* (0.16)
Observations	516	517	538	503	2074	1722	352
p-value of F-statistic	0.242	0.008	0.001	0.003	0.000	0.000	.
rho	0.425	0.432	0.354	0.427	0.380	0.374	0.000

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A5.21. Impact of Cambodia HARVEST on Per Capita Annual Expenditure in Real U.S. Dollars (FE Models), Sample 1

Variables [Dependent variables are real annual per capita expenditures in \$USD]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	4.745 (15.98)	9.248 (23.87)	2.836 (21.19)	-15.984 (16.93)	-0.043 (10.02)	-1.517 (11.70)	-14.293 (24.39)
New treatment variable-excludes dropouts	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
Program effect (DID)	-3.669 (15.16)	-2.585 (21.72)	-10.116 (21.89)	28.884 (17.97)	4.396 (9.90)	6.882 (11.50)	-4.802 (23.97)
HH head gender (1=Male)	50.839 (36.36)	-48.565* (23.38)	36.885 (33.66)	0.929 (29.87)	12.140 (15.85)		
Head's age (years)	-1.165 (6.23)	4.028 (7.97)	12.009 (6.21)	19.132* (7.68)	7.968* (3.56)	16.887** (4.49)	-6.613 (10.86)
Head's age squared	-0.004 (0.06)	-0.057 (0.08)	-0.119 (0.06)	-0.230** (0.08)	-0.094* (0.04)	-0.175** (0.05)	0.043 (0.11)
Household size (# of people)	-40.991** (7.06)	-39.386** (8.45)	-26.964** (10.17)	-33.913** (10.83)	-37.777** (4.60)	-38.887** (5.41)	-28.803** (9.93)
percent of HH members ever attended school	13.066 (39.59)	37.391 (46.43)	128.319* (56.60)	92.475* (46.86)	72.113** (23.71)	72.807* (28.79)	57.998 (48.09)
HH owns a cell phone (1=yes)	15.726 (19.94)	13.936 (13.57)	46.465* (18.61)	0.035 (18.27)	18.819* (9.15)	9.364 (10.03)	38.879 (23.18)
Total Livestock Units	8.156 (6.72)	1.088 (4.36)	0.898 (5.98)	-4.173 (4.63)	2.543 (3.30)	2.797 (3.75)	-0.343 (5.85)
total number of plots owned by the HH	5.846 (9.69)	0.465 (6.21)	12.220 (7.82)	9.228 (11.22)	9.297* (3.92)	11.187* (5.17)	-13.035 (13.51)
Log of household durable assets in Riels	17.406* (8.77)	35.745* (16.79)	11.879 (12.12)	42.156** (9.89)	27.238** (6.23)	21.255** (7.41)	53.629** (14.69)
Source of cooking fuel is wood (1=yes)	53.214 (37.76)	-29.124 (27.99)	54.024 (65.12)	-60.292 (42.32)	4.010 (22.64)	-1.234 (27.06)	27.327 (41.54)
Constant	466.475** (168.42)	489.779* (232.74)	-89.207 (176.47)	83.031 (193.15)	232.806* (94.40)	38.375 (109.91)	597.099* (300.31)
Observations	798	828	898	694	3218	2677	541
F-statistic	5.028	3.203	3.989	5.674	11.543	10.263	3.185
p-value of F-statistic	0.000	0.000	0.000	0.000	0.000	0.000	0.000
rho	0.569	0.481	0.452	0.480	0.475	0.484	0.488

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A5.22. Impact of Cambodia HARVEST on Per Capita Annual Expenditure in Real U.S. Dollars (FE Models), Sample 2

Variables [Dependent variables are real annual per capita expenditures in \$USD]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	4.072 (15.98)	5.697 (22.87)	2.755 (21.04)	1.636 (16.00)	0.869 (9.79)	2.556 (11.36)	-20.179 (24.46)
New treatment variable-includes dropouts	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
Program effect (DID)	-7.266 (14.94)	1.488 (21.61)	-11.575 (21.75)	22.545 (15.76)	4.116 (9.59)	6.673 (11.12)	2.889 (22.76)
HH head gender (1=Male)	66.306 (38.86)	-21.278 (23.21)	37.715 (32.51)	-1.447 (25.05)	18.867 (14.80)		
Head's age (years)	0.920 (6.13)	6.976 (7.65)	11.884 (6.15)	15.598* (7.07)	9.083** (3.47)	16.236** (4.33)	3.441 (10.58)
Head's age squared	-0.028 (0.06)	-0.088 (0.08)	-0.117 (0.06)	-0.188* (0.08)	-0.106** (0.04)	-0.173** (0.05)	-0.057 (0.11)
Household size (# of people)	-41.323** (6.74)	-36.295** (8.36)	-26.873** (9.97)	-42.860** (10.23)	-38.647** (4.38)	-40.242** (5.12)	-29.147** (9.73)
percent of HH members ever attended school	14.292 (40.72)	34.394 (42.93)	131.320* (55.94)	52.097 (39.62)	60.697** (22.11)	61.682* (26.26)	54.983 (46.74)
HH owns a cell phone (1=yes)	-0.416 (20.06)	14.073 (12.29)	46.386* (18.44)	0.124 (15.65)	14.247 (8.50)	4.201 (9.39)	29.776 (21.35)
Total Livestock Units	7.919 (6.61)	1.821 (4.15)	1.205 (5.81)	-0.723 (3.80)	2.995 (3.06)	3.204 (3.48)	-0.611 (5.64)
total number of plots owned by the HH	4.366 (9.55)	1.791 (5.97)	12.378 (7.76)	6.583 (9.69)	8.336* (3.77)	9.821* (4.93)	-16.256 (13.42)
Log of household durable assets in Riels	22.984** (8.65)	38.261* (15.20)	12.139 (11.95)	34.771** (8.73)	29.086** (5.80)	21.629** (6.83)	65.188** (14.89)
Source of cooking fuel is wood (1=yes)	58.872 (36.14)	-24.844 (26.16)	53.673 (65.14)	-52.442 (34.39)	3.559 (20.40)	-1.180 (24.37)	28.884 (38.20)
Constant	422.087** (162.08)	370.481 (216.02)	-92.319 (174.85)	223.967 (171.89)	220.900* (89.19)	87.081 (103.94)	368.437 (290.50)
Observations	864	916	910	898	3588	2977	611
F-statistic	5.988	2.756	4.141	6.170	13.248	11.402	3.472
p-value of F-statistic	0.000	0.001	0.000	0.000	0.000	0.000	0.000
rho	0.569	0.466	0.454	0.503	0.477	0.490	0.485

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$; Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A5.23. Impact of Cambodia HARVEST on Household Poverty (LPM FE Models), Sample 1

Variables [Dependent variables are binary with 1=poor and 0 otherwise]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	-5.317 (4.01)	-6.781 (4.98)	-2.951 (4.29)	-2.476 (4.08)	-4.962* (2.19)	-5.075* (2.31)	0.342 (6.80)
New treatment variable-excludes dropouts	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
Program effect (DID)	2.583 (3.79)	2.403 (3.92)	1.043 (3.35)	-2.773 (3.60)	1.296 (1.85)	2.331 (1.95)	-2.892 (6.08)
HH head gender (1=Male)	7.192 (9.72)	7.609 (6.79)	-4.345 (9.29)	-9.239 (5.72)	-0.182 (4.24)		
Head's age (years)	-1.105 (1.56)	-1.953 (1.98)	1.109 (1.46)	-4.130* (1.86)	-0.867 (0.84)	-2.514** (0.95)	0.686 (2.24)
Head's age squared	0.006 (0.01)	0.018 (0.02)	-0.013 (0.01)	0.043* (0.02)	0.007 (0.01)	0.022* (0.01)	-0.014 (0.02)
Household size (# members)	2.083 (1.64)	0.117 (1.47)	-0.671 (1.74)	-3.260 (1.82)	0.165 (0.83)	1.104 (0.88)	-4.251 (2.19)
percent of HH members ever attended school	-9.294 (8.75)	-8.377 (9.18)	-14.317 (7.32)	-13.690 (9.27)	- (4.31)	-10.174* (5.17)	-3.794 (8.41)
HH owns a cell phone (1=yes)	-2.892 (6.46)	-9.178 (5.57)	-3.551 (3.26)	-3.319 (4.32)	-4.607* (2.31)	-2.536 (2.54)	-7.559 (5.94)
Total Livestock Units	-0.436 (0.30)	-1.506* (0.67)	-0.960 (0.53)	0.225 (0.60)	-0.739** (0.26)	-0.587* (0.26)	-1.539 (1.05)
Total number of plots owned by the HH	3.570 (1.97)	0.222 (1.15)	-0.535 (1.43)	1.942 (1.50)	0.757 (0.71)	0.545 (0.88)	8.197** (3.14)
Log of real asset value in Riels	-4.520 (2.43)	-0.735 (2.07)	-3.430 (1.91)	-0.262 (2.00)	-2.255* (1.04)	-2.257* (1.13)	-2.102 (2.85)
Source of cooking fuel is wood (1=yes)	5.021 (4.04)	3.139 (6.97)	5.600 (7.17)	0.240 (5.15)	3.813 (2.69)	2.683 (2.85)	6.518 (7.53)
Constant	28.976 (43.75)	70.347 (51.74)	11.357 (35.39)	135.105** (44.56)	43.710* (21.84)		13.342 (49.87)
Observations	798	828	898	694	3218	2677	541
R-Square	0.044	0.036	0.016	0.000	0.043		0.014
rho	0.380	0.392	0.418	0.544	0.400		0.635

Marginal effects; SE in parentheses; $p < 0.05$, ** $p < 0.01$; Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A5.24. Impact of Cambodia HARVEST on Household Poverty (LPM FE Models), Sample 2

Variables [Dependent variables are binary with 1=poor and 0 otherwise]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	-4.988 (3.94)	-5.622 (4.73)	-3.041 (4.26)	-3.504 (4.01)	-4.698* (2.15)	-4.733* (2.25)	0.154 (6.73)
New treatment variable-includes dropouts	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
Program effect (DID)	2.539 (3.73)	2.548 (3.87)	1.104 (3.33)	-3.333 (3.48)	0.967 (1.83)	2.289 (1.93)	-3.589 (6.06)
HH head gender (1=Male)	10.104 (9.50)	6.929 (5.87)	-4.430 (8.98)	0.338 (7.09)	2.168 (3.99)		
Head's age (years)	-1.403 (1.48)	-2.002 (1.87)	1.108 (1.45)	-3.828* (1.81)	-0.930 (0.81)	-2.320* (0.94)	-0.246 (2.19)
Head's age squared	0.009 (0.01)	0.018 (0.02)	-0.012 (0.01)	0.042* (0.02)	0.008 (0.01)	0.020* (0.01)	-0.004 (0.02)
Household size (# members)	2.255 (1.50)	-0.739 (1.56)	-0.553 (1.70)	-2.872 (1.61)	0.008 (0.79)	0.806 (0.84)	-3.520 (2.05)
Percent of HH members ever attended school	-10.865 (8.41)	-10.941 (8.56)	-14.274 (7.26)	-11.338 (7.92)	-12.072** (4.05)	-11.171* (4.81)	-7.919 (8.09)
HH owns a cell phone (1=yes)	-4.913 (5.90)	-11.512* (5.20)	-3.454 (3.23)	-3.235 (3.72)	-5.365* (2.16)	-3.209 (2.41)	-6.655 (5.23)
Total Livestock Units	-0.524 (0.33)	-1.604* (0.64)	-0.942 (0.51)	-0.317 (0.59)	-0.873** (0.26)	-0.758** (0.27)	-1.464 (0.97)
Total number of plots owned by the HH	2.924 (1.98)	0.077 (1.12)	-0.551 (1.43)	2.072 (1.43)	0.674 (0.69)	0.314 (0.84)	7.315* (3.13)
Log of real asset value in Riels	-4.949* (2.35)	-1.178 (1.97)	-3.388 (1.89)	-0.050 (1.90)	-2.337* (1.01)	-2.483* (1.08)	-1.763 (2.86)
Source of cooking fuel is wood (1=yes)	4.147 (3.77)	2.604 (6.31)	5.641 (7.17)	5.023 (5.33)	4.674 (2.61)	3.425 (2.78)	4.506 (6.71)
Constant	40.528 (41.52)	84.361 (48.30)	10.465 (35.05)	109.832* (42.71)	45.373* (20.93)	78.805** (24.73)	39.138 (49.34)
Observations	864	916	910	898	3588	2977	611
F-statistic	2.964	2.413	2.351	3.230	8.799	8.294	2.023
p-value of F-statistic	0.001	0.005	0.006	0.000	0.000	0.000	0.025
rho	0.403	0.414	0.416	0.503	0.404	0.462	0.605

Marginal effects; SE in parentheses; * $p < 0.05$, ** $p < 0.01$; Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A5.25. Impact of Cambodia HARVEST on Underweight Women (Logistic FE Models), Sample 1

Variables [Dependent variables are binary with 1=underweight women and 0 otherwise]	Province				Overall	Head's gender
	BB	KT	PS	SR		Male
Year (1=2016)	0.000 (0.00)	-0.000 (0.00)	0.001 (0.00)	-0.029 (12.92)	-0.000 (0.00)	-0.022 (0.11)
New treatment variable-excludes dropouts	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
Program effect (DID)	-0.000 (0.00)	0.000 (0.00)	-0.001 (0.00)	0.018 (8.05)	0.000 (0.00)	0.015 (0.08)
HH head gender (1=Male)	-0.000 (0.00)	-0.000 (0.00)	-0.001 (0.00)	1.229 (626.60)	0.001 (0.01)	
Head's age (years)	-0.000 (0.00)	0.000 (0.00)	-0.000 (0.00)	0.005 (2.25)	-0.000 (0.00)	0.003 (0.01)
Head's age squared	0.000 (0.00)	-0.000 (0.00)	0.000 (0.00)	-0.000 (0.02)	0.000 (0.00)	-0.000 (0.00)
Household size (# of people)	0.000 (0.00)	-0.000 (0.00)	-0.002 (0.00)	-0.042 (18.55)	0.000 (0.00)	0.018 (0.09)
percent of HH members who are women 15-49 years	0.000 (0.00)	-0.001 (0.02)	0.003 (0.01)	-0.034 (15.23)	-0.000 (0.00)	-0.006 (0.09)
percent of HH members female	0.000 (0.00)	-0.000 (0.01)	-0.005 (0.00)	-0.351 (155.00)	0.000 (0.00)	0.076 (0.36)
Log of daily per capita food consumption in Riels	0.000 (0.00)	0.000 (0.00)	-0.000 (0.00)	-0.029 (12.96)	-0.000 (0.00)	0.010 (0.05)
Total operated land (Log)	0.000 (0.00)	0.000 (0.00)	-0.001 (0.00)	0.035 (15.38)	0.000 (0.00)	0.024 (0.13)
Total Livestock Units	-0.000 (0.00)	-0.000 (0.00)	-0.000 (0.00)	-0.002 (1.03)	-0.000 (0.00)	-0.002 (0.01)
Source of water is well (1=yes)	0.000 (0.00)	0.000 (0.01)	-0.002 (0.00)	0.014 (6.35)	0.000 (0.00)	0.011 (0.06)
Asset value (Log)	-0.000 (0.00)	0.000 (0.00)	-0.000 (0.00)	0.010 (4.58)	-0.000 (0.00)	-0.006 (0.03)

Annex A5.25. cont.

Variables [Dependent variables are binary with 1=underweight women and 0 otherwise]	Province				Overall	Head's gender
	BB	KT	PS	SR		Male
Woman's age (Years)	-0.000 (0.00)	-0.000 (0.00)	-0.001** (0.00)	-0.044 (19.65)	-0.000 (0.00)	-0.015 (0.08)
Woman's age square	0.000 (0.00)	0.000 (0.00)	0.000* (0.00)	0.001 (0.27)	0.000 (0.00)	0.000 (0.00)
Woman is caretaker of a child (1=Yes)	-0.000 (0.00)	-0.000 (0.00)	-0.000 (0.00)	0.064 (28.38)	-0.000 (0.00)	-0.018 (0.09)
Women is HH head (1=Yes)	-0.000 (0.00)	-0.000 (0.00)	-0.002 (0.00)	0.095 (41.83)	-0.000 (0.00)	0.000 (.)
Observations	250	191	219	228	888	754
Pseudo R-square	0.436	0.284	0.244	0.298	0.227	0.243
Chi2-statistic	80.248	39.56	38.665	50.844	147.995	134.3
p-value of Chi2-statistic	0.000	0.001	0.002	0.000	0.000	0.000
Log likelihood	-51.827	-49.956	-59.922	-59.893	-252.259	-209.33

Marginal effects; Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Note: For female-headed household could not calculate numerical derivatives (discontinuous region with missing values encountered).

Annex A5.26. Impact of Cambodia HARVEST on Underweight Women (Logistic FE Models), Sample 2

Variables [Dependent variables are binary with 1=underweight women and 0 otherwise]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	0.039 (0.48)	-0.000 (0.00)	0.001 (0.00)	0.000 (0.00)	0.000 (0.00)	-0.002 (0.01)	0.004 (0.00)
New treatment variable-includes dropouts	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
Program effect (DID)	0.002 (0.03)	0.000 (0.00)	-0.001 (0.00)	0.000 (0.00)	0.000 (0.00)	0.002 (0.01)	-0.003 (0.00)
HH head gender (1=Male)	-0.007 (0.09)	-0.000 (0.00)	-0.001 (0.00)	0.000 (0.00)	0.001 (0.00)		
Head's age (years)	-0.004 (0.05)	0.000 (0.00)	-0.000 (0.00)	-0.000 (0.00)	-0.000 (0.00)	0.001 (0.01)	-0.000 (0.00)
Head's age squared	0.000 (0.00)	-0.000 (0.00)	0.000 (0.00)	0.000 (0.00)	0.000 (0.00)	-0.000 (0.00)	-0.000 (0.00)
Household size (# of people)	0.013 (0.17)	0.000 (0.00)	-0.002 (0.00)	0.000 (0.00)	0.000 (0.00)	0.002 (0.01)	-0.004 (0.00)
percent of HH members who are women 15-49 years	0.075 (0.97)	-0.000 (0.00)	0.003 (0.01)	0.000 (0.00)	-0.000 (0.00)	0.001 (0.01)	-0.008 (0.02)
percent of HH members female	0.083 (1.11)	0.000 (0.00)	-0.005 (0.00)	-0.000 (0.00)	0.000 (0.00)	0.010 (0.06)	-0.015 (0.01)
Log of daily per capita food consumption in Riels	0.012 (0.16)	0.000 (0.00)	-0.000 (0.00)	-0.000 (0.00)	-0.000 (0.00)	0.001 (0.01)	-0.001 (0.00)
Total operated land (Log)	0.006 (0.08)	0.000 (0.00)	-0.001 (0.00)	0.000 (0.00)	0.000 (0.00)	0.003 (0.02)	-0.001 (0.01)
Total Livestock Units	-0.001 (0.01)	-0.000 (0.00)	-0.000 (0.00)	0.000 (0.00)	-0.000 (0.00)	-0.000 (0.00)	-0.001 (0.00)
Source of water is well (1=yes)	0.002 (0.03)	0.000 (0.00)	-0.002 (0.00)	0.000 (0.00)	0.000 (0.00)	0.001 (0.00)	0.002 (0.00)
Asset value (Log)	-0.019 (0.24)	-0.000 (0.00)	-0.000 (0.00)	0.000 (0.00)	-0.000 (0.00)	-0.001 (0.01)	0.001 (0.00)

Annex A5.26. cont.

Variables [Dependent variables are binary with 1=underweight women and 0 otherwise]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Woman's age (Years)	-0.010 (0.13)	-0.000 (0.00)	-0.001** (0.00)	-0.000 (0.00)	-0.000 (0.00)	-0.002 (0.01)	-0.001* (0.00)
Woman's age square	0.000 (0.00)	0.000 (0.00)	0.000* (0.00)	0.000 (0.00)	0.000 (0.00)	0.000 (0.00)	0.000* (0.00)
Woman is caretaker of a child (1=Yes)	-0.032 (0.41)	-0.000 (0.00)	-0.000 (0.00)	0.000 (0.00)	-0.001 (0.00)	-0.003 (0.02)	-0.001 (0.00)
Women is HH head (1=Yes)	-0.444 (45.29)	-0.000 (0.00)	-0.002 (0.00)	0.000 (0.00)	-0.001 (0.00)	0.000 (.)	-0.001 (0.00)
Observations	276	229	219	270	994	833	125
Pseudo R-square	0.374	0.298	0.244	0.24	0.219	0.227	0.44
Chi2-statistic	75.662	49.588	38.665	48.397	159.614	138.675	40.495
p-value of Chi2-statistic	0.000	0.000	0.002	0.000	0.000	0.000	0.001
Log likelihood	-63.407	-58.465	-59.922	-76.719	-284.862	-235.734	-25.774

Marginal effects; Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A5.27. Impact of Cambodia HARVEST on Woman's Body Mass Index (FE Models), Sample 1

Variables [Dependent variables are binary with 1=underweight women and 0 otherwise]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	-0.237 (0.40)	0.885** (0.29)	0.176 (0.31)	0.387 (0.29)	0.342* (0.16)	0.261 (0.20)	0.362 (0.39)
New treatment variable-excludes dropouts	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
Program effect (DID)	0.018 (0.34)	-0.397 (0.27)	0.480 (0.26)	-0.069 (0.26)	-0.006 (0.14)	0.054 (0.15)	-0.154 (0.37)
HH head gender (1=Male)	0.028 (0.45)	0.754 (0.66)	1.688** (0.53)	-2.423** (0.74)	-0.008 (0.34)		
Head's age (years)	-0.003 (0.10)	0.209 (0.11)	0.118 (0.09)	0.004 (0.12)	0.062 (0.05)	-0.006 (0.08)	0.164 (0.17)
Head's age squared	0.000 (0.00)	-0.002 (0.00)	-0.001 (0.00)	-0.000 (0.00)	-0.001 (0.00)	0.000 (0.00)	-0.002 (0.00)
Household size (# of people)	-0.337 (0.23)	-0.405 (0.21)	0.314 (0.32)	0.155 (0.22)	-0.103 (0.12)	-0.131 (0.18)	0.248 (0.24)
percent of HH members who are women 15-49 years	-2.068 (1.67)	1.392 (1.72)	-0.524 (1.47)	0.266 (1.48)	-0.346 (0.83)	-0.105 (0.99)	-0.301 (1.72)
percent of HH members female	-2.018 (1.26)	0.154 (0.92)	2.650 (1.44)	0.924 (0.77)	0.186 (0.52)	0.288 (0.98)	0.972 (0.65)
Log of daily per capita food consumption in Riels	-0.137 (0.38)	0.146 (0.29)	0.040 (0.27)	-0.001 (0.32)	0.022 (0.16)	-0.026 (0.17)	0.763* (0.34)
Total operated land (Log)	-0.420 (0.44)	-0.656 (0.34)	0.051 (0.30)	0.127 (0.35)	-0.263 (0.19)	-0.234 (0.19)	1.313* (0.53)
Total Livestock Units	0.073 (0.05)	0.038 (0.06)	0.179** (0.05)	0.053 (0.05)	0.068* (0.03)	0.066* (0.03)	0.033 (0.07)
Source of water is well (1=yes)	-0.167 (0.40)	-0.035 (0.44)	0.194 (0.36)	0.077 (0.37)	0.003 (0.19)	0.010 (0.20)	0.314 (0.52)
Asset value (Log)	0.081 (0.10)	-0.162 (0.11)	-0.029 (0.09)	-0.039 (0.09)	-0.049 (0.05)	0.007 (0.05)	-0.253* (0.11)

Annex A5.27. cont.

Variables [Dependent variables are binary with 1=underweight women and 0 otherwise]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Woman's age (Years)	0.307** (0.11)	0.456** (0.10)	0.386** (0.08)	0.482** (0.08)	0.411** (0.05)	0.406** (0.05)	0.376** (0.13)
Woman's age square	-0.003 (0.00)	-0.005** (0.00)	-0.004** (0.00)	-0.005** (0.00)	-0.005** (0.00)	-0.004** (0.00)	-0.005* (0.00)
Woman is caretaker of a child (1=Yes)	0.734* (0.35)	0.869* (0.34)	-0.022 (0.32)	0.200 (0.33)	0.399* (0.17)	0.475* (0.19)	0.308 (0.54)
Women is HH head (1=Yes)	0.107 (0.70)	0.077 (0.94)	1.405 (0.91)	-2.927** (0.61)	-0.670 (0.45)	0.000 (.)	0.163 (0.91)
Constant	21.277** (6.27)	8.796 (4.86)	4.225 (5.79)	12.748** (4.54)	12.877** (2.56)	14.505** (3.75)	0.648 (6.73)
Observations	839	773	917	863	3392	2879	513
R-square	0.316	0.332	0.339	0.362	0.315	0.338	0.164
p-value of Chi2-statistic	0.000	0.000	0.000	0.000	0.000	0.000	0.000
F-statistic	9.732	7.487	9.273	10.251	30.155	31.821	3.047
rho	0.644	0.685	0.703	0.646	0.643	0.654	0.563

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A5.28. Impact of Cambodia HARVEST on Woman's Body Mass Index (FE Models), Sample 2

Variables [Dependent variables are binary with 1=underweight women and 0 otherwise]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	-0.405 (0.41)	0.879** (0.29)	0.178 (0.31)	0.030 (0.28)	0.207 (0.16)	0.143 (0.19)	0.148 (0.42)
New treatment variable-includes dropouts	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
Program effect (DID)	0.083 (0.34)	-0.421 (0.27)	0.476 (0.26)	0.090 (0.23)	0.036 (0.13)	0.083 (0.15)	-0.206 (0.36)
HH head gender (1=Male)	0.100 (0.46)	0.535 (0.58)	1.689** (0.53)	-1.755** (0.61)	-0.003 (0.31)		
Head's age (years)	-0.038 (0.11)	0.115 (0.12)	0.119 (0.09)	0.044 (0.10)	0.051 (0.05)	-0.025 (0.08)	0.213 (0.16)
Head's age squared	0.001 (0.00)	-0.001 (0.00)	-0.001 (0.00)	-0.000 (0.00)	-0.000 (0.00)	0.001 (0.00)	-0.002 (0.00)
Household size (# of people)	-0.147 (0.24)	-0.510* (0.20)	0.315 (0.32)	0.173 (0.18)	-0.073 (0.11)	-0.082 (0.17)	0.148 (0.29)
percent of HH members who are women 15-49 years	-2.377 (1.63)	0.670 (1.76)	-0.531 (1.46)	1.101 (1.29)	-0.140 (0.80)	0.053 (0.93)	-0.193 (1.74)
percent of HH members female	-1.045 (1.35)	-0.260 (0.96)	2.645 (1.44)	0.873 (0.63)	0.188 (0.51)	0.275 (0.89)	0.742 (0.73)
Log of daily per capita food consumption in Riels	-0.166 (0.36)	-0.026 (0.27)	0.038 (0.27)	0.022 (0.28)	-0.042 (0.14)	-0.083 (0.16)	0.601 (0.36)
Total operated land (Log)	-0.418 (0.43)	-0.611 (0.32)	0.058 (0.30)	0.384 (0.28)	-0.170 (0.17)	-0.120 (0.17)	1.099* (0.55)
Total Livestock Units	0.075 (0.05)	0.054 (0.06)	0.176** (0.05)	0.033 (0.05)	0.066* (0.03)	0.068* (0.03)	0.017 (0.07)
Source of water is well (1=yes)	0.021 (0.37)	-0.204 (0.39)	0.191 (0.36)	0.068 (0.32)	0.027 (0.17)	0.059 (0.19)	0.268 (0.51)
Asset value (Log)	0.111 (0.10)	-0.118 (0.10)	-0.034 (0.09)	0.059 (0.08)	0.000 (0.05)	0.043 (0.05)	-0.127 (0.13)

Annex A5.28. cont.

Variables [Dependent variables are binary with 1=underweight women and 0 otherwise]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Woman's age (Years)	0.352** (0.11)	0.519** (0.09)	0.385** (0.08)	0.419** (0.08)	0.421** (0.05)	0.413** (0.05)	0.411** (0.13)
Woman's age square	-0.004* (0.00)	-0.006** (0.00)	-0.004** (0.00)	-0.005** (0.00)	-0.005** (0.00)	-0.005** (0.00)	-0.006** (0.00)
Woman is caretaker of a child (1=Yes)	0.957** (0.36)	0.860** (0.32)	-0.018 (0.32)	0.432 (0.29)	0.496** (0.16)	0.551** (0.18)	0.538 (0.51)
Women is HH head (1=Yes)	0.134 (0.72)	0.411 (0.80)	1.408 (0.91)	-2.254** (0.56)	-0.447 (0.41)	0.000 (.)	0.792 (0.96)
Constant	19.342** (6.02)	12.782* (4.95)	4.254 (5.76)	10.610** (3.92)	12.820** (2.44)	14.565** (3.48)	0.437 (6.88)
Observations	903	867	926	1108	3804	3222	582
R-square	0.319	0.355	0.340	0.314	0.309	0.333	0.166
p-value of F-statistic	0.000	0.000	0.000	0.000	0.000	0.000	0.001
F-statistic	9.573	9.368	9.309	10.954	32.849	34.768	2.615
rho	0.616	0.683	0.706	0.634	0.636	0.649	0.542

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A5.29. Impact of Cambodia HARVEST on Stunted Children under 5 Years (Logistic FE Models), Sample 1

Variables [dependent variables are binary with 1=stunted children and 0 otherwise]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	0.001 (0.08)	-0.008 (0.05)	-0.008 (2.05)	-0.012 (0.14)	-0.093 (0.25)	-0.010 (0.05)	-0.000 (0.00)
New treatment variable-excludes dropouts	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
Program effect (DID)	0.000 (0.03)	0.009 (0.06)	0.009 (2.34)	0.015 (0.18)	0.076 (0.19)	0.008 (0.04)	0.000 (0.00)
HH head gender (1=Male)	-0.030 (3.71)	0.005 (0.04)	-0.112 (36.16)	-0.024 (0.29)	-0.166 (0.42)		
Male children (1=Yes)	-0.001 (0.08)	0.003 (0.02)	0.000 (0.04)	0.008 (0.09)	0.008 (0.03)	-0.001 (0.01)	0.000 (0.00)
1=children was ever breastfed	0.000 (0.03)	-0.004 (0.03)	-0.014 (3.50)	-0.007 (0.09)	-0.029 (0.08)	-0.001 (0.01)	-0.000 (0.00)
Child's age in months	0.000 (0.01)	0.001 (0.01)	0.000 (0.04)	0.001 (0.02)	0.008 (0.02)	0.001 (0.01)	0.000 (0.00)
Children's age squared	-0.000 (0.00)	-0.000 (0.00)	-0.000 (0.00)	-0.000 (0.00)	-0.000 (0.00)	-0.000 (0.00)	-0.000 (0.00)
Children age 5-15 years (#)	-0.001 (0.06)	-0.002 (0.02)	0.015 (3.80)	-0.002 (0.03)	0.028 (0.07)	0.005 (0.02)	-0.000 (0.00)
Log of daily per capita food consumption in Riels	-0.001 (0.11)	-0.005 (0.04)	-0.004 (0.97)	0.012 (0.13)	0.002 (0.05)	-0.004 (0.01)	0.000 (0.00)
Caregiver's age (Years)	-0.000 (0.03)	0.008 (0.05)	0.000 (0.11)	-0.002 (0.03)	-0.004 (0.01)	-0.000 (0.00)	-0.000 (0.00)
Caregiver's age square	0.000 (0.00)	-0.000 (0.00)	-0.000 (0.00)	0.000 (0.00)	0.000 (0.00)	0.000 (0.00)	0.000 (0.00)
The care giver is the HH head(1=Yes)	-0.003 (0.22)	0.044 (0.30)	-0.058 (21.71)	-0.010 (0.11)	-0.038 (0.12)	-0.000 (0.01)	0.000 (0.00)
Caregiver have ever attended school (1=Yes)	-0.028 (2.66)	-0.026 (0.18)	0.003 (20.55)	-0.009 (0.11)	-0.136 (0.34)	-0.154 (9.79)	0.000 (0.00)
Observations	140	111	80	131	462	345	91
Pseudo R-square	0.205	0.272	0.635	0.257	0.115	0.162	0.202
Chi2-statistic	20.904	22.214	36.86	24.005	38.595	40.214	13.844
p-value of Chi2-statistic	0.075	0.052	0.000	0.031	0.000	0.000	0.311

Marginal effects; SE in parentheses; * $p < 0.05$, ** $p < 0.01$; Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A5.30. Impact of Cambodia HARVEST on Stunted Children under 5 Years (Logistic FE Models), Sample 2

Variables [dependent variables are binary with 1=stunted children and 0 otherwise]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	0.000 (0.00)	-0.011 (0.07)	-0.007 (0.74)	-0.014 (0.13)	-0.060 (0.19)	-0.003 (0.02)	-0.000 (0.00)
New treatment variable-includes dropouts	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
Program effect (DID)	0.000 (0.00)	0.008 (0.06)	0.008 (0.90)	0.017 (0.16)	0.050 (0.15)	0.003 (0.02)	0.000 (0.00)
HH head gender (1=Male)	-0.000 (0.00)	0.003 (0.02)	-0.107 (15.52)	-0.028 (0.26)	-0.117 (0.35)		
Male children (1=Yes)	-0.000 (0.00)	-0.000 (0.01)	0.001 (0.09)	0.007 (0.07)	0.009 (0.03)	-0.000 (0.00)	0.000 (0.00)
1=children was ever breastfed	0.000 (0.00)	-0.000 (0.01)	-0.015 (1.61)	-0.009 (0.09)	-0.018 (0.06)	-0.001 (0.00)	-0.000 (0.00)
Child's age in months	0.000 (0.00)	0.002 (0.01)	0.000 (0.01)	0.002 (0.02)	0.006 (0.02)	0.000 (0.00)	0.000 (0.00)
Children's age squared	-0.000 (0.00)	-0.000 (0.00)	-0.000 (0.00)	-0.000 (0.00)	-0.000 (0.00)	-0.000 (0.00)	-0.000 (0.00)
Children age 5-15 years (#)	-0.000 (0.00)	-0.001 (0.01)	0.016 (1.68)	0.000 (0.01)	0.014 (0.05)	0.001 (0.01)	-0.000 (0.00)
Log of daily per capita food consumption in Riels	-0.000 (0.00)	-0.008 (0.06)	-0.005 (0.57)	0.001 (0.02)	-0.005 (0.02)	-0.002 (0.01)	0.000 (0.00)
Caregiver's age (Years)	-0.000 (0.00)	0.009 (0.06)	0.000 (0.05)	-0.003 (0.03)	-0.002 (0.01)	-0.000 (0.00)	-0.000 (0.00)
Caregiver's age square	0.000 (0.00)	-0.000 (0.00)	-0.000 (0.00)	0.000 (0.00)	0.000 (0.00)	0.000 (0.00)	0.000 (0.00)
The care giver is the HH head(1=Yes)	-0.000 (0.00)	0.041 (0.28)	-0.058 (9.37)	-0.003 (0.04)	-0.029 (0.10)	-0.000 (0.00)	0.000 (0.00)
Caregiver have ever attended school (1=Yes)	-0.000 (0.00)	-0.025 (0.18)	0.005 (9.14)	-0.010 (0.10)	-0.093 (0.28)	-0.059 (3.28)	0.000 (0.00)
Observations	143	120	82	152	497	376	95
Pseudo R-square	0.207	0.282	0.632	0.231	0.116	0.161	0.209
Chi2-statistic	21.595	24.763	37.567	25.006	41.88	43.364	14.87
p-value of Chi2-statistic	0.062	0.025	0.000	0.023	0.000	0.000	0.249

Marginal effects; SE in parentheses; * $p < 0.05$, ** $p < 0.01$; Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Table A5.31. Impact of Cambodia HARVEST on Underweight Children under 5 Years (Logistic FE Models), Sample 1

Variables [dependent variables are binary with 1=underweight children and 0 otherwise]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	-0.000 (0.00)	-0.028 (10.72)	-0.000 (0.09)	-0.019 (40.57)	-0.009 (0.05)	-0.000 (0.00)	-0.133 (13.76)
New treatment variable-excludes dropouts	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
Program effect (DID)	0.000 (0.00)	0.103 (38.85)	0.000 (0.11)	0.010 (21.60)	0.008 (0.04)	0.000 (0.00)	0.136 (13.74)
HH head gender (1=Male)	0.000 (.)	1.129 (304.85)	0.000 (0.08)	-0.244 (531.10)	0.002 (0.01)		
Male children (1=Yes)	0.000 (0.00)	0.064 (24.18)	-0.000 (0.01)	-0.003 (6.62)	0.002 (0.01)	0.000 (0.00)	0.002 (0.02)
1=children was ever breastfed	-0.000 (0.00)	-0.147 (55.62)	-0.000 (0.10)	-0.001 (2.58)	-0.004 (0.02)	-0.000 (0.00)	0.002 (0.02)
Child's age in months	-0.000 (0.00)	-0.010 (3.85)	0.000 (0.00)	0.000 (0.66)	0.000 (0.00)	0.000 (0.00)	-0.001 (0.01)
Children's age squared	0.000 (0.00)	0.000 (0.08)	-0.000 (0.00)	-0.000 (0.01)	0.000 (0.00)	-0.000 (0.00)	0.000 (0.00)
Children age 5-15 years (#)	-0.000 (0.00)	-0.079 (29.76)	0.000 (0.04)	0.005 (10.41)	0.002 (0.01)	0.000 (0.00)	0.002 (0.01)
Log of daily per capita food consumption in Riels	-0.000 (0.00)	-0.147 (55.68)	0.000 (0.18)	-0.006 (13.16)	0.001 (0.00)	0.000 (0.00)	-0.008 (0.05)
Caregiver's age (Years)	0.000 (0.00)	0.030 (11.50)	0.000 (0.08)	0.007 (14.61)	0.002 (0.01)	0.000 (0.00)	-0.004 (0.03)
Caregiver's age square	-0.000 (0.00)	-0.000 (0.16)	-0.000 (0.00)	-0.000 (0.17)	-0.000 (0.00)	-0.000 (0.00)	0.000 (0.00)
The care giver is the HH head(1=Yes)	-0.000 (0.00)	0.070 (26.48)	0.000 (0.63)	-0.131 (283.97)	-0.001 (0.01)	-0.000 (0.00)	0.022 (0.15)

Annex A5.31. cont.

Variables [dependent variables are binary with 1=underweight children and 0 otherwise]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Caregiver have ever attended school (1=Yes)	-0.000 (0.01)	0.079 (30.00)	-0.001 (1.47)	-0.047 (109.46)	-0.004 (0.02)	-0.000 (0.00)	0.018 (0.12)
Observations	102	95	90	108	395	298	85
Pseudo R-square	0.222	0.453	0.408	0.443	0.132	0.186	0.285
Chi2-statistic	16.588	31.071	26.796	34.12	37.776	40.116	17.758
p-value of Chi2-statistic	0.166	0.003	0.013	0.001	0.000	0.000	0.123

Marginal effects; Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A5.32. Impact of Cambodia HARVEST on Underweight Children under 5 Years (Logistic FE Models), Sample 2

Variables [dependent variables are binary with 1=underweight children and 0 otherwise]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	-0.000 (0.00)	-0.005 (13.93)	-0.000 (0.09)	-0.000 (0.01)	-0.010 (0.05)	-0.000 (0.00)	-0.133 (13.76)
New treatment variable-includes dropouts	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
Program effect (DID)	-0.000 (0.00)	0.010 (25.25)	0.000 (0.11)	0.000 (0.01)	0.009 (0.04)	0.000 (0.00)	0.136 (13.74)
HH head gender (1=Male)	0.000 (.)	0.123 (284.34)	0.000 (0.08)	-0.000 (0.22)	0.002 (0.01)		
Male children (1=Yes)	0.000 (0.00)	0.005 (13.94)	-0.000 (0.01)	-0.000 (0.00)	0.002 (0.01)	0.000 (0.00)	0.002 (0.02)
1=children was ever breastfed	-0.000 (0.00)	-0.011 (29.43)	-0.000 (0.10)	-0.000 (0.00)	-0.005 (0.02)	-0.000 (0.00)	0.002 (0.02)
Child's age in months	-0.000 (0.00)	-0.001 (1.90)	0.000 (0.00)	0.000 (0.00)	0.000 (0.00)	0.000 (0.00)	-0.001 (0.01)
Children's age squared	0.000 (0.00)	0.000 (0.05)	-0.000 (0.00)	-0.000 (0.00)	0.000 (0.00)	-0.000 (0.00)	0.000 (0.00)
Children age 5-15 years (#)	0.000 (0.00)	-0.007 (16.79)	0.000 (0.04)	0.000 (0.00)	0.002 (0.01)	0.000 (0.00)	0.002 (0.01)
Log of daily per capita food consumption in Riels	0.000 (0.00)	-0.013 (33.59)	0.000 (0.18)	-0.000 (0.01)	0.001 (0.00)	0.000 (0.00)	-0.008 (0.05)
Caregiver's age (Years)	0.000 (0.00)	0.003 (7.74)	0.000 (0.08)	0.000 (0.00)	0.002 (0.01)	0.000 (0.00)	-0.004 (0.03)
Caregiver's age square	-0.000 (0.00)	-0.000 (0.10)	-0.000 (0.00)	-0.000 (0.00)	-0.000 (0.00)	-0.000 (0.00)	0.000 (0.00)

Annex A5.32. cont.

Variables [dependent variables are binary with 1=underweight children and 0 otherwise]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
The care giver is the HH head(1=Yes)	-0.000 (0.00)	0.001 (3.45)	0.000 (0.63)	-0.000 (0.12)	-0.001 (0.01)	-0.000 (0.00)	0.022 (0.15)
Caregiver have ever attended school (1=Yes)	-0.000 (0.00)	0.011 (27.43)	-0.001 (1.47)	-0.000 (0.05)	-0.004 (0.02)	-0.000 (0.00)	0.018 (0.12)
Observations	107	97	90	120	414	317	85
Pseudo R-square	0.21	0.443	0.408	0.381	0.133	0.189	0.285
Chi2-statistic	16.489	31.034	26.796	32.662	39.824	43.383	17.758
p-value of Chi2-statistic	0.17	0.003	0.013	0.002	0.000	0.000	0.123

Marginal effects; Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A5.33. Impact of Cambodia HARVEST on Wasted Children under 5 Years (Logistic FE Models), Sample 1 (a)

Variables [Dependent variables are binary with 1=wasted children and 0 otherwise]	Province		Overall	Head's gender
	PS	SR		Male
Year (1=2016)	0.177 (236.08)	-0.000 (0.00)	0.001 (0.01)	0.000 (0.00)
New treatment variable-excludes dropouts	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
Program effect (DID)	-0.213 (284.15)	-0.000 (0.00)	-0.003 (0.02)	-0.000 (0.00)
HH head gender (1=Male)	1.125 (1347.83)	0.000 (0.00)	0.032 (2.30)	
Male children (1=Yes)	0.042 (56.26)	-0.000 (0.00)	0.000 (0.00)	-0.000 (0.00)
1=children was ever breastfed	-0.133 (177.03)	0.000 (0.00)	-0.001 (0.01)	-0.000 (0.00)
Child's age in months	-0.006 (7.60)	-0.000 (0.00)	-0.000 (0.00)	-0.000 (0.00)
Children's age squared	0.000 (0.08)	0.000 (0.00)	0.000 (0.00)	0.000 (0.00)
Children age 5-15 years (#)	0.073 (97.56)	0.000 (0.00)	0.001 (0.01)	0.000 (0.00)
Log of daily per capita food consumption in Riels	-0.191 (254.18)	-0.000 (0.00)	0.000 (0.00)	0.000 (0.00)
Caregiver's age (Years)	0.143 (189.95)	-0.000 (0.00)	0.001 (0.01)	0.000 (0.00)
Caregiver's age square	-0.002 (2.84)	0.000 (0.00)	-0.000 (0.00)	-0.000 (0.00)
The care giver is the HH head(1=Yes)	1.446 (1940.66)	-0.000 (0.00)	0.003 (0.02)	0.000 (0.00)

Annex A5.33. cont.

Variables [Dependent variables are binary with 1=wasted children and 0 otherwise]	Province		Overall	Head's gender
	PS	SR		Male
Caregiver have ever attended school (1=Yes)	-1.365 (1954.53)	0.000 (0.00)	-0.003 (0.02)	-0.000 (0.00)
Observations	65	45	221	169
Pseudo R-square	0.369	0.389	0.211	0.16
Chi2-statistic	17.672	12.359	34.161	19.524
p-value of Chi2-statistic	0.17	0.262	0.001	0.077

Marginal effects; Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Convergence not achieved for BB, KT, and female-headed households.

Annex A5.34. Impact of Cambodia HARVEST on Wasted Children under 5 Years (Logistic FE Models), Sample 2 (a)

Variables [Dependent variables are binary with 1=wasted children and 0 otherwise]	Province		Overall	Head's gender
	PS	SR		Male
Year (1=2016)	0.180 (445.63)	-0.006 (1.06)	0.001 (0.01)	0.000 (0.00)
New treatment variable-includes dropouts	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
Program effect (DID)	-0.210 (521.95)	-0.002 (0.34)	-0.002 (0.01)	-0.000 (0.00)
HH head gender (1=Male)	1.527 (3211.17)	-0.093 (18.67)	0.021 (1.99)	
Male children (1=Yes)	0.054 (134.36)	-0.000 (0.01)	0.000 (0.00)	-0.000 (0.00)
1=children was ever breastfed	-0.136 (336.46)	0.002 (0.37)	-0.001 (0.01)	-0.000 (0.00)
Child's age in months	-0.007 (16.81)	-0.000 (0.02)	-0.000 (0.00)	-0.000 (0.00)
Children's age squared	0.000 (0.21)	0.000 (0.00)	0.000 (0.00)	0.000 (0.00)
Children age 5-15 years (#)	0.096 (239.28)	0.001 (0.21)	0.001 (0.01)	0.000 (0.00)
Log of daily per capita food consumption in Riels	-0.230 (571.37)	-0.013 (2.38)	0.000 (0.00)	0.000 (0.00)
Caregiver's age (Years)	0.158 (392.62)	-0.001 (0.17)	0.000 (0.00)	0.000 (0.00)
Caregiver's age square	-0.002 (5.78)	0.000 (0.01)	-0.000 (0.00)	-0.000 (0.00)
The care giver is the HH head(1=Yes)	1.858 (4646.99)	-0.138 (14.59)	0.002 (0.01)	0.000 (0.00)

Annex A5.34. cont.

Variables [Dependent variables are binary with 1=wasted children and 0 otherwise]	Province		Overall	Head's gender
	PS	SR		Male
Caregiver have ever attended school (1=Yes)	-1.721 (4496.10)	0.022 (12.98)	-0.002 (0.02)	-0.000 (0.00)
Observations	67	50	231	177
Pseudo R-square	0.346	0.426	0.211	0.169
Chi2-statistic	17.069	15.07	34.161	21.557
p-value of Chi2-statistic	0.196	0.303	0.001	0.043

Marginal effects; Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Convergence not achieved for BB, KT, and female-headed households.

Annex A5.35. Impact of Cambodia HARVEST on Height-to-Age Z-Scores of Children under 5 Years of Age (OLS FE Models), Sample 1

Variables [Dependent variables are height-to-age z-scores on children under 5 years]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	3.632 (2.88)	-0.122 (0.60)	-0.354 (0.78)	0.544 (0.43)	0.617 (0.58)	1.042 (1.01)	0.553 (0.60)
New treatment variable-excludes dropouts	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
Program effect (DID)	0.462 (2.38)	-0.306 (0.51)	0.035 (0.64)	-0.875* (0.39)	0.544 (0.83)	0.854 (1.03)	-0.795 (0.57)
HH head gender (1=Male)	7.924 (6.06)	-0.172 (0.85)	1.682* (0.80)	0.918 (0.72)	2.121 (1.57)		
Male children (1=Yes)	-3.118 (2.21)	-0.069 (0.30)	-0.356 (0.34)	-0.144 (0.28)	-0.878 (0.68)	-1.225 (1.00)	-0.097 (0.22)
1=children was ever breastfed	8.140 (7.85)	0.916 (0.63)	0.223 (0.56)	-0.182 (0.54)	2.455 (2.31)	3.276 (2.96)	-0.402 (0.47)
Child's age in months	0.941 (0.99)	-0.068 (0.04)	-0.158** (0.04)	-0.093** (0.03)	0.109 (0.22)	0.172 (0.29)	-0.010 (0.03)
Children's age squared	-0.013 (0.01)	0.001 (0.00)	0.002** (0.00)	0.001** (0.00)	-0.001 (0.00)	-0.002 (0.00)	-0.000 (0.00)
Children age 5-15 years (#)	0.097 (1.56)	0.108 (0.33)	-0.318 (0.25)	0.278 (0.25)	0.014 (0.26)	-0.272 (0.41)	0.417 (0.38)
Log of daily per capita food consumption in Riels	-23.270 (14.98)	-0.255 (0.38)	0.426 (0.58)	-0.532 (0.46)	-4.364 (3.90)	-5.588 (5.01)	-0.372 (0.47)
Caregiver's age (Years)	-1.568 (1.20)	-0.093 (0.14)	0.146 (0.14)	0.231 (0.12)	-0.536 (0.52)	-0.837 (0.79)	0.040 (0.17)
Caregiver's age square	0.015 (0.01)	0.002 (0.00)	-0.002 (0.00)	-0.003* (0.00)	0.005 (0.00)	0.008 (0.01)	0.000 (0.00)
The care giver is the HH head(1=Yes)	0.647 (2.28)	-1.154 (0.62)	2.354** (0.75)	1.158 (0.74)	0.640 (0.72)	0.415 (0.92)	-1.450 (2.40)

Annex A5.35. cont.

Variables [Dependent variables are height-to-age z-scores on children under 5 years]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Caregiver have ever attended school (1=Yes)	-2.244 (4.10)	0.368 (0.62)	-1.165 (0.61)	0.203 (0.51)	-0.097 (0.79)	-0.612 (1.38)	-0.910 (0.74)
Constant	236.517 (151.18)	3.379 (4.18)	-6.283 (6.14)	-0.159 (4.80)	47.788 (43.66)	67.094 (60.39)	1.820 (5.27)
Observations	340	337	331	358	1,366	1,129	237
R-square	0.143	0.235	0.201	0.217	0.032	0.042	0.157
F-statistic	0.859	3.167	5.415	2.718	2.736	2.067	1.173
p-value of F-statistic	0.597	0.000	0.000	0.001	0.001	0.017	0.308
rho	0.323	0.991	0.465	0.587	0.518	0.510	0.634

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A5.36. Impact of Cambodia HARVEST on Height-to-Age Z-Scores of Children under 5 Years of Age (OLS FE Models), Sample 2

Variables [Dependent variables are height-to-age z-scores on children under 5 years]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	3.582 (2.93)	0.029 (0.58)	-0.436 (0.78)	0.218 (0.42)	0.602 (0.62)	0.978 (1.05)	0.780 (0.60)
New treatment variable-includes dropouts	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
Program effect (DID)	0.310 (2.27)	-0.282 (0.50)	0.107 (0.64)	-0.738* (0.37)	0.557 (0.78)	0.899 (0.99)	-0.668 (0.55)
HH head gender (1=Male)	7.434 (5.93)	-0.308 (0.82)	1.662* (0.80)	0.463 (0.64)	1.951 (1.50)		
Male children (1=Yes)	-2.541 (1.93)	-0.021 (0.28)	-0.389 (0.34)	-0.040 (0.23)	-0.769 (0.59)	-1.016 (0.84)	-0.193 (0.21)
1=children was ever breastfed	7.555 (7.37)	0.665 (0.57)	0.319 (0.56)	-0.006 (0.46)	2.284 (2.08)	3.045 (2.67)	-0.532 (0.44)
Child's age in months	0.905 (0.96)	-0.072 (0.04)	-0.156** (0.04)	-0.081** (0.03)	0.095 (0.20)	0.152 (0.27)	-0.024 (0.03)
Children's age squared	-0.013 (0.01)	0.001 (0.00)	0.002** (0.00)	0.001** (0.00)	-0.001 (0.00)	-0.002 (0.00)	0.000 (0.00)
Children age 5-15 years (#)	-0.322 (1.36)	0.102 (0.31)	-0.250 (0.25)	0.377 (0.26)	0.033 (0.24)	-0.231 (0.37)	0.421 (0.37)
Log of daily per capita food consumption in Riels	-20.586 (13.94)	-0.263 (0.37)	0.337 (0.57)	0.092 (0.56)	-4.035 (3.70)	-5.100 (4.73)	-0.470 (0.46)
Caregiver's age (Years)	-1.642 (1.26)	-0.089 (0.13)	0.151 (0.14)	0.220 (0.11)	-0.539 (0.52)	-0.824 (0.78)	0.023 (0.17)
Caregiver's age square	0.016 (0.01)	0.001 (0.00)	-0.002 (0.00)	-0.003* (0.00)	0.005 (0.00)	0.008 (0.01)	0.000 (0.00)
The care giver is the HH head(1=Yes)	0.363 (2.07)	-1.106 (0.60)	2.313** (0.74)	1.033 (0.73)	0.575 (0.67)	0.316 (0.91)	-0.676 (2.46)

Annex A5.36. cont.

Variables [Dependent variables are height-to-age z-scores on children under 5 years]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Caregiver have ever attended school (1=Yes)	-2.058 (3.88)	0.310 (0.63)	-1.140 (0.63)	0.185 (0.51)	-0.116 (0.80)	-0.578 (1.39)	-0.732 (0.71)
Constant	213.152 (142.77)	3.670 (4.03)	-5.672 (6.09)	-6.073 (5.70)	44.940 (42.16)	62.251 (57.86)	3.412 (5.29)
Observations	354	369	337	437	1,497	1,240	257
R-square	0.133	0.229	0.196	0.191	0.030	0.039	0.156
F-statistic	0.691	3.568	5.285	2.809	2.889	2.166	1.394
p-value of F-statistic	0.772	0.000	0.000	0.001	0.000	0.012	0.174
rho	0.299	0.990	0.467	0.566	0.511	0.502	0.586

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A5.37. Impact of Cambodia HARVEST on Weight-to-Age Z-Scores of Children under 5 Years of Age (OLS FE Models), Sample 1

Variables [Dependent variables are weight-to-age z-scores of children under 5 years]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	1.050 (0.54)	0.296 (0.44)	0.058 (0.36)	0.193 (0.29)	0.446* (0.20)	0.376 (0.24)	0.436 (0.46)
New treatment variable-excludes dropouts	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
Program effect (DID)	-0.462 (0.47)	0.080 (0.39)	-0.225 (0.32)	-0.017 (0.24)	-0.034 (0.19)	0.084 (0.22)	-0.223 (0.45)
HH head gender (1=Male)	0.774 (1.26)	-0.697 (0.49)	1.344** (0.48)	0.205 (0.31)	0.204 (0.41)		
Male children (1=Yes)	-0.625 (0.38)	-0.242 (0.25)	-0.069 (0.19)	0.084 (0.17)	-0.214 (0.14)	-0.263 (0.18)	-0.164 (0.20)
1=children was ever breastfed	1.389 (1.11)	0.550 (0.41)	0.359 (0.28)	-0.056 (0.27)	0.475 (0.35)	0.689 (0.44)	-0.172 (0.41)
Child's age in months	0.130 (0.13)	-0.014 (0.02)	-0.023 (0.03)	-0.036 (0.02)	0.003 (0.03)	0.002 (0.04)	0.050 (0.03)
Children's age squared	-0.002 (0.00)	0.000 (0.00)	0.000 (0.00)	0.000 (0.00)	-0.000 (0.00)	-0.000 (0.00)	-0.001* (0.00)
Children age 5–15 years (#)	0.077 (0.32)	-0.065 (0.24)	-0.284 (0.14)	-0.195 (0.23)	-0.125 (0.12)	-0.147 (0.11)	-0.289 (0.31)
Log of daily per capita food consumption in Riels	-3.284 (2.26)	0.031 (0.39)	-0.100 (0.30)	0.120 (0.32)	-0.661 (0.60)	-0.947 (0.75)	0.551 (0.44)
Caregiver's age (Years)	-0.274 (0.19)	-0.186* (0.09)	-0.000 (0.08)	0.071 (0.08)	-0.127 (0.09)	-0.178 (0.12)	0.072 (0.15)
Caregiver's age square	0.003 (0.00)	0.002* (0.00)	0.000 (0.00)	-0.001 (0.00)	0.001 (0.00)	0.002 (0.00)	-0.000 (0.00)
The care giver is the HH head(1=Yes)	0.348 (0.51)	-0.961 (0.56)	0.137 (0.63)	0.680* (0.29)	0.136 (0.31)	0.132 (0.45)	-1.953 (1.82)

Annex A5.37. cont.

Variables [Dependent variables are weight-to-age z-scores of children under 5 years]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Caregiver have ever attended school (1=Yes)	0.430 (0.89)	0.072 (0.33)	0.602 (0.34)	-0.096 (0.24)	0.241 (0.24)	0.318 (0.30)	-1.038* (0.49)
Constant	33.216 (22.88)	2.291 (4.08)	-1.941 (3.35)	-3.439 (3.22)	7.187 (6.74)	10.986 (9.06)	-7.484 (4.57)
Observations	340	337	331	358	1,366	1,129	237
R-square	0.172	0.237	0.120	0.104	0.064	0.083	0.157
F-statistic	1.557	2.580	1.729	8.153	3.502	4.153	1.736
p-value of F-statistic	0.100	0.002	0.057	0.000	0.000	0.000	0.065
rho	0.383	0.839	0.523	0.509	0.515	0.524	0.662

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A5.38. Impact of Cambodia HARVEST on Weight-to-Age Z-Scores of Children under 5 Years of Age (OLS FE Models), Sample 2

Variables [Dependent variables are weight-to-age z-scores of children under 5 years]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	0.992 (0.56)	0.390 (0.44)	0.033 (0.35)	0.104 (0.27)	0.410* (0.20)	0.314 (0.25)	0.666 (0.47)
New treatment variable-includes dropouts	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
Program effect (DID)	-0.521 (0.45)	0.076 (0.38)	-0.193 (0.32)	0.028 (0.23)	-0.023 (0.19)	0.095 (0.21)	-0.115 (0.46)
HH head gender (1=Male)	0.687 (1.27)	-0.790 (0.46)	1.342** (0.49)	0.140 (0.25)	0.183 (0.38)		
Male children (1=Yes)	-0.542 (0.35)	-0.198 (0.24)	-0.056 (0.18)	-0.020 (0.15)	-0.205 (0.13)	-0.233 (0.16)	-0.209 (0.19)
1=children was ever breastfed	1.324 (1.05)	0.371 (0.38)	0.385 (0.27)	0.019 (0.25)	0.451 (0.32)	0.668 (0.40)	-0.312 (0.39)
Child's age in months	0.128 (0.13)	-0.018 (0.02)	-0.024 (0.03)	-0.034 (0.02)	0.001 (0.03)	0.001 (0.04)	0.035 (0.03)
Children's age squared	-0.002 (0.00)	0.000 (0.00)	0.000 (0.00)	0.000 (0.00)	-0.000 (0.00)	-0.000 (0.00)	-0.001 (0.00)
Children age 5-15 years (#)	0.046 (0.27)	-0.052 (0.23)	-0.251 (0.14)	-0.157 (0.23)	-0.095 (0.11)	-0.110 (0.11)	-0.285 (0.30)
Log of daily per capita food consumption in Riels	-2.780 (2.15)	0.026 (0.38)	-0.143 (0.30)	0.213 (0.31)	-0.578 (0.58)	-0.820 (0.72)	0.461 (0.44)
Caregiver's age (Years)	-0.302 (0.20)	-0.182* (0.09)	0.003 (0.08)	0.120 (0.08)	-0.125 (0.09)	-0.177 (0.12)	0.055 (0.16)
Caregiver's age square	0.003 (0.00)	0.002* (0.00)	0.000 (0.00)	-0.001 (0.00)	0.001 (0.00)	0.002 (0.00)	-0.000 (0.00)
The care giver is the HH head(1=Yes)	0.282 (0.51)	-0.926 (0.52)	0.116 (0.62)	0.510 (0.30)	0.094 (0.29)	0.092 (0.45)	-1.189 (1.89)

Annex A5.38. cont.

Variables [Dependent variables are weight-to-age z-scores of children under 5 years]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Caregiver have ever attended school (1=Yes)	0.444 (0.86)	0.039 (0.34)	0.619 (0.35)	0.023 (0.25)	0.271 (0.24)	0.364 (0.30)	-0.855 (0.49)
Constant	28.989 (22.10)	2.510 (4.00)	-1.680 (3.37)	-5.230 (3.05)	6.333 (6.54)	9.654 (8.77)	-6.039 (4.74)
Observations	354	369	337	437	1497	1240	257
R-square	0.158	0.228	0.115	0.110	0.062	0.078	0.138
F-statistic	1.414	2.741	1.655	2.102	3.832	4.342	1.186
p-value of F-statistic	0.154	0.001	0.073	0.014	0.000	0.000	0.297
rho	0.356	0.833	0.527	0.514	0.508	0.512	0.603

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A5.39. Impact of Cambodia HARVEST on Weight-to-Height Z-Scores of Children under 5 Years of Age (OLS FE Models), Sample 1

Variables [Dependent variables are weight-to-height z-scores of children under 5 years]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	3.180 (1.79)	0.569 (0.54)	2.628 (1.91)	-0.133 (0.48)	1.253* (0.55)	1.519* (0.75)	0.197 (0.68)
New treatment variable-excludes dropouts	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
Program effect (DID)	-2.249 (1.68)	0.442 (0.45)	1.273 (1.87)	0.714 (0.41)	0.277 (0.82)	0.392 (0.99)	0.312 (0.48)
HH head gender (1=Male)	2.057 (3.63)	-1.235 (0.63)	-0.516 (2.91)	-0.716 (0.52)	-0.280 (0.84)		
Male children (1=Yes)	-0.580 (1.33)	-0.334 (0.30)	0.278 (2.68)	0.231 (0.32)	-0.143 (0.76)	-0.253 (1.01)	-0.228 (0.23)
1=children was ever breastfed	1.034 (4.49)	-0.109 (0.46)	-1.796 (1.72)	0.030 (0.51)	-0.203 (1.25)	-0.018 (1.53)	-0.029 (0.45)
Child's age in months	0.470 (0.37)	0.005 (0.03)	0.383 (0.26)	-0.006 (0.03)	0.180 (0.10)	0.236 (0.13)	0.034 (0.04)
Children's age squared	-0.007 (0.01)	-0.000 (0.00)	-0.007 (0.00)	-0.000 (0.00)	-0.003 (0.00)	-0.004 (0.00)	-0.001 (0.00)
Children age 5-15 years (#)	-0.032 (0.72)	-0.166 (0.32)	0.514 (1.02)	-0.533 (0.42)	-0.098 (0.36)	-0.130 (0.42)	-0.632 (0.58)
Log of daily per capita food consumption in Riels	-4.868 (8.52)	0.105 (0.52)	-0.723 (0.91)	0.405 (0.57)	-0.790 (1.91)	-1.358 (2.48)	1.001 (0.53)
Caregiver's age (Years)	-1.045 (0.67)	-0.182* (0.09)	-1.031 (0.92)	-0.068 (0.14)	-0.491 (0.27)	-0.694 (0.39)	0.034 (0.22)
Caregiver's age square	0.010 (0.01)	0.002* (0.00)	0.011 (0.01)	0.001 (0.00)	0.005 (0.00)	0.007 (0.00)	0.000 (0.00)
The care giver is the HH head (1=Yes)	-0.035 (1.81)	-0.586 (0.62)	-2.574 (2.27)	-0.221 (0.59)	-0.402 (0.57)	-0.371 (1.16)	-1.828 (2.45)

Annex A5.39. cont.

Variables [Dependent variables are weight-to-height z-scores of children under 5 years]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Caregiver have ever attended school (1=Yes)	-1.596 (2.05)	-0.246 (0.48)	1.559 (1.43)	-0.189 (0.46)	-0.122 (0.46)	-0.178 (0.75)	-0.365 (0.53)
Constant	63.637 (81.66)	3.289 (5.09)	22.940 (23.97)	-2.347 (4.97)	16.293 (20.03)	25.056 (27.63)	-10.339* (4.77)
Observations	340	337	331	358	1,366	1,129	237
R-square	0.068	0.157	0.060	0.082	0.026	0.032	0.196
F-statistic	0.687	2.387	0.555	1.547	0.795	0.493	2.777
p-value of F-statistic	0.775	0.005	0.887	0.103	0.666	0.919	0.002
rho	0.501	0.964	0.495	0.957	0.597	0.580	0.698

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

Annex A5.40. Impact of Cambodia HARVEST on Weight-to-Height Z-Scores of Children under 5 Years of Age (OLS FE Models), Sample 2

Variables [Dependent variables are weight-to-height z-scores of children under 5 years]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Year (1=2016)	3.257 (1.87)	0.580 (0.52)	2.664 (1.92)	0.024 (0.45)	1.274* (0.54)	1.530* (0.74)	0.304 (0.68)
New treatment variable-includes dropouts	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
Program effect (DID)	-2.110 (1.55)	0.407 (0.44)	1.253 (1.85)	0.693 (0.40)	0.282 (0.74)	0.392 (0.91)	0.341 (0.48)
HH head gender (1=Male)	1.847 (3.59)	-1.230* (0.57)	-0.503 (2.90)	-0.377 (0.50)	-0.247 (0.80)		
Male children (1=Yes)	-0.361 (1.15)	-0.310 (0.29)	0.321 (2.63)	0.020 (0.26)	-0.144 (0.69)	-0.227 (0.90)	-0.213 (0.22)
1=children was ever breastfed	0.925 (4.17)	-0.162 (0.42)	-1.842 (1.74)	-0.024 (0.43)	-0.267 (1.14)	-0.102 (1.39)	-0.110 (0.41)
Child's age in months	0.466 (0.36)	0.004 (0.03)	0.381 (0.26)	-0.014 (0.03)	0.167 (0.09)	0.215 (0.12)	0.027 (0.04)
Children's age squared	-0.007 (0.01)	-0.000 (0.00)	-0.007 (0.00)	0.000 (0.00)	-0.003 (0.00)	-0.004 (0.00)	-0.000 (0.00)
Children age 5-15 years (#)	-0.346 (0.67)	-0.138 (0.31)	0.498 (0.99)	-0.581 (0.40)	-0.101 (0.31)	-0.122 (0.35)	-0.629 (0.57)
Log of daily per capita food consumption in Riels	-4.252 (7.52)	0.108 (0.51)	-0.702 (0.88)	0.028 (0.54)	-0.770 (1.80)	-1.302 (2.31)	0.970 (0.54)
Caregiver's age (Years)	-1.026 (0.66)	-0.181* (0.08)	-1.030 (0.92)	-0.000 (0.14)	-0.479 (0.27)	-0.678 (0.38)	0.027 (0.22)
Caregiver's age square	0.010 (0.01)	0.002* (0.00)	0.011 (0.01)	0.001 (0.00)	0.005 (0.00)	0.007 (0.00)	-0.000 (0.00)
The care giver is the HH head (1=Yes)	-0.303 (1.86)	-0.598 (0.56)	-2.567 (2.27)	-0.323 (0.54)	-0.363 (0.52)	-0.348 (1.12)	-1.524 (2.43)

Annex A5.40. cont.

Variables [Dependent variables are weight-to-height z-scores of children under 5 years]	Province				Overall	Head's gender	
	BB	KT	PS	SR		Male	Female
Caregiver have ever attended school (1=Yes)	-1.450 (2.04)	-0.242 (0.48)	1.560 (1.43)	0.002 (0.44)	-0.149 (0.46)	-0.228 (0.74)	-0.284 (0.52)
Constant	57.457 (73.59)	3.256 (4.97)	22.712 (23.67)	-0.014 (4.76)	15.959 (19.14)	24.396 (26.14)	-9.798 (4.98)
Observations	354	369	337	437	1,497	1,240	257
R-square	0.066	0.156	0.060	0.068	0.024	0.030	0.190
F-statistic	0.635	2.447	0.551	0.699	0.831	0.536	2.671
p-value of F-statistic	0.823	0.004	0.890	0.764	0.627	0.892	0.003
rho	0.497	0.963	0.496	0.951	0.592	0.575	0.683

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$.

Source: Cambodia HARVEST Baseline Survey, 2012 and Cambodia HARVEST Endline Survey, 2016.

ANNEX 6. RESULTS OF PROPENSITY SCORE MATCHING

Annex A6.1. Sample Balance before and after Matching: Results of PSM Based on Nearest Neighbor 4 (NN4) Model for Sample 1

Variable	Sample ^a	Mean		%bias	%reduct bias	t-test		V(T)/ V(C)
		Treated	Control			t	p>t	
Tropical Livestock	U	2.6649	2.2384	16.2		2.97	0.003	1.35*
Unit	M	2.6452	2.769	-4.7	71	-0.97	0.332	0.74*
Poverty score	U	32.413	30.375	17.4		3.29	0.001	0.93
	M	32.233	32.056	1.5	91.3	0.35	0.728	0.95
Poverty score square	U	1182.4	1064.6	15		2.83	0.005	0.99
	M	1171.9	1166.9	0.6	95.8	0.14	0.887	0.94
Asset index	U	0.2122	-0.1775	20.2		3.87	0	0.78*
	M	0.19851	0.27643	-4	80	-0.89	0.371	0.71*
Asset value	U	5.6109	5.1142	6.4		1.23	0.219	0.71*
	M	5.645	6.7311	-13.9	-118.7	-2.28	0.023	0.28*
Total land size (ha)	U	2.6951	2.713	-0.7		-0.14	0.891	0.88*
	M	2.7074	2.9855	-11.2	-1448	-2.3	0.021	0.62*
Total land area (square)	U	13.061	13.969	-2.5		-0.48	0.63	0.71*
	M	13.192	18.374	-14.2	-470.7	-2.3	0.022	0.27*
Housing index	U	0.14982	0.20498	-14.5		-2.78	0.006	.
	M	0.14857	0.17071	-5.8	59.9	-1.39	0.166	.
Quintiles of annual per capita expenditures	U	3.0313	2.8736	11.2		2.1	0.036	1
	M	3.0219	3.0143	0.5	95.2	0.12	0.901	1.01
Non food expenditures	U	2453.9	2330	3.3		0.62	0.537	0.93
	M	2487.2	2563.1	-2	38.7	-0.44	0.663	0.82*
Area of residence	U	0.10579	0.0889	6.4		1.19	0.233	1.04
	M	0.10217	0.11775	-5.9	7.7	-1.15	0.252	0.54*
Roof-durable	U	0.91728	0.87165	14.9		2.89	0.004	.
	M	0.91714	0.90929	2.6	82.8	0.64	0.523	.
Floor-durable	U	0.90533	0.91571	-3.6		-0.68	0.499	.
	M	0.90667	0.91405	-2.6	28.9	-0.59	0.554	.
Wall-durable	U	0.73254	0.71456	4		0.76	0.449	.
	M	0.73238	0.73381	-0.3	92.1	-0.07	0.941	.
Water source-well	U	0.71691	0.67816	8.4		1.6	0.111	.
	M	0.71905	0.69857	4.5	47.2	1.03	0.302	.
Water source-lake or rain	U	0.25092	0.28352	-7.4		-1.39	0.164	.
	M	0.24857	0.26524	-3.8	48.9	-0.87	0.382	.
Light source- electricity	U	0.29963	0.2433	12.7		2.36	0.019	.
	M	0.29429	0.30071	-1.4	88.6	-0.32	0.747	.
Light source-battery	U	0.45956	0.44253	3.4		0.64	0.521	.
	M	0.4619	0.46786	-1.2	65	-0.27	0.785	.
Fuel source-wood	U	0.95956	0.95785	0.9		0.16	0.872	.
	M	0.9581	0.96071	-1.3	-53.7	-0.3	0.761	.
Own cellphone	U	0.84007	0.8046	9.3		1.77	0.077	.
	M	0.8381	0.86476	-7	24.8	-1.72	0.086	.
Number of plots	U	4.2472	3.8966	16.4		3.04	0.002	1.13
	M	4.2543	4.229	1.2	92.8	0.27	0.785	1.18*
Total agric land	U	1.8892	2.0871	-7.9		-1.51	0.132	0.88*

Annex A6.1. cont.

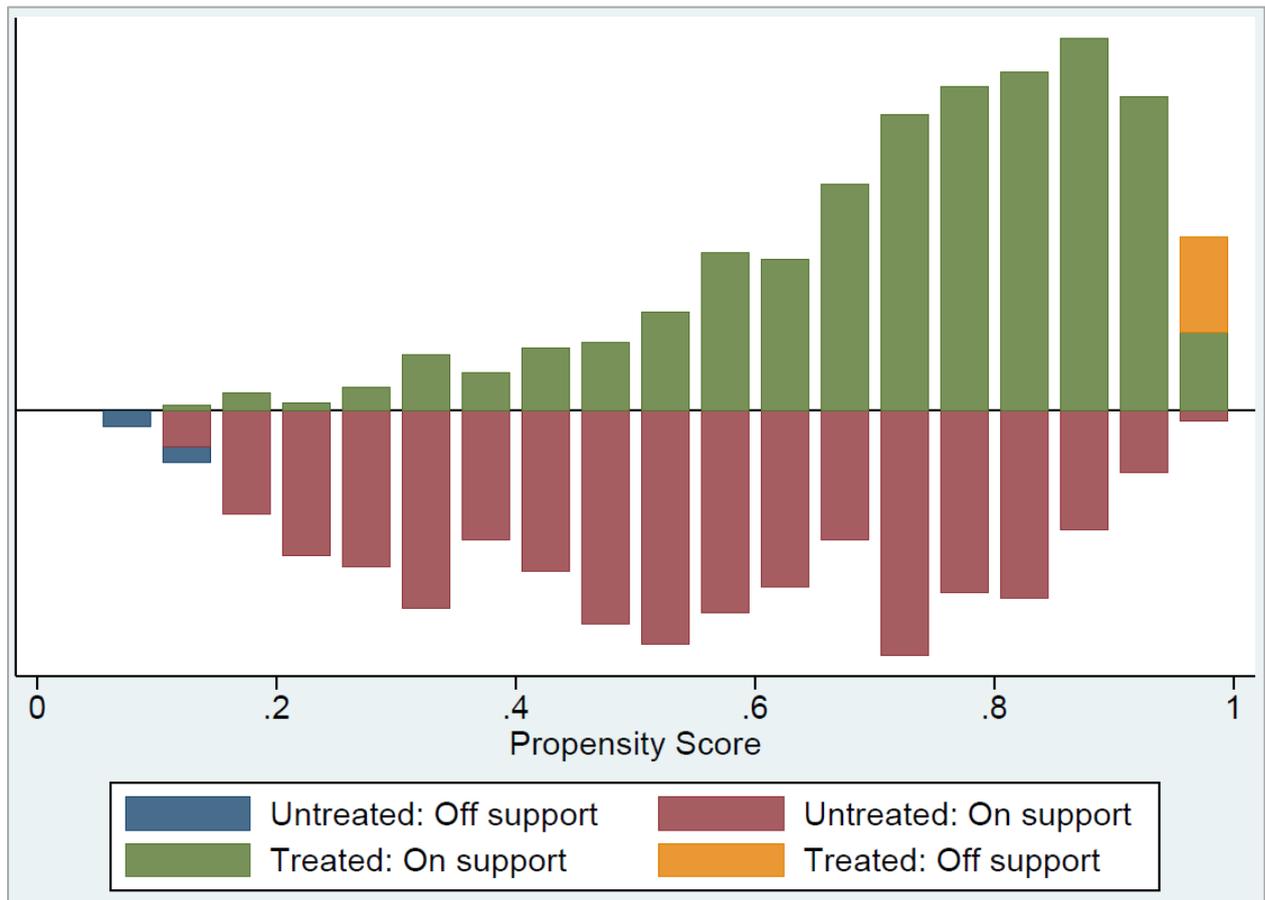
Variable	Sample ^a	Mean			%reduct bias	t-test		V(T)/ V(C)
		Treated	Control	%bias		t	p>t	
	M	1.9003	2.1285	-9.1	-15.4	-1.94	0.053	0.68*
Grow dry rice	U	0.26471	0.12261	36.5		6.54	0	.
	M	0.25333	0.25119	0.6	98.5	0.11	0.91	.
Grow wet rice	U	0.94118	0.94636	-2.2		-0.42	0.675	.
	M	0.94476	0.94167	1.3	40.3	0.31	0.759	.
Grow vegetable	U	0.83088	0.5728	58.8		11.6	0	.
	M	0.82571	0.8169	2	96.6	0.53	0.598	.
Home gardening	U	59.806	54.772	17.8		3.48	0.001	0.64*
	M	59.379	59.294	0.3	98.3	0.07	0.945	0.66*
Fish farmer	U	0.1011	0.01724	36.1		6.09	0	.
	M	0.07429	0.06881	2.4	93.5	0.49	0.627	.
HH size	U	5.3134	5.4828	-8.9		-1.7	0.089	0.86*
	M	5.339	5.3814	-2.2	75	-0.5	0.619	0.76*
Adult equiv unit	U	4.2362	4.3208	-5.1		-0.98	0.329	0.83*
	M	4.253	4.2828	-1.8	64.8	-0.4	0.687	0.77*
Female head	U	0.1489	0.15517	-1.7		-0.33	0.742	.
	M	0.15048	0.16	-2.7	-51.8	-0.6	0.547	.
Head literate	U	0.83548	0.74138	23.2		4.49	0	.
	M	0.83238	0.84548	-3.2	86.1	-0.82	0.415	.
Head's level of edu	U	5.3392	4.4368	22.7		4.27	0	0.97
	M	5.2971	5.416	-3	86.8	-0.66	0.507	0.85*
Head's age	U	47.621	44.232	28.3		5.33	0	0.99
	M	47.409	48.519	-9.3	67.3	-2.1	0.035	0.94
Highest edu level in the HH	U	9.2197	8.1916	28.6		5.49	0	0.79*
	M	9.1886	9.2731	-2.4	91.8	-0.55	0.584	0.82*
Dependency ratio	U	0.64214	0.66331	-3.4		-0.64	0.522	1.08
	M	0.6443	0.65528	-1.8	48.1	-0.35	0.727	0.61*
% children <5	U	0.08218	0.10392	-16.6		-3.17	0.002	0.80*
	M	0.08412	0.08613	-1.5	90.7	-0.37	0.709	1.05
% women 15-49	U	0.40902	0.41999	-5.9		-1.1	0.272	1.19*
	M	0.41082	0.4038	3.8	36	0.85	0.396	1.05
% of HH members ever attended school	U	0.80756	0.71941	41.3		7.98	0	0.72*
	M	0.80202	0.80746	-2.5	93.8	-0.65	0.518	1.07
% female members	U	0.52027	0.50502	8.9		1.65	0.098	1.15*
	M	0.5203	0.5212	-0.5	94	-0.12	0.904	1.1
Province-KT	U	0.25919	0.25287	1.4		0.27	0.786	.
	M	0.26667	0.28667	-4.6	-216.6	-1.02	0.306	.
Province-Pursat	U	0.30147	0.23372	15.3		2.84	0.005	.
	M	0.29143	0.24357	10.8	29.4	2.48	0.013	.
Province-SiemReap	U	0.19393	0.26054	-15.9		-3.05	0.002	.
	M	0.1981	0.17262	6.1	61.7	1.5	0.133	.

a. U=unmatched (before matching); M=Matched (after matching).

Annex A6.2. Covariate Bias before and after Matching (NN4, Sample 1)

Sample	Ps R2	LR chi2	p>chi2	Mean Bias	Med Bias	B	R	%Var
Unmatched	0.168	341.72	0	13.8	10.2	103.7*	1.01	61
Matched	0.016	47.49	0.259	3.9	2.6	30.2*	1.02	65

Figure A6.1. Density Distribution of Propensity Scores and Observations on Support and off Support in Treatment and Comparison Groups (NN4, Sample 1)



Annex A6.3. Sample Balance before and after Matching: Results of PSM Based on Kernel Matching Model for Sample 1

Variable	Sample ^a	Mean			%reduct bias	t-test		V(T)/ V(C)
		Treated	Control	%bias		t	p>t	
Tropical Livestock	U	2.6649	2.2384	16.2		2.97	0.003	1.35*
Unit	M	2.6452	2.7029	-2.2	86.5	-0.46	0.643	0.81*
Poverty score	U	32.413	30.375	17.4		3.29	0.001	0.93
	M	32.233	31.914	2.7	84.3	0.62	0.534	0.93
Poverty score square	U	1182.4	1064.6	15		2.83	0.005	0.99
	M	1171.9	1161.8	1.3	91.5	0.28	0.776	0.88*
Asset index	U	0.2122	-0.1775	20.2		3.87	0	0.78*
	M	0.1985	0.1735	1.3	93.6	0.29	0.775	0.71*
Asset value	U	5.6109	5.1142	6.4		1.23	0.219	0.71*
	M	5.645	6.4875	-10.8	-69.7	-1.85	0.065	0.31*
Total land size (ha)	U	2.6951	2.713	-0.7		-0.14	0.891	0.88*
	M	2.7074	2.9153	-8.3	-1057	-1.72	0.085	0.62*
Total land area	U	13.061	13.969	-2.5		-0.48	0.63	0.71*
(square)	M	13.192	17.956	-13	-424.7	-2.14	0.032	0.28*
Housing index	U	0.1498	0.20498	-14.5		-2.78	0.006	.
	M	0.1486	0.17001	-5.6	61.1	-1.34	0.18	.
Quintiles of annual	U	3.0313	2.8736	11.2		2.1	0.036	1
per capita	M	3.0219	2.978	3.1	72.2	0.71	0.477	0.99
expenditures								
Non food	U	2453.9	2330	3.3		0.62	0.537	0.93
expenditures	M	2487.2	2512.9	-0.7	79.2	-0.15	0.882	0.83*
Area of residence	U	0.1058	0.0889	6.4		1.19	0.233	1.04
	M	0.1022	0.11525	-4.9	22.5	-0.96	0.336	0.54*
Roof-durable	U	0.9173	0.87165	14.9		2.89	0.004	.
	M	0.9171	0.91737	-0.1	99.5	-0.02	0.985	.
Floor-durable	U	0.9053	0.91571	-3.6		-0.68	0.499	.
	M	0.9067	0.91365	-2.4	32.7	-0.56	0.576	.
Wall-durable	U	0.7325	0.71456	4		0.76	0.449	.
	M	0.7324	0.738	-1.3	68.8	-0.29	0.771	.
Water source-well	U	0.7169	0.67816	8.4		1.6	0.111	.
	M	0.7191	0.70516	3	64.2	0.7	0.482	.
Water source-lake or	U	0.2509	0.28352	-7.4		-1.39	0.164	.
rain	M	0.2486	0.25826	-2.2	70.3	-0.51	0.61	.
Light source-	U	0.2996	0.2433	12.7		2.36	0.019	.
electricity	M	0.2943	0.28208	2.7	78.3	0.62	0.537	.
Light source-battery	U	0.4596	0.44253	3.4		0.64	0.521	.
	M	0.4619	0.48757	-5.2	-50.7	-1.18	0.239	.
Fuel source-wood	U	0.9596	0.95785	0.9		0.16	0.872	.
	M	0.9581	0.95656	0.8	10.2	0.17	0.862	.
Own cellphone	U	0.8401	0.8046	9.3		1.77	0.077	.
	M	0.8381	0.85139	-3.5	62.5	-0.84	0.4	.
Number of plots	U	4.2472	3.8966	16.4		3.04	0.002	1.13
	M	4.2543	4.2371	0.8	95.1	0.18	0.854	1.12
Total agric land	U	1.8892	2.0871	-7.9		-1.51	0.132	0.88*
	M	1.9003	2.0553	-6.2	21.6	-1.31	0.189	0.68*

Annex 6.3. cont.

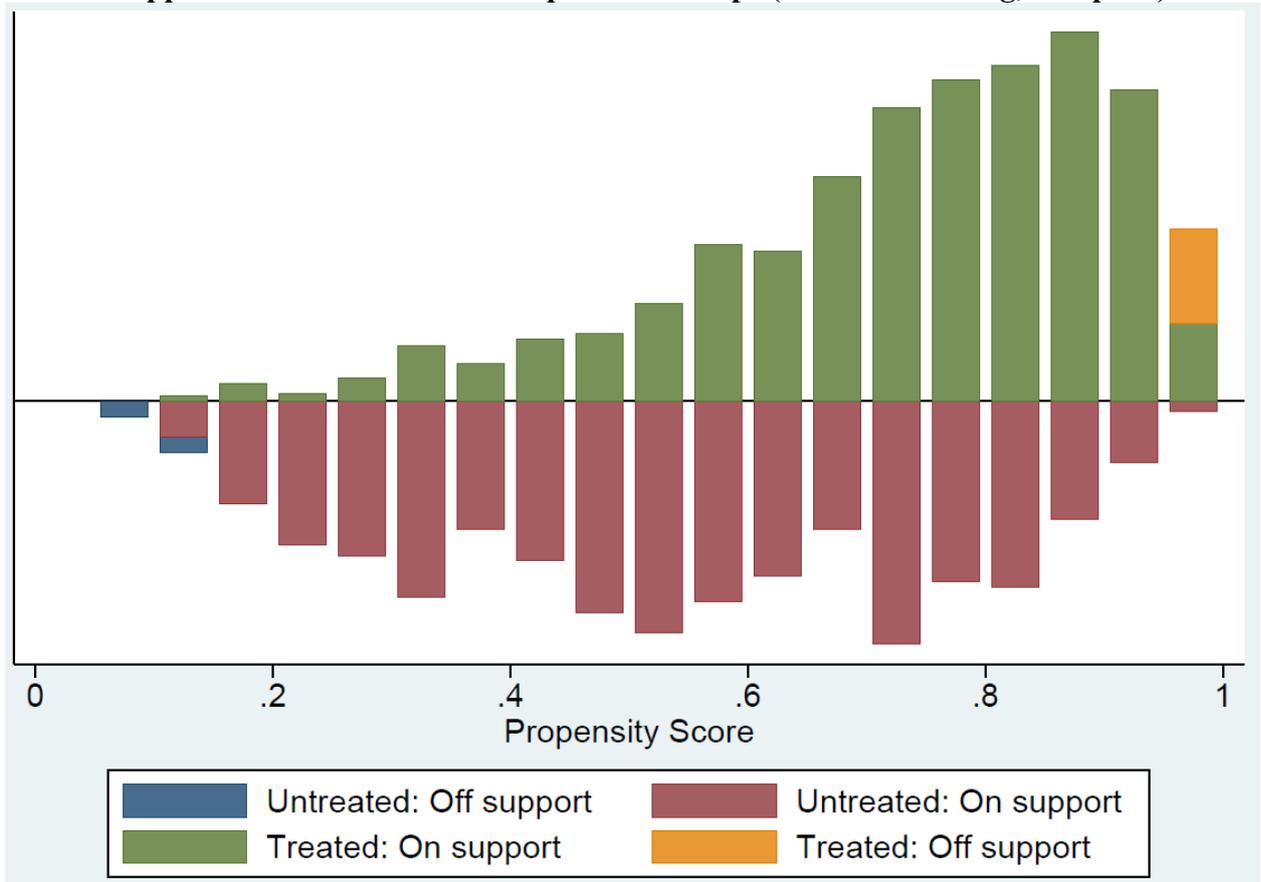
Variable	Sample ^a	Mean Treated	Control	%reduct %bias	t-test bias	V(T)/ t	0 p>t	. V(C)
Grow wet rice	U	0.9412	0.94636	-2.2		-0.42	0.675	.
	M	0.9448	0.94292	0.8	64.5	0.18	0.855	.
Grow vegetable	U	0.8309	0.5728	58.8		11.6	0	.
	M	0.8257	0.81902	1.5	97.4	0.4	0.688	.
Home gardening	U	59.806	54.772	17.8		3.48	0.001	0.64*
	M	59.379	59.773	-1.4	92.2	-0.32	0.749	0.65*
Fish farmer	U	0.1011	0.01724	36.1		6.09	0	.
	M	0.0743	0.06756	2.9	92	0.6	0.548	.
HH size	U	5.3134	5.4828	-8.9		-1.7	0.089	0.86*
	M	5.339	5.3494	-0.5	93.9	-0.12	0.903	0.78*
Adult equiv unit	U	4.2362	4.3208	-5.1		-0.98	0.329	0.83*
	M	4.253	4.2544	-0.1	98.4	-0.02	0.985	0.78*
Female head	U	0.1489	0.15517	-1.7		-0.33	0.742	.
	M	0.1505	0.16604	-4.3	-148.1	-0.98	0.329	.
Head literate	U	0.8355	0.74138	23.2		4.49	0	.
	M	0.8324	0.84611	-3.4	85.4	-0.86	0.392	.
Head's level of edu	U	5.3392	4.4368	22.7		4.27	0	0.97
	M	5.2971	5.5086	-5.3	76.6	-1.17	0.24	0.83*
Head's age	U	47.621	44.232	28.3		5.33	0	0.99
	M	47.409	48.151	-6.2	78.1	-1.4	0.161	0.93
Highest edu level in the HH	U	9.2197	8.1916	28.6		5.49	0	0.79*
	M	9.1886	9.2928	-2.9	89.9	-0.67	0.5	0.81*
Dependency ratio	U	0.6421	0.66331	-3.4		-0.64	0.522	1.08
	M	0.6443	0.64533	-0.2	95.1	-0.03	0.973	0.71*
% children <5	U	0.0822	0.10392	-16.6		-3.17	0.002	0.80*
	M	0.0841	0.09027	-4.7	71.7	-1.12	0.265	0.96
% women 15-49	U	0.409	0.41999	-5.9		-1.1	0.272	1.19*
	M	0.4108	0.39823	6.8	-14.9	1.52	0.129	1.04
% of HH members ever attended school	U	0.8076	0.71941	41.3		7.98	0	0.72*
	M	0.802	0.79868	1.6	96.2	0.39	0.696	0.99
% female members	U	0.5203	0.50502	8.9		1.65	0.098	1.15*
	M	0.5203	0.51659	2.2	75.7	0.49	0.624	1.09
Province-KT	U	0.2592	0.25287	1.4		0.27	0.786	.
	M	0.2667	0.30142	-8	-450	-1.77	0.078	.
Province-Pursat	U	0.3015	0.23372	15.3		2.84	0.005	.
	M	0.2914	0.252	8.9	41.8	2.03	0.042	.
Province-SiemReap	U	0.1939	0.26054	-15.9		-3.05	0.002	.
	M	0.1981	0.16122	8.8	44.6	2.2	0.028	.

a. U=unmatched (before matching); M=Matched (after matching).

Annex A6.4. Covariate Bias before and after Matching (Kernel Matching, Sample 1)

Sample	Ps R2	LR chi2	p>chi2	Mean Bias	Med Bias	B	R	%Var
Unmatched	0.168	341.72	0	13.8	10.2	103.7*	1.01	61
Matched	0.019	54.35	0.096	3.7	2.9	32.4*	1.22	65

Figure A6.2. Density Distribution of Propensity Scores and Observations on Support and off Support in Treatment and Comparison Groups (Kernel Matching, Sample 1)



Annex A6.5. Sample Balance before and after Matching: Results of PSM Based on Nearest Neighbor 4 (NN4) Model for Sample 2

Variable	Sample ^a	Mean		%bias	%reduct bias	t-test		V(T)/V(C)
		Treated	Control			t	p>t	
Tropical Livestock Unit	U	2.6077	2.2384	14.2		2.66	0.008	1.29*
	M	2.613	2.8278	-8.3	41.8	-1.82	0.07	0.76*
Poverty score	U	32.33	30.375	16.8		3.26	0.001	0.91
	M	32.297	31.734	4.8	71.2	1.22	0.224	0.91
Poverty score square	U	1174.3	1064.6	14.1		2.71	0.007	0.97
	M	1172.3	1148.7	3	78.5	0.75	0.453	0.92
Asset index	U	0.14287	-0.1775	16.5		3.24	0.001	0.81*
	M	0.14239	0.03687	5.4	67.1	1.33	0.184	0.74*
Asset value	U	5.4779	5.1142	4.5		0.88	0.381	0.84*
	M	5.4821	6.8309	-16.6	-270.9	-2.78	0.006	0.26*
Total land size (ha)	U	2.6032	2.713	-4.4		-0.85	0.395	0.91
	M	2.6096	2.7359	-5	-14.9	-1.15	0.251	0.65*
Total land area (square)	U	12.766	13.969	-3.2		-0.63	0.529	0.80*
	M	12.823	16.74	-10.4	-225.8	-1.89	0.059	0.30*
Housing index	U	0.16418	0.20498	-10.5		-2.06	0.039	.
	M	0.16206	0.17055	-2.2	79.2	-0.57	0.566	.
Quintiles of annual per capita expenditures	U	3.0118	2.8736	9.8		1.88	0.06	1.01
	M	3.0103	2.9275	5.9	40.1	1.47	0.141	1.01
Non food expenditures	U	2428.5	2330	2.6		0.51	0.609	0.89*
	M	2435.9	2476.5	-1.1	58.8	-0.27	0.79	0.83*
Area of residence	U	0.10046	0.0889	4.5		0.87	0.385	0.93
	M	0.10028	0.10399	-1.4	68	-0.31	0.756	0.55*
Roof-durable	U	0.90652	0.87165	11.1		2.2	0.028	.
	M	0.90751	0.90514	0.8	93.2	0.2	0.838	.
Floor-durable	U	0.90338	0.91571	-4.3		-0.82	0.414	.
	M	0.90514	0.90949	-1.5	64.7	-0.38	0.706	.
Wall-durable	U	0.73606	0.71456	4.8		0.93	0.352	.
	M	0.73597	0.73893	-0.7	86.2	-0.17	0.866	.
Water source-well	U	0.73213	0.67816	11.8		2.31	0.021	.
	M	0.73202	0.73379	-0.4	96.7	-0.1	0.92	.
Water source-lake or rain	U	0.23488	0.28352	-11.1		-2.17	0.03	.
	M	0.23478	0.23478	0	100	0	1	.
Light source-electricity	U	0.29065	0.2433	10.7		2.04	0.042	.
	M	0.29091	0.26265	6.4	40.3	1.59	0.112	.
Light source-battery	U	0.44933	0.44253	1.4		0.26	0.792	.
	M	0.44901	0.48439	-7.1	-420	-1.78	0.075	.
Fuel source-wood	U	0.96308	0.95785	2.7		0.52	0.601	.
	M	0.96285	0.97628	-6.9	-157.2	-1.97	0.049	.
Own cellphone	U	0.83504	0.8046	7.9		1.55	0.122	.
	M	0.83399	0.8417	-2	74.7	-0.53	0.599	.
Number of plots	U	4.132	3.8966	11.1		2.11	0.035	1.1
	M	4.1415	4.1832	-2	82.3	-0.48	0.632	0.99
Total agric land	U	1.8284	2.0871	-10.3		-2.01	0.044	0.89*

Annex A6.5. cont.

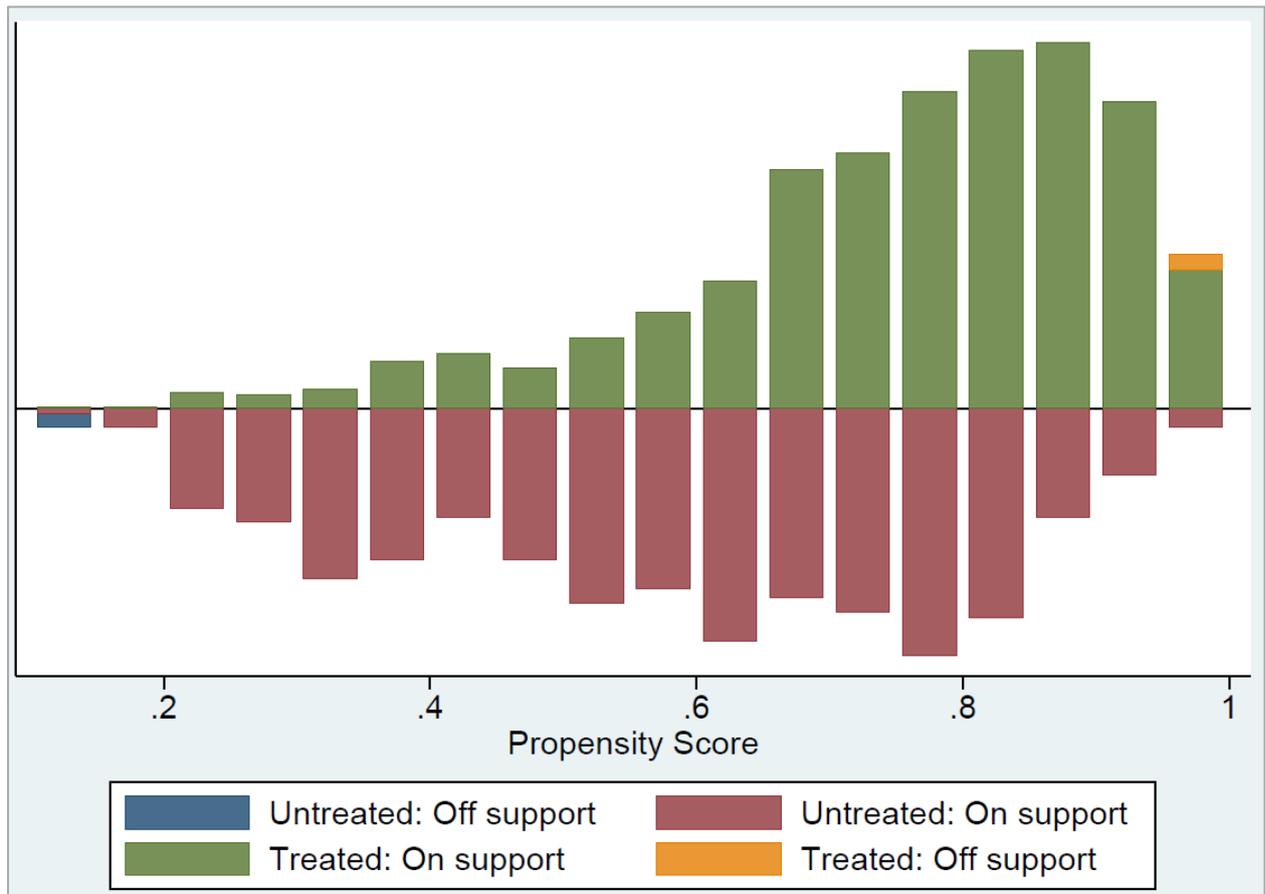
Variable	Sample ^a	Mean			%reduct bias	t-test		V(T)/ V(C)
		Treated	Control	%bias		t	p>t	
Grow dry rice	M	1.8345	1.8702	-1.4	86.2	-0.34	0.736	0.72*
	U	0.2498	0.12261	33.1		6.04	0	.
Grow wet rice	M	0.24585	0.22806	4.6	86	1.05	0.293	.
	U	0.93637	0.94636	-4.3		-0.8	0.421	.
Grow vegetable	M	0.93834	0.93577	1.1	74.3	0.27	0.79	.
	U	0.82718	0.5728	57.7		11.78	0	.
Home gardening	M	0.82609	0.83221	-1.4	97.6	-0.41	0.682	.
	U	58.004	54.772	11.4		2.28	0.023	0.67*
Fish farmer	M	57.9	58.707	-2.8	75.1	-0.7	0.483	0.64*
	U	0.09427	0.01724	34		5.79	0	.
HH size	M	0.08854	0.08004	3.8	89	0.77	0.442	.
	U	5.2867	5.4828	-10.4		-2.04	0.042	0.84*
Adult equiv unit	M	5.2901	5.3223	-1.7	83.6	-0.42	0.673	0.79*
	U	4.2167	4.3208	-6.3		-1.24	0.215	0.82*
Female head	M	4.2211	4.2537	-2	68.7	-0.49	0.625	0.77*
	U	0.1524	0.15517	-0.8		-0.15	0.882	.
Head literate	M	0.15257	0.1498	0.8	0.3	0.19	0.846	.
	U	0.81383	0.74138	17.5		3.45	0.001	.
Head's level of edu	M	0.81344	0.83538	-5.3	69.7	-1.45	0.147	.
	U	5.1862	4.4368	18.7		3.6	0	0.99
Head's age	M	5.1826	5.3783	-4.9	73.9	-1.2	0.231	0.9
	U	47.389	44.232	26.4		5.08	0	0.99
Highest edu level in the HH	M	47.379	47.802	-3.5	86.6	-0.87	0.383	0.93
	U	9.0723	8.1916	24.2		4.76	0	0.83*
Dependency ratio	M	9.0735	9.0221	1.4	94.2	0.36	0.718	0.87*
	U	0.64073	0.66331	-3.7		-0.7	0.485	1.09
% children <5	M	0.64057	0.64357	-0.5	86.7	-0.11	0.91	0.80*
	U	0.0827	0.10392	-16.1		-3.16	0.002	0.82*
% women 15-49	M	0.08298	0.08488	-1.4	91	-0.38	0.705	0.98
	U	0.41006	0.41999	-5.4		-1.01	0.31	1.19*
% of HH members ever attended school	M	0.40977	0.39571	7.6	-41.8	1.84	0.066	1
	U	0.80073	0.71941	37.7		7.49	0	0.75*
% female members	M	0.79971	0.80379	-1.9	95	-0.52	0.601	1.06
	U	0.51893	0.50502	8.1		1.54	0.125	1.16*
Province-KT	M	0.51818	0.51505	1.8	77.5	0.45	0.65	1.1
	U	0.25609	0.25287	0.7		0.14	0.887	.
Province-Pursat	M	0.25692	0.31502	-13.3	-1707.6	-3.24	0.001	.
	U	0.26237	0.23372	6.6		1.27	0.206	.
Province-SiemReap	M	0.26166	0.23261	6.7	-1.4	1.69	0.09	.
	U	0.24588	0.26054	-3.4		-0.65	0.515	.
	M	0.24664	0.20158	10.4	-207.4	2.72	0.007	.

a. U=unmatched (before matching); M=Matched (after matching).

Annex A6.6. Covariate Bias before and after Matching (NN4, Sample 2)

Sample	LR			Mean Med		B	R	%Var
	Ps R2	chi2	p>chi2	Bias	Bias			
Unmatched	0.147	319	0	12.3	10.4	97.1*	1.05	61
Matched	0.023	80.19	0	4.1	2.5	35.8*	1.14	57

Figure A6.3. Density Distribution of Propensity Scores and Observations on Support and off Support in Treatment and Comparison Groups (NN4, Sample 2)



Annex A6.7. Sample Balance before and after Matching: Results of PSM Based on Kernel Matching Model for Sample 2

Variable	Sample ^a	Mean			%reduct bias	t-test		V(T)/ (VC)
		Treated	Control	%bias		t	p>t	
Tropical Livestock	U	2.6077	2.2384	14.2		2.66	0.008	1.29*
Unit	M	2.613	2.6551	-1.6	88.6	-0.37	0.712	0.86*
Poverty score	U	32.33	30.375	16.8		3.26	0.001	0.91
	M	32.297	32.001	2.5	84.8	0.64	0.52	0.93
Poverty score square	U	1174.3	1064.6	14.1		2.71	0.007	0.97
	M	1172.3	1163.2	1.2	91.7	0.29	0.772	0.91
Asset index	U	0.14287	-0.1775	16.5		3.24	0.001	0.81*
	M	0.14239	0.08642	2.9	82.5	0.71	0.479	0.75*
Asset value	U	5.4779	5.1142	4.5		0.88	0.381	0.84*
	M	5.4821	6.2913	-10	-122.5	-1.88	0.06	0.35*
Total land size (ha)	U	2.6032	2.713	-4.4		-0.85	0.395	0.91
	M	2.6096	2.7472	-5.5	-25.2	-1.3	0.194	0.73*
Total land area (square)	U	12.766	13.969	-3.2		-0.63	0.529	0.80*
	M	12.823	15.731	-7.7	-141.8	-1.54	0.123	0.39*
Housing index	U	0.16418	0.20498	-10.5		-2.06	0.039	.
	M	0.16206	0.17735	-3.9	62.5	-1.02	0.306	.
Quintiles of annual per capita expenditures	U	3.0118	2.8736	9.8		1.88	0.06	1.01
	M	3.0103	2.9679	3	69.4	0.75	0.452	1
Non food expenditures	U	2428.5	2330	2.6		0.51	0.609	0.89*
	M	2435.9	2394.5	1.1	57.9	0.28	0.778	0.96
Area of residence	U	0.10046	0.0889	4.5		0.87	0.385	0.93
	M	0.10028	0.10422	-1.5	65.9	-0.34	0.736	0.59*
Roof-durable	U	0.90652	0.87165	11.1		2.2	0.028	.
	M	0.90751	0.90981	-0.7	93.4	-0.2	0.841	.
Floor-durable	U	0.90338	0.91571	-4.3		-0.82	0.414	.
	M	0.90514	0.90884	-1.3	70	-0.32	0.748	.
Wall-durable	U	0.73606	0.71456	4.8		0.93	0.352	.
	M	0.73597	0.74041	-1	79.3	-0.25	0.799	.
Water source-well	U	0.73213	0.67816	11.8		2.31	0.021	.
	M	0.73202	0.71733	3.2	72.8	0.83	0.408	.
Water source-lake or rain	U	0.23488	0.28352	-11.1		-2.17	0.03	.
	M	0.23478	0.24399	-2.1	81.1	-0.54	0.588	.
Light source- electricity	U	0.29065	0.2433	10.7		2.04	0.042	.
	M	0.29091	0.26858	5.1	52.9	1.25	0.211	.
Light source-battery	U	0.44933	0.44253	1.4		0.26	0.792	.
	M	0.44901	0.47796	-5.8	-325.5	-1.46	0.144	.
Fuel source-wood	U	0.96308	0.95785	2.7		0.52	0.601	.
	M	0.96285	0.96518	-1.2	55.4	-0.31	0.753	.
Own cellphone	U	0.83504	0.8046	7.9		1.55	0.122	.
	M	0.83399	0.843	-2.3	70.4	-0.62	0.538	.
Number of plots	U	4.132	3.8966	11.1		2.11	0.035	1.1
	M	4.1415	4.1163	1.2	89.3	0.3	0.765	1.13*
Total agric land	U	1.8284	2.0871	-10.3		-2.01	0.044	0.89*
	M	1.8345	1.8917	-2.3	77.9	-0.55	0.58	0.78*

Annex A6.7. cont.

Variable	Sample ^a	Mean			%reduct bias	t-test		V(T)/ (VC)
		Treated	Control	%bias		t	p>t	
Grow dry rice	U	0.2498	0.12261	33.1		6.04	0	.
	M	0.24585	0.23434	3	91	0.68	0.498	.
Grow wet rice	U	0.93637	0.94636	-4.3		-0.8	0.421	.
	M	0.93834	0.93744	0.4	91	0.09	0.926	.
Grow vegetable	U	0.82718	0.5728	57.7		11.78	0	.
	M	0.82609	0.82096	1.2	98	0.34	0.735	.
Home gardening	U	58.004	54.772	11.4		2.28	0.023	0.67*
	M	57.9	58.028	-0.4	96.1	-0.11	0.911	0.66*
Fish farmer	U	0.09427	0.01724	34		5.79	0	.
	M	0.08854	0.0707	7.9	76.8	1.66	0.098	.
HH size	U	5.2867	5.4828	-10.4		-2.04	0.042	0.84*
	M	5.2901	5.2819	0.4	95.8	0.11	0.913	0.83*
Adult equiv unit	U	4.2167	4.3208	-6.3		-1.24	0.215	0.82*
	M	4.2211	4.1968	1.5	76.7	0.37	0.711	0.83*
Female head	U	0.1524	0.15517	-0.8		-0.15	0.882	.
	M	0.15257	0.16117	-2.4	-209.8	-0.59	0.552	.
Head literate	U	0.81383	0.74138	17.5		3.45	0.001	.
	M	0.81344	0.82792	-3.5	80	-0.95	0.343	.
Head's level of edu	U	5.1862	4.4368	18.7		3.6	0	0.99
	M	5.1826	5.3058	-3.1	83.6	-0.75	0.454	0.87*
Head's age	U	47.389	44.232	26.4		5.08	0	0.99
	M	47.379	48.031	-5.4	79.4	-1.35	0.179	0.93
Highest edu level in the HH	U	9.0723	8.1916	24.2		4.76	0	0.83*
	M	9.0735	9.0245	1.3	94.4	0.34	0.731	0.86*
Dependency ratio	U	0.64073	0.66331	-3.7		-0.7	0.485	1.09
	M	0.64057	0.66124	-3.4	8.5	-0.74	0.461	0.66*
% children <5	U	0.0827	0.10392	-16.1		-3.16	0.002	0.82*
	M	0.08298	0.0895	-4.9	69.3	-1.3	0.195	0.97
% women 15-49	U	0.41006	0.41999	-5.4		-1.01	0.31	1.19*
	M	0.40977	0.39621	7.3	-36.7	1.79	0.074	1.04
% of HH members ever attended school	U	0.80073	0.71941	37.7		7.49	0	0.75*
	M	0.79971	0.79376	2.8	92.7	0.75	0.453	1
% female members	U	0.51893	0.50502	8.1		1.54	0.125	1.16*
	M	0.51818	0.51504	1.8	77.4	0.45	0.649	1.09
Province-KT	U	0.25609	0.25287	0.7		0.14	0.887	.
	M	0.25692	0.29946	-9.8	-1223.5	-2.39	0.017	.
Province-Pursat	U	0.26237	0.23372	6.6		1.27	0.206	.
	M	0.26166	0.23144	7	-5.4	1.76	0.078	.
Province-SiemReap	U	0.24588	0.26054	-3.4		-0.65	0.515	.
	M	0.24664	0.19733	11.3	-236.4	2.99	0.003	.

a. U=unmatched (before matching); M=Matched (after matching).

Annex A6.8. Covariate Bias before and after Matching (Kernel Matching, Sample 2)

Sample	Ps R2	LR		MeanBias	MedBias	B	R	%Var
		chi2	p>chi2					
Unmatched	0.147	319	0	12.3	10.4	97.1*	1.05	61
Matched	0.018	62.78	0.02	3.5	2.7	31.8*	1.6	61

Figure A6.4. Density Distribution of Propensity Scores and Observations on Support and off Support in Treatment and Comparison Groups (Kernel Matching, Sample 2)

