FINAL BASELINE SURVEY REPORT

"Reducing the Vulerability of Cambodian Rural Livelihoods through Enhanced Sub-National Climate Change Planning and Execution of Priority Actions (SRL) Project 2017 – 2020"

SUBMITTED TO:

Department of Climate Change
of the General Secretariat of
the National Council for Sustainable Development (GSSD)

BY:

GREEN INNOVATION SERVICES CO., LTD. (GIS)

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Acronyms and Abbreviations

AC	:	Agricultural Cooperative
AMAT	:	Adaptation Monitoring and Assessment Tool
ANOVA	:	Analysis of Variance
Avr.	:	Average
BR	:	Baray District
C1 Village	:	Control 1 Village
C2 Village	:	Control 2 Village
CBOs	:	Community-Based Organizations
CC	:	Climate Change
CCA	:	Climate Change Adaptation
CCAP	:	Climate Change Action Plan
CCCSP	:	The Cambodian Climate Change Strategic Plan
CC-DRR	:	Climate Change Disaster Risk Reduction
CCM	:	Climate Change Mitigation
CCSP	:	Climate Change Strategic Plan
CDCs	:	Commune Development Councils
CDP	:	Commune Development Plan
CDRM	:	Committee for Disaster Risk Management
CF	:	Community Forestry
CFi	:	Community Fisheries
CG	:	Controlled Group
CIP	:	Commune Investment Plan
CPA	:	Community Protected Area
CSA	:	Climate Smart Agriculture
CSOs	:	Civil Society Organizations
DCC	:	Department of Climate Change
DDCs	:	District Development Councils
DD / DID	:	Difference-in-Difference Design
DIP	:	District Investment Plan
DRM	:	Disaster Risk Management
DRR	:	Disaster Risk Reduction
e.g.	:	Example
etc.	:	Et Cetera
FFS	:	Farmer Field School
FGD	:	Focus Group Discussion
FWUC/WUG	:	Farmer Water User Committee / Water User Group
GCCSP	:	Gender and Climate Change Strategic Plan
GEF	:	Global Environment Facility
GHG	:	Greenhouse Gas
GIS	:	Green Innovation Services Co., Ltd.
GSSD	:	General Secretariat for Sustainable Development

ha/HH	:	Hectare Per Household
HHs	:	Households
ICT	:	Information and Communication Technology
ID Poor	:	Identification of Poor Household
IP	:	Investment Plan
IT	:	Information Technology
KI	:	Key Informant
KII	:	Key Informant Interview
KL	:	Kralanh District
KPS	:	Kampong Svay District
KPT	:	Kampong Thom Province
LIG	:	Livelihood Improvement Group
LNGOs	:	Local Non-Government Organizations
Log-Frame	:	Logical Framework
M&E	:	Monitoring and Evaluation
MAFF	:	Ministry of Agriculture, Forestry and Fisheries
MDE	:	Minimum Detectable Effect
MFIs	:	Micro Finance Institutions
MoE	:	Ministry of Environment
MoI	:	Ministry of Interior
MoP	:	Ministry of Planning
MWA	:	Ministry of Women's Affairs
MWRM	:	Ministry of Water Resources and Meteorology
N/A	:	Not Available
NAPA	:	National Adaptation Programme of Action to Climate Change
NAP-DRR	:	National Action Plan for Disaster Risk Reduction
NCCC	:	National Climate Change Committee
NCCD-S	:	National Committee for Sub-National Democratic Development Secretariat
NCDMS	:	National Committee for Disaster Management Secretariat
NCDRM	:	National Committee for Disaster Risk Management
NCSD	:	National Council for Sustainable Development
NGOs	:	Non-Governmental Organizations
NP-SNDD IP3	:	The National Program for Sub-National Democratic Development's 3-Year Implementation Plan
NR	:	Natural Resource
NSDP	:	National Strategic Development Plan
NSPS	:	The National Social Protection Strategy for the Poor and Vulnerable
NTFP	:	Non-Timber Forest Product
PB	:	Prasat Bakong District
PDCs	:	Provincial Development Councils
PDoA	:	Provincial Department of Agriculture
PDoE	:	Provincial Department of Environment
PDoWA	:	Provincial Department of Women's Affairs
PDWRM	:	Provincial Department of Water Resources and Meteorology

PRA	:	Participatory Rural Appraisal
PSB	:	Prasat Balangk District
RGC	:	Royal Government of Cambodia
SD	:	Sandan District
SG	:	Saving Group
SL	:	Svay Leu District
SLA	:	Sustainable Livelihood Approach
SME	:	Small Medium Enterprise
SMS	:	Short Message Service
SNAP	:	Strategic National Action Plan
SNAs	:	Sub-National Authorities
SRP	:	Siem Reap Province
SRL	:	Sustainable Resilient Livelihood
SS	:	Srey Snom District
ST	:	Santuk District
TG	:	Treatment Group
T Village	:	Treatment Village
t/ha	:	Ton Per Hectare
t/y	:	Ton Per Year
ToR	:	Term of Reference
TV	:	Television
UNDP	:	United Nations Development Programme
VB	:	Village Bank
VDC	:	Village Development Committee
VR	:	Varin District
WLG	:	Women Livelihood Group

EXECUTIVE SUMMARY

This baseline study aims to: (1) establish baseline data against the project's outcome, output and indicators; and (2) identify and recommend results that serve as a baseline to compare the progress and success of the project in the future. This baseline applied 4 main methods to collect data including: (1) documentary review; (2) on-going technical consultation with SRL team and experts; (3) 50 in-depth KIIs with relevant stakeholders; (4) survey interviews with 1,563 HHs; and (4) 25 FGD with 592 participants. The difference-in-difference design (DID) was used to support scientific power calculation for selecting sample villages and HHs for the survey. In total, 782 HHs and 781 HHs in KPT and SR respectively were surveyed. Data were analyzed using qualitative and quantitative analysis methods: (1) framework and livelihood analysis matrix, and (2) descriptive and inferential statistical tools of SPSS. Major results of this baseline study are as follows:

1. Livelihood Assets and Land Possession: The majority of survey HHs have residential land (KPT: 95%, SRP: 94%); yet treatment HHs has less land than others. 81% and 74% of HHs in SR and KPT respectively have rice farmland; and around 90% of possessed land are for wet rice farming. Beside possessing land for rice farming, some respondents also have land for home-garden and crop cultivation: 36% in KPT and 28% in SR. Notiveably, surveyed HHs in KPT and SR possess respectively 2 hectares and 2.9 hectares of rice farmland, 1.1 hectares and 1.3 hectares of cash or strategic crop farmland, and 0.009 hectares (90 m^2) and 0.013 hectares (131 m^2) of home-garden in average. HHs with less or no farmland usually rent land for rice farming and crop cultivation; they pay the average price of US $68/ha and US $118/ha per year in SR and KPT respectively. Yet, less than 10% of HHs said to have rented land.

2. Financial Capacity and On - Farm and Off - Farm Income Sources: The average annual income of all types of HHs in KPT is US$3,131 and in SR is US$ 2,773. Presently, off-farm sources of income (especially migration and wage labor) are more essential to HH economy than on-farm sources. Livelihoods sources considered to have contributed more positively to HHs' annual income include in order as follows: (1) seasonal wage labor and migration (in-country and oversea; KPT: US$ 1,863, SRP: US$ 1,598), (2) cash cropping (KPT: US$ 446, SRP: US$ 565), (3) rice production (KPT: US$ 484, SRP: US$ 316), and (4) livestock raising (KPT: US$ 299, SRP: US$ 243), (5) selling of fish catch (KPT: US$ 39, SRP: US$ 51).

3. Status of Food Security and Financial Shock: More than half of interviewed HHs reported food shortage, especially in rainy season (KPT: 62%, SR: 50%). In short, rice yield is only adequate for around 4-5 months, and T-HHs encounter the highest level of food insecurity. Indebtedness was one of the critical issues facing surveyed HHs (SR: 64%, KPT: 61%). The reasons for indebtedness include: (1) low income and seasonal work, (2) limited agricultural land, capital, knowledge and technology for increasing agricultural productivity, (3) low price for agricultural produces, (4) deteriorating quality of land and natural resources, and (5) disequilibrium between earning and expense. The priority expenses for HHs in order of importance are: (1) food stuffs, (2) health care, (3) social events, (4) debt repayment, and education.

4. Access to Water for HH Consumption: All HHs have access to water for domestic use; primary source of water is from family-based or community's dug wells (KPT: 91%, SR: 75%). Rainwater (28%) is preserved for extensive use followed by the use of dug pond (6%), natural stream and creek system (6%), and purchased water from private suppliers (8%). Buying safe and clean water is reported by 21% of HHs in SR and 6% in KPT; the average expense per time is around US$ 3.

5. Access to Water for Agriculture and Livelihood Activities: Around 20% of respondents in study areas reported to have water shortage for agricultural production in both rainy and dry seasons.

In KPT, 46% of HHs face water shortage in dry season; while in SR, 44% of HHs face this difficulty in rainy season. Due to limitation of water, most HHs cultivate rice only one time per year (SR:79%, KPT:66%); About 9% of HHs in KPT cultivate rice 2 times per year, and only 1% in SR. Rainfed wet rice cultivation is the most common practice in the target areas. The majority of HHs involved in rainfed wet rice farming (KPT: 96%, SR: 99%), while dry rice farming is absent in SR and only done by about 14% in KPT. Wet rice yield is considerably low (average in KPT: 1.3t/year and in SR:1.9t/year); while dry rice yield's average is up to 2.7t/year in KPT and 2.2t/year in SR). Cash crop farming, which is also heavily dependent on water availability, is less practice (SR: 28% and KPT:22%). Major cash crops include cassava and cashew nut; while sporadically grown ones include mung bean, peanut, maize and sesame. In average, HHs in both provinces could produce around 7t of cassava and 1.5t of cashew nut per year. The sizes of rice farmland and cash crop farmland left fallowed by respondents are almost the same (0.3 ha) between 2017 and 2018.

6. Livelihood Challenges, Experiences with Climate Change Hazards: Crucial livelihoods challenges include in order of severity as follow: (1) diseases (70%), (2) natural disasters (61%), (3) indebtedness (48%), (4) limited off-farm works (40%), (5) limited labor productivity for agriculture (40%), (6) increasing out-migration (30%), (7) limited land for agriculture (28%), (8) high agricultural production cost (27%), (9) decline of livelihood sources (24%), and (10) limited market mechanisms for local agricultural products (23%). Flood, drought, thunderstorm and windstorm are most common forms of climate hazards in the study areas, especially in KPT. Flood was perceived to be the main factor causing high danger on property, human wellbeing and agricultural activities. Drought was perceived to have high danger on agricultural production, but moderate impacts on animal and people. Thunderstorm was seen to have high impact on farming, while Windstorm have more impact on properties.

7. Livelihood and CC/DRR - Related Policy and Institutional Interventions: Livelihood intervention programs noted include: integrated farming, on-farm and off-farm livelihood strategies, SME development, saving group establishment, and market mechanisms. Obviously, HHs in T villages (31%) receive more CC-DRR related interventions. Surveyed HHs perceived that interventions had been mostly provided by: (1) village and commune authorities, (2) Cambodia Red Cross, (3) district and provincial authorities, and (4) local NGOs. Concerning climate smart and resilient livelihoods, majority of HHs reported they received training in techniques with regard to livestock raising (70%), rice cultivation (65%), vegetable growing (63%), home gardening (34%), and cash cropping (9%).

8. Local Involvement in and Reasons for Out – Migration: About 25% of HHs are involved in out-migration, both inside and outside the country. SR has higher number of out-migrants (27%) than KPT (24%). Major reasons include: (1) limited job opportunities, (2) insufficient income generation, (3) few economic opportunities locally, (4) inadequate land for agriculture, (5) increasing cost of living and unprofitable farming production, (6) indebtedness, and (7) CC impacts.

Recommendations

1. Strengthen capacity of SNAs, CADTIS, and SRL's grassroots team on climate change adaptation, resilient agriculture, market mechanisms, and relevant legal frameworks;
2. Promote ownership of local communities, CBOs, and SNAs as well as members of SRL-established groups or committees at the onset of SRL project implementation;
3. Enhance information dissemination concerning key project interventions, benefits and underlying strategies established within the framework of SRL project;
4. Enhance participation of men or male villagers in SRL project implementation;
5. Develop proper community-oriented, location-specific strategic and action plans;

6. Further communicate concepts and best practices of DRR/CCA to all relevant stakeholders, while assisting them to integrate these practices into CIP and CDP;
7. Formulate internal financing mechanism supported by effective market mechanisms to support the execution and management of SRL established groups from the beginning;
8. If possible, enhance the institutionalization of self-learning groups (SLGs) or farmer field schools (FFSs) in the target villages into official or legal ACs;
9. Introduce demonstration or model farms for climate resilient crop cultivation and animal husbandry to showcase best practices to local farmers;
10. Promote community-private sector partnership in agricultural production and its underlying value and supply chain systems; *and*
11. Expand climate smart or resilient agriculture extension services as well as DRR / CCA and community-based water governance interventions by using ICT-based system.

1. INTRODUCTION

1.1. Backgrounds and Rationale

Amidst global combined efforts to reduce, mitigate, and tackle greenhouse gas (GHG) emissions, natural disasters and other human-induced impacts on the global environment, it is scientifically and empirically known that the level of disaster and climate change are inevitable at present. Cambodia is highly vulnerable to the effects of climate change, in particular from heavy rainfalls, floods, droughts, windstorms, and seawater intrusion. For instance, based on post-flood need assessment conducted by the Royal Government of Cambodia in 2013, heavy rainfall in October 2013 resulted in flash floods, impacting over half a million people. More than half of Cambodia's provinces were impacted, with the Mekong region being particularly affected, as the river's water levels rose with the rainfall. An assessment indicated that the damage and loss caused by the 2013 floods was 356 million US$, of which 153 million US$ was the estimated value of the destruction of physical assets (damage) in the affected areas, and 203 million US$ the estimated losses in production and economic flows (RGC, 2013).

Cambodia is facing a climate condition which presents increasing extreme weather events and negative impacts in the forms of casualties and obstructions to the country's economic growth and development, destruction of infrastructural system, environmental depletion, and a decline in people's quality of life and welfare, especially on those living in rural and remote areas where subsistence agriculture and natural resources are their main sources of livelihoods and local economy. Whereas, Cambodia's main national development priority, enshrined in the National Strategic Development Plan (NSDP) for 2014-2018, is to reduce poverty while fostering economic growth at a steady rate of 7-8% per year. Efforts in addressing climate change in Cambodia cannot be separated from economic development and poverty alleviation goals. The agriculture sector is expected to grow at an annual rate of 5% in order to meet national economic growth and export targets, as well as to contribute to the population's food security needs.

Climate change issue has now arrived on the shoulders of the Cambodian government and its concerned state and non-state stakeholders to help local communities in the climate-induced natural disasters prone areas to adapt to these changes through appropriate adaptation and mitigation strategies. Therefore, it is crucial to identify proper and concrete mechanisms to address the growing risks and disasters and the consequential losses to target communities. On top of this, it is strongly required and recommended that community resilience and capabilities are built or improved through a proper scale of project frameworks in order for them to withstand and recover from natural disaster and climate change related problems.

Despite a growing recognition of the benefits and values of disaster risk management for economic growth, poverty reduction and improved people's welfare, Cambodia remains striving to overcome key challenges that have emerged across the country. These include: (1) limited capabilities (resources, skills, knowledge and advocacy, systems, and practices) to materialize and institutionalize disaster preparedness for effective and efficient preventive, response, and recovery strategies at local level; (2) limited capacity of concerned institutions, especially those at local level to plan and execute climate change adaptation and mitigation (CCA and CCM) alongside disaster risk management (DRM) using practical management frameworks; (3) limited political and economic commitment at national level due to emerging competing issues in other priority sectors; (4) limited CCA and CCM as well as disaster risk reduction (DRR) and DRM mainstreaming into country's sectoral legislative arrangements and integrated multi-sectoral policy and planning; (5) limited institutional frameworks, collaboration, and coordination among key stakeholders across different sectors; and (6) deficiency of proper sophisticated and practical CCA, CCM and DRM planning and execution as

well as monitoring frameworks and systems (i.e. institutional arrangement and mechanisms for implementation), particularly at the sub-national and grassroots levels, etc.

1.2. SRL Project Rationale and Policy Conformity

To assist the Royal Government of Cambodia (RGC) in addressing the identified alarming issues, the Department of Climate Change (DCC) of the General Secretariat of the National Council for Sustainable Development (GSSD-NCSD) through a chairmanship of the Ministry of Environment (MoE) is going to implement a 4-year project entitled "Reducing the Vulnerability of Cambodian Rural Livelihoods through Enhanced Sub-National Climate Change Planning and Execution of Priority Actions (SRL)" in 89 communes and 10 districts of Siem Reap (SRP) and Kampong Thom (KPT) provinces of Cambodia. With support and coordination from and collaboration with other key ministries and the National Committee for Sub-National Democratic Development Secretariat (NCDD-S), this project is designed to provide long-term benefits to and positive impacts on marginalized and vulnerable Cambodians, particularly poor, landless and land-poor, and female-headed households and households with disability living in rural and remote areas of the two target provinces.

The project entails a number of major investments in small-scale water management infrastructure, technical assistance to climate resilient agricultural production techniques and practices, and capacity building support targeting mainly poor women for improved food production through home-gardening systems and the institutionalization of financial and resource self-help and knowledge sharing groups for the local communities. More importantly, this project is meant to enhance the technical and administrative capacities of the target sub-national administrations (SNAs) at commune, district, and provincial levels in planning, designing, and delivering necessary public services for socio-ecological resilience building in the form of logical investments in rural livelihood and production systems through climate sensitive planning, budgeting, and execution.

SRL has been designed with thorough and cautious consideration of foremost relevant policies at global, national and local levels. Particularly, it is aligned with and responsive to the following key policy documents, including but not limited to:

- GEF Focal Area Objectives and Outcomes on CCA: 1- Reducing vulnerability to the adverse impacts of climate change;
- Cambodian Rectangular Strategy and the National Strategic Development Plan (NSDP 2014-2018) that recognize the need for action to address the impacts of climate change on agriculture and on irrigation infrastructure, which are key concerns of the SRL project;
- The Cambodian Climate Change Strategic Plan (CCCSP) that envisions promoting climate-resilient development and green growth in the period 2014-23 by focusing on adaptation activities aiming at strengthening community resilience;
- The Rice Policy (2010) which includes improvement of extension services, promotion of improved, climate-resilient rice seed varieties, irrigation development and support to Farmer Organizations;
- The National Social Protection Strategy for the Poor and Vulnerable (NSPS 2011-2015) which includes "The working-age poor and vulnerable benefit from work opportunities to secure income, food and livelihoods, while contributing to the creation of sustainable physical and social infrastructure assets;"
- Climate Change Action Plan of the Ministry of Agriculture, Forestry and Fisheries (MAFF-CCAP) with its first objective to ensure food security and farmers' livelihood improvement through an increase of crop production, agro-industrial at 10% per year, and to enhance development, the use of appropriate technology, renewable energy, the effective use of water, adaptation and mitigation." By assisting climate-vulnerable farmers to secure and improve their

production, the project will contribute to the achievement of the goals of the RGC's Flagship Rice Policy, and will support the priority for the strengthening of Farmer Organizations and Cooperatives in line with the Law on Agriculture Cooperatives (2013).

- Climate Change Strategic Plan of the Ministry of Water Resource and Meteorology (MWRM-CCSP), of which Objective 5 strongly intends to "take stronger community participation, such as Farmer Water User Committee in water resources management and development to address climate change impacts or obtain benefits from climate change induced opportunities."
- Gender and Climate Change Strategic Plan of the Ministry of Women's Affairs (MWA-GCCSP) with its Objective 6 focusing on expressing the need for the identification of effective mechanisms for scaling up the proven experiences on gender and climate change; *and*
- The National Program for Sub-National Democratic Development's 3-Year Implementation Plan (NP-SNDD IP3), which aims to build and strengthen capacities of SNAs in planning, designing, budging and executing decentralized development mechanisms through its NCDD-S that is the key agent and collaborator in implementing this SRL project.

1.3. SRL Project Objective, Outcomes, Outputs and Indicators

Based on the stated rationality, the project's framework, which include objectives, outputs, outcomes and sustainability has been constructed by the joint implementation team from DCC-GSSD and NCDD-S with strong support from UNDP-GEF. This session **(Table 1.1)** is a brief summary of the project objective, intended impact and sustainability, relevant outputs and outcomes, measurement indicators and tentative end of project target for the SRL project based on the provided project documents and logical framework (Log-Frame).

Table 1.1: SRL Project LogFrame

Project Objective	Outcomes	Outputs	Indicators	End of Project Target
Project Objective: Sub-national administration systems affecting investments in rural livelihoods are improved through climate sensitive planning, budgeting and execution **Project Impact Indicator:** 20% increase in income from agriculture and linked activities of target smallholder households **Sustainability:** Number of Districts and Communes integrating CCA in their development	**Outcome 1** Climate sensitive planning, budgeting and execution at the sub-national level strengthened	**Output 1.1** Capacity of sub-national councils (communes and districts) and Planning and Commune Support Units in two provinces enhanced for climate sensitive development planning and budgeting	# District and Commune Investment Programs that include specific budgets for adaptation actions (AMAT Indicator 13)	10 DIP and at least 50 CIP include specific budgets for adaptation activities
		Output 1.2 Technical capacity of agricultural extension officers and grass-roots NGOs enhanced for climate-resilient livelihood techniques and sustainable assistance to communities	Number of engineers and technicians (public sector, private sector and civil society) trained in delivery of climate resilient water infrastructure	At least 50 engineers and technicians trained using hands-on, demonstration scheme approach. At least 20% female
		Output 1.3 Technical capacity to execute climate resilient water infrastructure design and construction enhanced for about 50 Government technical officials and private contractors		

Project Objective	Outcomes	Outputs	Indicators	End of Project Target
plans and investment programs following NCDD-S guidelines **End of Project Target** At least 6,000 households increase income from agriculture by 20% compared with baseline 10 Target Districts and 89 Communes have formulated climate change adaptation strategies integrated in plans and IP		**Output 1.4** Knowledge management platform for sub-national Climate Change Adaptation Planning and resilient livelihoods support established	N/A	N/A
	<u>Outcome 2</u> Resilience of livelihoods for the most vulnerable improved against erratic rainfalls, floods and droughts	**Output 2.1** Climate-resilient small-scale water infrastructure designed and put in place in at least 10 districts following the resilient design standards specifically targeting rain-fed farmers	# Resilient infrastructure measures introduced to prevent economic loss and co-financed by Commune/Sangkat Fund	At least 100 climate resilient infrastructure schemes have been successfully implemented
		Output 2.2 Climate-resilient livelihood measures demonstrated in at least 10 districts targeting landless women and farmers practicing rain-fed agriculture	% of targeted households that have adopted resilient livelihoods under existing and projected climate change <u>(AMAT Indicator 3)</u>	At least 60% of HHs participating in livelihoods trainings adopted at least one resilient livelihood technique (half of the uptake is by women)
	<u>Outcome 3</u> Enabling environment is enhanced at sub-national level to attract and manage greater volume of climate change adaptation finance for building resilience of rural livelihoods.	**Output 3.1** Performance-based adaptation financing mechanism is strengthened and applied in 10 districts covering 89 communes and integrated into the enhanced climate-smart development planning	Minimum Access Conditions and Performance Measurement System improved Baseline Performance Assessment & Performance Target Setting	One manual improved 10 target districts
		Output 3.2 Capacity of Districts for self-monitoring of climate change adaptation and resilient livelihood support enhanced	# of districts carry out self-monitoring to ensure that the District is on track # of annual provincial reflection workshop/ events on the outcome performance assessment.	10 target districts (for 3 years: once per year) 3 annual provincial reflections (once/year)

1.4. Aim and Objectives of the Baseline Study

Green Innovation Services Co, Ltd. (GIS) has been commissioned to carry out baseline study and end-of the project impact assessment in order to assist the SRL project management and implementation teams in thoroughly gathering precise baseline data and in measuring accurate project's progress and performance. The overall information and summary illustrating the entire SRL project's strategic logical flow from objectives to outcomes, outputs, indicators and tentative project targets table is denoted in **Section 1.3** above **(Table 1.1)**. However, for the purpose of this study, the GIS team was commissioned to focus mainly on **Outcome 2** as stated in the ToR and further discussed during the project briefing by the Inter-Technical Team meeting (UNDP-DCC-NCDDS-GIS) taken place on 13th of November 2017 at MoE.

Consistent with the ToR (page 2), this study aims at assisting SRL project management and implementation teams in planning and carrying out a scientific baseline study (or baseline impact assessment) to collect fundamental baseline data and arrange sophisticated systematic dataset whilst preparing a concrete and applicable foundation for future project implementation towards its progress and success through well-prepared SMART project design / intervention logics and performance frameworks as well as for future follow-up surveys and end-line project impact assessment. The results of the baseline study coupled with the confirmation of practical project frameworks will also assist DCC of GSSD/MoE and its strategic partners, UNDP-GEF and NCDD-S, especially the implementing SNAs in the target areas, in designing a proper roadmap for future monitoring and evaluation (M&E) with regards to the relevance or appropriateness, effectiveness, efficiency, impact, sustainability, and opportunity cost or core values of this project in 160 coverage villages, 89 communes of 10 districts in SR and KPT provinces.

To achieve this aim, the following study objectives were addressed painstakingly throughout this baseline assessment:

- Establish baseline data against the project's outcome, output and indicators; *and*
- Identify and recommend appropriate results of key project outcome, output and impact indicators that serve as a baseline to compare the progress and success of the project in relation to its relevance, effectiveness, efficiency, impact, opportunity cost / core values, and sustainability

2. METHODOLOGY

2.1. Needed Information and Assessment Indicators

The focus of this baseline study is mainly on **Outcome 2**, and specifically **Output 2.2**. Therefore, in the subsequent section, the GIS research team identified measurement indicators and parameters to be used for data collection.

Table 2.1: Project Level Logical Framework

Project Objective	Project Impact Indicator	Sustainability	End of Project Target
Sub-national administration systems affecting investments in rural livelihoods are improved through climate sensitive planning, budgeting and execution	% increase in income from agriculture and linked activities of target smallholder households	Number of Districts and Communes integrating CCA in their development plans and investment programs following NCDD-S guidelines	At least 6,000 households increase income from agriculture by 20% compared with baseline 10 target districts and 89 communes have formulated climate change adaptation strategies integrated into plans and DIP and CIP

Table 2.2: SRL Project Outcome 2

Outcome	Outputs	Project Indicators	End of Project Targets
2. Resilience of livelihoods for the most vulnerable improved against erratic rainfalls, floods and droughts	**2.1.** Climate-resilient small-scale water infrastructure designed and put in place in at least 10 districts following the resilient design standards specifically targeting rain-fed farmers	# Resilient infrastructure measures introduced to prevent economic loss and co-financed by Commune / Sangkat Fund	At least 100 climate resilient infrastructure schemes have been successfully implemented # of households (HHs) and people benefits from resilient infrastructure scheme
	2.2. Climate-resilient livelihood measures demonstrated in at least 10 districts targeting landless women and farmers practicing rain-fed agriculture	% of targeted households that have adopted resilient livelihoods under existing and projected climate change	At least 60% of HHs participating in livelihoods trainings adopted at least one resilient livelihood technique (half of the uptake is by women)

Table 2.3: Assessment Indicators and Parameters

Outputs	Indicators	Parameters
2.1. Climate-resilient small-scale water infrastructure designed and put in place in at least 10 districts following the resilient design	# climate resilient small-scale water infrastructure supported	# climate resilient small-scale water infrastructure supported
	LNGOs recruited to provide extension services	# of LNGOs recruited to provide extension services Contract and ToR for extension services
		# of farmer groups formed

standards specifically targeting rain-fed farmers	NGOs carry out capacity development	Types and functions of farmer groups formed (against types of project intervention[1])
		# of technical knowledge trained to farmer groups
		# of participants in each training/ capacity building
		# of on-going technical supports to farmer groups
2.2. Climate-resilient livelihood measures demonstrated in at least 10 districts targeting landless women and farmers practicing rain-fed agriculture	Increase in income from agriculture and related activities, including mainly home consumption	% of increased income from rice cultivation Reasons for increase/decrease (against the function of project intervention)
		% of increased income from home garden Reasons for increase/decrease (against the function of project intervention)
		% of increased income from animal raising Reasons for increase/decrease (against the function of project intervention)
		% of increased income from strategic/cash crops Reasons for increase/decrease (against the function of project intervention)
		% of increased income from fishing Reasons for increase/decrease (against the function of project intervention)
		% of increased income from fish raising Reasons for increase/decrease (against the function of project intervention)
	Yield from rice production	# of rice yield/ha total # of rice yield/HH
	Yield of home gardens	# of yield home garden Purpose of gardening
	Migration for seasonal work Migration rate/volume	# of people out-migrated for seasonal work Reason for out-migration Remittance from migration
	Farmland left fallow	# of agricultural land owned by each HH Amount of land is currently being cultivated
	Freshwater availability for household use	# and types of water source in the locality Access to water sources in the locality for HH consumption Access to water sources in the locality for various agricultural production
	Time spent on water collection Money spent on water	Time spent of collecting water Distance of water sources from each HH Cost of water purchase per time Person responsible for water collection for the HH
	Damage to rice & crops due to climate hazards	Perception of vulnerability caused by climate hazards Level of danger to various agricultural activities Time and frequency of climate hazard occurrence

[1] Beside FWUC/WUG, concerning livelihood improvement, SRL project interventions include: 1) women livelihood group, 2) saving group, 3) small holder learning group, 4) agricultural cooperation (optional).

2.2. Data Collection Methods

In order to gather sufficient data and information needed as identified through indicators and parameters above, this SRL project baseline study applied a range of methods and tools for the collection and analysis of both primary and secondary data. These involve the following approaches:

2.2.1. Documentary Review and Analysis

This method was used to gather all relevant existing secondary data from different available sources. These data include: 1) project document and underlying performance frameworks and / or logframe; and 2) existing relevant data available at the DCC of the GSSD/MoE, relevant provincial line departments of the target provinces, the National Committee for Disaster Management Secretariat (NCDMS), Ministry of Interior (MoI) and its affiliated National Committee for Sub-National Democratic Development Secretariat (NCDD-S), and Provincial / District / Commune Development Councils (PDCs / DDCs / CDCs). Specifically, relevant documents for the review include the followings:

- Policy/ regulatory frameworks, strategic development plans and action plans;
- Commune Investment and Development Plan (CIP & CDP);
- Reports of the National Adaptation Programme of Action to Climate Change (NAPA);
- Reports of the Strategic National Action Plan (SNAP) Assessment;
- Cambodia Strategic National Action Plan for Disaster Risk Reduction (SNAP-DRR) 2008-2013)
- Previous Reports of the National Climate Change Committee (NCCC);
- Cambodia Climate Change Strategic Plan (CCCSP) 2014-2023;
- National Strategic Development Plan 2014-2018,
- Cambodian National Green Growth Road-Map and Strategic Plan (2013-2030);
- NAP-DRR 2014-2018;
- Cambodia Disaster Management Reference Handbook 2017;
- Cambodia Climate Change Action Plan for Disaster Management 2014-2018 and other sector-specific or sectoral climate change strategic plan and action plan for DRM; *and*
- Other sector-specific or sectoral DRR and DRM strategic plan and action plan (i.e. Plan of Action for DRR in Agriculture 2014-2018, etc.) in Cambodia.

Furthermore, other documents, reports, case studies, policy and strategy papers, and best practices as well as successful cases related to small-scale water management infrastructure, community resilience building, resilient agricultural production assistance and practices, capacity building support, food production and food security through home-gardening, integrated smart farming system, community empowerment, community participation and ownership, community economic development and endogenous development in a climate sensitive context, sustainable livelihood approaches (SLA) and diversified income generation strategies (i.e. self-help group, saving group, farmer producer group, micro-enterprises, etc.) were reviewed in order to provide better suggestions for the effective and successful implementation of this project in the target areas.

2.2.2. Technical Expert Consultation

The GIS research team carried on-going / sequential technical expert consultations with SRL project staff and experts of the DCC of GSSD/MoE, UNDP-GEF, and NCDD-S in order to get their support and approval concerning the following periodic issues:

- Power calculation methods for the scientific and logical selection of the total amounts of local villagers per each project intervention, the parameters of impacts to be assessed per each

intervention based on the project's output/ outcome/impact indicators, and the target households to be surveyed for this baseline assessment;
- The final set of selection criteria for selecting the target communes and participants for the focus group discussion (FGD);
- Finalizing research design, data collection and analysis methods, data collection tools, sampling techniques and sampling frames for the baseline survey and the follow-up small scale and large-scale surveys, and software and instruments for data entry and analysis, quality control mechanisms for data collection and processing (i.e. format check, tool testing / trailing, double entry, etc.); *and*
- Finalizing the format for baseline assessment survey report writing.

2.2.3. Key Informant Interviews with Target SNAs and Line Departments

This method was used to interview the selected key informants. In close consultation with DCC of GSSD/MoE, UNDP-GEF, and NCDD-S and the project team / staff, the GIS research team used purposive sampling technique to choose key informants representing SNAs in the target communes, districts, and provinces under this 4-year project's support for the KI interviews (Refer to **Annex A** for KII Guiding Questions).

At the provincial, district, and commune levels, this method was used to inquire key informants to provide perceptions on:

- Institutional arrangements, frameworks, and capacities, including but not limited to: institutional technical capacities and institutional setting (resources, skills, knowledge, staffing, organizational structure, alleged mandates, designated roles and responsibilities, reporting mechanisms and communication approaches), their readiness and preparedness to respond to climate change impacts, etc.;
- Required physical investments in rural livelihoods through climate sensitive planning, budgeting, and implementation; *and*
- Required investments in facilities and technical capacity building for small-scale water management infrastructure, for designing and executing and climate smart or resilient agricultural practices, and for improving livelihood strategies of the marginalized and vulnerable groups through suitable livelihood and production systems (i.e. food production through integrated farming, self-help groups, farmer production / home-garden groups, saving groups, water user groups, and micro-enterprises, etc.).

Also, this method was employed to ask informants to express their needs on technical capacity development related to CCA and DRR for the betterment of disaster management and climate adaptation in their localities. They were requested to provide opinions on the design, implementation inputs and approaches, expected outputs and outcomes of project performance, perceived impacts and sustainability, anticipated risks and challenges for the project implementation and possible remedies in order for this project to successfully achieve its general and specific objectives (Outcomes 1 and 3)[2] in a promptly and effective manner.

Sampling for KIIs: The target key informant groups for this baseline assessment is the SRL project team from DCC of GSSD/MoE, NCDD-S and UNDP-GEF as well as their project staff at national and sub-national levels. Next, based on close consultation with and coordination from this SRL project

[2] Outcome 1: Climate sensitive planning, budgeting, and execution at sub-national level strengthened. Outcome 3: Enabling environment is enhanced at sub-national level to attract and manage greater volume of climate change adaptation finance for building resilience of rural livelihoods.

team the research team first used purposive sampling technique to identify key informant identities and the level of their engagement patterns as project's beneficiaries and participants of the target SNAs including relevant line departments and local authorities. Existing CBOs and CSOs (mainly partner NGOs) in the areas will also be interviewed to gather information concerning perceptions of the current livelihoods, as well as climate hazards and intervention situations.

2.2.4. Focus Group Discussion (FGD)

The GIS research team used FGD method as part of the PRA process. For the baseline survey, the FGD process was employed to stimulate primary qualitative explanation to triangulate quantitative data (i.e. collected through survey questionnaires) in addition to elaborating on the indicators and parameters designed for quantitative questionnaire survey. These include inquiries on interactive discussion into the state of local economic drives, local communities' current livelihoods, livelihood challenges and opportunities, local communities' current organizational capacity to deal with agricultural challenges, especially those induced by climate change hazards, local perceptions on vulnerability to climate hazards, etc. Please refer to **Annex B** for Guiding Questions for FGD.

This method enabled the project beneficiaries to proactively intermingle in discussing, specifying, and reasoning their views or reflections on their involvement in and benefit from the project implementation, project design and performance, project impacts and outcomes, project sustainability, project accountability and transparency (leadership, structure, and practices), and quality of benefit sharing as well as on their suggestions for successful implementation, continuation, strengthening, and expansion of the project.

Specifically, the study participants were able to elaborate on the actual situations of their institutional arrangements, institutional frameworks, institutional settings and technical capabilities, institutional readiness and preparedness prior to the full operationalization of the project, their needs for project intervention strategies and for investments in climate smart agriculture, in improved socio-ecological resilience of people's on-farm and in-farm livelihoods against climate change impacts and extreme weather events, and in climate sensitive planning, budgeting, and execution as well as improved enabling environment for CCA performance by SNAs, including proper financing mechanisms to build rural agricultural livelihood resilience of the project's beneficiaries.

Sampling for FGDs: It was planned that at least 20 FGDs were done at district level *(2 per each target district)*, which is approximately equal to a stratified sample of 23% of the project's total target commune population. The selection of the communes for conducting FGDs was based on their socio-economic, demographic and geographical characteristics, type and occurrence of project interventions, and nature of function and responsibility attached to or influenced by the project, variation of project's stakeholder groups. In order to make it vibrant and expressive, the research team involved approximately 12-15 discussants / participants for each FGD process. They included representatives of SNAs at commune and district levels, representatives of climate resilient agricultural groups including women's livelihood group, saving groups, agricultural cooperative, smallholder learning group, water user groups, and representatives of the most marginalized and vulnerable groups to climate change impacts and extreme weather hazards. The selection of FGD informants were also considered gender balance, diversity of knowledge and experience, and variety of age group, etc. Remarkably, to enrich the qualitative information, **25 FDGs** were conducted at the end the quantitative household (HH) surveys.

2.2.5. Quantitative Questionnaire Survey

This method incorporated mainly quantitative / close-ended questions into the survey questionnaire for gathering valid, reliable, representative, explainable, and cumulative responses while allowing respondents to have flexible and close interaction with the interviewers or data enumerators. It was utilized to interview target household respondents, who are the marginalized and vulnerable groups (ID Poor 1 and ID Poor 2, landless and land poor, female-headed, and climate change impact prone or affected households), the future project-supported groups (Treatment Households), and ordinary villagers (Control 1 Households) in the selected target 160 villages, 89 communes, and 10 districts of SR and KPT provinces, where the project will be implemented over its 4-year timeframe as well as those who are regarded as non-beneficiary members living outside the target areas (Control 2 Households). Using household as a unit of analysis enables the GIS research team to avoid confusion and duplication of sample size selection for the survey interviews. The household respondents were disaggregated by:

- Gender,
- Age group,
- Ethnicity (Khmer and Non-Khmer only),
- Education level,
- Occupation,
- Poverty level (ID Poor 1 and Poor 2),
- Socio-economic status,
- Household status (i.e. female-headed vs. male-headed HHs, HHs with disability and / or more dependents),
- Land-holding status,
- Level of involvement in or receiving interventions / benefits (direct and indirect) from the project interventions,
- Households operating mono-cropping and those involved in integrated farming systems and / or multi-cropping practices,
- Level of household dependence on forest and natural resources in the areas,
- Level of household dependence on livestock raising for either household consumption and selling,
- Level of household dependence on out-migration works (seasonal, semi-permanent and permanent), *and*
- Level of household dependence on water supply for both household consumption and agricultural production.

In order to understand and analyze the multiplier and demonstration or spillover effects of the project while considering a possibility for project expansion as well as for the rectification of project interventions, the GIS research team did not target only the project beneficiaries (treatment or non-control group population), but also non-beneficiary groups that are considered as control population for this baseline study. In line with the ToR, household survey respondents were classified into the following types:

- Treatment households: refer to the project's beneficiary households that receive one or more of the project interventions[3];

[3] Project interventions include: 1) smallholder learning groups through climate smart farmer's field schools including integrated farming system; 2) women's livelihood and saving groups; 3) access to dry / wet season irrigation; 4) freshwater availability and 5) agricultural/farmer cooperative.

- Control population 1: refer to non-beneficiary households living in the 160 target villages of the project; *and*
- Control population 2: refer to non-beneficiary households living outside the project's coverage villages.

A structured questionnaire were developed (based on the indicators and parameters as listed in **Table 2.2 and 2.3** above) and used to help the selected respondents strategize and clarify their responses so that the research team could use them to support sequential analysis of perception on climate change impacts, livelihood conditions (social, physical, financial, natural, and human capital assets), natural resource-based and non-natural resource-based livelihood strategies (intensification, diversification, and alternative), socio-economic conditions, and urgent livelihood needs of the communities / villagers in selected target villages of the 89 communes and 10 districts in target provinces. This analysis enabled the research team to understand the community livelihood systems and preferences for successful and impactful interventions. Particularly, it generated baseline data for the research team to further discuss with the project management and implementation team of SRL project in order to set up appropriate benchmarks for the project to achieve within 4 years with regard to Outcome 2[4] of the project. This addresses the following project impact indicators, including:

1. Changes in income from agriculture and related activities;
2. Yield from rice production;
3. Yield from home-gardens;
4. Migration for seasonal work;
5. Farmland left fallowed; *and*
6. Freshwater availability for household and agricultural consumption.

Based on the indicators and parameters listed in **Tables 2.2 and 2.3** above, the quantitative survey questionnaire was used to collect quantitative data to measure perception on existing vulnerability, livelihood assets and strategies, livelihood challenges, internal and external influencing or enabling factors leading to livelihood improvement or shock, self-reliant/-sufficient or endogenous livelihood improvement activities, and other participatory climate resilient and climate sensitive livelihood and rural production systems in order to promote CCA practices through proper CCA planning, budgeting, and execution in the project's coverage areas. Particularly, it also helped the research team to assess (Please refer to **Annex C** for detail Household Survey Questionnaire):

- Household assets (i.e. house, land, infrastructure and IT facilities, material and non-material possession, etc.);
- Local's access to and use of small-scale water management infrastructure or facilities (i.e. dry/wet seasonal irrigation systems for increasing agricultural and land productivity and food security);
- Locals' income generation ability from on-farm (annual rice yield, home-grown productivity, animal raising, NTFP collection, etc.) and off-farm-based livelihoods (migration for seasonal work, working as service providers or wage laborers in the areas);
- Locals' access to extension services and agricultural technology in order to practice climate smart agriculture including innovative integrated farming;
- People's access to and use of available freshwater (i.e. sources of supply, time spent on water collection, water supply cost, pattern of freshwater use, burden on freshwater collection for households, etc.);

[4] Outcome 2: Resilience of livelihoods of the most vulnerable improved against erratic rainfall, floods, and droughts (ToR, page 1).

- Locals' perception on climate change/impact of climate change on livelihoods and access to weather information for agriculture, etc.;
- Locals' perception of women/gender issues in the locality;
- Locals' access to loan from external micro financial institutes/ banks (MFIs) and indebtedness;
- Locals' overriding living costs, as well as livelihood and local economic development challenges including access to market, market mechanisms, access to information, etc.; *and*
- Existence of value-added groups to improve livelihood security (e.g. women livelihood groups, saving groups, smallholder learning groups, agricultural/ farmer cooperative, water user groups, etc.).

2.3. Power Calculation and Sampling Method

It is important to note that the ultimate goal of this study's quantitative component is to assess the impact of the project's intervention to be carried out in 160 coverage villages, 89 communes of 10 districts in SRP and KPT provinces. To this end, the project involves comparing changes in the intervention group between the baseline and endline times taking into serious consideration changes in the control group for the same time period. Therefore, **the difference-in-difference (DD / DID) design method** is systematically used for the study with its design framework illustrated in detail below:

	Baseline	**Endline**	**Difference / Change**
Intervention group (T)	T_A	T_B	$T_B - T_A$
Control group (C)	C_A	C_B	$C_B - C_A$
Impact	***(Difference-in-Difference) = DD estimate = $(T_B - T_A) - (C_B - C_A)$***		

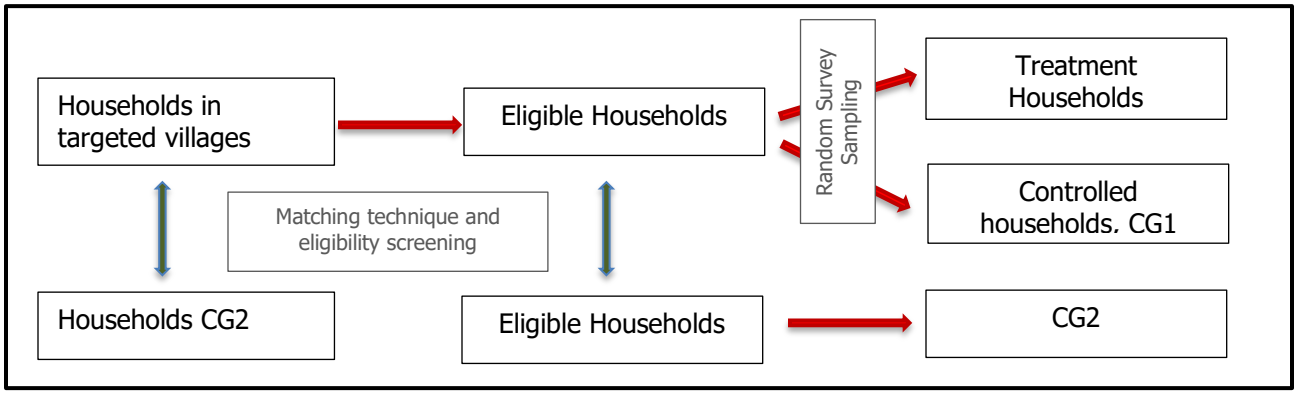
The overall null hypothesis is that the improvement of the outcome after the intervention is zero (H_0: DD = 0), or alternatively, H_a: DD > 0 after intervention.

With this design between groups, randomization can be relaxed. This also results in a potential weakness that is the DD comparison attributing to the intervention can be confounded by change or confounding factors experiencing differently by the two groups (intervention or T group and control or C group) throughout the course of intervention.

To assure the accuracy of the intervention impact taking into consideration the differences in temporal changes that may be experienced differently by the control (C) group, the study attempts to include two control groups – one is the control group encompassing households from the intervention villages (C1 group) and the other is the control group of households outside the intervention villages (C2 group) – for the purpose of showing parallel trends and logical outcome comparison between treatment / intervention (T) and control groups over space and time throughout the 4-year project implementation in the two target provinces. Noticeably, the outcome comparision between T and C2 groups would demonstrate the pure impact of the project, while the historical outcome measures between C1 and C2 groups would indicate the project's spillover impact over time. Despite its fundamental aim to discover and measure pure and spillover impacts, this study would also concentrate on outcome comparison between T and C1 groups with the intention of exploring indirect impact of the project as well as the livelihood adaptation capacity and resilience, motivation and willingness of C1 households to participate and apply climate smart agriculture and resilient livelihood approaches for the betterment of their livelihood security. Measuring income difference between T and C1 groups, which live in the same intervention villages, would help the study team to measure the impact of individual intervention logics in stimulating income growth on

the one hand and to provide practical suggestions to the SRL project team for improving future project planning and strategies on the other hand. Below is the sequential process of using DD framework in targeting sample population for the study:

Figure 2.1: Process of DD design for sample population selection



2.3.1. Power Calculation

The power analysis is performed to calculate the sample size needed for an accurate estimate of DD design with 90% power at a 5% significance level. Within this expectation, **PASS16 program** was used to compute the needed sample size for each group with several parameters being defined as follows:

- One-tailed t test is used;
- The minimum detectable change in the outcome improvement after intervention is 10% or d = 0.10 *(although the smaller minimum detectable change or MDE, i.e. d = 0.05, the better estimation of effect, this study opted for only 10% MDE due mainly to time constraint and the sufficient influence on power in which the effect or outcome could be still precisely estimated for the purpose of historical outcome measures of treatment and control groups)*
- The proportion of the treatment that would have the outcome improvement in the absence of the intervention is also 15%
- The ratio of the treatment group versus control group is 40% T - 30% C1 – 30% C2
- The expected impact captured in the difference-in-difference will be detected for each province

Table 2.4. Estimated Sample Size for the Baseline Survey

Type of Village	Minimum Number of HHs		Adjusted HH Size for Subject Loss		Adjustment Factor *
	One Province	Both Provinces	One Province	Both Provinces	
T	274	548	356	712	30%
C1	192	384	211	422	10%
C2	192	384	211	422	10%
Total	***658***	***1,316***	***779***	***1,556***	***18%***

Note: * The adjustment factor is put for re-matching of total sample size of HHs interviewed during the fieldworks with the power calculation using DID / DD design that yields 10% MDE and for addressing the population mobility issue among selected T, C1 and C2 groups.

The needed sample size for each province is 274 households (HH) for the treatment group and 192 HHs for each control group, with a total of 658 HHs. Given the population mobility issue for such a prolonged intervention period (04 years), a concern about subject loss to the follow-up is warranted. Therefore, an adjustment factor was used to increase the sample size to assure sufficient household respondents by the end of the intervention. Applying the adjustment factor, the final sample size for both provinces are approximately 712 households for the treatment group and 422 households for each control group, with a total of 1,556 households.

2.3.2. Sampling Method

The selection of the surveyed villages was done firstly through the selection of the 160 target villages out of the total 810 villages within the target communes of 10 districts under the SRL project coverage areas. With support from the SRL project team, especially key staff of NCDDS, the 1-5 scaling item was used in order to score each village based upon the following criteria: (1) total number of household in the village, (2) number of female headed households in the village, (3) ID Poor (Poor 1 and Poor 2), (4) level of vulnerability to climate change or climate change affected villages, and (5) avoid duplication / overlapping with TSSD project. The final decision for village selection was supported by analyzing the cumulative scores of each village plus proportion analysis in order to make the selected villages disperse across geography.

Despite concentrating on the use of selection criteria to choose target treatment villages out of the total 80 villages for each province or 160 villages for both target provinces, when integrated with small scale water infrastructure development as an integral part of the SRL project phase-in interventions on a yearly basis, some changes were required to improve the quality of village selection while simultaneously ensuring the equitable access of each village, commune and district to receive equitable benefits from SRL project interventions within its 4-year timeline. Therefore, livelihood intervention services and small-scale water infrastructure projects under SRL support mechanisms were somehow required to be overlapped within target treatment villages in order to improve people's access to effective and efficient use of water for household consumption and agricultural production, including practices of climate smart and resilient agriculture by local beneficiaries in the areas.

C1 villages were selected from the lists of T villages. C2 villages were selected outside the lists of 160 selected villages of the target communes and districts in which the SRL project would cover during its 4-year interventions in Kampong Thom and Siem Reap provinces. Although C2 villages are geographically located outside the SRL project coverage areas, they are required to share similar characteristics with the nearby project's target villages, T and C1 villages, and are located in between 1-3 km or up to 5km (very few) from the target (treatment) villages. Table 2.5 below portrays sample size calculation for the numbers of selected T, C1, and C2 villages as well as specific amounts of local HH respondents for each village and province for the baseline survey.

Table 2.5: Sample Size Calculation for Selected Household Respondents

Types of household group	Number of Households		Households per villages	Number of villages		Types of villages
	Each province	Both provinces		Kampong Thom	Siem Reap	
T	356	712	25	27		Beneficiary
C1	211	422	25	16		Beneficiary
C2	211	422	25	16		Non-beneficiary
Total	***779***	***1,556***		***43***		

In order to share equal number between the two target provinces, the number of beneficiary villages was increased from 27 to **28 T villages** meaning **14 T villages for Kampong Thom** and another **14 T villages for Siem Reap**. Therefore, **44 villages** (**28 T villages, 16 C1 villages, and 16 C2** villages) were chosen for the baseline study. In addition, the numbers of respondents for T, C1 and C2 villages were slightly increased with an attempt to cope with the missing values of data and incomplete questionnaires during the survey interviews with selected HH representatives. In total, **1,563 HHs** were surveyed, **782 HHs** and **781 HHs** of which were done in Kampong Thom and Siem Reap provinces respectively, and **726 HHs**, **422 HHs**, and **415 HHs** representing target respondents in T villages, C1 villages, and C2 villages in that order. Tables 2.6, 2.7, and 2.8 below portray specific names and total numbers of respondents of target villages, communes and districts under SRL project coverage areas in Kampong Thom and Siem Reap.

Table 2.6: Total Number of Respondents per Target Province

Type of Village	Total Number of Respondents Per Target Province		Total
	Kampong Thom	Siem Reap	
Treatment village	361	365	726
	46.2%	46.7%	46.4%
Control 1 village	211	211	422
	27.0%	27.0%	27.0%
Control 2 village	210	205	415
	26.9%	26.2%	26.6%
Total	**782**	**781**	**1,563**
	100%	100%	100%

Table 2.7: Total Number of Respondents at Commune Level Based on Type of Village

Target District	Total Number of Respondents at Commune Level Based on Type of Village			Total
	Treatment village	Control 1 village	Control 2 village	
Baray	77	55	50	182
Kampong Svay	78	52	28	158
Prasat Balangk	47	25	53	125
Sandan	80	53	27	160
Santuk	79	26	52	157
Kralanh	81	25	50	156
Prasat Bakong	50	25	51	126
Srei Snom	76	51	25	152
Svay Leu	77	50	25	152
Varin	81	60	54	195
Total	**726**	**422**	**415**	**1,563**

Table 2.8: Total Number of Respondents for Each Selected Village

No.	Names of Selected Villages	Total Number of Respondents for Each Selected Villages			Total
		Treatment village	Control 1 village	Control 2 village	
Kampong Thom Province					
1	Boeng Khang Tboung	0	0	25	25
2	Pongro	25	29	0	54
3	Pongro Ling	0	0	25	25
4	Serei Sameakki Kandal	25	26	0	51
5	Damnak	27	0	0	27
6	Trapeang areaks	28	27	0	55
7	Kab Thlok	25	0	0	25
8	Voa Yeav	25	25	0	50
9	Bou Pueng	0	0	28	28
10	Sangvat	0	0	28	28
11	Trapeang Knong	26	0	0	26
12	Chey	21	25	0	46
13	Thnal	0	0	25	25
14	Tuek Vil	0	0	27	27
15	Rumpuh	27	27	0	54
16	Rovieng	25	26	0	51
17	Veal Pring Leu	28	0	0	28
18	Ou Kohkir	27	0	0	27
19	L'ak	25	26	0	51
20	Pnov	0	0	25	25
21	Prampir Meakkakra	27	0	0	27
22	Trapeang Trom	0	0	27	27
Siem Reap Province					
23	Chanlas Dai	0	0	25	25
24	Rolum Svay	26	25	0	51
25	Roung Kou	25	0	0	25
26	Lhong	30	0	0	30
27	Phlang	0	0	25	25
28	Stueng	25	25	0	50
29	Ta Koy	0	0	26	26
30	Souphi	0	0	25	25
31	Roluos Kaeut	25	0	0	25
32	Ruessei Sanh	25	25	0	50
33	Slaeng Kong	25	0	0	25
34	Klang Hay	0	0	25	25
35	Thlok	26	26	0	52
36	Sakda	25	0	0	25
37	Chob Kraom	26	26	0	52
38	Rohal	26	24	0	50
39	Thmei	0	0	25	25
40	Kouk Chan	29	28	0	57
41	Ou Tey	0	0	26	26
42	Srae Nouy	0	0	28	28
43	Voat	26	0	0	26
44	Rumduol	26	32	0	58
Total		**726**	**422**	**415**	**1,563**

Table 2.9: Total Number of Respondents for Each Selected Commune

No.	Names of Surveyed Communes	Kampong Thom	Siem Reap	Total
1	Boeng	25	0	25
2	Krava	25	0	25
3	Pongro	54	0	54
4	Sralau	78	0	78
5	Chey	55	0	55
6	Damrei Slab	75	0	75
7	Kampong Kou	28	0	28
8	Kraya	28	0	28
9	Phan Nheum	26	0	26
10	Sala Visai	46	0	46
11	Tuol Kreul	25	0	25
12	Klaeng	27	0	27
13	Mean Chey	54	0	54
14	Ngan	79	0	79
15	Chroab	27	0	27
16	Kampong Thma	51	0	51
17	Pnov	25	0	25
18	Tang Krasang	27	0	27
19	Ti Pou	27	0	27
20	Chanleas Dai	0	76	76
21	Roung Kou	0	25	25
22	Sranal	0	55	55
23	Bakong	0	50	50
24	Ballangk	0	26	26
25	Kantreang	0	25	25
26	Roluos	0	25	25
27	Chrouy Neang Nguon	0	50	50
28	Klang Hay	0	50	50
29	Slaeng Spean	0	52	52
30	Boeng Mealea	0	25	25
31	Svay Leu	0	77	77
32	Ta Siem	0	50	50
33	Lvea Krang	0	83	83
34	Srae Nouy	0	54	54
35	Varin	0	58	58
		782	**781**	**1,563**

2.4. Data Analysis Methods

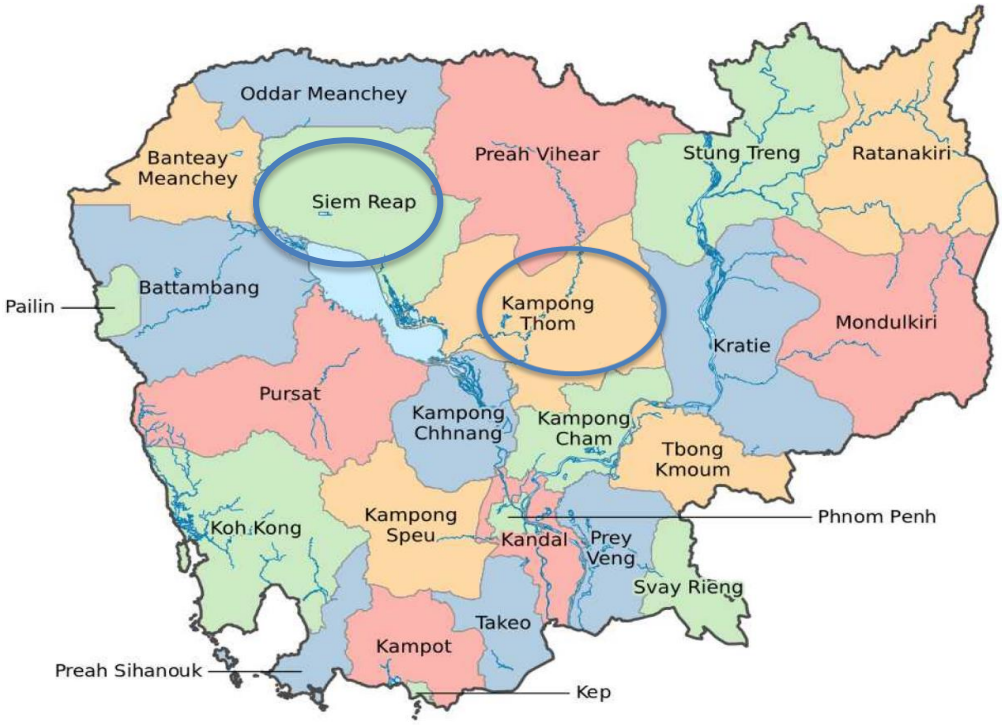
Both qualitative and quantitative data analysis methods were used in this baseline study. Qualitatively, it included Framework Analysis and Livelihood Analysis Matrix. Quantitatively, it involved the use of SRL Project LogFrame and standard indicators and analysis matrix, SPSS (frequency, cross-tabulation, compare means, multiple responses, correlation, one-way ANOVA, etc.), and Likert Scale Analysis.

3. BASELINE SURVEY FINDINGS

3.1. Profile of Target Study Areas

Kampong Thom and Siem Reap provinces lie within the Tonle Sap agro-ecological zone and comprise of mainly low-lying agricultural land and forest. Siem Reap Province is located in northwest Cambodia and bordered by Oddor Meanchey province to the north, Preah Vihear and Kampong Thom provinces to the east, Banteay Meanchey province to the west and Tonle Sap to the south. Siem Reap is subdivided into eleven districts - Angkor Thom, Angkor Chum, Banteuy Srey, Chi Kraeng, Kralanh, Pouk, Prasat Bakong, Soutr Nikum, Srei Snam, Svay Leu, and Varin - plus Siem Reap city which is classified as a Municipality. Siem Reap has a total land area of 10,299 square kilometers and is ranked as the 10th largest province in Cambodia. Most part of the province, especially the southern part, consists of typical wet plains covered by rice fields and agricultural plantations. The northern part of the province is hilly area covered by forests.

Map 3.1: Study Areas Location



Kampong Thom province borders the provinces of Siem Reap to the northwest, Preah Vihear to the north, Stung Treng to the northeast, Kratie to the east, Kampong Cham, Kampong Chhnang to the south, and the Tonle Sap to the west. This province includes low-lying floodplain areas and higher ground to the northeast. It is Cambodia's 2nd largest province with a total land area of 13,814 square kilometers, which is divided into 8 districts, namely Baray, Kampong Svay, Prasat Balank, Stung Sen, Prasat Sambour, Stoung, Santouk and Sadan. Kampong Thom is located at the central point of the country, and is home to exotic lakes, rivers, forests, mountains and more than 200 ancient temples. Kampong Thom province is divided into two parts: 1) East of National Road 6 covers 70 percent of the province and consists of forests and plateaus, which are rich in natural resources and good for profitable agriculture, forestry and animal husbandry; and 2) West of National Road 6 covers 30 percent surface and consists of wet plains extending to Tonle Sap Lake. This area is one of the best areas in Cambodia for rice cultivation and fishing. Two of the three core areas in Tonle Sap Biosphere

Reserve are located in Kampong Thom - Boeng Chhmar (14,560 hectares) and Stung Saen (6,355 hectares).

Due to such geographical conditions and a vast area of land availability in the provinces, Kampong Thom and Siem Reap are predominantly agricultural. According to the 2008 Census, 86% of the workforce in Kampong Thom and 73% in Siem Reap are employed in the agriculture and natural resources sectors. Rice is the predominant crop in both provinces with much smaller areas of other field crops including cassava, corn, sugar cane, mung beans, etc. Smallholder farmers typically grow vegetables in arable garden plots and raise livestock including chickens, pigs and cattle. Larger scale agriculture, including commercial rice growing as well as cassava and some tree crops plantation, is increasingly important in some districts. However, much of Siem Reap's economy is focused on the foreign tourism due to presence of the famous Angkor World Heritage Site and Angkor Complex itself. Fishing is the second most important industry after tourism. Thousands of tons of fish are annually exported to other provinces across the country or outside Cambodia.

At the time of the study, more updated population database was limited. The total population in Siem Reap is 946,656 whilst in Kampong Thom is 697,360 (NCDD, 2010). According to the Ministry of Planning (MoP, 2012), Kampong Thom and Siem Reap are among the six provinces (others are Kampot, Takeo, Kandal, and Kampong Cham) that provide the most low-skilled and unskilled internal migrants. Simultaneously, Siem Reap is one of the top four destination provinces in the country for first-time internal migration, besides Phnom Penh, Preah Sihanouk and Svay Rieng.

3.2. Findings from KIIs and FGDs

At the end of the survey, **50 key informants** (24 in KPT and 26 in SRP) were interviewed and **25 FDGs (11 in KPT and 14 in SRP)** with a total of **592 participants** were conducted in two target provinces. Among the 50 key informants, six were female and most of them were responsible SNAs (i.e. village chiefs/VDC members and commune chiefs/ council members) in the target study areas

Table 3.1: Number of qualitative informants in the study provinces

No.	Province	Number of Participants
In-depth key informant interviews (KIIs)		
1	Kampong Thom	24
2	Siem Reap	26
	Total	**50 key informants**
Focus group discussions (FGDs)		
1	Kampong Thom	11 (230 Participants)
2	Siem Reap	14 (362 Participants)
	Total	**25 groups (592 Participants)**

3.2.1. Livelihood Strategies and Income

From FGDs with treatment participants and KIIs with SNAs, the major livelihood activities are identified to be rice farming, home-gardening and livestock raising. Nearly all project beneficiaries and villagers in the target areas engage in these activities to some extent (see **Table 3.2**). However, they caution that these livelihood activities are not their main sources of income. Their engagement in these activities can only help with everyday subsistence (mainly food stuffs), but produce no or very little income. Their main sources of income (in monetary term) are from wage laboring (mostly

in nearly plantations) and migrating to work either in some other provinces or cities in Cambodia (e.g. Siem Reap, Phnom Penh, etc.) or abroad (e.g. Thailand, Malaysia, South Korea, etc.). Fishing, NTFP collecting and strategic crop cultivating are listed as subsidiary occupations but provided additional needed cash for their household immediate expenditure (i.e. clothes, medicine, food, etc.).

In both provinces, rice farming is the first main subsistence occupation for households in the study areas, and rice is predominantly a rain-fed wet season crop. In Cambodia, there are two major types of rice cultivation; they are "rain-fed wet rice" and "dry season rice". Rain-fed wet rice is a type of rice, which is grown in the period from May to November and the harvesting time is normally from late November to February (USDA, 2013). Due to irregularity and uneven distribution of rainfall, even rain-fed wet rice need additional irrigation system for additional water in case of erratic drough and for discharging water out of the rice field in case of temporary flood due to excessive rainfall at a certain period. However, dry season rice is a type of rice which is grown in dry season from late October to late March, and it is ususally fully or partially irrigated (Nesbitt, 1997). The most important dry season farming occurs in areas subject to seasonal inundation, especially around the Tonle Sap Great Lake (see **Table 3.2** and **3.4** for details**)**. Most rice farmers in the two provinces now plant by distributing or direct seeding rather than using the traditional transplanting / sowing methods and use new seed varieties, although seed is more commonly kept from their own previous harvest rather than bought from other people. They also consume significant amounts of chemical fertilizers and predominantly use hand tractor for ploughing rather than traditional tools with cow or buffalo. Harvesting machinery is also becoming increasingly popular in most study areas.

Table 3.2: Distribution of Livelihood Strategies in the Study Areas

Livelihood Strategies	**Kampong Thom**					**Siem Reap**				
On-Farm Occupation	**KPS**	**PSB**	**ST**	**SD**	**BR**	**PB**	**SL**	**SS**	**KL**	**VR**
Wet Rice Farming	■	■	■	■	■	■	■	■	■	■
Dry Rice Farming			■	■	■					
Fishing	■		■			■			■	
Home-Gardening	■	■	■	■	■	■	■	■	■	■
Livestock Raising	■	■	■	■	■	■	■	■	■	■
Crop Cultivating	■	■	■	■	■			■		■
On-Farm Occupation	**KPS**	**PSB**	**ST**	**SD**	**BR**	**PB**	**SL**	**SS**	**KL**	**VR**
Collecting NTFP	■	■	■				■			
Self-Employing (Local SMEs)	■	■	■		■	■		■		
Logging	■									
Wage Laboring	■	■	■	■	■	■	■	■	■	■
Govt. Officer, CBO	■					■				
Internal Seasonal Migration	■		■	■		■	■			
Internal Long-Term Migration	■	■		■	■	■	■		■	■
Oversea Migration	■	■		■			■	■	■	■

Note: List of abbreviated district names

Kampong Thom	*Abbr.*	*Siem Reap*	*Abbr.*
▪ Kampong Svay	KPS	▪ Prasat Bakong	PB
▪ Prasat Balank	PSB	▪ Svay Leu	SL
▪ Santuk	ST	▪ Srey Snom	SS
▪ Sandan	SD	▪ Kralanh	KL
▪ Baray	BR	▪ Varin	VR

Rice yields are quite low and vary considerably between regions, according to soil fertility and water conditions, seed varieties and the agriculture techniques employed. The average wet season rice yield is only 1.5t/ha in Kampong Thom and 1.7t/ha in Siem Reap province, while dry season rice yield is a bit higher (3.7t/ha) for Kampong Thom (see **Table 3.4** for detailed rice yield in each study district). However, according to FGDs with SNAs and treatment HH participants (via KIIs and FGDs), only households in Santuk, Sandan and Baray districts in Kampong Thom province grow rice in dry season as well as the wet season. None of the target villagers in Siem Reap and the rest of Kampong Thom engage in dry rice farming (Refer to **Table 3.2** and **Table 3.4**). Low rice yields are identified to be strongly associated with limited water resource and poor soil fertility (**Table 3.3)**. Most farmers grow rice to meet their domestic consumption needs first and then sell any surplus or any amount needed to pay off debts owed to input suppliers. With low yields and small plot sizes (**Table 3.4)**, this means that many poorer farmers produce predominantly for own consumption and gain rather little cash income from rice growing.

Most vegetable cultivation is carried out on small home garden plots in the wet season and is predominantly for household consumption. Only a minority of farmers attempt year-round, market-orientated vegetable production (using well water and nearby pond if available). Likewise, livestock production is also mainly small scale and informal in nature, with chickens, pigs and cows in particular allowed to graze freely. Unfortunately, sickness and mortality rates among these livestock are quite high. Rather than relying on livestock for a regular cash income, farmers tend to sell livestock when they need cash. For relatively small purchases, chickens may be sold, while cattle are sold in case of a major cash need such as a health treatment or other emergencies in the household.

The majority of the population in the target study area are poor and struggle very hard with several livelihood activities for survival, but their livelihoods face with numerous challenges including:

- Inadequate water for both household consumption and agricultural purposes
- Limited land size and low soil fertility
- Low rice yield but high production cost
- Limited knowledge in crop species suitable for climate and geography
- High occurrence of disease with both human and livestock
- Instable market and low price for rice production and agricultural products
- Indebtedness
- Limited economic opportunities in the locality
- High rate of migration (both internal and external)
- Low cost for their labor (especially for internal seasonal migrants)
- High vulnerability and frequent occurrence of natural disasters (e.g. flood, drought thunderstorm and windstorm, etc.)

Table 3.3: List and Distribution of Livelihood Challenges

Livelihood Challenges	Kampong Thom					Siem Reap				
	KPS	PSB	ST	SD	BR	PB	SL	SS	KL	VR
Inadequate water for both household consumption and agriculture	■	■	■	■	■	■	■	■	■	■
Limited land size and low soil fertility	■	■	■	■		■		■		
Indebtedness (almost 100%)	■		■	■	■		■	■	■	■
Limited economic opportunities	■				■	■	■		■	■
Low labor cost (migrants)	■	■	■	■	■	■	■	■	■	■
Limited knowledge in crop species suitable for climate and geography		■		■						

Disease (human and livestock)		■			■	■	■		■	■
Instable market and low price for agricultural products	■		■				■	■		■
High rate of migration	■	■	■	■					■	
Low yield but high production cost	■	■						■		
Vulnerable to natural disasters		■	■	■		■		■		

3.2.2. Land Availability and Use

In both provinces, land availability for household to cultivate rice is considerably small: minimum of 0.5ha/HH and maximum of 6ha/HH (see **Table 3.4** for detail information by district). However, this figure indicates large variations with significant numbers of landless families and a minority of households having relatively large land holdings (more than 2ha). Inequality of land distribution appears to be increasing and may be driven by key factors including population growth (family plots are sub-divided as new households are formed after marriage), forced sales due to debt (especially to micro-finance institutions - MFIs), family emergencies or natural disasters. Generally, households in the study areas can be classified into three categories below:

1. Those who are either landless or whose land holdings are not large enough to meet the household's rice consumption needs (i.e. less than 0.5ha) – this category roughly corresponds to the households holding ID-Poor cards;
2. Households with enough land to meet their rice consumption needs and to produce a surplus for a small sale, but probably not enough to support the household without some off-farm supplementary income (land holdings roughly 0.5-2.0ha);
3. Those with land holdings large enough (above 2ha) to meet household needs for both food and cash income primarily by farming.

Table 3.4: Household Land Availability and Average Rice Yield

Target Areas	**Land Availability Per HH**		**Average Yield**	
Kampong Thom				
	Minimum	**Maximum**	**Avr. Yield of Wet Rice Per Hectare**	**Avr. Yield of Dry Rice Per Hectare**
Kampong Svay	0.5ha	2.5ha	1.5t	No Dry Rice
Prasat Balank	0.5ha	3ha	2t	No Dry Rice
Santuk	0.3ha	2ha	1.4t	7t
Sandan	<0.5ha	3ha	0.8t	2t
Baray	0.5ha	1ha	1.9t	2t
Siem Reap				
	Minimum	**Maximum**	**Avr. Yield of Wet Rice Per Hectare**	**Avr. Yield of Dry Rice Per Hectare**
Prasat Bakong	0.5ha	2ha	1.2t	No Dry Rice
Svay Leu	0.5ha	6ha	2.5t	No Dry Rice
Srey Snom	1ha	3ha	1.15t	No Dry Rice
Kralanh	<1ha	3ha	1.5t	No Dry Rice
Varin	0.5ha	2ha	2t	No Dry Rice

3.2.3. Migration Patterns

Internal migratory employment in either agriculture (e.g. in nearby rubber or cassava plantations) and non-agriculture occupations (e.g. construction, hospitality or transportation sector and home services), has become extremely important to the rural economy and has both positive and negative impacts on the rural economy and society (see **Table 3.2** and **Table 3.5)**. The availability of employment opportunities and long-term migration for work have had a significant impact on availability of labor for on-farm agriculture. There are many households where the young, single adults and married men have migrated to find work, leaving what becomes effectively a female-headed household with elderly dependents and children.

Migratory employment patterns are different for women and for men. For women, the most important form of internal migratory employment is in the garment factory and hospitality industry (message club, restaurant, karaoke palour, etc.) though women also migrate for work in other industries and for service occupations (i.e. servant in urban households, especially in Phnom Penh). These tend to be internal long-term migration and mainly young, unmarried women migrate.

Table 3.5: Migration Patterns and Remittance Level in the Study Areas

Migration Patterns	Kampong Thom					Siem Reap				
	KPS	PSB	ST	SD	BR	PB	SL	SS	KL	VR
Wage Laboring										
Internal Seasonal Migration										
Internal Long-Term Migration										
Oversea Migration										
Average Monthly Remittance	120$	150$	65$	80$	194$	25-50$	125$	125$	156$	76$

Men migrate for work in urban occupations such as construction but also for agriculture labor on plantations. Men's migratory works tend to be casual or seasonal in nature and may complement or compete with on-farm agriculture works. Both sexes (though more men than women) migrate to Thailand for employment, usually on an informal basis. Migration to Thailand is important for both Kampong Thom and Siem Reap provinces, due to the proximity of the border. Remittance (either from internal or external migration) is an important component of HH incomes of most households in the study areas. Farmers rated income from seasonal or long-term laboring alongside rice production and fishing as the most important livelihood activities. Seasonal labor employment can typically find work for around 10-15 days per month at wage rates of around $4 to $5 per day, while those who engage in long-term employment (e.g. hospitality industry or home service) can earn around $150-$200 per months (see **Table 3.5** for average monthly remittance by district). Longer term overseas migration is also important. In most communities in the study areas, there are at least 4-10 people migrated to Thailand or other countries, such as Malaysia or Suth Korea to seek works.

3.2.4. Climate Change Vulnerabilities and Fresh Water Availability

During FGDs and KIIs, participants identified major climate vulnerabilities in the target areas to be floods, thunderstorm, windstorm, heavy rainfall and droughts. These are not new occurrences but the local population perceived that there is an increase in the frequency and intensity of these events, and a reduction in predictability (e.g. floods occurring at unusual times of year). These events can be very disturbing or destructive for agricultural activities and have the side effect of discouraging

farmers from investing more in future years' farming because the risk of production failure is too high.

Access to clean and adequate water resources for both household consumption and agriculture is problematic. All participants engaged in the FGDs and KIIs mentioned the availability of wells in most households in all districts in the study areas, but the quality of water in some places (especially in Prasat Bakong district) is very poor for household consumption. Meanwhile, water shortage for agricultural purposes (for rice and strategic crop cultivation, as well as home-gardening) are recognized by FGD and KI participants. In many study areas, farmers grow a single, wet season or rain-fed rice since rainfall may be complemented with irrigation that exists in some studied districts (Kampong Svay, Prasat Balank, Sandan, Prasat Bakong, Svay Leu, Srey Snom). Actually, these canals may provide adequate water for double cropping for only a small number of households, but can be accessed (using diesel pumps and pipes or hoses up to several hundred metres in length) by larger numbers of farmers for supplementary irrigation during dry spells that occur in the growing season. However, most farmers do not own pumps; the cost of pump hire and fuel is reported to be quite high, and thus has become the main barrier for many poor households in the study areas.

Table 3.6: List of Natural Disasters and Water Resource Availability

Climate Change Context	**Kampong Thom**					**Siem Reap**				
Occurrence of Natural Disasters	**KPS**	**PSB**	**ST**	**SD**	**BR**	**PB**	**SL**	**SS**	**KL**	**VR**
Flood	■	■	■	■	■	■	■	■	■	■
Heavy rainfall				■	■		■		■	■
Drought	■	■	■	■	■	■	■	■	■	■
Windstorm	■	■		■	■			■	■	■
Thunderstorm				■	■		■		■	■
Water Resource Status										
Well water as source of water for HH consumption	■	■	■	■	■	■	■	■	■	■
Availability of nearby river, pond water for agricultural purposes	■			■	■	■	■		■	■
Availability of dike, canal, stream water for agricultural purposes	■	■		■		■	■	■		
Adequacy of water for HH consumption	■	■	■	■	■		■	■	■	■
Adequacy of water for agriculture										

3.3. Findings from Household Surveys

3.3.1. Demographic and Social Characteristics of Surveyed Respondents

According to Figures 3.1 and 3.2, 1,563 household (HH) respondents were surveyed during fieldwork processes, 726 of which represented the Treatment (T) HHs whilst other 422 and 415 of them respectively characterized the Control 1 (C1) and Control 2 (C2) HHs. Most of respondents were dominantly female (KPT: 81%, SRP: 80%) due to the fact that most of male members, including HH heads, had gone to work on farms and in nearby plantations in the early rainy season whilst others had migrated to work in the neighboring countries, particularly Thailand (Figure 3.3). Of total, 17%, 23%, 19%, 9%, 11% and 38% respectively of Poor 1, Poor 2, female-headed, disability, climate change (CC) affected, and SRL established member HHs were surveyed. In addition, Figure 3.5 shows that most of Poor 1 and Poor 2 HHs came from Santuk district (64%) followed by those of Kampong Svay (61%), Sandan (47%), Prasat Bakong (43%), Prasat Balangk (38%), Baray (37%), Svay Leu (34%), Srey Snom (31%), Varin (30%), and Kralanh (24%).

When disaggregated by type of village, the proportion of female-headed HHs across T, C1, and C2 villages surveyed during fieldworks are almost homogenous, and this case similarly applies to the amount of male and female survey respondents. As further illustrated in Figure 3.4, the numbers of Poor 1 and Poor 2 HHs involved in the study are more prevalent in the treatment villages, while the number of female-headed HHs is more predominant in C2 villages. It was interesting to observe that CC affected HHs from T villages, who participated in the study, were only accounted for 6% which is about half or nearly one third of those of C1 and C2 villages.

Figure 3.1: Type of Respondents (n = 1563)

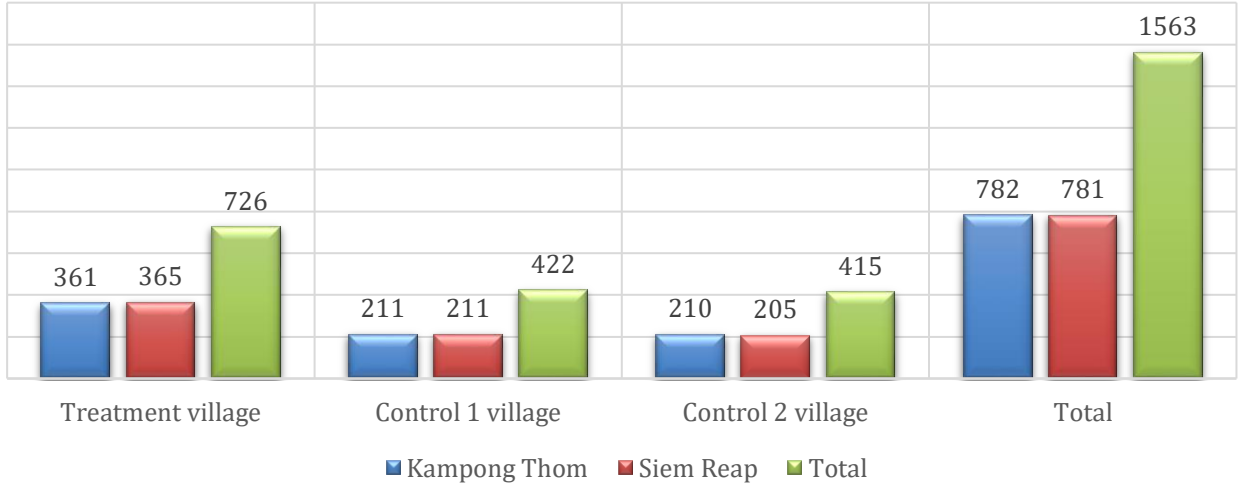
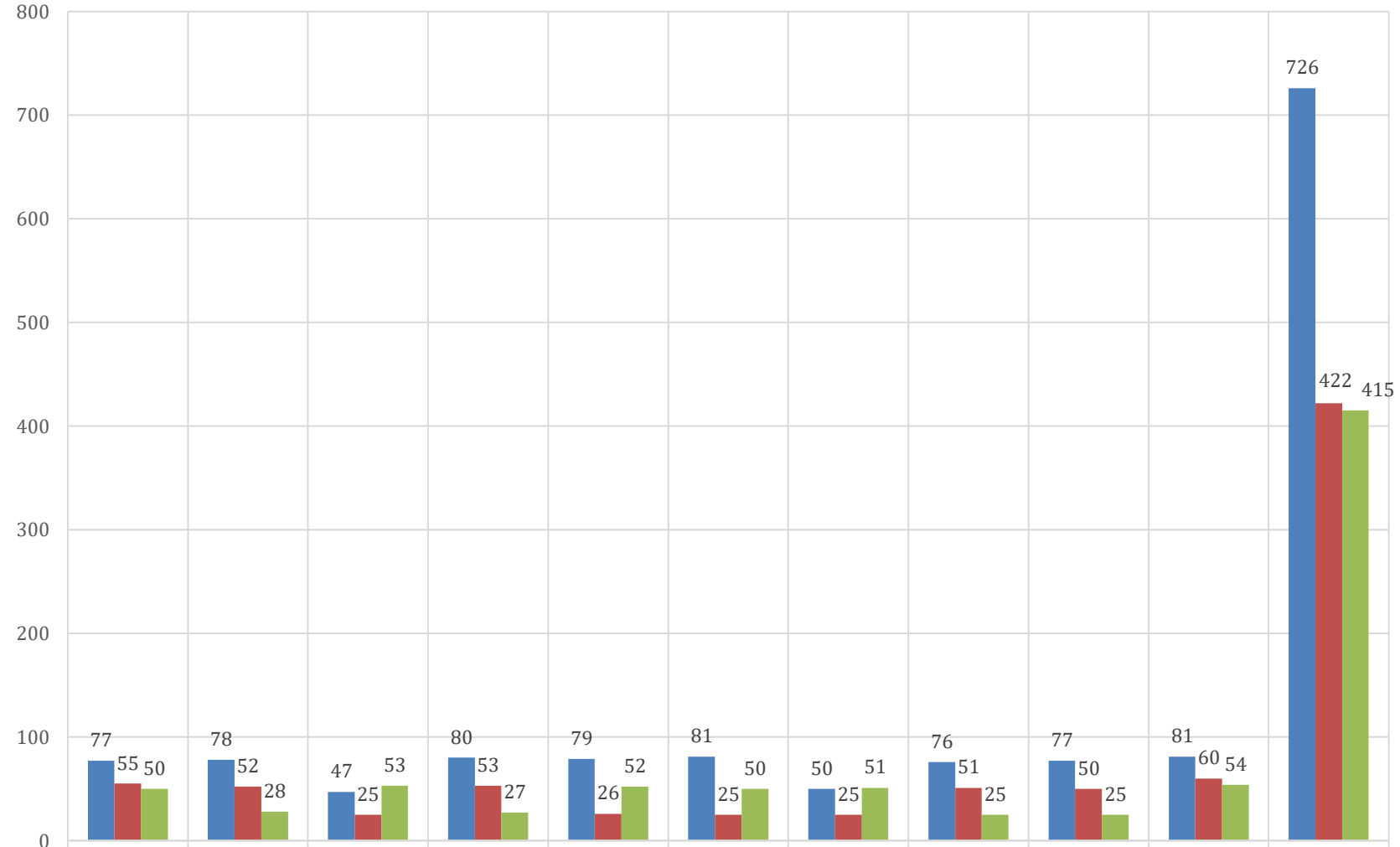
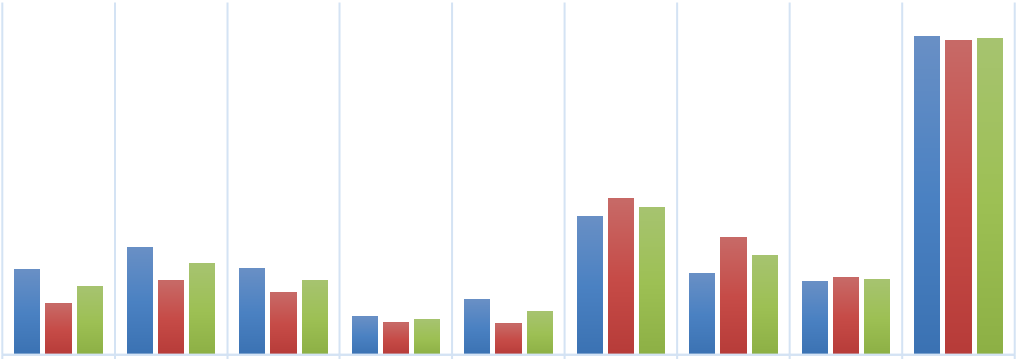


Figure 3.2: Type of Villages Disaggregated by District (n = 1563)



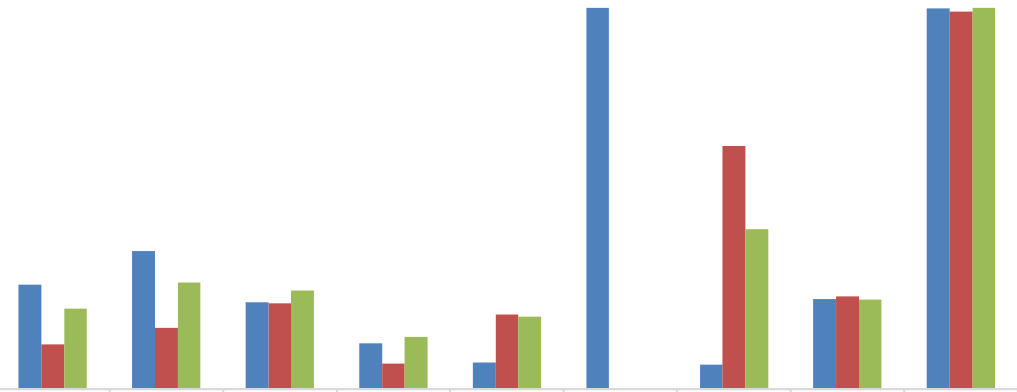
	Baray	Kampong Svay	Prasat Balangk	Sandan	Santuk	Kralanh	Prasat Bakong	Srei Snom	Svay Leu	Varin	Total
Treatment village	77	78	47	80	79	81	50	76	77	81	726
Control 1 village	55	52	25	53	26	25	25	51	50	60	422
Control 2 village	50	28	53	27	52	50	51	25	25	54	415

Figure 3.3: Type of Surveyed Respondents (n = 1563)



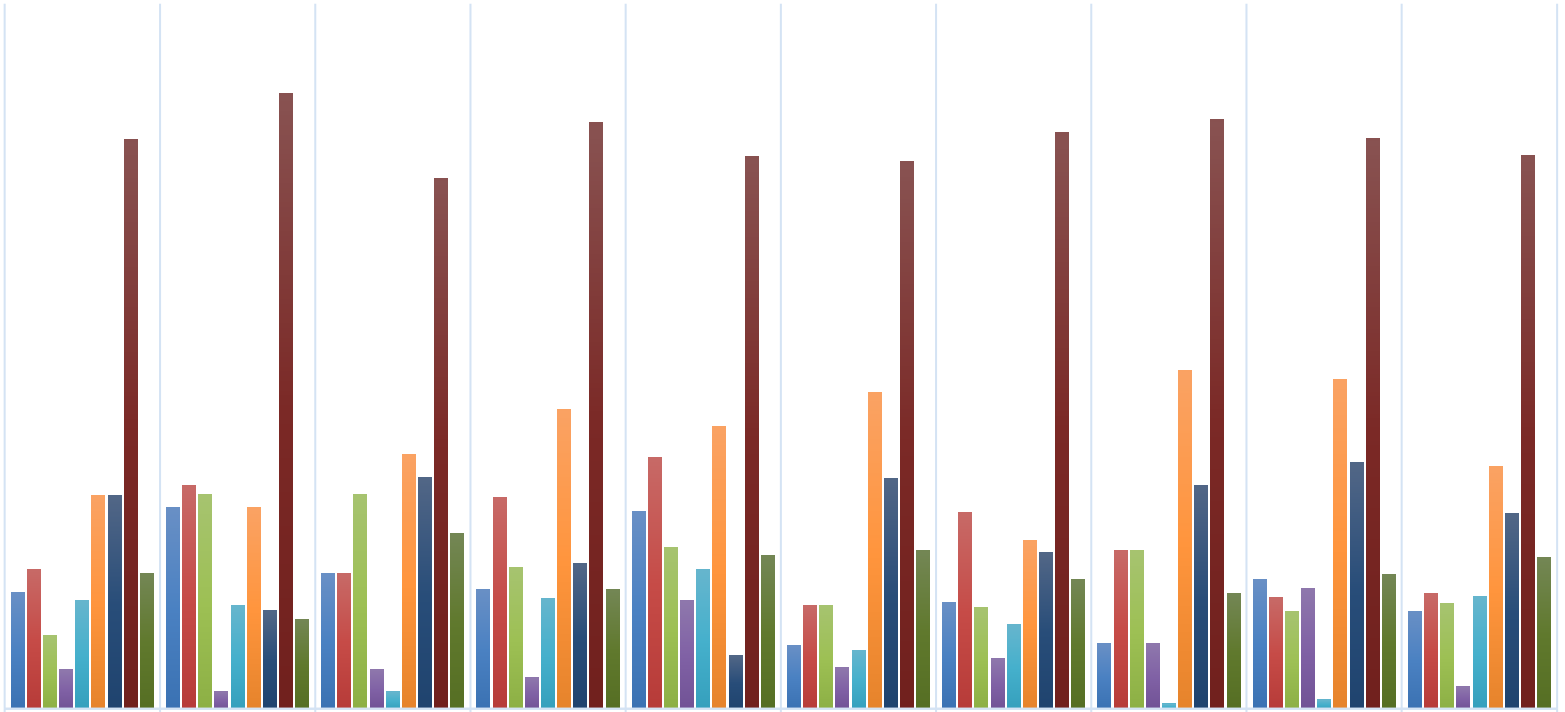
	Poor 1	Poor 2	FHHs	HHs with disability	CC affected	SRL-established CBO HHs	Other	Male	Female
Kampong Thom	22%	27%	22%	10%	14%	35%	21%	19%	81%
Siem Reap	13%	19%	16%	8%	8%	40%	30%	20%	80%
Total	17%	23%	19%	9%	11%	38%	25%	19%	81%

Figure 3.4: Type of Surveyed Respondents by Type of Village (n = 1563)



	Poor 1	Poor 2	FHHs	HHs with disability	CC affected	SRL-established CBO	Other	Male	Female
Treatment village	22%	29%	18%	10%	6%	81%	5%	19%	81%
Control 1 village	9%	13%	18%	5%	16%	0%	52%	20%	80%
Control 2 village	17%	23%	21%	11%	15%	0%	34%	19%	81%

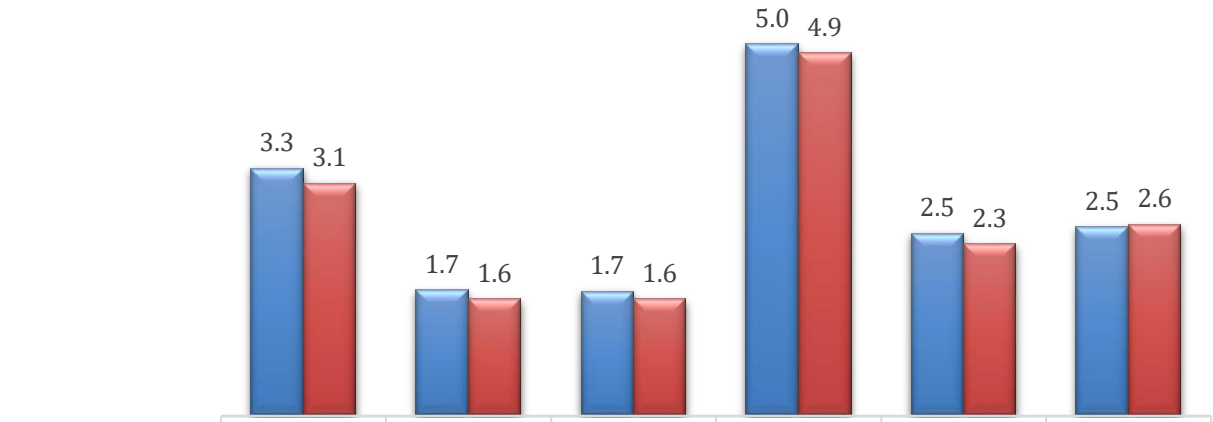
Figure 3.5: Type of Surveyed Respondents Disaggregated by District (n = 1563)



	Baray	Kampong Svay	Prasat Balangk	Sandan	Santuk	Kralanh	Prasat Bakong	Srei Snom	Svay Leu	Varin
Poor 1	17%	29%	19%	17%	28%	9%	15%	9%	18%	14%
Poor 2	20%	32%	19%	30%	36%	15%	28%	22%	16%	16%
FHHs	10%	30%	30%	20%	23%	15%	14%	22%	14%	15%
HHs with disability	6%	2%	6%	4%	15%	6%	7%	9%	17%	3%
CC affected	15%	15%	2%	16%	20%	8%	12%	1%	1%	16%
SRL-established CBO	30%	29%	36%	43%	40%	45%	24%	48%	47%	34%
Other	30%	14%	33%	21%	8%	33%	22%	32%	35%	28%
Female	81%	87%	75%	83%	78%	78%	82%	84%	81%	79%
Male	19%	13%	25%	17%	22%	22%	18%	16%	19%	22%

Figure 3.6 illustrates that the average members of HH in the areas is 5 with an equal prevalence of male and female members (2.5) in Kampong Thom and more prevalence of female members (2.6) in Siem Reap. Each HH generally has an average number of 3 children with an equal average number of sons and daughters in Kampong Thom (1.6) and Siem Reap (1.7).

Figure 3.6: Average Number of Household Members (n = 1563)



	Average children	Average son	Average daughter	Average member in family	Average male member	Average female member
Kampong Thom	3.3	1.7	1.7	5.0	2.5	2.5
Siem Reap	3.1	1.6	1.6	4.9	2.3	2.6

Figure 3.7: Average Number of Household Members (n = 1563)

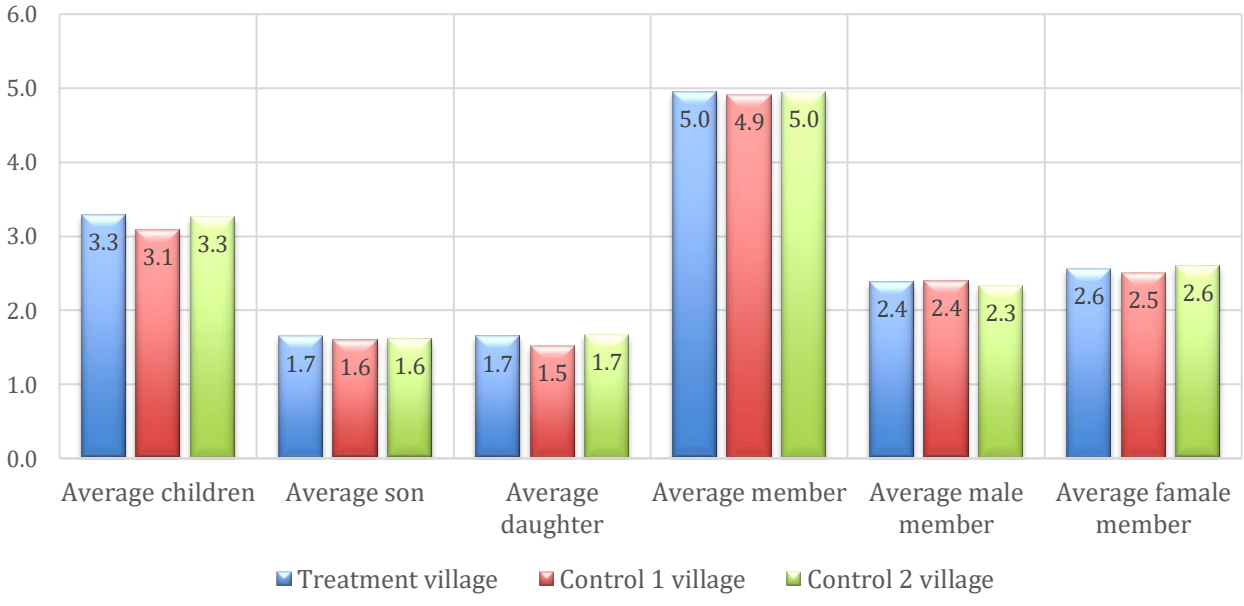
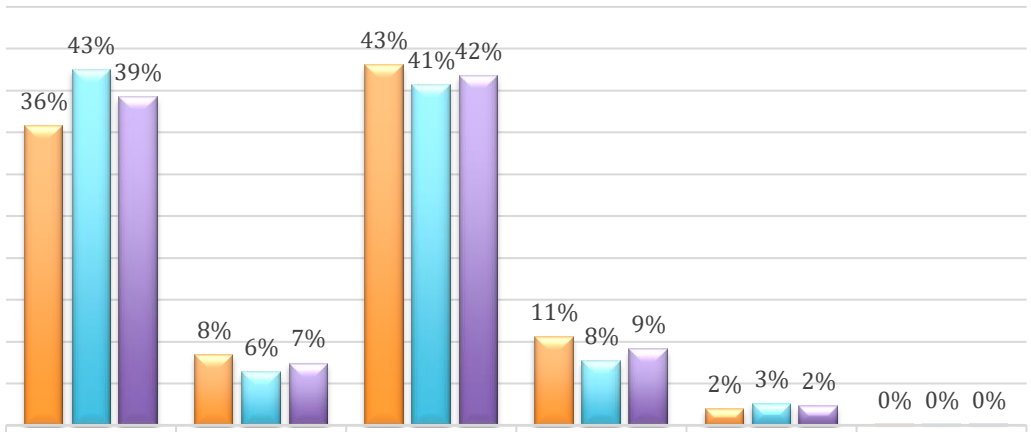


Figure 3.8 indicates that 39% of the total HH respondents have received no education, while 42% of others obtained only primary education due to their families' economic condition alongside limited schooling system in the areas. Only 2% of them have upper secondary school education background, and none of the total HH respondents possesses any necessary technical or vocational training skills apart from attending literacy class (7%) to enable them to read and write at a very basic level. Although Siem Reap has more HH respondents with no education, it still has higher rate of those schooling up to upper secondary level than that in Kampong Thom province. Due to remote geographical landscape, Varin (46%) and Kralanh (46%) districts have the most no education HHs followed very closely by Svay Leu (45%), Sandan (42%), Kampong Svay (42%), Prasat Balangk (40%), and Srei Snom (40%), let alone those living in Prasat Bakong (49%), Baray (47%), Santuk (43%) to have most access to primary education (Figure 3.9). According to Figure 3.10, most of the T households have no education (42%) if compared to C1 (45%) and C2 (42%) households whose rate of primary education access is higher. Of total, HH respondents in C2 villages have the highest amount of access to lower secondary and upper secondary education (Figure 3.10).

Figure 3.8: Level of Education of Surveyed Respondents by Province (n = 1563)



	No education	Literacy class	Primary	Lower secondary	Upper Secondary	University
Kampong Thom	36%	8%	43%	11%	2%	0%
Siem Reap	43%	6%	41%	8%	3%	0%
Total	39%	7%	42%	9%	2%	0%

Figure 3.9: Level of Education of Surveyed Respondents by District (n=1563)

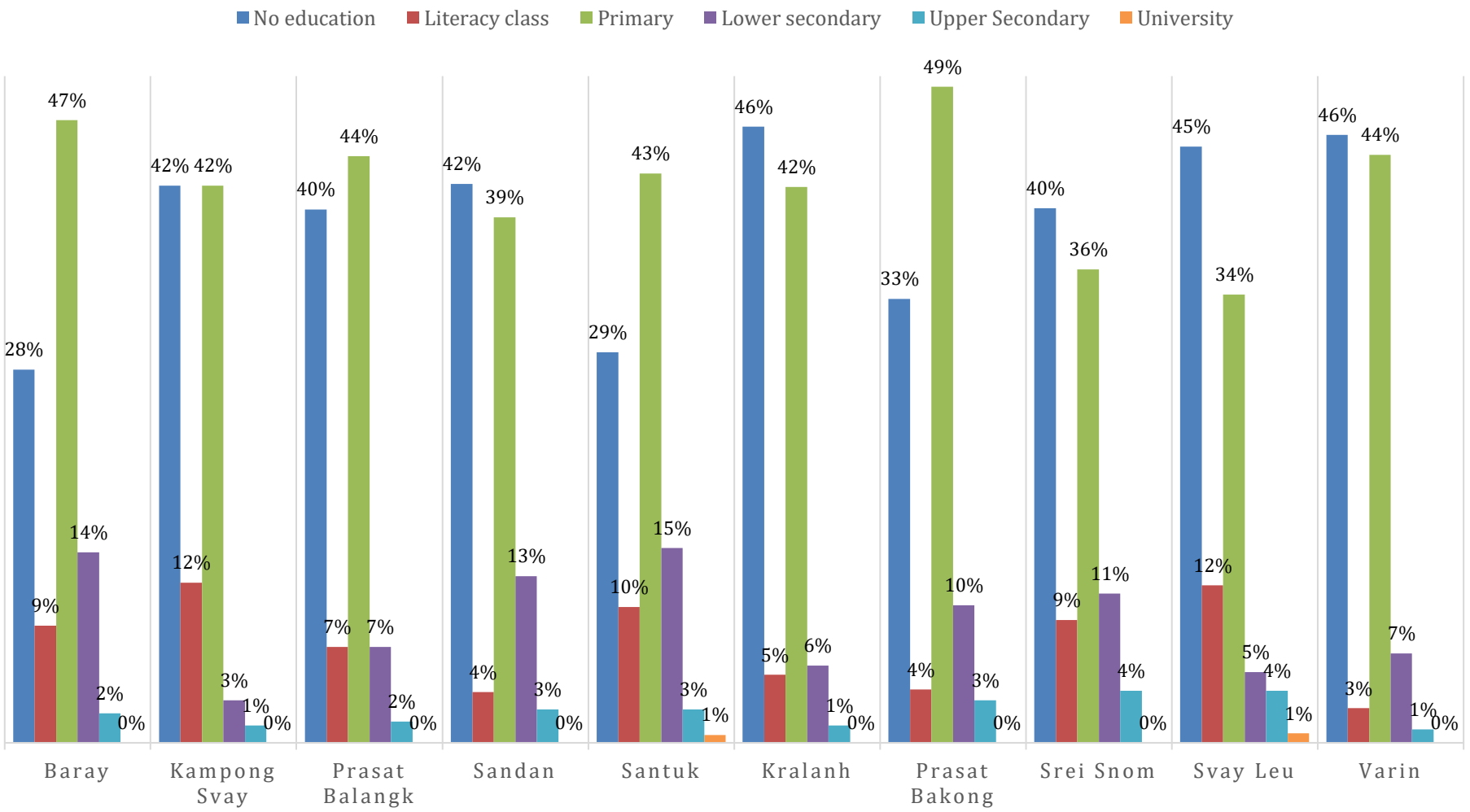
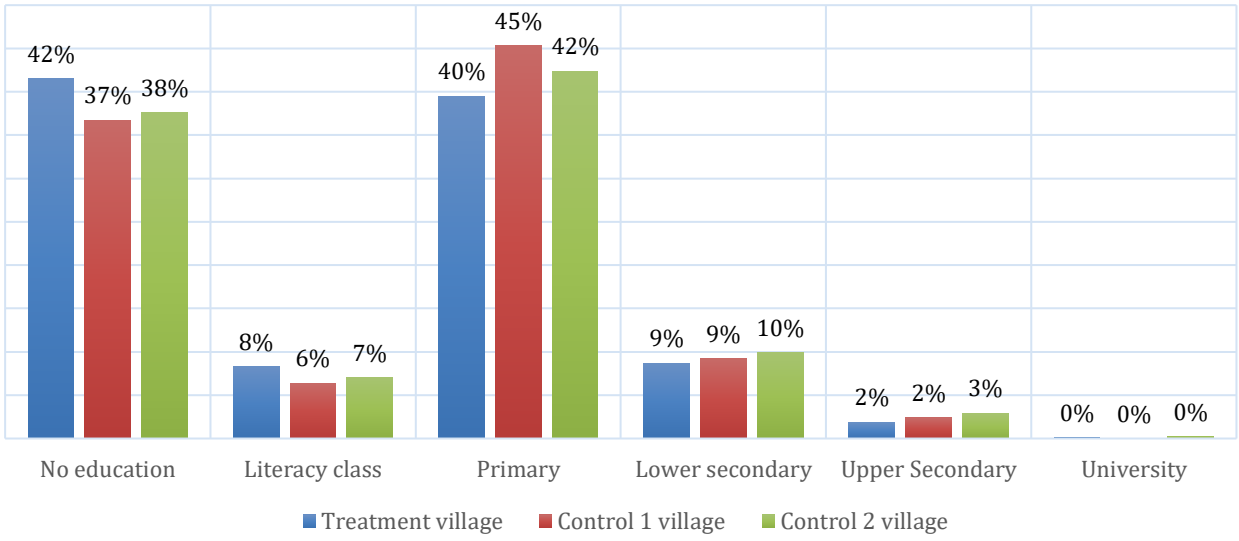


Figure 3.10: Level of Education of Surveyed Respondents by Type of Village (n = 1563)



3.3.2. Possession of Land and Other Assets and Land Use for Agriculture

Land possession, land ownership and land use for proper settlement and agricultural production were also reported during baseline survey fieldworks. According to Figure 3.11, the majority of HH respondents have residential land to build houses and live on (KPT: 95%, SRP: 94%). If compared across the 10 target districts, 96% of HH respondents in Baray, Kampong Svay, Sandan, Kralanh, and Varin districts own permanent residential land (Figure 3.12). However, residential possession among the Treatment HHs is accounted for 93%, which is still considered the lowest rate if compared to that of Control 1 and Control 2 HHs (95%) (Figure 3.13). Those reported to have no residential land are mostly newcomers from other provinces as well as the newlyweds who share residential land with their parents or relatives.

Regarding agricultural production, HH respondents in Siem Reap (81%) get higher access to permanent rice farmland than that of Kampong Thom (74%). While more HHs in Siem Reap (98%) have access to wet season or rain-fed rice cultivation farmland than those in Kampong Thom (92%), only 2% of them have dry season rice farmland, which is much lower than that of 14% of HH respondents surveyed during the baseline study (Figure 3.11). 100% of the surveyed HHs in Srei Snom and Kralanh districts possess and have access to wet rice paddy followed closely by 97% in Baray and Svay Leu, 96% in Santuk, 95% in Varin, 94% in Prasat Balangk, 92% in Kampong Svay and Prasat Bakong, and 82% in Sandan (Figure 3.12). HHs in the treatment and Control 2 villages have equal percentage of wet rice cultivation land (94%), which is lower than those living in the Control 1 villages (Figure 3.13). Of total, HH respondents in Sandan district (23%) have the highest access to dry rice cultivation followed by 22% of HHs in Baray, 15% in Prasat Bakong, 11% in Kampong Svay, 7% in Santuk, and 1% in Svay Leu and Prasat Balangk. Only 12%, 6% and 5% of HHs in C1, T, and C2 villages own land for dry rice farming respectively (Figure 3.13).

Home-gardening is also typical of current livelihood strategies of the surveyed respondents in both provinces with HHs in Kampong Thom (36%) have higher percentage of land possession and engagement than 28% of those living in Siem Reap (Figure 3.11). Usually, home-gardening is

practiced both subsistence farming and additional income generation reasons. As shown in Figure 3.12, the highest percentage of possession and involvement by HH respondents in home-gardening is in Prasat Balangk (42%) followed very closely by 41% of HHs in Kampong Svay and 38% in Kralanh and Sandan districts. HHs in Varin (21%) district are considered to have the lowest access to home-gardening system for their supplementary livelihood activities. However, if disaggregated by type of village, HHs in the T villages engage the most in home-gardening (Figure 3.13).

In terms of fruit and cash crop farms, HH respondents in Siem Reap (28%) have the higher involvement rate than those in Kampong Thom (22%) (Figure 3.11). HHs in Varin district (51%) have the highest engagement in fruit and cash crop farming followed by 46% in Prasat Balangk, 44% in Sandan, 35% in Svay Leu, 22% in Srei Snom, 11% in Baray, 9% in Kralanh, 7% in Santuk, 5% in Kampong Svay, and 2% in Prasat Bakong (Figure 3.12). Of total, HHs in the T villages (35%) have the highest land ownership and participation in cash or strategic cropping, and those in the C2 villages have the lowest rate of 21% only (Figure 3.13). For fruit and cash crops, most people plant cassava and cashew nut for they are much needed by the neighboring markets from Thailand and Vietnam.

HHs with limited rice farmland or no farmland usually rent land for rice and crop cultivation, and they are supposed to pay landowners in average of 68$ and 118$ per hectare per year in Siem Reap and Kampong Thom respectively depending on their negotiation, location, and land fertility or quality. Although only 12% and 4% of HHs in Siem Reap and Kampong provinces reported to have rented land for agricultural production, the percentage of land rental among the survey respondents in Varin (23%) and Svay Leu (22%) denotes the first and second highest practice of all the target districts under the SRL project coverage (Figure 3.12), and if disaggregated by type of village, HHs in the T villages (10%) practice the most in such land renting for agricultural purposes (Figure 3.13).

Figure 3.11: Land Possession and Renting Land for Agriculture (n = 1563)

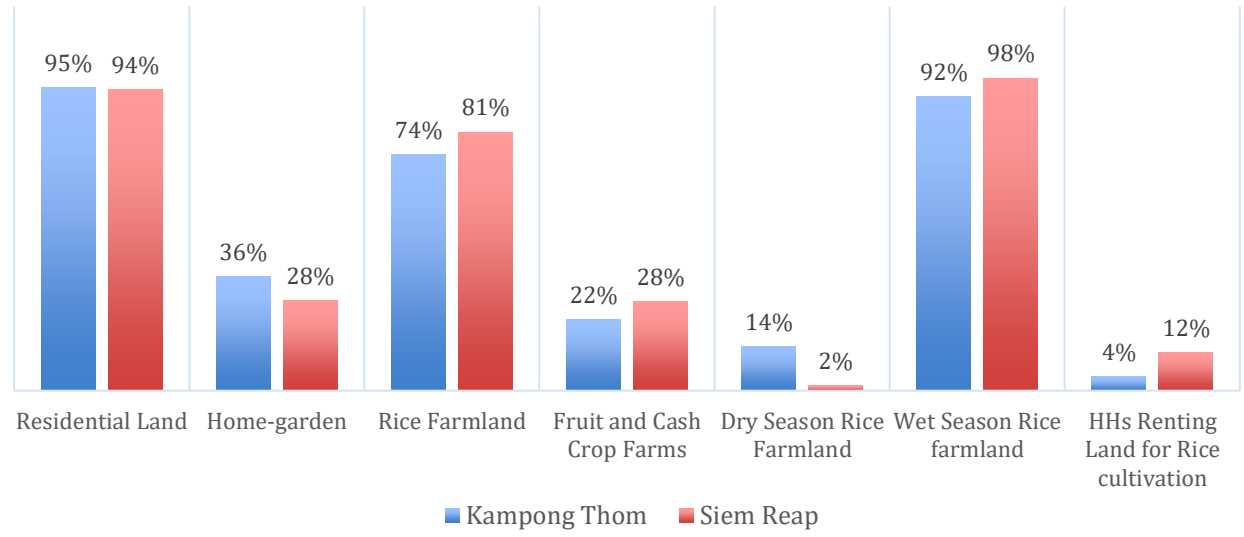


Figure 3.12: Land Possession and Renting Land for Agriculture (n = 1563)

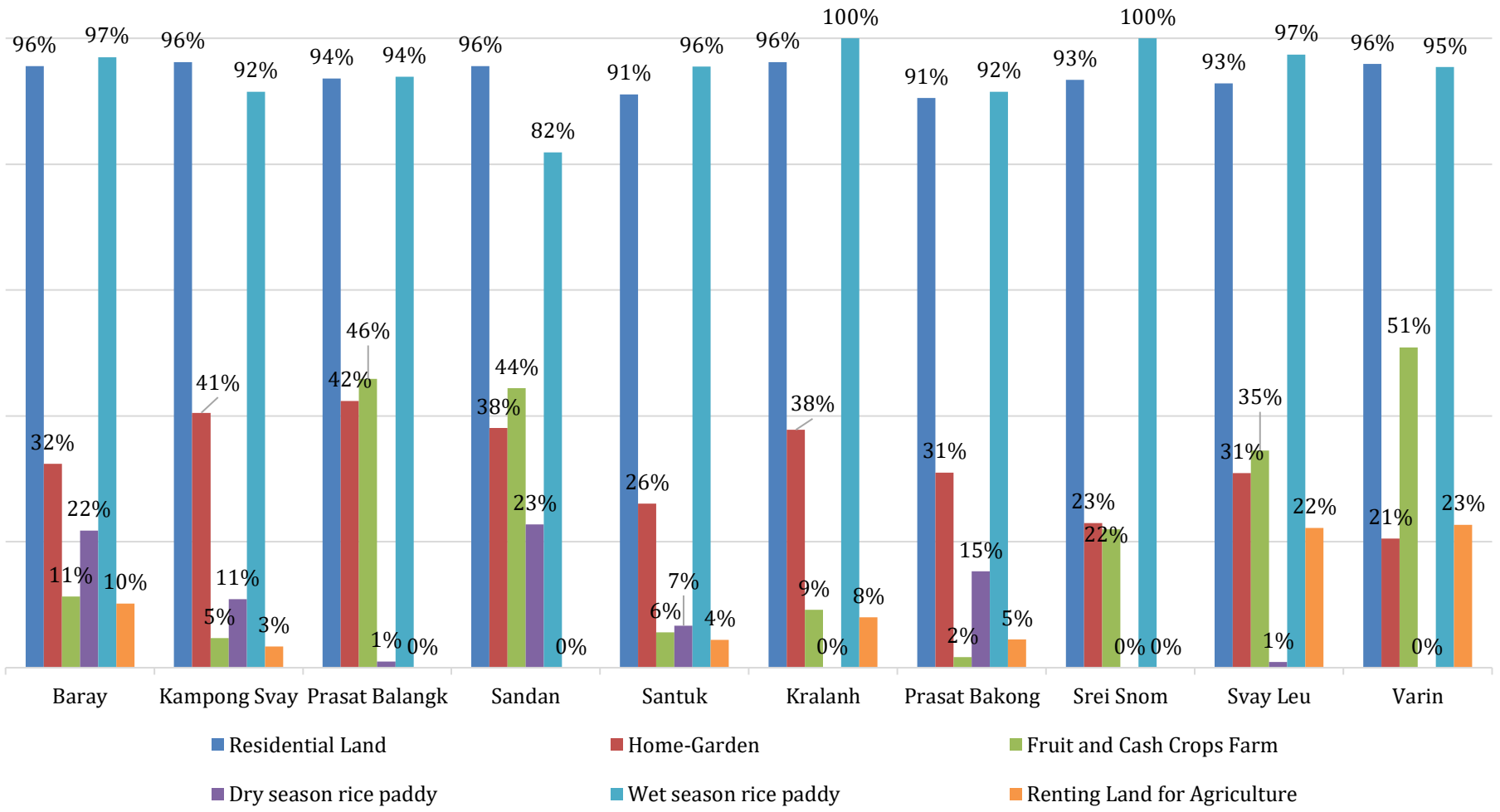
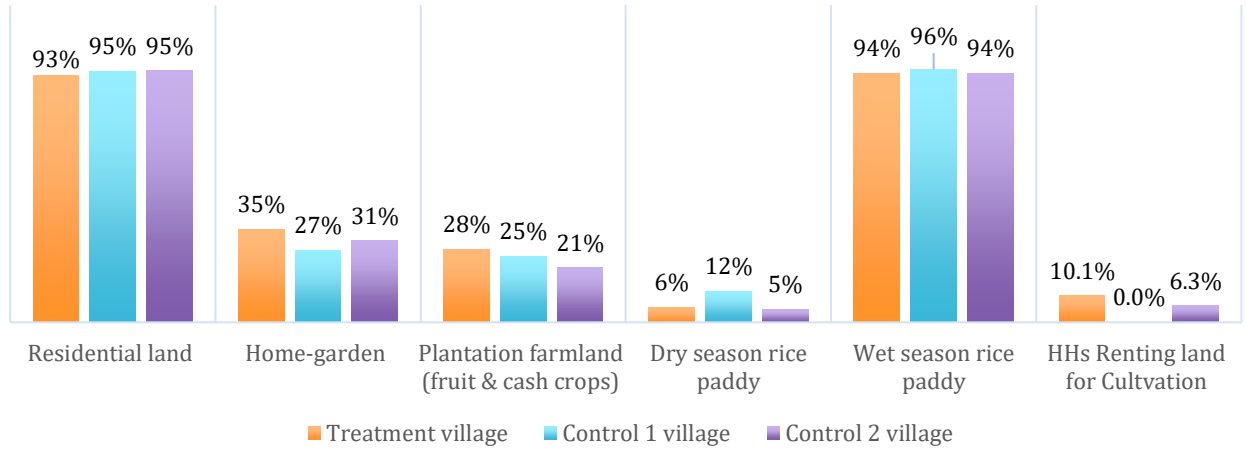


Figure 3.13: Land Possession and Renting Land for Agriculture (n = 1563)



Local HH respondents surveyed in the two target provinces are involved mainly in rain-fed rice farming (KPT: 96%, SRP: 99%), let alone dry rice cultivation to be almost absently practiced in Siem Reap while 14% of HH respondents in Kampong Thom reported to have been involved in this farming process once a year. In spite of this fact, the average percentage of rice cultivation across the two target provinces is 77% (Figure 3.14). As indicated in Figure 3.15, Srei Snom (99%) is the most engaged district in rice cultivation followed by Varin (87%), Kampong Svay (82%), Kralanh (81%), Sandan (79%), Baray and Svay Leu (76%), Prasat Balangk (74%), and Santuk (58%). Of total, local involvement in rice cultivation in Prasat Bakong remains the lowest one with less than 50% of the survey HH respondents engaged with this livelihood activity. However, a vast majority of the surveyed HHs are involved in rain-fed wet rice farming with Srei Snom, Svay Leu, Varin, and Prasat Balangk having 100% of their surveyed population participate in this activity for their daily livelihoods (Figure 3.15). Local involvement in dry rice cultivation is relatively low although 24% of HHs in Baray and Sandan districts of Kampong Thom province and 17% of HHs in Prasat Bakong district of Siem Reap province reported to have been practicing such activity for extra rice production and income accumulation for their families. If disaggregated by type of village, 98%, 98%, and 96% of HH respondents living in the T, C1 and C2 villages respectively are strongly dependent on annual rainfall in the rainy season to support their rice farming and of total, only those living in C1 villages (13%) reported to have the highest engagement in dry rice cultivation (Figure 3.16).

Figure 3.14: Involvement in Rice Cultivation (n = 1563)

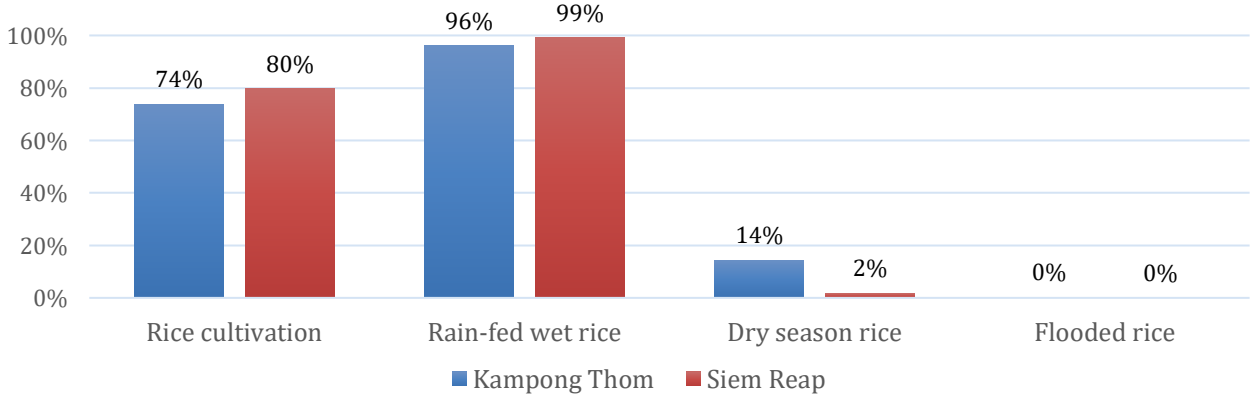


Figure 3.15: Involvement in Rice Cultivation (n = 1563)

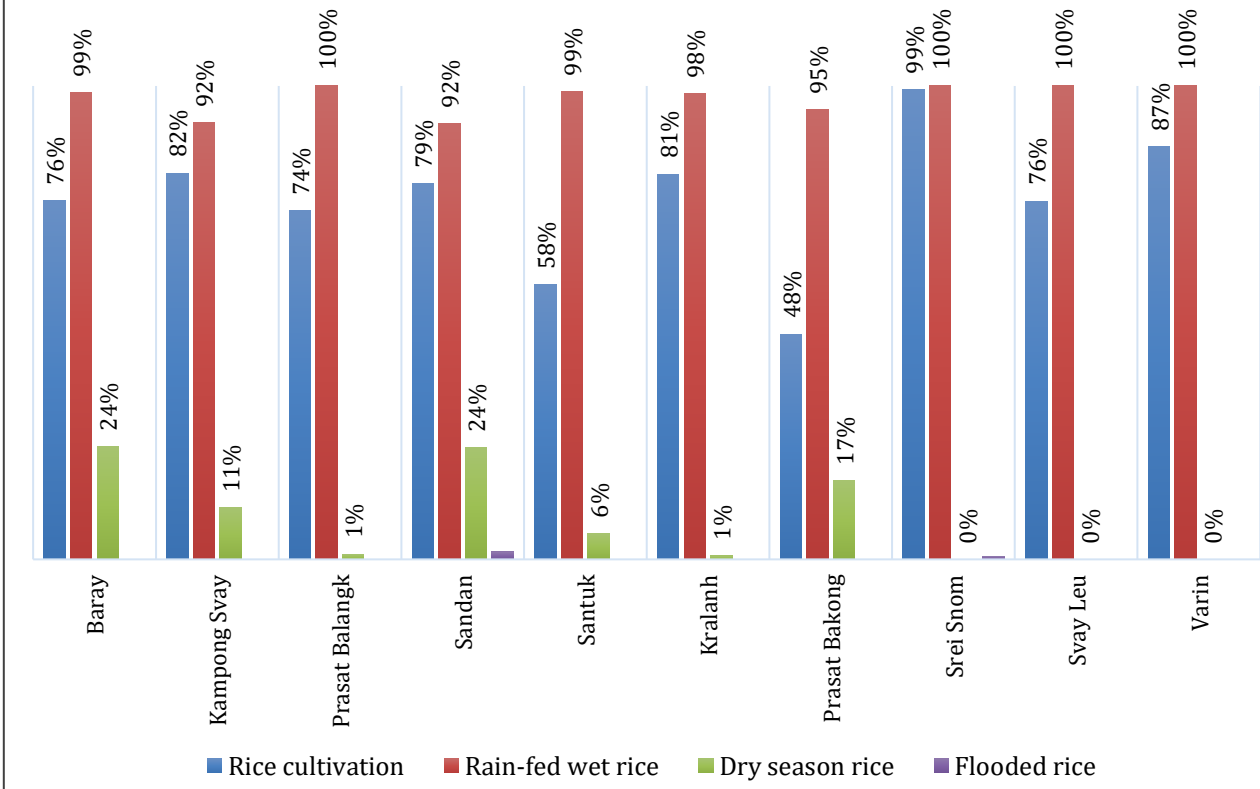
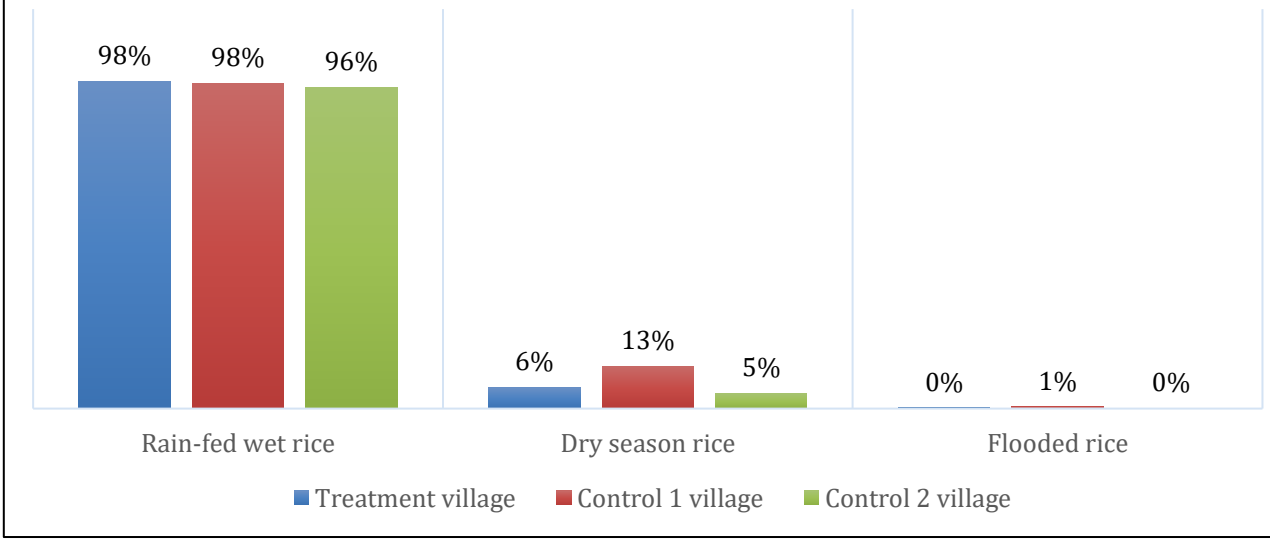
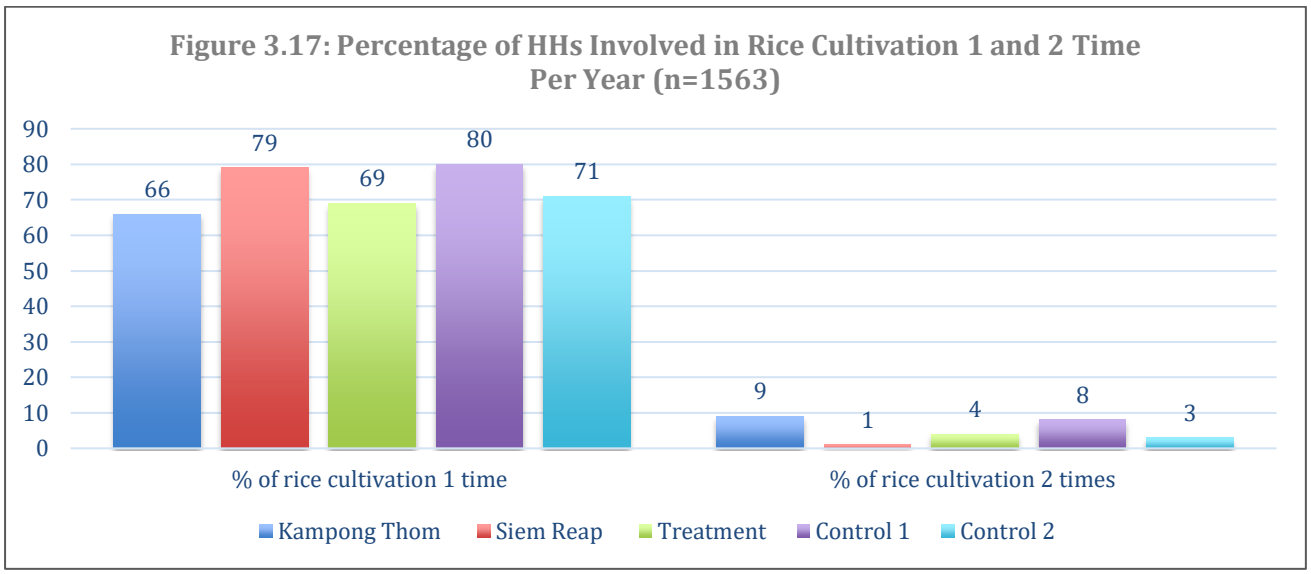


Figure 3.16: Type of Village and Their Involvement in Rice Cultivation (n = 1563)



Noticeably, more than half of HH respondents in Kampong Thom and Siem Reap conduct rice farming only one time per year. In particular, there is 66% of survey HHs in Kampong Thom and 79% of HHs in Siem Reap province cultivate rice one per year (Figure 3.17). Among these, 69% of treatment HHs, 80% of Control 1 and 71% of Control 2 HHs conduct rice farming 1 time per year. There is only 9% of HHs in Kampong Thom and 1% of surveyed HHs in Siem Reap practice rice cultivation 2 time per year; if aggregated by type of HHs, 5% of Treatment HHs, 8% of Control 1 and only 3% of Control 2 HHs involved in two time farming.



3.3.3. Main Livelihoods, Income Generation, and Perceived Sufficiency

Figure 3.18 shows that, cumulatively, the average annual income of the surveyed HH respondents in Kampong Thom is US$ 3,131, which is higher than that of those surveyed in Siem Reap (US$ 2,773). However, the average annual income of each target district remains significantly disperse with Baray (US$ 4,334) having the highest average followed by Prasat Bakong (US$ 3,483), Santuk (US$ 3,292), and Kampong Svay (US$ 3,070). According to Figure 3.20, even though Kampong Thom has higher average annual income than Siem Reap, one of its target districts, Prasat Balangk (US$ 1,716), represents the lowest average annual income generation area following Srei Snom (US$ 2,092), Svay Leu (US$ 2,094), Sandan (US$ 2,140), Varin (US$ 2,313), and Kralanh (US$ 2,938). Yet, in overall, HHs with disability earn the lowest income at US$ 1,344 per annum following female-headed HHs (US$ 1,632), Poor 2 HHs (US$ 2,333), CC affected HHs (US$ 2,574), and Poor 1 HHs (US$ 2,782) (Figure 3.21).

Interestingly, a decrease or an increase in annual HH income is substantially dependent on how diversified the income sources are, both in terms of on-farm and off-farm livelihood strategies. Among many different livelihood sources repeatedly highlighted by the surveyed HHs, four of which are considered to have contributed quite positively to the increase in their annual gross income. These include (1) seasonal wage labor and in-country and outside-country migration, (2) cash and strategic cropping, (3) rice production, and (4) livestock raising. Despite its minor contribution to HH income, selling of fish catch is considered as one of the key income sources by many respondents during the survey process. Figure 3.19 indicates that wage labor and migration is the most vital income source for both target provinces (KPT: US$ 1,863, SRP: US$ 1,598) secondly and thirdly followed by cash cropping and rice cultivation in that order.

Figure 3.18: Total Annual Income at Provincial Level (US$, n = 1563)

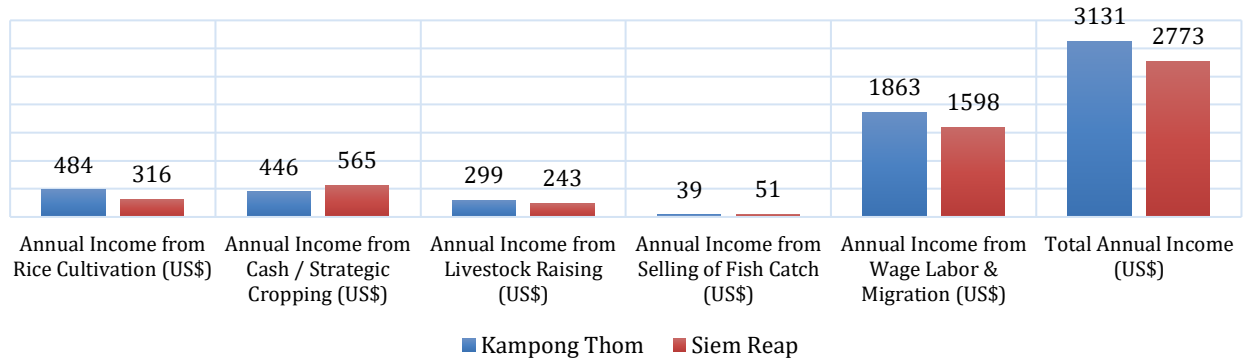
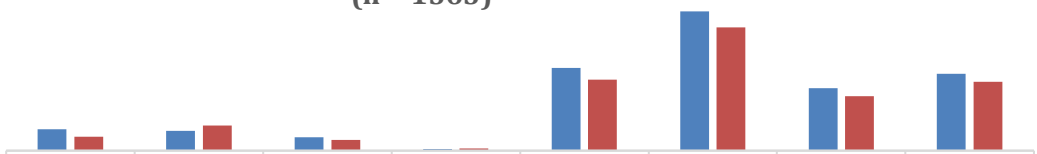


Figure 3.19: Main Income Sources and Total Annual Income by Province (n = 1563)



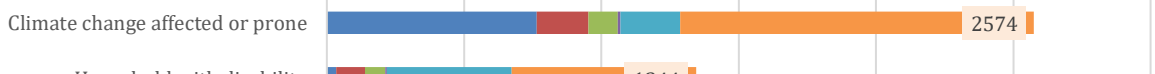
	Income from Rice Cultivation (US$)	Income from Cash / Strategic Cropping (US$)	Income from Livestock (US$)	Income from Selling of Fish Catch (US$)	Income from Wage Labor and Migration (US$)	Total Annual Income (US$)	Total Annual Expense (US$)	Total Annual Net Saving (US$)
Kampong Thom	484	446	299	39	1863	3131	1407	1724
Siem Reap	316	565	243	51	1598	2773	1222	1551

Regardless of place of residence, HH respondents in all target districts perceived that wage labor and migration had contributed a lot to the increase in their family's earnings. This perception on actual income status and sources of injection has made off-farm livelihood related income generation activities (KPT: US$ 1,863, SRP: US$ 1,598) to be relatively more important than that of on-farm livelihoods (KPT: US$ 1,268, SRP: US$ 1,175) (Figure 3.23). This case is also echoed when disaggregated local perceptions by type of village. According to Figure 3.22, among all HHs in the three types of selected villages, HHs in the C1 villages earn the most annual income from wage labor and migration (US$ 2,172) followed by those in the T (US$ 1,663) and C2 (US$ 1,380) villages. The T villagers earn the least income of US$ 2,850 whilst C1 villagers receive the highest annual income (US$ 3,355) in almost all major income sources except from rice cultivation that remains the least earning at only US$ 393 per annum.

Figure 3.20: Total Annual Income at District Level (US$, n = 1563)

As further portrayed in Figure 3.20, HH respondents in Baray annually earn the most income from wage labor and migration (US$ 2,724), and so do other target districts selected for the baseline survey. Second and third to Baray are Prasat Bakong and Kampong Svay districts with the annual income from such sub-sector amount to US$ 2,461 and US$ 1,777 respectively, while local HHs in Svay Leu earn the lowest rate of US$ 927 only. The second most annual income for HHs in Santuk (US$ 1,249), Kampong Svay (US$ 853), and Baray (US$ 646) districts of Kampong Thom province is derived from rice cultivation. While HH respondents in Kralanh (US$ 900), Varin (US$ 737), Srei Snom (US$ 565), Svay Leu (US$ 550), Sandan (US$ 430), and Prasat Balangk (US$ 247) regarded cash or strategic cropping as the second most vial earning source, those in Prasat Bakong referred to livestock raising as an alternative.

Figure 3.21: Average Income of Type of Selected HHs by Sectors (n = 1563)



HHs with disability seem to earn the least from wage labor and migration (US$ 909) if compared to other types of selected HH respondents during survey fieldworks. Nevertheless, regardless of type of selected HHs, income source from wage labor and migration is the most vital contribution to increased HH economy in the target areas (Figure 3.21). Although annual income from rice cultivation stays in the third rank for Poor 2 HHs (US$ 209) and fourth rank for female-headed HHs (US$ 96), HHs with disability (US$ 67), and Poor 1 HHs (US$ 66), this income source is perceived to have provided the 1st most earning for CC-affected / prone HHs (US$ 1,527). It is interesting to learn that income from cash / strategic cropping remain the 2nd most important earning source for Poor 1 HH (US$ 313) Poor 2 HHs (US$ 282), female-headed HHs (US$ 264), and HHs with disability (US$ 211).

Figure 3.22: Total Annual Income by Type of Village (US$, n = 1563)

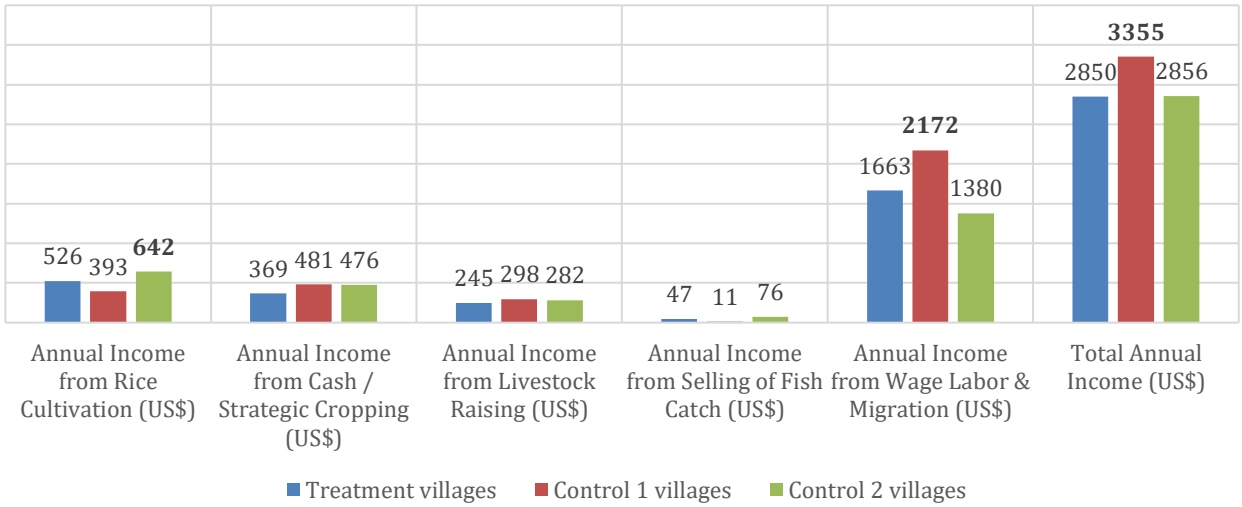
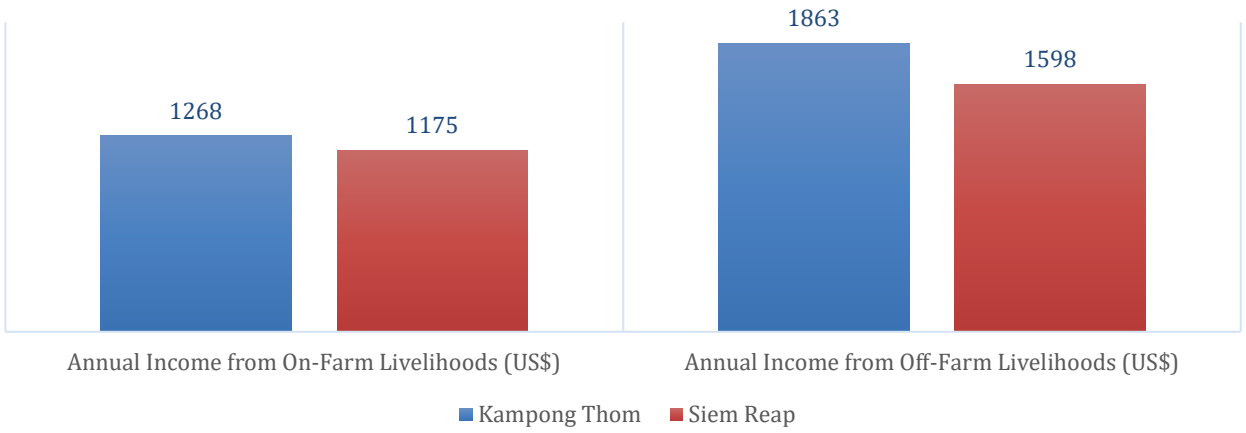
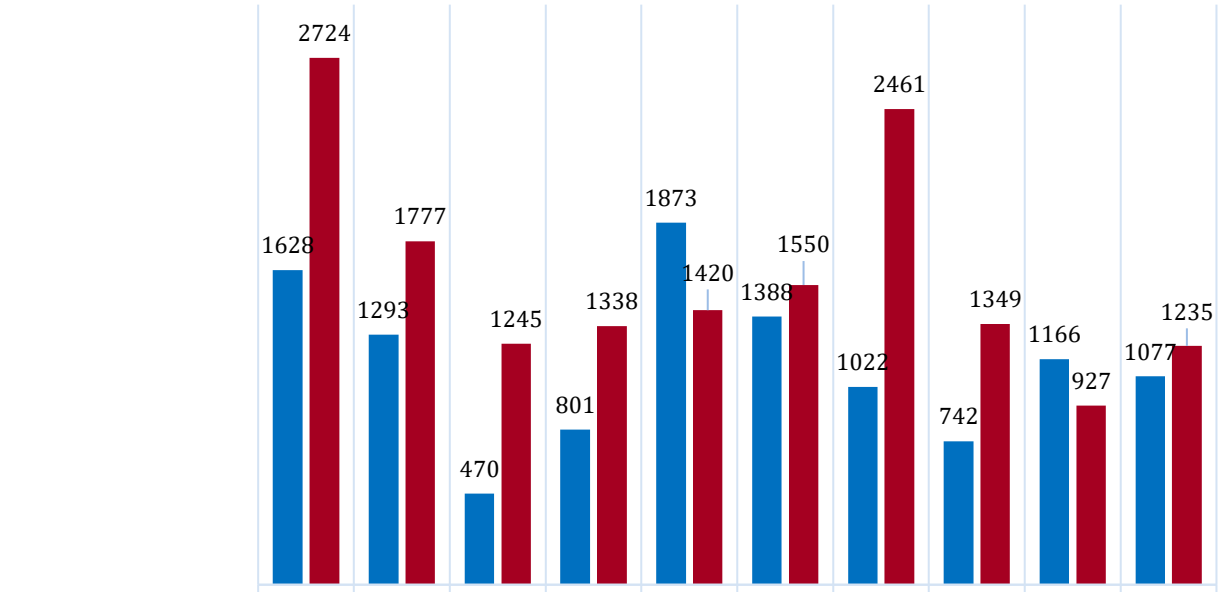


Figure 3.23: Total Income from On-farm and Off-Farm Livelihoods (US$, n = 1563)



As indicated in Figure 3.24, income from off-farm livelihoods is more important than from on-farm livelihoods for the surveyed HH respondents in almost all target districts, exclusive of those living in Santuk (US$ 1,873) and Svay Leu (US$ 1,166). For HHs in Prasat Balangk and Srei Snom, off-farm income generation is almost triple and twice of income from on-farm livelihoods respectively. This case also applies to HHs in the treatment villages and C1 villages, where more income sources are mainly generated from off-farm economic activities (T: US$ 1,663, C1: US$ 2,172, C2: US$ 1,476) (Figure 3.25). Of total, HHs in C2 villages (US$ 1,380) earn the highest amount of income from on-farm livelihoods followed by those in T villages (US$ 1,187) and C1 villages (US$ 1,183) in that order.

Figure 3.24: Total Income from On-farm and Off-Farm Livelihoods by District (US$, n = 1563)



	Baray	Kampong Svay	Prasat Balangk	Sandan	Santuk	Kralanh	Prasat Bakong	Srei Snom	Svay Leu	Varin
Annual On-Farm Income	1628	1293	470	801	1873	1388	1022	742	1166	1077
Annual Off-Farm Income	2724	1777	1245	1338	1420	1550	2461	1349	927	1235

Figure 3.25: Total Income from On-Farm Livelihoods by Type of Village (US$, n = 1563)

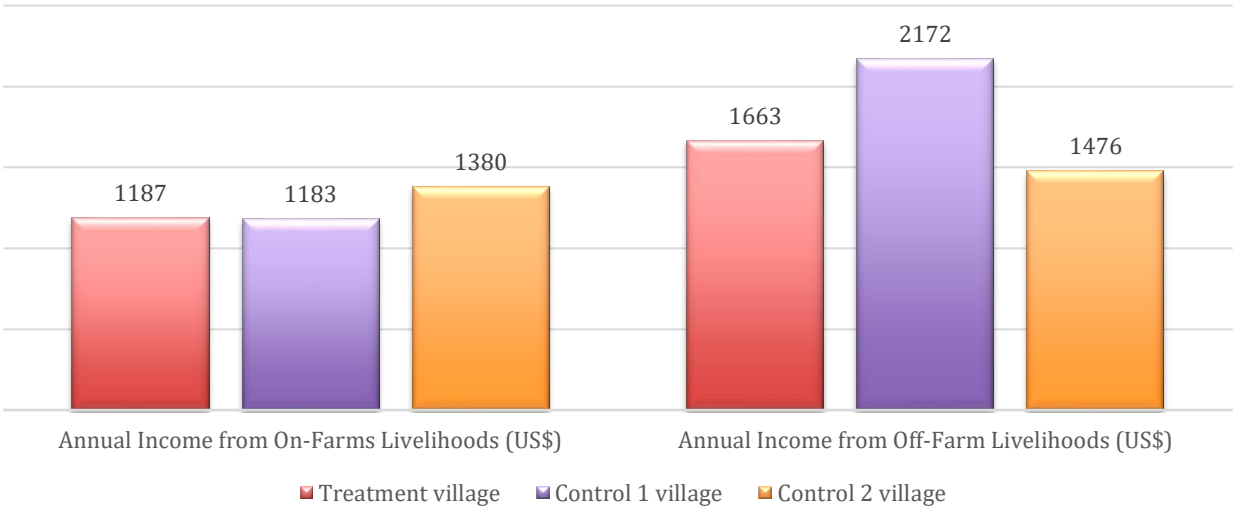


Figure 3.26: Perceived Main Livelihoods by Surveyed Respondents at Provincial Level (%, n=1563)

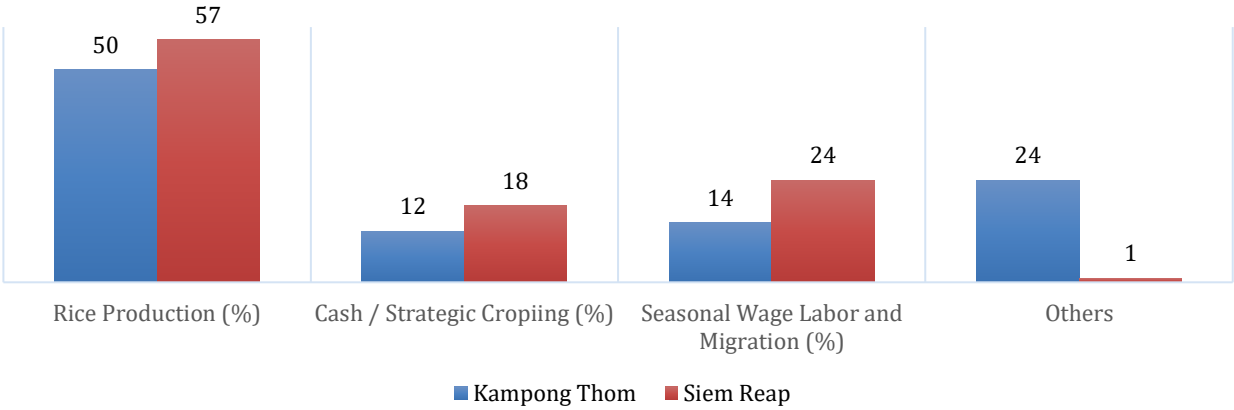
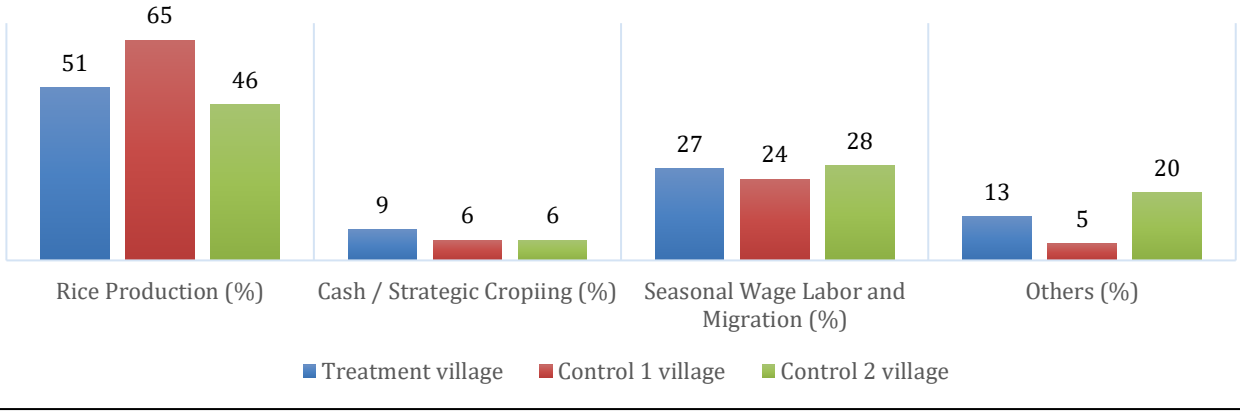


Figure 3.27: Perceived Main Livelihoods by Surveyed Respondents by Type of Village (%, n = 1563)



When asked to perceive the sufficiency of their income for daily livelihoods and expenses, the majority of the surveyed respondents reported that it was not enough (KPT: 61%, SRP: 67%) (Figure 3.28). Despite their considerable savings, those living in Kampong Thom (11%) and Siem Reap (6%) expressed their complete anxiety over their insufficient income to cover their livings and all expenses involved in agricultural production, medical treatment, food consumption, and purchase of basic commodities for their families (Figure 3.28). According to Figure 3.29, at least 63% of the HH respondents in all the target villages perceived that their incomes were really insufficient for their daily expenses. Among all, HHs in Srei Snom and Kampong Svay (78%) suffered the most from such income meagerness followed by those in Varin and Prasat Bakong (76%), Santuk (75%), Sandan (74%), Prasat Balangk (72%), Kralanh (70%), Svay Leu (64%), and Baray (63%). When disaggregated by type of village, 95%, 74%, and 67% of HHs in the T villages, C2 villages, and C1 villages respectively have faced this problem throughout the year (Figure 3.30).

Rice production is mainly done at subsistence level. About 62% HH respondents in Kampong Thom and 50% in Siem Reap reported inadequate rice yield for household consumption (Figure 3.28). This case is much more critical for Prasat Balangk and Kampong Svay districts, where 82% and 75% of the surveyed HHs in that order expressed complete food shortage throughout the year (Figure 3.29). However, the compare means calculation in Figure 3.31 reveals that amazingly across the 10 districts, HHs in Bary, Savy Leu and Prasat Balangk could use their produced rice only up to 3, 3.3 and 3.7 months respectively, which are the 1st, 2nd and 3rd lowest of rice stock capacity for household consumption. Across all the districts, the average length of consumption of produced rice per HH is 4.6 months with Kralanh having the longest lasting use of 5.7 months (Figure 3.31). Of total, HH respondents in the T villages could produce adequate rice for 5 months household consumption only, yet this figure is still higher than that of C1 and C2 villagers (4 months) (Figure 3.32). In general, those could not produce adequate rice even for household purposes usually buy rice from nearby districts or the provincial township to support their daily need. This is mainly because they are more interested to grow cash or strategic crops and participate in out-migration works in which they think could help them much better in improving their family welfare, especially through a robust increase in a more reliable income generation activity.

Figure 3.28: Perceived Sufficiency of Income and Rice Consumption by Province (n = 1563)

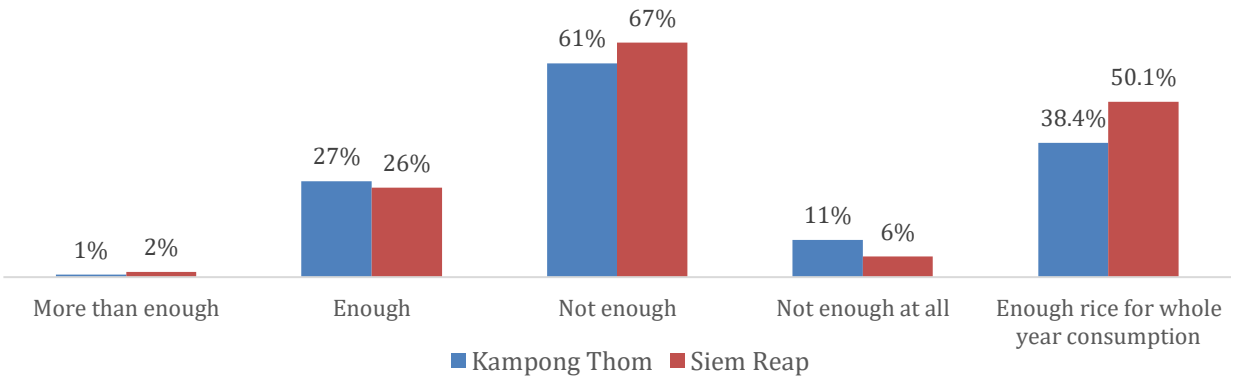


Figure 3.29: Perceived Sufficiency of Income and Rice Consumption by District (n = 1563)

Figure 3.30: Perceived Sufficiency of Income and Rice Consumption by Type of Village (n = 1563)

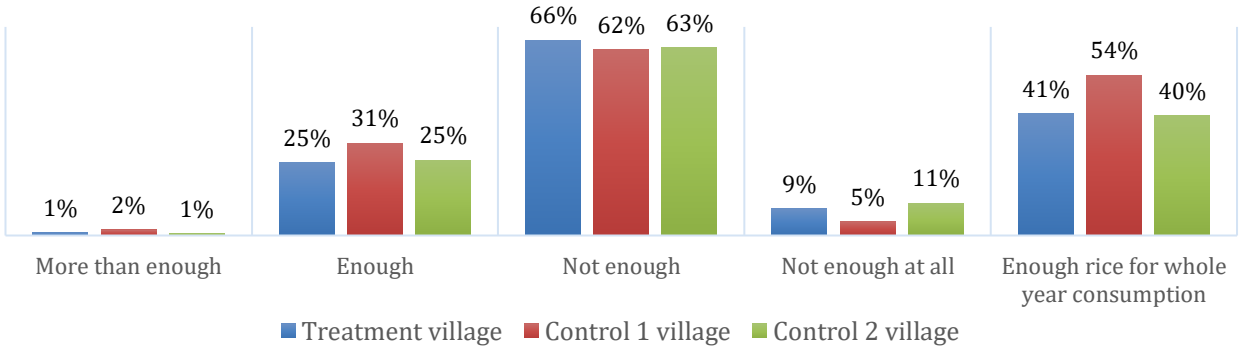
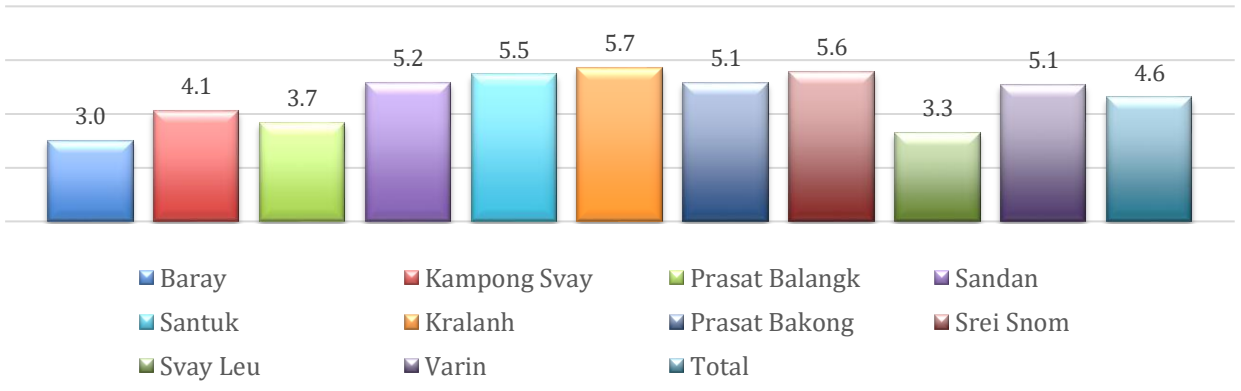
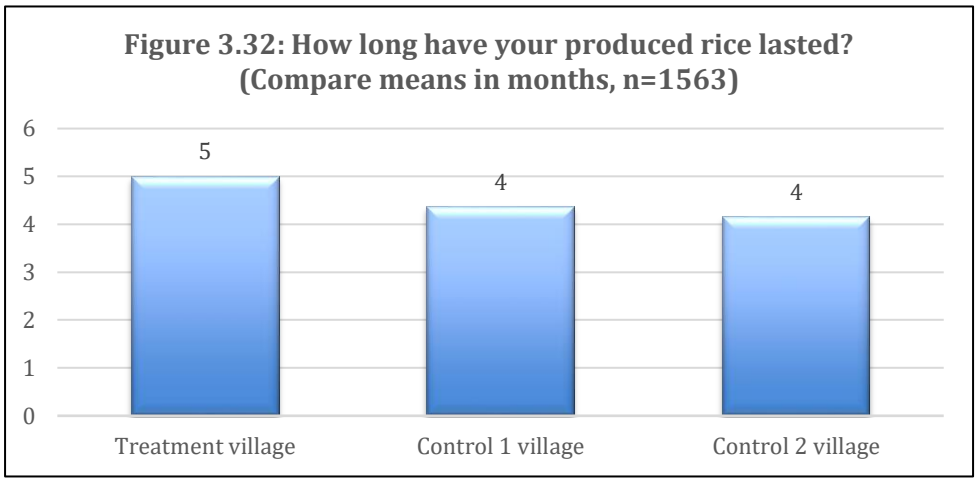


Figure 3.31: How long does your harvested rice last? (Compare means in month, n = 1563)





Insufficient rice production coupled with limited income generation capacity amongst local people in the two target provinces have triggered common food shortage throughout the year. Figure 3.33 shows that 58% and 51% of the surveyed respondents in Siem Reap and Kampong Thom respectively suffer food shortage in rainy season, while 27% and 38% of them also experience such a livelihood shock in dry season. In addition, 19% and 17% of the surveyed HHs encounter food insecurity respectively before and during farming season, which is slightly higher than those in Siem Reap. As illustrated in Figure 3.34, HHs in all the target districts face food shortage mostly in rainy season with those in Baray (64%) and Prasat Balangk (37%) receiving the highest and the lowest impact correspondingly. While people in Prasat Balangk (32%), Srei Snom (25%), Svay Leu (22%), Baray (19%), and Kampong Svay and Sandan (18%) considered pre-farming season as the second most challenging food insecurity period, those HHs in Kralanh and Prasat Bakong (20%), Sandan (20%), and Santuk referred to during-farming season as the second most severe period of food meagerness for their families. It is remarkable to learn that food shortage does not occur and cause much problem during flood and drought period (Figure 3.34). When disaggregated by type of village, HHs in the T villages encounter the highest level of food insecurity in both rainy season (57%) and dry season (35%) if compared with those of C1 (dry season: 55%, rainy season: 28%) and C2 (dry season: 48%, rainy season: 34%) villages, yet their difficulty facing such a challenge before and during farming seasons are almost similar between one another (Figure 3.35).

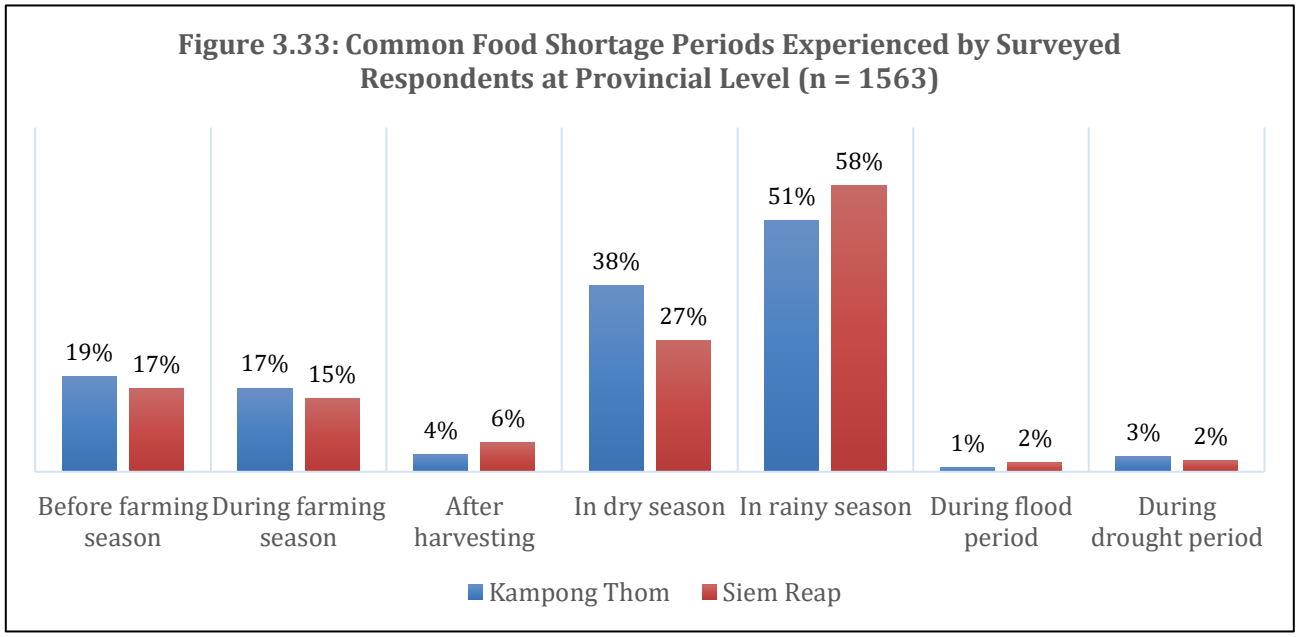
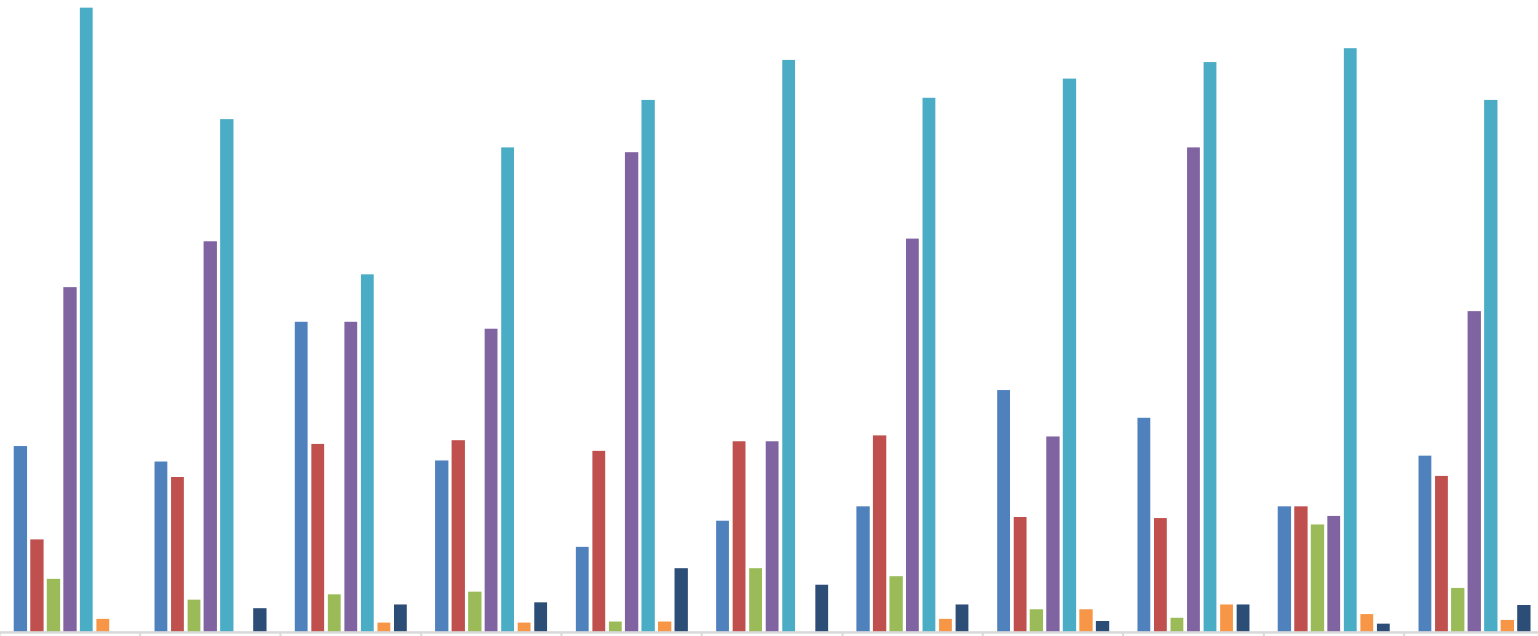
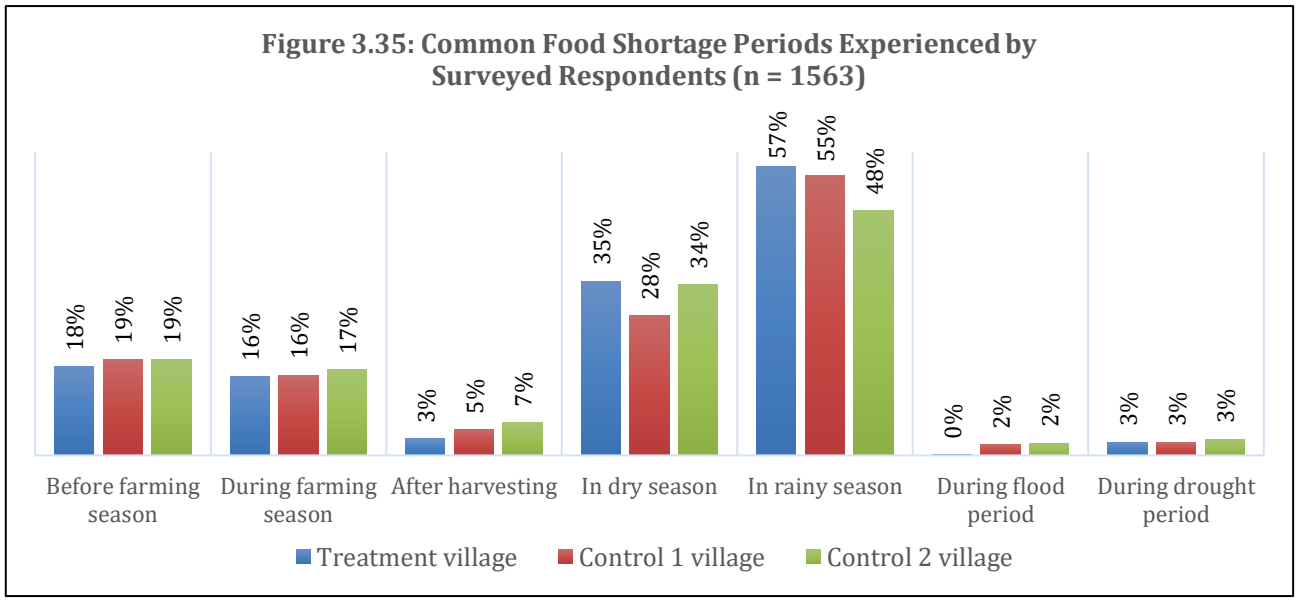


Figure 3.34: Common Food Shortage Periods Experienced by Surveyed Respondents at District Level (n=1563)



	Baray	Kampong Svay	Prasat Balangk	Sandan	Santuk	Kralanh	Prasat Bakong	Srei Snom	Svay Leu	Varin	Total
Before farming season	19%	18%	32%	18%	9%	12%	13%	25%	22%	13%	18%
During farming season	10%	16%	19%	20%	19%	20%	20%	12%	12%	13%	16%
After harvesting	6%	3%	4%	4%	1%	7%	6%	2%	2%	11%	5%
In dry season	36%	40%	32%	31%	50%	20%	41%	20%	50%	12%	33%
In rainy season	64%	53%	37%	50%	55%	59%	55%	57%	59%	60%	55%
During flood period	1%	0%	1%	1%	1%	0%	1%	2%	3%	2%	1%
During drought period	0%	3%	3%	3%	7%	5%	3%	1%	3%	1%	3%



3.3.4. Financial Status and Main Household Expenses

Overall, according to Figure 3.36, the majority of the households surveyed felt that their livelihood activities were unable to meet their household needs. Indebtedness was one of the critical issues in which 64% and 61% respectively of HHs in Siem Reap and Kampong Thom shared experienced during the survey, and in average approximately 65% of the indebted households often encountered many difficulties in repayment. The reasons why household needs were not met while being susceptible to indebtedness were due to: (1) low income and seasonal work, (2) lack of agricultural land, capital, knowledge and technology for increasing agricultural productivity, (3) fluctuation of prices for agricultural produces, (4) decline in land and forest resources, and (5) disequilibrium between earnings and expenses. Among all the target districts, HHs in Varin have the most indebtedness rate at 73% followed by those in Baray (71%), Kampong Svay (67%), Srei Snom (65%), Kralanh and Svay Leu (63%), Santuk (57%), Sandan (56%), and Prasat Balangk and Prasat Bakong (51%) (Figure 3.37). According to Figure 3.37, higher than 60% of HHs in the T, C1 and C2 villages are indebted, and of total, those living in C2 villages (69%) face the most challenge in repayment followed closely by those in C1 villages (66%) and T villages (61%) (Figure 3.38).

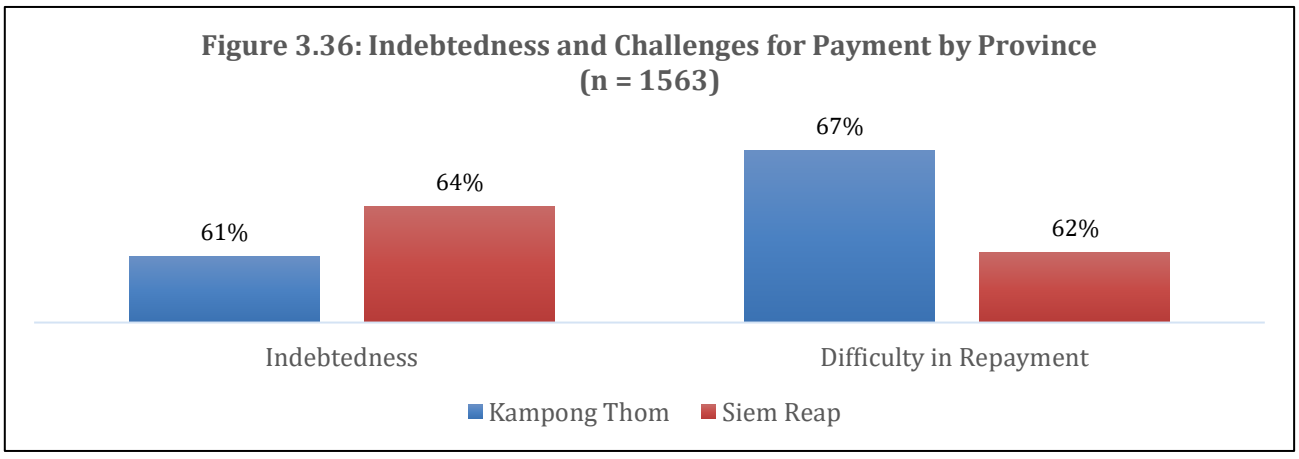


Figure 3.37: Indebtedness and Challenges for Repayment (n=1563)

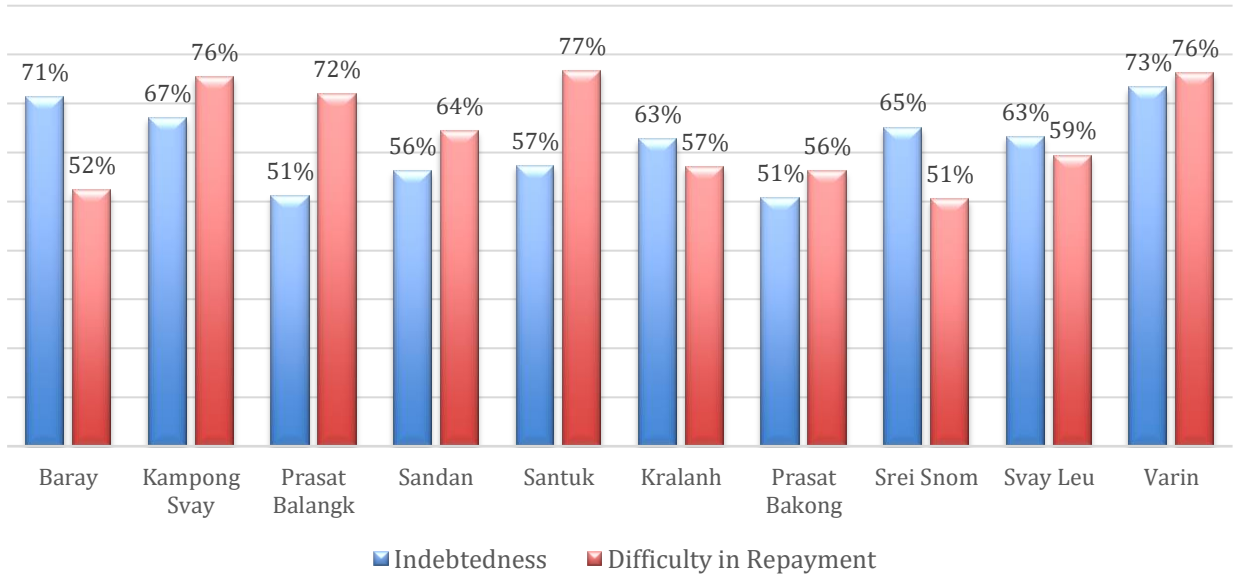
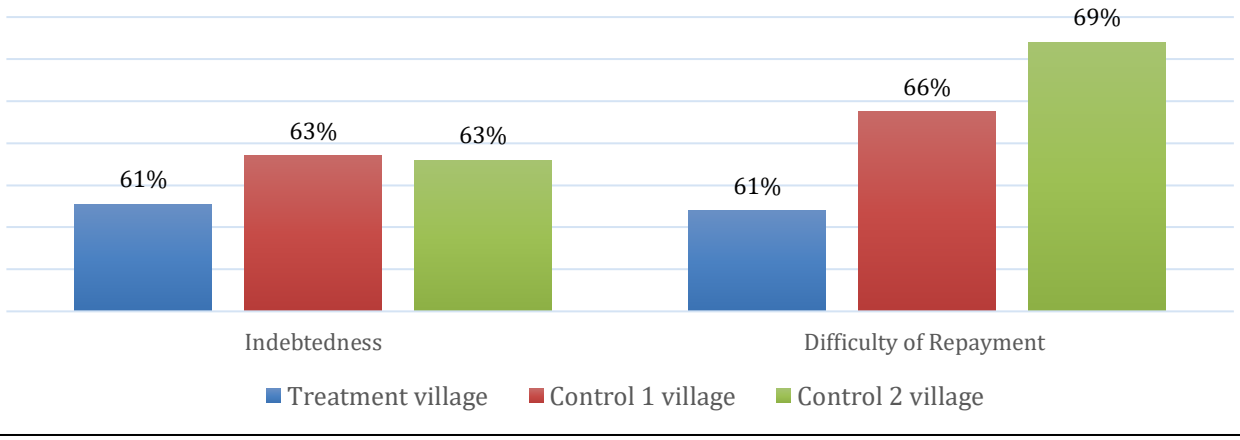


Figure 3.38: Indebtedness and Challenge for Repayment by Surveyed Respondents in Type of Village (n=1563)



There are five main sources of money lending system in the study areas, including but not limited to: (1) micro finance institutions or MFIs, (2) commercial or specialized banks, (3) friends and relatives, (4) local NGOs, and (5) local moneylenders. As indicated in Figure 3.39, 38% of the respondents feel more comfortable to access to MFI loans (i.e. AMK, SATHAPANA, AMRET, PRASAC, etc.) with Kampong Thom (44%) having higher access rate than Siem Reap (33%). While approaching loans via commercial and specialized banks (i.e. ACLEDA) is the 2nd best option (25%) for both provinces, borrowing money from friends and relatives is considered by HHs in Siem Reap (28%) to be the 2nd safest and most approachable means. HH respondents in Kampong Thom (12%) are more engaged in loan access with existing local NGOs operating in their locality, while HHs in Siem Reap prefer local moneylenders to local NGOs and existing saving groups in the areas. However, getting loans from local moneylenders often involves the highest interest rate ranging from 36% to 120% per annum.

Borrowing money from friends and relatives are being commonly practiced by more HHs in Prasat Bakong (45%), Kralanh (40%), and Srei Snom (36%) districts of Siem Reap province (Figure 3.40). Local NGOs is the 2nd most accessible loan provider for 22% of HHs in Kampong Svay, while local moneylenders' loan service is regarded as the 3rd approachable source for HHs in Svay Leu (21%). However, MFIs and banks still stay at the 1st and 2nd top of loan provider list for local villagers in all the surveyed districts in Kampong Thom province (Figure 3.40). Interestingly, when disaggregated by type of village, more HHs in the T, C1 and C2 villages consider MFIs (T: 36%, C1: 38%, C2: 43%) and commercial and specialized banks (T: 22%, C1: 26%, C2: 27%) as the 1st and 2nd priority for their loan access (Figure 3.41). Friends and relatives still play a crucial role in providing informal loans, mostly with no interest, and are regarded as the safest loan access and the 2nd main source by T households (22%) and 3rd main source by C1 (17%) and C2 (20%) households following MFIs and commercial or specialized banks.

Figure 3.39: Source of Accessed Money Lending System by Province (n = 1563)

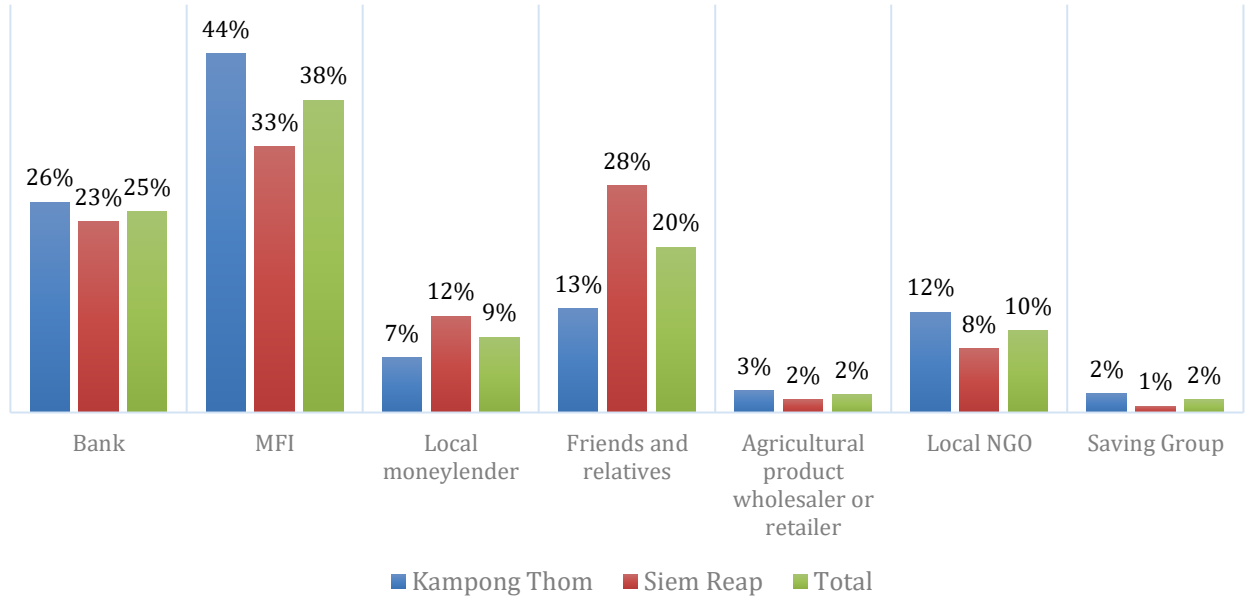
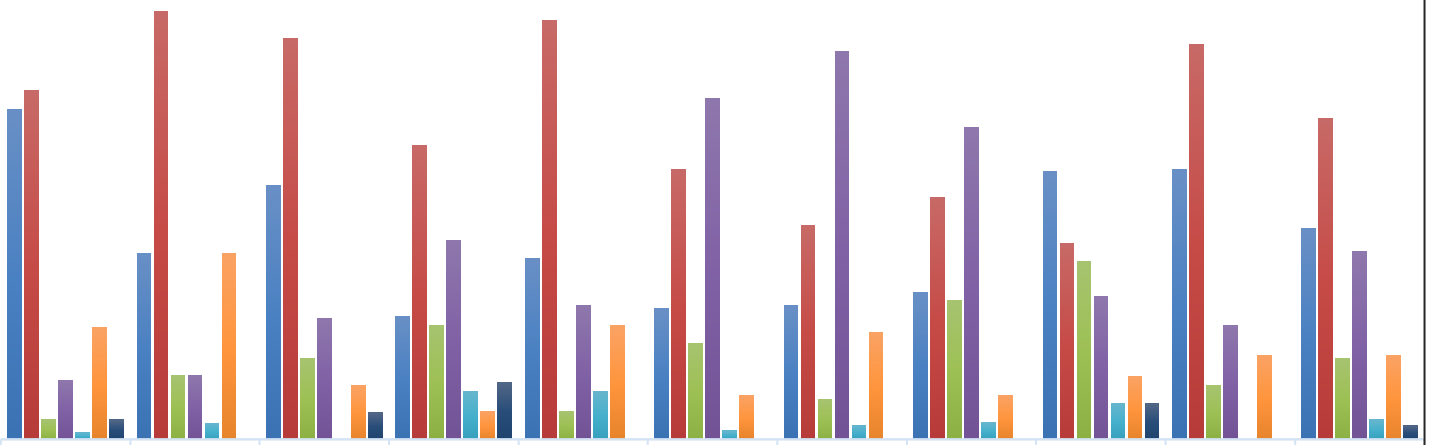
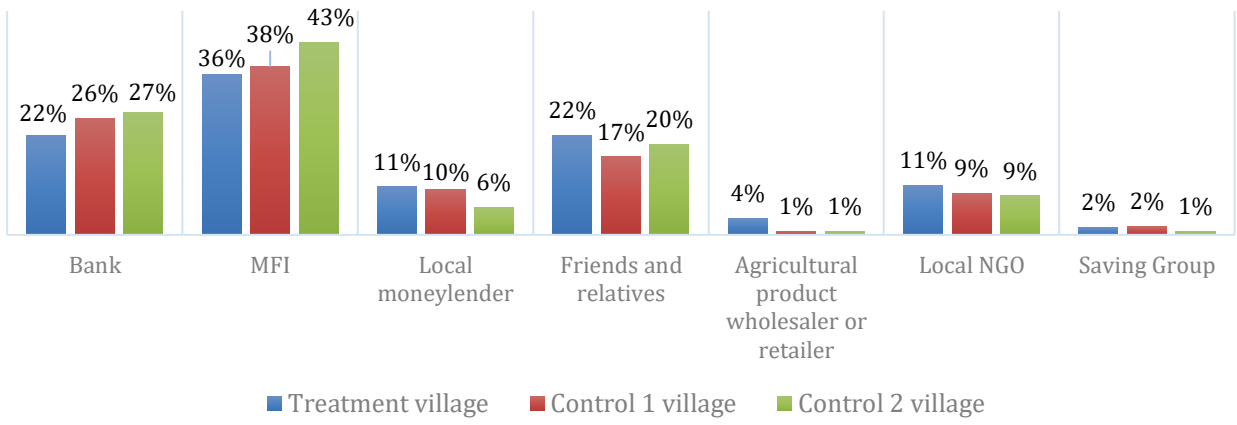


Figure 3.40: Sources of Accessed Money Lending System by District (n = 1563)



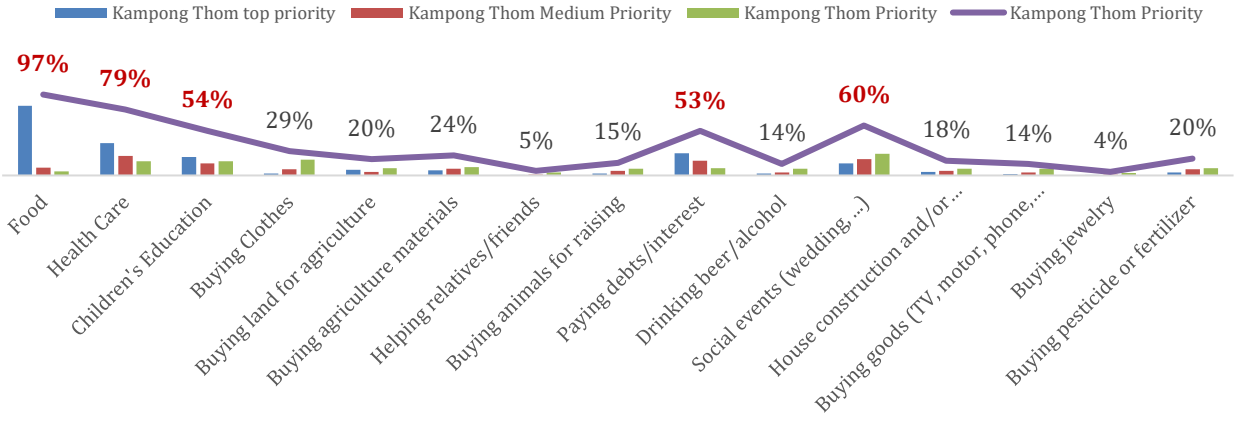
	Baray	Kampong Svay	Prasat Balangk	Sandan	Santuk	Kralanh	Prasat Bakong	Srei Snom	Svay Leu	Varin	Total
Bank	39%	22%	30%	14%	21%	15%	16%	17%	31%	32%	25%
MFI	41%	50%	47%	34%	49%	32%	25%	28%	23%	46%	38%
Local moneylender	2%	8%	9%	13%	3%	11%	5%	16%	21%	6%	10%
Friends and relatives	7%	8%	14%	23%	16%	40%	45%	36%	17%	13%	22%
Agricultural wholesaler or retailer	1%	2%	0%	6%	6%	1%	2%	2%	4%	0%	2%
Local NGO	13%	22%	6%	3%	13%	5%	13%	5%	7%	10%	10%
Saving Group	2%	0%	3%	7%	0%	0%	0%	0%	4%	0%	2%

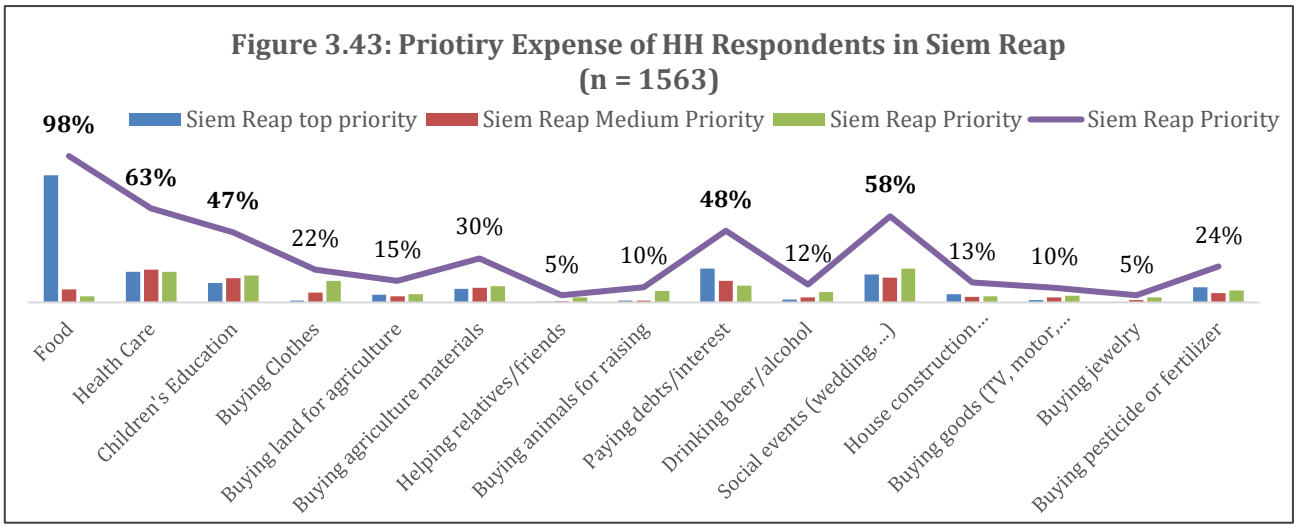
Figure 3.41: Accessed Money Lending System by Type of Village (n = 1563)



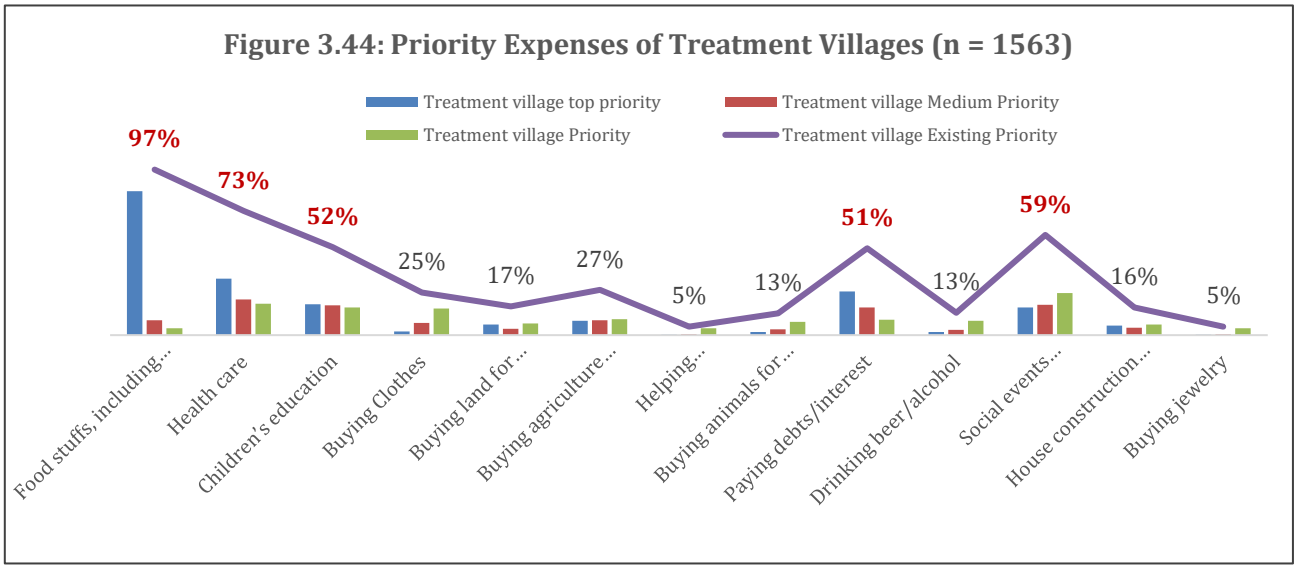
Purposes of using loan and priority HH expenses were also reported during the survey fieldworks. According to Figure 3.42 and Figure 3.43, the four most priority expenses for the survey respondents in Kampong Thom and Siem Reap provinces are chronologically for food stuffs (KPT: 97%, SRP: 98%), health care (KPT: 79%, SRP: 63%), social events (KPT: 60%, SRP: 58%), and debt repayment (KPT: 53%, SRP: 48%). Spending on children education becomes the 5th priority in both provinces (KPT: 54%, SRP: 47%). However, although Kampong Thom shares the same most priority expenses on food and social events (i.e. wedding, birthday, house warming, etc.), the majority of its HH respondents (54%) spend for children's education higher than that of Siem Reap (47%). Expenses on agricultural materials, pesticide and fertilizer, and purchase of agricultural land are also interestingly significant, according to the standpoints of the surveyed respondents. At least 12% to 14% of the expense is for drinking alcohol like beer and wine and usually male members of the family do it.

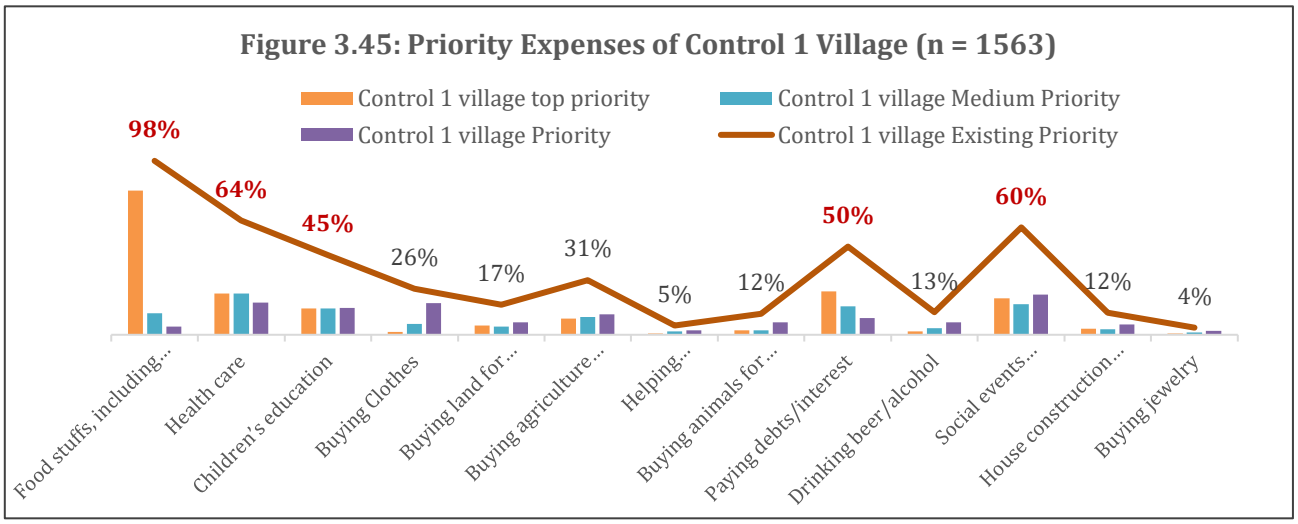
Figure 3.42: Priotiry Expense of HH Respondents in Kampong Thom (n = 1563)

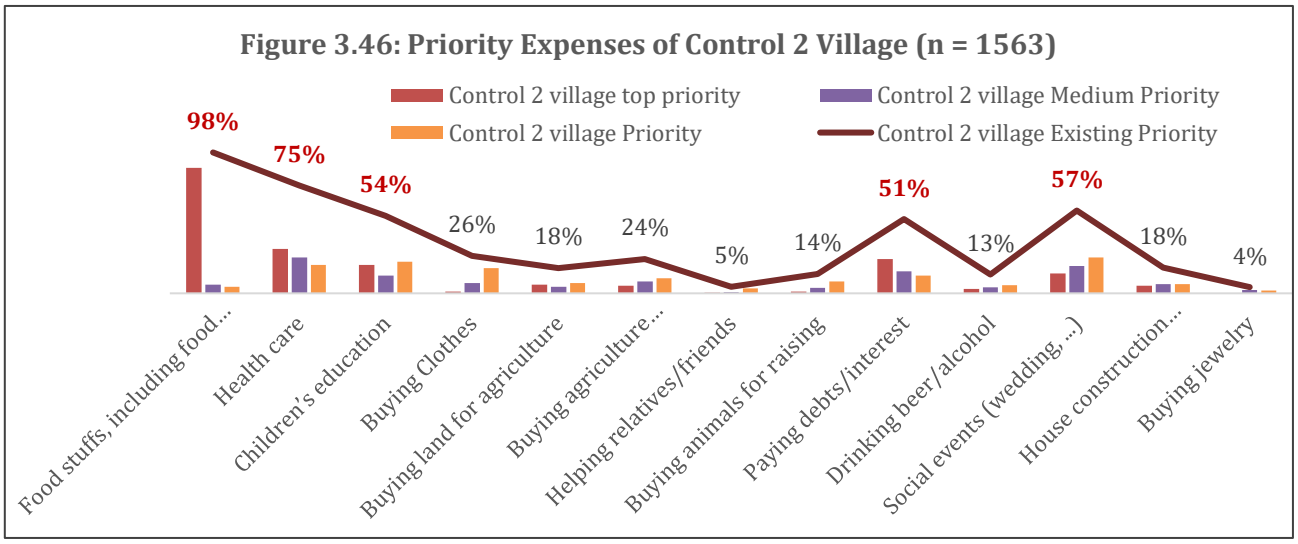




Priority expenses for local HHs in the T, C1 and C2 villages are almost similar compared to priority expenses by province. Spending for food stuffs is the most priority for either type of villagers targeted during the baseline survey reaching approximately 98% across all the villages. In addition, according to Figures 3.44, 3.45 and 3.46, health care cost remains the 2nd top priority expense with 75% of C2 villagers and 73% of T villagers spending much more than those in C1 villages (64%). At least half of the total expenses is mainly for debt repayment (T: 51%, C1: 50%, C2: 51%) across all types of villages, and such an expense is almost equal to the expense for children's education for T (52%) and C2 (54%) villagers, except for C1 villagers (45%), who would need to save up and use their earnings to deal with debt repayment or to pay the interest more than the investment in their children's education. Noticeably, people's spending for social events (T: 59%, C1: 60%, C2: 57%) is almost equal to buying agricultural materials, buying land for agriculture and buying animal for raising combined.







3.3.5. Agricultural Product Transport Means and Market Information Access

It was also found that local villagers in the target provinces sold their agricultural products, usually the surplus, to different market sources. They normally used different means to transport products to those markets. According to Figure 3.47, more villagers in Siem Reap usually use hand tractor (Kor Yun) while those in Kampong Thom use motorcycle as second popular means to transport their products to the market in both dry season and rainy season. Yet, hand tractor is not popular among local villagers in Kampong Thom, where most often buyers come to buy their products in the village in rainy season (55%) and dry season (57%). Tractor was perceived as the most unaffordable means, and almost none of the surveyed HH respondents reported to have bought or used this modern transport mean at all. About 18% and 15% of local villagers in Kampong Thom and Siem Reap respectively use car, mostly rented car, for transporting their agricultural products, especially their strategic crops, such as cassava and cashew nut to the market (Figure 3.47). Although more than 50% and less than half of the surveyed respondents in Kampong Thom and Siem Reap commonly see buyers approaching them in their own villages, they are still cautious about the price that is sometime manipulated or suppressed by the buyers to have it lower than the market prices.

However, it is astonishing to see that, when disaggregated by type of village, the majority of local villagers in all T (54%), C1 (47%) and C2 (49%) villages tend to rely on buyers who come to purchase their agricultural products in their own villages in both seasons given the fact that they are not much willing to spend money on transport cost whilst some buyers are capable of controling the market prices and make them fluctuated depending on their will. As further illustrated in Figure 3.48, the 2nd and 3rd common means of transport are motorcycle (T: 46%, C1: 39%, C2: 46%) and hand tractor (T: 34%, C1: 40%, C2: 32%) in that order in both dry and rainy seasons.

Figure 3.47: Means for Transporting Agricultural Products to Market (n = 1563)

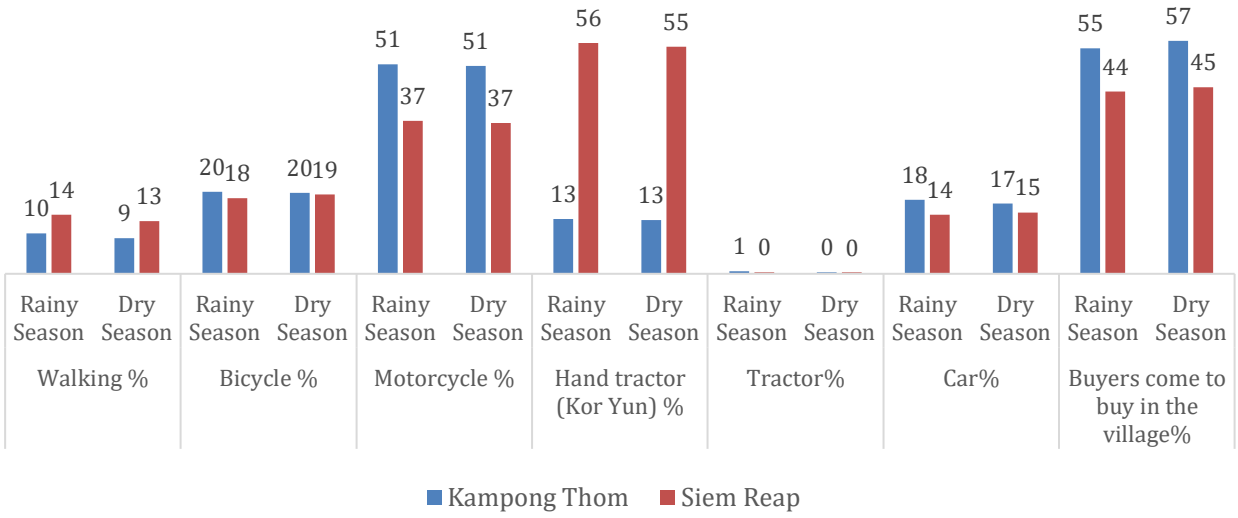
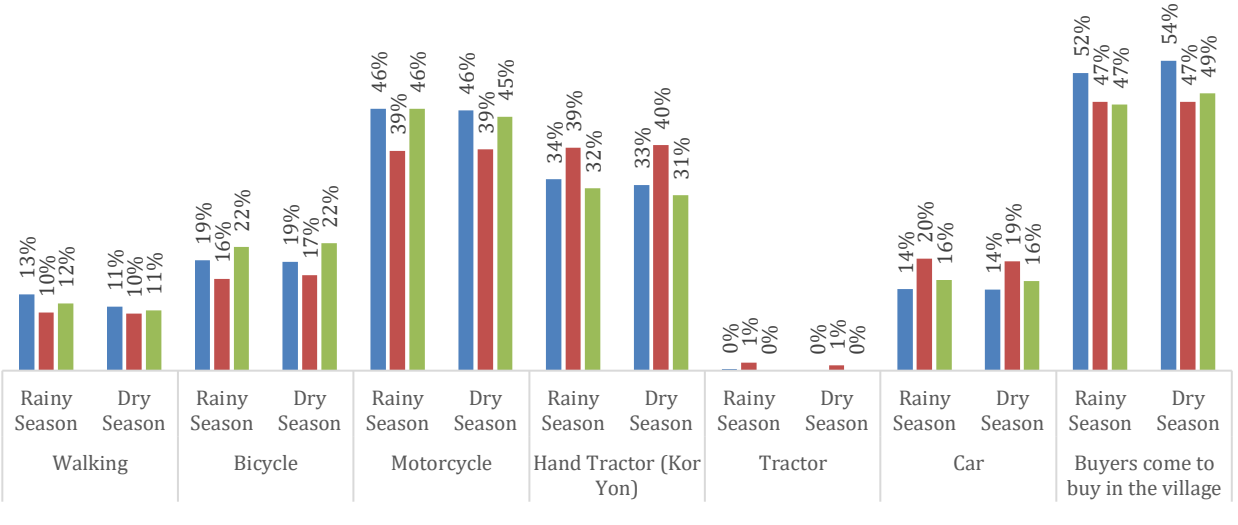
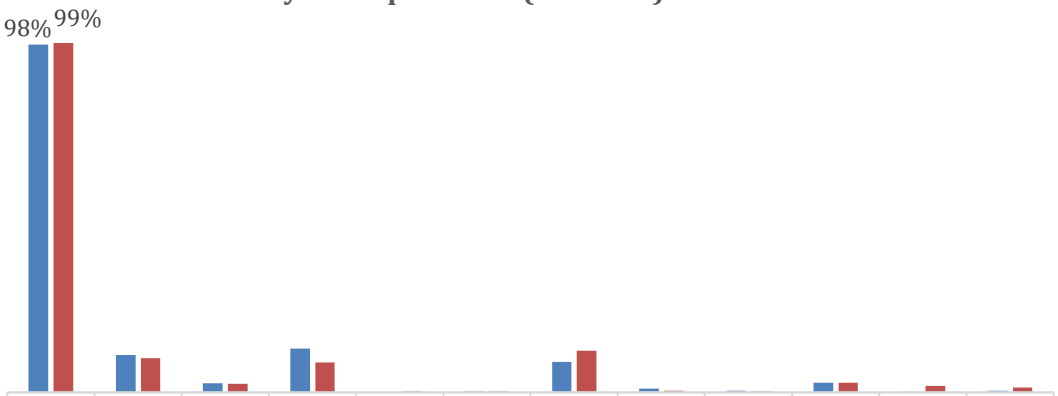


Figure 3.48: Means for Transporting Agricultural Products to Market (n = 1563)



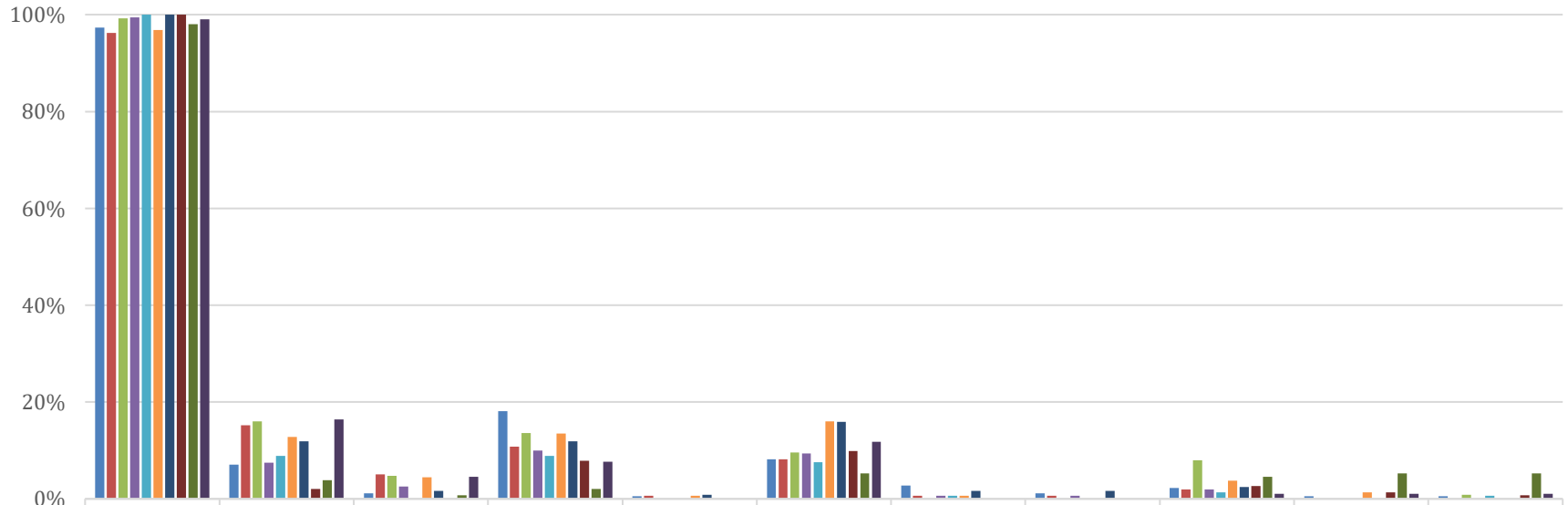
Rather than using mass media and social media or depending on information given by responsible line departments and local authorities, the surveyed respondents in the two target provinces prefer to get access to market information for selling agricultural products mostly through word-of-mouth (KPT: 98%, SRP: 99%) (Figure 3.49). Following this, watching television (KPT: 12%, SRP: 9%), meeting with village chief (KPT: 11%, SRP: 10%), and listening to the radio (KPT: 9%, SRP: 12%) are alternative options for information access despite their unpopularity among local villagers surveyed during the fieldworks. Although it was found during the fieldworks that most of the HH respondents and local villagers had access to smart phone and the use of social media (i.e. Facebook) and other internet purposes, very few of them realized the benefits of using such technology to browse market information for their agricultural products. Yet, there is a possibility in promoting ICT application in improving local villagers' access to market information (Figures 3.49, 3.50, 3.51).

Figure 3.49: Means of Access to Market Information by Surveyed Respondents (n = 1563)



	Word-of-Mouth	Meeting with Village Chief	Meeting with Commune Chief	Watching TV	Meeting with District Chief	Meeting with Local NGO	Listen to the Radio	Awareness Raising Campaign	Poster, Banner, Signpost, etc.	Telephone & SMS	Internet	Social Media
Kampong Thom	98%	11%	3%	12%	0%	0%	9%	1%	1%	3%	0%	0%
Siem Reap	99%	10%	2%	9%	0%	0%	12%	0%	0%	3%	2%	1%

Figure 3.50: Mean of Access to Market Information by Surveyed Respondents (n=1563)



	By word-of-mouth	Meeting with village chief	Meeting with commune chief	Watching TV	Meeting with local NGOs	Listening to the radio	Awareness Raising Campaing	Poster, banner, signpost, etc.	Telephone and SMS	Internet	Social media (I.e. Facebook)
Baray	97%	7%	1%	18%	1%	8%	3%	1%	2%	1%	1%
Kampong Svay	96%	15%	5%	11%	1%	8%	1%	1%	2%	0%	0%
Prasat Balangk	99%	16%	5%	14%	0%	10%	0%	0%	8%	0%	1%
Sandan	99%	8%	3%	10%	0%	9%	1%	1%	2%	0%	0%
Santuk	100%	9%	0%	9%	0%	8%	1%	0%	1%	0%	1%
Kralanh	97%	13%	5%	14%	1%	16%	1%	0%	4%	1%	0%
Prasat Bakong	100%	12%	2%	12%	1%	16%	2%	2%	2%	0%	0%
Srei Snom	100%	2%	0%	8%	0%	10%	0%	0%	3%	1%	1%
Svay Leu	98%	4%	1%	2%	0%	5%	0%	0%	5%	5%	5%
Varin	99%	16%	5%	8%	0%	12%	0%	0%	1%	1%	1%

Figure 3.51: Mean of Access to Market Information by Surveyed Respondents (n = 1563)

	By word-of-mouth	Meeting with village chief	Meeting with commune chief	Watching TV	Meeting with district chief	Meeting with local NGOs	Listening to the radio	Awareness raising campaign	Poster, banner, signpost, etc.	Telephone and SMS	Internet	Social media (i.e. Facebook)
Treatment village	99%	10%	2%	9%	0%	0%	10%	1%	0%	3%	1%	1%
Control 1 village	97%	8%	3%	12%	0%	0%	11%	1%	1%	3%	2%	1%
Control 2 village	99%	12%	4%	11%	1%	1%	9%	1%	1%	2%	1%	1%

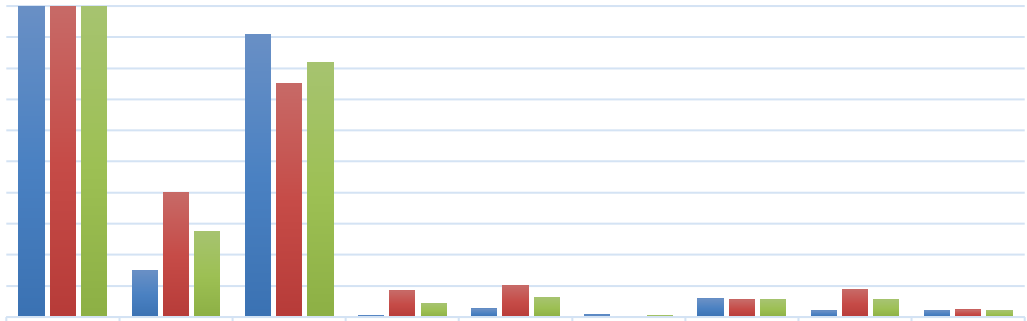
3.3.6. Water Access and Consumption and Access Means

Access to water for household consumption is relatively good across the two provinces. According to Figure 3.52, a vast majority of the surveyed respondents (99.7% in average for Kampong Thom and Siem Reap) could access water for daily domestic use, and out of total, local HHs of each type of village and of each district receive complete water access from 99% to 100% (Figures 3.52. and 3.53). However, regarding means of access, local villagers in Kampong Thom (91%) mostly access to water through their existing wells as well as community wells followed by those in Siem Reap (75%) who also use such a water source as a priority. Interestingly, rainwater (28%) is usually well preserved for extensive use followed by the use of dug pond (6%), natural stream and creek system (6%), and buying water from potential local and private suppliers (8%) (Figure 3.52). If compared to local HHs in Kampong Thom, the surveyed respondents in Siem Reap (40%) use rainwater as the 2nd priority of access to water consumption.

When asked about means of access to safe and clean water drinking and cooking, 83%, 88%, and 73% respectively of HHs in T, C1 and C2 villages in the target provinces reported that well water is safe enough for cooking, yet they need to boil water for drinking (Figure 3.53). Among all types of villages, rainwater is mostly used by T villagers for they consider it as the 2nd best option followed by water collection from dug pond and buying water from local suppliers (7%) (Figure 3.53). While a vast majority of local HHs (82%) across the 10 target districts consider well water the 1st best means for collecting clean water for use in both rainy and dry seasons, local villagers in Svay Leu (49%) tend to use rainwater for daily consumption (Figure 3.54).

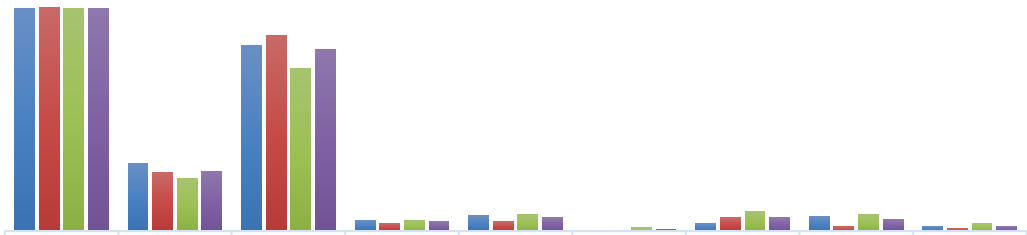
Buying safe and clean water for drinking and cooking and other key purposes (i.e. bathing and washing) is more common for the surveyed respondents in Siem Reap (21%) than for those in Kampong Thom (6%) (Figure 3.55). This happens more for people in Srei Snom (38%), Varin (24%) and Svay Leu (22%) (Figure 3.57). Yet, those living in Prasat Bakong who have never spent money on buying water for almost all of them have their own wells or share wells with their families and relatives. According to Figures 3.58 and 3.59, the average expense for buying clean water per time among people in T, C1 and C2 villages is almost US$ 3, yet those in Srei Snom, Svay Leu and Sandan pay up to US$ 4. Usually, clean water costs moderately US$ 1.2 per cubic meter and among all district, local villagers in Santuk (US$ 1.3) pay the least for purchasing safe and clean water per time.

Figure 3.52: Access to Water and Sources of Water Accessed by Respondents (n = 1563)



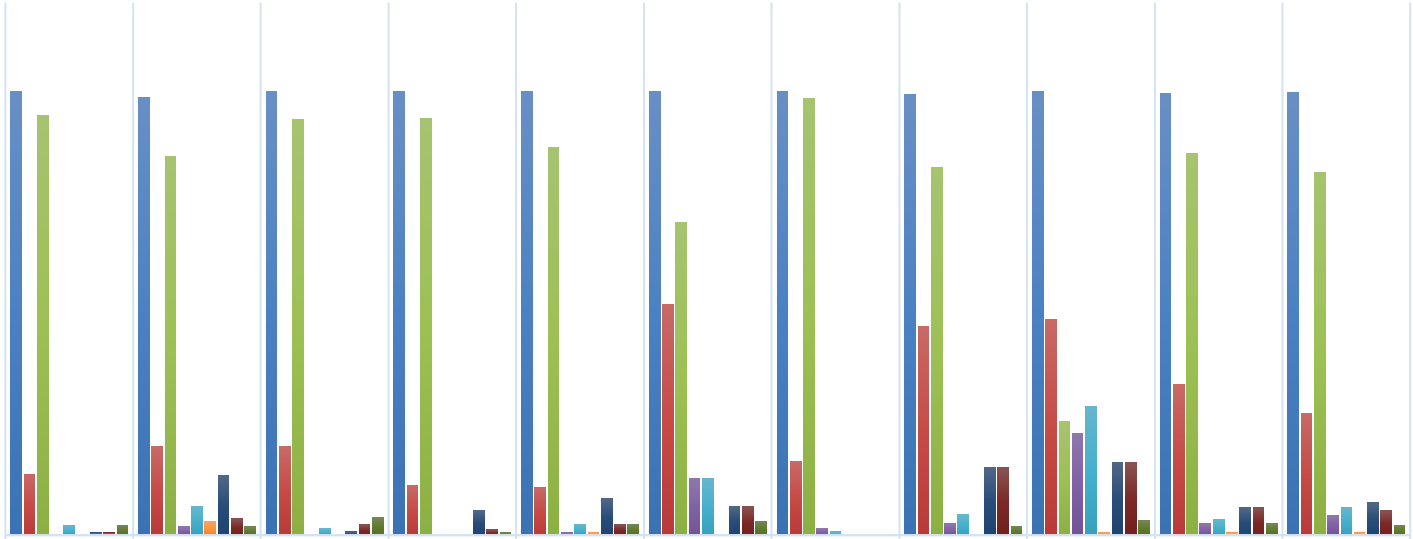
	Access to Water	Rainfall	Well	Natural pond	Dug pond	Nearby river	Natural stream & creek system	Buy water from local supplier	Buy water from private supplier
Kampong Thom	99.7%	14.9%	90.9%	0.5%	2.6%	0.8%	5.8%	2.1%	2.2%
Siem Reap	99.7%	40.2%	75.2%	8.5%	10.1%	0.3%	5.5%	9.0%	2.3%
Total	99.7%	27.5%	81.7%	4.5%	6.4%	0.6%	5.7%	5.5%	2.3%

Figure 3.53: Access to Water and Means of Access by Surveyed Respondents (n = 1563)



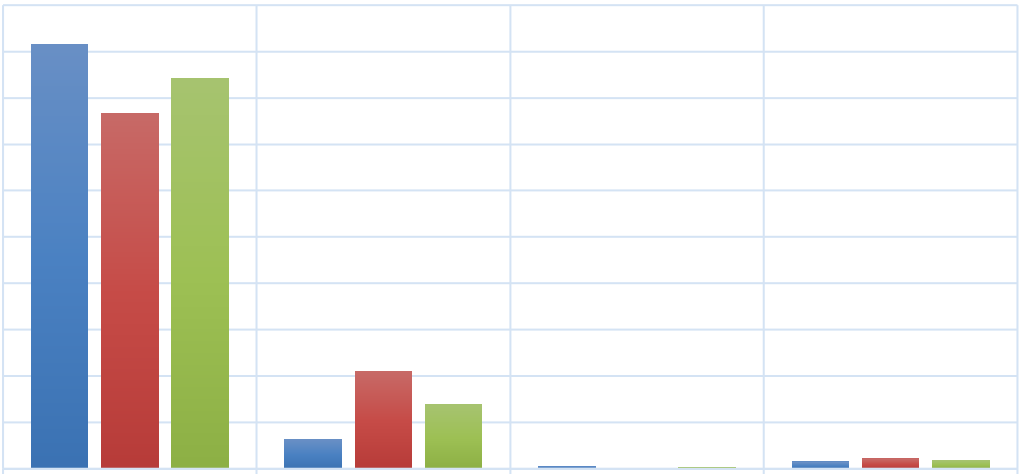
	Access to water for HH use	Rainfall	Well	Natural pond	Dug pond	Nearby river	Natural stream & creek system in the locality	Buy water from local supplier / owner	Buy water from private water supplier
Treatment village	100%	30%	83%	5%	7%	0%	4%	7%	2%
Control 1 village	100%	26%	88%	4%	4%	0%	6%	2%	1%
Control 2 village	100%	24%	73%	5%	7%	2%	9%	7%	3%
Total	100%	27%	81%	4%	6%	1%	6%	5%	2%

Figure 3.54: Access to Water and Means of Access by Surveyed Respondents (n = 1563)



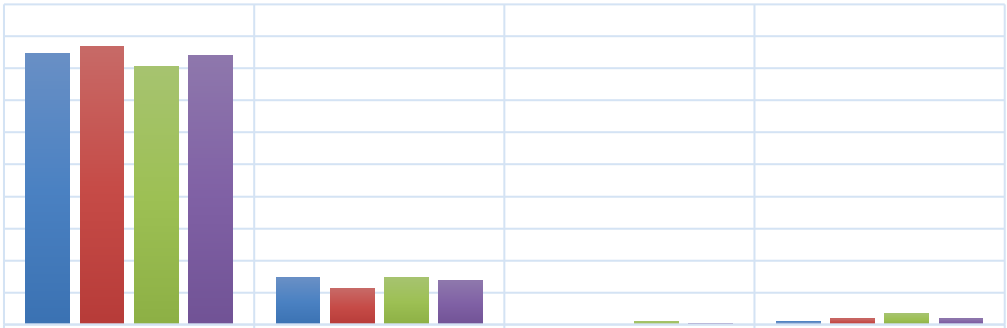
	Baray	Kampong Svay	Prasat Balangk	Sandan	Santuk	Kralanh	Prasat Bakong	Srei Snom	Svay Leu	Varin	Total
Access to Water	100%	99%	100%	100%	100%	100%	100%	99%	100%	100%	100%
Rainfall	14%	20%	20%	11%	11%	52%	17%	47%	49%	34%	28%
Well	95%	85%	94%	94%	87%	71%	98%	83%	26%	86%	82%
Natural pond	0%	2%	0%	0%	1%	13%	2%	3%	23%	3%	5%
Dug pond	2%	6%	2%	0%	3%	13%	1%	5%	29%	4%	6%
Nearby river	0%	3%	0%	0%	1%	0%	0%	0%	1%	1%	1%
Natural stream & creek system	1%	14%	1%	6%	8%	6%	0%	15%	16%	6%	7%
Buy water from local supplier	1%	4%	2%	1%	3%	6%	0%	15%	16%	6%	5%
Buy water from private supplier	2%	2%	4%	1%	3%	3%	0%	2%	3%	3%	2%

Figure 3.55: Mean of Access to Clean and Safe Drinking Water (n = 1563)



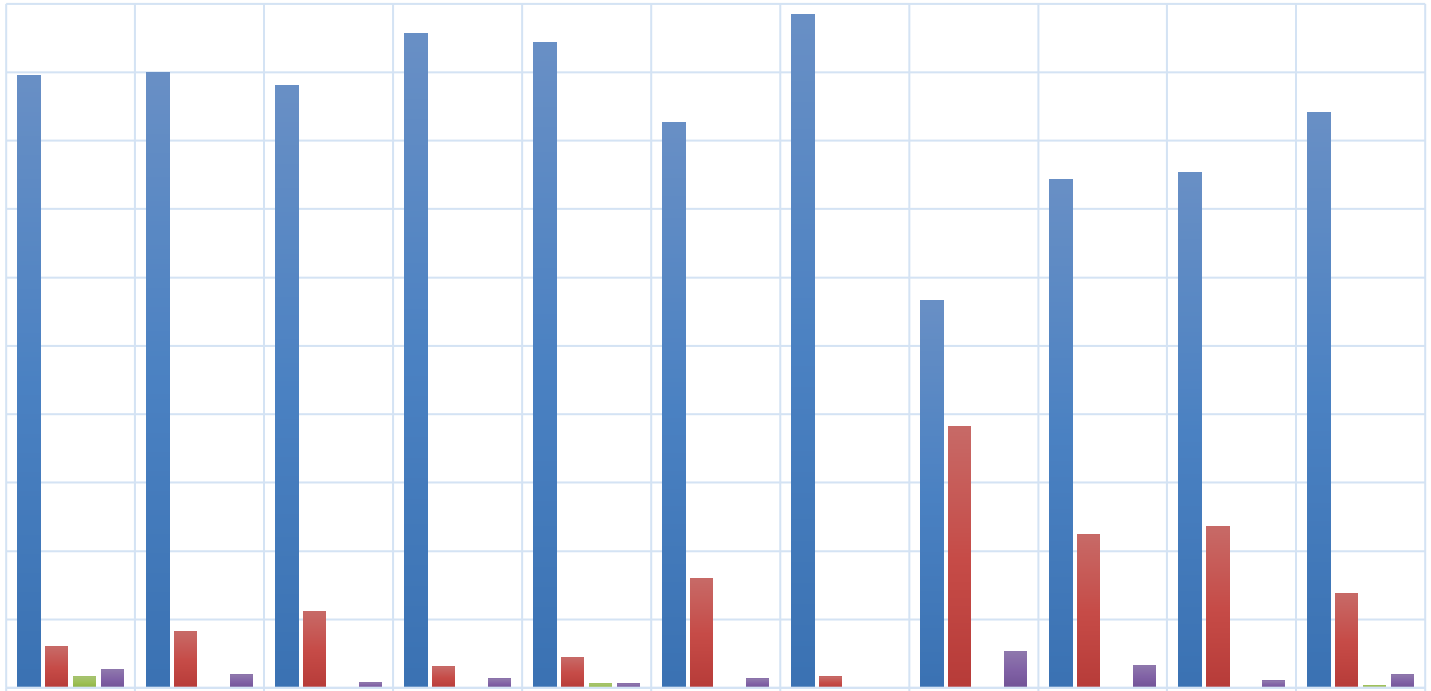
	Free of charge (for public)	Purchase from local owner	Pay to the government	Purchase from private water supplier
Kampong Thom	92%	6%	1%	2%
Siem Reap	77%	21%	0%	2%
Total	84%	14%	0%	2%

Figure 3.56: Means of Access to Clean and Safe Drinking Water by Type of Village (n = 1563)



	Free of charge (for public)	Purchase from local owner	Pay to the government	Purchase from private water supplier
Treatment village	85%	15%	0%	1%
Control 1 village	87%	11%	0%	2%
Control 2 village	81%	15%	1%	4%
Total	84%	14%	0%	2%

Figure 3.57: Means of Access to Clean and Safe Drinking Water (n = 1563)



	Baray	Kampong Svay	Prasat Balangk	Sandan	Santuk	Kralanh	Prasat Bakong	Srei Snom	Svay Leu	Varin	Total
Free of charge (for public)	90%	90%	88%	96%	94%	83%	98%	57%	74%	75%	84%
Purchase from local owner	6%	8%	11%	3%	5%	16%	2%	38%	22%	24%	14%
Pay to the government	2%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%
Purchase from private supplier	3%	2%	1%	1%	1%	1%	0%	5%	3%	1%	2%

Figure 3.58: Average Expense for Buying Clean Water Per Time (US$, n = 1563)

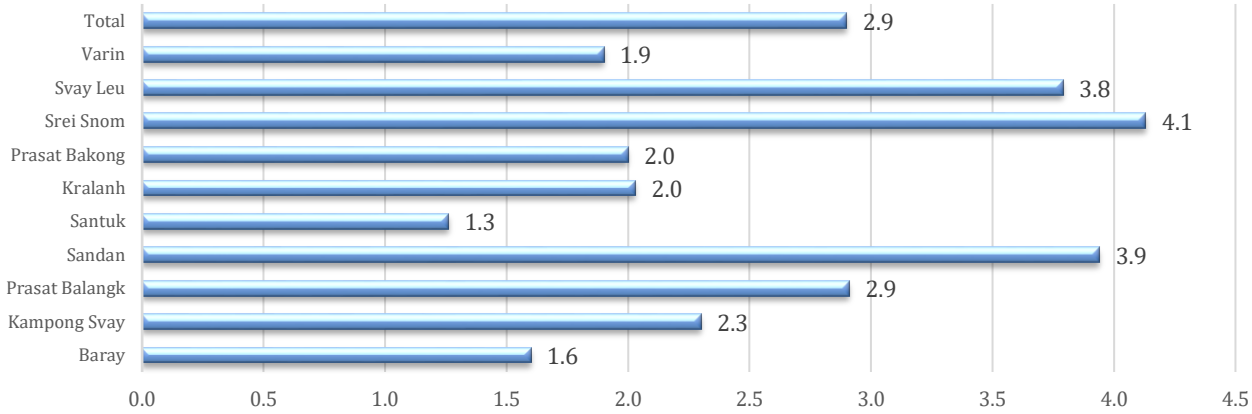
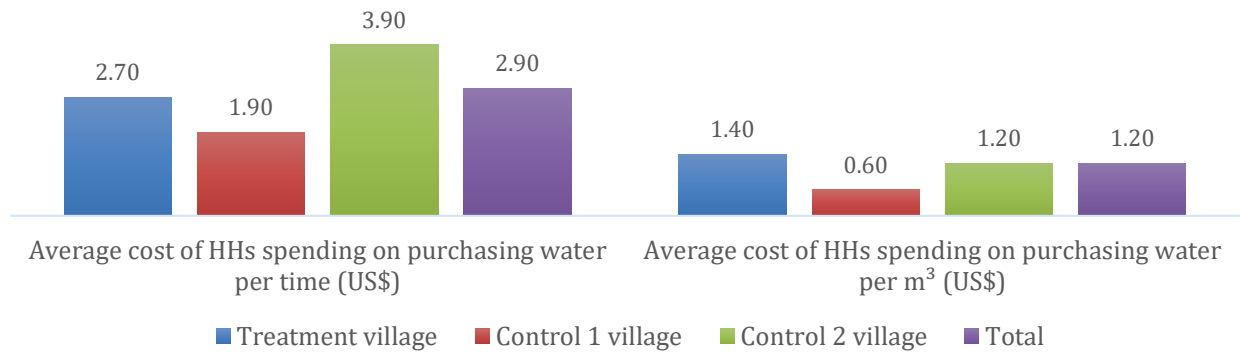


Figure 3.59: Average Expense of Buying Clean Water Per time and Per Cubic Meter by Surveyed Respondents (n = 1563)



Time consumed by individual HHs for water access or collection was also included during survey fieldworks. According to Figure 3.60, 31% of the total surveyed respondents in both provinces spend less than 30 minutes for collecting water for household consumption in both dry and rainy seasons. Although at least more than half of the surveyed HHs in each type of village could easily get access to water for household consumption via own wells and / or existing dug ponds, the amount of T villagers (59%) getting water access through this source is the least (59%) compared to those in C1 villages (65%) and C2 villages (69%) (Figure 3.61). However, more respondents in T villages (37%) spend less than 30 minutes in collecting water if compared to C1 (27%) and C2 (26%) villagers. A few of them take up to one hour (4%) or longer (2%) to collect water, and this only happens with those living in remote areas of Varin and Kampong Svay districts in Siem Reap and of Kampong Svay in Kampong Thom (Figure 3.62).

The majority of the surveyed households (83%) across all the target provinces collect water on a daily basis (Figure 3.63). This is mostly frequent for the people in Prasat Bakong (97%), Baray (93%), Prasat Balangk (92%), Santuk (91%), Sandan (88%), and Kralanh (80%). Yet, 9% of them collect water in every 2-3 days, 5% collect once a week, 2% collect in every two weeks, and another 1% collect once a month, and this case more likely occurs in both provinces where some local HHs

have enough facilities to store water for longer use (Figure 3.63). More than 80% of the surveyed respondents in each type of village reported to collect or buy water everyday with those in C1 villages (85%) represent the highest amount of people practicing such a daily purchase (Figure 3.64). Although a vast majority of HH respondents in T villages (82%) fetch and / or buy water everyday, 11% and 5% of other T HHs usually collect water in every 2-3 days and once a week respectively (Figure 3.64).

Figure 3.60: Time Consumed for Water Access (n = 1563)

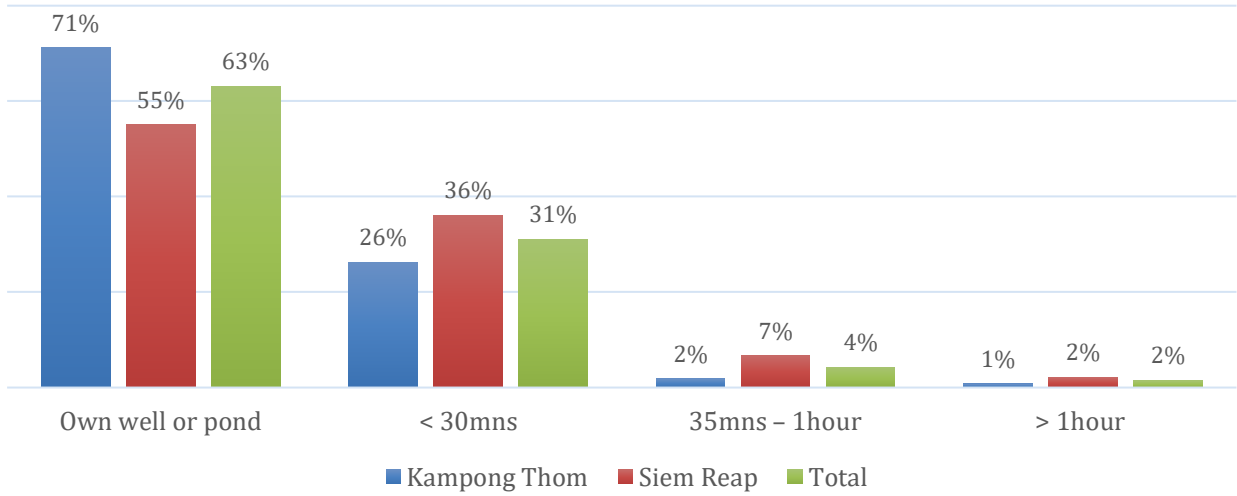


Figure 3.61: Time Consumed for Water Access by Type of Village (n = 1563)

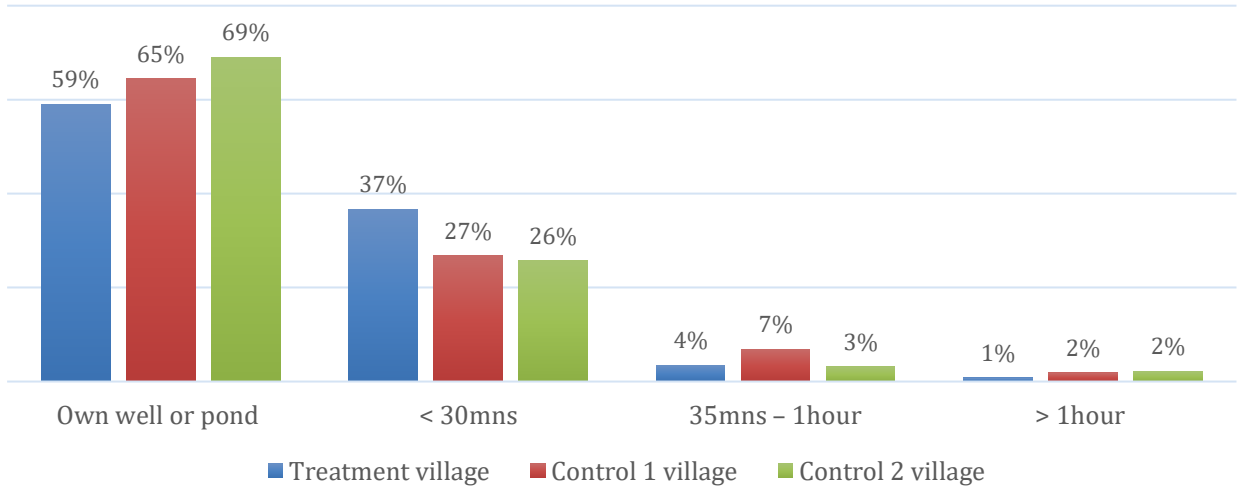
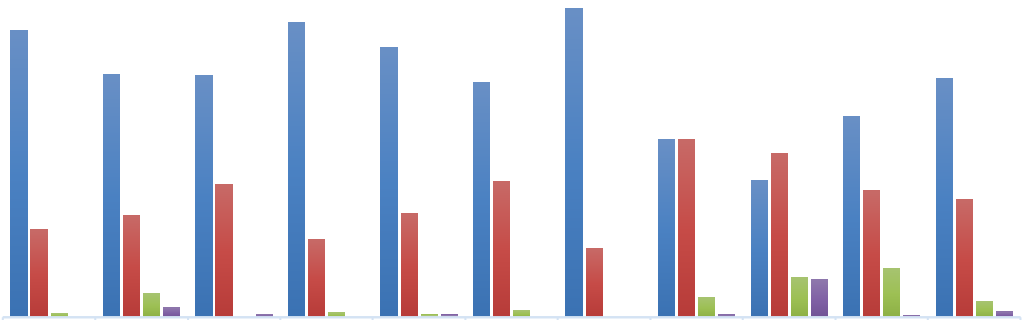
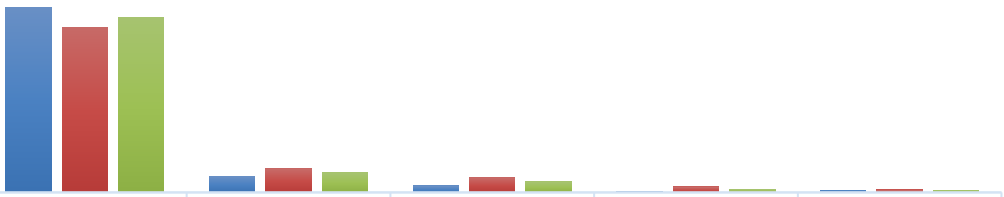


Figure 3.62: Time Consumed for Water Accessed Disaggregated by District (n=1563)



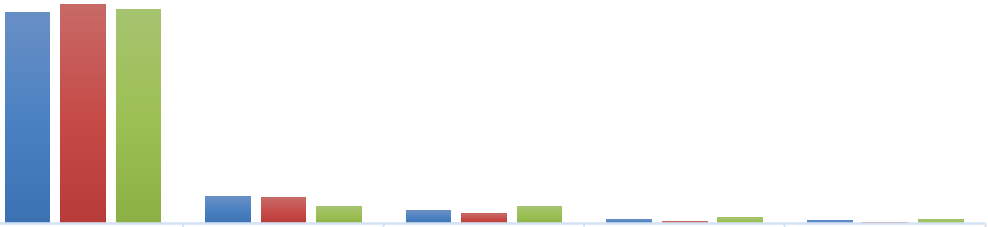
	Baray	Kampong Svay	Prasat Balangk	Sandan	Santuk	Kralanh	Prasat Bakong	Srei Snom	Svay Leu	Varin	Total
Own Well/pond	76%	64%	64%	78%	71%	62%	82%	47%	36%	53%	63%
< 30mns	23%	27%	35%	21%	27%	36%	18%	47%	43%	34%	31%
35mns – 1hour	1%	6%	0%	1%	1%	2%	0%	5%	11%	13%	4%
> 1hour	0%	3%	1%	0%	1%	0%	0%	1%	10%	1%	2%

Figure 3.63: Frequency of Water Collection or Buy Water by HH Respondents (n = 1563)



	Everyday	Every 2-3 days	One time per week	Every 2 weeks	One time per month
Kampong Thom	88%	8%	3%	1%	1%
Siem Reap	78%	11%	7%	3%	1%
Total	83%	9%	5%	2%	1%

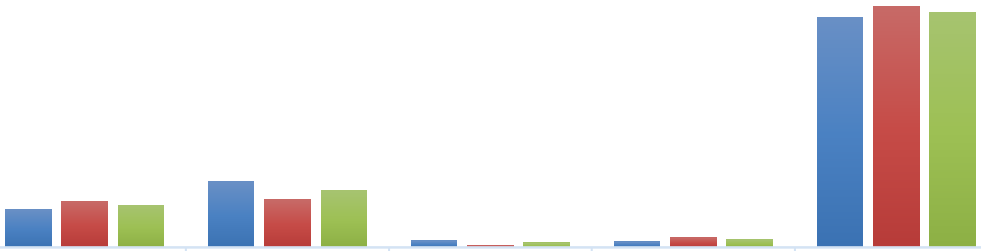
Figure 3.64: Frequency of Water Collection or Purchase by HH Respondents by Type of Village (n=1563)



	Everyday	Every 2-3 days	One time per week	Every 2 weeks	One time per month
Treatment village	82%	11%	5%	2%	1%
Control 1 village	85%	10%	4%	1%	0%
Control 2 village	83%	7%	7%	2%	1%

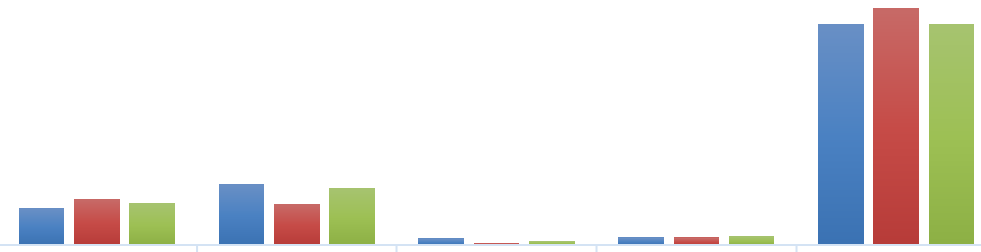
More than half of the surveyed respondents (68%) reported that everyone in the family, exclusive mainly of young children, disable members, and elderly, was helping each other to fetch water for daily household consumption (Figure 3.65). Of total, local households in Siem Reap (69%) share equal water collection task among their HH members, and so do those in Kampong Thom (66%). However, when disaggregated by gender, women seem to carry out this work more than men do, and this case is quite realistic in all target provinces and districts except in Varin and Svay Leu (Figure 3.66). Interestingly, although 67% of the respondents in T villages, whose amount is second to those in C1 villages yet equal to those in C2 villages, sharing equal role among their family members in collecting water for HH use, women (18%) are still subject to spending more effort than men (11%) in undertaking this rountine duty (Figure 3.66). This case is replicated in C2 villages where the amount of women participation in water collection (17%) slightly outnumbers men participation (13%), while this case is vice versa for C1 households (men: 14%, women: 12%).

Figure 3.65: Responsibility of Household Members in Fetching Water (n = 1563)



	Man	Woman	Female children	Male children	Everyone helps each other
Kampong Thom	11%	19%	2%	2%	66%
Siem Reap	13%	14%	1%	3%	69%
Total	12%	16%	1%	2%	68%

Figure 3.66: Responsibility of HH Members in Fetching Water by Type of Village (n=1563)



	Man	Woman	Female children	Male children	Everyone helps each other
Treatment village	11%	18%	2%	2%	67%
Control 1 village	14%	12%	0%	2%	71%
Control 2 village	13%	17%	1%	3%	67%

As indicated early in Figures 3.63 and 3.65, a significant number of the surveyed respondents in the two target provinces still buy water for daily livelihood needs. While than half of local villagers in Siem Reap (54%) tend to buy water more in dry season, 56% of those in Kampong Thom usually buy water in both dry and rainy seasons (Figure 3.67). Across type of village, T villagers (63%) interviewed during the survey buy water mostly in dry season whereas those in C1 (63%) and C2 (54%) villages mostly do so in both dry and rainy seasons (Figure 3.68). Yet, the percentage of local HHs buying water in both rainy and dry seasons is 48% in total. Unlike other districts, all the surveyed respondents in Prasat Bakong (100%) buy water in both seasons mainly for cooking and drinking followed by those in Baray (84%), Sandan (74%), Santuk (67%), Kampong Svay (63%), and Varin (56%) (Figure 3.69).

Figure 3.67: Season of Buying Water by Province (n = 1563)

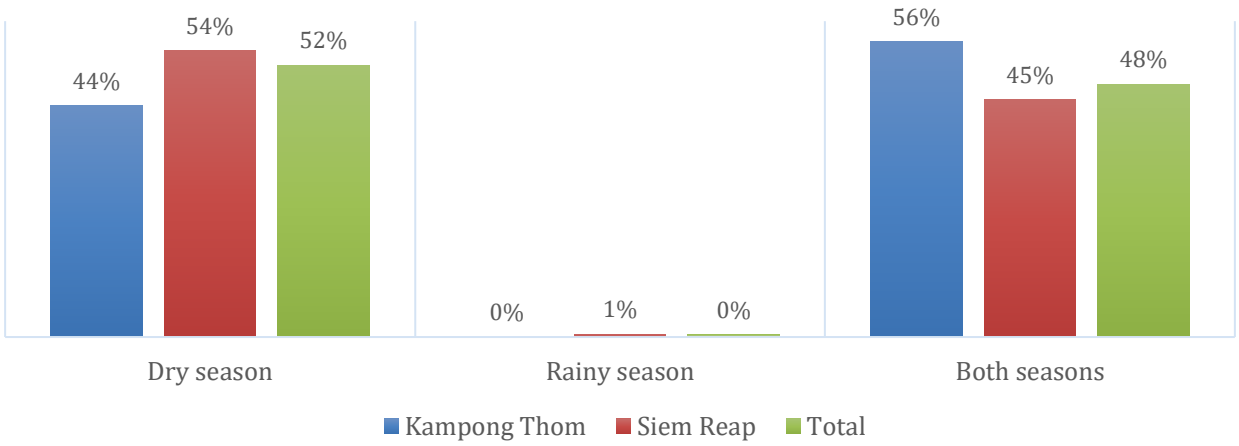


Figure 3.68: Season for Buying Water by Type of Village (n=1563)

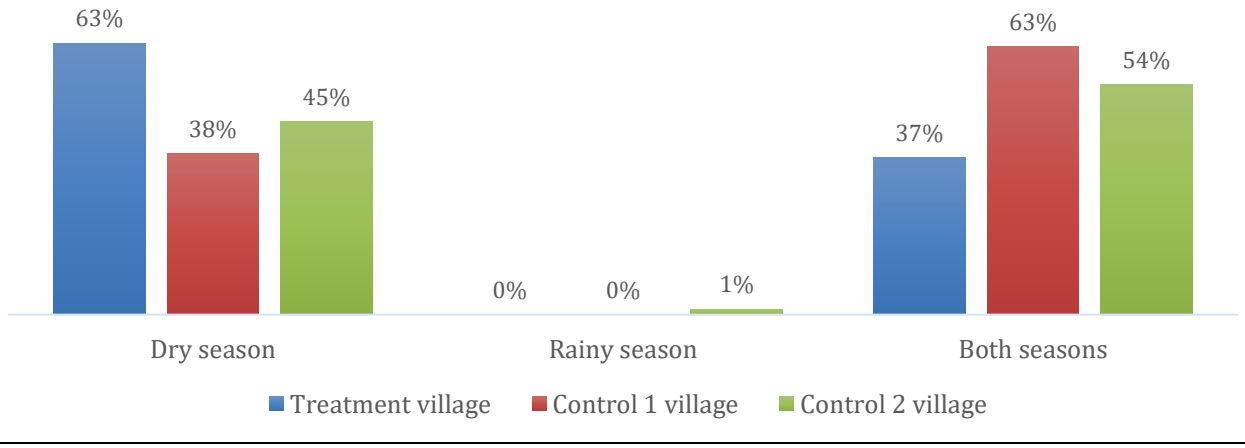
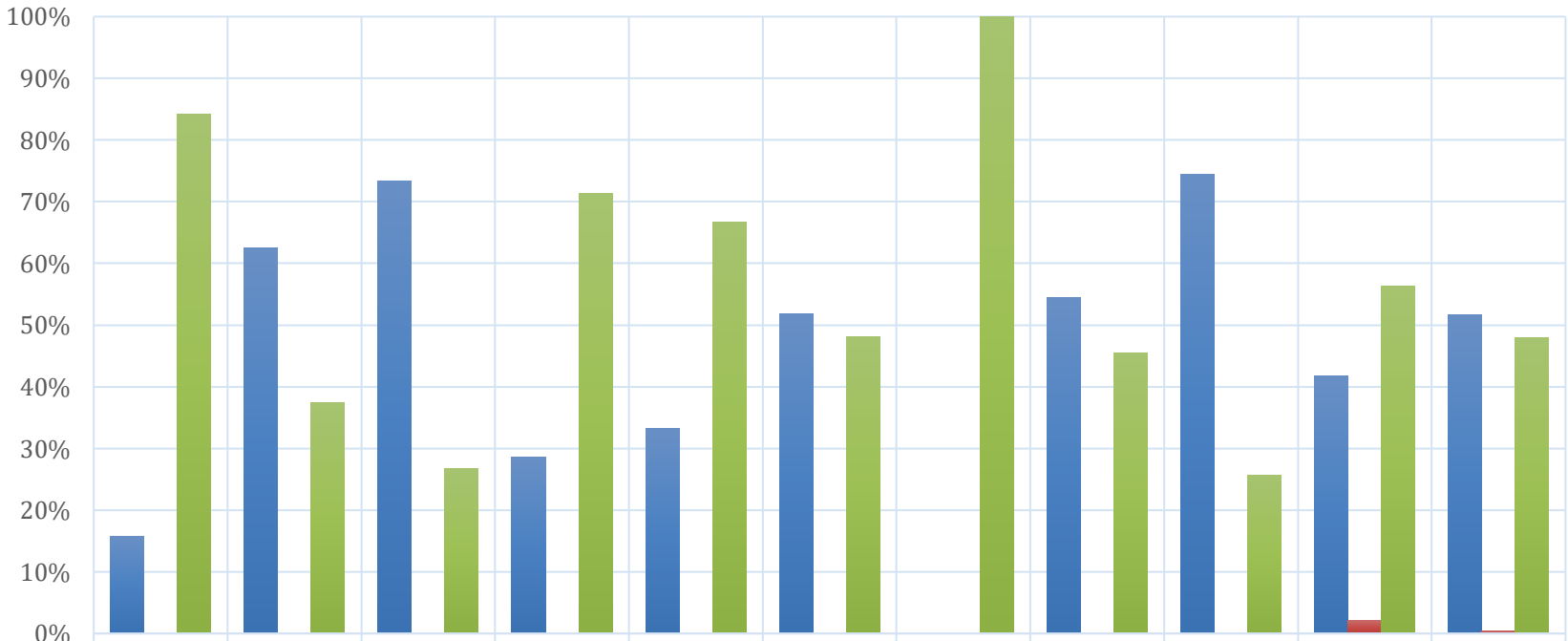


Figure 3.69: Season for Buying Water for HH Use (n=1563)



	Baray	Kampong Svay	Prasat Balangk	Sandan	Santuk	Kralanh	Prasat Bakong	Srei Snom	Svay Leu	Varin	Total
Dry season	16%	63%	73%	29%	33%	52%	0%	55%	74%	42%	52%
Rainy season	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%	0%
Both seasons	84%	38%	27%	71%	67%	48%	100%	46%	26%	56%	48%

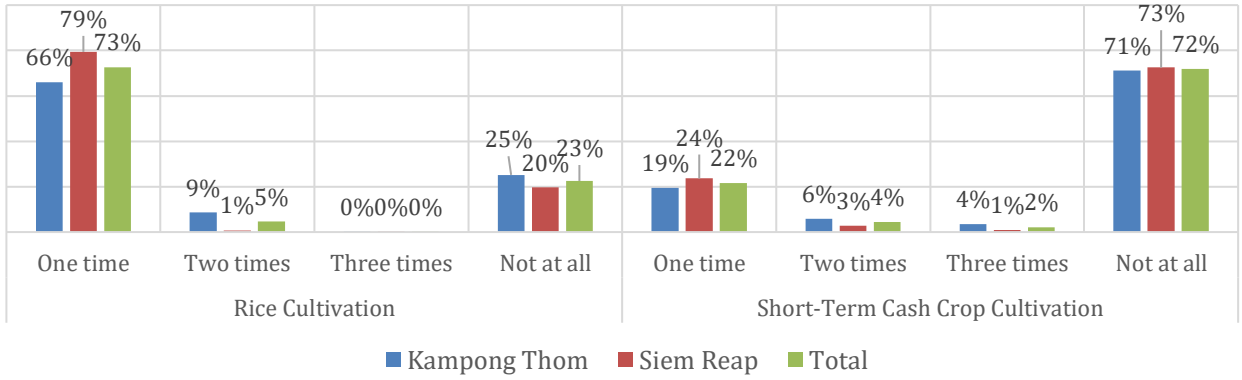
3.3.7. Water Access and Use for Agriculture and Means of Access to Relevant Information

Involvement in rice cultivation by the surveyed respondents was also targeted during survey fieldworks. According to Figure 3.70, the majority of respondents (73%) cultivate rice one time per year and between the two target provinces, one-time rice cultivation is more involved by local HHs in Siem Reap (79%) than in Kampong Thom (66%). Among these percentages, those who produce rain-fed wet rice one time per year is approximately 85% in Kampong Thom and 97% in Siem Reap. By type of village, 92% of T villagers, 87% of C1 villagers and 94% of C2 villagers practice one-time rain-fed wet rice per year.

For dry season rice, the effort in producing 1 time and 2 times per year is similar. Approximately 5% and 1% of HHs in Kampong Thom and Siem Reap respectively cultivate dry rice once a year. Precisely, around 2%, 4% and 2% of T, C1 and C2 HHs produced dry season rice one time per year. Interestingly, a few respondents (9% and 1% of HHs in Kampong and Siem Reap) claimed to have cultivated dry season rice two times per year, within that 4%, 8% and 2% of T, C1 and C2 HHs are practicing that 2-time cultivation pattern. It is notable that 2-time dry season rice cultivation is made possible by the introduction of new type of rice seed. Usually people in these 2 provinces plant short-term rice crop that could give them immediate yield within 3-4 month period, and rice seeds are usually resilient to water or weather condition if compared to long-term rice crop.

Only 9% of HH respondents in Siem Reap practice rice cultivation 2 times per year (wether they produce rain-fed wet season rice and dry season rice or 2-time dry season rice), which is a bit higher than those in Kampong Thom (5%). The percentage of HHs that cultivate double cropping (which mean both rain-fed wet rice and dry season rice cultivations) is 11% in Kampong Thom and only 1% of HHs in Siem Reap. By type of village, only 1% of those in C2 involved in double cropping; while there were around 5% and 11% of T and C1 HHs respectively do so.

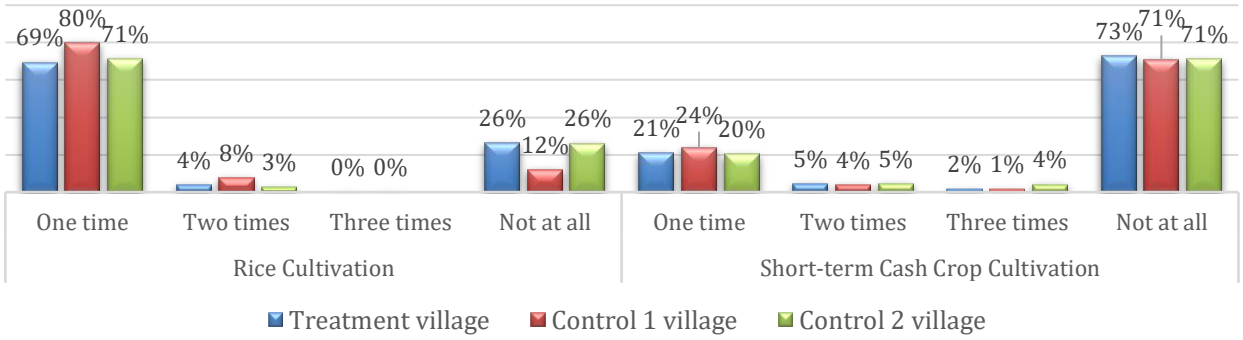
Figure 3.70: Number of Rice and Short-Term Cash Crop Cultivation Time Per Year (n = 1563)



As shown further in Figure 3.70, cash crop and strategic crop farming is still less popular in both provinces with HHs in Siem Reap (24%) having higher involvement than those in Kampong Thom (19%). Local participation in cash / strategic crop farming is mainly due to people's increasingly interest to earn quick income from off-farm sources, especially from out-migration to the neighboring Thailand and seasonal wage labor in nearby plantation. 80% and 8% of HH respondents in C1 villages respectively cultivate rice one time and two times per year, and these amounts of C1 household participation in rice cultivation are the highest compared to other types of villages for both 1-time (T: 69%, C2: 71%) and 2-time (T: 4%, C2: 3%) rice production (Figure 3.71). Although C1

households still involve more in short-term cash crop cultivation once a year (24%) followed closely by those in T villages (21%) and C2 villages (20%), C2 villagers seem to put more effort in cash crop cultivation in terms of frequency and time and yearly production (about 5% of them grow cash crops 2-3 times per year).

Figure 3.71: Number of Rice and Short-term Cash Crop Cultivation Time Per Year (n = 1563)

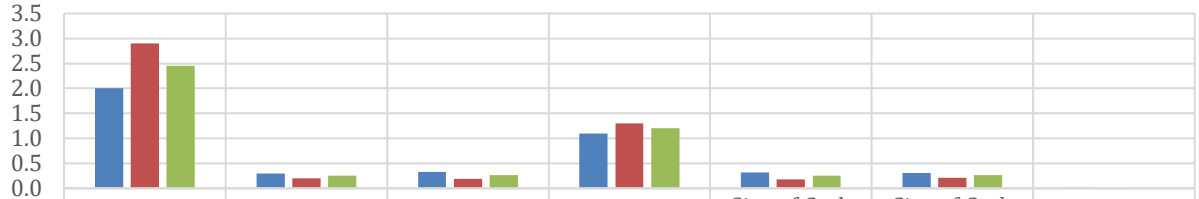


Local villagers surveyed in Kampong Thom and Siem Reap possess respectively 2 hectares and 2.9 hectares of rice farmland, 1.1 hectares and 1.3 hectares of cash or strategic crop farmland, and 0.009 hectares (90 m^2) and 0.013 hectares (131 m^2) of home-garden in average (Figure 3.72). Wet season rice yield is often higher than that of dry season one. Figure 3.74 shows that, in average, local HHs in Kampong Thom and Siem Reap could produce 1.3t and 1.9t of wet season rice and 2.7t and 2.2t of dry season rice per year respectively. When disaggregated by type of village, T villagers produce the least wet season rice yield (1.53t) compared to C1 and C2 villagers that respectively produce 1.78t and 1.65t per year. Local involvement in dry season rice farming is most dynamically involved by villagers in Santuk and Kampong Svay districts and every year they could produce up to 7.8t and 6.8t of rice respectively due mainly to their available dry rice paddies that are located in close proximity to the existing irrigation system in the areas. Among all districts targeted during the survey, people in Varin, Srei Snom, and Prasat Bakong of Siem Reap province do not cultivate dry rice at all. T villagers (2.4t) produce higher yield of dry season rice than C1 villagers (1.8t). Yet, it is still much lower than the annual yield of dry season rice produced by C2 villagers (6.3t). Cash crops are mainly cassava and cashew nut production, let alone other substantial crops, such as mungbean, peanut bean, maize, and sesame to be sporadically grown by a very few farmers surveyed during the fieldworks. The results of compare means in Figure 3.74 shows that annually they could produce 7.1t and 7.2t of cassava and 1.3t and 1.8t of cashew nut for Kampong Thom and Siem Reap in that order.

The survey also inquired the HH respondents to report about their experience and the size of leaving their farmland fallowed. According to Figure 3.72, the sizes of rice farmland and cash crop farmland left fallowed by local villagers are almost the same ranging from 0.25 to 0.3 hectares between last year (2017) and this year (2018). According to Figure 3.73, local respondents in T villages leave the least amount of rice farmland (0.24ha out of 2.23ha) and cash crop farmland (0.13ha out of 1.04ha) fallowed this year (2018) if compared with those in C1 and C2 villages who have left the amounts of 0.26ha (out of 2.56ha) and 0.3ha (out of 2.96ha) of rice farmland and 0.33ha (out of 1.33ha) and 0.39ha (out of 1.4ha) of cash crop farmland fallowed respectively. Selected HHs in T and C1 villages tend to use more land for rice and cash crop cultivation whilst those in C2 villages keep on

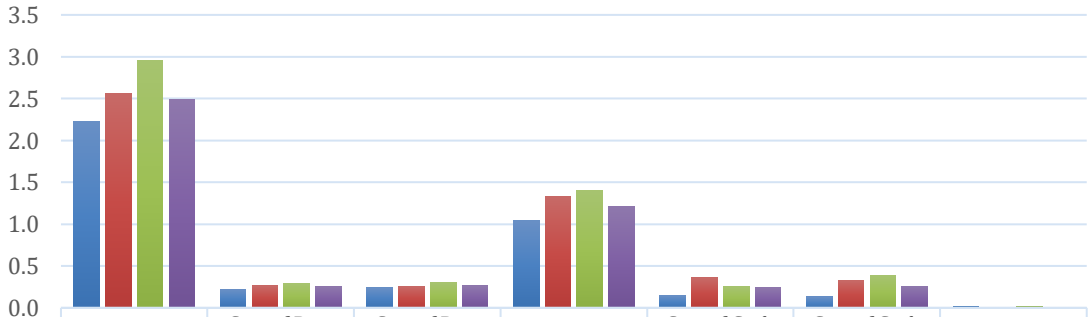
abandoning their farmland this year (2018) if compared to the amount of land they left fallowed last year.

Figure 3.72: Average Size of Rice and Cash Crop Farmland and Size of Farmland Left Fallowed (n = 1563)



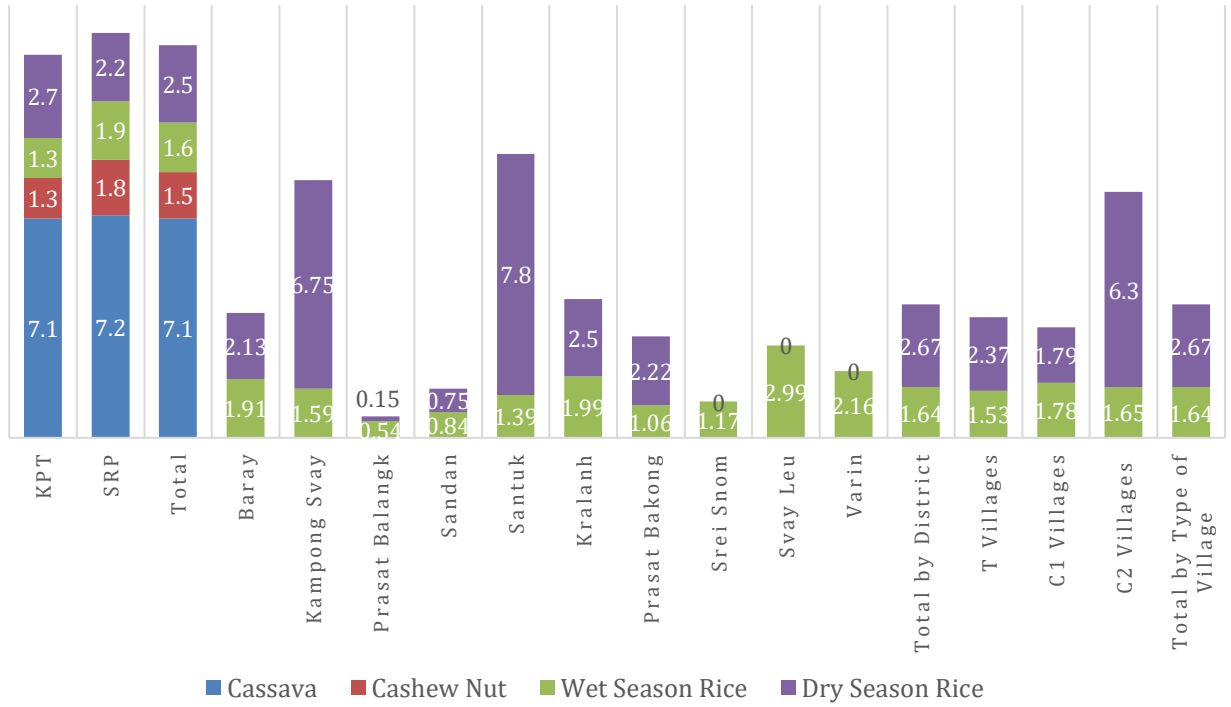
	Size of Rice Farmland (ha)	Size of Rice Farmland Left Fallowed Last Year (ha)	Size of Rice Farmland Left Fallowed This Year (ha)	Size of Cash Crop Farmland (ha)	Size of Cash Crop Farmland Left Fallowed Last Year (ha)	Size of Cash Crop Farmland Left Fallowed This Year (ha)	Size of Home-Garden (ha)
KPT	2.0	0.3	0.33	1.1	0.32	0.31	0.009
SRP	2.9	0.2	0.19	1.3	0.18	0.21	0.013
Total	2.5	0.3	0.26	1.2	0.25	0.26	0.011

Figure 3.73: Average Size of Rice and Cash Crop Farmland and Size of Farmland Left Fallowed by Type of Village (n = 1563)



	Size of Rice Farmland (ha)	Size of Rice Farmland Left fallowed Last Year (ha)	Size of Rice Farmland Left fallowed This Year (ha)	Size of Cash Crop Farmland (ha)	Size of Cash Crop Farmland Left fallowed Last Year (ha)	Size of Cash Crop Farmland Left fallowed This Year (ha)	size of your home-garden (ha)
Treatment village	2.23	0.22	0.24	1.04	0.15	0.13	0.011
Control 1 village	2.56	0.26	0.26	1.33	0.36	0.33	0.009
Control 2 village	2.96	0.30	0.30	1.40	0.25	0.39	0.011
Total	2.49	0.25	0.26	1.21	0.24	0.26	0.010

Figure 3.74: Average Quantity Produced (Ton Per Year, n = 1563)



The survey results in Figure 3.75 show that rice cultivation is mainly rain-fed with 73% of the total local villagers in both provinces depend on rainfall for their rice production process. This case is even more occurrent in Siem Reap province (84%). Water sources including well (18%), natural stream or creek system (14%) and water irrigation (11%) were perceived to have significantly contributed to increasing cultivation efforts of the surveyed farmers and rice productivity. However, there are no significant differences between each type of selected villages concerning their access to water for agriculture, their dependency on rainwater, and other water sources (Figure 3.76). Approximately, 34%, 33% and 29% of T, C1, and C2 villagers respectively get access to water for agriculture, yet 73% of them in average (T: 73%, C1: 75%, C2: 71%) are strongly reliant on rainfall as a means of natural water supply.

Figure 3.75: Access to Water for Agricultural Consumption and Means of Water Accessed by Respondents (n = 1563)

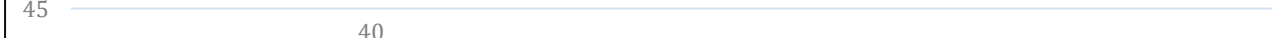
	Access to water for crop cultivation	Rainfall	Well	Natural pond	Dug pond	Nearby river	Natural stream & creek system in the locality	Water irrigation (e.g. canal, dyke, reservoir, etc.)	Buy water from local supplier / owner	Buy water from private water supplier
Kampong Thom	29%	60%	23%	5%	5%	2%	18%	18%	0%	0%
Siem Reap	35%	84%	13%	3%	7%	0%	9%	3%	1%	0%
Total	32%	73%	18%	4%	6%	1%	14%	11%	1%	0%

Figure 3.76: Access to Water for Agricultural Purposes and Water Sources by Type of Village (n = 1563)

Water irrigation system is regarded as one of the sophisticated means of access to water for agricultural purposes throughout the year, yet in general there were only 18% of HH respondents in Kampong Thom and 3% in Siem Reap could access to irrigated water for their paddies. Noticeably, around 12%, 11% and 7% of HHs in T, C1, and C2 villages respectively use existing water irrigation systems in the areas to irrigate their paddies. Around 30% of those who cultivated rice once a year in Siem Reap could get access to irrigated water, while less percentage of HHs (23%) could do so in Kampong Thom. Mostly, those who produced rain-fed wet season rice got more access to irrigation system; in Siem Reap there were about 38% and in Kampong Thom 35%. Noticeably, HHs in Treatment villages (40%) have more access to irrigated water than those in Control 1 (36%) Control 2 villages (31%) (Figure 3.77).

Much less percentage of rice farmers who cultivated two time per year (or double cropping) have access to nearby irrigation system. Only 4% of rice farmers in Kampong Thom and 2% of T village who cultivated rice 2 time per year got access to irrigated water. Mostly importantly, those who practice dry rice cultivation are not found to have much access to irrigation water. In Kampong Thom there were only 6% of survey HHs have access to irrigated water for dry season rice. By type of village, only 5% of Control 1 farmers who cultivated dry season rice could access to nearby irrigated water, followed by 3% and 2% of treatment and control 1 villages respectively. This strongly implies that there was a severe shortage of irrigation system in the two provinces; moreover, even irrigated water in these limited irrigation system is more available and accessible mostly in rainy season than in dry season for agricultural purpose. Additionally, 1% of those in Siem Reap needed to buy water from local suppliers (who pump from distance pond to sell to farmer) for agricultural purpose. The cost of water purchase range from US$ 25 to US$ 100 depending on the size of farmland and the number of times to irrigate rice paddies.

Figure 3.77: Type of Rice Cultivation and Access to Irrigated Water (n=1563)



According to Figure 3.78, 37% of local respondents in Kampong Thom have experienced water shortage, while almost half of those in Siem Reap have faced such a livelihood problem. Water shortage usually occurs in dry season for people in Kampong Thom (46%), while more people in Siem Reap (44%) commonly face this difficulty in rainy season. As for specific type of village, 50%, 43%, and 34% of HH respondents in C1, T, and C2 villages in that order have encountered water shortage, yet only 19%, 20% and 18% of them respectively experience this livelihood shock throughout the year (Figure 3.79). The amounts of local people experiencing water shortage in dry and rainy season across all types of village are almost similar and usually are amounted less than half of the total respondents surveyed during the fieldworks. Yet, 18% and 21% of HH respondents in Kampong Thom and Siem Reap reported to have challenged water shortage for agricultural production in both rainy and dry seasons. The level of incidence of water shortage in Kampong Thom in 2017 was considered lower than that in 2016, but this case was reported to be higher in 2017 by local villagers in Siem Reap (Figure 3.80). Water shortage was moderately high in 2017 for C1 (47%) and C2 (61%) villagers, let alone water availability for T villagers (30%) to be shrinking in this same year compared to water use condition in 2016 (T: 28%, C1: 40%, C2: 56%) (Figure 3.81).

When disaggregated by district, local people in Varin (67%) are more susceptible to water shortage for agriculture followed by those in Kampong Svay (51%), Svay Leu (48%), Srei Snom (46%), Baray and Sandan (41%), and Kralanh (40%) (Figure 3.82). Usually, Siem Reap is more prone to water shortage, and the surveyed HHs of this province face this problem more in rainy season, while those in Kampong Thom find it more difficult in dry season, despite the fact that about 20% of them in each province would face it in both seasons.

Figure 3.78: Experience with Water Shortage and Duration (n = 1563)

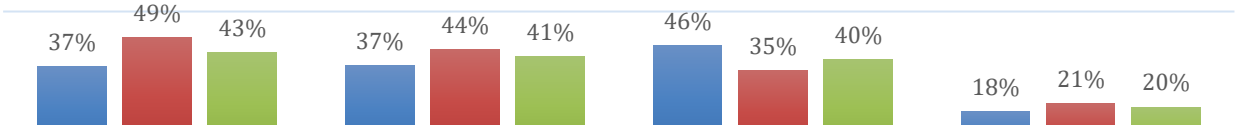


Figure 3.79: Experienced With Water Shortage and Duration by Type of Village (n = 1563)

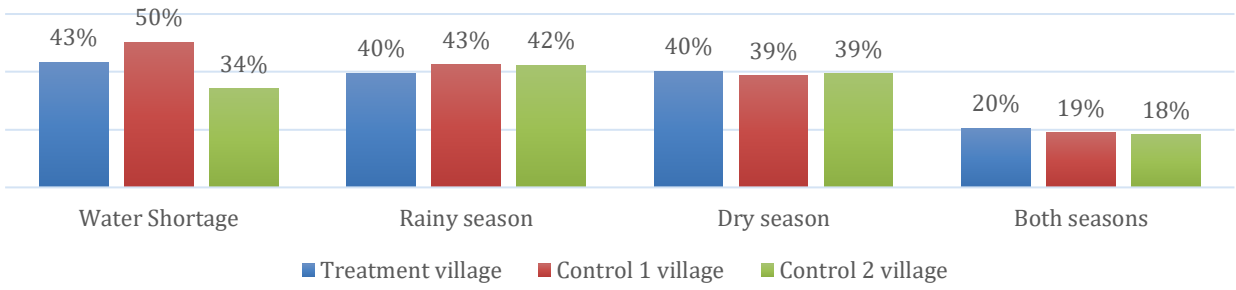


Figure 3.80: Water Shortage in 2016 vs. 2017 Experienced by Surveyed Respondents (n = 1563)

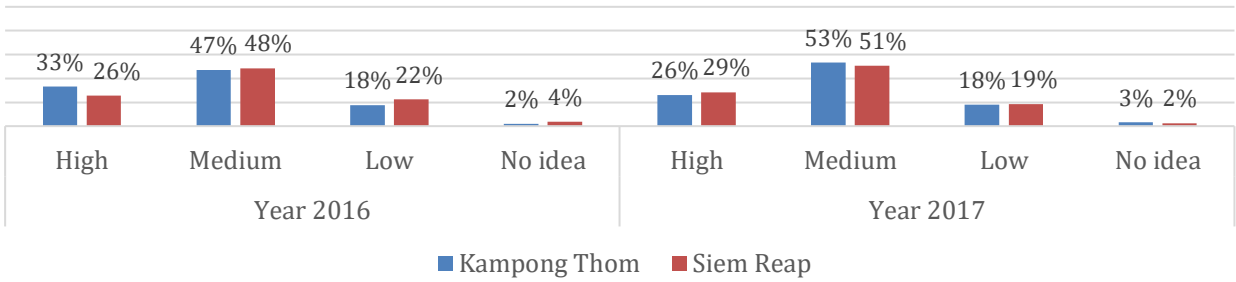


Figure 3.81: Water Shortage 2016 vs. 2017 Experienced by Surveyed Respondent in Type of Village (n=1563)

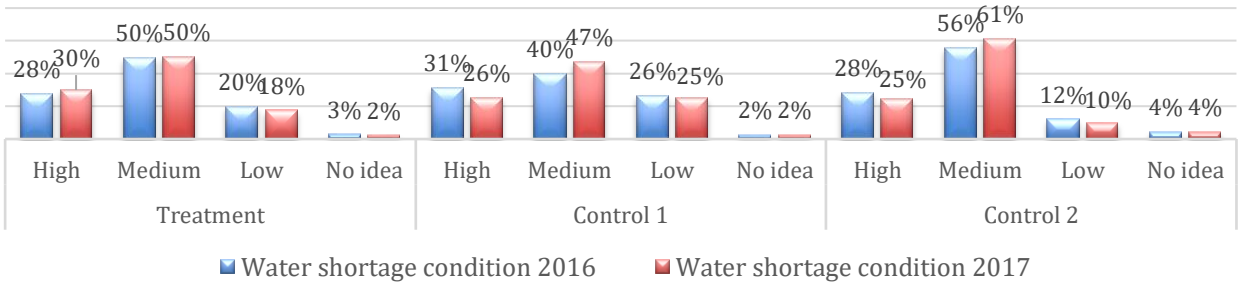
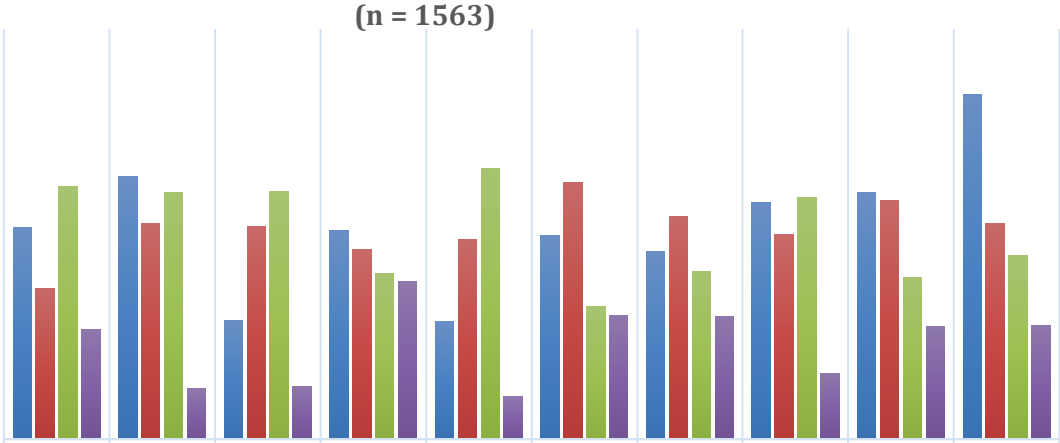


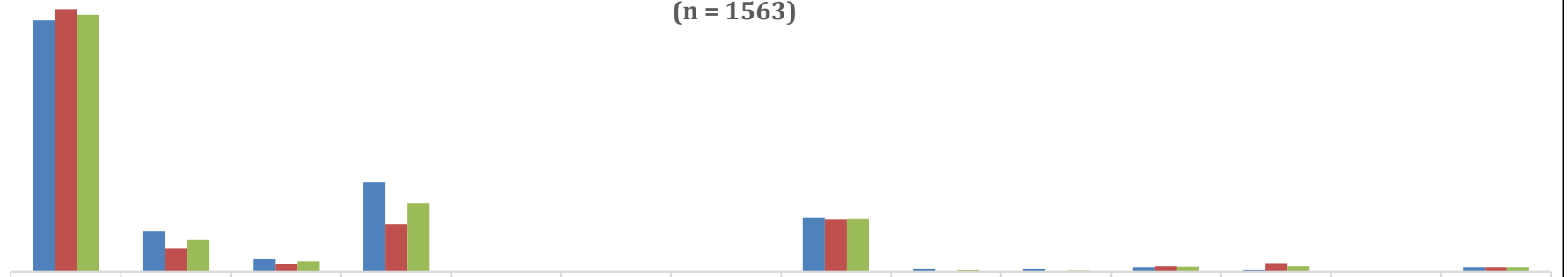
Figure 3.82: Experience with Water Shortge and Duration at District Level (n = 1563)



	Baray	Kampong Svay	Prasat Balangk	Sandan	Santuk	Kralanh	Prasat Bakong	Srei Snom	Svay Leu	Varin
Water shortage	41%	51%	23%	41%	23%	40%	37%	46%	48%	67%
Rainy season	29%	42%	41%	37%	39%	50%	44%	40%	47%	42%
Dry season	49%	48%	48%	32%	53%	26%	33%	47%	32%	36%
Both seasons	21%	10%	10%	31%	8%	24%	24%	13%	22%	22%

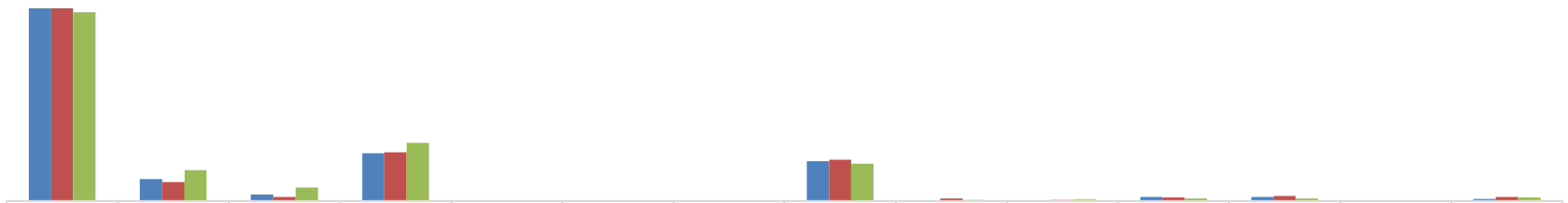
Figure 3.83 indicates that access to information on weather forecast related to water condition and rainfall for agricultural production is mostly done through word-of-mouth (KPT: 93%, SRP: 97%). Across the two target provinces, the surveyed respondents use television (25%) and radio (20%) as the second and third priority means to get access to such information. Meeting with village chief was also reported by 14% of the HH respondents to have helped them in figuring out information that they could use to prepare for their agricultural efforts. Access to information on water condition for agriculture at specific village type level is done via similar means of communication perceived and practiced by local HH respondents in both target provinces. As pointed out in Figure 3.84, the most popular means of access is word of mouth (T: 96%, C1: 96%, C2: 94%) followed mildly by watching TV (T: 24%, C1: 24%, C2: 29%), listenining to the radio (T: 20%, C1: 20%, C2: 19%), and meeting with village chief (T: 11%, C1: 10%, C2: 15%).

Figure 3.83: Access to Information on Weather Forcast Related to Water Condition and Rainfall for Agriculture (n = 1563)



	By word-of-mouth	Meeting with village chief	Meeting with commune chief	Watching TV	Meeting with district chief	Meeting with local NGOs	Meeting with provincial line departments	Listening to the radio	Awareness raising campaign	Poster, banner, signpost, etc	Telephone and SMS	Internet	Newspaper	Social Media (i.e. Facebook)
KPT	93%	15%	5%	33%	0%	0%	0%	20%	1%	1%	2%	1%	0%	1%
SRP	97%	9%	3%	17%	0%	0%	0%	19%	0%	0%	2%	3%	0%	1%
Total	95%	12%	4%	25%	0%	0%	0%	20%	1%	1%	2%	2%	0%	1%

Figure 3.84: Access to Information on Water Availability or Rainfall Partern for Agriculture by Surveyed Respondents in Type of Village (n=1563)

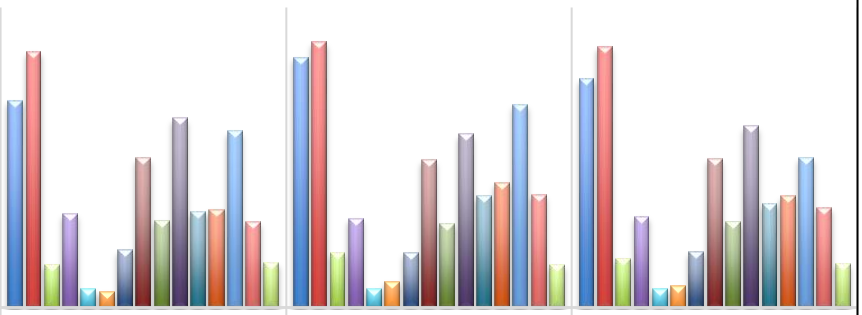


	By word-of-mouth	Meeting with village chief	Meeting with commune chief	Watching TV	Meeting with district chief	Meeting with local NGOs	Meeting with provincial line departments	Listening to the radio	Awareness raising campaign	Poster, banner, signpost, etc.	Telephone and SMS	Internet	Newspaper	Social media (i.e. Facebook)
Treatment	96%	11%	3%	24%	0%	0%	0%	20%	0%	0%	2%	2%	0%	1%
Control 1	96%	10%	2%	24%	0%	0%	0%	20%	1%	1%	2%	2%	0%	2%
Control 2	94%	15%	7%	29%	0%	0%	0%	19%	1%	1%	1%	1%	0%	2%

3.3.8. Existing Livelihood Challenges

The surveyed respondents were also asked to report their livelihood challenges in the areas. All the challenges were classified into 15 categories, including security and safety, farm production cost, labor productivity, out-migration, land size for agriculture, indebtedness, market mechanism, availability of off-farm works, domestic violence, rapid economic development, competition with newcomers, the existence of livelihood sources, land use and natural resource related conflicts, diseases, and natural disasters. According to Figure 3.85, across the two target provinces, diseases (70%) were perceived to have triggered most livelihood challenges followed by natural disasters (61%), indebtedness (48%), lack of off-farm jobs or works (40%), lack of labor productivity for agriculture (40%), increasing out-migration (30%), limited land for agriculture (28%), high agricultural production cost (27%), decline or loss of livelihood sources (24%), and lack of markets and market mechanisms for local agricultural products (23%). Other factors involved in causing minor influence on the increase in livelihood challenges for the surveyed respondents comprise of declining or loss of main livelihood sources (24%), particularly diversified on-farm and in-farm production activities, lack of and irregular markets for agricultural products (23%), domestic violence (15%), conflicts over land and natural resources (13%), and security and safety (12%). When disaggregated by province, there are no significant variation between the two target provinces although local villagers in Siem Reap are more prone to natural disasters (67%), diseases (71%), limited land access (30%), limited labor productivity (54%), increasing out-migration (33%), and conflicts over land and natural resources (15%), while those in Kampong Thom are more affected by indebtedness (50%) and other remaining challenges highlighted in Figure 3.85.

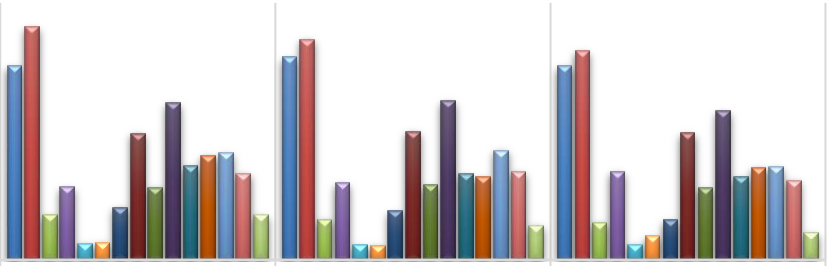
Figure 3.85: Main Livelihood Challenges (n = 1563)



	Kampong Thom	Siem Reap	Total
Natural disasters	55%	67%	61%
Diseases	68%	71%	70%
Conflicts over land & NR	12%	15%	13%
Declining/loss of livelihood sources	25%	24%	24%
Competition with new newcomers	5%	5%	5%
Rapid economic development	4%	7%	6%
Domestic violence	15%	15%	15%
Lack of off-farm job opportunities	40%	39%	40%
Lack of markets and market mechanisms	23%	22%	23%
Indebtedness	50%	46%	48%
Limited land for agriculture	26%	30%	28%
Increasing out-migration	26%	33%	30%
Lack of labor productivity for agriculture	47%	54%	40%
High cost for agricultural production	23%	30%	27%
Security and safety	12%	11%	12%

Like the results disaggregated by province, diseases are considered the most severe livelihood challenge by most of HH respondents in T villages (73%), C1 villages (69%) as well as C2 villages (65%). Second and third to this main livelihood problem are natural disasters (T: 60%, C1: 63%, C2: 60%) and indebtedness (T: 49%, C1: 50%, C2: 46%). Other drivers of livelihood challenges indicated in Figure 3.86 include lack of off-farm job opportunities, lack of labor productivity for agriculture, increasing out-migration, limited land for farm production, high production cost, shrinking livelihood capital assets, and lack of markets and market mechanisms for local agricultural products. Noticeably, the number of increasing out-migration among T villagers is the highest among all types of villages (T: 33%, C1: 26%, C2: 29%) targeted during survey fieldworks.

Figure 3.86: Main Livelihood Challenges in Type of Village (n=1563)



	Treatment village	Control 1 village	Control 2 village
Natural disasters	60%	63%	60%
Diseases	73%	69%	65%
Conflicts over land & NR access and use	14%	13%	12%
Decline or loss of livelihood sources	23%	24%	28%
Competition with new newcomers	5%	5%	5%
Rapid economic development	5%	5%	8%
Domestic violence	16%	15%	13%
Lack of off-farm job opportunities	39%	40%	40%
Lack of markets and market mechanisms	23%	23%	22%
Indebtedness	49%	50%	46%
Limited land for agricultural production	29%	27%	26%
Increasing out-migration	33%	26%	29%
Lack of labor productivity for agriculture	33%	34%	29%
High cost for agricultural production	27%	28%	25%
Security and safety	14%	11%	8%

61% of the surveyed respondents reported that their families had experienced with natural disasters and extreme weather hazards, and drought (63%) was considered the most severe effect followed by flood and flashflood (47%), windstorm (38%) and thunderstorm (32%) (Figure 3.87). When compared between provinces, local villagers in Siem Reap (68%) have experienced the consequences more than those in Kampong Thom (54%), especially been affected more by drought and windstorm, while HH respondents in Kampong Thom have been affected more by flood (50%). According to Figure 3.89, local villagers in Varin (81%) district are mostly vulnerable to natural disasters and extreme weather hazards and of total, those living in Santuk (45%) are the least vulnerable. Droughts are mostly common in Svay Leu (87%), Srei Snom (82%), and Kralanh (72%), while floods are mostly existent in Santuk (70%), Kralanh (60%), and Sandan (62%). More than half of HH

respondents in Varin have experienced windstorm. Across all types of villages, people in T and C1 villages are more affected by droughts, and C2 villagers are more impacted by flood (Figure 3.88).

Figure 3.87: Experience with Natural Disasters and Extreme Weather Hazards (n = 1563)

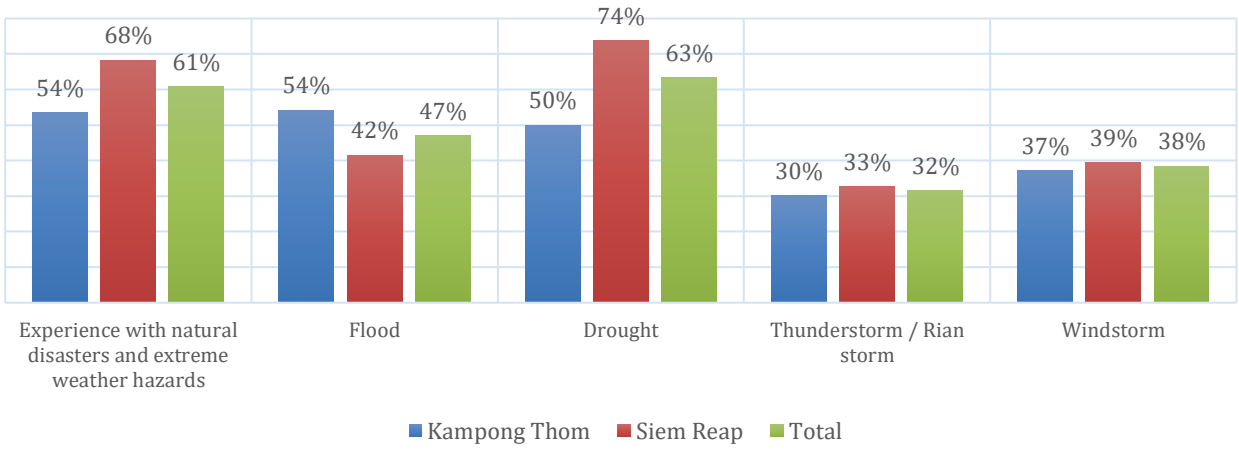


Figure 3.88: Existence of Natural Disaster by Type of Village (n = 1563)

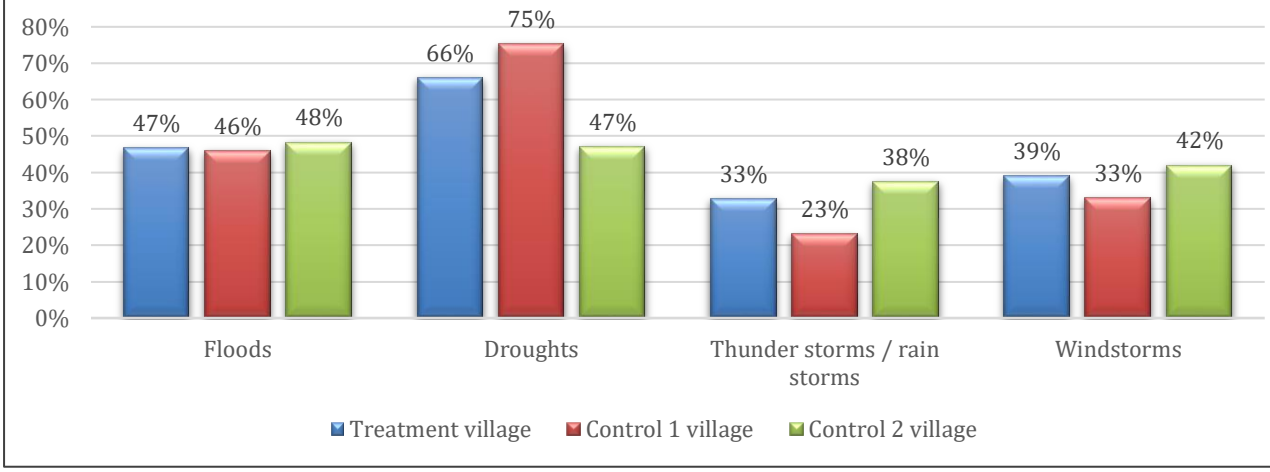
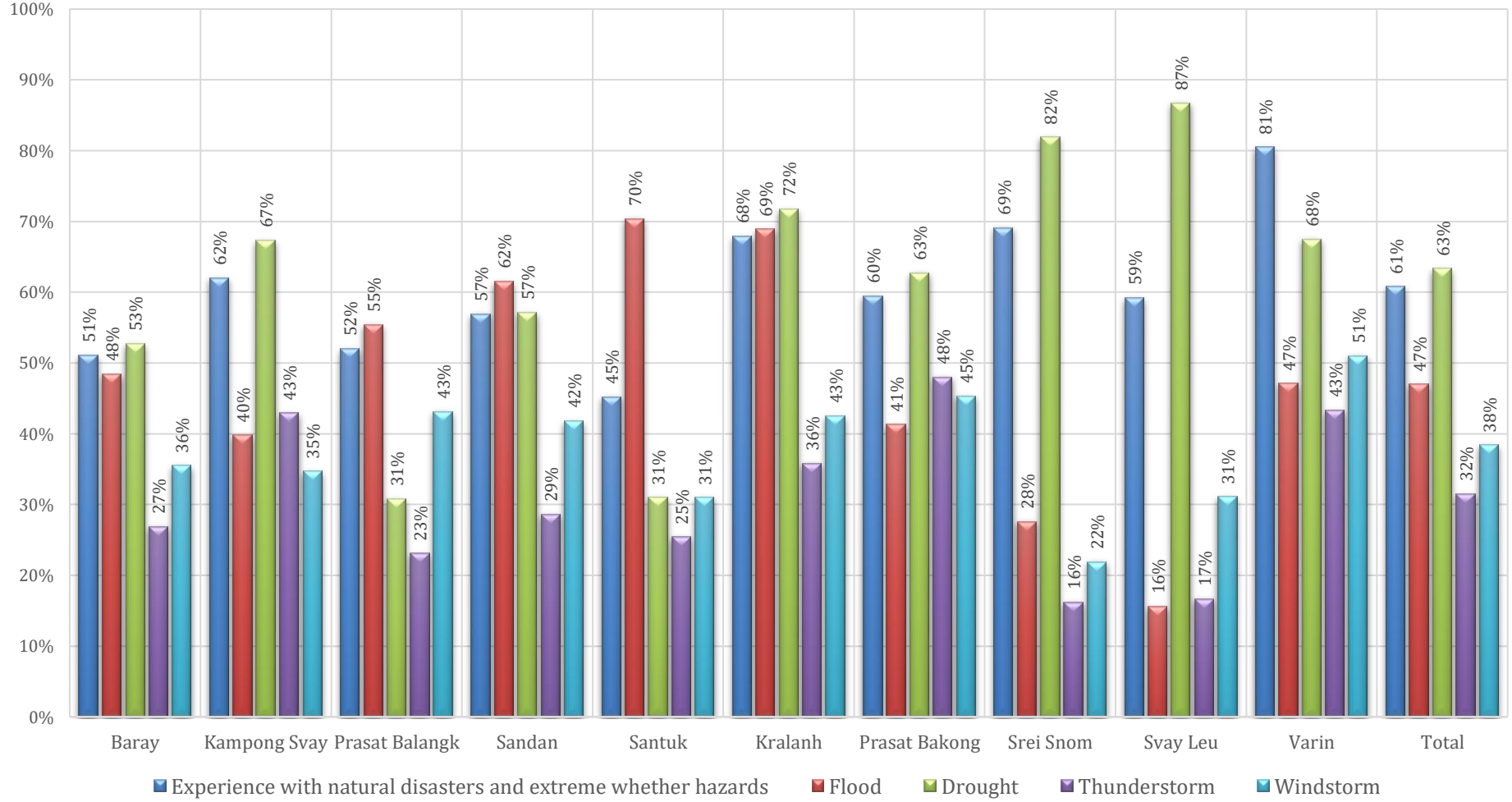
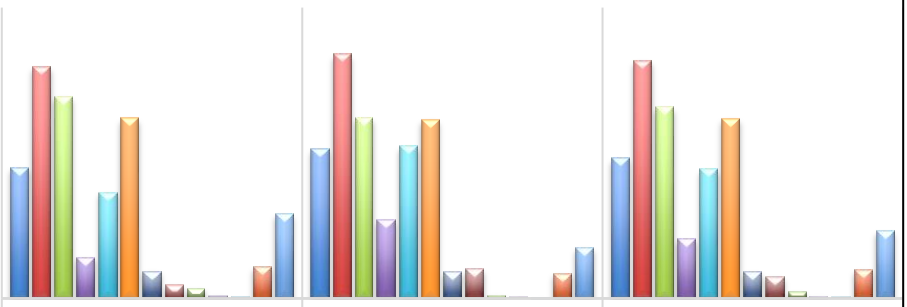


Figure 3.89: Experience with Natural Disasters and Extreme Weather Hazards (n = 1563)



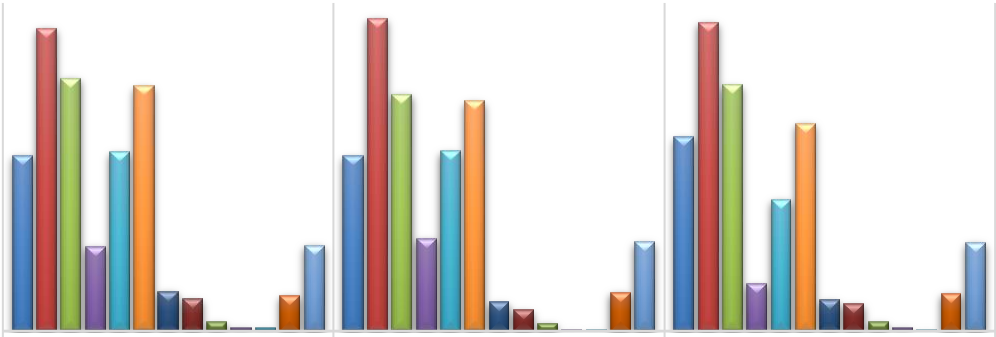
In terms of diseases, most of the surveyed respondents are affected by fever (65%), typhoid (53%), stomachache (49%), and diarrhea (39%), dengue fever (36%), and respiratory diseases (19%). While fever (67%), dengue fever (42%) and diarrhea (41%) are more prevalent in Siem Reap, local villagers in Kampong Thom are more likely to be distressed by typhoid (56%) and respiratory diseases (23%), such as coughing (Figure 3.90). Considerable health problems for T, C1 and C2 villagers are mostly caused by fever (T: 65%, C1: 67%, C2: 66%) and typhoid (T: 54%, C1: 51%, C2: 53%), moderately triggered by stomachache (T: 52%, C1: 49%, C2: 44%), and slightly crippled by diarrhea (T: 38%, C1: 37%, C2: 41%) and dengue fever (T: 38%, C1: 38%, C2: 28%) (Fogire 3.91). However, most of diseased faced by each type of villagers are usually curable and waterborne diseases. It is noted that more respondents in T villages are the most prone people to common diseases above exclusive of fever, across type of village.

Figure 3.90: Common Health Problems Faced by Surveyed Respondents (n = 1563)



	Kampong Thom	Siem Reap	Total
Diarrhea	36%	41%	39%
Fever	64%	67%	65%
Typhoid	56%	50%	53%
Malaria	11%	22%	16%
Dengue fever	29%	42%	36%
Stomachache	50%	49%	49%
Diabetes	8%	7%	7%
Tuberculosis	4%	8%	6%
Hepatitis	3%	1%	2%
Infant mortality	1%	0%	1%
Maternal death during delivery	1%	0%	0%
Malnutrition	9%	7%	8%
Respiratory diseases	23%	14%	19%

Figure 3.91: Common Health Problems Faced by Surveyed Resondents in Type of Village (n=1563)



	Treatment village	Control 1 village	Control 2 village
Diarrhea	38%	37%	41%
Fever	65%	67%	66%
Typhoid	54%	51%	53%
Malaria	18%	20%	10%
Dengue fever	38%	38%	28%
Stomachache	52%	49%	44%
Diabetes	9%	6%	7%
Tuberculosis	7%	5%	6%
Hepatitis	2%	2%	2%
Infant mortality	1%	0%	1%
Maternal death during delivery	1%	0%	0%
Malnutrition	8%	8%	8%
Respiratory diseases	18%	19%	19%

3.3.9. Local Perceptions on Natural Disasters and Access to CC-DRR Information

The surveyed respondents were also requested to provide perceptions on the level of danger of natural disasters and extreme weather hazards on their rice crop, cash crop and raised animals as well as on their properties and animal and human life in the areas. Flood was reckoned as a main factor causing high danger on rice crop (KPT: 76%, SRP: 53%) and on cash crop (KPT: 54%, SRP: 33%) and on raised livestock (KPT: 37%, SRP: 16%). In addition, 35% and 25% of local respondents in Kampong Thom and Siem Reap respectively perceived that flood had caused high danger on their properties as well as human and animal life (Figure 3.92). Drought has provided the high danger on rice crop in both provinces (KPT: 58%, SRP: 48%), according to the survey results shown in Figure 3.93. It has also caused high effect on cash or strategic cropping (KPT: 43%, SRP: 32%) and raised livestock (KPR: 30%, SRP: 17%) of local farmers in the areas and moderate impacts on animal and human life (KPT: 33%, SRP: 28%). Thunderstorm was regarded to have the potential to produce high danger or impact on farming production in Kampong Thom (84%) and Siem Reap (45%) (Figure 3.95). However, 16% and 21% of the surveyed respondents in Kampong Thom and Siem Reap respectively also thought that it had caused danger on their properties as well. Windstorm is more prevailing in Kampong Thom than in Siem Reap. According to Figure 3.94, windstorm more likely cause moderate to high damage or loss of properties in Kampong Thom (70%) than in Siem Reap (60%).

Figure 3.92: Perceived of Danger of Flood by Surveyed Respondents (%, n = 1563)

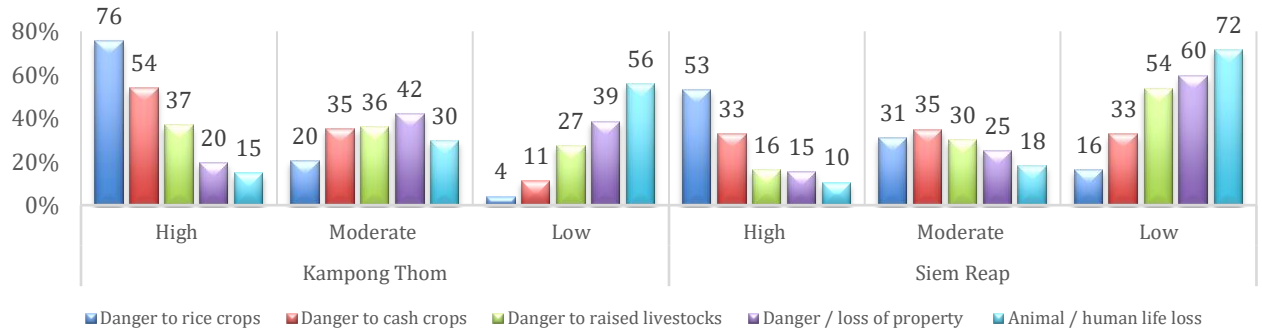


Figure 3.93: Perceived of Danger of Drought by Surveyed Respondents (%, n = 1563)

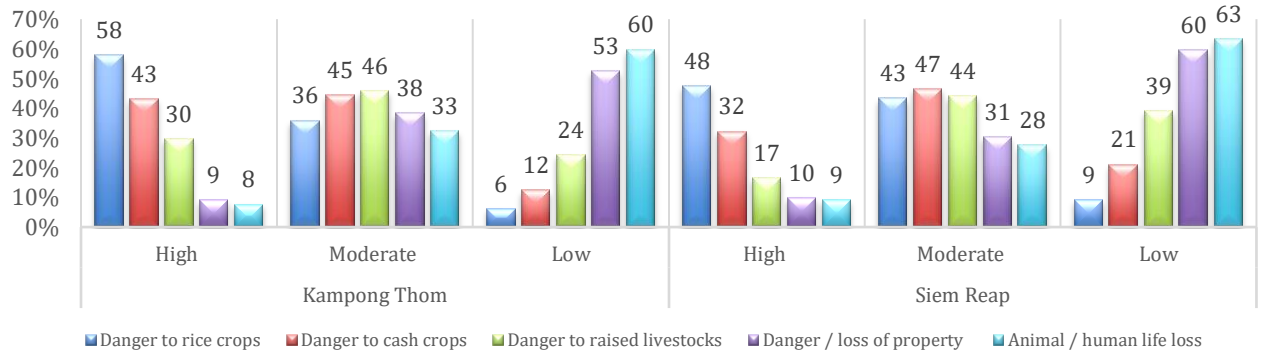


Figure 3.94: Perceived of Danger of Windstorm by Surveyed Respondents (%, n = 1563)

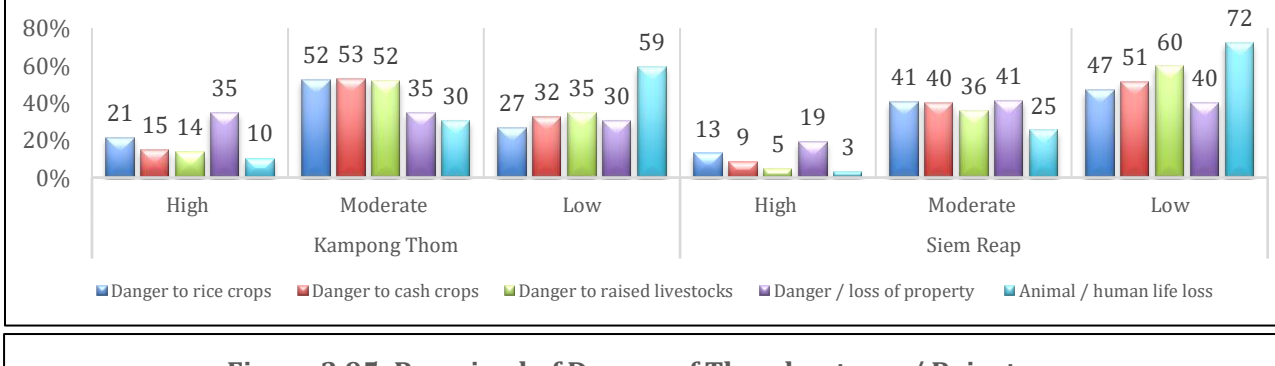
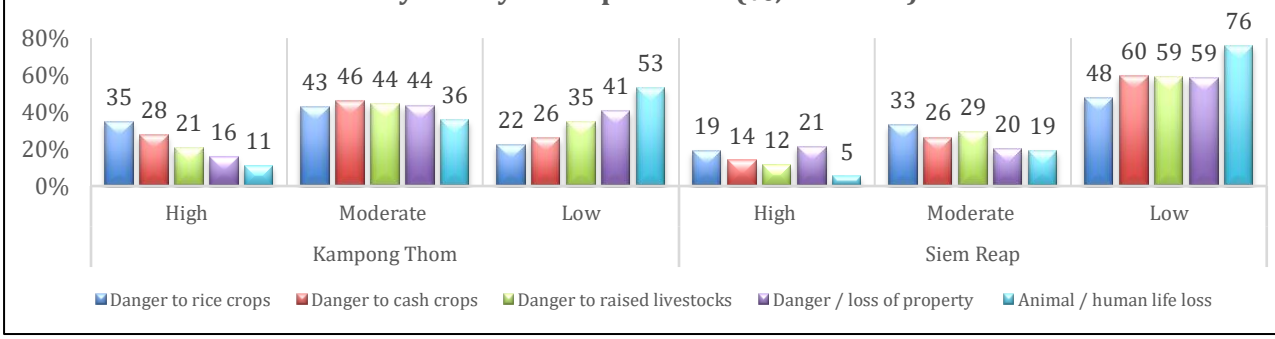
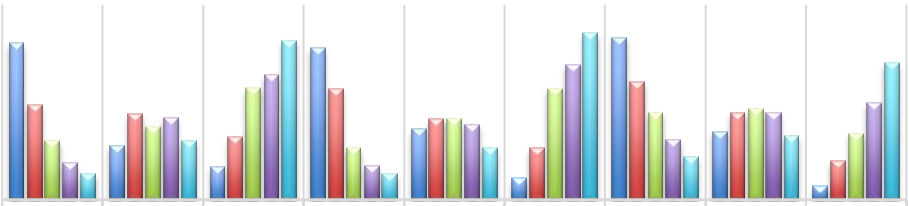


Figure 3.95: Perceived of Danger of Thunderstorm / Rainstorm by Surveyed Respondents (%, n = 1563)



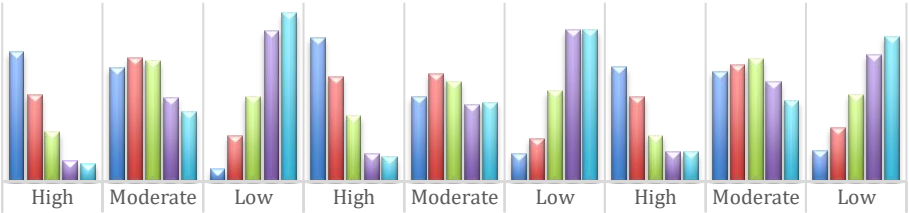
Floods and droughts are perceived to have caused more severe impacts on agricultural production systems and livelihoods of local villagers in all types of village, among main natural disasters in the areas (Figures 3.96 and 3.97). Yet, floods are more devastating for rice crop production of the majority of local HH respondents surveyed during the fieldworks (T: 64%, C1: 62%, C2: 67%) whilst droughts have impacted approximately half or slightly more than half of the total respondents on their rice crop cultivation (T: 51%, C1: 56%, C2: 45%). Cash crop cultivation was reported to have been moderately affected by natural disasters, particularly floods (T: 39%, C1: 46%, C2: 48%) followed closely by droughts and prolonged droughts (T: 34%, C1: 41%, C2: 33%), and among all types of villagers, T HH respondents receive the least impact on their cash crop production from these main disasters (Figures 3.96 and 3.97). Although thunderstorm and rainstorm have triggered lower impacts on rice crop (T: 25%, C1: 25%, C2: 28%), cash crop (T: 19%, C1: 23%, C2: 19%), and livestock production (T: 19%, C1: 9%, C2: 14%), they have been stressed by more than half of the respondents in T (51%) and C2 (57%) villages and one third of those in C1 villages (32%) to cause them moderate to high damage and loss of their properties (Figure 3.98). According to Figure 3.99, nearly half of the total respondents in T, C1 and C2 villages reckon that windstorm has impacted and brought moderate danger to their rice and cash crop cultivation, livestock raising, and their HH properties in spite of the fact that it could also cause loss of animal and human life to some extent (T: 8%, C1: 5%, C2: 5%).

Figure 3.96: Perceived Danger of Flood by Surveyed Respondents by Type of Village (n = 1563)



	Treatment village			Control 1 village			Control 2 village		
	High	Moderate	Low	High	Moderate	Low	High	Moderate	Low
Rice Crop	64%	22%	14%	62%	29%	9%	67%	28%	6%
Cash Crop	39%	35%	26%	46%	33%	21%	48%	36%	16%
Livestock Raising	24%	30%	46%	21%	33%	46%	36%	37%	27%
Damage and Loss of Property	15%	34%	51%	14%	31%	55%	25%	36%	40%
Loss of Animal and Human Life	11%	24%	65%	11%	21%	68%	18%	26%	56%

Figure 3.97: Perceived Danger of Drought by Surveyed Respondents by Type of Village (n = 1563)



	Treatment village			Control 1 village			Control 2 village		
	High	Moderate	Low	High	Moderate	Low	High	Moderate	Low
Rice Crop	51%	45%	5%	56%	33%	11%	45%	43%	12%
Cash Crop	34%	48%	18%	41%	42%	17%	33%	46%	21%
Livestock Raising	20%	47%	33%	26%	39%	35%	18%	48%	34%
Damage and Loss of Property	8%	33%	59%	11%	30%	59%	11%	39%	50%
Loss of Animal and Human Life	7%	27%	66%	10%	31%	59%	11%	32%	57%

Figure 3.98: Perceived Danger of Thunderstorm/Rainstorm by Surveyed Respondents by Type of Village (n = 1563)

	Treatment village			Control 1 village			Control 2 village		
	High	Moderate	Low	High	Moderate	Low	High	Moderate	Low
Rice Crop	25%	43%	32%	25%	28%	47%	28%	35%	38%
Cash Crop	19%	39%	43%	23%	25%	53%	19%	35%	46%
Livestock Raising	19%	37%	44%	9%	32%	60%	14%	36%	50%
Damage and Loss of Property	18%	33%	49%	11%	21%	68%	26%	31%	44%
Loss of Animal and Human Life	10%	26%	63%	2%	25%	74%	7%	27%	66%

Figure 3.99: Perceived Danger of Windstorm by Surveyed Respondents by Type of Village (n = 1563)

	Treatment village			Control 1 village			Control 2 village		
	High	Moderate	Low	High	Moderate	Low	High	Moderate	Low
Rice Crop	18%	49%	33%	11%	42%	47%	18%	43%	39%
Cash Crop	15%	47%	38%	8%	40%	52%	7%	48%	45%
Livestock Raising	9%	47%	44%	6%	34%	60%	9%	43%	48%
Damage and Loss of Property	27%	40%	33%	17%	29%	54%	30%	44%	26%
Loss of Animal and Human Life	8%	29%	63%	5%	23%	72%	5%	28%	67%

People in the study provinces usually use word-of-mouth as the most important means of access to information related to natural disasters and extreme whether hazards in the areas (KPT: 92%, SRP: 96%). Following word-of-mouth, quite a low number of people surveyed during the fieldworks usually get access to such information through television (25%), radio broadcasting (21%), and meeting with their village chiefs (11%) (Figure 3.100). Word-of-mouth alongside other three common means of communication in pursuit of access to information on natural disasters and extreme climate events are similarly practiced by local respondents across each type of village (Figure 3.101).

Figure 3.100: Means of Information Access Related to Natural Hazards & Extreme Weather Events (n = 1563)

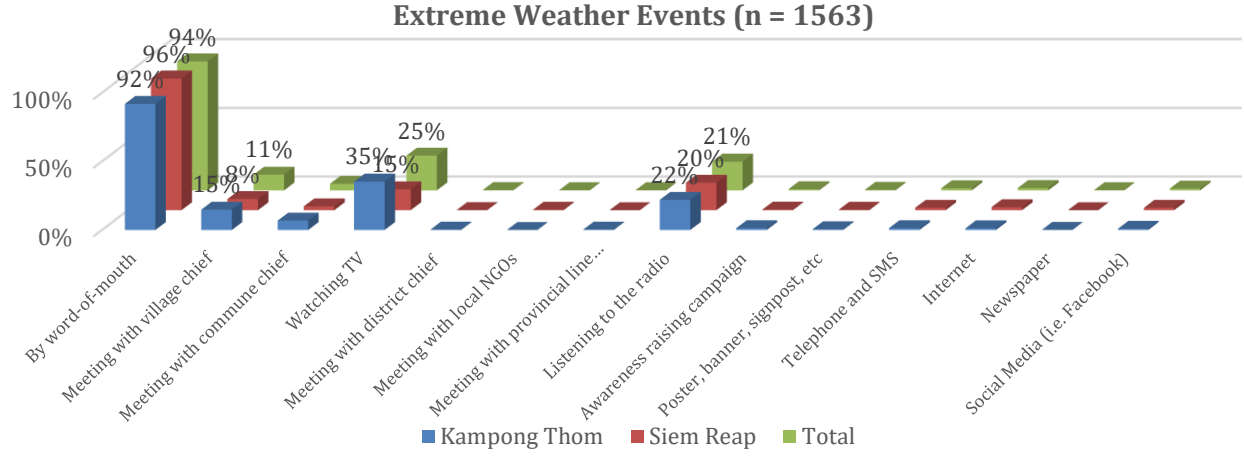


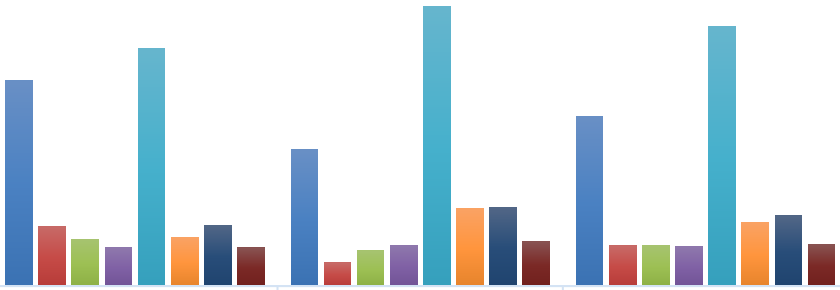
Figure 3.101: Means of Information Access Related to Disaster Prevention and Response Advice by Type of village (n = 1563)

3.3.10. Livelihoods and CC-DRR Related Interventions in the Areas

The surveyed respondents were also asked to express their knowledge of the existing community-based organizations (CBOs) in the areas. CBOs in this regard refer to 8 main community groups or organizations established by civil society organizations, governmental bodies and or own community systems with support from sub-national administrations in their localities. These CBOs include but not limited to: community forestry (CF), community fisheries (CFi), community protected area (CPA), women livelihood group (WLG), saving group or village bank (SG / VB), farmer water user group (FWUG), farmer field school (FFS), and farmer producer group or agricultural cooperative (AC).

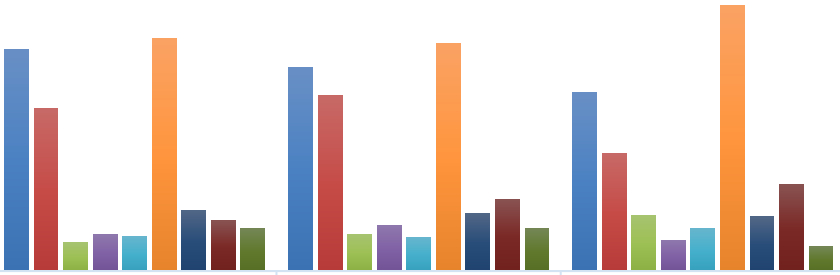
According to Figure 3.102, in total 59% of the surveyed respondents know about the existence of concerned CBOs in their localities with HH respondents in Siem Reap having more knowledge of some of their performances (62%). In general, local villagers know about the existence of SG/VB (68%), CF (45%), FFS (19%), FWUG (17%), AC (11%), CPA and CFi (11%), and WLG (10%), despite their variation of knowledge of these CBOs' performances as well as their benefits for the locals. Although T villagers (64%) surveyed during the fieldworks seem to know more about the existence of community organizations in the areas than C1 (59%) and C2 (51%) villagers, they are still less knowledgeable and acquainted with specific types and actual performances of those CBOs than other types of villagers targeted (Figure 3.103). Across type of village, C1 villagers tend to know more about CF (50%) and CPA (13%) whilst C2 villagers are more familiar with CFi (16%), women livelihood group (12%), SG or VB (76%), and FFS (25%). The presences of FFS (18%), AC (12%), and SG/VB (67%) are also known more by T villagers (Figure 3.103).

Figure 3.102: Local Knowledge of Existing CBOs (n = 1563)



	Kampong Thom	Siem Reap	Total
Community Forest	54%	36%	45%
Community Fishery	16%	6%	11%
Community protected area	12%	9%	11%
Women Livelihood Group	10%	11%	10%
Saving Group / Village Bank	63%	74%	68%
Farmer Water User Community	13%	20%	17%
Farmer Field School	16%	21%	19%
Farmer Producer Group or Farmer / Agriculture Cooperative	10%	12%	11%

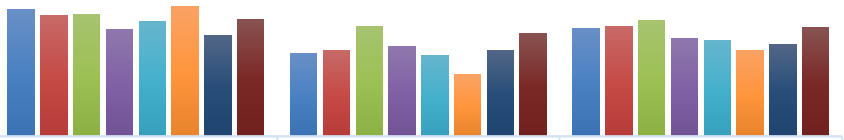
Figure 3.103: Knowledge of Existing CBOs and Existing CBOs Perceived by Surveyed Respondents in Type of Village (%, n=1365)



	Treatment village	Control 1 village	Control 2 village
Knowledge of Existing CBOs	64	59	51
Community Forest	47	50	34
Community Fishery	8	11	16
Community protected area	10	13	9
Women Livelihood Group	10	10	12
Saving Group / Village Bank	67	65	76
Farmer Water User Community	18	17	16
Farmer Field School	15	21	25
Farmer Producer Group or Farmer / Agriculture Cooperative	12	12	7

As further detailed in Figure 3.104, nearly half of the HH respondents in both provinces are members or at least used to be members of CPA (50%), CFi (47%), AC (47%), and CF (46%) in the areas. 42%, 41%, 39% and 37% of them also refer to their memberships with WLG, SG/VB, FFS, and FWUG. Between the two provinces, more local respondents in Kampong Thom are associated with such existing CBOs than those in Siem Reap. When disaggregated by type of village, T villagers are more associated with CF (48%), CFi (53%), WLG (44%) and FWUG or FWUC (44%) in the areas, while C1 household respondents are more involved in CPA (53%), SG / VB (43%). Of total, as further shown in Figure 3.105, C2 HH respondents seem to have more active participation in FFS (42%) and farmer producer group or AC (60%) if compared to those surveyed in T (FFS: 40%, AC: 45%) and C1 (FFS: 35%, AC: 43%) villages.

Figure 3.104: Local Membership with Existing CBOs (%, n=1563)



	Kampong Thom	Siem Reap	Total
Community Forest	54	35	46
Community Fishery	52	37	47
Community Protected Area	52	47	50
Women Livelihood Group	46	39	42
Saving Group / Village Bank	49	35	41
Farmer Water User Community	55	26	37
Farmer Field School	43	37	39
Farmer Producer Group OR Farmer / Agricultural Cooperative	50	44	47

Figure 3.105: Local Membership with Existing CBOs by Type of Village (n=1563)

	Treatment village	Control 1 village	Control 2 village
Community Forest	48%	44%	44%
Community Fishery	53%	46%	41%
Community Protected Area	50%	53%	42%
Women Livelihood Group	44%	38%	42%
Saving Group / Village Bank	40%	43%	41%
Farmer Water User Community	44%	27%	30%
Farmer Field School	40%	35%	42%
Farmer Producer Group OR Farmer / Agricultural Cooperative	45%	43%	60%

Further investigation was put on local community perceptions on related livelihood and CC / DRR related interventions in the areas. According to Figure 3.106, livelihood related intervention programs of government and non-government stakeholders were perceived to have been provided more to local respondents in both provinces (KPT: 38%, SRP: 56%), and usually they involve integrated farming, on-farm and off-farm livelihood strategies and small and medium enterprise development, saving group establishment, and some market mechanisms. This case also applies to all districts and all types of villages surveyed during the fieldwork processes. However, as pointed out in Figure 3.108, local villagers in Kralanh (74%) receive the most livelihood-related interventions followed by

those in Srei Snom (66%), Svay Leu (52%), and Sandan (48%). For CC/DRR-related interventions, the amount of receipt is more prevalent in Varin (47%) and Kralanh (40%). According to Figure 3.107, HH respondents in T villages (31%) receive more CC-DRR related interventions than those in C1 villages (30%) but lower than C2 villagers (39%). Although the amount of livelihood-related interventions is more cumulative for T villagers (47%) than C2 villagers (45%), local HH respondents in C1 villages (49%) receive the most support through such interventions in the areas.

Figure 3.106: Perceived Receipt of Interventions Related to CC-DRR and Livelihoods (n = 1563)

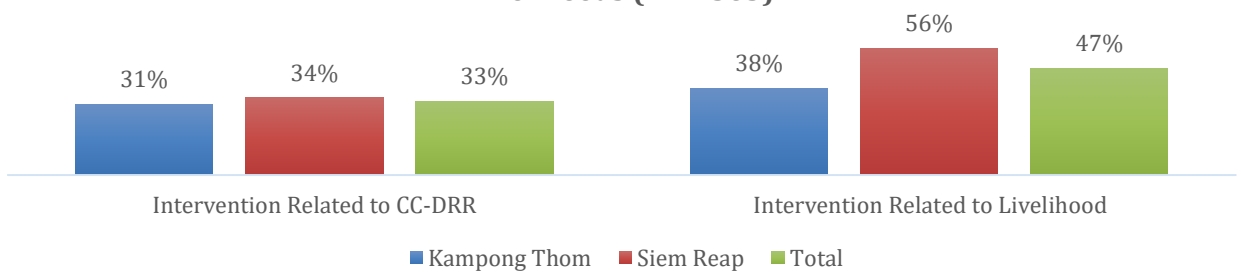


Figure 3.107: Perceived Receipt of Interventions Related to CC-DRR and Livelihood by Type of Village (n = 1563)

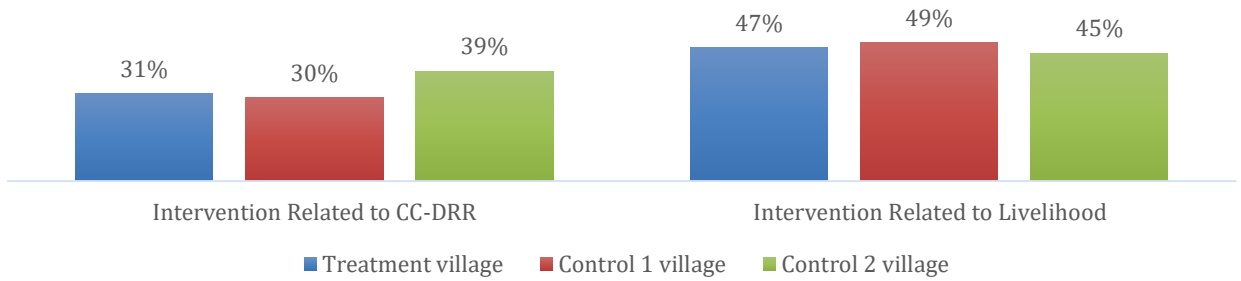
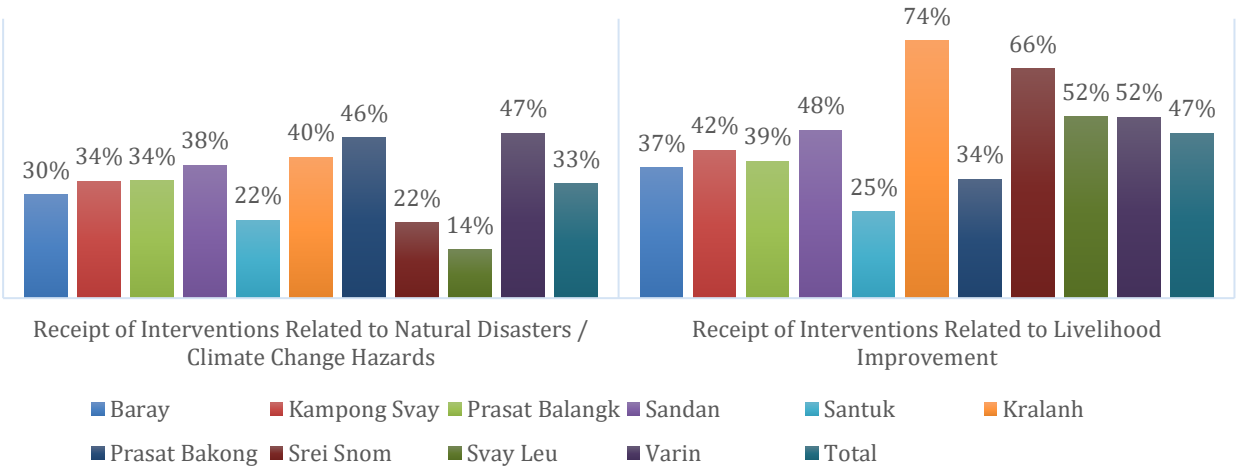


Figure 3.108: Perceived Receipt of Interventions Related to CC-DRR and Livelihoods (n = 1563)



As further detailed in Figure 3.109, amidst many, the surveyed respondents perceived that livelihood and CC / DRR related interventions had been mostly provided by village and commune authorities (KPT: 53%, SRP: 37%), Cambodia Red Cross (KPT: 30%, SRP: 38%), district and provincial authorities (KPT: 28%, SRP: 15%), and local NGOs (KPT: 23%, SRP: 17%). Some low percentages were also given to the relevant provincial line departments of environment, agriculture, rural development, and education by some local HH respondents in Kampong Thom, while those in Siem Reap only referred to commune-level health care center as an additional agent that has helped them to improved their livelihoods in some extent. Village and commune authorities are considered the 1st vital DRR/CC-related interventionists by local respondents in T (45%) and C1 (46%) villages, and of all key stakeholders in the areas, Cambodia Red Cross is the 2nd most helpful agency (T: 27%, C1: 30%) to help them prevent, respond and recover from DRR/CC-related risks and crises (Figure 3.110). However, for C2 villagers, Cambodia Red Cross (48%) is the most active player providing immediate interventions in this respect followed by village and / or commune authorities (45%) and district or provincial authorities (18%).

Figure 3.109: Perceived Knowledge of DRR/CC Related Intervention Providers (n = 1563)

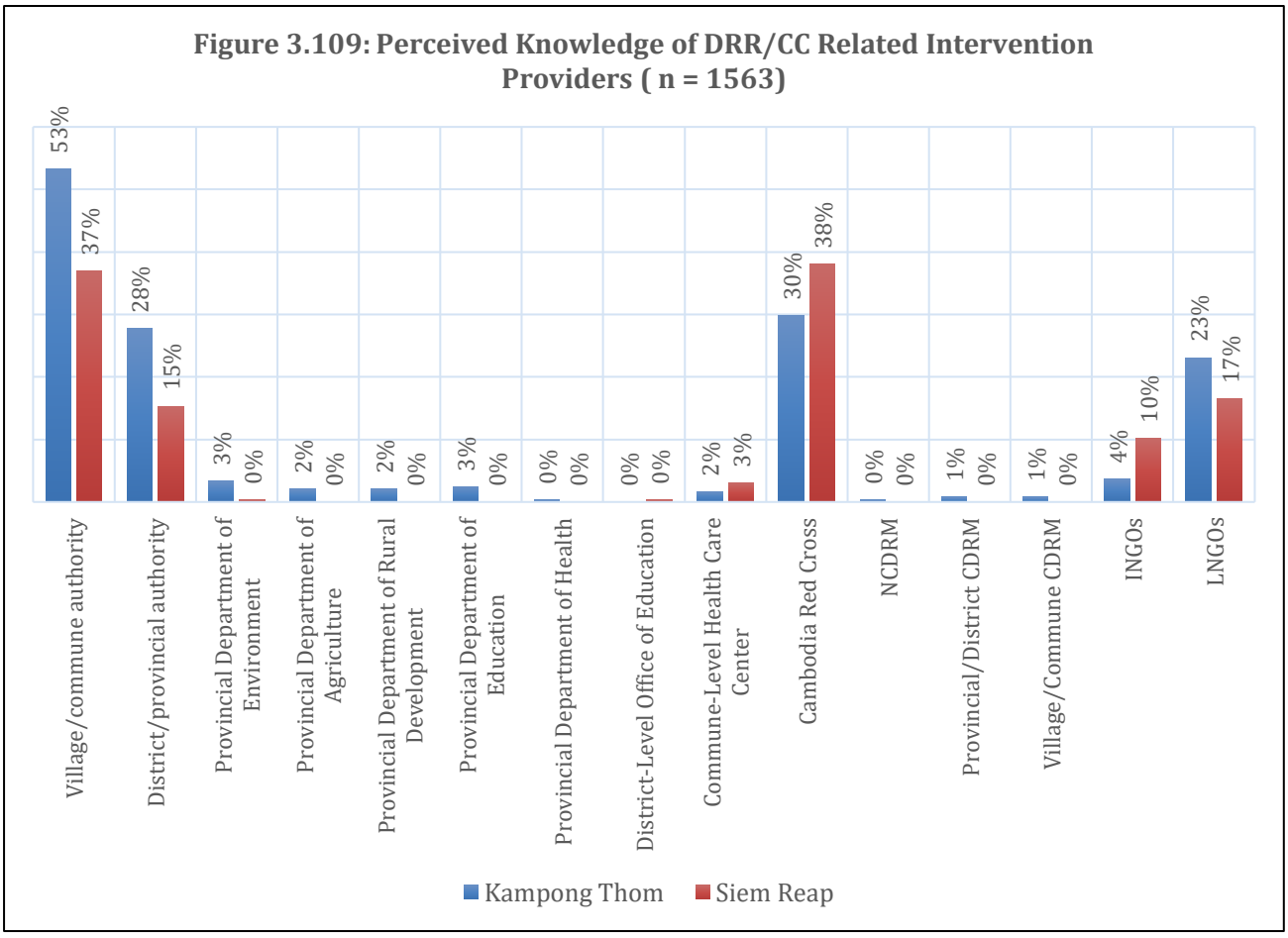
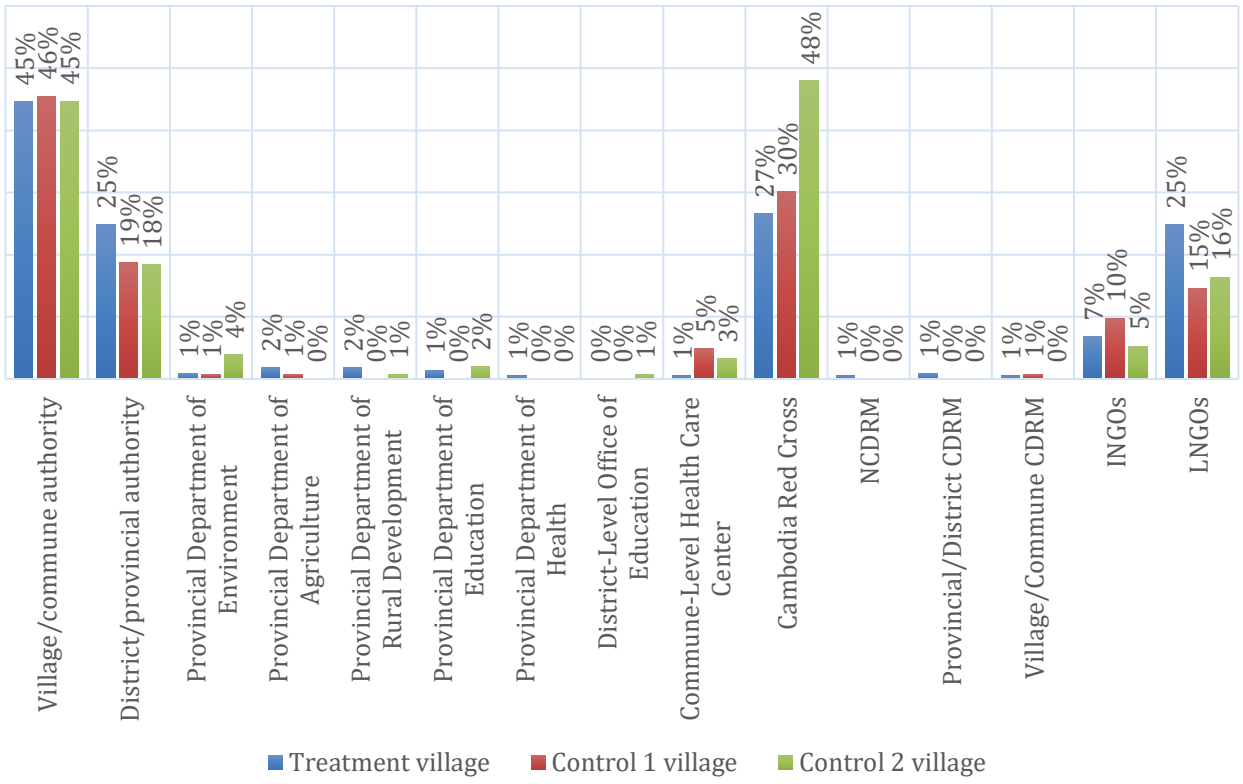


Figure 3.110: Type of Village with Their Perceived DRR/CC Intervention Providers (n=1563)



Regarding CC / DRR related interventions, out of total HH respondents in the two provinces, 77% reported that interventions were more on surviving gifts or aids in emergency cases followed by 19%, 9%, 8%, and 6% respectively on climate adaptive infrastructure, such as irrigation and road system, early warning system, capacity building for climate smart or resilient planning at commune and community levels, weather forecasting, and provisional relocation (Figure 3.111). These cases also apply to both provinces with kampong Thom receiving more interventions in almost all fields, except survival gifts and early warning system. Figure 3.113 indicates that T and C2 villagers have received almost similar amount of interventions related to CC-DRR interventions. Among all types of villages, C1 villagers reported to have received lower amount of intervention with regards to survival gifts (69%) and early warning system (7%), and received the highest backup in terms of capacity building for climate resilient planning and implementation.

Concerning climate smart and resilient agriculture and livelihoods, the majority of respondents reported that they had been assisted mostly to receive livestock raising technique (70%), rice cultivation technique (65%), vegetable growing technique (63%), home gardening technique (34%), and cash cropping technique (9%) (Figure 3.112). Of total, equal amount of local HH respondents in both provinces receive the most interventions to improve their rice cultivation (65%) and vegetable plantation (63%), livestock raising technique (70%), and home-gardening (34%). Results in Figure 3.112 shows that Siem Reap's villagers receive more interventions in relation to livestock raising (77%) and cash cropping (14%) techniques. However, T villagers usually receive more interventions than C2 villagers exclusive of vegetable growing technique, but lower than C1 villagers (Figure 3.114).

Figure 3.111: Types of Received Interventions Related to CC-DRR (n = 1563)

Figure 3.112: Types of Agriculture-Related Interventions (n = 1563)

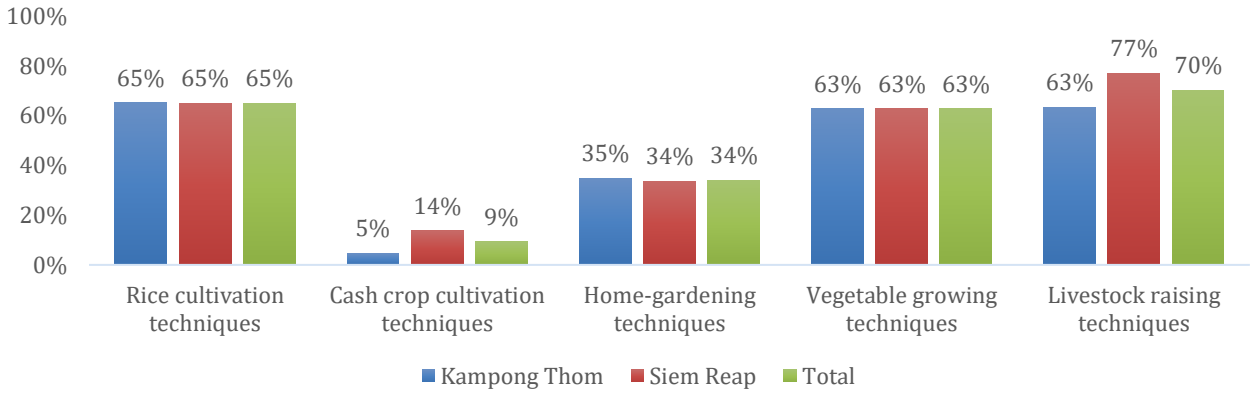
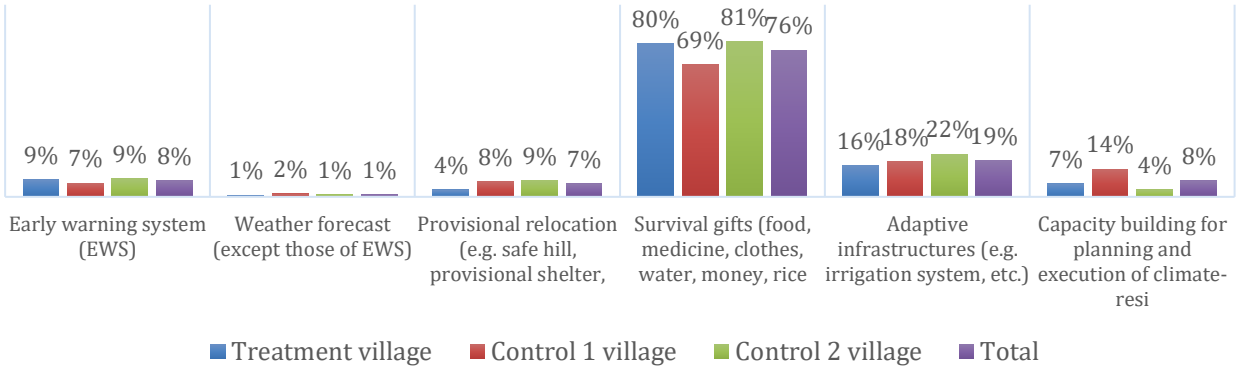
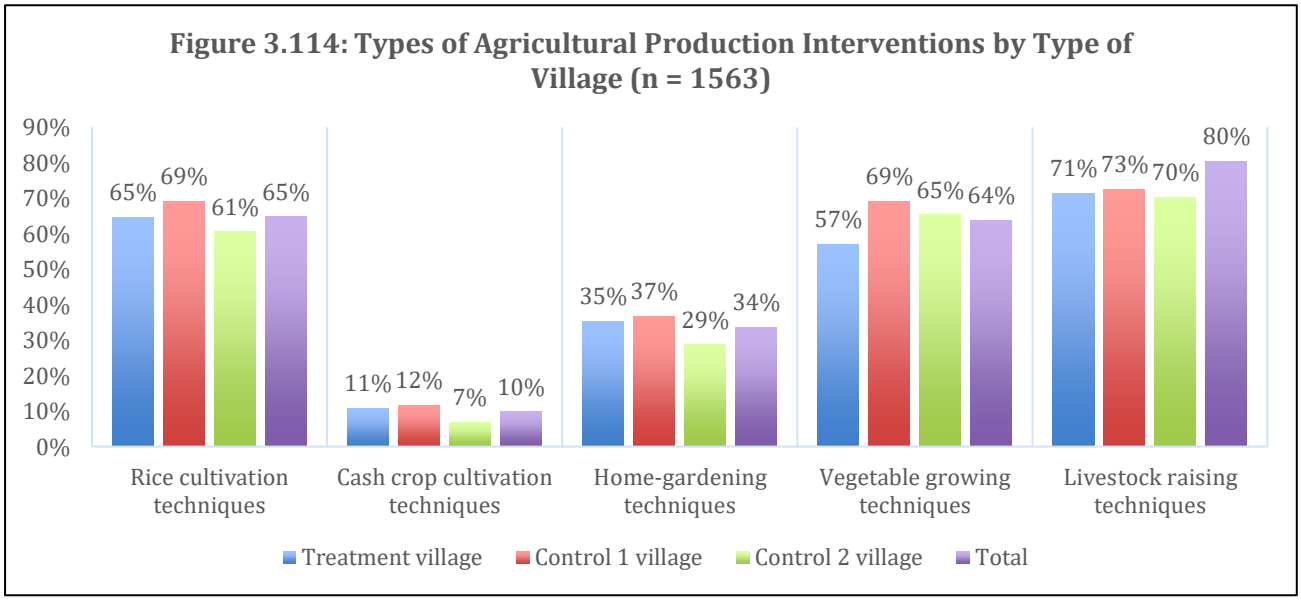


Figure 3.113: Types of Interventions Received in Preventing and Coping with DRR-CC by Type of Village (n = 1563)





3.3.11. Community Perceptions on Climate Resilient Livelihood Capacity

All the surveyed respondents were asked to identify their perceptions on the existing capacity related to many important livelihood strategy improvement, climate smart and resilient livelihoods and agriculture, community development and management, and CC / DRR adaptive planning. As shown in Figure 3.115, local respondents in Kampong Thom province perceived their current capacity is absent or very limited in almost all the fields. Their almost complete absent farm-based and off-farm based livelihood strategies (96%), climate smart community planning (95%), risk and crisis management (95%), proposal and feedback writing (95%), report writing (95%), business need assessment and feasibility study as well as financial management (94%), community leadership (94%), contract farming (93%), agricultural value and supply chain (92%), sale and marketing (91%), food processing and packaging (89%), bookkeeping (90%), DRR and DRM (86%), climate change adaptation and mitigation (81%), PEST management (80%), and soil management strategy (80%).

Current capacity of the surveyed respondents in Siem Reap is absolutely missing in relation to non-farm-based livelihoods (97%), community planning (97%), contract farming (97%), proposal and feedback writing (97%), agricultural value and supply chain (96%), risk and crisis management (95%), sale and marketing of agri-products (95%), food processing and packaging (91%), financial management (91%), conflict resolution (90%), natural and human-induced DRR/M (90%), CCA and CCM (85%), soil management (85%), climate resilient or smart agriculture – CSA (81%), water governance and efficient management (82%), and others (Figure 3.116).

If compared between type of village, there are no significant differences related to perceived existing capacities of T, C1 and C2 villagers that need to be improved in a timely and effective manner. Mostly, local HH respondents in each type of village perceived that their capacities were limited concerning climate smart agriculture ((T:, CCA and CCM, entrepreneurship, marketing and market mechanisms, food processing and packaging, community and family planning, value chain and supply chain of agricultural products, water resource management and governance, business feasibility assessment, contract farming, PEST management, and business risk and crisis management (Figures 3.117, 3.118 and 3.119).

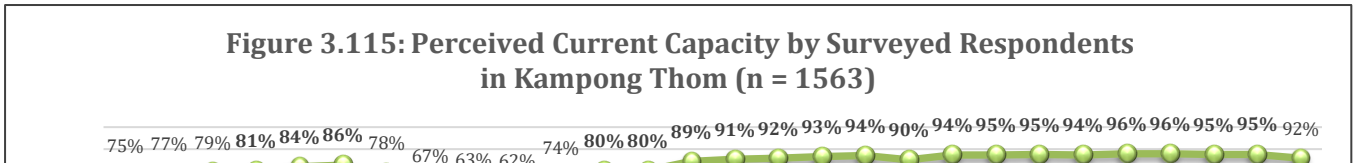


Figure 3.116: Perceived Current Capacity by Surveyed Respondents in Siem Reap(n = 1563)

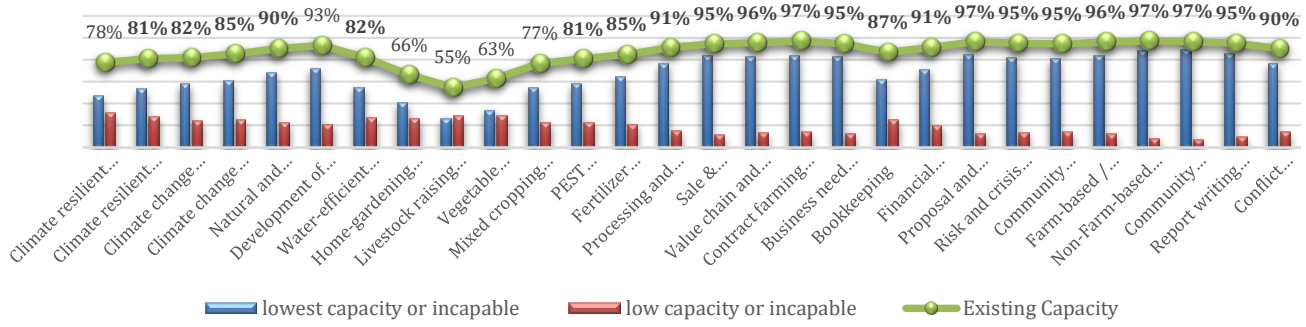


Figure 3.117: Pereived Current Capacities of HHs in Treatment Village (n=1563)

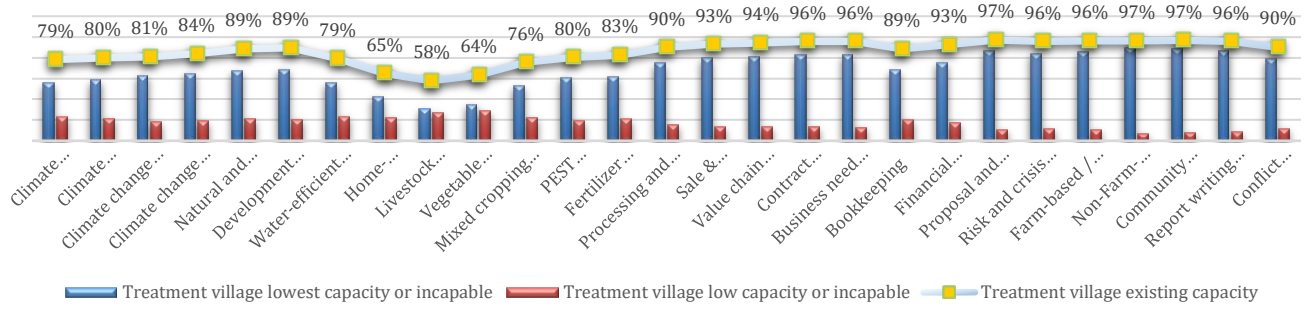


Figure 3.118: Perceived Current Capacities of HHs in Control 1 Village (n=1563)

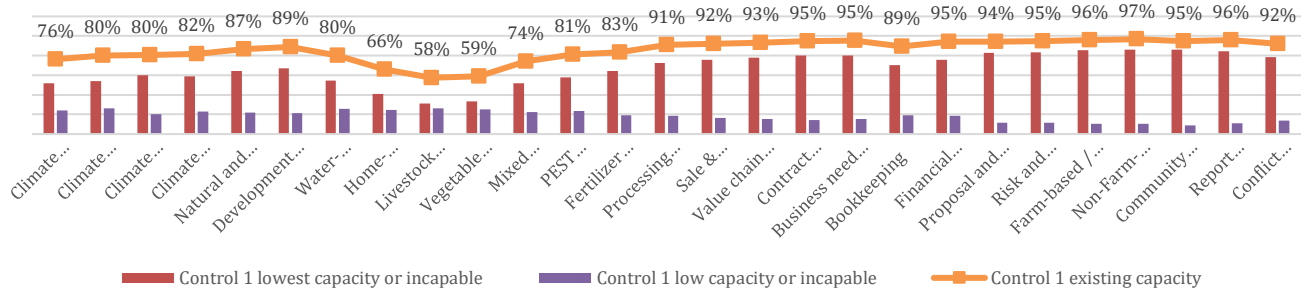
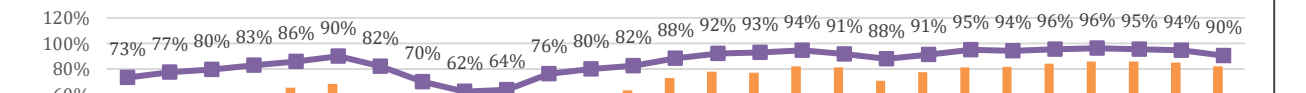


Figure 3.119: Perceived Current Capacities of HHs in Control 2 VIllage (n=1563)



3.3.12. Community Perceptions on Required Capacity Building Programs

It is interesting to know that although Figures 3.115-119 signify local perceptions on their existing limited capacities in almost all areas related to climate resilient livelihood improvement, the results of ANOVA analysis in **Table 3.7** denotes only half of the total numbers of relevant interventions are needed by local HH respondents in the two target areas. These encompass DRR-M, development of DRR and CCA plan, livestock raising technique, mixed cropping or integrated farming technique, fertilizer management strategy, processing and packaging of agricultural products, sale and marketing for farm and non-farm products, value chain and supply chain of local products, contract farming and other business contracting procedure, bookkeeping, financial management procedure, non-farm and off-farm based entrepreneurship skills, community planning and monitoring and evaluation, farmer water user group management, climate resilient or smart agriculture (CSA), self-business assessment and community small business feasibility assessment, integration of DRR and CCA plan into village and commune development plan, water governance, climate resilient infrastructure development, and business partnership building and compliance.

Table 3.7: Needed Capacity Building Programs Perceived by Local Communities

ANOVA					
	Sum of Squares	**df**	**Mean Square**	**F**	**P-Value**
Climate resilient rice production techniques	0.159	1	0.159	0.173	0.68
Climate resilient fruit and cash crop production techniques	0.477	1	0.477	0.551	0.46
Climate change hazards prevention & response	0.292	1	0.292	0.378	0.54
Climate change adaptation	2.183	1	2.183	2.936	0.09
Natural and human-made disasters management	6.854	1	6.854	11.032	***0.00***
Development of DRR and CCA plan	13.369	1	13.369	24.237	***0.00***
Water-efficient use & water (infrastructure) management	1.256	1	1.256	1.407	0.24
Home-gardening techniques	0.184	1	0.184	0.152	0.70
Livestock raising techniques	7.636	1	7.636	6.285	***0.01***

Vegetable growing techniques	0.965	1	0.965	0.787	0.38
Mixed cropping or integrated farming techniques	4.977	1	4.977	4.669	***0.03***
PEST management strategies	0.002	1	0.002	0.002	0.96
Fertilizer management strategies	5.344	1	5.344	6.318	***0.01***
Processing and packaging of agricultural produce	4.688	1	4.688	8.133	***0.00***
Sale & marketing strategies for farm and non-farm products	11.263	1	11.263	24.43	***0.00***
Value chain and supply chain of local products	5.619	1	5.619	14.696	***0.00***
Contract farming and other business contracting procedures	2.52	1	2.52	7.556	***0.01***
Business need and feasibility assessment	0.458	1	0.458	1.209	0.27
Bookkeeping	10.889	1	10.889	16.947	***0.00***
Financial management procedures	6.701	1	6.701	13.524	***0.00***
Proposal and feedback writing	0.73	1	0.73	2.131	0.15
Risk and crisis management	0.007	1	0.007	0.02	0.89
Community leadership	0.067	1	0.067	0.181	0.67
Farm-based / on-farm entrepreneurship skills	0.007	1	0.007	0.019	0.89
Non-Farm-based / off-farm entrepreneurship skills	1.343	1	1.343	4.789	***0.03***
Community planning and M&E	2.138	1	2.138	6.907	***0.01***
Report writing and communication skills	0.049	1	0.049	0.15	0.70
Conflict resolution skills and techniques	2.103	1	2.103	3.622	0.06
Farmer water user group	5.111	1	5.111	17.422	***0.00***
Saving group / village bank	0.003	1	0.003	0.011	0.92
Climate resilient / smart agricultural production	12.58	1	12.58	50.335	***0.00***
Agriculture/Farmer Cooperative (AC)	0.314	1	0.314	1.114	0.29
Self-business assessment and community small business feasibility assessment	7.474	1	7.474	27.954	***0.00***
Integration of DRR and CCA plan into your community, village and commune development plan	3.434	1	3.434	14.435	***0.00***
Water efficient management (storage, distribution and use)	9.421	1	9.421	33.645	***0.00***
Climate resilient water infrastructure development	2.815	1	2.815	10.82	***0.00***
Climate resilient infrastructure development	2.993	1	2.993	11.411	***0.00***
Natural and human-made disasters reduction and management	2.323	1	2.323	9.271	***0.00***

Businesses partnership building and compliance	4.313	1	4.313	11.788	***0.00***

Note: P-Value < 0.05 is significant

3.3.13. Out-Migration Patterns and Drivers

The results of the baseline survey indicate that in total, 25% of the surveyed HH respondents across the 10 target districts are involved in out-migration, both inside and outside the country. However, the amounts of HHs involved in out-migration are varying from one district to another. As shown in Figure 3.120, local villagers in Kralanh (64%) mostly migrate out of their areas in seek for livelihood opportunities and additional HH income generation. This amount is even twice or more than twice of those in Srei Snom (36%), Kampong Svay (34%), Baray (31%), and Prasat Balangk (31%). Local HHs in Sandan, Prasat Bakong, Santuk, Varin and Svay Leu also engage with out-migration as a source of additional or alternative livelihood option. Between the two target provinces, Siem Reap (27%) has higher number of out-migrants than that of Kampong Thom (24%). As further portrayed in Figure 3.121, out-migration is mostly committed by T villagers (28%) followed by those in C2 (25%) and C1 (20%) villages.

Figure 3.120: Involvement in Out-Migration at District and Provincial Level (n = 1563)

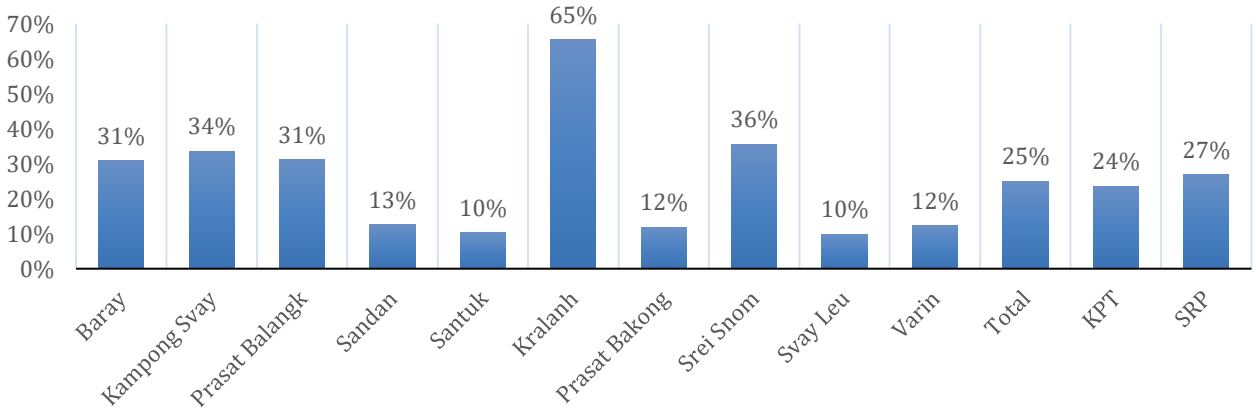
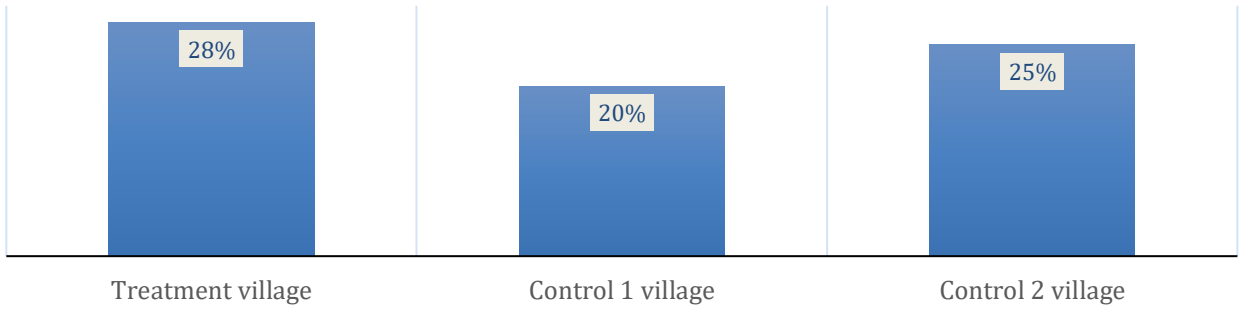


Figure 3.121: Involvement in Out-migration Work by Type of Village (n = 1563)



For inside-country or internal out-migration, almost all out-migrants go to the neighboring Thailand with Siem Reap (99%) having slightly more local HHs involved in this activity that those HHs in Kampong Thom (93%). Often, they work in agricultural farming ranging from rice and cash crop planting and harvesting to animal production in addition to their minor works in the factories and at local markets in Thailand. Only a few of local HHs in Kampong Thom (6%) out-migrate to Malaysia, and all of them work as house-maids. Interestingly, 1% of and 2% of the surveyed HHs also have their family members working in agricultural field in South Korea. As further illustrated in Figure 3.122, most of the surveyed HHs in Kampong Thom (93%) prefer Phnom Penh capital as the most potential destination for their inside-country out-migration to other places, while those in Siem Reap (70%) mostly out-migrate to Siem Reap districts where they could earn their incomes from tourism industry related works and / or construction works. Yet, 11% of the respondents in Siem Reap also choose Phnom Penh as their destination and usually, they work as laborers, construction workers, or garment factory workers that are similar to prospective jobs committed by local villagers in Kampong Thom. Regardless of type of village, the vast majority of local HH respondents prefer Thailand (T: 97%, C1: 96%, C2: 99%), Phnom Penh (T: 63%, C1: 72%, C2: 68%), and Siem Reap (T: 21%, C1: 26%, C2: 27%) as the 1st, 2nd and 3rd most popular migration destinations respectively to other places (Figure 123).

Since out-migration was found to be an increasing common social phenomenon in the target districts of Kampong Thom and Siem Reap, local HH respondents were also asked to provide reasons for their out-migration works. Mostly, local villagers out-migrate because of no job opportunities in the areas (68%) followed closely by lack of additional income to support the family (60%). According to Figure 3.124, other main reasons include but not limited to: limited or no economic opportunities (41%); insufficient or no land for agriculture (38%); climate change impacts (25%); increasing cost of living (20%), indebtedness (14%); change upon cultural habit and lifestyle (14%); and others.

Figure 3.122: Destinations of Out-Migration (n = 1563)

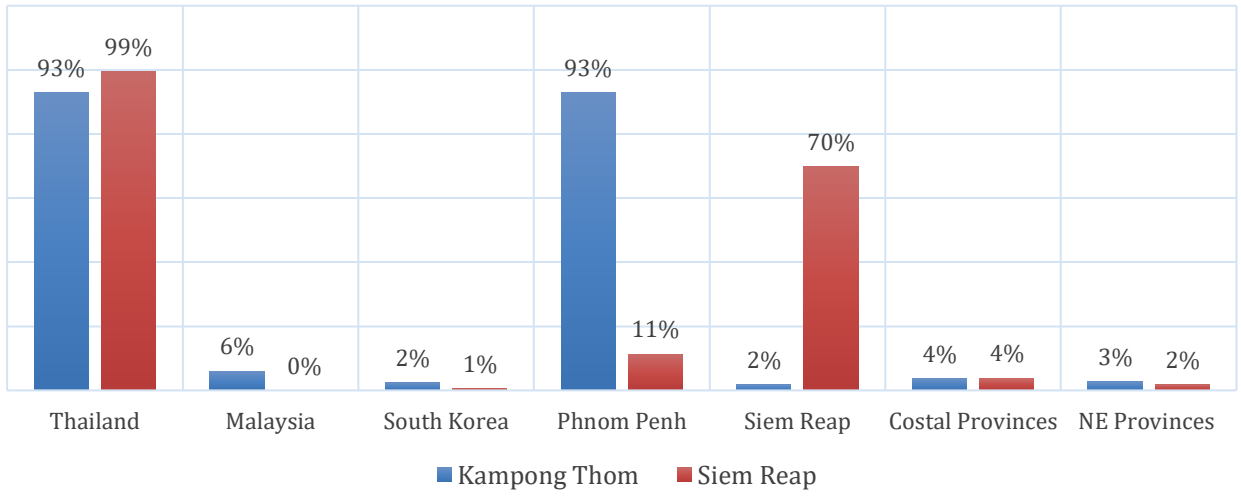


Figure 3.123: Destinations of Out-Migration by Type of Village (n = 1563)

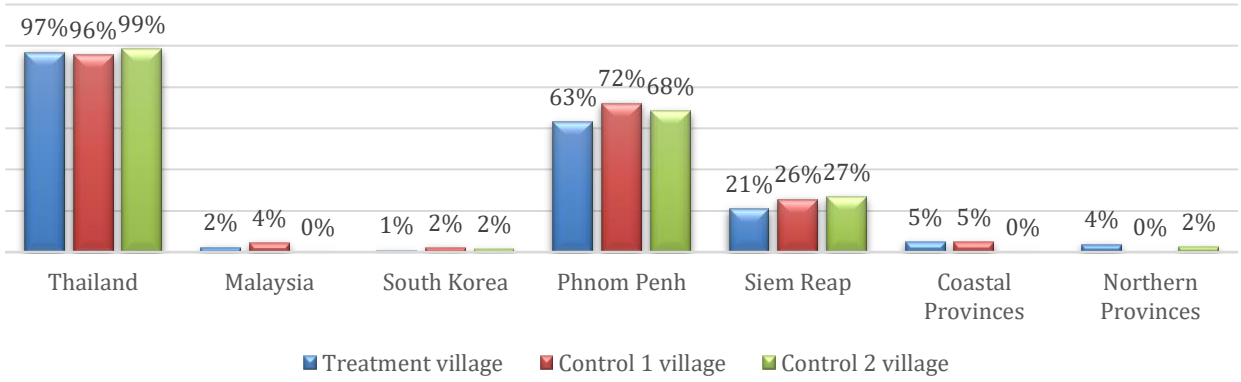
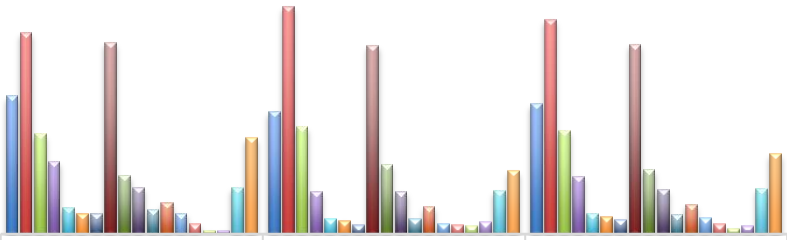


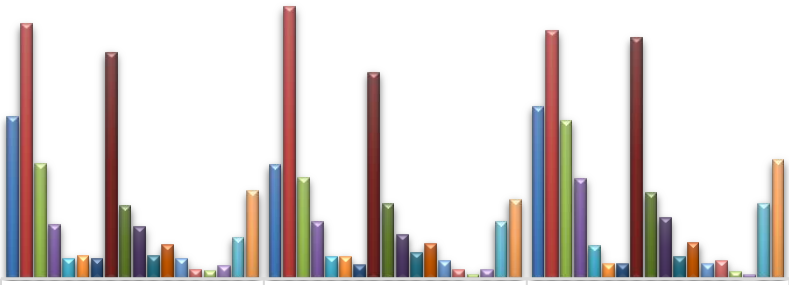
Figure 3.124: Reasons for Out-Migration by Province (n = 1563)



	Kampong Thom	Siem Reap	Total
Limited or no economic / business opportunities in the area	43%	39%	41%
No job opportunities in the area	64%	72%	68%
Insufficient or no land for agricultural production	32%	34%	33%
Unprofitable agricultural production	23%	13%	18%
Insufficient markets to buy agricultural produce and local-made products	8%	5%	6%
Limited water & irrigation system for agricultural production	7%	4%	5%
Limited or no skills and facilities for climate resilient agricultural production	7%	3%	5%
Lack of additional income to support the family	60%	60%	60%
Increasing cost of living	18%	22%	20%
Follow other neighbors, villagers, and / or friends	15%	13%	14%
Follow family and relatives	8%	5%	6%
Low labor cost in the area	10%	9%	9%
Education	7%	3%	5%
Marriage	3%	3%	3%
Depletion or shrinking of land and natural resources in the area	1%	2%	2%
Increasing natural disasters and climate change hazards	1%	4%	2%
Indebtedness	15%	14%	14%
CC Impacts	30%	20%	25%

When disaggregated by type of village, the majority of local respondents still elucidate that no job opportunities (T: 67%, C1: 72%, C2: 66%) and insufficient income generation to support the families (T: 60%, C1: 55%, C2: 64%) are the main reasons for their on-going or increasing out-migration followed moderately by limited or no economic and business opportunities in the areas (T: 43%, C1: 30%, C2: 46%) and inadequate land for agriculture (T: 31%, C1: 27%, C2: 42%) (Figure 3.125). Increasing cost of living (T: 19%, C1: 20%, C2: 23%) coupled with unprofitable production (T: 14%, C1: 15%, C2: 27%) and indebtedness (T: 11%, C1: 15%, C2: 20%) have also stimulated local villagers to move out of their homes in seek for additional livelihood income and better living condition for the family, specifically their children. It is interesting to note that CC impacts have also contributed to increasing people's out-migration in the study areas and at least one fifth of the total respondents in T (23%), C1 (21%) and C2 (31%) villages believe that it is a novel yet prominent reason that would gradually push local people to leave their villages, particularly in off-farm season as well as during natural disaster periods.

Figure 3.125: Reasons for Out-migration by Type of Village (n = 1563)



	Treatment village	Control 1 village	Control 2 village
Limited or no economic / business opportunities in the area	43%	30%	46%
No job opportunities in the area	67%	72%	66%
Insufficient or no land for agricultural production	31%	27%	42%
Unprofitable agricultural production	14%	15%	27%
Insufficient markets to buy agricultural produce and local-made products	5%	6%	9%
Limited water & irrigation system for agricultural production	6%	6%	4%
Limited or no skills and facilities for climate resilient agricultural production	5%	3%	4%
Lack of additional income to support the family	60%	55%	64%
Increasing cost of living	19%	20%	23%
Follow other neighbors, villagers, and / or friends	14%	12%	16%
Follow family and relatives	6%	7%	6%
Low labor cost in the area	9%	9%	10%
Education	5%	5%	4%
Marriage	2%	2%	5%
Depletion or shrinking of land and natural resources in the area	2%	1%	2%
Increasing natural disasters and climate change hazards	3%	2%	1%
Indebtedness	11%	15%	20%
CC Impact	23%	21%	31%

4. CONCLUSIONS AND RECOMMENDATIONS

4.1. Summary of Key Findings of SRL Baseline Survey

Most of the surveyed HH respondents are found to have used multiple or diversified strategies, including both on-farm and off-farm works, to maintain as well as improve their livelihoods. In average, local villagers in Kampong Thom could earn an annual income of US$ 3,131, which is a bit higher than those in Siem Reap whose annual income reach US$ 2,773 by the time of baseline survey. Among all, people in Baray district have the highest annual income followed by those in Prasat Bakong, Santuk, and Kampong Svay. When disaggregated by type of village, T households earn the least annual income of US$ 2,850 if compared to C1 HHs and C2 HHs that could earn up to US$ 3,355 and US$ 2,856 per annum. A variation of HH annual income is mainly reliant on how diversified the income sources are. Of total income sources, wage labor and out-migration has played the most crucial role in accelerating the annual income of the surveyed HH respondents, regardless of province, district, and type of village. Other supporting sources include cash or strategic cropping, rain-fed rice cultivation, and animal raising.

It is found that most of the surveyed respondents in Kampong Thom and Siem Reap are living in a vulnerable condition due mainly to: (1) family status and structure, such as Poor 1 and Poor 2 households, female-headed households, households with disability, and households with more dependents (children and elderly); (2) limited or no access to formal schooling system; (3) limited livelihood capability in terms of limited agricultural land and other fundamental resources, skills, knowledge, income generation and off-farm job opportunities, land ownership and access right, and traditional cultural practices in farming systems; (4) unproductive and unprofitable farming system; (5) livelihood shocks, including also financial shock, trends of migration and market, and seasonality; (6) indebtedness and improper use of loan without practical family planning; (7) increasing cost of living amidst increasing abandon of farm-based livelihoods as well as lack of additional off-farm income sources; (8) lack of market mechanisms and post-harvesting skills and technologies (i.e. processing and packaging, etc.) for local agricultural products; (9) limited access to water for household consumption and agricultural production; (10) increasing occurrence and diversity of natural disasters and extreme weather hazards, especially prolonged drought, flood and windstorm; and (11) limited CC-DRR related interventions together with low participation of local communities, particularly male villagers and youth, in actual implementation of such interventions.

Local participation in traditional rain-fed rice cultivation coupled with other key factors, such as limited agricultural land, high production cost, and low price for rice, have remunerated local villagers very little if compared to other main livelihood activities. Apart from rice cultivation, local villagers perceive seasonal wage labors, inside-country and outside-country migration, cash and strategic cropping, and animal husbandry as main sources of income for their families. Rice production is viewed to have triggered insufficient yield to support daily consumption and exchange for households' basic commodities. Although there is a slight possibility of saving the net income following all types of expenses, the surveyed respondents are concerned with insufficient income to address their livelihood challenges. Most of their expenses are done with buying food stuffs and other consumption needs, medical treatment, debt repayment and monthly interest payment, social events, children education, and social events. The majority of the surveyed respondents are indebted to mostly micro finance institutions as well as commercial or specialized banks operating in the areas, despite some access to loans from existing saving groups, local moneylenders, and friends and relatives. Across the 10 target districts of the two target provinces, at least two third (2/3) of them have struggled to repay their debts, and as repeatedly iterated in the findings section, repayment is considered as one of the must-expense activities of the locals. Higher than 60% of HHs in the T, C1 and C2 villages are

indebted, and of total, those living in C2 villages face the most challenge in repayment followed closely by those in C1 villages and T villages.

Transporting agricultural products by means of motorcycle and hand tractor is the most common activities among the surveyed respondents, although more than half of them still depend on buyers to come and buy products in the village that could eventually reduce their transport and transaction costs to some extent. Using these means would help them to access to the markets easily, and sometime they help them to approach to the right markets for better prices. If compared to all relevant means, word-of-mouth has been practiced by almost all surveyed respondents in getting access to market information. This definite means is also followed mildly by mass media (TV and radio) and village meeting and discussion as part of their basic platform for information access and sharing at village and commune levels.

Access to water for household consumption is viable for the majority of local villagers with rainwater, well, dug pond, and buying water from local and private suppliers are considered respectively the 1st, 2nd, 3rd, and 4th common access means being practiced by them, regardless of place of residence. However, having grasped that these water sources are yet to be improved its quality, about one fifth (1/5) of the respondents usually buy safe and clean water for cooking and drinking and sometimes for for bathing and washing as well. Most people collect water from their own wells, ponds and / or rainwater storage jars and tanks. Those with none of these sources usually spend mostly less than 30 minutes in order to collect water on a daily basis or in every 2-3 days. Male and female members almost share equal role in collecting water although in some cases women are more responsible for this work since men travel far off for seasonal labor works, farm-based works, or other off-farm labor-intensive works during their out-migration periods.

Buying water for household consumption and agricultural production is mostly common in dry season for more than half of local people in both provinces, despite nearly half of them also buy it in both dry and rainy seasons to address their daily needs. Of total, all the surveyed villagers in Prasat Bakong cannot miss to buy water for daily domestic use. Buying water is also common for the majority of the people in Baray, Sandan, Kampong Svay, Santuk, and Varin, let alone approximately one fourth (1/4) of those in Svay Leu and Prasat Balangk to buy water for both dry and rainy seasons. The average cost of buying clean water per time is about US$ 3 for both provinces with local villagers in Srei Snom, Svay Leu, and Sandan districts to pay up to US$ 4 due mainly to the lack of water and regular water supply services in the areas.

Access to water for agriculture is very much limited at present, and this case has made rice and other crop cultivations costly, unproductive and / or unprofitable. Of total, local villagers in Siem Reap, especially in Varin, Srei Snom and Svay Leu districts encounter more difficulties with water shortage in dry season. This case also commonly happens for those living in Kampong Svay district of Kampong Thom province. If compared to 2016, water shortage and duration of drought in 2017 is moderately prevalent and there is a sign of increasing prolonged drought and flood that is challenging for local farmers in the 10 districts of the two target provinces. Half or nearly half of C1, T, and C2 villagers have encountered water shortage, yet only about one fifth of them experience this livelihood shock throughout the year. Water shortage was moderately high in 2017 for C1 and C2 households, let alone water availability for T villagers to be shrinking in this same year compared to water use condition in 2016. Amidst this impediment, local farmers still use word-of-mouth as the most reliable means of access to weather forecast and water condition for their cultivation processes.

Of total, diseases (curable, waterborne, and impedimic), natural disasters (flood, drought, windstorm, and thunderstorm), indebtedness, lack of off-farm works or jobs, lack of labor productivity for agriculture, increasing out-migration, and limited land for agriculture are among

many livelihood challenges being confronted by local villagers in the areas. Drought and windstorm are the most challenging issues for local people in Siem Reap, while flood is considered as the most difficult, extreme weather event for those in Kampong Thom. Among all target districts, Varin is found to have its people mostly prone to extreme natural disasters and CC hazards. Flood is the main factor causing high danger on rice crop and on cash crop as well as on raised livestock. In addition, nearly one third of the surveyed respondents think that flood have caused high danger on their properties as well as human and animal life. Drought has provided the high danger on rice crop in both provinces. It has also caused high effect on cash or strategic cropping and raised livestock of local farmers in the areas and moderate impacts on animal and human life. Thunderstorm is seen to have the potential to produce higher danger or more impact on farming production in Kampong Thom than in Siem Reap. Windstorm is more prevailing in Kampong Thom than in Siem Reap, and is more likely to cause moderate to high damage or loss of properties in both provinces. Access to information related to natural disasters and extreme weather events are mostly practiced by word-of-mouth.

More than half of the surveyed respondents acknowledge that they comprehend about the existence of relevant CBOs in the areas. Although local villagers in Siem Reap know more about the performances of those community-driven organizations on the ground, the locals in Kampong Thom are more associated with those CBOs. Almost half of the HH respondents acknowledge that they are members or least used to me members of those existing CBOs and mostly, they are part of community protected areas, community fisheries, agricultural cooperatives, community forestry, women livelihood groups, saving groups or village banks, farmer field schools, and farmer water user groups. In the forms of interventions, local villagers in both provinces think they have received more support in relation to livelihood improvement programs, and usually they involve integrated farming, on-farm and off-farm livelihood strategies, small and medium scale enterprise development, and some market mechanisms. The amount of receipt of CC/DRR-related interventions is more prevalent in Varin and Kralanh districts of Siem Reap province. Village and commune authorities are commonly perceived to have mostly provided livelihood and CC/DRR-related interventions followed by a country-wide humanitarian organization, Cambodia Red Cross, district and provincial authorities and local NGOs.

In total, there are six considerable interventions related to CC/DRR in the areas. They include survival aids or emergency aids, climate adaptive and resilient infrastructure, early warning system, capacity building for climate smart / resilient planning, weather forcasting, and provisional relocation. Between the two target provinces, local villagers in Kampong Thom receive more interventions in almost all fields, exclusive of survival gifts / aids and early warning system. T and C2 villagers receive almost similar amount of interventions related to CCA/DRR, while C1 villagers receive the highest backup in terms of capacity building for climate resilient planning and implementation. However, across 10 districts, all of these interventions are consciously regarded as vital support programs for helping them to address their livelihood problems.

Concerning climate smart or resilient agriculture, the majority of the surveyed respondents have retrieved relatively interventions related to livestock raising technique, rice cultivation technique, vegetable growing technique, home gardening technique, and some cash cropping technique. However, in order to improve their livelihoods and climate resilient and adaptive capacity amidst increasing livelihood challenges in the areas, most of them wish to improve their skills, knowledge and practices related to entrepreneurship, CCA / DRR and DRM, development of DRR and CCA plan, livestock raising technique, mixed cropping or integrated farming technique, fertilizer management strategy, processing and packaging of agricultural products, sale and marketing for farm and non-farm products, value chain and supply chain of local products, contract farming and other business contracting procedure, bookkeeping, financial management procedure, non-farm and off-farm based

entrepreneurship skills, community planning and monitoring and evaluation, farmer water user group management, climate resilient or smart agriculture (CSA), self-business assessment and community small business feasibility assessment, integration of DRR and CCA plan into village and commune development plan, water governance, climate resilient infrastructure development, and business partnership building and compliance.

Out-migration to work inside Cambodia, in the neighboring Thailand, and other countries, is increasing both in terms of its frequency and momentum. It is found that at least one fourth (1/4) of the total HH respondents are involved or have their family members involved in out-migration in seek for livelihood opportunities and additional income generation sources. Of total, local villagers in Kralanh district out-migrate the most. No job opportunities in the areas alongside the lack of additional income to support the family and limited agricultural land are considered the most important drivers of out-migration for T, C1, and C2 households. Yet, other six influencing fctors have also caused people to commit out-migration, including limited or no economic opportunities in the areas, climate change impacts, increasing cost of living, indebtedness, and change upon traditional cultural habit and lifestyle among local villagers.

4.2. Summary of SRL Indicators and Parameters Based Results

Table 4.1: Baseline Data for Objective 2.1

Outputs	Indicators	Parameters	Baseline Data
2.1. Climate-resilient small-scale water infrastructure designed and put in place in at least 10 districts following the resilient design standards specifically targeting rain-fed farmers	# climate resilient small-scale water infrastructure supported	▪ # climate resilient small-scale water infrastructure supported	N/A
	LNGOs recruited to provide extension services	▪ # of LNGOs recruited to provide extension services ▪ Contract and ToR for extension services	CADTIS
	NGOs carry out capacity development	▪ # of farmer groups formed	N/A
		▪ Types and functions of farmer groups formed (against types of project intervention[5])	N/A
		▪ # of technical knowledge trained to farmer groups	N/A
		▪ # of participants in each training/ capacity building	N/A
		▪ # of on-going technical supports to farmer groups	N/A

Table 4.2: Baseline Data for Objective 2.2

Outputs	Indicators	Parameters	Baseline Data

[5] Beside FWUC/WUG, concerning livelihood improvement, SRL project interventions include: 1) women livelihood group, 2) saving group, 3) small holder learning group, 4) agricultural cooperation (optional).

2.2. Climate-resilient livelihood measures demonstrated in at least 10 districts targeting landless women and farmers practicing rain-fed agriculture	Increase in income from agriculture and related activities, including mainly home consumption	▪ % of increased income from rice cultivation ▪ Reasons for increase/decrease (against the function of project intervention)	• Annual income ○ KPT: 3,131$ ○ SRP: 2,773$ ○ T household (T): 2,850$ ○ C1 household (C1): 3,355$ ○ C2 household (C2): 2,856$ • Average income from rice cultivation ○ KPT: 484$ ○ SRP: 316$ ○ T: 526$ ○ C1: 393$ ○ C2: 642$ • This amount of income in the baseline year decreased compared to last year (2017).
		▪ % of increased income from home garden ▪ Reasons for increase/decrease (against the function of project intervention)	• Average income from home-gardening: ○ KPT: 19$ ○ SRP: 34$ ○ T1: 15$ ○ C1: 15$ ○ C2: 54$ • Reasons: N/A
		▪ % of increased income from animal raising ▪ Reasons for increase/decrease (against the function of project intervention)	• Average income from animal raising: ○ KPT: 299$ ○ SRP: 243$ ○ T: 245$ ○ C1: 298$ ○ C2: 282$ • Reasons: N/A
		▪ % of increased income from strategic/cash crops ▪ Reasons for increase/decrease (against the function of project intervention)	• Average income from strategic/cash crops: ○ KPT: 446$ ○ SRP: 465$ ○ T: 369$ ○ C1: 481$ ○ C2: 476$ • This amount of income in the baseline year decreased compared to last year (2017).
		▪ % of increased income from fishing ▪ Reasons for increase/decrease (against the function of project intervention)	• Average income from fishing: ○ KPT: 39$ ○ SRP: 51$ ○ T: 47$ ○ C1: 11$ ○ C2: 76$ • Reasons: N/A
		▪ % of increased income from fish raising ▪ Reasons for increase/decrease (against the function of project intervention)	• Average income from fish raising: ○ KPT: 50$ ○ SRP: 99$ ○ T: 23$ ○ C1: 11$ ○ C2: 187$ • Reasons: N/A

	Yield from rice production	▪ # of rice yield/ha
		▪ Total # of rice yield/HH
			• KPT:
			  ○ Wet rice yield: 1.3t/ha
			  ○ Dry rice yield: 2.7t/ha
			  ○ Total rice yield of HH: 4t/HH
			• SRP:
			  ○ Wet rice yield: 1.9t/ha
			  ○ Dry rice yield: 2.2t/ha
			• T village:
			  ○ Wet rice yield: 1.64t/ha
			  ○ Dry rice yield: 2.37t/ha
			• C1 village:
			  ○ Wet rice yield: 1.78t/ha
			  ○ Dry rice yield: 1.79t/ha
			• C2 village:
			  ○ Wet rice yield: 1.65t/ha
			  ○ Dry rice yield: 6.3t/ha
			• Total rice yield of HH: 4.1t/HH

	Yield of home gardens	▪ # of yield home garden ▪ Purpose of gardening	• Average yield of home garden: N/A • Purpose of home-gardening: HH consumption only (KPT:67%, SRP:75%), and both HH consumption and selling to market (KPT:32%, SRP:22%)

	Migration for seasonal work Migration rate/volume	▪ # of people out-migrated for seasonal work
		▪ Reasons for out-migration
		▪ Remittance from migration
			• Average number of out-migrant:
			  ○ KPT: 27%
			  ○ SRP: 24%
			  ○ T: 28%
			  ○ C1: 20%
			  ○ C2: 25%
			(mostly prevalent to Kralanh district = 65%)
			• Reasons:
			  ○ No job opportunities in the areas (68%)
			  ○ Lack of additional income to support the family (60%)
			  ○ Limited or no economic opportunities (41%)
			  ○ Insufficient or no land for agriculture (38%)
			  ○ Climate change related impacts (25%)
			  ○ Increasing cost of living (20%)
			  ○ Indebtedness (14%)
			  ○ Change upon cultural habit and lifestyle (14%)
			• Annual remittance from seasonal labor:
			  ○ KPT: 1863$
			  ○ SRP: 1598$
			  ○ T: 1,663$
			  ○ C1: 2,172$
			  ○ C2: 1,380$

	Farmland left fallow	▪ # of agricultural land owned by each HH	• Average size of agricultural land: ○ Rice farmland (KPT: 2ha, SRP: 2.9ha, T: 2.23ha, C1: 2.56ha, C2: 2.96ha)

		▪ Amount of land is currently being cultivated	○ Cash crop farmland (KPT: 1.1ha, SRP: 1.3ha, T: 1.04ha, C1: 1.33ha, C2: 1.40ha) ○ Home-garden: (KPT: 90m^2, SRP: 113m^2, T:110m^2, C1: 90m^2, C2: 110m^2) • Amount of farmland cultivated: ○ Rice farmland: (KPT: 1.7ha, SRP: 2.7ha, T: 2ha, C1: 2.3ha, C2: 2.7ha) ○ Cash crop farmland: (KPT: 0.8ha, SRP: 1.1ha, T: 0.9ha, C1: 1ha, C2: 1ha) ○ Home-garden: (KPT: 90m^2, SRP: 113m^2, T:110m^2, C1: 90m^2, C2: 110m^2)
	Freshwater availability for household use	▪ # and types of water source in the locality ▪ Access to water sources in the locality for HH consumption ▪ Access to water sources in the locality for various agricultural production	▪ Types of water sources for HH consumption are: ○ Rainwater (KPT: 14.9%, SRP: 40.2%, T: 30%, C1: 26%, C2: 24%) ○ Well (KPT: 90.9%, SRP: 75.2%, T: 83%, C1: 88%, C2: 73%) ○ Natural pond (KPT: 0.5%, SRP: 8.5%, T: 5%, C1: 4%, C2: 5%) ○ Nearby river (KPT: 0.8%, SR: 0.3%, T: 0%, C1: 0%, C2: 2%) ○ Natural stream or creek system in the locality (KPT: 5.8%, SRP: 5.5%, T: 4%, C1: 6%, C2: 9%) ○ Buy water from suppliers (KPT: 2.1%, SRP: 9%, T: 7%, C1: 2%, C2: 7%) ○ Buy water from private water suppliers (KPT: 2.2%, SRP: 2.3%, T: 2%, C1: 1%, C2: 3%) • Types of water sources for agricultural production are: ○ Rainwater (KPT: 60%, SRP: 84%, T: 73%, C1: 75%, C2: 71%) ○ Well (KPT: 23%, SRP: 13%, T: 21%, C1: 9%, C2: 21%) ○ Natural pond (KPT: 5%, SRP: 3%, T: 5%, C1: 3%, C2: 3%) ○ Dug pond (KPT: 5%, SRP: 7%, T: 7%, C1: 6%, C2: 4%) ○ Nearby river (KPT: 2%, SRP: 0%, T: 0%, C1: 1%, C2: 3%) ○ Natural stream or creek system in the locality (KPT: 18%, SRP: 9%, T: 9%, C1: 8%, C2: 15%) ○ Buy water from private water suppliers (KPT: 0%, SRP: 0%, T: 0%, C1: 0%, C2: 0%)

	Time spent on water collection Money spent on water	▪ Time spent of collecting water ▪ Distance of water sources from each HH ▪ Cost of water purchase per time ▪ Person responsible for water collection for the HH	• Time spend for collecting water of HHs in is less than 30mn (KPT: 26%, SRP: 36%, T: 37%, C1: 27%, C2: 26%) • Distance of accessing water: N/A • Cost of water purchase: o KPT: 2.3$/per time o SRP: 3.1$/per time o T: 2.70$/per time o C1: 1.90$/per time o C2: 3.90$/per time • Everyone helps each other for water collection for HH use: (KPT: 66%, SRP: 69%, T: 67%, C1: 71%, C2: 67%)
	Damage to rice & crops due to climate hazards	▪ Perception of vulnerability caused by climate hazards ▪ Level of danger to various agricultural activities ▪ Time and frequency of climate hazard occurrence	• Climate hazard in KPT: o Flood (54%), drought (50%), thunderstorm/rainstorm (30%) and Windstorm (37%) • Climate hazard in SRP: o Flood (42%), drought (74%), thunderstorm/rainstorm (33%) and windstorm (39%) • Level of danger in SR: o Flood: highly affected to rice crop (53%), cash crop (33%) and raise livestock (16%) o Drought: highly affected to rice crop (48%), cash crop (32%) and raise livestock (17%) o Thunderstorm/rainstorm: highly affected to rice crop (19%), cash crop (14%) and loss of property (21%) o Windstorm: highly affected to rice crop (13%), cash crop (9%) and loss of property (19%) • Level of danger in KPT: o Flood: highly affected to rice crops (76%), cash crops (54%) and livestock (34%) o Drought: highly affected to rice crops (50%), cash crops (43%) and livestock (30%) o Thunderstorm/rainstorm: highly affected to rice crop (35%), cash crop (28%), raise livestock (21%) o Windstorm: highly affected to rice crop (21%), cash crop (15%) and loss of property (35%) • Time and frequency of climate hazard occurrence: N/A

4.3. Recommendations

The following strategies should be taken into serious consideration for the progress and success of SRL project performance in the 10 districts of the two target provinces:

1. Strengthen capacity of SNAs, CADTIS, and SRL's grassroots implementation staffs on climate change adaptation and mitigation, climate smart and resilient agriculture, market mechanisms, and all relevant legal and policy frameworks (including also by-law or rule and regulation formulation) involved in ensuring effective and efficient management and governance of small-scale water infrastructure before further convey key messages to local beneficiaries in the areas;

2. Promote ownership (sense of belonging, sense of pride, active participation, and practices) of local communities, CBOs, and SNAs as well as members of SRL-established groups or committees at the onset of SRL project implementation;

3. Enhance the dissemination of information on key project interventions, the establishment of SRL-supported groups (i.e. FWUCs, FWUGs, LIGs, SGs, SLGs or FFSs, etc.) as well as on their benefits and underlying strategies established ororganized within the framework of SRL project support to the wider public, particularly to all committee and group members and all relevant SNAs;

4. Enhance participation of men or male villagers in SRL project implementation at village level in order to ensure gender equity / balance that is considered one of the key intricaments for project success;

5. Develop proper community-oriented, location-specific strategic and action plans for all the SRL-established groups, particularly FWUCs, FWUGs, and LIGs, with support from CADTIS and SRL project implementation staffs in order to enhance practical, realistic operation and management of these groups;

6. Further communicate concepts and best practices of DRR/CCA to all relevant authorities and community groups or CBOs, especially those established under SRL project, while simultaneously helping those groups to successfully integrat those concepts and practices into CIP and CDP and practice the by the wider public in the communities;

7. Formulate internal financial mechanisms and sustainable financing mechanism supported by effective market mechanisms in order to support the execution and management of SRL-established groups, especially FWUCs, FWUGs, LIGs and SGs, from the beginning rather than to have them solely dependent on project support;

8. If possible, enhance the institutionalization of self-learning groups (SLGs) or farmer field schools (FFSs) in the target villages into official or legal ACs in order to capitalize its positive impacts on community livelihood improvement, income intensification and diversification, and market mechanisms for home-grown agricultural products (rice, vegetable, fruit and cash crops and raised animals);

9. With support from CADTIS, introduce demonstration or model farms for climate resilient and adaptive crop cultivation and animal husbandry to showcase best practices to local farmers in the areas by starting from selecting and training model farmers while providing them necessary skills, knowledge, technology and facilities for such climate smart agriculture;

10. Promote community-private sector partnership in agricultural production and its underlying value and supply chain systems so as to enable local farmers and the local communities as a whole to set up proper market mechanisms for their products; *and*

11. Expand climate smart or resilient agriculture extension services as well as DRR / CCA and community-based water governance interventions by using ICT-based system in order to improve the quality of intervention programs and prompt communication and response between local beneficiaries and the project intervention actors and by engaging other relevant local NGOs and project partners at the provincial and grassroots levels to collaborate with CADTIS and other SRL-recruited NGOs to intensify and extensify the interventions and benefits for local beneficiaries and other villagers in the target villages.

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ANNEXES

Annex A: GUIDING QUESTIONS FOR KEY INFORMANT INTERVIEW

Date:…….. Time:……....
Interviewer's name: …… Position……..
Village:…… Commune: ……..
District:…….. Province: ……..

- What are current local economic drives and livelihood situations in the locality over the last five years?
- What is the situation of climate hazards or natural disasters in the locality over the last five years? Do you conduct VRA mapping in this locality?
- How do climate phenomena affect livelihoods or agricultural practices in the locality over the last five years?
- Are there interventions with regard to coping with or adaptation to climate change impacts in the locality? Why? Or why not?
- If yes, were such interventions planned and integrated into CIP? Or were they spontaneous one-off intervention? Why?
- Would you recall the existing interventions for responding to climate hazards in your location? When? Who involve in? Why? How?
- What are major challenges in implementing these interventions?
- What are strengths of the intervention? Which intervention strategies are most effective for this locality? In what aspect? Why?
- What are your institution's current plans to assist local community coping with or adapting to climate change and improving local livelihoods?
- What is the extent of your institution's capacity (e.g. technical and financial) in terms of planning climate change intervention and adaptation?
- Do you plan to integrate the climate change into your institutional development plans in the near future? How would you do that?
- What do you think is the extent of local communities' capacity (technical, financial, organizational…) in terms of livelihood improvement and climate change adaption?
- What are current major climate-induced challenges to local livelihoods? How could these be solved through SRL project?
- What climate change adaption would you like to see happen in your locality? Do you have any suggestion or recommendation for improving the community livelihood and also responding to climate change?

Annex B: GUIDING GUESTIONS FOR FOCUS GROUP DISCUSSION

1. Village's name where FGD conducted.
2. Date and time for FGD conduct.
3. Number of participants and discussants involved. Enclose the attendance list to the report.
4. In case of adjustment (deletion and/or addition) to the registered or established short list, how many members have been changed or taken from the long list and who are they (name, sex, and type of beneficiary)?
5. Occupations of villagers (established members and common villagers) and percentage of villagers involved in each occupation.
6. Average size (minimum and maximum) of rice farmland owned, cultivated, and left fallowed. Type of rice cultivation, seed (s) selected, number of cultivations per year, and average rice yield per hectare per cultivation (minimum and maximum).
7. Current situation of land ownership, including residential land, rice farm, fruit farm, cash crop farm, and home-garden.
8. Main challenges for rice, fruit crop and cash crop cultivation as well as home-gardening.
9. Primary and secondary livelihood challenges.
10. Occurrence and type of diseases by season, quality of health care treatment services in the area or nearby places, etc.
11. Current situation of in-country and outside country outmigration (where they go, reasons behind out-migration, challenges involved, and amount of remittance and number of times for sending remittance to the families leaving behind as part of accumulative income).
12. Issues and current situation of DRR / CC in the village, level of vulnerability and priority for project intervention.
13. Current situation of water access and consumption, including main water sources for household use and agricultural production in the village.
14. Current situation of poverty in the village, including number of Poor 1 and Poor 2 households.
15. Current situation of indebtedness, names of loan providers, percentage of villages indebted to either MFIs or commercial and specialized banks and percentage of villages receiving loan from more than one lending institution.
16. Current situation of market and market prices for local agricultural produce.
17. Suggestions for climate resilient livelihoods and climate smart agriculture to be considered by the project.

Annex C: HOUSEHOLD SURVEY QUESTIONNAIRES

SRL Baseline Impact Assessment of Project on

"Reducing the Vulnerability of Cambodian Rural Livelihoods through Enhanced Sub-National Climate Change Planning and Execution of Priority Actions"

QUESTIONNAIRE FOR HOUSEHOLD SURVEY

Questionnaire N°:…….. Date:……
Interviewer's name: …… Time:……
Village:…… Commune: ……..
District:…… Province: ……..

Type of Selected Household:

1. *Poor 1 ☐* ***2.*** *Poor 2 ☐* ***3.*** *Female-headed ☐* ***4.*** *Household with disability ☐*
5. *Climate change affected or prone ☐* ***6.*** *SRL-established CBO household member ☐*

Type of Village: ***1.*** *Treatment village ☐* ***2.*** *Control 1 village ☐* ***3.*** *Control 2 village ☐*

PART 1: Respondent and Household Background Information

1. Respondent's name: ……
1a. Respondent's Code: ……
1b. Contact Phone: ……
1c. Permanent Address: ……
2. Sex: 1. Male ☐ 2. Female ☐
3. Age: ……..
4. Are you the household head? 1. Yes ☐ 2. No ☐ ***(If yes, skip to Q5)***
4a. If no, what is your relationship with the household head?
1. Wife ☐ 2. Husband ☐ 3. Daughter ☐ 4. Son ☐ 5. Relatives ☐
5. Marital status: 1. Married ☐ 2. Single ☐ 3. Divorced ☐ 4. Separate ☐
6. Ethnicity: 1. Khmer ☐ 2. Non-Khmer ☐ 3. Indigenous people ☐
7. Level of education:
1. No education ☐ 2. Literacy class ☐ 3. Technical / Vocational Training ☐
4. Primary ☐ 5. Lower secondary ☐ 6. Upper Secondary ☐
7. University *(specify the degree attained: ……..)*
8. Does your family have an ID Poor? 1. Yes ☐ 2. No ☐ ***(If no, skip to Q9)***
8a. If yes, which one? 1. ID Poor 1 ☐ 2. ID Poor 2 ☐
9. Are you an in-migrant? ☐ Yes ☐ No ***(If no, skip to Q10)***
9a. If yes, where do you and your family migrate from? ……..
9b. Year of migration into the area: ……
9c. Reasons for in-migration:
1. Marriage ☐ 2. Education ☐ 3. Look for agricultural land ☐
4. Work in construction sector ☐ 5. Work in tourism sector ☐
6. Look for natural resources ☐ 7. Work in agricultural sector ☐
8. Others ☐ *(specify:……)*
10. How many children do you have (or are there in your family)? ……
10a. How many sons? …….. How many daughters? ……
11. How many members are there in your family? ……
11a. How many male members?…….. How many female?……
12. Level of education of household members

Level of Education	*Male (no.)*	*Female (no.)*
1. No education ☐		
2. Primary ☐		
3. Literacy class ☐		
3. Technical / Vocational Training ☐ *(Specify names of skills: ……. ……. ……)*		
4. Lower secondary ☐		
5. Upper secondary ☐		
6. University ☐		

PART 2: Livelihood, Income and Productivity Analysis

2A. Land Availability

(Landlessness was defined as not having (enough) land and not having the means to purchase land for either residential or agricultural purposes)

13. Does your family have residential land? 1. Yes ☐ 2. No ☐ ***(If no, skip to Q13a)***
If yes, indicate the size of your residential land: ..... m^2

13a. Does your family have home-garden? 1. Yes ☐ 2. No ☐ ***(If no, skip to Q13b)***
If yes, indicate the size of your home-garden: ..... m^2

13b. Does your family have farmland? 1. Yes ☐ 2. No ☐ ***(If no, skip to Q13c)***
If yes, answer the followings:

Types of Land	**Availability**	**Quantity**	**Amount of Land Cultivated / Used**
Plantation farmland (fruit and case crops)	1. Yes ☐ 2. No ☐	.....ha	.....ha
Dry season rice paddy	1. Yes ☐ 2. No ☐	.....ha	.....ha
Wet season rice paddy	1. Yes ☐ 2. No ☐	.....ha	.....ha

13c. If no land for rice/crop cultivation or agricultural production, do you and your family normally rent the land? 1. Yes ☐ 2. No ☐ ***(If no, skip to Q14)***

13d. If yes, how much do you spend for the rent? Riel..... per ha/year

13e. If yes, how many times do you rent per year?
1. One time ☐ 2. Two times ☐ 3. More than two times ☐

2B. Possession of Tangible Assets

14. Does your family have following assets?

Types of Asset	**Possession**	**Quantity *(0 = No)***
Wooden house with brick roof	1. Yes ☐ 2. No ☐	
Wooden house with thatch roof	1. Yes ☐ 2. No ☐	
Wooden house with zinc roof	1. Yes ☐ 2. No ☐	
Half concrete and half wooden house with brick roof	1. Yes ☐ 2. No ☐	
Bamboo and cane house with palm leave or thatch roof	1. Yes ☐ 2. No ☐	
Bicycle	1. Yes ☐ 2. No ☐	
Motorcycle	1. Yes ☐ 2. No ☐	
Car / truck / van, etc.	1. Yes ☐ 2. No ☐	
Hand tractor (Kor Yun)	1. Yes ☐ 2. No ☐	
Tractor	1. Yes ☐ 2. No ☐	
Ox cart	1. Yes ☐ 2. No ☐	
Small / mini rice harvest machine	1. Yes ☐ 2. No ☐	
Small / mini rice mill machine	1. Yes ☐ 2. No ☐	
Mobile phone (simple model)	1. Yes ☐ 2. No ☐	
Smart phone	1. Yes ☐ 2. No ☐	
Television	1. Yes ☐ 2. No ☐	
Radio	1. Yes ☐ 2. No ☐	
CD / VCD / DVD playing machine	1. Yes ☐ 2. No ☐	

Generator	1. Yes ☐ 2. No ☐	
Water pumping machine	1. Yes ☐ 2. No ☐	
Solar panel	1. Yes ☐ 2. No ☐	
Boat	1. Yes ☐ 2. No ☐	
Fishing gear (except boat)	1. Yes ☐ 2. No ☐	
Battery	1. Yes ☐ 2. No ☐	
Fan	1. Yes ☐ 2. No ☐	
Water jar	1. Yes ☐ 2. No ☐	
Rainwater storage tank	1. Yes ☐ 2. No ☐	
Others *(specify:……..)*	1. Yes ☐ 2. No ☐	

2C. Occupation and Income: Which of the following occupations are you and your household involved in making your daily living? *(You can tick more than one answer)*

15. Rice cultivation 1. Yes ☐ 2. No ☐ ***(If no, skip to Q17)***

16. Type of rice yield and sale:

Types of Rice	**Size of Cultivated Farm / Plot**	**Quantity Produced**	**Average Sale**
1. Rain-fed wet rice ☐	……..ha	Quantity/ha:…… t	Average annual sale: …….. Riel
2. Dry season rice ☐	……..ha	Quantity/ha:…… t	Average annual sale: …….. Riel
3. Flooded rice ☐	……..ha	Quantity/ha:…… t	Average sale: …….. Riel

16a. Number of rice farming effort per year:

1. One time per year ☐ 2. Two times per year ☐ 3. Three times per year

16b. Size of rice fields left fallowed in comparison to last year *(please put '0' if none of your rice fields is left fallowed)*

Last Year: …… ha This Year: …… ha

17. Home-gardening production: 1. Yes ☐ 2. No ☐ ***(If no, skip to Q18)***

17a. What type of vegetable cultivated: ……

17b. What year did you start growing vegetable? ……

17c. What month do you normally grow vegetable/home-gardening? ……

17d. Purpose of home-gardening and average sale:

Purposes	**Average Annual Sale**
1. For HH consumption only ☐ 2. For selling to market only ☐ 3. For both household consumption and selling to market ☐	Sale in Riel ……

18. Strategic or cash cropping *(including agro-industrial crops)*: 1. Yes ☐ 2. No ☐ ***(If no, skip to Q19)***

18a. If yes, which types:

Types of Crop	**Size of Cultivated Farm**	**# of Effort per Year**	**Quantity Produced**	**Average Annual Sale**
1. Cassava ☐	…… ha	1. One time ☐ 2. Two times ☐	……t/year	Average sale in Riel ……
2. Mungbean ☐	…… ha	1. One time ☐ 2. Two times ☐	……t/year	Average sale in Riel ……
3. Sesame ☐	…… ha	1. One time ☐ 2. Two times ☐	……t/year	Average sale in Riel ……
4. Maize ☐	…… ha	1. One time ☐ 2. Two times ☐	……t/year	Average sale in Riel ……
5. Cashew nut ☐	…… ha	N/A	……t/year	Average sale in Riel ……
6. Rubber ☐	…… ha	N/A	……t/year	Average sale in Riel ……
7. Peanut bean ☐	…… ha	1. One time ☐ 2. Two times ☐	……t/year	Average sale in Riel ……
8. Peppercorn ☐	…… ha	1. One time ☐ 2. Two times ☐	……t/year	Average sale in Riel ……

18b. Size of cash crop farmlands left fallowed in comparison to last year *(please put '0' if none of your farmlands is left fallowed)*

Last Year: ..... ha This Year: ..... ha

19. Poultry farming: 1. Yes ☐ 2. No ☐ ***(If no, skip to Q20)***

19a. What year did you start to raise poultry? .....

19b. If yes, which types, for what purposes, and average sale:

Types *(can tick more than one)*	**Purposes**	**Average Annual Sale**
1. Chicken ☐ 2. Duck ☐ 3. Muscovy duck ☐ 4. Goose ☐	1. For HH consumption only ☐ 2. For selling to market only ☐ 3. For both household consumption and selling to market ☐	Sale in Riel .....

20. Cattle & other animal raising besides poultry: ☐ Yes ☐ No ***(If no, skip to Q21)***

Types *(can tick more than one)*	**Purposes**	**Average Annual Sale**
1. Cow ☐ 2. Buffalo ☐ 3. Pig ☐ 4. Goat ☐ 5. Others ☐ *(specify:.....)*	1. For HH consumption only ☐ 2. For selling to market only ☐ 3. For both household consumption and selling to market ☐	Sale in Riel .....

21. NTFP collection: 1. Yes ☐ 2. No ☐ ***(If no, skip to Q22)***

21a. What type of NTFP does your family collected?.....

21b. Purpose of NTFP collection and average sale:

Purposes	**Average Annual Sale**
1. For HH consumption only ☐ 2. For selling to market only ☐ 3. For both household consumption and selling to market ☐	Sale in Riel .....

22. Wildlife Hunting: 1. Yes ☐ 2. No ☐ ***(If no, skip to Q23)***

22a. What type of wildlife animal does your family collect?.....

22b. Purpose of wildlife animal hunting and average sale:

Purposes	**Average Annual Sale**
1. For HH consumption only ☐ 2. For selling to market only ☐ 3. For both household consumption and selling to market ☐	Sale in Riel .....

23. Fishing: 1. Yes ☐ 2. No ☐ ***(If no, skip to Q24)***

23a. Purpose of fishing and average sale:

Purposes	**Average Annual Sale**
1. For HH consumption only ☐ 2. For selling to market only ☐ 3. For both household consumption and selling to market ☐	Sale in Riel .....

24. Fish raising: 1. Yes ☐ 2. No ☐ ***(If no, skip to Q25)***

24a. Purpose of fish raising and average sale:

Purposes	**Average Annual Sale**
1. For HH consumption only ☐ 2. For selling to market only ☐ 3. For both household consumption and selling to market ☐	Sale in Riel .....

25. Seasonal labor in nearby plantation: 1. Yes ☐ 2. No ☐ ■Annual income: Riel.....

26. Permanent labor in nearby plantation: 1. Yes ☐ 2. No ☐ ■Annual income: Riel.....

27. Cricket raising/catching: 1. Yes ☐ 2. No ☐ ■Annual income: Riel.....

28. Money lending: 1. Yes ☐ 2. No ☐ ■Annual income: Riel.....

29. Logging: 1. Yes ☐ 2. No ☐ ■Annual income: Riel.....

30. Land leasing: 1. Yes ☐ 2. No ☐ ■Annual income: Riel.....

31. Artisanal mining: 1. Yes ☐ 2. No ☐ ■Annual income: Riel.....

32. Work in mining industry: 1. Yes ☐ 2. No ☐ ■Annual income: Riel.....

33. Work in construction sector: 1. Yes ☐ 2. No ☐ ■Annual income: Riel.....
34. Work in garment industry: 1. Yes ☐ 2. No ☐ ■Annual income: Riel.....
35. Work with government: 1. Yes ☐ 2. No ☐ ■Annual income: Riel.....
36. Work with I/LNGOs: 1. Yes ☐ 2. No ☐ ■Annual income: Riel.....
37. Work with private sector: 1. Yes ☐ 2. No ☐ ■Annual income: Riel.....
38. Business (e.g. SME,.....): 1. Yes ☐ 2. No ☐ ■Annual income: Riel.....
39. Work in tourism industry: 1. Yes ☐ 2. No ☐ ■Annual income: Riel.....
40. Out-migration work: 1. Yes ☐ 2. No ☐ ***(If no, skip to Q41)***

40a. If yes, please answer the followings:

Out-Country Migration ***(Can tick more than 1)***	**Average Annual Remittance**	**Frequency of Remittance**
1. Thailand ☐	Average Annual Remittance in Riel	☐ One a year ☐ Twice a year ☐ > Twice a year ☐ Every month
2. Malaysia ☐		
3. South Korea ☐		
4. Japan ☐		
5. Others ☐ (.....)		
In-Country Migration ***(Can tick more than 1)***	**Average Remittance**	**Frequency of Remittance**
1. Phnom Penh Capital ☐	Average Annual Remittance in Riel	☐ One a year ☐ Twice a year ☐ > Twice a year ☐ Every month
2. Siem Reap ☐ *(Siem Reap city for those living in other districts of Siem Reap province)*		
3. Coastal provinces ☐		
4. Northeastern provinces ☐		
5. Others ☐ (.....)		

40b. If yes, what are the reasons for their out-migration? *(Can tick more than one)*

1. Limited or no economic / business opportunities in the area ☐
2. No job opportunities in the area ☐
3. Insufficient or no land for agricultural production ☐
4. Unprofitable agricultural production ☐
5. Insufficient markets to buy agricultural produce and local-made products ☐
6. Limited water & irrigation system for agricultural production ☐
7. Limited or no skills and facilities for climate resilient agricultural production ☐
8. Lack of additional income to support the family ☐
9. Increasing cost of living ☐
10. Follow other neighbors, villagers, and / or friends ☐
11. Follow family and relatives ☐
12. Low labor cost in the area ☐
13. Education ☐
14. Marriage ☐
15. Depletion or shrinking of land and natural resources in the area ☐
16. Increasing natural disasters and climate change hazards ☐
17. Insecurity ☐
18. Indebtedness ☐

Total annual household income summed up by interviewee: Riel.....

41. List down the top 5 livelihood activities for income generation involved by you / your family. ***Use number of occupation list above to fill out the blanks.*** And how do you think about its productivity or significance in relation to your annual household income ***(verify their answers with Q15-40)*** during these past 12 months with the previous year and next year?

Top 3 Livelihood Activities / Annual Income	Present Level of Productivity or Momentum	Comparison of Annual Income with the Last Year	Projection of Annual Income for Next Year
Top 1 [……..]	1. Increased ☐ 2. Decreased ☐ 3. Don't know ☐	1. Increased ☐ 2. Same as last year ☐ 3. Decreased ☐	1. Increased ☐ 2. Same as this year ☐ 3. Decreased ☐
Top 2 [……..]	1. Increased ☐ 2. Decreased ☐ 3. Don't know ☐	1. Increased ☐ 2. Same as last year ☐ 3. Decreased ☐	1. Increased ☐ 2. Same as this year ☐ 3. Decreased ☐
Top 3 [……..]	1. Increased ☐ 2. Decreased ☐ 3. Don't know ☐	1. Increased ☐ 2. Same as last year ☐ 3. Decreased ☐	1. Increased ☐ 2. Same as this year ☐ 3. Decreased ☐

2D. Market Conditions and Accessibility

42. What do you think about potential market and market accessibility for local products?

Type of Products	Potential Market *(Can tick more than one)*	Market Accessibility
Rain-fed wet season rice	1. Local merchant/dealer ☐ 2. Merchant / dealer from nearby district or township ☐ 3. Merchant /dealer from nearby province ☐ 4. Merchant / dealer from Vietnam ☐ 5. Merchant / dealer from Thailand ☐ 6. Self-selling at local market ☐ 7. Contract farming or sale contract with buyer ☐	1. Easily accessible ☐ 2. Accessible ☐ 3. Like before / no idea ☐ 4. Difficult to access ☐ 5. Very difficult to access ☐
Dry season rice	1. Local merchant/dealer ☐ 2. Merchant / dealer from nearby district or township ☐ 3. Merchant /dealer from nearby province ☐ 4. Merchant / dealer from Vietnam ☐ 5. Merchant / dealer from Thailand ☐ 6. Self-selling at local market ☐ 7. Contract farming or sale contract with buyer ☐	1. Easily accessible ☐ 2. Accessible ☐ 3. Like before / no idea ☐ 4. Difficult to access ☐ 5. Very difficult to access ☐
Home-garden produces / home-grown vegetables	1. Local merchant/dealer ☐ 2. Merchant / dealer from nearby district or township ☐ 3. Merchant /dealer from nearby province ☐ 4. Merchant / dealer from Vietnam ☐ 5. Merchant / dealer from Thailand ☐ 6. Self-selling at local market ☐ 7. Contract farming or sale contract with buyer ☐	1. Easily accessible ☐ 2. Accessible ☐ 3. Like before / no idea ☐ 4. Difficult to access ☐ 5. Very difficult to access ☐
Raised livestock *(poultry and cattle)*	1. Local merchant/dealer ☐ 2. Merchant / dealer from nearby district or township ☐ 3. Merchant /dealer from nearby province ☐ 4. Merchant / dealer from Vietnam ☐ 5. Merchant / dealer from Thailand ☐ 6. Self-selling at local market ☐ 7. Contract farming or sale contract with buyer ☐	1. Easily accessible ☐ 2. Accessible ☐ 3. Like before / no idea ☐ 4. Difficult to access ☐ 5. Very difficult to access ☐
NTFPs	1. Local merchant/dealer ☐ 2. Merchant / dealer from nearby district or township ☐ 3. Merchant /dealer from nearby province ☐ 4. Merchant / dealer from Vietnam ☐ 5. Merchant / dealer from Thailand ☐ 6. Self-selling at local market ☐ 7. Contract farming or sale contract with buyer ☐	1. Easily accessible ☐ 2. Accessible ☐ 3. Like before / no idea ☐ 4. Difficult to access ☐ 5. Very difficult to access ☐
Strategic / cash crops	1. Local merchant/dealer ☐ 2. Merchant / dealer from nearby district or township ☐ 3. Merchant /dealer from nearby province ☐ 4. Merchant / dealer from Vietnam ☐ 5. Merchant / dealer from Thailand ☐ 6. Self-selling at local market ☐ 7. Contract farming or sale contract with buyer ☐	1. Easily accessible ☐ 2. Accessible ☐ 3. Like before / no idea ☐ 4. Difficult to access ☐ 5. Very difficult to access ☐
Fishes	1. Local merchant/dealer ☐ 2. Merchant / dealer from nearby district or township ☐ 3. Merchant /dealer from nearby province ☐ 4. Merchant / dealer from Vietnam ☐ 5. Merchant / dealer from Thailand ☐ 6. Self-selling at local market ☐ 7. Contract farming or sale contract with buyer ☐	1. Easily accessible ☐ 2. Accessible ☐ 3. Like before / no idea ☐ 4. Difficult to access ☐ 5. Very difficult to access ☐

43. How could people in your area access to other areas, especially to markets for selling agricultural or local products? ***(Can tick more than one answer)***

<u>In rainy season</u>:

1. Walking ☐ 2. Bicycle ☐ 3. Motorcycle ☐ 4. Hand tractor *(Kor Yun)* ☐ 5. Tractor ☐
6. Car ☐ 7. Buyers come to buy in the village ☐

In dry season:

1. Walking ☐ 2. Bicycle ☐ 3. Motorcycle ☐ 4. Hand tractor *(Kor Yun)* ☐ 5. Tractor ☐
6. Car ☐ 7. Buyers come to buy in the village ☐

44. Access to information:

44a. How do you get access to market information? ***(Can tick more than one of the followings)***

1. By word-of-mouth ☐ 2. Meeting with village chief ☐
3. Meeting with commune chief ☐ 4. Watching TV ☐
5. Meeting with district chief ☐ 6. Meeting with local NGOs ☐
7. Meeting with provincial line departments ☐ 8. Listening to the radio ☐
9. Awareness raising campaign ☐ 10. Poster, banner, signpost, etc. ☐
11. Telephone and SMS ☐ 12. Internet ☐
13. Newspaper ☐ 14. Social media (i.e. Facebook)

2E. Expenses and Adequacy for Household Needs

45. Is your HH income enough to support daily expense and other extra costs?

1. More than enough ☐ 2. Enough ☐ 3. Not enough ☐ 4. Not enough at all ☐

46. Does your family have enough rice for consumption the whole year?

1. Yes ☐ 2. No ☐ ***(If yes, skip to Q47)***

46a. If No, how many months have your produced rice lasted? ……

46b. If No, when does your family normally experience food shortage?

1. Before farming season ☐ 2. During farming season ☐ 3. After harvesting ☐
4. In dry season ☐ 5. In rainy season ☐ 6. During flood period ☐
7. During drought period ☐ 8. Others *(specify:……..)*

47. Do you or does your family borrow money from others?

1. Yes ☐ 2. No ☐ ***(If no, skip to Q48)***

47a. If yes, who/what is the lender? *(Can tick more than one)*

1. Bank ☐ 2. MFI ☐ 3. Local moneylender ☐ 4. Friends and relatives ☐
5. Agricultural product wholesaler or retailer (merchant / dealer) ☐
6. Local NGO ☐ 7. Others: *(specify:……)*

47b. If yes, is it difficult to repay them? 1. Yes ☐ 2. No ☐

47c. What are the purposes for borrowing money? *(Can tick more than one)*

1. Buy food ☐ 2. Medical treatment ☐ 3. Agricultural production ☐
4. Household consumption needs (except food) ☐
5. Funeral ceremony ☐ 6. Service existing debt ☐ 7. Marriage ceremony ☐
8. Purchase of modern facilities (i.e. motorcycle, TV, etc.) ☐
9. Others ☐ *(specify:……)*

48. What is your family's average annual spending? Riels ……

48a. What is your family's average daily spending? Riels ……

48b. What is your family's average weekly spending? Riels ……

48c. What is your family's average monthly spending? Riels ……

48d. Please circle the followings by ranking from 1 (top priority) to 5 (least priority).

Types of Expense	**Priority**	**Types of Expense**	**Priority**
Food stuffs, including food processing	1 2 3 4 5	Paying debts/interest	1 2 3 4 5
Health care	1 2 3 4 5	Drinking beer/alcohol	1 2 3 4 5
Children's education	1 2 3 4 5	Social events *(wedding, funeral, etc.)*	1 2 3 4 5
Buying Clothes	1 2 3 4 5	House construction and / or maintenance	1 2 3 4 5
Buying land for agriculture	1 2 3 4 5	Buying goods *(TV, motor, phone, etc.)*	1 2 3 4 5
Buying agriculture materials	1 2 3 4 5	Buying jewelry	1 2 3 4 5
Helping relatives/friends	1 2 3 4 5	Buying pesticide or fertilizer	1 2 3 4 5
Buying animals for raising	1 2 3 4 5	Others (……)	1 2 3 4 5

PART3: Freshwater, Water Infrastructure and Access to Water

49. Does your family have access to water for household use?
1. Yes ☐ 2. No ☐ ***(If no, skip to Q50)***

49a. If yes, what are the sources of water for your access? ***(Can tick more than one)***
1. Rainfall ☐ 2. Well ☐ 3. Natural pond ☐ 4. Dug pond ☐
5. Nearby river ☐ 6. Natural stream & creek system in the locality ☐
7. Buy water from local supplier / owner ☐ 8. Buy water from private water supplier ☐
9. Others ☐ *(specify:……)*

49b. If yes, how long does it take to walk/travel to fetch water?
1. Not at all, have own well or pond within house compound or use stored rainwater ☐
2. Less than 30mns ☐ 3. Between 35mns – 1hour ☐
4. More than 1hour (water sources are very far from home) ☐

50. How often does your family collect or buy water?
1. Everyday ☐ 2. Every 2-3 days ☐ 3. One time per week ☐ 4. Every 2 weeks ☐
5. One time per month ☐ 6. Others ☐ *(specify:……)*

51. Who in your family is responsible for fetching water for household consumption?
1. Man ☐ 2. Woman ☐ 3. Female children ☐ 4. Male children ☐ 5. Everyone helps each other ☐

52. How do you or does your family access to clean water supply?
1. Free of charge (for public) ☐ 2. By purchasing from local owner ☐
3. By paying to the government ☐ 4. By purchasing from private water supplier ☐

53. If your family buys water for household consumption, how much do you spend per time or cubic meter (m^3)? Per time: Riel/US$..... OR Per m^3: Riel/US$.....

53a. How many months in a year does your family buy water for household consumption? …… months

53b. Which season does you normally buy water for household consumption?
1. Dry season ☐ 2. Rainy season ☐ 3. Both dry and rainy seasons ☐

54. Does your family have access to water for crop cultivation and other agricultural purposes/activities?
1. Yes ☐ 2. No ☐

54a. If yes, what are the main sources of water? ***(Can tick more than one)***
1. Rainfall ☐ 2. Well ☐ 3. Natural pond ☐ 4. Dug pond ☐
5. Nearby river ☐ 6. Natural stream & creek system in the locality ☐
7. Water irrigation *(e.g. canal, dyke, reservoir, etc.)* ☐
8. Buy water from local supplier / owner ☐ 9. Buy water from private water supplier ☐
10. Others ☐ *(specify:……)*

55. How many times do you and your family cultivate rice per year?
1. One time ☐ 2. Two times ☐ 3. Three times ☐ 4. Not at all ☐

56. How many times do you and your family cultivate short-term cash crops (< 6 months) per year? 1. One time ☐ 2. Two times ☐ 3. Three times ☐ 4. Not at all ☐

57. Have you and your family ever experienced water shortage or scarcity for the cultivation of rice and other crops (mainly cash crops)?
1. Yes ☐ 2. No ☐ ***(If no, skip to Q58)***

57a. If yes, when do you normally experience it?
1. Rainy season ☐ 2. Dry season ☐ 3. Both rainy and dry seasons ☐

57b. Since over the last 2 years, what has been the condition of water shortage or scarcity in your area?
Year 2016: 1. High ☐ 2. Medium ☐ 3. Low ☐ 4. No idea ☐
Year 2017: 1. High ☐ 2. Medium ☐ 3. Low ☐ 4. No idea ☐

58. Does your family buy water from local supplier / owner and / or private water supplier for agricultural production? 1. Yes ☐ 2. No ☐ ***(If no, skip to Q59)***

58a. If yes, how much do you normally spend for irrigating your rice paddy per hectare or per time?
Riels:..... / ha OR Riels:..... / time

58b. If yes, when do you normally buy water for agricultural production?
1. Rainy season ☐ 2. Dry season ☐ 3. Both rainy and dry seasons ☐

58d. Since over the last 2 years, what has been your family's condition of buying water for agricultural production?

Amount of water needed: 1. Increased ☐ 2. Same as before ☐ 3. Decreased ☐
Price of water: 1. Increased ☐ 2. Same as before ☐ 3. Decreased ☐

59. Are there any water irrigation system nearby your farmlands and living area?
1. Yes ☐ 2. No ☐ ***(If no, skip to Q60)***

59a. If yes, do you use this system to irrigate your farmlands?

Type of Farmland	Use of Water Irrigation System	Size of Irrigated Farmland
▪ Rain-fed rice paddy	1. Yes ☐ 2. No ☐	Year 2017: ..... ha Year 2018: ..... ha
▪ Dry rice paddy	1. Yes ☐ 2. No ☐	Year 2017: ..... ha Year 2018: ..... ha
▪ Fruit crop plantation	1. Yes ☐ 2. No ☐	Year 2017: ..... ha Year 2018: ..... ha
▪ Cash crop plantation	1. Yes ☐ 2. No ☐	Year 2017: ..... ha Year 2018: ..... ha

60. How do you get access to forecast information concerning water availability or rainfall pattern for annual agricultural plan? ***(Can tick more than one of the followings)***
1. By word-of-mouth ☐ 2. Meeting with village chief ☐
3. Meeting with commune chief ☐ 4. Watching TV ☐
5. Meeting with district chief ☐ 6. Meeting with local NGOs ☐
7. Meeting with provincial line departments ☐ 8. Listening to the radio ☐
9. Awareness raising campaign ☐ 10. Poster, banner, signpost, etc. ☐
11. Telephone and SMS ☐ 12. Internet ☐
13. Newspaper ☐ 14. Social media (i.e. Facebook) ☐

61. How do you get access to forecast on possibility of natural hazards or extreme weather hazards during the farming period? ***(Can tick more than one of the followings)***
1. By word-of-mouth ☐ 2. Meeting with village chief ☐
3. Meeting with commune chief ☐ 4. Watching TV ☐
5. Meeting with district chief ☐ 6. Meeting with local NGOs ☐
7. Meeting with provincial line departments ☐ 8. Listening to the radio ☐
9. Awareness raising campaign ☐ 10. Poster, banner, signpost, etc. ☐
11. Telephone and SMS ☐ 12. Internet ☐
13. Newspaper ☐ 14. Social media (i.e. Facebook) ☐

PART4: Local Perceptions of Livelihood Vulnerability

62. What are the common major health problems in your family and village?
(Can tick more than one)
1. Diarrhea ☐ 2. Fever ☐ 3. Typhoid ☐ 4. Malaria ☐ 5. Dengue fever ☐
6. Stomachache ☐ 7. Diabetes ☐ 8. Tuberculosis ☐ 9. Hepatitis ☐
10. Infant mortality ☐ 11. Maternal death during delivery ☐ 12. Malnutrition ☐
13. Respiratory diseases *(coughing, fluenza, etc.)* ☐ 14. Others ☐ *(specify:.....)*

63. What are other major livelihood problems that cause or increase vulnerability upon your family's and community livelihoods? ***(Can tick more than one)***
1. Natural disasters ☐
2. Diseases *(curable, waterborne, and epidemic)* ☐
3. Conflicts over land & NR access and use ☐
4. Decline or loss of livelihood sources ☐
5. Competition with new in-migrants/newcomers ☐
6. Rapid economic development ☐
7. Domestic violence ☐
8. Lack of off-farm job opportunities ☐
9. Lack of markets and market mechanisms for agriculture ☐
10. Indebtedness ☐
11. Limited land for agricultural production ☐
12. Increasing out-migration ☐
13. Lack of labor productivity for agriculture ☐

14. High cost for agricultural production ☐
15. Security and safety (e.g. drug use, gangster, thief, etc.) ☐
16. Lack of labor productivity for farming ☐
17. Others: (specify:……..) ☐

64. Have your family and community ever encountered natural disasters and extreme weather hazards in your area? 1. Yes ☐ 2. No ☐ ***(If no, skip to Q65)***

64a. If yes, what are they? And how severe or dangerous they are on rice production, cash crop production, animal / livestock raising and home-gardening?

Type	Existence	Level of Danger to Rice Crop	Level of Danger to Cash Crop	Level of Danger to Livestock Raising	Damage or Loss of Property	Loss of Animal and Human Life
Floods	1. Yes ☐ 2. No ☐	1. High ☐ 2. Moderate ☐ 3. Low ☐	1. High ☐ 2. Moderate ☐ 3. Low ☐	1. High ☐ 2. Moderate ☐ 3. Low ☐	1. High ☐ 2. Moderate ☐ 3. Low ☐	1. High ☐ 2. Moderate ☐ 3. Low ☐
Droughts	1. Yes ☐ 2. No ☐	1. High ☐ 2. Moderate ☐ 3. Low ☐	1. High ☐ 2. Moderate ☐ 3. Low ☐	1. High ☐ 2. Moderate ☐ 3. Low ☐	1. High ☐ 2. Moderate ☐ 3. Low ☐	1. High ☐ 2. Moderate ☐ 3. Low ☐
Thunder storms / rain storms	1. Yes ☐ 2. No ☐	1. High ☐ 2. Moderate ☐ 3. Low ☐	1. High ☐ 2. Moderate ☐ 3. Low ☐	1. High ☐ 2. Moderate ☐ 3. Low ☐	1. High ☐ 2. Moderate ☐ 3. Low ☐	1. High ☐ 2. Moderate ☐ 3. Low ☐
Wind storms	1. Yes ☐ 2. No ☐	1. High ☐ 2. Moderate ☐ 3. Low ☐	1. High ☐ 2. Moderate ☐ 3. Low ☐	1. High ☐ 2. Moderate ☐ 3. Low ☐	1. High ☐ 2. Moderate ☐ 3. Low ☐	1. High ☐ 2. Moderate ☐ 3. Low ☐

65. How do you get access to forecast on possibility of natural hazards / disasters as well as access to information on disaster prevention and response advice? ***(Can tick more than one of the followings)***

1. By word-of-mouth ☐
2. Meeting with village chief ☐
3. Meeting with commune chief ☐
4. Watching TV ☐
5. Meeting with district chief ☐
6. Meeting with local NGOs ☐
7. Meeting with provincial line departments ☐
8. Listening to the radio ☐
9. Awareness raising campaign ☐
10. Poster, banner, signpost, etc. ☐
11. Telephone and SMS ☐
12. Internet ☐
13. Newspaper ☐
14. Social media (i.e. Facebook) ☐

PART5: Intervention and Organizational Capacity

66. Are there any community-based organizations established in your village / community? 1. Yes ☐ 2. No ☐ ***(If no, skip to Q67)***

66a. If yes, are you and your family member of these CBOs?

Types of CBOs	**Membership**	**Type of Membership**
1. Community Forest ☐	1. Yes ☐ 2. No ☐	1. MC ☐ 2. Ordinary ☐
2. Community Fishery ☐	1. Yes ☐ 2. No ☐	1. MC ☐ 2. Ordinary ☐
3. Community Protected Area☐	1. Yes ☐ 2. No ☐	1. MC ☐ 2. Ordinary ☐
4. Women Livelihood Group ☐	1. Yes ☐ 2. No ☐	1. MC ☐ 2. Ordinary ☐
5. Saving Group / Village Bank ☐	1. Yes ☐ 2. No ☐	1. MC ☐ 2. Ordinary ☐
6. Farmer Water User Community ☐	1. Yes ☐ 2. No ☐	1. MC ☐ 2. Ordinary ☐
7. Farmer Field School ☐	1. Yes ☐ 2. No ☐	1. MC ☐ 2. Ordinary ☐
8. Farmer Producer Group OR Farmer / Agricultural Cooperative ☐	1. Yes ☐ 2. No ☐	1. MC ☐ 2. Ordinary ☐
9. Others ☐ *(specify:……)*	1. Yes ☐ 2. No ☐	1. MC ☐ 2. Ordinary ☐

66b. If yes, what benefits you, your family and community receive from each CBO?
(You may tick more than 1 answer)

Types of CBOs	Types of Benefits	
☐ Farmer Producer Group OR Farmer / Agricultural Cooperative	1. Local empowerment ☐	5. Business management skills ☐
	2. Resource mobilization skills ☐	6. Protection of farmer benefits ☐
	3. Market access and control ☐	7. Better earning from collective action ☐
	4. Management capacity ☐	8. Networking with stakeholders ☐
☐ Saving Group / Village Bank	1. Forest conservation ☐	5. NTFP processing skills ☐
	2. Resource mobilization skills ☐	6. Business management skills ☐
	3. Market access and control ☐	7. Earning from NTFP processing ☐
	4. Management capacity ☐	8. Networking with stakeholders ☐
☐ Women Livelihood Group (WLG)	1. Women empowerment ☐	5. Improved self-respect for women ☐
	2. Resource mobilization skills ☐	6. Protection of women benefits ☐
	3. Gender awareness raising among local people ☐	7. Access to safe financial resources ☐
	4. Opportunities for business development and innovation ☐	8. Networking with stakeholders ☐
☐ Farmer Water User Community (FWUC)	1. Freshwater availability ☐	5. Irrigation system development ☐
	2. Water resource management ☐	6. Access to freshwater for HH use ☐
	3. Less or no expense on water purchase from private sector ☐	7. Access to adequate freshwater for agricultural activities ☐
	4. Management capacity ☐	8. Networking with stakeholders ☐
☐ Farmer Field School	1. Improved knowledge and skills in seed selection ☐	5. Improved knowledge in pesticide or fertilizer consumption ☐
	2. Improved knowledge in soil fertility and protection ☐	6. Access to technical supports for agricultural endeavors ☐
	3. Less or no expense on water purchase from private sector ☐	7. Access to adequate freshwater for agricultural activities ☐
	4. Management skills/capacity ☐	8. Networking with stakeholders ☐
☐ Community Forest (CF)	1. Forest/Freshwater conservation ☐	5. Conservation skills ☐
	2. Resource mobilization skills ☐	6. Protection from natural disasters ☐
	3. Earning form forest patrol ☐	7. Earning from NTFP sale ☐
	4. Management capacity ☐	8. Networking with stakeholders ☐
☐ Community Fishery (CFi)	1. Water conservation for use ☐	5. Conservation skills ☐
	2. Resource mobilization skills ☐	6. Protection of water pollution ☐
	3. Earning form patrol activities ☐	7. Earning from fishing activities ☐
	4. Management capacity ☐	8. Networking with stakeholders ☐
☐ Community Protected Areas (CPA)	1. Forest/Freshwater conservation ☐	5. Conservation skills ☐
	2. Resource mobilization skills ☐	6. Protection from natural disasters ☐
	3. Earning form forest patrol ☐	7. Earning from NTFP sale ☐
	4. Management capacity ☐	8. Networking with stakeholders ☐

67. Have you and your family / community ever received any intervention or assistance to prevent, cope with, and recover from effects of natural disasters and climate change hazards? 1. Yes ☐ 2. No ☐ ***(If no, skip to Q68)***

67a. If yes, who provide intervention or assistance? ***(Can tick more than one)***

1. Village/commune authority ☐
2. District/provincial authority ☐
3. Provincial Department of Environment ☐
4. Provincial Department of Agriculture ☐
5. Provincial Department of Rural Development ☐
6. Provincial Department of Education ☐
7. Provincial Department of Women Affairs ☐
8. Provincial Department of Health
9. District-Level Office of Cadastral ☐
10. District-Level Office of Education
11. Commune-Level Health Care Center ☐
12. Cambodia Red Cross ☐
13. NCDRM ☐
14. Provincial/District CDRM ☐
15. Village/Commune CDRM ☐
16. NCDDS ☐
17. SRL Project ☐
18. INGOs ☐ *(specify: .....)*
19. LNGOs ☐ *(specify: .....)*
20. Others ☐ *(specify:.....)*

68. What kind of intervention or assistance have you and your family / community received in preventing and coping with natural disasters and climate change hazards?

(Can tick more than one)

1. Early warning system (EWS) ☐
2. Weather forecast *(except those of EWS)* ☐
3. Provisional relocation *(e.g. safe hill, provisional shelter, transport, etc.)* ☐

4. Survival gifts *(food, medicine, clothes, water, money, rice and crop seeds, etc.)* ☐
5. Adaptive infrastructures (e.g. irrigation system, etc.) ☐
6. Capacity building for planning and execution of climate-resilient livelihoods ☐
7. Others ☐ *(specify:……..)*

69. Have you and your family / community ever received intervention or assistance related to livelihood adaptive capacity such as climate smart or resilient agricultural production? 1. Yes ☐ 2. No ☐ ***(If no, skip to Q70)***

69a. If yes, what type of agricultural production do those interventions focus on?
(Can tick more than one)

1. Rice cultivation techniques ☐ 2. Cash crop cultivation techniques ☐
3. Home-gardening techniques ☐ 4. Vegetable growing techniques ☐
5. Livestock raising techniques ☐ 6. Others ☐ *(specify:……..)*

70. What strategies or mechanisms have been introduced to help improve climate smart or resilient agricultural production in your farm or community? And have you / your family ever practiced them?
(Can tick more than one)

Related Strategies / Mechanisms	***Practice Experience***
1. Seed selection ☐	1. Yes ☐ 2. No ☐
2. Water drip system ☐	1. Yes ☐ 2. No ☐
3. Water-efficient use and management ☐	1. Yes ☐ 2. No ☐
4. Composting & co-composting	1. Yes ☐ 2. No ☐
5. Capacity building & awareness raising ☐	1. Yes ☐ 2. No ☐
6. Agricultural extension services ☐	1. Yes ☐ 2. No ☐
7. PEST/fertilizer management ☐	1. Yes ☐ 2. No ☐
8. Soil fertility management ☐	1. Yes ☐ 2. No ☐
9. Effective microorganisms producing ☐	1. Yes ☐ 2. No ☐
10. Animal vaccination ☐	1. Yes ☐ 2. No ☐
11. Building of local organizations (e.g. FWUC, F/AC, WU/SC, SLG, etc.) ☐	1. Yes ☐ 2. No ☐
12. Climate resilient water infrastructure (e.g. canal, dug pond, reservoir, tube well, etc.) ☐	1. Yes ☐ 2. No ☐
13. Others ☐ *(specify:……..)*	1. Yes ☐ 2. No ☐

71. What is the extent of your current capacity concerning the followings?
(Circle the number in the scale below that best describe your capacity by taking into account that 1 = lowest capacity or incapable, 5 = highest capacity of very capable)
(Climate resilient production techniques refer to non-conventional farming techniques that enable farmer to adapt to impacts of climate change on agriculture by using techniques that require less water, reduce soil erosion or keep soil fertility, use adaptive seeds / species, or cultivate at the specific time of the year, etc.)

☐ Climate resilient rice production techniques	1 2 3 4 5
☐ Climate resilient fruit and cash crop production techniques	1 2 3 4 5
☐ Climate change hazards prevention & response	1 2 3 4 5
☐ Climate change adaptation	1 2 3 4 5
☐ Natural and human-made disasters management	1 2 3 4 5
☐ Development of DRR and CCA plan	1 2 3 4 5
☐ Water-efficient use & water (infrastructure) management	1 2 3 4 5
☐ Home-gardening techniques	1 2 3 4 5
☐ Livestock raising techniques	1 2 3 4 5
☐ Vegetable growing techniques	1 2 3 4 5
☐ Mixed cropping or integrated farming techniques	1 2 3 4 5
☐ PEST management strategies	1 2 3 4 5
☐ Fertilizer management strategies	1 2 3 4 5
☐ Processing and packaging of agricultural produce	1 2 3 4 5
☐ Sale & marketing strategies for farm and non-farm products	1 2 3 4 5
☐ Value chain and supply chain of local products	1 2 3 4 5
☐ Contract farming and other business contracting procedures	1 2 3 4 5
☐ Business need and feasibility assessment	1 2 3 4 5
☐ Bookkeeping	1 2 3 4 5

☐ Financial management procedures 1 2 3 4 5
☐ Proposal and feedback writing 1 2 3 4 5
☐ Risk and crisis management 1 2 3 4 5
☐ Community leadership 1 2 3 4 5
☐ Farm-based / on-farm entrepreneurship skills 1 2 3 4 5
☐ Non-Farm-based / off-farm entrepreneurship skills 1 2 3 4 5
☐ Community planning and M&E 1 2 3 4 5
☐ Report writing and communication skills 1 2 3 4 5
☐ Conflict resolution skills and techniques 1 2 3 4 5
☐ Others *(specify:.....)* 1 2 3 4 5

72. What is your perception on the level of significance of the following interventions or assistances?

Interventions/Capacity Building	**Level of Significance**	
Farmer water user group	1. Very significant ☐ 2. Significant ☐	3. Not significant ☐ 4. Not significant at all ☐
Saving group / village bank	1. Very significant ☐ 2. Significant ☐	3. Not significant ☐ 4. Not significant at all ☐
Climate resilient / smart agricultural production	1. Very significant ☐ 2. Significant ☐	3. Not significant ☐ 4. Not significant at all ☐
Agriculture/Farmer Cooperative (AC)	1. Very significant ☐ 2. Significant ☐	3. Not significant ☐ 4. Not significant at all ☐
Self-business assessment and community small business feasibility assessment	1. Very significant ☐ 2. Significant ☐	3. Not significant ☐ 4. Not significant at all ☐
Development of DRR and CCA plan for your community (including village and commune)	1. Very significant ☐ 2. Significant ☐	3. Not significant ☐ 4. Not significant at all ☐
Water efficient management (storage, distribution and use)	1. Very significant ☐ 2. Significant ☐	3. Not significant ☐ 4. Not significant at all ☐
Climate resilient water infrastructure development	1. Very significant ☐ 2. Significant ☐	3. Not significant ☐ 4. Not significant at all ☐
Climate resilient infrastructure development (i.e. community roads)	1. Very significant ☐ 2. Significant ☐	3. Not significant ☐ 4. Not significant at all ☐
Natural and human-made disasters reduction and management	1. Very significant ☐ 2. Significant ☐	3. Not significant ☐ 4. Not significant at all ☐
Contract farming and other businesses partnership building and compliance	1. Very significant ☐ 2. Significant ☐	3. Not significant ☐ 4. Not significant at all ☐

Thank you for your time and collaboration!

Annex D: Fieldwork Plan for Conducting Survey in Kampong Thom and Siem Reap

Working Schedule
For Baseline Impact Assessment Survey, Kampong Thom

Date	Mean of Transportation	Duration	District	Commune	Village	Type of Village	Number of Surveyed HH
23/04/18	**Group 1** Van 1, Car 1 **Group 2** Van 2, Car 2	Morning	*Depart from PP for KPT*				
		Afternoon	*Provincial Meeting on*				
24/04/18	**Group 1** Van 1, Car 1	Morning	Kampong Svay	Chey	Trapeang Areaks	Treatment	25
						Control 1	25
		Afternoon	Prasat Balangk	Sala Visai	Chey	Treatment	25
						Control 1	25
	Group 2 Van 2, Car 2	Morning	Kampong Svay	Damrei Slab	Voa Yeav	Treatment	25
						Control 1	25
		Afternoon	Kampong Svay	Damrei Slab	Kab Thlok	Treatment	25
				Kampong Kou	Bou Peung	Control 2	25

25/04/18	**Group 1** Van 1, Car 1	Morning	Prasat Balangk	Phan Nheum	Trapeang Knong	Treatment	25
				Kraya	Sangvat	Control 2	25
		Afternoon	Prasat Balangk	Tuol Kreul	Thnal	Control 2	25
			Santuk	Chroab	Ou Kohkir	Treatment	25
	Group 2 Van 2, Car 2	Morning	Santuk	Tang Krasang	Prampir Meakkakra	Treatment	25
				Ti Pou	Trapeang Trom	Control 2	25
		Afternoon	Santuk	Kampong Thma	L'ak	Treatment	25
						Control 1	25
26/04/18	**Group 1** Van 1, Car 1	Morning	Sandan	Mean Chey	Rumpuh	Treatment	25
						Control 1	25
		Afternoon	Santuk	Pnov	Pnov	Control 2	25
	Group 2 Van 2, Car 2	Morning	Sandan	Ngan	Rovieng	Treatment	25
						Control 1	25
		Afternoon	Sandan	Ngan	Veal Pring Leu	Treatment	25

				Klaeng	Teuk Vil	Control 2	25
27/04/18	**Group 1** Van 1, Car 1	Morning	Baray	Pongro	Pongro	Treatment	25
						Control 1	25
		Afternoon	Baray	Boeng	Boeng Tboung	Control 2	25
				Krava	Pongro Ling	Control 2	25
	Group 2 Van 2, Car 2	Morning	Baray	Sralau	Serei Sameakki Kandal	Treatment	25
						Control 1	25
			Baray	Sralau	Damnak	Treatment	25

Remarks:

- Treatment = target villages which are selected to get interventions from project directly
- Control 1 = the same villages within treatment villages which are selected for those who indirectly affected by the project interventions
- Control 2 = villages which are outside of the project target areas and received nothing from the project interventions

Working Schedule
For Baseline Impact Assessment Survey, Siem Reap

Date	Mean of Transportation	Duration	District	Commune	Village	Time	Type of Village	Number of Surveyed HH
25/04/18	1 Car *(Core team members of GIS)*	Morning	*Provincial Meeting on*					
06/05/2018	**Group1 Group 2**	Morning	*Depart from PP for SR*					
07/04/18	**Group 1** Van 1, Car 1	Morning	Prasat Bakong	Roluos	Roluos Kaeut	០៨AM ០០:	Treatment	25
				Ballangk	Takoy	០៨AM ០០:	Control 2	25
		Afternoon		Kantreang	Souphi	០២PM ០០:	Control 2	25
	Group 2 Van 2, Car 2	Morning	Svay Leu	Svay Leu	Chob Kraom	០៨AM ០០:	Treatment	25
							Control 1	25
		Afternoon		Svay Leu	Thmei	០២PM ០០:	Control 2	25
08/05/18	**Group 1** Van 1, Car 1	Morning	Varin	Srae Nouy	Voat	០៨AM ០០:	Treatment	25

					Srae Nouy	០៨AM ០០:	Control 2	25
		Afternoon		Lvea Krang	Ou Tey	០២PM ០០:	Control 2	25
	Group 2 Van 2, Car 2	Morning	Svay Leu	Ta Siem	Rohal (Kronhoung)	០៨AM ០០:	Treatment	25
							Control 1	25
				Boeng Mealea	Sakda	០៨AM ០០:	Treatment	25
09/05/18	**Group 1** Van 1, Car 1	Morning	Varin	Lvea Krang	Kouk Chan	០៨AM ៣០:	Treatment	25
							Control 1	25
		Afternoon		Varin	Rumdoul	០២PM ០០:	Treatment	25
							Control 1	25
	Group 2 Van 2, Car 2	Morning	Srei Snom	Slaeng Spean	Thlok	០៩AM ០០:	Treatment	25
							Control 1	25
10/05/18	**Group 1** Van 1, Car 1	Morning	Kranlanh	Sranal	Lhong	០៨AM ០០:	Treatment	25
					Phlang	០៨AM ០០:	Control 2	25
		Afternoon		Roung Kou	Roung Kou	០២PM ៣០:	Treatment	25

	Group 2 Van 2, Car 2	Morning	Srei Snom	Chrouy Neang Nguon	Ruessei Sanh	០៨AM ៣០:	Treatment	25
							Control 1	25
		Afternoon		Klang Hay	Slaeng Kong	០៦PM ៣០:	Treatment	25
					Klang Hay	០៦PM ៣០:	Control 2	25
11/05/18	**Group 1** Van 1, Car 1	Morning	Kralanh	Chonloas Dai	Rolum Svay	០៨AM ០០:	Treatment	25
							Control 1	25
					Chonloas Dai	០៨AM ០០:	Control 2	25
	Group 2 Van 2, Car 2	Morning	Prasat Bakong	Bakong	Stueng	០៨AM ០០:	Treatment	25
							Control 1	25
	Group 1 &2	Afternoon	*Depart for PP*					

Remarks:

- Treatment = target villages which are selected to get interventions from project directly
- Control 1 = the same villages within treatment villages which are selected for those who indirectly affected by the project interventions
- Control 2 = villages which are outside of the project target areas and received nothing from the project interventions

Appendix E: Fieldwork Photos in Kampong Thom and Siem Reap Provinces