



SRL Project Endline Report

“Reducing the Vulnerability 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)

Dr. Neth Baromey, Dr. Rith Sam Ol, Dr. Poch Bunnak,
Dr. Heng Naret, Dr. Chhun Sophal, Mr. Tuy Samram,
and Mr. Men Minea

SEPTEMBER 2020
Green Innovation Services, Co., Ltd. (GIS)

Disclaimer: This document is produced by Green Innovation Services Co., Ltd. (GIS) under the Contractual Agreement with the Department of Climate Change (DCC-MoE) of the Secretariat of the National Council for Sustainable Development (GSSD). The views expressed in this report are those exclusively of the authors and do not necessary reflect or represent the views and opinions of DCC-MoE of GSSD/NCSD and her partners, NCDDS and UNDP-GEF.

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

ENDLINE SURVEY REPORT

SEPTEMBER 2020

Submitted by:

Green Innovation Services Co., Ltd. (GIS)
(855) 23 921 26 26 / 16 78 38 99
gis.caminfo@gmail.com / baromeyneth@yahoo.com

Core Team Members:

Dr. Neth Baromey (Team Leader), Dr. Rith Sam Ol, Dr. Poch Bunnak,
Dr. Heng Naret, Dr. Chhun Sophal, Mr. Tuy Samram, and Mr. Men Minea

Table of Contents

List of Tables	i
List of Figures	ii
Acronyms and Abbreviations	iii
Executive Summary	iv
1. Introduction	1
2. SRL Project	2
2.1. Project Objectives and Logical Framework.....	2
2.2. Summary of Project Interventions / Inputs	4
2.2.1. Project Interventions in Small-Scale Water Management Infrastructures.....	4
2.2.2. Project Intervention in Extension Services	6
3. Methodology	11
3.1. Assessment Indicators	11
3.2. Data Collection Methods	12
3.2.1. Documentary Review and Analysis	12
3.2.2. Technical Expert Consultation	13
3.2.3. Key Informant Interviews with Target SNAs	13
3.2.4. Focus Group Discussion (FGD)	14
3.2.5. Household Survey	15
3.3. Impact Evaluation Methodology.....	16
3.3.1. Power Calculation	17
3.3.2. Sampling Method	17
3.4. Data Analysis Methods.....	18
4. Endline Assessment Findings	19
4.1. Project’s Relevance.....	20
4.1.1. Policy Conformity and Alignment	20
4.1.2. Local Preferences and Responsiveness.....	21
4.1.3. Local Perceptions of Interventions and Benefits	22
4.2. Project’s Efficiency.....	25
4.3. Project’s Effectiveness	27
4.3.1. Effectiveness of Small-Scale Water Infrastructures.....	30
4.3.2. Effectiveness of Extension Services.....	34
4.4. Project’s Impact	38
4.4.1. Interventions’ Impacts.....	38
4.5. Project’s Best Practices and Challenges	55

4.5.1. Best Practices	55
4.5.2. Challenges and Limitations	57
4.6. Project’s Sustainability	58
4.6.1. Sustainability of Income Generation and Livelihood Diversification.....	58
4.6.2. Sustainability of Institutionalization and Capacity Development	61
5. Conclusion and Recommendations.....	63
5.1. Concluding Summary	63
5.2. Recommendations.....	64
References.....	66
Appendices	68

List of Tables

Table 2.1:	Project Level Logical Framework	2
Table 2.2:	SRL Project Logical Frame	2
Table 2.3:	Summary of Water Management Infrastructures Provided by SRL in KPT	5
Table 2.4:	Summary of Water Management Infrastructures Provided by SRL in SRP	5
Table 2.5:	Number and Types of Groups Established by CADTIS in SRP and KPT	9
Table 2.6:	Summary of CCT Provided to LIGs and SGs in KPT and SRP	9
Table 2.7:	Group Members Received Training in Resilient Agricultural Techniques	10
Table 2.8:	Types of Training Provided by CADTIS by Types of Group	10
Table 3.1:	Assessment Indicators and Parameters.....	11
Table 3.2:	Number of qualitative informants in the study provinces	14
Table 3.3:	Number of qualitative informants in the study provinces	15
Table 3.4:	Estimated Sample Size for the Baseline Survey.....	17
Table 3.5:	Sample Size Calculation for Selected Household Respondents.....	18
Table 4.1:	Demographic Information of HH Respondents from T and C2 Villages	19
Table 4.2:	Perception of Group Significance by T Respondents	23
Table 4.3:	Perception of Benefits by T HHs.....	23
Table 4.4:	Summary of SNAs' Perception Scores in Relation to Project Interventions	24
Table 4.5:	Local Intervention Costs (Services and Infrastructure Delivery).....	26
Table 4.6:	Estimation of Rice and All Farm-Based Revenues in Five Years	26
Table 4.7:	Comparison of Project Achievements and End of Project Targets	27
Table 4.8:	Comparison of Project Achievements at Endline and Baseline Data	29
Table 4.9:	Perception on Water Infrastructure Intervention by T HHs	31
Table 4.10:	Summary of Rice Production and Yields by Types of Respondent	33
Table 4.11:	Migration Patterns, Size and Purposes by Types of Respondent	36
Table 4.12:	Regression of DiD Framework Analysis (T-C2) on Income by Category	46
Table 4.13:	Changes in Rice Cultivation Efforts, Yield and Migration Behaviors	48
Table 4.14:	Regression of DiD Framework Analysis (T-C2) on Behavioral Change	51
Table 4.15:	Conditions of Water Use and Shortage and Perceived Vulnerability	54
Table 4.16:	Conditions of Water Use and Shortage and Perceived Vulnerability.....	55

List of Figures

- Figure 3.1: Process of DD design for sample population selection 16
- Figure 4.1: Comparison of Perception on Access to Water and Water Sources 32
- Figure 4.2: Comparison of Perception of Danger from Flood..... 32
- Figure 4.3: Comparison of Average Size of Rice Farmland and
Land Left Fallowed..... 34
- Figure 4.4: Comparison of Involvement in Home-Gardening Livelihoods..... 35
- Figure 4.5: Comparison of HH Income and % of Change for KPT and SRP..... 37
- Figure 4.6: Comparison of HH Income of T HHs..... 37
- Figure 4.7: Percentage of Change in Total Income of T, C1 and C2 Groups 39
- Figure 4.8: Illustration of the SRL Project’s Pure Impact (T-C2) without TSSD 40
- Figure 4.9: Total Annual Income of CBOs HHs and C1 and C2 HHs 41
- Figure 4.10: Comparison of Change in Animal Raising Income of T, C1 and C2 42
- Figure 4.11: Illustration of Pure Impact in Income from Animal Sales (T-C2)..... 42
- Figure 4.12: Comparison of HH Income and % of Change for T, C1 and C2 43
- Figure 4.13: HH Income and % of Change for Rice Sale among T, C1 and C2 43
- Figure 4.14: Illustration of Pure Impacts in Income from Rice Sales (T-C2) 44
- Figure 4.15: Comparison of Trends in Rice Yields among T, C1 and C2 44
- Figure 4.16: Comparison of Rice Sale among CBO HHs..... 45
- Figure 4.17: Comparison of Sale from Raised Animals 45
- Figure 4.18: Comparison of Sale from Home-Gardening Produces 46
- Figure 4.19: Comparison of HH Income and % of Change for Remittance 47
- Figure 4.20: Trends in Respondents’ Rice Production Efforts 47
- Figure 4.21: Comparison of Rice Production Efforts per Year 49
- Figure 4.22: Comparison of Residential and Home-gardening Land 49
- Figure 4.23: Comparison of Trend in Leaving Rice Farmland Fallowed..... 50
- Figure 4.24: Summary of Rice Cultivation Patterns and Yield 50
- Figure 4.25: Comparison of Trend in Home-gardening Involvement..... 51
- Figure 4.26: Comparison of Trend in Migration Involvement 52
- Figure 4.27: Illustration of Pure Impact in Migration Involvement..... 52
- Figure 4.28: Comparison of Perception on Water Shortage 53
- Figure 4.29: Illustration of Pure Impact on Perceived Water Shortage..... 53
- Figure 4.30: Comparison of Trend in Perceived Vulnerability to Climate Hazards..... 54

Acronyms and Abbreviations

ANOVA	:	Analysis of Variance
CBOs	:	Community-Based Organizations
CC	:	Climate Change
CDP	:	Commune Development Plan
CIP	:	Commune Investment Plan
DCC	:	Department of Climate Change
DID	:	Difference-in-Difference Design
DIP	:	District Investment Plan
FFS	:	Farmer Field School
FGD	:	Focus Group Discussion
FNA	:	Farmer Need Assessment
GIS	:	Green Innovation Services Co., Ltd.
GSSD	:	General Secretariat for Sustainable Development
HHs	:	Households
ID Poor	:	Identification of Poor Household
KI	:	Key Informant
KII	:	Key Informant Interview
KPT	:	Kampong Thom Province
LIG	:	Livelihood Improvement Group
LNGOs	:	Local Non-Government Organizations
MDE	:	Minimum Detectable Effect
M&E	:	Monitoring and Evaluation
MAFF	:	Ministry of Agriculture, Forestry and Fisheries
MoE	:	Ministry of Environment
MoI	:	Ministry of Interior
MWA	:	Ministry of Women’s Affairs
MOWRAM	:	Ministry of Water Resources and Meteorology
NCCD-S	:	National Committee for Sub-National Democratic Development Secretariat
NCSD	:	National Council for Sustainable Development
NGOs	:	Non-Governmental Organizations
RGC	:	Royal Government of Cambodia
SG	:	Saving Group
SME	:	Small and Medium-Sized Enterprise
SNAs	:	Sub-National Authorities
SRP	:	Siem Reap Province
SRL	:	Sustainable and Climate-Resilient Livelihood
UNDP	:	United Nations Development Programme
VDC	:	Village Development Committee
WLG	:	Women Livelihood Group
WUG/FWUG	:	Farmer Water User Committee / Water User Group

Executive Summary

PROJECT INFORMATION

The Project, "Reducing the Vulnerability of Cambodian Rural Livelihoods through Enhanced Sub-National Climate Change Planning and Execution of Priority Actions (SRL)," aims to ensure that "Sub-national administration (SNA) systems affecting investments in rural livelihoods are improved through climate sensitive planning, budgeting and execution." The SRL project had been implemented in 89 communes and 10 districts of Siem Reap (SRP) and Kampong Thom (KPT) provinces by the General Secretariat of the National Council for Sustainable Development (GSSD-NCSD) and the National Committee for Sub-National Democratic Development Secretariat (NCDDS) between 2017 and 2020.

Green Innovation Services Co, Ltd. (GIS) has been commissioned to carry out both the Baseline Study and the Endline Impact Assessment. To date, the firm successfully completed the Baseline Study in May 2018 and the Endline Assessment in May 2020. The impact assessment focuses mainly on **Outcome 2**, "Resilience of livelihoods for the most vulnerable improved against erratic rainfalls, floods and droughts." To achieve this, the project intervened in two major aspects:

- Facilitate investments in and building of small-scale water management infrastructure.
- Assisting groups of poor and vulnerable people, especially women, to develop livelihood activities requiring only limited amounts of land through: 1) The provision of extension services to establish social capital; and 2) Build local capacity to enhance communities' awareness, knowledge, skills and tools / inputs for agricultural related productions.

In total, 89 water management infrastructure projects were implemented including the construction and renovation of the followings: 1) 36 earth canals, and a concrete canal; 2) 24 earth dams and 20 drifts; 3) 21 pipe culverts and 133 regulators, 5 open ring wells, and 22 ponds. These infrastructures were recorded to have fed approximately 9,038.66 ha of land and benefited about 12,988 people among which 3,030 are female. CADTIS CONSULTANT Co., Ltd. was chosen for the period of 24 months, from April 2018 through to April 2020 to provide extension services:

- Two types of documents: 1) by-laws for Farmer Water User Groups (FWUGs) and Water User Group (WUG), and 2) management and operation guidelines for Saving Group (SG) and Livelihood Improvement Group (LIG and Small Learner Group - SLG) based on guidelines from Ministries associated with governance of the key resources.
- By 2020, the SRL project achieved the end of project target concerning establishing of 160 CBOs (80 in each province) with a total of 6745 members (5,023 female):
- In total, 3,322 members (2,156 females) of WUGs/FWUGs, LIGs and SGs were trained in skills related to management, leadership, legal frameworks, and resilient natural agricultural techniques with regard to animal raising, vegetable growing and rice farming.
- After training, all 40 SGs received Conditional Cash Transfer (CCT) of USD 2,000 to start group operation; while 1,942 members of LIGs (1,309 females) received USD 50 each for start-up the training techniques and implement their chosen livelihoods.
- 22 Farmer Field School (FFS) in the 10 target districts were established;
- Local study tours for 252 members (184 females) were organized.

METHODOLOGY

This project endline assessment was carried out based on five major data sources:

- Project documents, reports and material achievements;

- Consultation with national and international experts;
- Key information interviews with relevant 71 Sub-National Authorities (12 females);
- Focus group discussion with 29 established CBOs; *and*
- Survey interviews with the treatment (THHs) and controlled groups (C1 and C2 HHs).

The SRL project's impacts were focused on the seven impact indicators:

1. Changes in freshwater availability for household and agricultural consumption;
2. Changes in perception of climate change incidences and vulnerability.
3. Changes in yield from rice production;
4. Changes in amount of farmland left fallowed;
5. Changes in efforts and Yield of home-gardening;
6. Changes in migration behaviors;
7. Changes in income from agriculture and related activities;

This Impact Assessment was guided by a statistical power calculation and sampling design, the DID design method, which were developed since the Baseline survey period and was re-implemented at this Endline Study with as much the same households (HHs) as can be found. The outcome comparison between T and C2 groups would demonstrate the pure impact of the project, while the historical outcome measures between T and C1 groups and between C1 and C2 groups would indicate the project's spillover impact over time.

ENDLINE ASSESSMENT FINDINGS

▪ Relevance

The SRL project is strongly relevant and responsive to the national policies and local needs due to the applicable intervention designs, and choices of implementation approaches and procedures that meaningfully engaged the most important strategic partners (i.e. NCDDS and SNAs) and target local participants in a timely and proper manner.

▪ Efficiency

Cost-benefit analysis of the two major interventions is also found to be substantially efficient in terms of value of money spend. The research team found that monetary benefits that can be potentially generated from the synergy of the two interventions for the period of five years, **USD 7,048,525** (average of benefits from T HHs) or **USD 13,995,875** (average benefits from all types of CBO members) (See **Table 4.4** for detailed calculation), fairly exceeds the entire costs of the SRL project (**USD 5,273,236**) or costs of interventions, **USD 2,088,053** (while costs of all direct local support to funding small-scale water management infrastructure and delivery of extension services is only **USD 1,873,903.71**).

▪ Effectiveness

In general, the SRL project is effective; most of the key achievements have exceeded the end of project targets, except the formation of the agricultural cooperatives:

- At least 100 climate resilient infrastructure schemes were planned and 89 projects were completed by April 2020; 262 schemes were built/renovated.
- Target local HHs were planned to gain benefits from resilient infrastructure schemes and 12,988 HHs (3,030 female) were recorded to have benefited, among which 3,627 HHs and 3,030 females were members of WUG/FWUG.

- About 66% of LIG members (2,922 HHs) participating in livelihoods trainings had adopted at least one resilient livelihood technique, while end of project target is 60%.
- 160 farmer groups (LIG, FWUG/WUG, SG) were established (6,745 members and 5,023 females) as planned for the end of project target.
- 40 SGs were established and provided with Conditional Cash Transfer (CCT) of USD 2,000 for each group as planned.
- 20 SLGs and 22 FFSs were successfully established from among the LIG members.
- However, none of the planned 10 Agricultural Cooperatives (AC) was established.

▪ **Impacts on Income Generation**

General Annual Income: Overall, if only annual income is examined and compared, the SRL project's impact is small yet ($p>0.05$), which may be due to implementation time limitation, hasty assessment and other obstacles such as COVID-19 pandemic outbreak. T HHs' annual income is USD 3,682, while C1 HHs' is USD 3,679 and C2 HHs' is USD 3,723. This makes T HHs' income increased 29.2%, C2 HHs' 28.7% and C1 HHs' 9.6%. Annual income of WUG/FWUG HHs increased 58% followed closely by SLG HHs (57%) and LIG HHs (49%). Only SG HHs' income decreased 11%.

Chicken Sale: The SRL project has positive pure impact on chicken sale of T HHs ($p=0.049$). T HHs' sale increased 62%, when C1 HHs' increased 21% and C2 HHs' decreased 20% instead. For CBO HHs, positive impact was found among LIG HHs ($p=0.000$) whose chicken sale increased 68%. SLG HHs' sale increased 131%, while FWUG/WUG HHs and SG HHs also increased about 30% each.

Vegetable Sale: Impacts on vegetable sale is positive ($p=0.001$). T HHs' sale increased 122%, when C2 HHs and C1 HHs' increased around 30% only. Despite insignificant statistical relation ($p>0.05$), all CBO HHs (except SG HHs) have increased vegetable sale. SLG and FWUG/WUG HHs' sale increased nearly 400%, while LIG HHs' increased 173%. Only SG HHs' sale decreased 6%.

Rice Sale: Impacts on rice sale is high for LIG HHs ($p=0.042$) whose rice sale increased 74%. Despite insignificant relation ($p>0.05$), T and C2 HHs increased rice sale around 8%, while C1 HHs increased this sale to 50%. FWUG/WUG and SLG HHs' sale also increased (38% and 11% respectively). Only SG HHs' rice sale decreased 48%.

Non-Agricultural-Based Income: In principle, the project's intervention did not affect remittance ($p>0.05$) of T HHs or CBO HHs. T HHs' remittance increased 43%, while C1 HHs' did 6% and C2 HHs' increased 79%.

▪ **Impacts on Perceptual and Attitudinal Change**

Rice Farming Behaviors: Overall, the project has positive impact on improved attitude toward rice farming ($p=0.004$). 6% more of T HHs have increased involvement in rice farming more than once a year, while C2 HHs decreased 3% of HHs who farmed more than one time per year. LIG and SG HHs are more involved in farming effort than other CBO HHs.

Land Use and Left Fallow: T HHs used nearly all land available, while C1 and C2 HHs left about 20%-30% of their farmlands fallowed, though the statistical relation is non-significant ($p>0.05$). WUG/ FWUG HHs increased amount of farmland but reduced that left fallowed more than other CBOs'; their average amount of land increased about one hectare and they cultivated them all.

Migration Behaviors: Statistically, SRL's interventions affect migration behavior ($p=0.007$). T and C1 HHs has similar proportion of migration involvement that is less than C2 HHs. LIG HHs seems to be more involved in outmigration than other CBO members ($p=0.002$).

Water Access and Climate Vulnerability: Interventions in water infrastructures affected water access ($p=0.003$) and climate vulnerability, especially drought ($p=0.005$). Less percentage of T HHs perceiving shortage of water for agriculture. In contrast, 18% of C2 HHs stated increase water shortage for agriculture. Yet, perceived vulnerability remain severe in terms of drought; FWUG/WUG and SLG HHs reported drought more than other CBO HHs ($p=0.005$ and 0.026 in that order).

▪ **Project's Best Practices and Challenges**

Best Practices: The SRL project was successful to some extent due to the followings:

- Application of collaborative frameworks and co-funding policy with SNAs to address climate change impacts on local livelihoods;
- Application of bottom-up approach to identify intervention aiming to consolidate the results of need assessment with CIP/CDPs to ensure long term application and financing;
- Employment of transparent and accountable procurement procedures;
- Employment of criteria-based approach in selecting the project beneficiaries;
- Collaboration between strategically important stakeholders (i.e. MoE and NCDDS);
- Alignment of interventions with nearby projects' prominent interventions;
- Introduction of interrelated and complementary livelihood interventions; and
- Introduction of knowledge exchange platform (FFS/SLG) to share information and farming experience among both beneficiaries and non-beneficiaries.

Challenges and Limitations: The project could not realize its full impact due to:

- Partial or incomplete function of small-scale water management infrastructures;
- Limited timeframe for implementation of the livelihood interventions, which led to immaturity of established CBOs and incomplete function of infrastructures;
- Selection of extremely poor or vulnerable HHs for interventions, which take much longer time and more effort to create positive impacts and behavior change;
- Increasing occurrence and intensity of extreme climate events in recent years;
- Dependency of small-scale water management infrastructure (esp. irrigation canal) on the availability and sufficiency of the major connecting canals in the areas;
- Frequent change of SNA representatives to collaborate with the contracted service provider (CADTIS) in implementing interventions; and
- Outbreak of COVID-19 pandemic that has severely impeded the implementation process.

▪ **Sustainability Assessment and Recommendation**

The SRL project's impacts on income generation are positive for farmed-based income categories (sale of rice, home-garden produce, raised animals) although it is not very favorable for all types of CBO HHs (i.e. SG HHs). Yet, the project's sustainability still remains a concern due to: 1) SNAs' capacity to continue extension services; 2) immaturity and inadequate technical capacities of CBO HHs; 4) shortage of entrepreneurial motive among CBO HHs; 5) low monetary gains (in contrast to the percentage of change) and its adequacy for HH expenses and for enhancing HH welfare so that beneficiaries will stay at home continuing these farm-based livelihoods.

The largest farm-based income should be from the sale of rice, yet this has not been the case due mainly to: 1) increased intensity of drought over the past years, 2) the partial function of the SRL's water management infrastructures, 3) the beneficiaries' limited attention to capacity building with regard to resilient rice farming techniques, and 4) the lack of mechanism to deal with price fluctuation and swindle caused by local or external rice dealers.

Income from farm-based livelihoods has potential to rise higher when the following factors are thoroughly considered: 1) assurance that small-scale water management infrastructures function fully; 2) target farmers changed their perception of rice farming and farm-based livelihoods from an endeavor for subsistence to be an agro-enterprise; 3) additional interventions are in place to hearten locals' attention on skill development in climate resilient agriculture and entrepreneurship, and 4) enhancement of market mechanism and/or institutionalization of agricultural cooperative to reduce unnecessary variability, ensure realistic market access and price, as well as to inspire locals' commercial spirits. In the present situation, due to the rise of health conscious markets with trend in consuming safe agricultural produces, the local people have a good chance to enhance farming production system and sell their harvested produces with more reasonable price. Besides, the issues of water shortage for home-gardening can also be reduced / solved with further intervention in additional smart agricultural technologies (e.g. raised-bed garden with sprinkler drip system, etc.).

In summation, there is a chance that the SRL's impacts can be increased and sustained provided an extension of project timeframe and further interventions are established taking into serious account the following issues:

1. Ensuring that small-scale water infrastructures fully function from 2021 onward;
2. Providing additional appliances for WUGs to enable access to community pond water;
3. Fully formalizing WUGs/FWUGs and aligning them with other established structures, and establishing the financing mechanisms to properly maintain provided infrastructures;
4. Offering more capacity building to WUG/FWUG committee in skills related to relevant legal frameworks, management, leadership and financial management, etc.;
5. Enhancing capacity building in necessary skills for climate resilient rice production, especially with regard to seed selection, safe production, post-harvest management, etc.;
6. Delivering interventions in establishment of agricultural cooperative to encourage larger scale agricultural production and rural entrepreneurship development;
7. Adding interventions in capacity building for CBOs and enhancing management systems;
8. Providing more trainings for SG members specifically as they received the least impact presently while being less motivated and inclined to adopt supplementary livelihoods;
9. Providing supplementary supports and technical trainings for LIG HHs by paying specific attention to: 1) business development; 2) risk / disease prevention and management; 4) post-harvest disease prevention; 5) safe storage, packaging and transportation, etc.; and
10. Providing additional trainings to supporting SNAs to enhance their capacity and skills to adequately support and coordinate further intervention and implementation at local level.

1. Introduction

The Royal Government of Cambodia (RGC) has taken strategic and systematic steps to respond to increasing climate change phenomena and its negative impacts on rural economy, infrastructural system, environment, and people's quality of life and welfare. Rural and remote areas, where subsistence agriculture and natural resources are their main sources of livelihoods, are particularly at risk. One of the major strategies to date is a 4-year project named "Reducing the Vulnerability of Cambodian Rural Livelihoods through Enhanced Sub-National Climate Change Planning and Execution of Priority Actions (SRL)." This project has been implemented in **89 communes and 10 districts of Siem Reap (SRP) and Kampong Thom (KPT) provinces** by the Department of Climate Change (DCC) of the General Secretariat of the National Council for Sustainable Development (GSSD-NCSD) and the National Committee for Sub-National Democratic Development Secretariat (NCDDS).

Green Innovation Services Co, Ltd. (GIS) has been commissioned to carry out the project evaluation to assist the SRL project management and implementation teams in thoroughly gathering precise baseline data and in measuring accurate project's progress, performance and impacts. To date, the firm has successfully completed the Baseline Study in May 2018 and the Small-Scale Follow-Up Survey in mid-2019. The Endline Assessment was conducted in May 2020.

This project is designed to provide long-term benefits to marginalized and vulnerable Cambodians, especially poor, landless and land-poor, female-headed households and households with disability living in rural and remote areas of the two target provinces. The project includes a number of investments in small-scale water management infrastructure, technical assistance to climate resilient agricultural production techniques and practices, and capacity building targeting mainly poor women in the communities. Additionally, this project aims to enhance the technical and administrative capacities of the target sub-national administrations/authorities (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.

Enclosed herein **Table 2.2** the project's logical framework (log-frame) illustrates the entire strategic logical flow from objectives to outcomes, outputs, indicators and project targets. Yet, the scope of assessment assignment for GIS team is mainly on the **SRL Project's Outcome 2**. This outcome focuses on the project's impacts on community livelihoods, specifically their alternative income generation capacities and their awareness of climate change and capacities to implement the project's interventions as well as to plan their available meager resources (i.e. land and money) in climate-smart manners. Partially, GIS's assessment also looks at the provided capacity buildings for targeted sub-national authorities and the constructed small-scale water infrastructures as well as their associated effects on climate smart planning, policies and local livelihood production.

Precisely, the objectives of this endline assessment are to:

1. Examine the project's outputs in relation to number, scope and purposes of interventions in small-scale water infrastructures, extension services for project beneficiaries' and partially SNA's capacity building;
2. Assess the project's performance and success in terms of relevance, effectiveness, efficiency, impact, and sustainability;
3. Collect lessons learned (best practices and key challenges) from the project's implementation and suggest further intervention approaches and strategies in order to

maximize and sustain positive impacts and minimize negative impacts on local livelihoods in the context of increasing climate change events.

2. SRL Project

2.1. Project Objectives and Logical Framework

The SRL project commenced its implementation in July 2016 and will end in December 2020. The project's log-frame, which includes objectives, outputs, outcomes and sustainability, has been constructed by the joint implementation team from DCC-GSSD/NCSD and NCDDDS with strong support from UNDP-GEF. According to the SRL's Project Document, the overriding objective of the SRL project is to ensure that "***Sub-national administration systems affecting investments in rural livelihoods are improved through climate sensitive planning, budgeting and execution.***" **Table 2.1** provides an illustration of the project objective, how the project's impacts and sustainability will be measured, and its end of project target.

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 climate change adaptation in their development plans and investment programs following NCDDDS 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

In order to achieve this overriding impact, three strategic objectives, together with specific associated outputs, outcomes and measurement indicators were developed. **Table 2.2** encompasses the summary of these objectives, relevant outputs and outcomes, measurement indicators and tentative end of the project target of each strategic project objective based on the provided key Project Documents and log-frame.

Table 2.2: SRL Project Logical Frame

Project Objective	Outcomes	Outputs	Indicators	Project Target
Project Objective: Sub-national administration systems affecting investments in rural livelihoods are improved through climate sensitive planning, budgeting and execution	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 (<u>AMAT Indicator 13</u>)	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	Number of engineers and technicians (public sector, private	At least 50 engineers and technicians trained using hands-on,

Project Objective	Outcomes	Outputs	Indicators	Project Target
<p>Project Impact Indicator: 20% increase in income from agriculture and linked activities of target smallholder households</p> <p>Sustainability: Number of Districts and Communes integrating CCA in their development plans and investment programs following NCCDS guidelines</p> <p>End of Project Target At least 6,000 households increase income from agriculture by 20% compared with baseline</p> <p>10 Target Districts and 89 Communes have formulated climate change adaptation strategies integrated in plans and IP</p>		climate-resilient livelihood techniques and sustainable assistance to communities	sector and civil society) trained in delivery of climate resilient water infrastructure	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		
		Output 1.4 Knowledge management platform for sub-national Climate Change Adaptation Planning and resilient livelihoods support established	N/A	N/A
	Outcome 2 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 CSF	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 (AMAT Indicator 3)	At least 60% of HHs participating in livelihoods trainings adopted at least one resilient livelihood technique (half of the uptake is by women)
	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.	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)

For the purpose of this impact assessment, the GIS team was commissioned to focus mainly on **Outcome 2** and especially **Output 2.2** as stated in the ToR and further discussed during the project briefing at the Inter-Technical Team meeting (UNDP-DCC-NCDDS-GIS) on 13 November 2017 at the Ministry of Environment (MoE). The subsequent section explains the project interventions and achievements, particularly interventions that are specifically related to Outcome 2, at the time of the endline survey.

2.2. Summary of Project Interventions / Inputs

The SRL project's **Outcome 2** is, "*Resilience of livelihoods of the most vulnerable improved against erratic rainfall, floods and droughts.*" To achieve this, the project intervened in two major aspects:

- Facilitate investments in small-scale water infrastructure and water management.
- Groups of poor and vulnerable people, especially women, have been assisted to develop proper livelihood activities requiring only limited amounts of land. They have also received complementary supports for social capital building activities including leadership trainings and formation of saving groups.

Section 2.2.1 below summarizes the interventions and total investments in terms of small-scale water management infrastructures, and **Section 2.2.2** summarizes extension services in terms of numbers of activities and groups, including number of group members established by the selected service provider (CADTIS, Co., Ltd.), as well as investments provided by the SRL project through CADTIS. These sections are prepared in order to demonstrate how the two outputs (i.e., from small-scale water management infrastructures and extension services) have been designed to synergize each other in order to promote ultimate community resilient livelihoods.

2.2.1. Project Interventions in Small-Scale Water Management Infrastructures

Support for small-scale water infrastructures was implemented through co-finance investments in production-linked small-scale water infrastructures. The financed water infrastructures have been prioritized and selected from the Commune Investment Programs and for which base costs are financially supported by Commune/Sangkat Fund (CSF).

Based on purposes and functions designed for water management infrastructures, it appears that water infrastructure schemes are mostly rice irrigation system. However, scheme identification was based on the climate change-mainstreamed local development planning process and on selection criteria reflecting climate change vulnerability. Scheme design for particular location and locality was carried out in a participatory manner involving beneficiary farmers who are members of the Farmer Water User Group (FWUG) or Water User Group (WUG).

Schemes supported by the SRL project include (either new construction or restoration of old ones): 1) irrigation canal, 2) dam, 4) drift, 5) community pond, 6) watergate, 7) regulating gate / regulator, and 8) installment of ring pits. Assessment of the design's suitability and quality of water management infrastructures is beyond the scope of this study. This endline impact assessment only focuses on quantity, implementation process and measurement of the infrastructures provided (see **Table 2.3 and Table 2.4**). In summation, according to monitoring progress report from NCDDS (April 2020), the following water management infrastructures were constructed and restored in the two target provinces:

- In total, **36 earth irrigation canals** with a total length of 48,673m (18 lines = 27,240m in KPT and 18 lines = 21,433m in SRP) were constructed and restored with KPT receiving **an additional line of concrete canal of 437m length**.
- Earth dams and drifts were also restored and built in both provinces: 1) **24 earth dams** (14 lines in KPT = 4,536m and 10 lines in SRP = 2,708m) and 2) **20 drifts** (10 lines in KPT = 183.13m and 10 lines in SRP = 265m).

Table 2.3: Summary of Water Management Infrastructures Provided by SRL in KPT

Description	No	Measure	Profited Land	Benefited Group – WUGs/FWUGs	
				Total	Female
Kampong Thom Province					
Earth Canals	18	L=27,240m	3,532.29 ha	5,866 HHs	2,121 HHs
Concrete Canals	1	L=437m			
Community Ponds	8	Storage: 105,700m ³			
Drift	10	L= 183.13m			
Pipe Culverts	19				
Earth Dams	14	L= 4,536m			
Regulators	78	R=1m R= 0.6m Rectangular:(4-20)*(2-5)*(1.5-4)m			
Open ring wells	5				

Sources: Outcome reports on small-scale water management infrastructures 2017-2019 (NCDD: July 2020)

- Water infrastructure's necessary facilities / ancillaries, which enable them to function more effectively, were also added and repaired: 1) **21 pipe culverts** were provided (19 in KPT and 2 in SRP); 2) **133 regulators** were built and renovated (81 in KPT and 60 in SRP); 3) **122 rounded Watergates** (78 in KPT and 55 in SRP) and **5 Open ring well** in KPT were built.
- In response to local needs of water for either household consumption or small-scale home-gardening, as well as for conserving fish species /seedlings, **22 community ponds** were restored and newly dug up (8 in KPT and 14 in SRP).

Table 2.4: Summary of Water Management Infrastructures Provided by SRL in SRP

Description	No	Measure	Profited Land	Benefited Group – WUGs/FWUGs	
				Total	Female
Siem Reap Province					
Earth Canals	18	L=21,433m	5,506.37 ha	7,122 HHs	909 HHs
Earth Dams	10	L=2,708m			
Community Ponds	14	Storage:187,900m ³			
Drifts	10	L= 265m			
Regulators	55	R=1m R= 0.6 Rectangular:(4-20)*(2-5)*(1.5-4)m			
Pipe Culverts	2				

Sources: Outcome reports on small-scale water management infrastructures 2017-2019 (NCDD: July 2020)

These infrastructures were recorded to have fed approximately 9,038.66 ha (3,532.29ha in KPT, 5,506.37ha in SRP) of land and benefited at least 12,988 people (5,866 in KPT, 7,122 in SRP) among which 3,030 are female (2,121 in KPT, 909 in SRP). Specifically, those directly and significantly benefited from these water infrastructures are members of LIGs and members of WUGs/FWUGs as these Community-Based Organizations (CBOs) and their members reside along the infrastructures and were formed to use and maintain them. Some of these infrastructures have already been set to function since 2019, but some of them will start to function in the rainy season of this 2020. (See **Table 2.3**, **Table 2.4** for details)

2.2.2. Project Intervention in Extension Services

SRL's **Output 2.2** is, "*Climate-resilient livelihood measures demonstrated in 10 districts targeting landless women and farmers practicing rain-fed agriculture.*" From the onset, the project aimed to support selected groups of climate-vulnerable smallholder and landless farmers to participate in relevant trainings on climate-resilient agriculture-based livelihood techniques and practices, together with associated activities designed to assist the farmers to them.

Actual detailed plans for **Output 2.2** activities (including type of established groups or CBOs and what techniques to be trained in the target localities) were firmly based on climate resilient local development planning (**Output 1**) and on a participatory "Farmer Needs Assessment", which is an analysis of climate vulnerabilities, access to water including rainfall patterns, local resources such as canals and reservoirs, opportunities for livelihoods and identification of suitable training topics needed in the specific beneficiary communities. Detailed information concerning Farmer Needs Assessment is in **Annex 2**, and is not fully described in this endline assessment report.

Output 2.2 were designed to assist farmers to make efficient use of existing water resources and improved access to water resulting from the investments under **Output 2.1**. Specifically, the SRL project supports three distinct sub-groups of farmers:

1. Poor and vulnerable women who lack access to land;
2. Vulnerable commercial smallholders (women and men) with access to sufficient land to grow a field crop for sale; *and*
3. Farmers benefitting from water infrastructure investments who were a high priority for rain-fed agriculture activities. From amongst beneficiary communities, the basic criteria for group participation were those who are committed to investing time and resources in learning and adopting new or improved agriculture livelihood techniques.

To achieve Project **Outcome 2.2**, especially to carry out the extension service programs and activities, **CADITS CONSULTANT Co., Ltd. with 15 staffs** was selected to provide field-based service delivery in target communities for the period of 22 months, starting from April 2018 through to March 2020. A two-month extension was made until the end of April 2020 to support smooth and successful function transfer from CADTIS to the target SNAs. CADTIS had been contracted with NCDDS to provide assistance and service delivery in the forms of:

1. Producing necessary regulatory documents and management frameworks / guidelines for each type of group established by SRL project (e.g. by-laws, rules and regulation, etc.) for group governance;
2. Establishing 5 types of groups identified in the SRL project documents and according to the results of Farmer Need Assessment;
3. Provide on-going skill development and support service delivery to organized group members; and
4. Transfer of cash and materials inputs provided by SRL project to appropriate organized group members and monitor to ensure that funds are used accordingly.

According to their end of service report to NCDDES (April 2020), CADTIS has implemented 18 major activities including:

- Activity 1: Preparation of initial document for establishment of WUGs/FWUGs;
- Activity 2: Establishment of FWUG and WUG;
- Activity 3: Establishment of Livelihood Improvement Group (LIGs);
- Activity 4: Establishment of Saving Group (SGs);
- Activity 5: Establishment of Smallholder Learning Groups (SLGs);
- Activity 6: Conduction of Farmer Needs Assessment (FNA);
- Activity 7: Development of training materials for resilient agricultural techniques;
- Activity 8: Conduction of local study tours;
- Activity 9: Establishment of Farmer Field Schools (FFS);
- Activity 10: Provision of trainings for leaders of WUG/FWUG
- Activity 11: Provision of trainings for SGs;
- Activity 12: Provision of trainings for chicken raising groups (CRG);
- Activity 13: Provision of trainings for vegetable farming (VGG) and frog raising groups;
- Activity 14: Provision of trainings for rice cultivating groups (RCG);
- Activity 15: Provision of trainings for SLGs;
- Activity 16: Conduction of re-dissemination meetings for SGs;
- Activity 17: Conduction of echo-trainings for leaders of WUGs/FWUGs and SGs; and
- Activity 18: Transfer of cash (**50\$/LIG member and 2000\$/SG**) for farmer groups.

For preparation of regulatory documents and management frameworks / guidelines for group establishment and operation, CADTIS has produced two main types of documents: 1) by-laws for WUGs/FWUGs and 2) management and operation frameworks / guidelines for LIGs and SGs.

- Contents and principles of these legal documents were based on relevant overriding Ministry associated with governance of the key resources. For instant, by-laws for WUGs/FWUGs were based on Guidelines provided by Department of Farmer Water Users (DFWU), Ministry of Water Resources and Meteorology (MOWRAM), particularly on Prakas N° 306 and Regulation N° 01 of the MOWRAM (Steps to Develop FWUG /WUG).
- Management and operation framework/guidelines for formation of LIGs and SGs were based on the process used by NCDDES for formation of Livelihood Improvement Groups (following the Tonle Sap Poverty Reduction and Smallholder Development Project - TSSD project) but there was less emphasis on selection based on poverty ranking and on voluntary self-selection based on interest to engage in and commit to livelihood activities.

By April 2020, CADTIS has established 160 groups, 80 in each target province. (i.e. about 16 per each district of 10 target districts in total); each group would consist of approximately 25 women. The group is selected from a list of livelihood activities based on suitability to local circumstances, access to product markets and interest of the group members. There were four types of group established: LIG, SG, SLG, WUG/FWUG. (See **Table 2.6** for specific numbers and members of each group established in each province)

The followings briefly describe functions of each specific group or CBO and their underlying regulatory documents:

- **WUGs/FWUGs** are established to ensure that sustainable operation and maintenance arrangements for small-scale water management infrastructures are in place. Yet, activities of these CBOs will go beyond the “baseline” of the standard WUG/FWUG related activities and will seek to develop the WUGs/FWUGs into an effective farmer organization (i.e. agricultural cooperative or AC) capable of raising awareness of climate change

challenges and adaptive responses amongst its members, and of organizing cooperative production, marketing and / or credit activities amongst its members. This is likely to involve the FWUGs/FWUGs having a dual identity as an agricultural cooperative. The difference between FWUG and WUG is that FWUG membership spans across villages that have received construction or renovation of irrigation canals and other necessary facilities, while WUG is organized at village level specifically for those that have received construction or renovation of community ponds and wells.

- **40 WUGs/FWUGs** have been established (20 in each province) with a total of **3,627 members (KPT= 2,430; SRP= 1,197)**, in which **3,030** members are female. None has been promoted to become an agricultural cooperative.
- **LIGs** are expected to empower and enable community beneficiaries to realize a sustainable increase in income from agriculture and closely linked activities, based on application of climate-resilient improved techniques. Particularly, LIGs aim to support poor and vulnerable women to adopt or improve climate-resilient agricultural livelihood activities that do not require large amounts of land or labor through technical skill development trained by CADTIS staffs, access to assistance and supports provided by CADTIS staffs and access to fund (i.e. from SG and Conditional Cash Transfer - CCT). LIG's sub-group schemes based on local assessment and preference include: 1) vegetation growing group (CGG), 2) domestic animal (chicken/ duck/frog raising) (DARG), and 3) rice production group (RPG).
 - Totally, there are **80 LIGs (40 for each province) with 2,094 members (1,309 female) established by March 2020.**
- **SLGs** are groups of smallholders and outstanding or model farmers established to enhance members' smallholding productions and enterprises through improved technical skills and assistance from the SRL's extension services, while concurrently provide practical learning opportunities for LIG members to learn from these local peers who have excelled themselves in implementing resilient livelihood techniques by actual demonstration shown through Farmer Field Schools, in addition to technical training and study tour provided by CADTIS staffs. SLG members can be outstanding members of LIGs or ordinary local beneficiaries that have already advanced their own investment / small business venture in the assisted resilient livelihoods and need additional technical trainings for better performance and maybe market opportunity through agricultural cooperative in the future.
 - Totally, there are **20 SLGs with 500 members (334 female) established by March 2020** in all target areas.
- **SGs** aim at forming a savings scheme in cooperation with a microfinance institution (MFI) that is active in the area. Initially this would involve a joint deposit account managed by the group members followed subsequently by disbursing loans according to rules and conditions agreed within the group. The group may engage in other types of cooperative action, for example in purchase of inputs for the livelihood activity or in marketing of the products.
 - Totally, there are **40 SGs (20 for each province) with 1,024 members (684 female) established by March 2020.**

Table 2.5: Number and Types of Groups Established by CADTIS in SRP and KPT

Description	LIG	SG	SLG	WUG/ FWUG	Total
Total # in KPT	40	20	10	20	80 (excl. SLG)
# of members	Total: 1,021 Female: 586	Total: 524 Female:300	Total: 250, Female:157	Total: 2,430 Female: 2,121	Total: 3,975 Female: 3,007
Total in SRP	40	20	10	20	80 (excl. SLG)
# of member	Total: 1,073 Female: 723	Total: 500 Female:384	Total: 250, Female:177	Total: 1,197 Female: 909	Total: 2,770 Female: 2,016
Grand Total	2,094	1,024	500	3,627	6,745 Female: 5,023

Sources: NCDDES (July 2020); SLG members are also LIGs', so they are excluded from total sum

The SRL project also provides a **CCT of USD 50 to each members of LIG** and **USD 2,000 for a SG** as start-up fund when registered with a local bank or micro financial institution (MFI). The purpose of conditional cash transfer is to offset the cost and risk to poor households of investing in the start-up costs of a climate resilient livelihood activity. Group members were expected to demonstrate that they have invested significant resources (own labor, agriculture inputs, etc.) in livelihood activities subjective of the trainings. Noticeably, the cash transfer approach aimed at covering the actual costs of starting climate-resilient livelihood activities, initially paid for by the beneficiaries themselves, and hence, enhancing the ownership and sustainability of investments.

Table 2.6: Summary of CCT Provided to LIGs and SGs in KPT and SRP

No	Province	No of LIGs	No of Members	Fund (USD)	No of SGs	No of Members Borrowed from SG	Fund Borrowed (USD)
1	KPT	40	910	45,500	20	308	47,400
2	SRP	40	1,032	51,600	20	272	39,200
Total		80	1,942 F:1,309	97,100	40	580	86,600

Source: CADTIS's End of Project Report (April 2020)

To ensure effectiveness of agricultural skill development and outcomes of LIGs, CADTIS has also established 22 FFSs in the 10 target districts (11 in each province). The main purpose of FF is to provide members of LIGs, SLGs and future interested villagers a place for learning and practices not through abstract training but through demonstration of actual practices by key selected farmer that is a member of established LIGs or non-group member that is residing in the locality. CADTIS organized local study tours for 252 members (184 female) to visit nearby successful TSSD's programs. Additionally, on-going capacity building activities for leaders and selected members of WUGs/FWUGs, LIGs and SGs were also provided by CADTIS's staffs (see detailed in **Table 2.7**). The contents / topics for each group's trainings are listed in **Table 2.8**.

Table 2.7: Group Members Received Training in Resilient Agricultural Techniques

Year	Pro- vince	FWUG/WUG Participants		SG Participants		LIG Participants		SLG Participants	
		F	Total	F	Total	F	Total	F	Total
2018	KPT	23	77	21	34	647	998	77	125
2019		12	86	28	38	304	495	100	125
2018	SRP	3	20	19	33	711	982	84	125
2019		47	85	15	27	326	447	73	125
Total		85	268	83	132	1988	2922	334	500

Source: CADTIS's end of project report (April 2020)

Table 2.8: Types of Training Provided by CADTIS by Types of Group

Groups	Types of Trainings/ Dissemination Workshops
WUG/FWUG	<ul style="list-style-type: none"> ▪ Training for committee members, district officers and commune council about roles and responsibility of committees in developing by-laws ▪ Training on development of WUG/FWUG by-laws ▪ Training for committee members, sub-committee members, village and commune chief about: <ul style="list-style-type: none"> • Roles and responsibility, as well as management structures of WUGs/FWUGs as defined by participatory developing by-laws • 5-year action plans for WUGs/FWUGs
SG	<ul style="list-style-type: none"> ▪ Training on book keeping methods ▪ Training on record of financial transaction ▪ Training on saving group management ▪ Training on conflict resolution methods
SLG	<ul style="list-style-type: none"> ▪ Same with LIG plus practical demonstration by FFS model farmers
LIG/CRG	<ul style="list-style-type: none"> ▪ Training on techniques for preparation of henhouse and required materials ▪ Training of techniques for chick selection and chicken breeding ▪ Training on techniques for chicken breeding and care of chicks ▪ Training on techniques for preparation of chicken food ▪ Training on techniques for caring of chicken health (e.g. vaccination) ▪ Training on economic analysis concerning chicken raising
LIG/FRG	<ul style="list-style-type: none"> ▪ Techniques for raising frog in a container: <ul style="list-style-type: none"> • Techniques for success and advantages of raising frog in a container • Selection of location for container construction • Techniques for constructing the right container • Types of frog foods and feeding methods • Types of frog medicines for treatment of illness
LIG/RPG	<ul style="list-style-type: none"> ▪ Training on understanding of rice seeds and selection techniques ▪ Training on preparation of seed for cultivation ▪ Training on preparation of rice nursery ▪ Training on soil preparation and appropriate use of fertilizer ▪ Training on cultivating methods ▪ Training on management and care of seedling ▪ Training on harvesting methods and seed keeping ▪ Training on integration of new knowledge on small-holder agricultural businesses in rice production
LIG/VGG	<ul style="list-style-type: none"> ▪ Training on seed selection ▪ Training on soil/nursery preparation techniques ▪ Training on spreading of seeds and seedling refinement

	<ul style="list-style-type: none"> ▪ Training on planting and sowing of seedling ▪ Training on care of seedling after planting ▪ Training on harvesting techniques ▪ Training on selection and keeping of seeds
--	---

Sources: Training Manuals for WUG/FWUG, LIG, and SG developed by CADTIS

3. Methodology

3.1. Assessment Indicators

In the subsequent sections, we restated measurement indicators and parameters, as well as sources and types of information and techniques used for data collection, analysis and report writing.

Table 3.1.: Assessment Indicators and Parameters

Outputs	Indicators	Parameters	Collection Methods	Information
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	Desk review FGD & KIIs	<ul style="list-style-type: none"> • Database of small-scale water infrastructures delivered in KPT and SR • Database of WUG/FWUG
	LNGOs recruited to deliver extension services	# of LNGOs recruited to provide extension services	Desk review FGD & KIIs	
	NGOs carry out capacity development	# of groups formed	Desk review FGD & KIIs	<ul style="list-style-type: none"> • SRL Project documents • CADTIS's farmer need assessment FNA report • CADTIS's final reports • Progress reports to NCDDS
		Types and functions of groups formed (against project intervention)		
		# of technical skills trained to groups		
# of participants in each trainings				
Types of on-going technical supports				
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	Desk review Survey data FGD & KII	<ul style="list-style-type: none"> • SRL Project Documents • Small scale follow-up survey report • Baseline survey report
		% of increased income from home garden		
		% of increased income from animal raising		
		% of increased income from strategic crops		
	% of increased income from fishing			
Yield from rice production	# of rice yield/ha	Desk review Survey data	<ul style="list-style-type: none"> • SRL Project Documents 	

	Yield of home gardens	# of yield home garden (purpose of gardening) Home garden land used & left fallowed	FGD & KII	<ul style="list-style-type: none"> • Small scale follow-up survey report • Baseline survey report
	Migration Rate/volume	# of people migrated for work (reasons)	Desk review Survey data FGD & KII	<ul style="list-style-type: none"> • SRL Project Documents • Small scale follow-up survey report • Baseline survey report
		Remittance		
	Farmland left fallow	Size of agricultural land owned by HHs	Desk review Survey data FGD & KII	<ul style="list-style-type: none"> • SRL Project Documents • Small scale follow-up survey report • Baseline survey report • Endline survey report
		Size of land cultivated		
		Size of land left fallowed		
	Freshwater availability for household use	# and types of water source in the locality	Desk review Survey data FGD & KII	<ul style="list-style-type: none"> • SRL Project Documents • Small scale follow-up survey report • Baseline survey report • Endline survey report
		Access to water for HH consumption		
		Access to water sources for agriculture		
	Damage to rice & crops due to climate hazards	Perception of vulnerability to climate hazards	Desk review Survey data FGD & KII	<ul style="list-style-type: none"> • SRL Project Documents • Small scale follow-up survey report • Baseline survey report • Endline survey report
		Level of danger to agricultural activities		

3.2. Data Collection Methods

In order to gather sufficient data and information needed as identified through indicators and parameters above, the endline study reapplied methods and tools, which were employed in the baseline study, for the collection and analysis of both primary and secondary data. These involve the following approaches:

3.2.1. Documentary Review and Analysis

This method was used to review relevant existing secondary data from different available sources. These data include: 1) project document and underlying performance frameworks and / or log-frame; and 2) key documents and reports of firms commissioned to implement extension services and water infrastructures. Specifically, relevant documents for the review include the followings:

- CADTIS's FNA report for extension services;
- Database of villages received small scale water infrastructures in KPT and SR
- Database of established FWUG & WUG
- CADTIS annual progress reports to NCDDDS
- CADTIS end of project reports to NCDDDS
- NCDDDS monitoring track for small-scale water management infrastructures
- NCDDDS's annual project report
- The SRL's Vulnerability and Risk Assessment (VRA) reports
- Monitoring and evaluation report from relevant stakeholders
- SRL project's trimester report (2020)
- GIS's Baseline and small-scale follow-up survey reports

3.2.2. 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 NCDDS 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 endline assessment;
- Verification of the project's lists of treatment recipients to finalize lists of exact respondents that have been surveyed in baseline study to be surveyed interview for this endline study, and to participate in the focus group discussion (FGD);
- Finalizing research design, data collection and analysis methods, data collection tools, sampling techniques and sampling frames for the endline survey, and software and instruments for data entry and analysis, quality control mechanisms for data collection and processing (i.e. format check, tool testing / trailing, etc.); and
- Finalizing the format for endline assessment survey report writing.

3.2.3. Key Informant Interviews with Target SNAs

In close consultation with DCC of GSSD/MoE, UNDP-GEF, and NCDDS and the project team / staff, the GIS research team used purposive sampling 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 **Appendix A** for KII Guiding Questions).

At the district, commune and village levels, key informants were interviewed to provide perceptions on:

- Knowledge and participation of SRL intervention activities and supports;
- Knowledge and skills built through capacity building programs / activities of SRL projects and demonstrated impacts created by these newly learned knowledge and skills;
- Effects of SRL intervention activities and supports on themselves and their villages, communes or districts;
- Challenges to implementation of SRL interventions
- Limitations of SRL intervention activities and supports on themselves and their villages, communes or districts;
- Suggestions for further interventions and supports to assist them and their people to overcome stated challenges, limitations and shortcoming in skills and knowledge concerning climate change events and livelihood strategies.

Sampling for KIIs: The target key informant groups for this endline assessment comprise of:

1. Existing SNAs, particularly local authorities at village, commune and district levels that have participated in intervention activities of SRL project with extension service providers and project coordinating team in their locality;
2. Those who have been chosen as key persons for the village, commune and districts; and
3. Those who have attended climate resilient / adaptive capacity building programs provided by DCC-MOE, NCDDS and UNDP-GEF.

At the end of the survey, 71 key informants (38 in KPT and 33 in SRP) were interviewed in two target provinces (**Table 3.2**). Among them, 12 were female and most of them were SRL chosen key persons and responsible SNAs (i.e. village chiefs / deputy chiefs and commune chiefs/ council members) in the target study areas.

Table 3.2: Number of qualitative informants in the study provinces

No.	Province	Number of Participants
<i>In-depth key informant interviews (KIIs)</i>		
1	Kampong Thom	38 (6 female)
2	Siem Reap	33 (6 female)
Total		71 key informants (12 female)

3.2.4. Focus Group Discussion (FGD)

The GIS research team used FGD as part of the PRA process. Assessment of the protect interventions on livelihoods and income generation are typically complex and may not be easily done by examining quantitative data only. Therefore, for this endline data collection, the FGDs were conducted to stimulate to triangulate quantitative data. These included inquiries on discussion into the following issues (Refer to **Appendix B** for Guiding Questions for FGD):

- Participation in intervention groups established by CADTIS through extension services;
- Knowledge, experiences and monetary and non-monetary inputs participants received from the attending intervention activities implemented by SRL projects;
- Change observed by participants in relations to effects from functions of infrastructures and intervention programs provided by SRL project, particularly on livelihoods and income generation, water availability and access, land availability and use, migration patterns and remittance, perception of vulnerability and preparedness; and
- Especially group’s measurement / calculation of key project Outcome in terms of income (both from agricultural and off-farm occupations).

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, and quality of benefit sharing as well as on their suggestions for further intervention and expansion of the project.

Sampling for FGDs: FGD was conducted in every treatment villages (T) with majority of key active members of groups established by CADTIS through agricultural extension service program. Participants included representatives of key persons / SNAs at village, commune and district levels and representatives of climate resilient agricultural groups including LIG, SG, SLG, FWUG/WUG.

In the selection of FGD participants, we strived to consider criteria such as gender balance, diversity of knowledge and experience, and variety of age group, etc. Yet, due to the timing of this Endline study (in May and beginning of farming season and right after the regional closure due to COVID-19 prevention measure), many targeted participants were busily engaged in the preparation of their land for upcoming agricultural production or feared of COVID-19 infection from outsiders (the research team).

Hence, the target criteria could not be strictly followed. The research team was able to conduct all 29 FDGs (15 in KPT and 14 in SRP) with a total of 519 participants in two target provinces. However, group composition (i.e. age, gender, etc.) varied considerably due to each specific location of the study with reference to rainfall distribution and occurrence of COVID-19 incident.

Table 3.3: Number of qualitative informants in the study provinces

No.	Province	Number of Participants
<i>Focus group discussions (FGDs)</i>		
1	Kampong Thom	15 (217 Participants)
2	Siem Reap	14 (248 Participants)
Total		29 groups (519 Participants, 364 Female)

3.2.5. Household Survey

This method incorporated mainly close-ended questions into the survey questionnaire for gathering reliable, representative, responses at household level / member level. In order to understand and analyze the multiplier 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 classified the household survey respondents into the three types:

- **Treatment households (T HHs):** refer to the project’s beneficiary households living in the 160 target villages that receive one or more of the project interventions;
- **Control population 1 (C1 HHs):** refer to non-beneficiary households living in the project’s 160 target villages of the project but did not receive intervention; *and*
- **Control population 2 (C2 HHs):** refer to non-beneficiary households living outside the project’s coverage villages.

A structured questionnaire was developed (based on the indicators and parameters as listed in **Table 3.1** above). The key components of the survey questionnaires include (Refer to **Appendix C** for detailed survey questionnaires):

- Awareness or knowledge of supports in terms of extension services and small-scale water management infrastructures;
- Involvement in the project interventions (i.e. membership status in WUG/FWUG, LIG, SLG, SG; trainings in climate resilient agricultural techniques, CCT, study tour, FFS, etc.);
- Perceptions of the project interventions’ significance;
- Possession of all types of land and their use patterns;
- Income generation activities or livelihood strategies (on-farm and off-farm livelihoods) encompassing information regarding:
 - Types of farming / cultivation (types of rice, crop, vegetable, etc.),
 - Types of agricultural activities (rice and crop cultivation, animal raising, etc.)
 - Patterns of production efforts (how many times per year),
 - Purposes of farming (for household consumption and/or sale),
 - Productivity and yields (e.g. dry and wet rice),
 - Sale of harvests (rice, crop, vegetable, animal, etc.),
 - Migration pattern (seasonal or permanent),
 - Purposes, drivers and destinations of migration,
- Expense categories and adequacy of income;

- Water's availability and access for the purposes of household consumption and agricultural;
- Vulnerability to climate change disasters as well as levels of impact from each type of climate hazard; and
- Perception of helpfulness of and contributions from the SRL project towards improving livelihoods and adaptation to climate change incidents.

3.3. Impact Evaluation Methodology

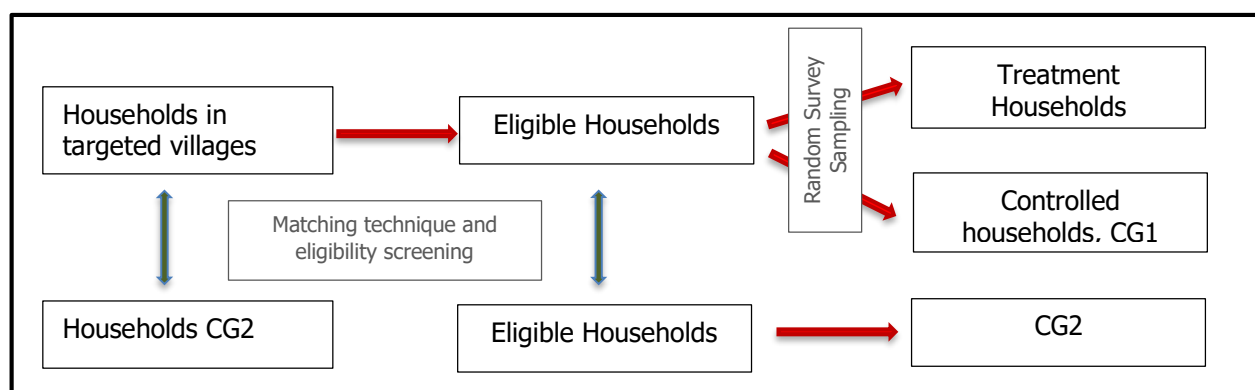
3.3.1 Evaluation Method

Noticeably, the ultimate goal of this study's quantitative component is to assess the impact of the project's intervention. To this end, the study used a difference-in-difference methodology. This means that changes in the intervention group between the baseline and endline are compared with changes in the control group over time (Table 3.1)

	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) = DiD estimate = $(T_B - T_A) - (C_B - C_A)$		

The outcome comparison 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 of the project over time.

Figure 3.1: Process of DD design for sample population selection



Despite its fundamental aim to discover and measure pure 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. Below is the sequential process of using DD framework in targeting sample population for the study:

3.3.1. Power Calculation

The power analysis is performed to calculate the sample size needed for an accurate estimate of DiD 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 / effect 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**; and
- The expected impact captured in the DiD will be detected for each province.

Table 3.4. 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 design that yields 10% MDE and for addressing the population mobility issue among selected T, C1 and C2 groups.

According to Baseline Survey, the needed sample size calculated for each province is 274 households (HH) for the treatment group and 192 HHs for each control group, with a total of 658 HHs. However, a larger number of participants, 1,556 HHs, were surveyed during the Baseline study due to addition of adjustment factors to ensure that the minimum number of respondents can be reached at time of Endline Assessment despite the possible loss of respondents because of unanticipated incidents. As stated in the Baseline report, a concern about subject loss to the follow-up survey was warranted as a result of the population mobility issue for such a prolonged intervention period (2-3 years); therefore, an adjustment factor was used to increase the sample size to assure sufficient household respondents by the end of the intervention that is roughly 1,300 HHs (see **Table 3.4**).

3.3.2. Sampling Method

The logics for selection of survey villages (for T, C1 and C2) were explained in detail in **Sampling Method Section of the Baseline Assessment**. This Endline Impact Assessment revisited all same villages that the research team conducted the Baseline Assessment. To track the actual changes taken place over the project intervention timeframe, the same number of participants

(but without the addition / increase due to adjustment factors) have to be surveyed in both Baseline and Endline Assessment.

However, the final number of respondents for the Endline survey was a little lower than 1,300 HHs after the actual calculation due to reduced amount of people receiving intervention than anticipated at Baseline period. Actually, the average number of the established CBOs (i.e. LIG, FWUG, WUG, SG, SLG) is only 26 HHs across the two target provinces, which is 10 to 25 fewer HHs than the initially planned and selected long list (50 HHs) and the short list of target beneficiaries (35HHs) used for sample size calculation during the Baseline Study. Hence, the GIS Team selected only a maximum of **20 T HHs** per each T village for Endline quantitative surveys. For any T villages that has the total amount of the established CBO less than 20 HHs, all the HHs were interviewed.

Table 3.5: Sample Size Calculation for Selected HHs

Types of household group	Number of Households		Households per villages	Number of villages		Types of villages
	Each province	Both provinces		KPT	SRP	
T	280	560	20	28		Beneficiary
C1	160	320	20	16		Beneficiary
C2	160	320	20	16		Non-beneficiary
Total	600	1,200		44		

According to **Table 3.5**, a maximum of **560 T HHs** (280 for each province), **320 C1 HHs from the beneficiary villages**, and **320 C2 HHs from the non-beneficiary villages** should have been selected for the survey interviews. However, based on actual number of the established T HHs enclosed in **Appendix D**, only a maximum of **553 T HHs (273 HHs in KPT and 280 HHs in SRP)** was calculated to be interviewed leading to a total amount of **1,193 HHs** (T, C1 and C2) for the Endline survey fieldworks. Please refer to **Appendix D** for detailed number of HHs in each CBO, the average numbers of HHs estimated for the Endline survey and the actual numbers of surveyed respondents.

Using the recorded lists of attendance during the Baseline Assessment, as well as the Small-Scale Follow-Up Survey, the GIS Team first targeted all the same T HHs representatives in order to ensure concrete comparison on the project impact indicators throughout project implementation. The same application was carried out with C1 and C2 HH respondents too. In case of uncertainty or change in composition of HH members (due to outmigration or withdrawal of participation in project implementation), especially those participated in one of the groups established by SRL project with support from CADTIS, the GIS Team closely worked with CADTIS field staff and key SNAs in each province to ensure selection of the right people.

3.4. Data Analysis Methods

Both qualitative and quantitative data analysis methods were used in this Endline Assessment. Qualitatively, we used simple Content and Thematic Analysis Matrix to analyze data obtained from KIIs and FGDs. Quantitatively, both Strata and SPSS tools were used. To capture the intervention impact through time, the DiD method is used. With this method, the effect of an intervention on an outcome is captured to be the difference in the average change over time in the outcome between the Treatment HHs and Controlled HHs. Statistical test is performed to see if the difference exists in the population from which the sample is drawn. Stata, Regression with

interaction effect, marginal effects and graphs were employed to figure scale/percentage of changes and causal relationship between predictors and the impact indicators.

Additionally, the project is assessed using the five DAC criteria: relevance, effectiveness, efficiency, impact and sustainability.

- To analyze **relevance** of the project interventions, authors first examine the alignment of the project interventions with relevant policies and their contribution to climate change's coping / adaptation strategies. Then, the project performance was assessed in terms of its responsiveness to the actual needs of target community on the ground, as well as embedded socio-economic situations in the target area and in the country.
- The project's **effectiveness** was measured by direct comparison between baseline and endline results of the same key project indicators to indicate the changes taking place over time, and the achievements gained so far against the end of project targets.
- The project **efficiency** measures worthiness of interventions in terms of value of money spent for the chosen intervention in comparison to alternative options, as well as appropriateness of spending methods.
- The impact assessment critically examines causal relationship between dependent variable (which are the project's intervention inputs) and independent variable (which are expected benefits gained from each type of intervention) in order to measure the achievement of the project's key outcomes and objectives among each specific inputs (at particular group level). Additionally, the assessment will pay attention to comparison between the treatment group and the controlled groups based on the DiD analysis framework in order to actually find pure and spill-over impacts of the SRL project.
- **Sustainability** was analyzed by critically weighing the combining force of impacts from different indicators on target beneficiaries, especially measuring continuity of impacts and their contributions to beneficiaries' perpetual behavioral changes.

4. Endline Assessment Findings

This Endline Assessment, especially the quantitative sections, was based mainly on the analysis of the HH survey. The total number of respondents for this survey was **1,193 HHs**. Among them, there were **553 HHs** respondents from treatment villages, while C1 and C2 villages had about **320 HH** respondents each.

Table 4.1: Demographic Information of HH Respondents from T and C2 Villages

Districts	T	C2	Category	Variables	T	C2
Baray	54	42	Sex	Male	22%	18%
Kampong Svay	65	21		Female	78%	82%
Prasat Balangk	41	44	Age Group	< 20 years old	1%	2%
Sandan	56	20		21-50 years old	60%	58%
Santuk	51	41		> 50 years old	39%	40%
Kralanh	61	40	HH Size	Aver. HH No	5.10	4.92
Prasat Bakong	41	40	Education	No Education	44%	40%
Srei Snom	62	23		Functional Literacy	7%	3%
Svay Leu	60	18		Primary School	40%	43%
Varin	60	40		Secondary School	9%	15%

A total of 44 villages (28 Treatment, 16 C1 and 16 C2 villages) from 10 districts in KPT and SRP were being surveyed. **Table 3.6** summarizes the distribution of HH respondents (T and C2) in each district, and the percentage of respondents categorized by sex, age group, HH size, and level of education. Among T HH respondents being interviewed, 457 HHs were member of LIG (63 are SLG's), 141 were SG's while 42 other HHs were members of WUG/FWUGs.

4.1. Project's Relevance

4.1.1. Policy Conformity and Alignment

According to the project document, the SRL project is designed to assist the RGC in addressing the identified alarming issues and impacts of climate change in the SRP and KPT provinces. Particularly, this project is meant to provide long-term benefits to marginalized and vulnerable Cambodians. According to myriad of reports and studies conducted by this project's consultant (i.e. CADTIS) and management team (described in the **Section 2** above), the project entailed a number of major investments in small-scale water management infrastructure and extension service program.

Consequently, the project's major interventions have provided immediate and long-term solutions to local and national dilemma as identified in a number of key sectorial climate change policies below. It is widely recognized that climate change and global warming hits Cambodia, including the 2 target provinces, the most in the forms of water resource, creating erratic rainfall, deteriorating soil fertility, causing extreme weather events such as flood and drought (Watt, Chhuon and Chea, 2012; MEF and NCSD, 2018). These phenomena gravely affect people's well-being, property, infrastructures, etc.; particularly, the sector that affects more is agriculture. While these impacts critically affect people at all levels, they more severely affect rural poor communities with less or no capacity to adapt to these climate incidents and who are strongly dependent on agricultural sector for livelihoods and survival. Obviously, climate change impacts on agriculture badly affect the RGC's Rice policies and poverty alleviation strategies (MEF and NCSD, 2018). Observably, the SRL Project has been designed with thorough and cautious consideration of foremost relevant policies at global, national and local levels. Particularly, it is aligned with and conforming to the following key policy documents:

- 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 (MOWRAM-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”.
- 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.

Additionally, SRL project is closely aligned with 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 NCDDS that is the key agent and collaborator in implementing this SRL project. SRL project was also designed 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 water infrastructures, rural livelihoods and production systems through climate sensitive planning, budgeting, and execution (**Output 1** and **Output 3**). Yet, the assessment of these interventions (i.e. **Output 1** and **Output 3**) is beyond the scope of this endline study.

4.1.2. Local Preferences and Responsiveness

The selection of applicable locations and specification of all intervention steps developed in **Outcome 2** was informed by on participatory planning and design, which involved the trained SNAs (**Output 1**), the target local beneficiaries and the selected credible service provider (CADTIS). The development of small-scale water management infrastructures and extension service interventions was firmly based on Farmer Need Assessment Report (see **Annex 2**).

The results of such participatory process were climate smart investments that were integrated into the Commune Development Plan (CDP) and Commune Investment Plan (CIP). The SRL’s support for small-scale water infrastructures happened in the form of co-finance investments in production-linked small-scale water infrastructure that are selected from the CDP/CIP and for which base cost are co-financed by CSF in order to ensure better ownership.

The endline survey confirmed the most pressing climate needs, identified by the expert groups. Shortage of water, occurrence of climate hazards and its impacts have been reconfirmed as they were badly felt by respondents. More than 90% of all respondents of the Endline Survey mentioned the existence of weather hazards, especially drought and flood; while more than 50% of them suffered from water shortage. Only 2% of survey respondents, regardless of village location, had access to river; majority or all of them were strongly dependent on rainfall, well, pond, irrigation systems and natural waterways. To improve water access for agriculture, intervention in irrigation system is strongly needed as only less than 10% of respondents in most of the district under SRL’s intervention have already accessed public irrigation system. Scheme design for particular location and locality was carried out in a participatory manner involving beneficiary farmers who are members of the FWUC or WUC, which were specifically formed to ensure effective operation and good maintenance of these infrastructures.

It is also generally recognized that the majority of rural poor who are most vulnerable to climate change are landless and women-headed HHs, HHs with disability, and smallholder farmer HHs cultivating rain-fed agriculture. Therefore, from the onset, the SRL project aimed to support these

selected groups of climate-vulnerable smallholder and landless farmers to participate in trainings on climate-resilient agriculture livelihood techniques, together with associated activities designed to assist them to adopt these techniques. Actually, **Output 2.2** and **Output 2.1** were designed to synergize each other's impacts by assisting farmers to optimize the use of existing water resources and water gained through small-scale water management interventions. For example, provision of community ponds and wells were not only meant to provide more access to water for rice cultivation, but also to provide space for conservation of fish species to increase fish population in the areas for enhancement of nutritional needs and water supply for home-gardening and domestic animal during dry seasons.

For livelihood improvement, the SRL project assisted in establishing three major types of group: LIG (rice, home-gardening, chicken, duck, and frog sub-groups), SG and SLG/FFS. Each type of intervention activity is specifically designed to suit the needs of local people together with socio-economic situations in the areas. Rice cultivation, home-gardening and animal raising are the primary livelihoods for most of the families in target study areas regardless of types of village or geographical location; it is also the most vulnerable type of agricultural production thoroughly affected by climate variability. Although incomes from these productions are found to be secondary to income from remittance, they are actually net disposable income that people can use for other purposes since rice cultivation, homegrown vegetable cultivation and animal raising have already provided them the basic sustenance (i.e. Cambodian people eat rice and the main course cooked mostly from vegetable and domestic animal / fish meats). They may be sold in low price but have to be bought back from the market in much higher price if they are not available at home. Interventions that contribute to improve rice cultivation and are associated with homegrown food security (animal raising and home-gardening) are the most necessary and responsive strategy since they have triggered the increase in both basic food security and disposable income.

Furthermore, it is well known that rural communities are also deeply indebted to private lenders, including MFIs, which frequently lead them to lose collateral land and become more vulnerable to poverty and climate events. There were more than 60% of respondents in this endline study that are currently indebted. SGs aimed to provide access to disbursing loans according to rules and conditions agreed within the local group. The group may engage in other types of cooperative action, for example in purchase of inputs for the livelihood activity or in marketing of the products. SGs enabled their members to get access to locally and more friendly form of loans from their own peers to enable to fulfill urgent needs safely or to kick start or improve a promising enterprise after their learning from LIG interventions. Additionally, remote rural communities are mostly illiterate or lowly educated; more than 80% of survey respondents in both KPT and SRP had only primary education or no education at all. Therefore, it automatically takes more time and effort for external trainer and skill developer to build their capacity effectively. This is often not quite possible for many rural development program with limited timeline and resources. Therefore, the establishment of SLG to provide knowledge dissemination or echo-training from training participants to other group members in the locality is an exceptionally well thought out technique for improving both comprehension and practice for trainees and knowledge sharing for other members. FFS is another thoughtful plan and most relevant as local farmers do not usually learn much from one-off training or capacity building; they often need more demonstrations and evidences, such as those provided through FFS through key selected farmers in their area.

4.1.3. Local Perceptions of Interventions and Benefits

The project's relevance has been once again proven during the survey interview with project beneficiaries. Up to 95% of the interviewed members of established CBOs confirmed that the SRL project's interventions were relevant, beneficial, and helpful to their current livelihoods and responsive to their crucial basic needs. Additionally, most CBO members perceived the project's

interventions and benefits as significant (see **Table 4.2**), although the perceptions varied from a specific CBO to the other (see **Table 4.3**). In general, about 90-100% of T HHs from all types of CBOs perceived the project to be either significant or highly significant; only less than 10% of them perceived the project to be merely partially significant.

Table 4.2: Perception of Group Significance by T Respondents

CBO Perceptions (T HHs)	Level of Significance	Total	KPT	SRP
Perceived significance of WUG/FWUG	Significant	76%	66.7%	84.6%
	Strongly significant	24%	33.3%	15.4%
Perceived significance of LIG	Partially significant	7%	10%	4%
	Significant	49%	43%	54%
	Strongly significant	45%	47%	42%
Perceived significance of SG	Significant	66%	57%	74%
	Strongly significant	32%	40%	23%
Perceived significance of SLG	Significant	50%	26%	74%
	Strongly significant	42%	61%	23%

For LIG interventions, about half of the participants considered LIG membership and participation to have contributed to building their capacity in terms of animal raising techniques and practices. Another similar portion of LIG members, approximately 47%, thought LIG was beneficial in terms of CCT fund delivery (USD 50) that enabled them to start up small poultry enterprises or improve their home-based animal raising venture. About 39% of LIG members referred LIG's benefit to the promotion of diversified livelihoods (not wholly dependent on rice farming).

Perceived benefits appeared to be slightly lower among SG members. The direct benefits from SG establishment seemed to be centered on institutional establishment and capacity building (i.e. access to start-up CCT fund, learning of skills to operate SG and providing opportunities for members to access safe loan for livelihood needs). Approximately 45% of SG members perceived reception of CCT (USD 2,000) fund as a major benefit from SG that enabled group members to start revolving fund that encouraged members to learn to manage and operate the group for long-term benefits (i.e. reduction of risky debt and dependency on Micro Financial Institutes). Approximately 34% of them added they benefited from SG through access to safe loan for starting resilient agricultural-based livelihoods and for enriching inputs to rice farming practices (e.g., fertilizer inputs). About 24% of SG members believed they benefited from SG participation in the form of improved financial management skills through SG process and practices.

Table 4.3: Perception of Benefits by T HHs

Perceived Benefits of LIG (by T Village Respondents)	% of HHs
Capacity building on animal raising technique	48%
Have received a start-up fund for chicken raising	47%
Have improved and diversified livelihood strategies	39%
Have increased household income from agriculture-related activities	23%
Perceived Benefits of SG	KPT
Have received a start-up fund for operating the saving group	45%
Capacity building on saving group processes and practices	24%
Capacity building on establishment of saving group and by-law	21%
Increasing fund for members to borrow and use community loan to support their agriculture-based livelihood options	34%
Perceived Benefits of SLG	KPT
Capacity building on animal raising technique and practice	47%

Have received a start-up fund for chicken raising	42%
Have improved and diversified livelihood strategies	28%

With regard to SLG, three types of benefits were specifically mentioned by the majority of participated members including: 1) skill improvement in terms of effective and efficient animal raising techniques (47%), 2) CCT fund for development of FFS and start-up of the chosen trained resilient livelihoods (42%), and 3) improvement and diversification of livelihood options (28%). Many other benefits were claimed as well, although they were mostly mentioned by smaller numbers of all types of CBO members (around 20% or less).

Additionally, relevant SNAs involved in the project's implementation also confirmed the relevance and significance of the SRL's interventions. Interviewed SNAs in the target areas offered varied perceptions on different types of intervention. According to KIIs with 66 target village, commune and district authorities in the target areas, quantified scores of SNAs' perceptions on each intervention's impact varied (see **Table 4.4**). Most importantly, impacts in terms of *integration of climate resilient livelihood framework into CDP/CIP* and enabling them to be able to understand local vulnerability in order to plan and prioritize the types of water infrastructure investment option specifically needed in their locality (either at village or commune level) are very high ($p=0.001$) followed by *capacity to develop and implement climate adaptation planning* ($p=0.015$). These two perceptions of the project's impacts are fundamental as it is directly related to the whole project's objective, "*Sub-national administration systems affecting investments in rural livelihoods are improved through climate sensitive planning, budgeting and execution.*"

Table 4.4: Summary of SNAs' Perception Scores in Relation to Project Interventions

Perception-Based Assessment of SRL Project Interventions	Mean Square	Sig. (P<0.05)	Mean	Std. Deviation
SNAs have the capacity to develop & implement climate resilient planning	4.422	0.015	3.85	0.880
Climate resilient livelihood improvement frameworks were integrated into CDP/ CIP	9.488	0.001	4.07	0.972
Resilient water infrastructures were well initiated and developed in the target areas based on local priority and need	12.214	0.001	4.30	1.046
Annual agriculture-related income of T HHs increased due to SRL interventions	0.317	0.447	3.65	0.732
Non-agriculture-related income of T HHs has improved	1.075	0.165	3.58	0.743
Community livelihoods in T villages have improved and diversified due to interventions	0.688	0.211	3.80	0.659
Out-migration for works among T HHs were reduced due to interventions	0.387	0.471	3.68	0.854
T HHs have increasingly adopted agriculture-based income generation activities	8.254	0.001	3.62	0.885
Local access to water for HH use and agriculture has been improved due to interventions	9.488	0.002	3.73	1.006
T HHs have improved capacity to manage their land for agricultural related production	0.284	0.541	3.63	0.863
Local exposure to impacts of climate hazards were reduced	4.298	0.014	3.50	0.854
SNAs have capacity to plan, develop, and manage climate resilient projects in a timely and successful manner	1.075	0.178	3.92	0.766

T HHs have the capacity to adapt to CC impacts and could address climate vulnerabilities in a timely and proper manner	0.317	0.544	3.35	0.917
SRL has indicated good examples to non-targeted SNAs and non-beneficiary HHs in adapting to & addressing CC impacts on livelihoods	7.587	0.030	3.55	1.281

It is, as such, very influential for the sustainability of the interventions as they ensure that SNAs in the target areas have relevant comprehension of climate change incidents and have capacities to somehow determine appropriate measures to overcome challenges on their own with minimal external supports in the future. In addition, SNAs also expressed perceived relevance and positive impact of project interventions on target beneficiaries. Interviewed SNAs summed up that the project's effects on local communities were highly positive in following regards:

- SRL project encouraged and enabled target beneficiaries to adopt more *agriculture-based livelihoods* ($p=0.001$);
- SRL project contributed to improve access to water for agriculture through many small-scale water management infrastructure schemes ($p=0.002$);
- SRL project contributed to reduction of local vulnerability and exposure to climate hazards ($p=0.014$), especially with regard to averting flood; and
- SRL project contributed to demonstrating good examples to other non-beneficiary SNAs and HHs in nearby areas ($P=0.030$) to consider similar interventions and actions in order to develop their locality and enhance local livelihoods.

4.2. Project's Efficiency

This section measures worthiness / merits of SRL project in terms of value of money spent for the chosen interventions (exclusive of quality assessment of small-scale water management infrastructures that is beyond the scope of this study), particularly in the form of cost-benefit analysis. Therefore, in further assessment of efficiency, the research team critically conducts cost-benefit analysis of the project's interventions, as well as the appropriateness of expenditure and spending methods.

Irrespective of the infrastructures' qualification and specification, which is beyond the scope of this study, the research team found the methods of investment in the small-scale water management infrastructure to be properly standardized. As stated previously, the choices of small-scale water infrastructure scheme to be constructed or renovated in a specific locality was made in a participatory manner and every infrastructure was co-funded by the SRL project's fund together with CSF. This co-funding strategy is productive and supplementary, while helping the project to avoid overlapping or contradictory efforts (and conflict of interest) with mandated local authorities; this method is exceptionally constructive for the current context of rural development in Cambodia.

In addition, to maximize or optimize the use of fund, every investment/development project was selected through appropriate calls for bidding to adequately qualified tenderers in order to select the best developers/constructors possible at the most applicable price. The research team found the process to be quite beneficial as the implementers appeared to be able to gain offerings from tender lower than the estimated price that allowed the majority of the project interventions to achieve a bit bigger or larger scale of water infrastructures, or more quantity of them than the estimation from the beginning. The study found no project proposal that had been implemented with less estimated measures or spent more than the anticipated amount of fund. Likewise, an appropriate bidding procedure had been employed until CADTIS Co., Ltd. and more than 15 staffs were selected for implementing required extension services. KII and FGD data informed the

research team that relevant SNAs and members of the established groups regarded CADTIS field staffs to be highly skillful, down-to-the-earth and extremely helpful in providing extension services. Additionally, there were continuous reports conducted by both NCCDS and DCC-MoE illustrating satisfactory performances by tenders of all types of interventions.

Cost-benefit analysis of the two major interventions has substantiated efficiency of the project in terms of value of money spent. The research team found that monetary benefits that can be potentially received from the synergy of the two interventions for the period of five years, **USD 7,048,525** (average of benefits from THHs) or **USD 13,995,875** (average benefits from all types of CBO member) (See **Table 4.6** for detailed calculation), fairly exceeds the entire costs of the SRL project (**USD 5,273,236**) or costs of interventions, **USD 2,088,053** (while costs of all direct local support to funding small-scale water management infrastructure and delivery of extension services is only **USD 1,873,903.71**) (see **Table 4.4** for sources and types of fund).

Table 4.5: Local Intervention Costs (Services and Infrastructure Delivery)

Expense Categories	SRL Fund (USD)	CSF (USD)	Total Fund (USD)
Small-Scale Water Management Infrastructure for KPT	647,850	219,684.13	867,534.13
Small-Scale Water Management Infrastructure for SRP	598,000	225,019.58	823,019.53
Extension Service Expense for KPT	89,750	N/A	89,750
Extension Service Expense for SRP	93,600	N/A	93,600
Total	1,429,200	444,703.71	1,873,903.71

Sources: NCCDS's SRL's Project Track Record of Intervention Activities, Achievements, Numbers of Beneficiaries and Relevant Expenses from 2017-2019 (July 2020)

Table 4.6: Estimation of Rice and All Farm-Based Revenues in Five Years

Categories of Intervention Related Agricultural Income	Amount of Increased Annual Income	5 Year Estimation	Amount Multiplying By No of Beneficiaries (No. of All CBO Members = 6,745HH)
Rice Sale of THHs	USD 40	USD 200	USD 1,349,000
Sale of HG Produces	USD 18	USD 90	USD 607,050
Sale of Raised Animals	USD151	USD 755	USD 5,092,475
Total of T HHs	USD 209	USD 1045	USD 7,048,525
Rice Sale of FWUG/WUG	USD 202	USD 1,010	USD 6,812,450
Sale of HG Produces	USD 49	USD 245	USD 1,652,525
Sale of Raised Animals	USD 96	USD 480	USD 3,237,600
Total Benefits for WFUG	USD 347	USD 1,735	USD 11,702,575
Rice Sale of LIG	USD 388	USD 1,940	USD 13,085,300
Sale of HG Produces	USD 26	USD 130	USD 876,850
Sale of Raised Animals	USD 166	USD 830	USD 5,598,350
Total Benefits for LIG	USD 580	USD 2,900	USD 19,560,500
Rice Sale of SLG	USD 526	USD 2,630	USD 17,739,350
Sale of HG Produces	USD 60	USD 300	USD 2,023,500
Sale of Raised Animals	USD 321	USD 1,605	USD 10,825,725
Total Benefits for SLG	USD 907	USD 4,535	USD 30,588,575
Rice Sale of SG	USD (-253)	USD (-1,265)	USD (-8,532,425)
Sale of HG Produces	USD (-1)	(USD -5)	USD (-33,725)
Sale of Raised Animals	USD 80	USD 400	USD 2,698,000
Total Benefits for SG	USD (-174)	USD (-870)	USD (-5,868,150)
Average Of All Groups	USD 415	USD 2,075	USD 13,995,875

Source: Endline Survey May 2020

For efficiency assessment, we employed the most direct calculation technique by matching the lump-sum of all assumed costs of interventions and the sum of all assumed benefits of interventions. For this analysis and impact assessment, the research team was not privileged to costs of separated service charges (e.g. expenses on CADTIS) and all management costs, so only the entire project costs for all complimentary strategic objectives and the specific cost of interventions to achieve Outcome 2 above as indicative costs were taken into account.

- Costs = Sum of expenses on implementation of all interventions for Outcome 2 (infrastructure constructions + CCT + SG seed fund + FFS development + inputs for skill development + consultant service charges + management costs)
- Benefits = X-time * of sum of monetary gained from (water purchase + revenue from rice + income from home garden + income from selling of raised animals) * total number of all beneficiaries (all groups’ members in HH unit)

Important considerations for calculating benefits:

- Properly maintained water-infrastructures may last for longer than 10 years. In a normal circumstance, a derelict infrastructure may last about 10 years; in this climate change scenario, we will take a 5-year durability for the water management infrastructures. Therefore, all the benefits gained will be multiplied by five times (**X=5**).
- The total members of all groups including WUGs/FWUGs, LIGs, SGs are **6,745 HHs** (excluded SLG members, see **Table 2.5**).
- Monetary conversion of purchase price of water was also not possible, therefore we assumed the zero benefit for this criteria although there were small numbers of T HHs bought water for consumption and agriculture prior to the SRL’s interventions.
- Benefits from agricultural livelihoods were calculating by using increasing amount of income from each category / involved agricultural livelihoods.

4.3. Project’s Effectiveness

The project’s effectiveness is measured by direct comparison between baseline and endline, results of the same key project indicators to indicate the changes taking place over time and the achievements gained so far against the end of project targets.

Table 4.7: Comparison of Project Achievements and End of Project Targets

Project Strategy	Indicator	Baseline	End of Project Target	Project Achievements
Outcome 2 Resilience of livelihoods for the most vulnerable improved against erratic rainfalls, floods and droughts	# resilient infrastructure measures introduced to prevent economic loss and co-financed by CSF	None	At least 100 climate resilient infrastructure schemes have been successfully implemented	89 projects were completed by April 2020. At least 262 climate resilient infrastructure schemes were built/renovated (canal, pond, dam, drift, regulators, pipe culvert, open ring wells).
	% of targeted households that have adopted resilient livelihoods under existing and projected	None	#HHs and people (#women) benefited from resilient infrastructure scheme.	12,988 HHs (3,030 female) benefited from resilient infrastructure scheme. (3,627 HHs and 3,030 female who are members of WUGs/FWUGs)

Project Strategy	Indicator	Baseline	End of Project Target	Project Achievements
	climate change (AMAT Indicator 3)	None	At least 60% of HHs participating in livelihoods trainings adopted at least one resilient livelihood technique (half of the uptake is by women)	Total members of LIG received training are 2,922 (1,988 female), and 1,942 (66%) members received CCT for starting-up resilient livelihoods (Based on May 2020, Endline Survey data: 95% of LIG, 98% of CRG, 75% of VGG members took up chicken raising and vegetable growing practices).
Output 2.1 Climate-resilient small-scale water infrastructure designed and put in place in at least 10 districts following resilient design standards specifically targeting rain-fed farmers	# climate-resilient small-scale water infrastructure provided	None	60 climate resilient small-scale water infrastructures	89 projects were completed by April 2020. At least 262 climate resilient infrastructure schemes were built/renovated (canal, pond, dam, drift, regulators, pipe culvert, open ring wells).
	LNGO recruited to provide extension services	None	At least 2 LNGOs or public/private service providers	CADTIS was recruited with 15 staffs working as service providers.
	NGO carries out capacity development	None	160 farmer groups (20 FWUCs)	160 farmer groups (40 WUGs/FWUGs) were formed and trained.
Output 2.2 Climate-resilient livelihood measures demonstrated in at least 10 districts targeting landless women and farmers practicing rain-fed agriculture	# women's Livelihood Groups formed	None	160 farmer groups (LIG, SG, SLG)	160 farmer groups (40 WUGs/FWUGs) were formed and trained (total members are 6,745 and 5,023 female)
	# climate-resilient livelihood measures demonstrated	Baselines report	20% increase in intervention-based income, and other impact indicators	Detail in Section 4.3.1, 4.3.2 below (see also Table 4.6)
	# group saving supported.	None	40 SG planned to be established	40 SGs supported (US\$2,000/group)
	# smallholder Learning Group (SLG) through FFS supported	None	20 SLG planned to be established	20 SLGs, 22 FFS were established, 500 members (334 female) were trained
	# agriculture cooperatives formed	None	10 Agriculture cooperatives	<i>None of Agricultural Cooperative (AC) was founded</i>

Table 4.8: Comparison of Project Achievements at Endline and Baseline Data

Project Strategy	Indicators	Parameters		Baseline	Endline
Output 2.2 Climate-resilient livelihood measures demonstrated in at least 10 districts targeting landless women and farmers practicing rain-fed agriculture	1. Changes in water availability for HHs and agricultural consumption	Access to water for agricultural production		34%	56%
		Access to water in the locality for HH consumption		100%	96%
	2. Changes in perception of climate hazards and vulnerability	Perceived vulnerability to flood		47%	18%
		Perceived vulnerability to drought		66%	93%
		Level of danger to rice crop by flood		64%	61%
		Level of danger to rice crop by drought		51%	56%
	3. Changes in yield from rice production	# of rice yield/ha	Wet rice (t/ha)	1.5	2.0
			Dry rice (t/ha)	2.4	2.1
		# of rice cultivation/year	1 time	69%	72%
			2 time	4%	7%
			3 time	0%	0.2%
			Not at all	26%	21%
	Total # of rice yield/HH (t)		3.9	4.1	
	4. Changes in amount of farmland left fallowed	Size of rice farmland availability (ha)		2.23	3.06
		Size of rice farmland cultivated (ha)		2.00	3.04
		Size of rice farmland left fallowed (ha)		0.24	0.02
	5. Changes in efforts and yield of home-gardening	Involvement in home-gardening		37%	51%
		Purpose of home-gardening for HH consumption only		73%	51%
		Purpose of home-gardening for HH consumption and sale		27%	48%
		Size of home-gardening land (m ²)		110	149
	6. Changes in migration	Number of people out-migrated	Aver. # of migrants	28%	32%
			Involvement in seasonal labour	41%	40%
			Involvement in permanent labour	3%	9%
Remittance (USD)		1,663	2,373		
7. Changes in income from agriculture and related activities (USD)	Income from rice sale		526	566	
	Income from sale of HG produces		15	33	
	Income from animal sale		245	396	
	Income from strategic crops		369	265	
	Income from fishing		47	48	

In general, the SRL project is successful to some extent based on comparison between baseline and endline data, as well as comparison of the end of project targets (from Project Log-frame joined by developed by MoE and NCDSDS, 2017) and the achievements according to documents reported by CADTIS or specifically monitored and evaluated by NCDSDS specialized experts. The SRL project is able to achieve the end of project targets nearly in all indicators, except the

formation of the agricultural cooperatives (see **Table 4.7**). Following sections illustrate the project's effectiveness through comparison between endline and baseline data obtained through large-scale survey.

4.3.1. Effectiveness of Small-Scale Water Infrastructures

Generally, the project's rationality concerning water management infrastructures is that the sustained growth in farm-based income will be achieved by improving availability and efficient management of water for wet season cropping, particularly by providing irrigation for short dry periods that occur predominantly in the early and middle stages of the wet/rainy season. Expected immediate benefits from such investments include: 1) allowing farmers to grow rice during the wet season, avoiding flood risk; (perception on functions of infrastructures in relation to access to water and damage of climate hazards); 2) through removing the risk of crop loss due to drought, encourage farmers to invest in additional inputs and improved production techniques (e.g. increase farmed land or reduction of farm land left fallow); and 3) potentially to move from production of a single rice crop to a double rice crop or a rice crop plus a second cash crop (e.g. cultivation efforts).

Therefore, to measure effectiveness, we first compare data from baseline and endline study concerning: 1) respondents' overall perception concerning access to water (reduction of shortage) for either HH consumption and agriculture; 2) their perception of vulnerability to climate disaster, especially flood and drought; 3) number of times farmer cultivate rice per year and types of rice (wet or dry rice species) being cultivated by farmers in target areas; and 4) size of farm land left fallow; and 5) yield received per hectare by different types of rice species and types of respondents.

Indicator 1: Changes in Water Availability and Access

Initially, T HHs' average knowledge of the small-scale water infrastructure intervention is somehow low (21.5% across the two provinces with 19% in KPT and 24% in SRP). However, the knowledge varies depending on schemes they have witnessed in their locality (see **Table 4.9**). For example, there were 68% of T respondents in KPT knew about the SRL's intervention concerning construction of new irrigation canals, while there were 59% of T respondents in SRP knew about constructing ponds because there were more of each specific intervention in each respective province. As well, it should be noted that only 14 villages of the 44 target villages in the two provinces for large-scale survey received the water infrastructure interventions due to Commune Performance Based Grant (CPBG) selection procedure for this intervention.

Positively, however, more proportion of T respondents (81% in total; 43% in KPT, 38% in SRP) strongly understood the key function of water infrastructures and the overriding management groups (WUGs/FWUGs). T respondents also indicated high involvement in relevant trainings that resulted in more understanding of the corresponding purposes and management of the provided infrastructures. See **Table 4.9** for detailed information in relation to awareness, perceived benefits and skills learnt.

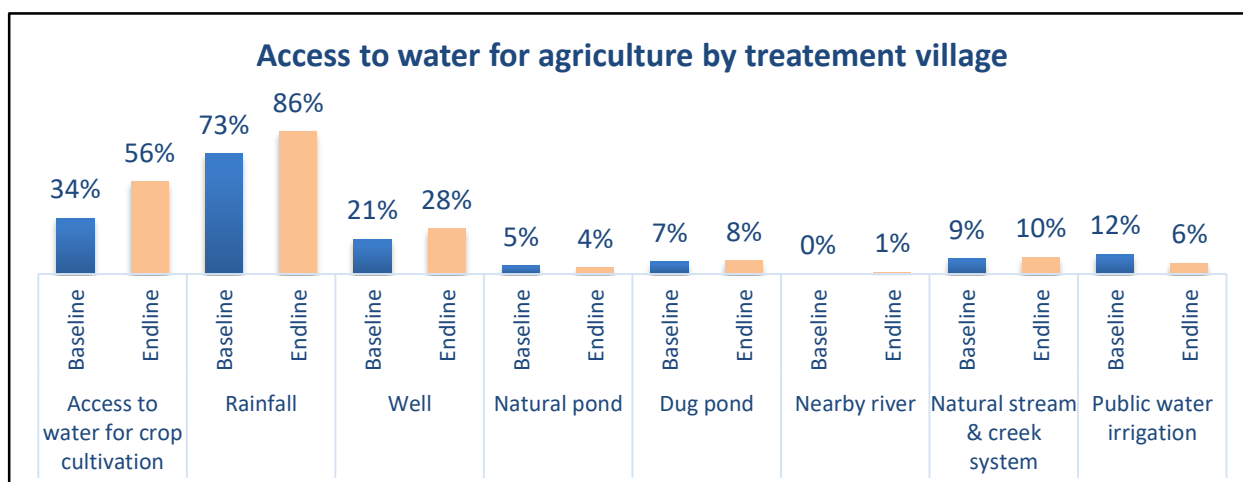
Principally, access to water is moderately effective. At both Baseline and Endline time, nearly 100% of respondents mentioned access to water for HH consumption, but access to water for agriculture varies. Increase of access to water for agricultural purposes among T HHs was around 22%. In general, there is an increase in access to manmade resources including types of water schemes provided through the SRL project's intervention (i.e. well, pond, etc.). Effect in terms of access to water from irrigation system (e.g. canal) was not recognized yet possibly due to the fact that most of the SRL project's infrastructures were completed in 2019 and have not functioned at their full capacity at the time of the Endline Survey (May 2020).

Table 4.9: Perception on Water Infrastructure Intervention by T HHs

Existence of Water Infrastructure	KPT (T HH)	SRP (T HH)	Perceived Purpose of WUG/FWUG Establishment	KPT (T HH)	SRP (T HH)
Existence of water infrastructure	19%	24%	For managing water resources for equitable use by WUG members	43%	38%
Constructing new canal	68%	16%	For managing water resources for equitable use by other people	14%	22%
Restoring old canal	8%	13%	For maintaining water quantity and quality for domestic use	14%	38%
Digging new pond	12%	59%	For maintaining water quantity and quality for agriculture	24%	3%
Constructing of flashflood dam	12%	13%	For collecting water user fee to maintain water infrastructure and development activities	5%	0%
Perceived Purposes of Intervention	KPT (T HH)	SRP (T HH)	Participation in WUG/FWUG related Trainings and Benefits	KPT (T HH)	SRP (T HH)
For household consumption	7%	44%	<i>Have participated in WUG/FWUG related trainings</i>	67%	88%
For strategic or cash cropping	1.5%	12%	Increase knowledge and understanding of management of water resources in the locality	40%	26%
For home-gardening / vegetable cultivation	34%	26%	Understand about roles and responsibilities being a WUG/FWUC management or member	20%	35%
For rice farming in dry season	56%	15%	Develop WUG/FWUC by-law and/ or any other related regulations	20%	16%
For rice farming in both dry and rainy seasons	1.5%	3%	Know about how to use water user fee as a sustainable financing mechanism to manage and maintain water infrastructure	20%	3%
			Understand how to sustainably manage and use small-scale water infrastructure to adapt to CC impacts	0%	19%

There was a slight decrease in access to natural water sources and public irrigation infrastructures at the Endline survey period as somewhat anticipated since there were 2-year gap between the Baseline and Endline survey. It is noted that continuous global warming and climate incidents plus anthropogenic causes (e.g. deforestation) distressing water ecosystem in Cambodia and gradually decrease endowment of water resources (from natural ponds, rivers, creeks and streams, etc.), which automatically decrease its capacity to deliver water to the irrigation systems year by year.

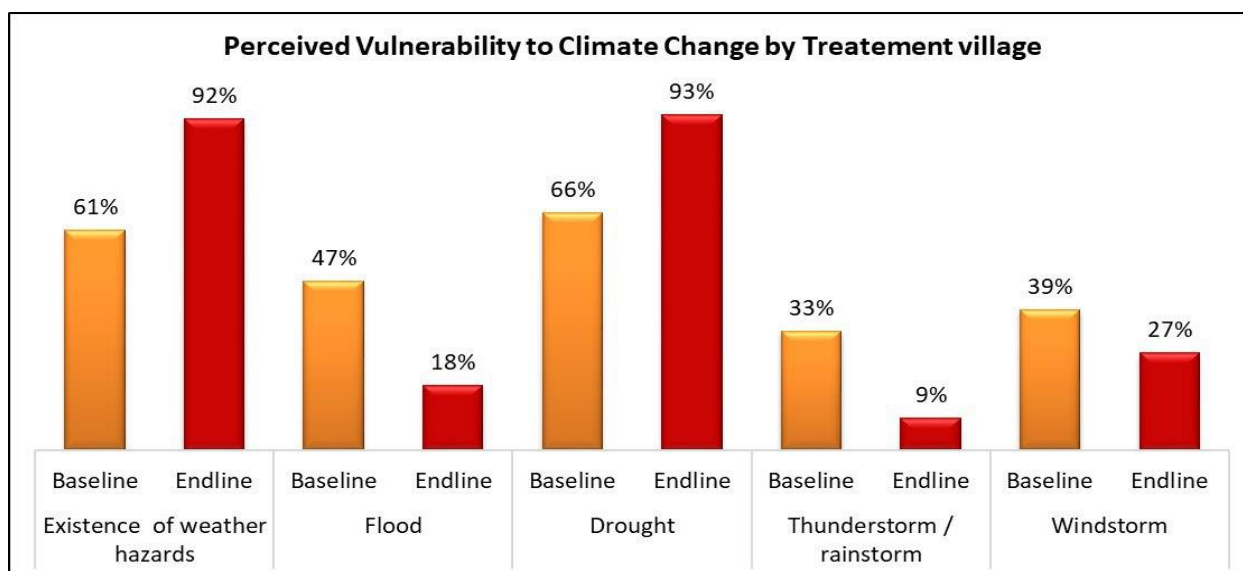
Figure 4.1: Comparison of Perception on Access to Water and Water Sources



Indicator 2: Changes in Perception of Vulnerability to and Damage of Climate Hazards

It appeared that effectiveness on perception of vulnerability to climate events in terms of damage on rice production in particular is mostly moderate. In general, the SRL project’s small-scale water management infrastructure interventions have not yet essentially contributed to appease target beneficiaries of apprehension concerning vulnerability to climate hazards (particularly flood and drought as intended in the project design) and its impacts on their life, especially on rice production; although, there was a consolation concerning these infrastructures’ benefit with regard to helping the target beneficiaries to cope with flood incident.

Figure 4.2: Comparison of Perception of Danger from Flood



In fact, climate change incidents have become increasingly more severe and more frequent in the two target provinces; the frequency of climate hazard occurrences grew from around 10 times in 1990s to nearly 100 times in the last decade (2010s) (GSSD, MoE and NCDDS, 2019). Consequently, there were about 31% more of respondents mentioned that climate change incidents occurred in their locality. Notwithstanding, there was a 30% decrease amount of T HHs considered themselves vulnerable to flood. Yet, up to 90% of T HHs perceived drought to be most problematic and that it has the highest impact on rice production. Some T HHs thought the

provided water infrastructures contributed to prevent flood and its damage on rice production (when there were more rainfalls) than to provide additional water when there was drought.

Indicator 3: Changes in Rice Production Efforts and Yields

Rice cultivation is a primary livelihood for the majority of households in target study areas regardless of type of village or geographical location. Rice cultivation livelihood contributes to increase both basic food security and disposable income for households. This endline assessment found that the study's respondents engaged in two types of rice cultivation - wet rice and dry rice - and cultivating rice from 1 to 3 times per year using dry rice seed species. Wet rice cultivation refers to a type of cultivation taking place in rainy season using heavy or medium type of rice that takes about 5-8 months to harvest. Dry rice cultivation refers to cultivation taking place in both rainy season and dry season (slightly before or after the traditional raining period) or in early rainy season (late April or early May to August) and late rainy season (September to December) by using a specific type of short-term or light rice species that takes only 3-4 months to harvest.

Table 4.10: Summary of Rice Production and Yields by Types of Respondent

Description		KPT	SRP	T Baseline	T Endline
Number of cultivation per year	1 time	64%	82%	69%	72%
	2 time	12%	0%	4%	7.1%
	3 time	0%	0%	0%	0.2%
	Not at all	24%	18%	26%	21%
Average Yield per hectare	Wet rice	1.7	2.2	1.5	2
	Dry rice	2.6	2.2	2.4	2.1
	Total	4.3	4.4	3.9	4.1

In short, effectiveness in terms of rice production efforts and selection of resilient rice species is moderate. About 60% of T respondents recognized the key function of water infrastructures, which were specifically built for increasing involvement in rice production and effort. Observably, there was a positive change (although it is still small) in commitment to rice cultivation among target respondents. There was an increase in proportion of target farmers (in T villages) engaged in rice farming. About 5% of those who did not farm rice during baseline period started to farm once a year. Whilst, those who farmed once a year and twice per year increased around 3% more each. Remarkably, among the 12% of farmers in KPT and the whole target areas (since those in the whole SRP farmed only once a year) who farmed twice a year, 7.1% were from T villages. As well, throughout all target areas, there were only 0.2% of respondents farmed three times per year, and all of them were from T villages.

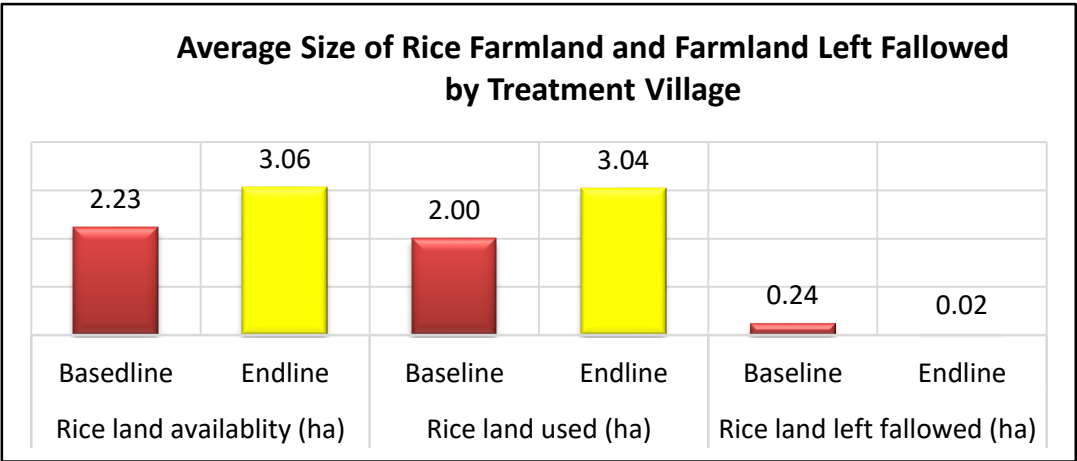
According to KIIs and FGDs, most people, especially SRL beneficiaries in T villages, presently engaged more in short-time light rice production in both rainy and dry seasons (or two times in the rainy season) than wet rice cultivation they traditionally practiced before. With a possibility of more regular amount of water from irrigation systems and water channels to recess water influx if there is flood, yields of wet rice slightly increased from 1.5t/ha to 2t/ha. Yet, yields from dry rice decreased a little from 2.4t/ha to 2.1t/ha probably resulting from agricultural intensification (i.e. additional amount of farming efforts among farmers or the occurrence of prolong drought in 2019 while the supported irrigation systems have not fully functioned).

Indicator 4: Changes in Farmland Left Fallow

The project's effectiveness in terms of contribution to usage of rice farmland is considerably high when looked at the size of rice farmland available and the size of land left fallowed between

baseline and endline period. In relation to land availability and land use, it is observed that amount of land available for rice farming has increased, while in contrary the amount of farmland left fallowed decreased to nearly none at al. At baseline, households from T villages had only an average rice paddy of 2.2ha, and they seemed to be aspired to acquire more rice farmland at the time of endline study since the average size increased to 3.06ha. Despite, there was nearly no land left fallowed at the time of project endline assessment. During baseline period, T HHs had the average land size of around 2.23ha (22,300 m²), and they left around 0.24 (2400 m²) of farmland fallowed while at the endline their average farmland was expanded to 3.06ha (30,600 m²) and they left only 0.02ha (200 m²) of the total farmland fallowed. Additionally, although the average size of land for home-gardening around their houses is only 149 m², T respondents claimed to have used all available land.

Figure 4.3: Comparison of Average Size of Rice Farmland and Land Left Fallowed



4.3.2. Effectiveness of Extension Services

The SRL project’s expected benefits of **Output 2.2** is a sustained growth or increase in income from agriculture and other closely linked activities, based on application of the improved climate-resilient techniques. The project document indicated that achievement in terms of sustainable income would be achieved largely through the following means:

- Supporting rain-fed farmers to increase rice production and crop security using better soil conservation and management, on-farm water management, crop planning, selection of improved seed varieties, appropriate fertilizer application, pest management and other techniques applicable to the particular circumstances, with an emphasis on maximizing efficient use of available water resources and improved access to water resulting from Output 2.1 investments. Effectiveness of these means was examined in the sections related to effectiveness of small-scale water management interventions described earlier.
- Supporting poor and vulnerable women to adopt or improve climate-resilient agricultural livelihood activities that do not require large amounts of land or labor, for example vegetable gardening, small livestock raising (chicken, duck and frog) and possibly some processing and / or marketing type activities.

Consequently, in order to examine effectiveness of extension service interventions, we will look at: 1) changes of involvement in home-gardening and use of available residential land for any trained livelihood activities, 2) likelihood of migration / outmigration, and 3) changes of indicative annual income by section, especially those related to livelihood improvement programs.

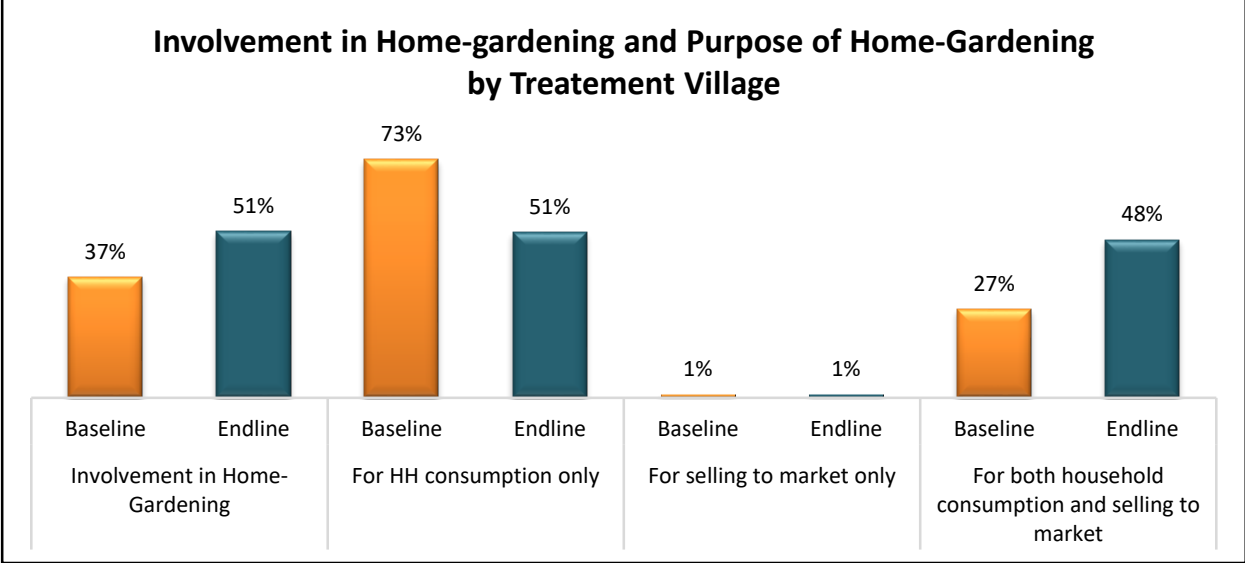
Indicator 5: Changes in Efforts for and Yields from Home-gardening

The average size of respondents’ land available for home-gardening was found to be quite small (149 m²) for rural Cambodian. This is not surprising as being landless or land poor was one of the eligibility criteria for beneficiary household selection by the project. However, at least 51% of T respondents were engaged in home-gardening activities, which was a 14% increase from the baseline period.

Overall, effectiveness of the project in terms of encouraging beneficiaries to engage in home-gardening is also moderate. The main purposes for home-gardening are HH consumption and sale to market. Noticeably, there was a positive change to the home-gardening patterns too. 22% fewer households grew vegetable only for home consumption, while growing for own consumption and market sale increased by 48%. This showed a more comprehensive land use and commitment to produces for income generation. Since the majority of the SRL project’s beneficiaries were poor and vulnerable households, the option for cultivating vegetables only for sale is not an option yet. On the other hand, the size of residential land was also found to be larger, which might be linked with increased standard of living among locals in the target areas. The size of home-gardening land also grew from baseline to endline period (from an average of 110 m² to 149 m²).

Yield of home-gardening was not possible to be measured kilogram (no HHs could recall how many kilograms or amount of produces), but rather in monetary gain that was analyzed in the subsequent income from home-gardening section.

Figure 4.4: Comparison of Involvement in Home-Gardening Livelihoods



Indicator 6: Migration Patterns and Remittance

Although migration was not the most important livelihood for respondents in the target study areas, income from remittance marked the biggest proportion of respondents’ overall annual income. From the endline study, nearly all respondents’ HH member were engaged in migration seasonally or permanently and sent remittance home more than USD 2,000 per year. In general, the project’s effectiveness in terms of reduced migration practice among local people seemed to be very low. Instead, there was an increased trend in migration from baseline to endline period. In general, the study respondents were engaged in two forms of migration:

- **Seasonal migration** is a short-term migration that people took during their free times from agriculture or when they urgently needed cash. It was mostly to conduct tasks that could be finished for a short period of time, such as clearing weeds or harvesting crops at big nearby plantations, construction works in the nearby cities or townships, and doing a diversity of manual works. Migrants sometime engaged in more than a type of work during their migration period, and they normally received weekly or daily wages.
- **Permanent migration** mostly referred to migration for longer period of time to another place, inside or outside the country, and such activity provided migrants with a fixed salary for the entire period of time that they worked in that place.

Table 4.11: Migration Patterns, Size and Purposes by Types of Respondent

Description		KPT	SRP	Baseline	Endline
Income from remittance		2593	2170	1663	2373
Average number of migrants		34%	25%	28%	32%
Involvement in seasonal labor		34%	41%	41%	40%
Involvement in permanent labor		7%	5%	3%	9%
Reasons for migration					
Limited or no economic / business opportunities		17%	32%	43%	26%
No job opportunities in the area		78%	76%	67%	75%
Insufficient or no land for agricultural production		16%	20%	31%	22%
Unprofitable agricultural production		11%	15%	14%	11%
Lack of additional income to support the family		62%	58%	60%	67%
Increasing cost of living		43%	32%	19%	44%
Follow neighbors, villagers, and / or friends		21%	14%	14%	18%
Follow family and relatives		20%	5%	6%	11%
Low labor cost in the area		17%	10%	9%	13%
Education		10%	28%	5%	22%
Marriage		9%	7%	2%	9%
Indebtedness		26%	17%	11%	15%
Patterns of migration	Thailand	30%	76%	97%	49%
	Malaysia	1%	0%	2%	1%
	Korea	0%	1%	1%	0%
	Phnom Penh	62%	11%	63%	41%
	Siem Reap	1%	9%	21%	4%
	Coastal provinces	4%	3%	5%	4%
	Northern Provinces	2%	1%	4%	2%

Based on results of the endline assessment, only 9% of T HHs' engaged in permanent migration, yet 30% to 40% of them involved in periodical seasonal migration whenever they had free time. There was a wide range of different drivers causing migration according to study respondents. They could be categorized as economical, natural and climatic, and social factors.

- **Economic factors** included shortage of job opportunity in the locality, deficiency of agricultural production due to limited land and unreliable market, rising cost of living, indebtedness, and low labor cost in the locality.
- **Natural and climatic factors** included depletion or shrinking of natural bounty, limitation of skills in resilient agriculture, limited water and irrigation system.
- **Social factors** comprised of cross-regional marriage, imitation of relatives, friends and neighbors, etc. Among all factors, economic factors are the leading cause for migration, followed by social and natural or climatic factors.

Indicator 7: Changes in Livelihoods and Income Generation

In general, effectiveness in terms of increasing farm-based income is high. The SRL project fully receives its end of project target in terms of assisting the target beneficiaries to increase income, especially those from farm-based livelihoods that are related directly with intervention activities. The annual income of T HHs increased by 29% (from USD 2,850- USD 3,682). However, when disaggregated by province, the project is more successful in KPT than in SRP. Annual income of respondents in KPT increased from USD 3131 to USD 4046, which was equal to 29% change, but annual income of respondents in SRP increased only 16% (USD 2773-3215).

Income from rice in general had not improved very much (only 8% increase), which may due to many reasons including market failure (sudden decrease rice price from 1200 Riel/kg in 2018 to 900 Riel/kg in 2019), prolong drought in the same year when the irrigation systems have just been constructed and have not functioning at its full capacity yet. Nonetheless, income from home-garden and animal raising had remarkably changed at 122% and 62% respectively. With the prolong drought and without direct intervention with regard to strategic cropping, this type of income decreased noticeably (-28%).

Figure 4.5: Comparison of HH Income and % of Change for KPT and SRP

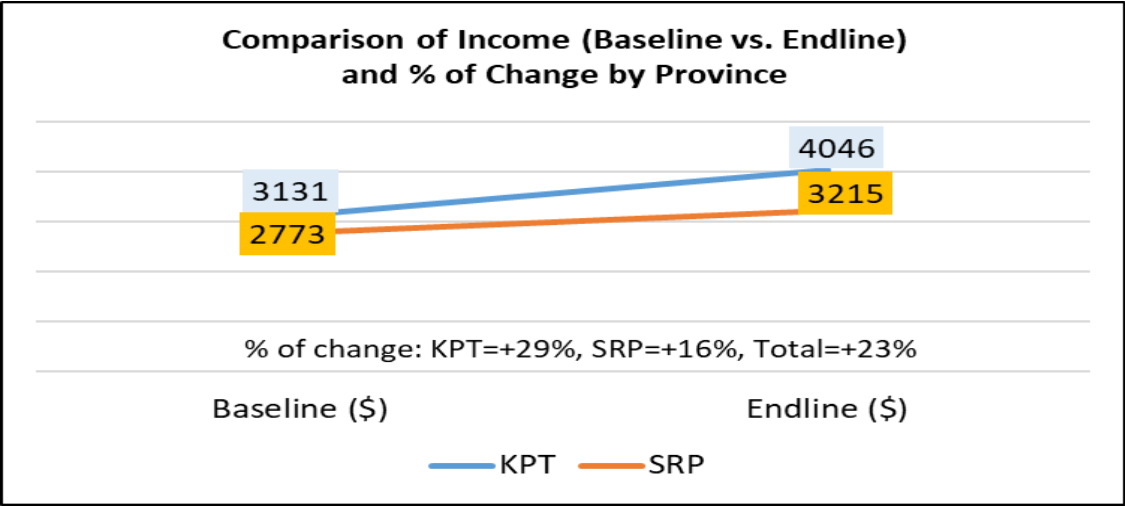
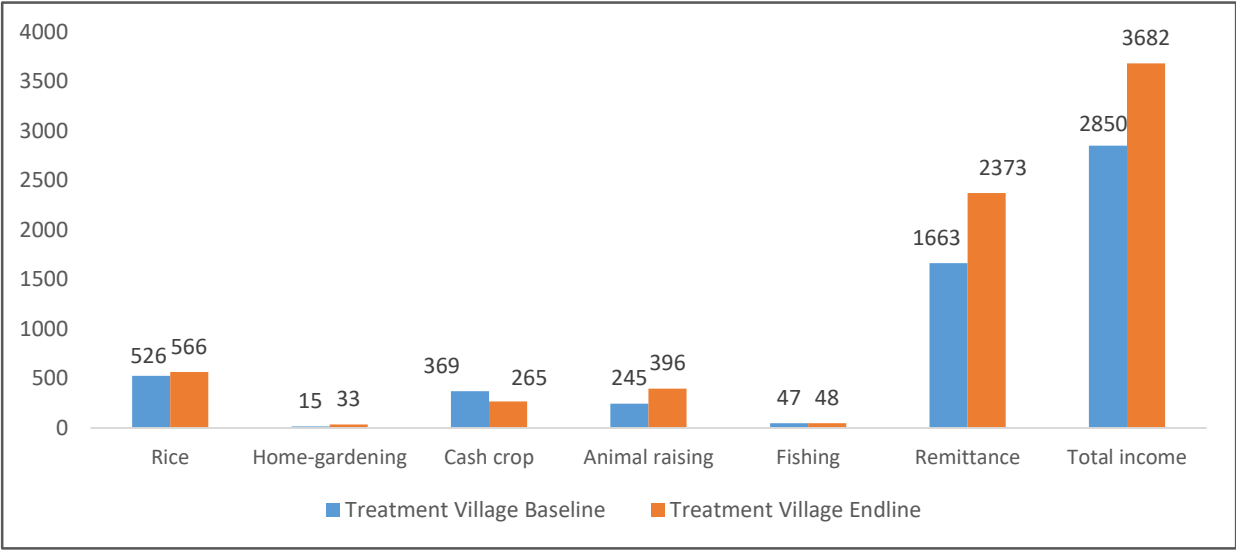


Figure 4.6: Comparison of HH Income of T HHs



4.4. Project's Impact

The effectiveness analysis above informs the overall changes occurring in the SRL's project beneficiaries overtime (from Baseline to Endline period), which signify the achievement of the project's end of targets. This section focuses on identifying long-term specific *pure impact (T-C2)* and *spillover impact (T-C1 and C1-C2)* from the interventions.

As well, it is assumed that impacts of the projects do not realize equally by all types of beneficiaries in Treatment villages since different HHs engage in different interventions / treatments or choose to be engaged in different livelihood options introduced by the SRL project as defined in the form of membership: LIG, SG, SLG, WUG/FWUG and the provision of small-scale water management infrastructures. Therefore, this section will additionally specify pure and spillover impacts of project interventions on each type of group/CBO (mostly T/CBO – C2 and moderately T-C1 and C1-C2).

4.4.1. Interventions' Impacts

In the project design, the utmost impact indicator of the SRL project is directly measured through increase of annual income, especially from agricultural related livelihoods. This eventual direct achievement is aimed to achieve through combined synergy / effect of the two major types of intervention: small-scale water management infrastructures and agricultural extension services.

Furthermore, the SRL project also aims at seeing indirectly the cascading attitudinal changes. The project anticipates that through the two types of interventions, impacts in terms of the increase in or the resurgence of farm-based livelihood practices will also contribute to increase rural productivity by reducing farmland left fallowed. Leaving farmland fallowed is the vicious cause of more rural poverty in the future when external sources of income become inaccessible or insecure (e.g. hindrance for migration due to job decline in tourism and construction industry as a result of COVID-19 outburst, or the accident of risky migration, such as human trafficking in some overseas destinations, etc.). Consequently, the project also indirectly intends to see positive changes in such controversial rural livelihood tradition, especially out-migration that may have short-term positive economic impacts but cause long-term irreversible impacts on both migrants and the families left behind.

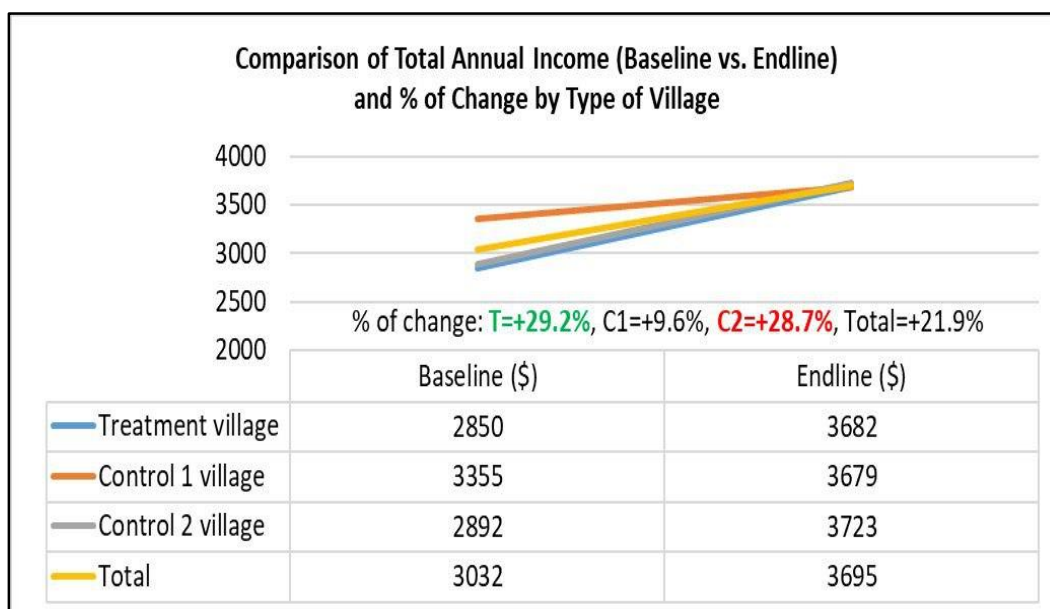
Successively, the direct impact on farm-based incomes are measured by three major impact indicators including income generated from: 1) rice cultivation, 2) home-gardening, and 3) animal raising (and if possible, fishing too). Furthermore, the project impacts in terms of perception and attitudinal changes related to 1) availability of and access to water for domestic consumption and agriculture, 2) vulnerability to climate hazards, 3) amount of farmland left fallowed, and 4) commitment to out-migration are also be measured. The subsequent sections present the project's impacts both directly and indirectly.

4.4.1.1 Intervention Impacts on Income Generation

There was a substantial income change from baseline to endline survey period. The income increase was observed for all - T, C1 and C2 HHs - with several comparisons across the groups being important:

- The average HH income at the baseline survey was similar between T and C2 HHs as this was one of the criteria for selection (USD 2,850 and USD 2,892 respectively), while that of C1 HHs' (USD 3,355) was higher¹.
- The increase rate by the endline survey was similar for T and C2 (29% indicating low pure impact), while the rate for C1 HHs was lower than T and C2 HHs (9% indicating no spillover effect).
- As designed, C2 group is the key control for impact assessment.
- Total HH income of T HHs increased on average from USD 2,850 at baseline survey to USD 3,682 at endline survey. This means that total HH income increased 29.2% after the project ends. Everything else being equal, the increase could be accounted for two factors, including the intervention impact and the counterfactual, that would happen to the project's beneficiaries in the absent of the project interventions. As shown above, change observed for the C2 HHs is a proxy for counterfactual.

Figure 4.7: Percentage of Change in Total Income of T, C1 and C2 Groups



¹ C1 HHs' income at Baseline survey was higher than T and C2 HHs (USD 3,355; 2,850 and 2,892 respectively). These HHs were considered to be better off than target HHs, which were Poor 1 and Poor 2 and others vulnerable / marginal HHs. That was one of the reasons why they were not included in the target list of beneficiaries at the beginning of the SRL project interventions although they reside in intervention villages too.

Figure 4.8: Illustration of the SRL Project’s Pure Impact (T-C2) without TSSD



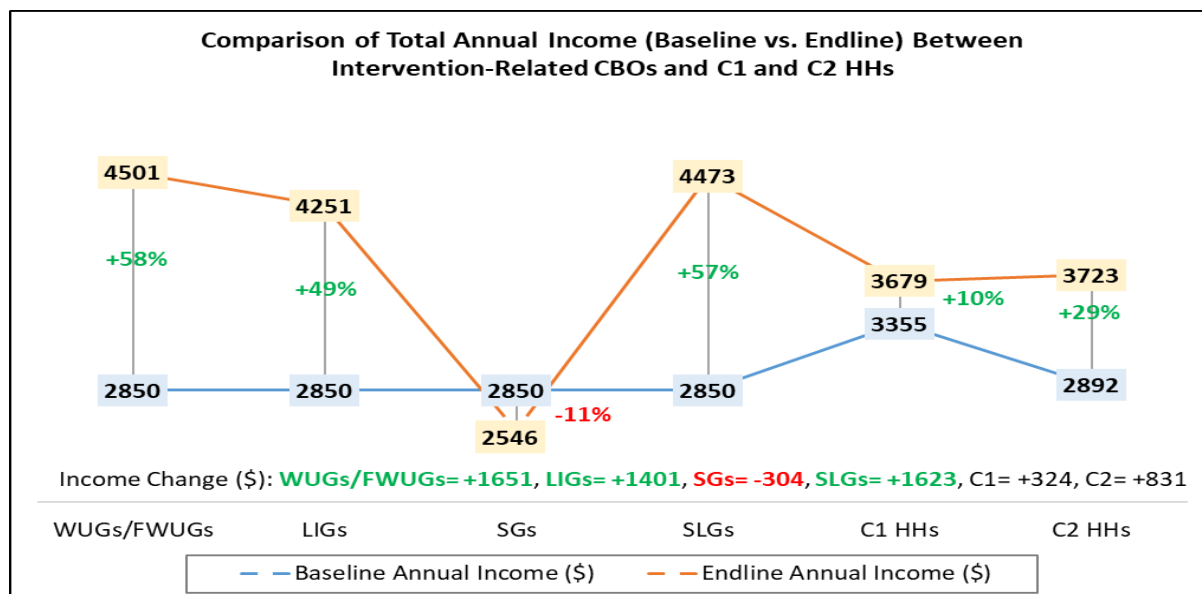
- After taking into account the counterfactual, the total HH income increased by less than 1% from endline to baseline survey. However, it was also important to note that some of the C2 villages had been under a longer and larger 7-year project intervention, e.g. the Tonle Sap Poverty Reduction and Smallholder Development Project (TSSD² 2017-2023). This was not in the design. Thus, the above C2 counterfactual would be affected by this project leading to confounding counterfactual. Yet, the research team was not able to perform a sensitive analysis by comparing the income change for C2 with and without TSSD due to lack of permission to access and use of TSSD database and information. Therefore, it was supposed that the counterfactual could be removed and that both T and C2 HHs’ total income had increased by 29%.
- The income change of T HHs was more noticeable when comparing with C1 HHs, which resided in the same village and was considered better than the SRL’s project beneficiaries. C1 HHs’ total income increased only 9.6% (USD 3,355 – 3,679) indicating that the endline amount of T HHs’ total income increased faster and reached as high as that of C1 HHs (USD 3,682 – 3,679) already.
- Taking the two comparisons (T-C2 and T-C1) into account: the SRL project’s overall pure impact (T-C2) on total HH income is 29% and spillover impact (C1-C2) is none.

The annual income of HHs from all types of established CBOs, except SG members, was higher than annual income of T HHs in general, as well as C1 and C2 HHs in particular (see **Figure 4.9**) despite insignificant P values in relation to total income for all CBOs (see **Table 4.12**):

- Percentage of change of annual income for WUG/FWUG and SLG HHs were the highest in comparison to other groups. It increased about USD 1,651 and 1,623 respectively meaning 58% and 57% rose from T HHs’ total income at baseline. Even considering the counterfactual C2 HHs’ 29% increase, WUG/FWUC and SLG HHs’ total income had increased by at least 28%-29%.

² The TSSD was designed to implement similar interventions, which was to foster community-driven infrastructure (also include irrigation system) and capacity development for 1,241 Livelihood Improvement Groups in 1,193 villages in five target provinces including SRP, KPT, Banteauy Meanchay, Kompong Cham and Tbong Khmum.

Figure 4.9: Total Annual Income of CBOs HHs and C1 and C2 HHs



- Percentage of change of total annual income for LIG HHs was the second highest, which was 49% growth (USD 1,401) from T HHs’ baseline income. If the counterfactual C2 HHs’ 29% increase was considered, LIG HHs total income increased by 20%.
- Percentage of change among SG HHs was negative (-11%) meaning the total income of SG HHs decreased by 11% from the baseline period.
- Pure impact of the project (CBOs-C2) was high; at least 20% different between CBO HHs’ total annual income (except SG HHs) and C2 HHs’ income. This denoted that the interventions concerning FWUC/WUG, LIG and SLG establishment had the biggest pure impact on total income generation.

The analysis below also broke down the total HH income into various times of income based on different income sources and the project’s intervention including rice cultivation, other agricultural activities assisted by the SRL such as home-gardening and domestic animal raising, and non-agricultural activities especially remittance from migration. The purpose of this analysis was to detect which type of income was more likely to be improved after the intervention period.

First, it was observed that the SRL project interventions had the highest pure impact (T-C2) on income from animal raising (specifically chicken sale). Particularly, income from chicken sale had increased 62% among T HHs, but decreased 20% for C2 HHs. Spillover impact on C1 HHs’ was also observed as there was 21% increase of income from chicken sale among C1 HHs too.

This showed that among livelihood intervention logics, communities in the target areas preferred chicken raising the most. FGD results showed that the reason for this preference included: it was ideal for HH consumption and celebratory feast (Cambodian rural folks like to cook chicken for important guests or for celebration time), as well as providing the quickest return on investment (monetary) they needed for their immediate necessary expenditure. Additionally, market for naturally raised chicken was large and easily accessible.

Thus, income from animal raising in T villages (USD 396), which was a direct result of LIG functions, surpassed that of C1 and C2 HHs (USD 396-361-224 respectively). **Table 4.12** proves significant relationship of the intervention on income from animal sale, as p-value for beneficiary CBOs, particularly LIG HHs concerning animal sale is 0.000 (see **Table 4.12**).

Figure 4.10: Comparison of Change in Animal Raising Income of T, C1 and C2

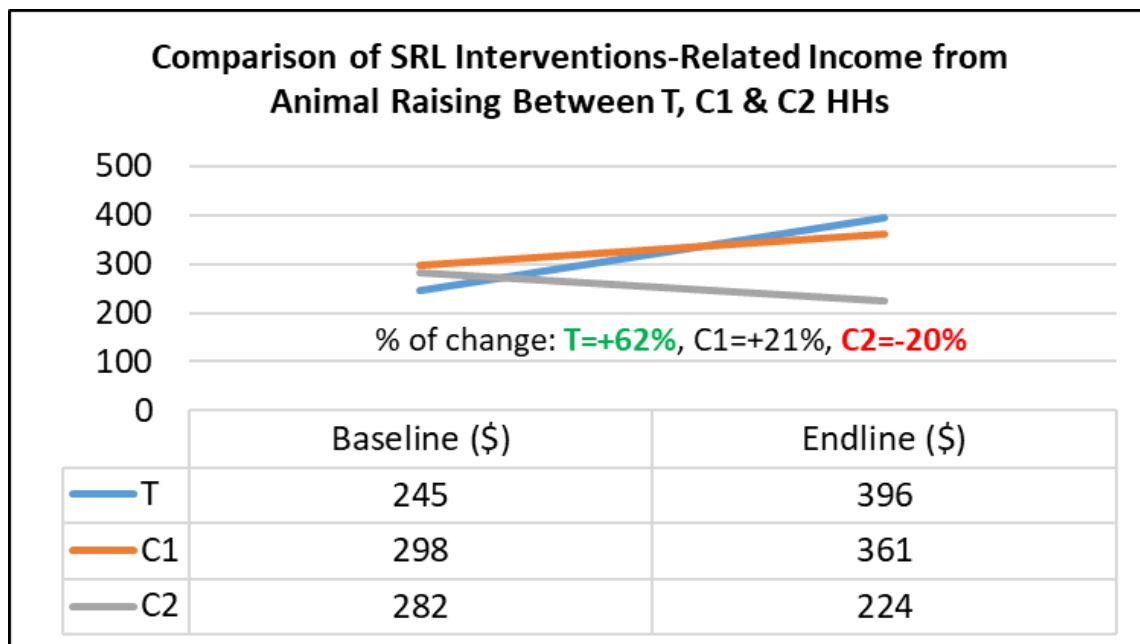
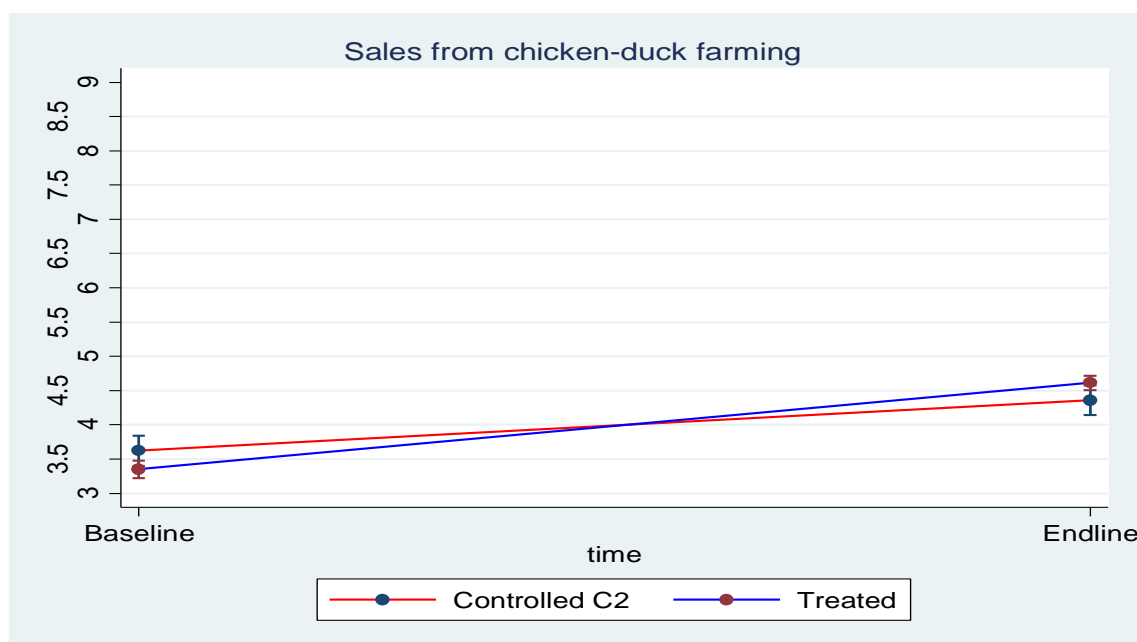


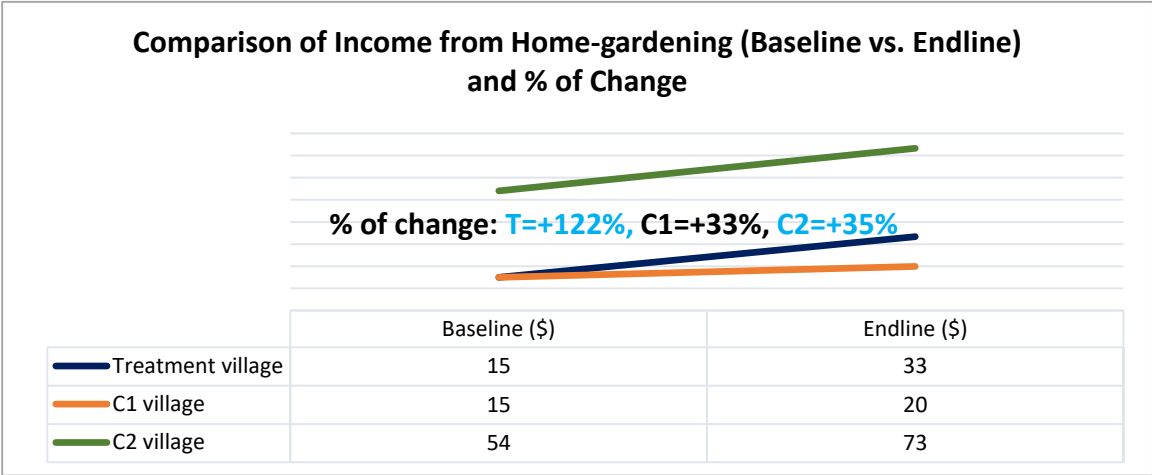
Figure 4.11: Illustration of Pure Impact in Income from Animal Sales (T-C2)



Second, with time variance and in comparison to controlled C2 HHs, the percentage of change for the income from sale of home-gardening produces was largely increased among T HHs with significant value ($p=0.002$ and 0.001 ; see **Table 4.12**). The percentage of change among T HHs was impressive; it was a 122% increase, which was approximately 86% more than C2 HHs' change (increased 36%). This category of income from C1 groups had increased only by 33%, showing the no spillover impact and indicated that intervention logic in terms of vegetable growing was not very popular among rural people as its capacity to stimulate the imitation of the introduced activities among non-beneficiaries was quite low. The amount of monetary gain (approx. USD 20) was smaller in comparison to animal raising livelihoods (which may be more

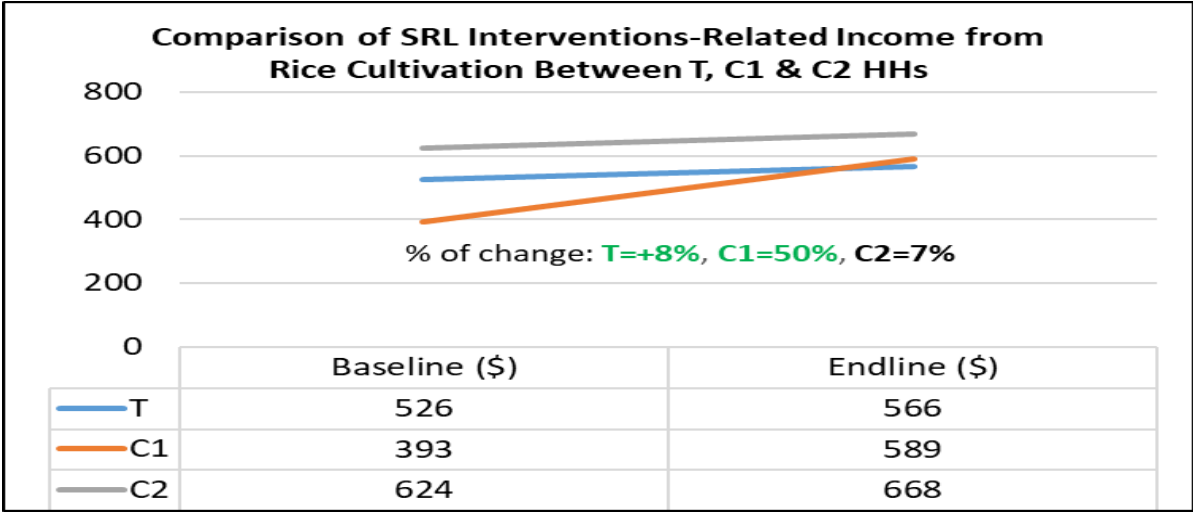
due to the beneficiaries' average land size for home-gardening³ – 149 m² at Endline period). The FGD data showed that the main benefit of home-gardening was not necessarily income generation, but mostly for HH consumption and increase of nutritional intake.

Figure 4.12: Comparison of HH Income and % of Change for T, C1 and C2



Third, rice cultivation, which was one of the most important income generation categories that the SRL project's dual interventions aimed to stimulate had the least pure impact, but high spillover impact. With time variance, percentage of change concerning income from rice sale was statistically significant for T HHs, but it was not so if comparing T to C2 HHs. The income from T and C2 HHs had increased at similar level (approx. 7%); the difference between the two groups was only 1%. On the other hand, spillover impact on C1 group was very high (50% increase). C1 groups who did not have much income from rice cultivation at baseline received much more from rice sale at the Endline period. This huge increase of income from rice cultivation among C1 HHs could be explained by a consistent increase in rice yield from the lowest among the three groups at baseline (only 3.57t/ha) to nearly equal to T group (4t/ha). It was noted that both pure and spillover impact in terms of rice yield was very noticeable; T and C1 HHs' percentage of change was positive, while C2 HHs' change was negative (23% decrease of yield).

Figure 4.13: HH Income and % of Change for Rice Sale among T, C1 and C2



³ Landless and land poor HHs, such as Poor 1, Poor 2, HHs with disable persons or female-headed HHs were primary target beneficiaries of the SRL project.

Figure 4.14: Illustration of Pure Impacts in Income from Rice Sales (T-C2)

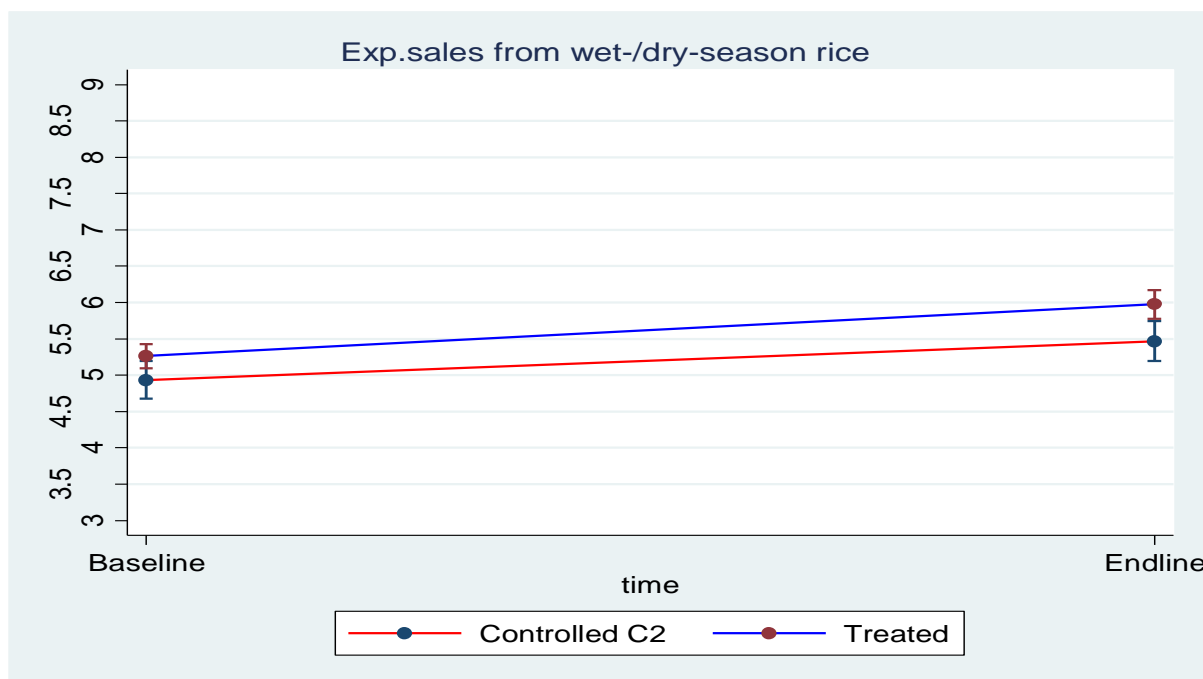
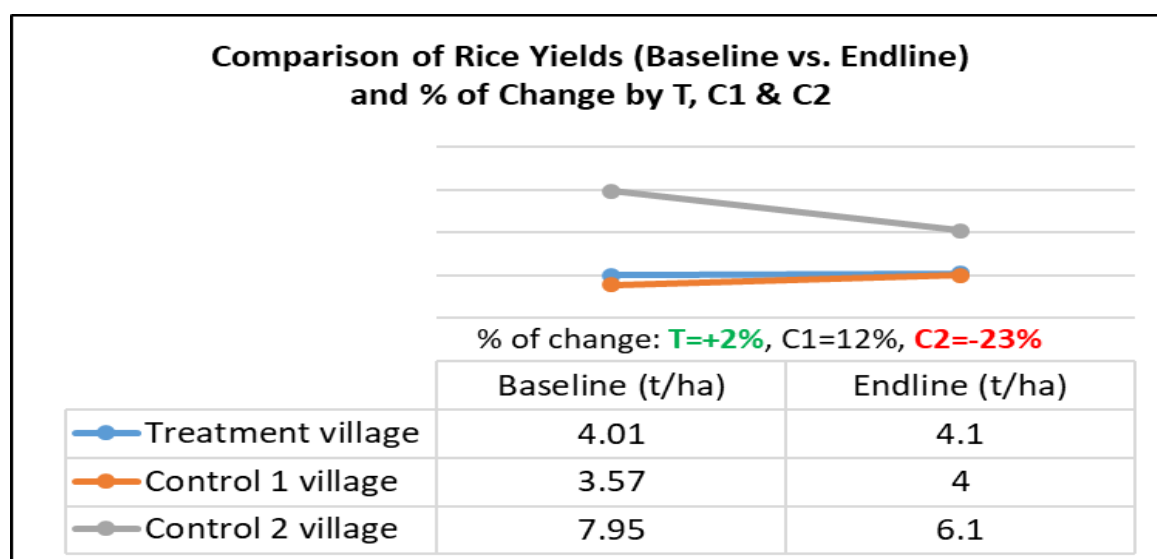


Figure 4.15: Comparison of Trends in Rice Yields among T, C1 and C2



For income from rice sale, significant relationship p-value is positive ($p=0.042$; see **Table 4.12**) for LIG HHs that had the highest percentage of change for this income (74% increase). Although p-value was not significant for other CBO HHs, the study also found a remarkable increase by WUG/ FWUG HHs (38%) and SLG HHs (11%). Concerning this income, it could be articulated that pure and spillover impact were high. All CBO members' income from rice sale (except SG HHs) was higher than C2 HHs' percentage of change, which was 7% increase (see **Figure 4.16**).

Pure impact on incomes from animal raising and home-gardening was also high among all CBO HHs, except SG HHs whose income had increased only with regard to animal raising.

Figure 4.16: Comparison of Rice Sale among CBO HHs

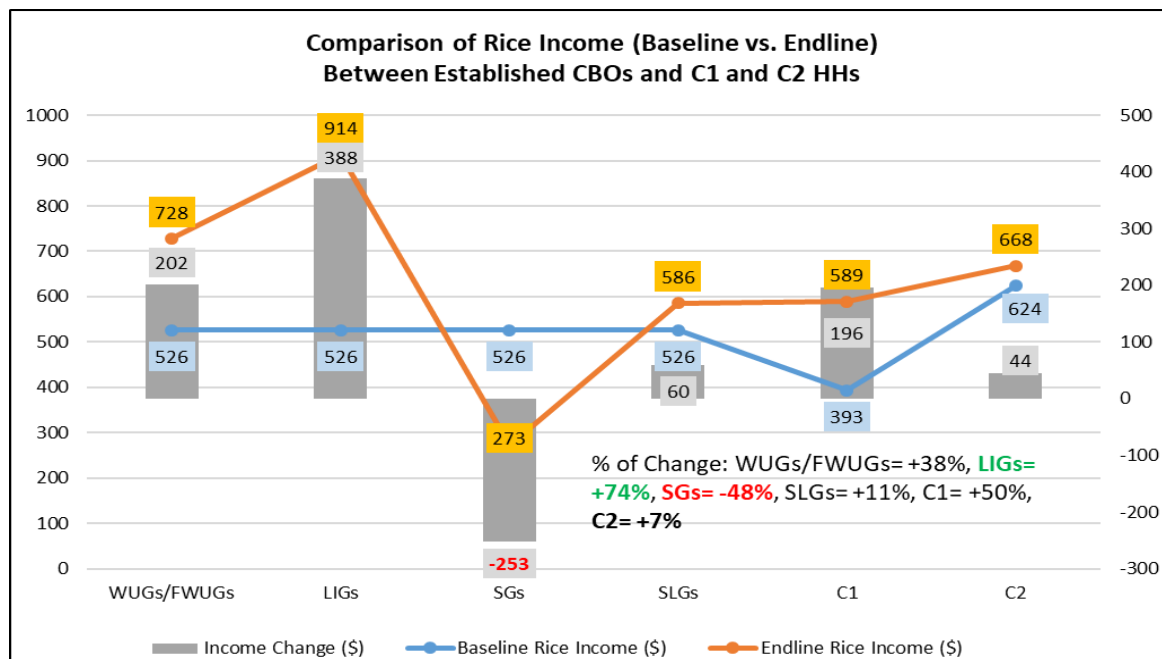
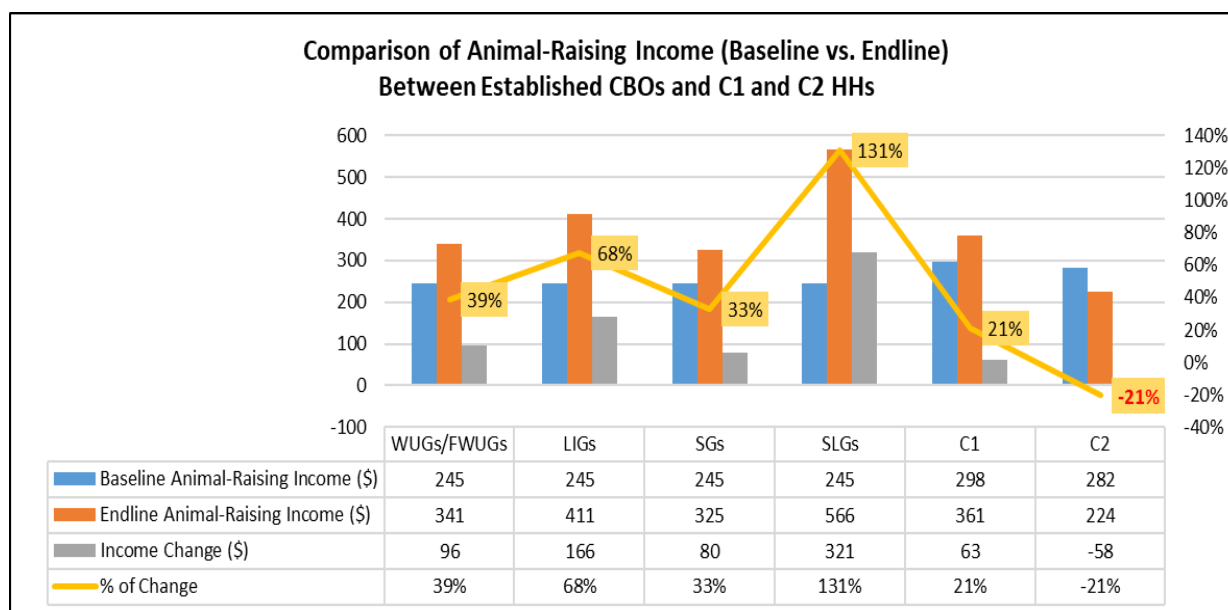
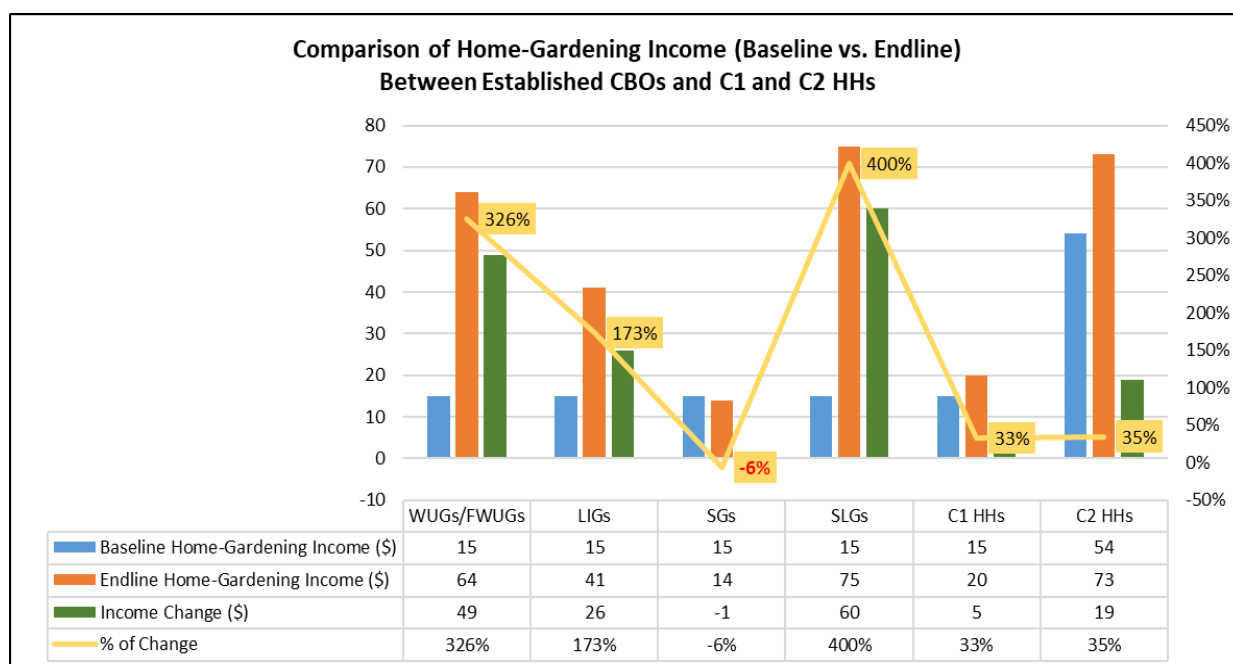


Figure 4.17: Comparison of Sale from Raised Animals



- SLG members, who were indeed model farmers, received the highest pure impact from project interventions related to animal raising and home-gardening though the relationship is insignificant (see **Table 4.12**). SLG HHs' percentage of change for sale of home-gardening produces was as high as 400% (C2=35%), while the change in animal raising income was also 131% increase (while C2=-21%).
- The second highest receivers of pure impact with regard to these two incomes were WUG/FWUG and LIG HHs. Percentage of change for home-gardening of WUG/FWUG HHs was nearly as high as that of SLG HHs (326% increase) while that of LIG HHs was up to 173%. Whereas, income from animal raising had also increased up to 68% for LIG HHs (p-value = 0.000, see **Table 4.12**), 39% increase for WUG/FWUG HHs.

Figure 4.18: Comparison of Sale from Home-Gardening Produce

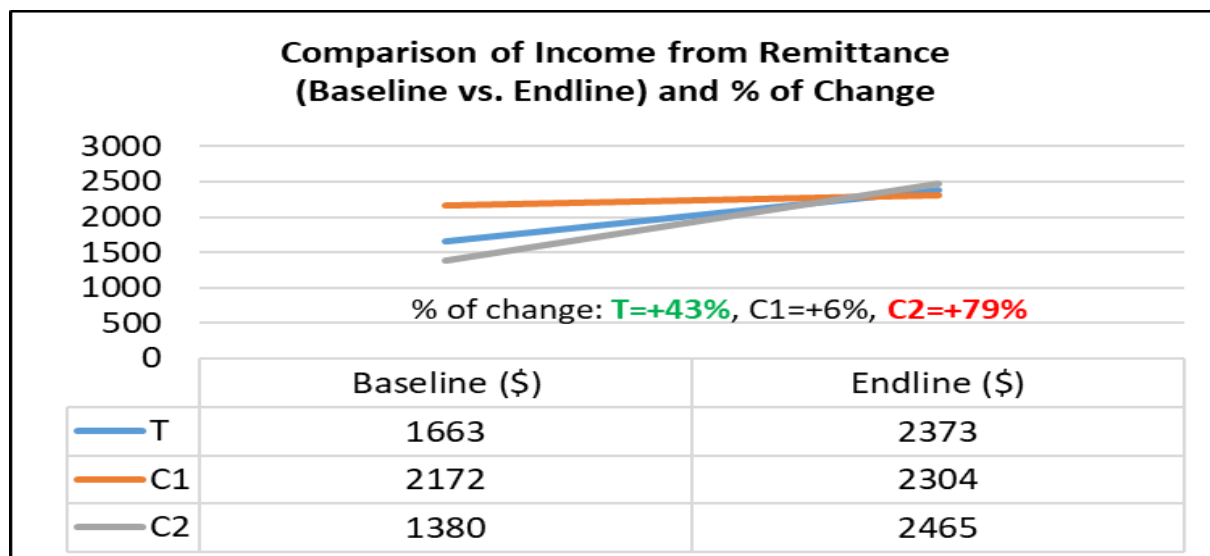


- Fortunately, SG members, whose income seemed to have not received impacted by any intervention yet, had also received pure impacts from the SRL project in the form of animal raising livelihood. Their income from animal raising had increased 33%, while C2 HHs had decreased by 21%. This showed that besides receiving non-monetary impacts in terms of increasing capacities for financial management, the main activity that SG members were interested to invest in was animal raising.

Table 4.12: Regression of DiD Framework Analysis (T-C2) on Income by Category

Full Respondent	Total Annual Income			Rice Sale			Home-gardening Sale			Animal Sale		
	Coeff.	t	P	Coeff.	t	P	Coeff.	t	P	Coeff.	t	P
Time Endline	1.326	16.11	0.000	0.625	4.07	0.000	0.959	3.19	0.002	0.744	5.99	0.000
Treated (T_C2)	0.110	1.60	0.109	0.097	0.76	0.449	-0.967	-3.37	0.001	-0.212	-1.97	0.049
Endline#Treated (time#T_C2)	-0.058	-0.29	0.774	-0.443	-1.07	0.283	-0.016	0.03	0.978	-0.027	0.12	0.905
WUGs/FWUGs	0.122	0.49	0.627	0.382	0.94	0.349	0.259	0.32	0.749	-0.096	0.40	0.689
SGs	-0.243	-1.34	0.179	0.289	0.78	0.436	0.280	0.56	0.576	0.212	1.20	0.229
SLGs	0.133	0.88	0.381	0.007	0.03	0.979	0.471	1.39	0.166	0.000	0.00	1.000
LIGs	0.091	0.50	0.617	0.766	2.04	0.042	0.254	0.51	0.611	0.691	3.68	0.000

Figure 4.19: Comparison of HH Income and % of Change for Remittance



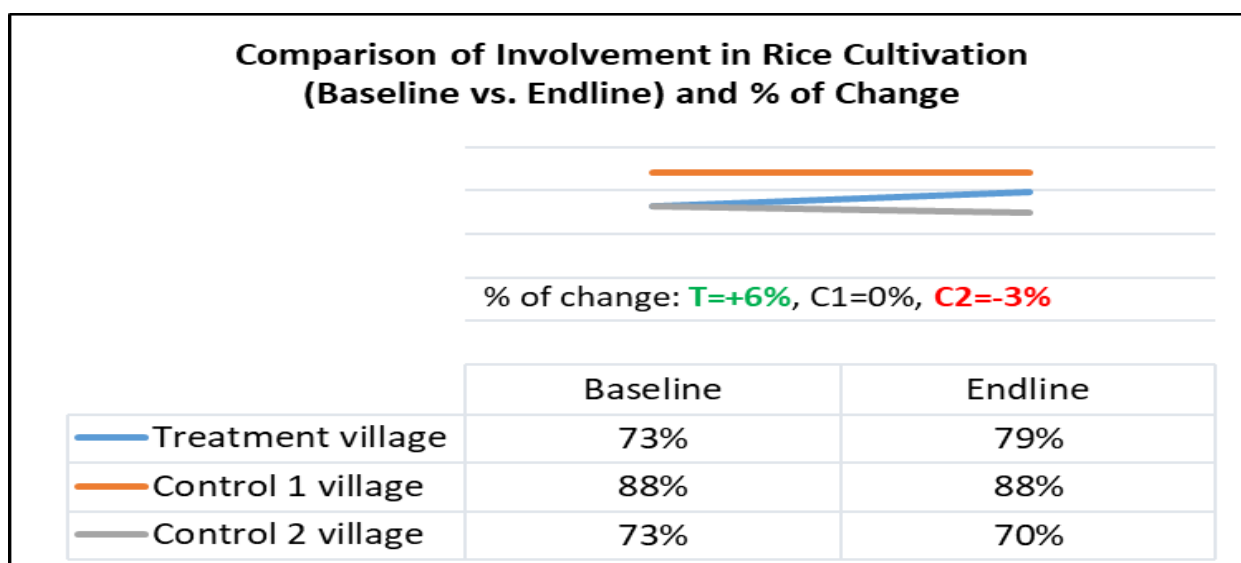
Lastly, in contrast to all incomes from agricultural-based livelihoods, non-agricultural income – remittance – had increased more among C2 HHs than those of T HHs or C1 HHs (see **Figure 4.19**). In principle, project’s intervention might not contribute to prevent or hinder migration that leads to lessen income from remittance. Instead, remittance increased 43% for T HHs due mainly to their increasing involvement in migration.

4.4.2.2 Intervention Impacts on Perceptual and Attitudinal Change

Attitudinal Change toward Rice Cultivation

Overall, there were both pure and spillover impacts regarding changing attitude toward rice farming. Percentage of change among T HHs who were involved or committed to rice cultivation showed a 6% increase if compared to the baseline data. Trend between T and C1 was similar showing small spillover effect. Although, there was no positive change observed among C1 HHs, it was still better than C2 HHs’ (-3%).

Figure 4.20: Trends in Respondents’ Rice Production Efforts



The detailed comparison between T, C1 and C2’s engagement in rice farming from baseline to endline period (**Figure 4.24**) showed the obvious positive behavioral change, more commitment to rice farming among the SRL project’s beneficiaries (though remains small) in which they study did not detect very much among C1 HHs who were living in the same location.

Percentage of T HHs involved in rice farming once and twice a year increased (about 3% each), while those who did not farm at all decreased 5%. Percentage of C1 HHs engaged in one-time rice cultivation increased by only 1%, while the percentage of those engaged in two times per year decreased by 2%. Less interest in and commitment to rice farming increased among C2 HHs; there was about 4% decrease among respondents from C2 villages engaged in once a year rice cultivation, while those who did not farm rice at all increased by 3%.

At CBO level, the positive behavioral change concerning rice cultivation was shown via significant statistical correlation with LIG HHs (p=0.000). Initially, regression of intervention and number of rice cultivation (for T HHs at endline period) showed the positive correlation between CBO HHs (except SLG HHs) and rice yield (p<0.05). Noticeably, WUG/FWUG HHs were more likely to farm more than once a year (p=0.044). Yet, with time variance and comparison with C2, significant correlation occurred with only LIG HHs (p=0.000; see **Table 4.14**).

Pure impact (CBOs – C2) was slightly detected. The change in C2 HHs was negative (-3%), but all CBO members had increased involvement in rice cultivation, especially among WUG/FWUG members (20%). This indicated that WUG/FWUG members started to think about rice farming for positively and had increased their involvement in rice cultivation more than other CBO members.

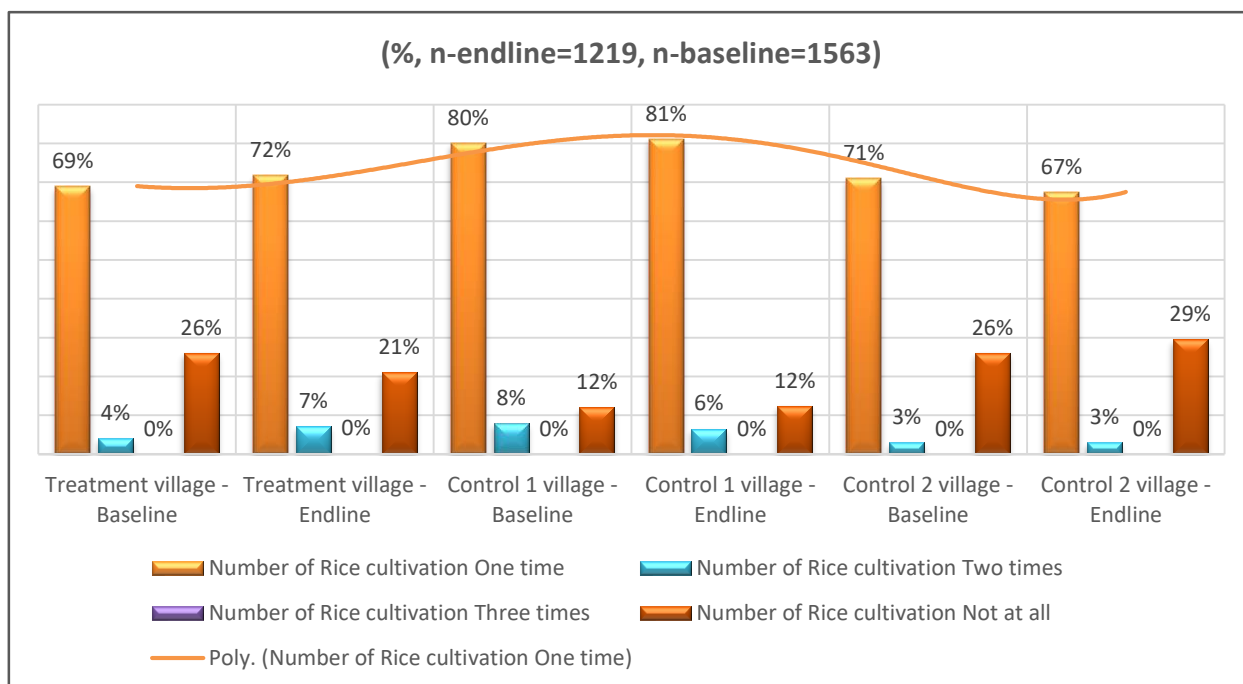
Pure impact in rice yield was also found; C2 HHs had decreased yields by -1.85t/ha, while yields of WUG/FWUG HHs decreased only -0.76t/ha. Although rice yields did not increase yet, the intervention helped lessen the loss (less than the decrease rate in C2 HHs).

This revealed that with the interventions, all types of CBO members (though the amount varies) had more commitment / confidence to invest inputs into farming and as a result had cultivated rice better than the two controlled groups. Model farmers from SLG appeared to do better than other CBO HHs; their yields increased by 0.29 to 0.63t/ha (see **Table 4.13**).

Table 4.13: Changes in Rice Cultivation Efforts, Yield and Migration Behaviors

Type of CBOs and Villages	Involvement in Rice Cultivation (%)		Rice Yield (t/ha)		Involvement in Out-Migration (%)	
	Baseline	Endline	Baseline	Baseline		
WUGs/FWUGs	73%	93%	3.90	3.14	28%	32%
LIGs	73%	75%	3.90	4.19	28%	32%
SGs	73%	88%	3.90	3.13	28%	23%
SLGs	73%	75%	3.90	4.53	28%	33%
C2	73%	70%	7.95	6.1	25%	32%

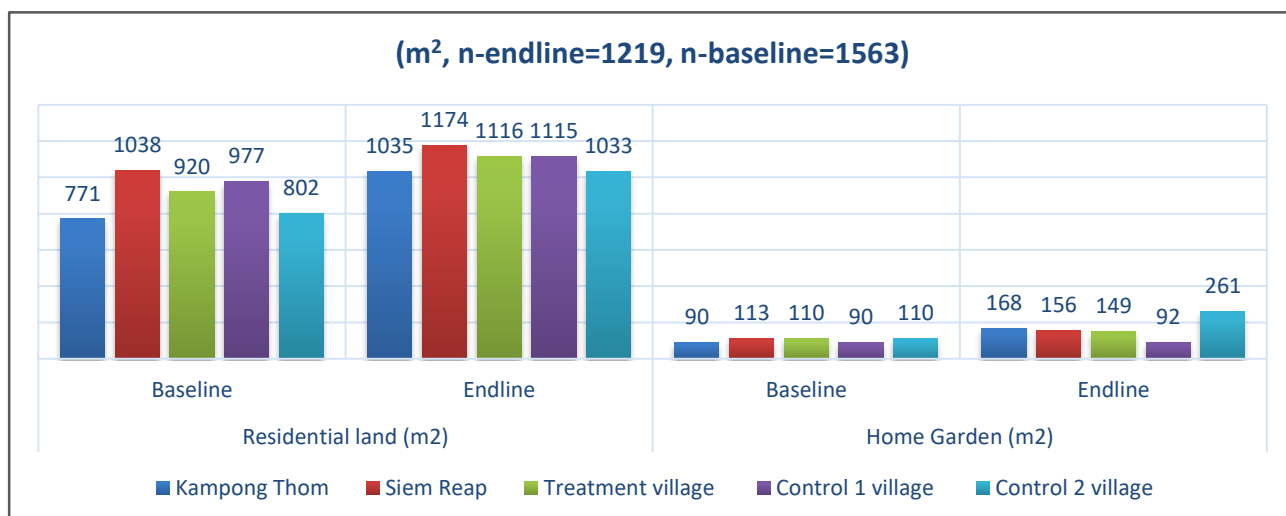
Figure 4.21: Comparison of Rice Production Efforts per Year



Attitudinal Change toward Land Possession and Use

A tendency to enlarge land, either farmland or residential land, was observed among T, C1 and C2 HHs. Overall, perceived importance and need of land among rural people, especially T HHs, remained strong although many of them were more engaged in migration presently. KII and FGD informants explained that many migrants used their remittance for buying more farmland and expanding residential land or building bigger houses in their homeland. This portrayed an unconscious statement that all types of migrants intended to return home and resume their agricultural livelihoods sometime in the future when they could rely on these livelihoods to live well.

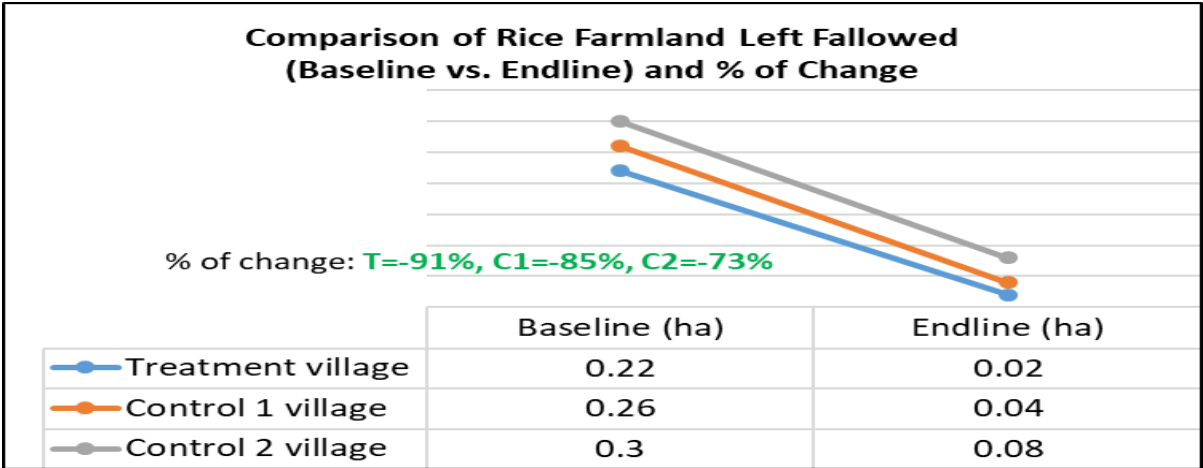
Figure 4.22: Comparison of Residential and Home-gardening Land



The difference between T, C1 and C2 HHs was observed clearer if taking land use and land left fallowed simultaneously into consideration. At baseline, T HHs used an average of 2ha of land

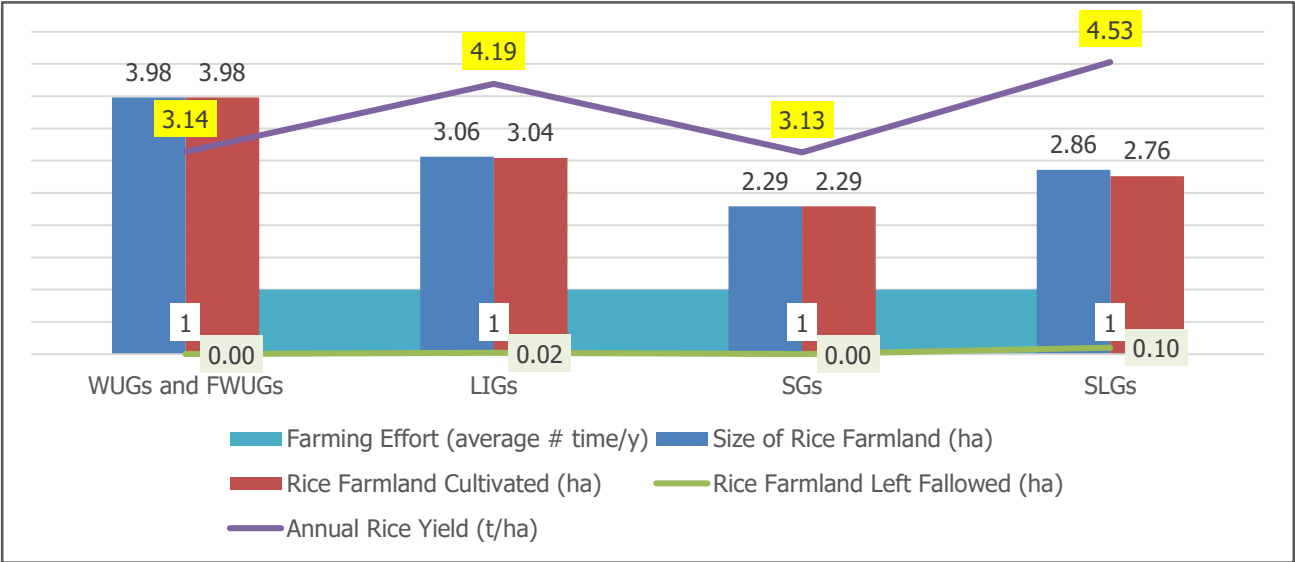
and left about 0.24ha fallowed, but at endline period they seemed to be inspired to use all land available (about 3ha). Only 0.02ha of farmland was left fallow. This indicated that T HHs used at least 91% more of the land they left before in addition to extra acquired land of nearly a hectare more, while C1 group used up to about 85% more of the leftover land, and C2 used only 73%.

Figure 4.23: Comparison of Trend in Leaving Rice Farmland Fallowed



The SRL’s project was more successful with WUG/FWUG HHs in terms of rice farming and reduction of farmland left fallowed than other CBO HHs. WUG/FWUG HHs possessed bigger amount of land (average of 3.98ha) than other CBOs HHs (see **Figure 4.24**). As a result, they were strongly engaged in rice farming livelihood by leaving none of their farmland fallowed at the time of this endline study. LIG members owned a little smaller amount of farmland (average of 3.06ha) and, in addition, they were strongly engaged in farming although they left a very small amount of farmland fallow (average amount of 0.02ha= 200m²).

Figure 4.24: Summary of Rice Cultivation Patterns and Yield



Dismally, SLG members or the model farmers, who received higher yields per hectare than other types of CBO HHs (as they were a bit better off than other members and thus more capable of adding necessary inputs and implementing the trained techniques better), did not seem to prioritize rice farming livelihoods. They possessed less amount of land than WUG/FWUG and LIG HHs, but left bigger amount of land fallowed than other HHs (average of 0.10ha=1000m²).

The project seemed to have no impacts in terms of changing behaviors for home-gardening effort. Once again, there was a parallel increase trend between all types of HHs. The different in the level of involvement between people who received extension services (i.e. skill development and other inputs) from the project and those who did not (C1, C2) was less than 6%.

Figure 4.25: Comparison of Trend in Home-gardening Involvement

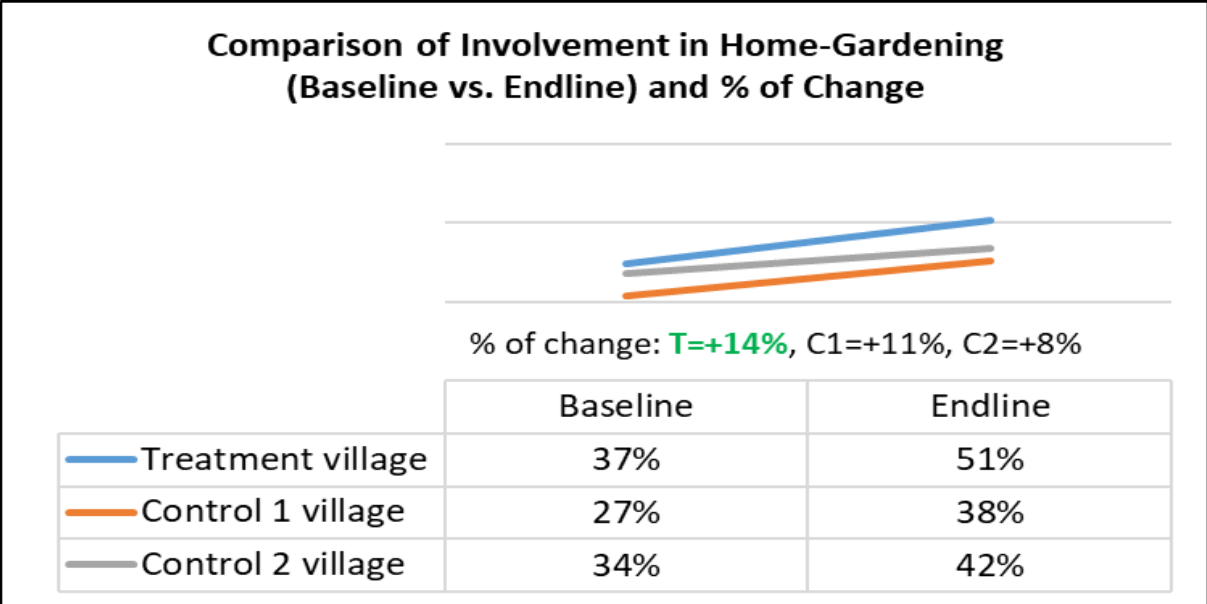


Table 4.14: Regression of DiD Framework Analysis (T-C2) on Behavioral Change

Full Respondent	Land Left Followed			# of Cultivation			Outmigration		
	Coeff.	t	P	Coeff.	t	P	Coeff.	t	P
Time Endline	-0.421	-1.30	0.197	0.535	1.15	0.251	0.285	1.73	0.084
Treated (T_C2)	-0.129	-0.75	0.454	0.608	1.47	0.141	0.127	0.91	0.364
Endline#Treated (time#T_C2)	-0.940	-0.13	0.900	-2.361	-2.92	0.004	-1.027	-2.70	0.007
WUGs/FWUGs	-	-	-	-0.929	-0.89	0.372	0.192	0.36	0.721
SGs	0.578	0.59	0.556	1.368	2.67	0.008	0.261	0.79	0.431
SLGs	-0.809	-1.23	0.240	0.126	0.26	0.793	-0.078	-0.27	0.785
LIGs	0.820	1.04	0.299	2.538	3.81	0.000	1.083	3.16	0.002

Note: - = Results omitted or excluded due mainly to collinearity

Attitudinal Change toward Migration Practice

In general, T, C1 and C2 HHs involved in migration. Statistical test showed LIG HHs were most likely to migrate than their non-LIG counterpart. Little pure and spillover impact was detected; the percentage of change for T and C1 was less than that of C2 HHs (see **Table 4.13**).

Figure 4.26: Comparison of Trend in Migration Involvement

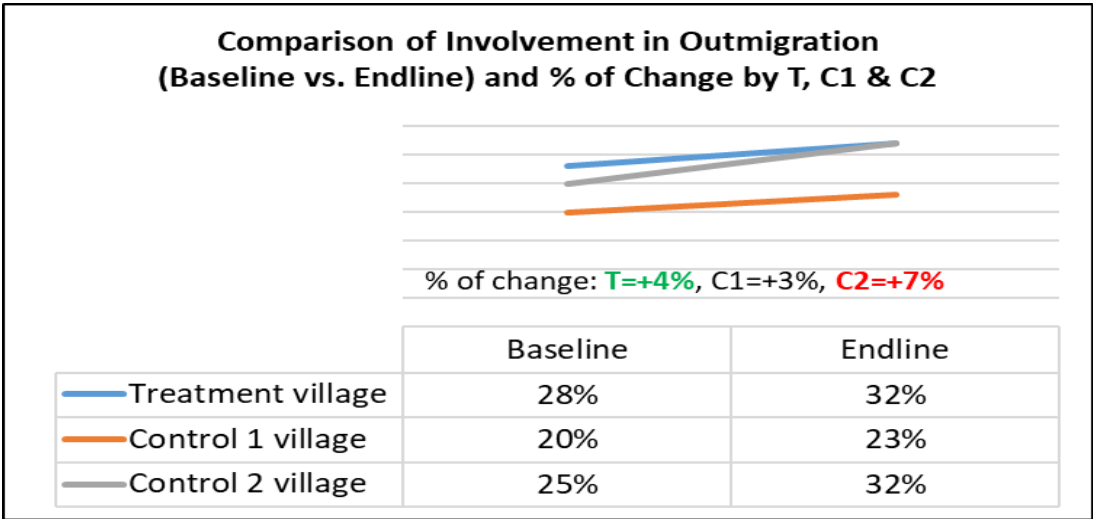
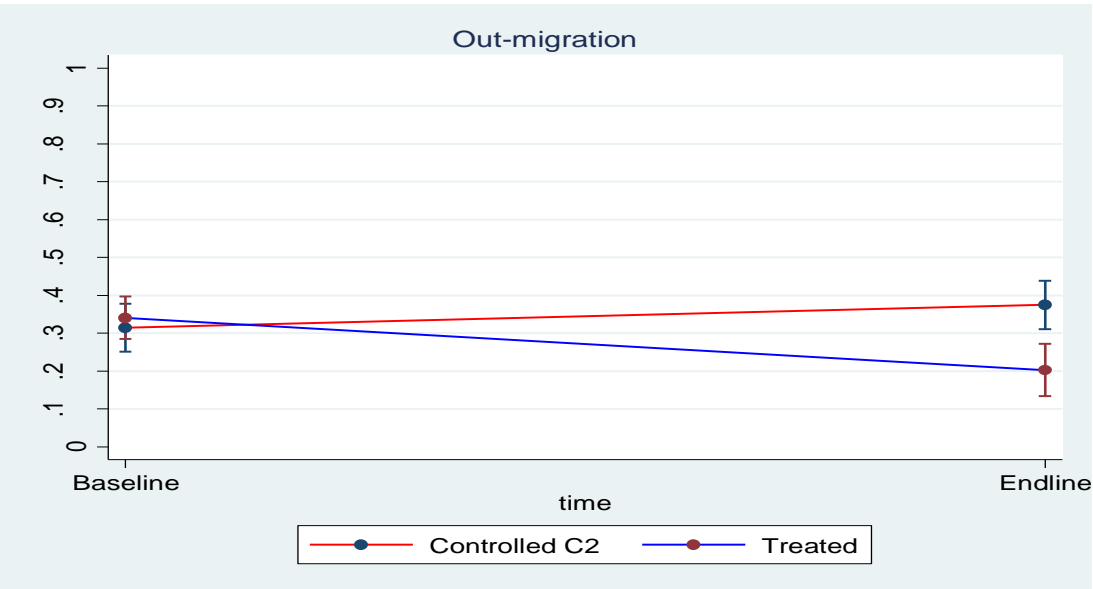


Figure 4.27: Illustration of Pure Impact in Migration Involvement



Perceptual Change toward Water Access and Vulnerability to Climate Hazards

The SRL project’s aim to reduce water shortage for agricultural purpose was positively impactful and contributed to change farmers’ perception on water shortage for agriculture. Comparison of change trend between T, C1 and C2 HHs showed that the SRL’s interventions in small-scale water infrastructures had both pure and spillover impacts (see **Figures 4.28, 4.29**). Although natural water resources decreased and there was drought in 2019, there was less portion of T HHs (-1%) perceiving shortage of water for agriculture in their areas, while about 18% C2 HHs stated increased water shortage for agriculture in their locality. C1 HHs, who were in the same villages had parallel trend; none of C1 HHs mentioned about water shortage. This indicated spillover effect of small-scale water management infrastructures intervened by the project.

Different to perception of water shortage, perception and attitude toward climate hazards, especially the ones with the most impact on rice cultivation – flood and drought – had not changed positively; however, both pure and spillover impact were detected.

It was widely acknowledged by the survey respondents that climate change phenomenon had intensified year by year⁴. Therefore, both target beneficiaries and controlled groups naturally had increased fear of these phenomena and remained considering themselves and agricultural production, especially rice cultivation, to be vulnerable to these incidents. Notwithstanding, there was pure impact on perception of vulnerability to drought; though T and C2 perceived their vulnerability to drought increased, percentage of change for C2 HHs' increased around 20% more than that of T HHs'. Spillover impact was discovered as well when T and C1 HHs had similar percentage of change that was less than C2 HHs (Figure 4.30).

Figure 4.28: Comparison of Perception on Water Shortage

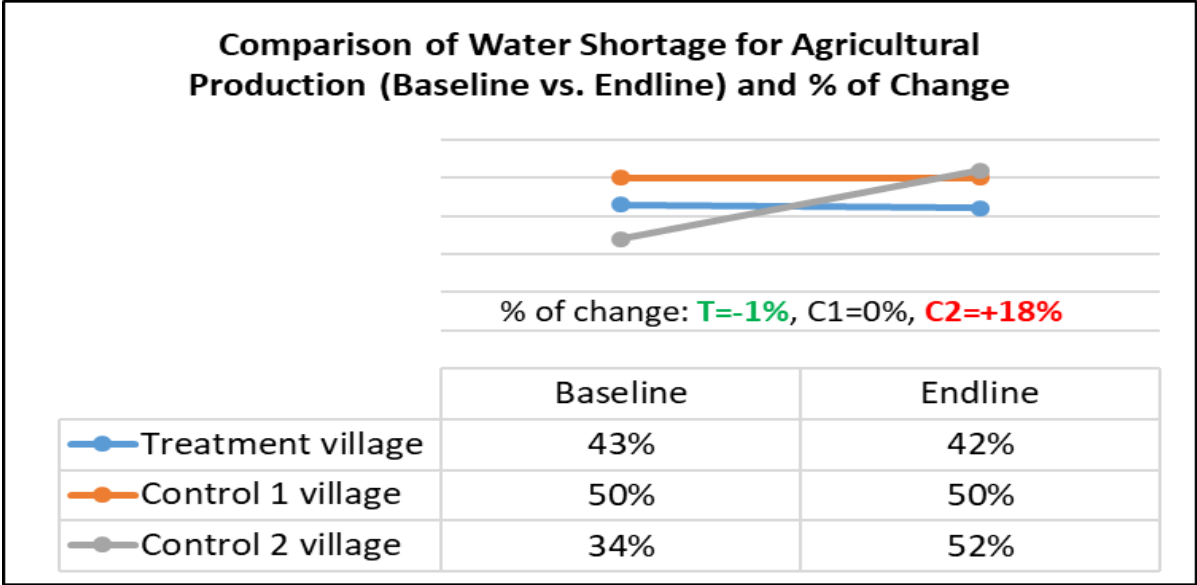
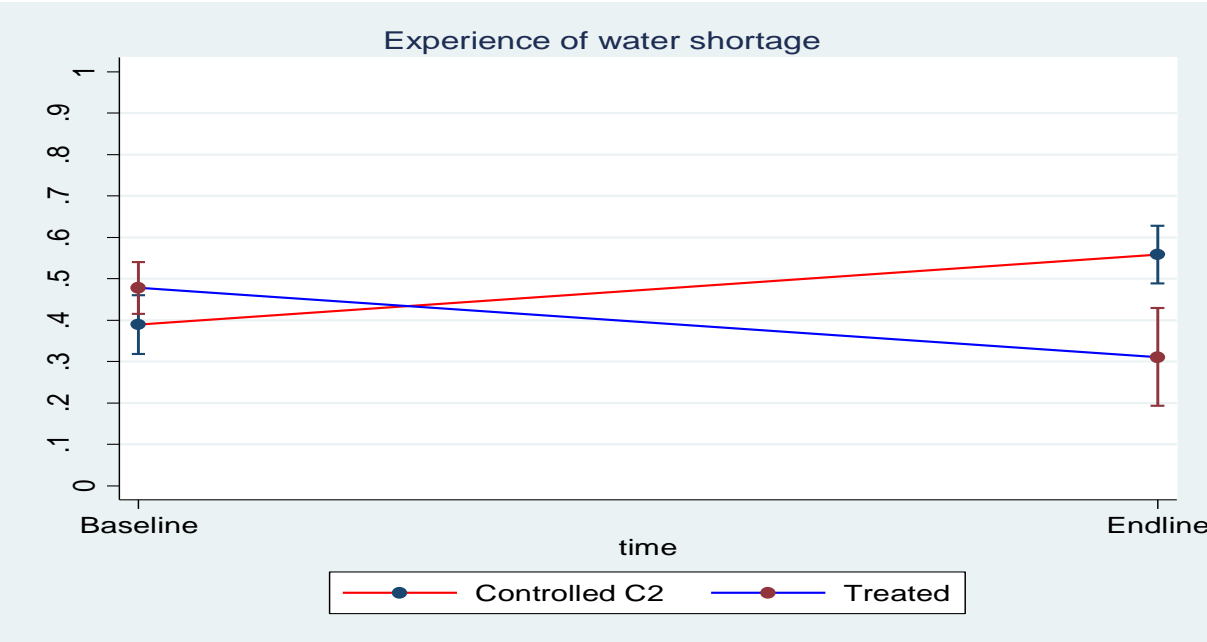


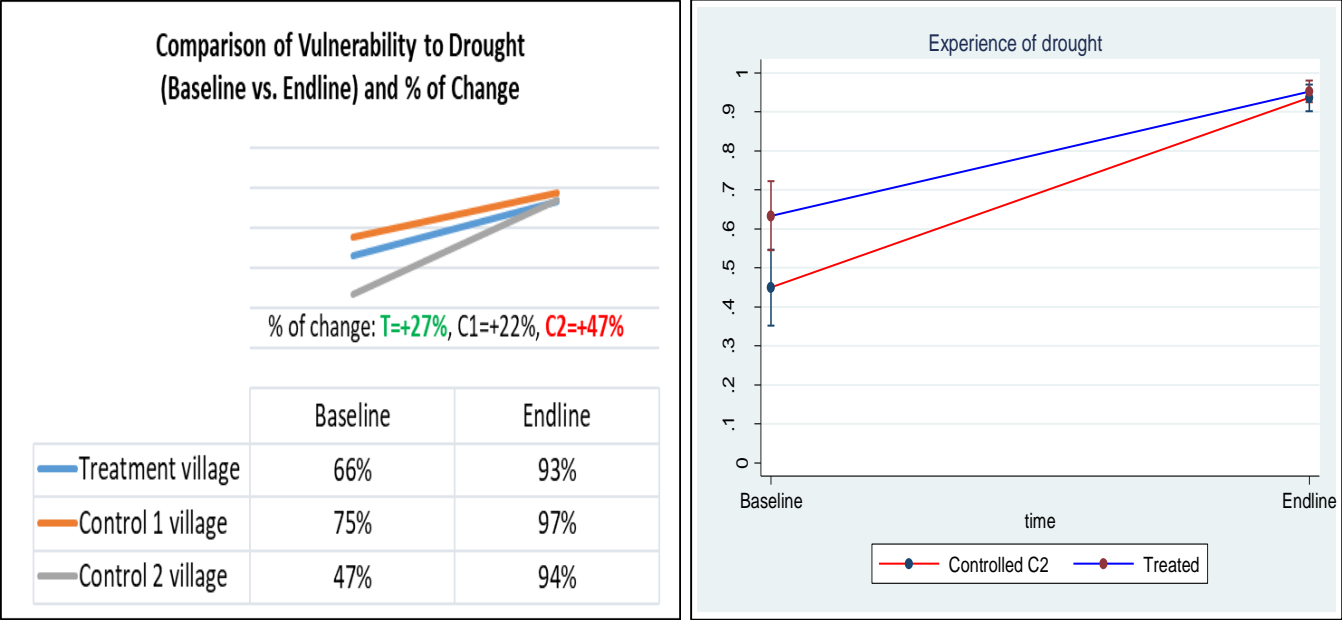
Figure 4.29: Illustration of Pure Impact on Perceived Water Shortage



⁴ Refer to Vulnerability and Risk Assessment Report for SRP and KPT for the last 10 years conducted by an SRL consultant enclosed in **Annex 2** of this Impact Assessment.

Instead, impact on perceived vulnerability to flood had positive change. Spillover impact was clearly shown as T and C1 HHs had similar percentage of change, which indicated less fear of flood (around 30% decrease) since they had more infrastructures / channels to recede water from rice fields whenever there was flood. However, pure impact was slight as C2 HHs had also decreased fear of flood (23% decrease), though the percentage of change was less than that of C1 and T HHs’.

Figure 4.30: Comparison of Trend in Perceived Vulnerability to Climate Hazards



Perceived vulnerability at CBO members’ level was slightly different. Roughly, nearly all CBO members reported they had access to water for HH consumption. If comparing percentage of changes between CBO members and C2 HHs, in particular:

- There was a small pure impacts on reduction of water shortage for agriculture (ranging from 2-12%), percentage of change of all CBO HHs (except SLG HHs) were bigger than C2 HHs that still had increased water shortage around 18% (see **Table 4.15**).
- There was no pure impact on perception of vulnerability to climate hazards [all except SLGs whose percentage of change (18%) was smaller than that of C2 HHs (27%)].

Table 4.15: Conditions of Water Use and Shortage and Perceived Vulnerability

Type of HHs	Water Shortage for Agriculture		Vulnerability to Climate Hazards		Vulnerability to Drought (%)		Vulnerability to Flood (%)	
	Baseline	Endline	Baseline	Endline	Baseline	Endline	Baseline	Endline
WUGs/FWUGs	43%	41%	61%	100%	66%	68%	47%	46%
LIGs	43%	42%	61%	92%	66%	93%	47%	18%
SGs	43%	31%	61%	90%	66%	87%	47%	23%
SLGs	43%	60%	61%	79%	66%	85%	47%	22%
C2	34%	52%	63%	90%	47%	94%	48%	25%

- Perceived vulnerability to flood was similar between T HHs and LIG, but a bit different with WUG/FWUG, SG and SGL (all<T HHs' change of -30%). There was a small pure impact on perceived vulnerability toward flood; percentages of change from LIG, SG and SLG HHs (all<23%) were smaller than that of C2 HHs' (23%).
- There was a small pure impact on perceived vulnerability toward drought as percentages of change of all CBOs HHs (all<33%) were smaller than that of C2 HHs (47% increase). Yet, pure impact on LIG HHs is the slightest as percentage of change from this group member (27%) is less than that of other CBO HHs.
- Notably, WUG/FWUG HHs appeared to have received higher pure impact from the interventions in relation to perception of drought; though the percentage of change was not decreased yet (2%), it was lesser than that of C2 HHs (47%).

Table 4.16: Conditions of Water Use and Shortage and Perceived Vulnerability

Full Respondent	Drought			Flood			Water for Agriculture			Water Shortage		
	Coeff.	t	P	Coeff.	t	P	Coeff.	t	P	Coeff.	t	P
Time Endline	2.997	10.28	0.000	-	-	0.000	1.628	10.14	0.000	0.708	4.65	0.000
Treated (T_C2)	0.773	4.85	0.000	-	-	0.674	0.222	1.66	0.097	0.375	2.94	0.003
Endline#Treated (time#T_C2)	-	-0.83	0.406	-	-	0.914	-	-2.87	0.004	-	-	0.001
WUGs/FWUGs	-	-2.78	0.005	1.338	2.91	0.004	1.513	2.34	0.019	0.218	0.48	0.632
SGs	-	-1.65	0.099	-	-	0.729	0.662	1.57	0.117	-	-	0.859
SLGs	-	-2.22	0.026	0.268	0.71	0.477	-	-1.01	0.315	0.608	2.14	0.032
LIGs	0.056	0.11	0.914	-	-	0.289	0.583	1.35	0.177	0.760	1.86	0.064

4.5. Project's Best Practices and Challenges

Overall, the SRL project's benefits was strongly observed, especially in relation to relevance and efficiency measures, while with regard to effectiveness measure the benefits were partially detected and varied according to types of intervention and benefits expected. Yet, in terms of impact measurement, the project's effects were slightly detected. Information from KIIs and FGDs assisted in understanding logics behinds these SRL's intervention achievement or the lack of it. In summary, they may be the results of best practices and challenges or limitations as follows:

4.5.1. Best Practices

- First, the SRL project denotes a significant move towards efficient project inputs with prospective diversified outputs and outcomes in rural Cambodia using collaborative frameworks and co-funding policy with sub-national administrations, especially at commune/Sangkat level to enhance responsive and proactive interventions in addressing livelihood problems and agricultural production system triggered by increasing climate change impacts.
- The SRL project has applied an innovative bottom-up approach to identify intervention schemes for the target areas with an intention to consolidate the results of vulnerability and need assessment with commune development and investment plans before every and each intervention takes place. The open call for bidding proposal for needed

investment projects is rigorous and substantive in engaging village and commune authorities to work in concerted efforts to identify their priority investments before submitting the proposals further for consideration at provincial and national levels through one-window service office at the district level. This has also brought in appropriate phase-in intervention activities in the forms of livelihood strategies and improved access to water for domestic consumption and agriculture for the target areas across KPT and SRP.

- The SRL project has adopted a groundbreaking criteria-based approach in selecting a wide range of project beneficiaries to be supported throughout project timeline. The adoption of such approach does not only necessarily allow the project to tackle poverty alleviation at the village level, but also contextualizes its strategic interventions within a limited funding and timeframe whilst increasing access for the poor, the vulnerable, and the marginal groups to livelihood improvement and climate adaptation and response.
- The SRL project's employment of the most strategically important stakeholders for development and implementation of the climate adaption and resilient livelihood intervention at sub-national and local level. Multi-sectoral and inter-ministerial collaboration and coordination among DCC of GSSD-NCS, MoE, and NCDD of MoI in developing and implementing the project specifically empowered and fostered climate adaptation planning capacity at commune/Sangkat level and improve living conditions of rural farmers amidst increasing extreme weather hazards, particularly droughts.
- The SRL project's alignment of its interventions with other projects' interventions in the neighboring areas has increased a likelihood of the project success and sustainability by using limited inputs. For example, connection with ADB-supported Chouk Ksach FWUC for the continuity of the two SRL-supported FWUGs, including (1) in Thnol Cheat and Punnareay villages and (2) Praneak village.
- In addition, the project has provided an extensive water infrastructure support to non-beneficiary villagers and villages to improve their access to water for agricultural production (e.g. canal restoration in Thnol Cheat village gives an opportunity for people in Thnol Thmey, Chi Ouk and Pou Pi villages to irrigate their rice paddies and cultivate rice twice a year. This was one of the reasons why C1 respondents' income from rice production grew substantially).
- The SRL project does not introduce any standalone livelihood intervention, but supports diversified supplementary livelihood strategies (e.g. vegetable growing or rice cultivation practices in addition to chicken raising under LIG intervention or to SG intervention). This is supported by a flexibility or an adaptability plan developed by the contracted service provider (CADTIS) in collaboration with CBO management and the targeted commune councils.
- The SRL project design has the potential to induce dynamic and proactive community involvement in and strong commitment towards endogenous livelihood improvement intervention practices. Most of the model farmers, especially chicken raisers, are willing to share their knowledge and farming experience not only to their LIG members, but also to non-beneficiary HHs living within and outside the target areas of the project (e.g. cases of chicken raisers in Rong Kor village, Rong Kor commune, Kralanh district, Siem Reap province).

4.5.2. Challenges and Limitations

- Primarily, it is critical to note that at the time of the endline survey (May 2020), most of interventions in terms of water management infrastructures (more than 90%) were completed but not fully functional. Most of the small-scale water infrastructures have just recently built or renovated (Year 2019: KPT=27 projects, SRP=24 projects; Year 2020: KPT 11 projects, SRP=22 projects), and thus make it difficult for the project to achieve immediate positive impacts on agricultural production and livelihood improvement. Especially, those infrastructures completed in 2019 would start functioning in the rainy season of the 2020, which is from at least June onward. Therefore, the entire outcomes of the small-scale water management infrastructures were not fully recognized yet. In theory, such projects could generate significant impacts in 2 years after construction or renovation.
- Project design with limited timeline for actual implementation on the ground could trigger an impediment for maintaining and sustaining the project frameworks after project termination. On the other hand, if the project does not continue for any further phases, it would strongly discourage the established CBOs, particularly the LIGs and WUGs/FWUGs, not to trust other similar project activities despite their current commitment and dynamic involvement.
- Involvement of project beneficiaries from Poor 1 (extremely poor) and Poor 2 (moderately poor) families with very limited farmland access and livelihood options as well as from the elderly groups could easily lead to changing composition and membership of the established CBOs since the targeted beneficiaries are mostly prospective for out-migration for immediate livelihood needs, and hence unable to meaningfully undertake intervention practices respectively.
- Increasing occurrence and intensity of extreme climate events, particularly prolonged droughts and erratic rainfalls, strongly affect amount, velocity, and regular flow of water from upstream to downstream areas, let alone most of the built water infrastructures (i.e. canals), exclusive of dug ponds, to have insufficient water for irrigation purposes. Such climate change impact also affects agricultural practices of the target communities in the areas, and without any immediate mitigation, it may lead more people to renounce their rice farming to pursue out-migration or seasonal wage labors that could provide immediate income to support their families.
- Dependency of small-scale water management infrastructure (esp. irrigation canal) on the availability and sufficiency of the major connecting canals in the areas (to deliver water into smaller SRL canals). This is one of the reasons why water infrastructure intervention in KPT appeared to be more effective than those in SRP since there is more major / main canals connecting to more reliable sources (e.g., Chhouk Ksach Main Canal, 6 Makara and 31 Kanha Main Canal, Chin Canal, etc. connecting to several big rivers such as Sen, Stong and Chinit River that have separated sources from the major Prey Long area) in KPT than in SRP (that mostly connected with natural streams, a few major canals such as Tavkod and Taneav canal and Rolous River that doesn't have much water volume to start with).
- Changing representatives or contact points of commune councils (at commune level) to collaborate with the contracted service provider (CADTIS) in implementing interventions to the target communities may hinder achievement of positive attitude (knowledge and awareness, commitment, policy and mechanism) as well as moderate capacities of these

local administrations to fully implement the frameworks of the project beyond the project's termination.

- Absence of incentivization policy for representatives or contact points of commune councils (or SNAs in general) to undertake their works in post-project termination period may prevent enthusiastic commitment and necessary interventions as required by unexpected circumstances too.
- COVID-19 pandemic has impeded SRL's planned livelihood and water infrastructure related implementation schemes supposed to be both provided by the service provider (CADTIS) as well as the NCDDES team at national and sub-national levels. Since its outbreak in early 2020, almost all the remaining climate adaptive livelihood interventions (e.g. CBO establishment, capacity building for newly founded LIGs, SLGs, and SGs, formation of agricultural cooperatives or ACs, etc.) and climate resilient water infrastructures (e.g. constructions of remaining canals and ponds, regulators, dams and other waster infrastructure schemes, WUGs and FWUGs establishment and capacity building, formulation of water user fee mechanism, etc.) have been postponed or just supplied to the target areas within the remaining project coverage areas. Late interventions and sporadic follow-up works have also triggered less participation from target beneficiaries who need to regularly catch up with project supports and implement project schemes in realizing the betterment of their livelihood strategy and agricultural production. Furthermore, the impacts of COVID-19 pandemic also entail distancing communication between CADTIS and the established CBO members and between key implementation actors of the project as well as disruption of linkage between the supported farmer producers and the markets.

4.6. Project's Sustainability

Sustainability of the project is measured based on how sufficient and resilient the project's achievement/success is and of how damaging or obstructive the shortcomings can be. Consequently, this section commences with the summary of key achievements and shortcomings, as well as rationalities for such occurrences so that additional efforts, suggestions and recommendations for further interventions can be made in a strategic and impactful manner.

4.6.1. Sustainability of Income Generation and Livelihood Diversification

According to the results of comparison of income based on different categories or livelihood activities in Impact Assessment Section, it can be concluded that the SRL project has low pure and spillover impacts if we merely look at annual income in general. On the other hand, it has higher impacts if we focus on categorical incomes, particularly those agricultural-based ones that are directly linked with the project's interventions. Nonetheless, it is still a concern whether such increase in agricultural-based income will be sustained in the following years without further supports and interventions from the project. Indeed, achievements with regard to increased incomes are very dependent on the indirect impacts of the project, particularly the people's attitudinal change toward land use and their confidence on capacities, their perceived vulnerability to climate hazards and their perceived adequacy / effect of the project's interventions. Thus, to analyze the sustainability of impacts on income generation, we will closely examine rationalities / factors behind and prospective consequences that will be caused by each achievement and shortcoming.

Overall, it is noted that annual income of T HHs has increased by 29.2%, which is very good because it is more than the end of the project target (20%). Yet, there is a concern that the biggest portion of this annual income is from remittance. In particular, the project has very small

pure impact; in comparison to C2 HHs, the difference is only 0.5%. Besides, there is no spillover impact as C1 HHs' annual income increased by only 9.6%. However, this small pure and spillover impacts may not be too worrisome as this outcome is actually founded to have been caused by several confounding factors mentioned in the methodology and various sections earlier. They include availability of similar interventions from other projects (presently or previously) in C2 villages and the fact that C1 HHs' baseline income was already high in comparison to T and C2 HHs' baseline, which is difficult to raise it much higher in the target areas' context. There is not much conclusion to be made based on this proportion of overall income.

On the other hand, the project is highly and positively impactful (pure and spillover) with regard to all incomes from agricultural-based livelihoods except cash cropping (that was not considered specifically by the SRL's intervention design). Both pure and spillover impact is quite good. Annual agricultural-based income of T HHs has increased by 27% (more than target), while C2's increase in this regard is only 1% but C1 HHs' increase is 37%.

It is good that C1 HHs that reside in the same treatment villages have increased their income as well, and thus shows the diversified livelihoods introduced by the SRL project are appropriate and thus being adapted beyond immediate beneficiaries. However, the bigger increase in C1 HHs' income (in comparison to T HHs) in this category indicates an issue or concern with options of direct project beneficiaries and/or intervention designs / logics. With regard to choices of direct beneficiaries, it is noted that target beneficiaries (poor 1, poor 2, female-headed or family with disability) are very prone to migration for immediate cash need and abandon the participation in the project. As well, they have very limited capacity / available inputs to fully apply all the trained techniques in order to realize the full impact of the interventions, while it was observed that provision from the project to support the livelihood activity application is limited (i.e. CCT of USD 50.00 / HHs).

When it is commendable to provide a minimum incentive possible (so that the project is not bribing people's involvement) but still received targeted size of participation (>60% of trainees; see **Table 4.6**) to apply the trained livelihood techniques. The issue here is inadequacy of the increased income from the desired categories to encourage people to take up more agricultural livelihoods, increased rural productivity by putting more efforts on farming and reducing the amount of farmland left fallowed, as well as changing perceptions towards turning to out-migration as a most feasible alternative for immediate cash need. Specifically, the amount of annual agricultural-based income is founded to remain small; it is USD 996, only USD 210 more than baseline income, and is still much less than the claimed expense for T HHs' basic needs (USD 1,379), such as clothing, children's education, foods (in addition to available domestic animals, fishes, and vegetable), medical expense, social activities, etc., excluding necessary expenses on agricultural production (e.g. hired machinery, fertilizer, manual assistant, transportation cost, etc.).

Additionally, concerning intervention designs to improve livelihoods, it appeared that both animal raising and home-gardening are more positively impactful than rice cultivation at the present time. Both income from animal sale and sale of home-garden produces increased remarkably, 122% and 62% respectively, while income from rice sale increased only 8%. Once again, while the change is impressive and denotes that the project has positive impact, the sustainability here still hangs on the amount of income received from each of this category to decide whether they will keep the livelihoods after the project termination (Rice sale = USD 566, increase USD 40; Home-garden sale = USD 33, increase USD 18; Animal sale = USD 396, increase USD 151).

Animal raising, especially chicken raising, is the most favorable farm-based livelihood strategy engaged by 89% of T HHs. The rationales behind this choice are quite economical, which include: 1) need short time to raise; 2) do not require much land, capital or inputs to raise; 3) provide

quick cash nearly whenever they need it; 4) there is always market demand; 5) is handy for both HH consumption or festive activities. Home-gardening activity seems to be also popular with an engagement of 51% by T HHs too. These two activities are presumed to be sustained for a long time. Yet, the intervention's impact in terms of encouraging people to cultivate more vegetables around their residents is low (despite high increase of income) because people have somehow done that in rural area and they prefer to keep it more conservative and mostly for HH consumption rather than for sale and enlarge it as a form of micro agro-enterprise. Even though most respondents actively participated in LIG-based activities, they appeared to practice these livelihoods in a small-scale and laidback manner. This once again may concern with the amount of support the SRL project has delivered (USD 50) and size of land target beneficiaries (landless and land poor HHs) possessed for these homebound activities (approximately 149 m²). Therefore, while they are sure to keep practicing these two livelihoods even after the project ceases, they may not think them to be important enough or to produce adequate cash to keep them at home to reduce out-migration for additional cash need. Of note, there were 32% of T HHs still engaged in out-migration, especially seasonal ones (i.e. 32% of WUG/FWUG, 40% of LIG and 60% of SG members).

In general, the project's impact in terms of possible contribution to reduce migration practice among local people in target areas seemed to be nearly ineffective. All respondent groups confirmed increased trend in involving in out-migration for one reason or the other with and without intervention. Although with intervention, the increased percentage among T Group HHs is less than that of C2 group. This may denote that it does not necessarily mean the intervention is not at all impactful, but it indicates that any intervention to increase local agricultural livelihoods cannot prevent or reduce out-migration because rural people perceived migration as supplementary off-farm livelihoods in addition to agricultural ones. As well, migration appeared to become a socially assimilated behavior that is being imitated socially among relatives, friends and neighbors. For example, people living in the same villages (T and C1) migrated at similar proportion; there was a 4% increase of overall percentage of migrants in T and 3% in C1 groups, which is a bit lower than in C2 villages (7%).

The utmost important achievement that the combined interventions aimed to accomplish and that the SRL project and relevant SNAs seemed to have invested heavily on is to increase rice production and sale. This is one of the most important and biggest amount of income category; although it appeared small presently it is much larger if we count the average revenue farmers were able to gain from sale of rice (WUG/FWUG = USD 2,499; LIG = USD 2,547; SLG = USD 2,830). This revenue from sale of rice is indeed a bit more than that received from annual remittance (USD 2,373). The key to sustain practices of rural agricultural livelihoods, to increase rural productivity and welfare, and to keep rural people from migrating too much is to assist them overcoming / adapting to climate change impacts on rice production and productivity.

Presently, the impact of the SRL project in this regard remains moderate; the income from rice sale slightly increased compared to the Baseline data. Although this does not necessarily mean the intervention was less impactful or beneficiaries may not have strong commitment since there were increase in overall rice yields per hectare (see **Table 4.14**) despite a prolonged drought in 2019, and the size of rice farmland owned by target farmers also increased noticeably (approximately 0.83 ha, which in KPT and SRP cost around USD 3,000-4,000). In addition, there was a marked decrease in the size of rice farming land left followed by either T HHs and active members of CBOs as illustrated in **Figures 4.27, 4.28** above. However, most small-scale water management infrastructures constructed / renovated by the SRL project are not even fully functional yet.

Observably, the low reception of rice sale seemed to be caused by economic environment and local rice dealer / intermediary in the target provinces – price of rice in the market remarkably

fell in 2019. For instance, target farmers used to get 1,100 Riel/kg in 2018 for good species of rice but they got only 900 Riel/kg in 2019). While such occurrence is frequent and has also been realized and considered in the project document through the design of agricultural cooperative intervention in order to prevent leakage and swindle by local or external intermediary, this attempt failed to be accomplished due to time limitation and the outbreak of COVID-19 epidemic.

Favorably, it is broadly recognized that land is one of the most important assets for rural people, especially those most vulnerable and marginal communities in Cambodia (such as Poor 1 HHs, Poor 2 HHs, female-headed HHs, HHs with disability, and climate change impact prone HHs). Possession of land enables these grassroots communities to undertake livelihood activities that at least provide them the basic nourishment (i.e. rice and basic foods such as domestic animal, vegetable and fruits, etc.). As noted several time earlier, the survey respondents (T, C1 and C2) give great importance to land possession (farmland and residential land) and rice cultivation activities. All types of respondents have increased the size of their land possession over the past two years and none of the respondents stated they do not engage in rice farming (though mostly for subsistence and not for sale presently).

4.6.2. Sustainability of Institutionalization and Capacity Development

The SRL project contains substantial interventions with regard to institutionalization and capacity development at both SNA and CBO level. Activities at SNA level were meant to ensure that local interventions are correctly determined and properly implemented. Besides, it is to ensure that beneficiaries will receive appropriate and necessary assistance and inputs from their overriding authorities when the project ceases. Impacts in terms of integration of climate resilient livelihood framework into CDP/CIP and training SNAs on climate vulnerability in order to plan and prioritize the types of water infrastructure investment option specifically needed in their locality (either village or commune) are found to be very high.

These are very fundamental for the project's sustainability as they ensure that SNAs in the target areas have relevant comprehension of climate change incidents and have capacities to determine appropriate measures to overcome the challenges on their own without the external technical intervention in the future. As well, integration of climate resilient livelihood framework into CDP/CIP ensure that SNAs will adequately consider and have access to necessary funding for implementing relevant climate resilient projects in the future.

However, local stakeholders feared the project's impact in this regard can only be sustained as long as the mandate of the current CDP/CIP. It seems that more skills development and knowledge management systems are required to plan, develop and manage future endeavors. It was observed that the composition of key SNAs involved in implementing the SRL project changes throughout the project timeframe and current key persons or implementers may not have been involved in the provided capacity building programs so far. From key informant interviews, the majority of currently involved SNAs, especially those from SRP, were founded to have not taken part in earlier activities and have not been knowledgeable of most information or relevant processes and procedures. Many SNAs admitted (and confirmed by insignificant statistical values $P=0.178$; $P=0.544$) that: 1) they have more understanding of climate change events, but do not believe they have adequate capacity to plan, develop and manage climate resilient projects in a timely and successful manner on their own yet; additionally, 2) they did not think T HHs adequately understand climate change and have capacity to collaboratively apply climate resilient framework with SNAs, as well as to manage their land sustainably yet. Complimentary skill development and demonstration is mandatory for both parties.

Furthermore, the study also found that the established CBOs' current capacities (either of management committees and ordinary members) are inadequate for carrying out the project's

interventions on their own, even with support from the commune councils, without any further supports from the project yet. This shortcoming was strongly reflected in the HH survey too. The majority of members from all types of group assumed the project's benefits to be monetary gain, especially the CCT, and its contribution to enable them to diversify their livelihoods. Capacity building or skill development is not thoroughly considered or realized, and thus indicates the obvious limitation in this regards. A type of capacity that seems to be remarkably recognized and claimed by nearly half of members from LIG and even SLG (who are model farmers) is animal raising technique. This has been proved by ample adoption of this livelihood among T HHs and the noticeable increase of income from animal sale too. Other skills, such as natural agricultural production, climate resilient production, home-gardening, etc., were not recognized by many CBOs' members (less than 10%).

This may lead to the assumption that the livelihood activity that is most likely to be applied for a long period of time is animal raising. Sustainability and enhancement of home-gardening and resilient rice production may not have materialized yet. Findings from FGDs confirmed that home-gardening intervention seemed to be undervalued by many CBO members. Many of them thought this livelihood is very dependent on water availability and very seasonal (difficult to cultivate in dry season), while it can bring merely insubstantial income to the HHs (e.g. USD 33/year). CBO members who are likely to keep on undertaking home-gardening or growing vegetable for both HH consumption and sale are those who reside in close proximity to water sources (e.g. stream, river, wells, natural ponds, etc.) and have spare residential land bigger than average land size (149m²).

As well, capacity building in natural or resilient agricultural techniques seemed to be unappreciated. It was apparent that project beneficiaries viewed water availability and the provision of hard infrastructures (e.g. irrigation canals) as more important to increase rice productivity and agricultural production than the capacity to apply the appropriate climate smart techniques. Findings from FGDs informed that rice farmers claimed to have farmed their whole life and know how to do it very well; they only need more water to enhance it production. In support of this opinion, the study found that among LIG's 2,087 members, there were only 210 members (153 female) who belong to RGGs or RPGs and had participated in climate resilient rice cultivation techniques. Disappointingly, among thousand members of WUGs/FWUGs, there was only this small amount of people interested in capacity building interventions concerning climate resilient rice cultivation. This has been affirmed in the average amount of rice yield each type of CBO members gained in 2019 too; WUG/FWUG members gained the average yield of 3.14t/ha, while LIG members (including RGG) gained 4.19t/ha, and the model farmers, SLG members, gain up to 4.53t/ha.

SG members' capacity and the group's sustainability is the very worrisome. Formation of by-laws / regulations and capacity building for group operation management were not actually understood as important and strongly recognized by CBO management committee and members alike despite it is being a major guiding material to govern their group's operation. Only about 24% of SG members recognized capacity building on saving group process and practices, while other specific skills in this regards were not consciously recognized by many group members (<20%). SGs particularly do not seem to be fully confident or comfortable of their new capacity and roles. This problem was intensified when many SG members migrate frequently. Findings from FGDs and KIIs informed that SG members change constantly; CADIIS has to repeatedly provide echo-trainings to assist the new managements and members. SG members appeared to see SG as a mean to access more and safer loan for group members; yet with regard to how they use available fund/loan to improve their livelihoods is not very clear. Markedly, all members of the established CBOs increased both annual and agricultural-based income extraordinarily (around 50% more than Baseline); while SG group members' annual income decreased 11%, income from rice sale decreased 48% and income from home-gardening sale decreased 6%.

Formalization and financing mechanisms for WUGs/FWUGs are found to be challenging and may critically affect the group's long-term function and sustainability. For instance, some CBOs, especially those that need to be legally established with specific guideline from relevant Ministry (i.e. WUGs/FWUGs) need further capacity and regulatory building. Some WUGs have transformed their dug or restored ponds to be informal community fish refuges (e.g. the case of Prampi Makkara village of Tang Krasang commune in KPT) and community fish ponds (e.g. Voa Yeav village of Damrei Slab commune in KPT) that need further technical and regulatory supports from the project with regard to fishery aspects in addition to water management. For FWUGs, additional supports in the forms of echo-trainings, improvement of management framework, establishment of water user fee system, coherent implementation mechanism and more enabling facilities are needed. Of total, only FWUG in Kvek village, Kampong Thmor commune, Santuk district that has collected initial fee once from their members. Without this support, there is no guarantee that the provided small-scale water management infrastructures will be fully used, appropriately maintained and will provide significant impacts to the target population in the areas in the future. Especially, when FWUG membership is rather illusive; it was not very clear at the time of the Endline Assessment whether only formally organized members who can access to the provided infrastructures with voluntary membership fee, or all HHs whose paddy fields / farmland are in adjacent to or are located along the canals may use the water from the SRL infrastructures.

5. Conclusion and Recommendations

5.1. Concluding Summary

In summation, this assessment found that the SRL project's target are met, especially in relation to relevance and efficiency measures, while with regard to effectiveness measure the benefits are partially detected and varied according to types of intervention and benefits expected. In terms of impact measurement, the project's effects are slightly detected due to the limitation of the project's implementation timeline, immaturity of the project's beneficiaries and CBOs, as well as other impediment such as COVID-19 and existence of unforeseen interventions, etc.

First, the SRL project is strongly relevant and responsive to the national policies and local needs due to applicable intervention designs, and choices of implementation approaches and procedures that meaningfully engaged the most important strategic partners (i.e. NCDDDS and SNAs) and target local participants in a timely and proper manner. Then, the SRL project is highly efficient since the potential monetary outcomes far exceed the cost of the project's implementation. This efficiency was found to be also caused by both appropriateness and effectiveness of the intervention designs/logics, and the transparent procurement procedures.

In terms of effectiveness and impact measurement, the project's achievement varies according to specific impact indicators. In general, the SRL project is strongly effective; the project achievements exceeded the end of project targets in nearly all indicators, except the formation of the agricultural cooperatives.

Slight positive impacts were detected based on diversity of the impact indicators. Concerning the project's impacts on income generation, the impacts are particularly positive for farm-based income categories (sale of rice, home-garden produce, raised animals, etc.) although it is not very favorable for all types of CBO members (i.e. SG members income had decreased). This marked increase of intervention related incomes indicates effectiveness and positive impacts of the project, but there is an apprehension about the impacts' sustainability due to low figure of the monetary gains (in contrast to the percentage of change) and its adequacy for HH expenses

and for enhancing their welfare so that beneficiaries will stay at home continuing these farm-based livelihoods.

The largest farm-based income should be from the sale of rice, yet this has not been the case due mainly to increased intensity of climate change incidents (especially drought) over the past years, the partial function of the provided water management infrastructures, the beneficiaries' limited attention on building their capacities with regard to complementary resilient rice farming techniques, and the lack of mechanism to deal with price fluctuation and swindle caused by local or external rice dealers. Income from rice sale has potential to rise much higher when the following factors are thoroughly considered: 1) assurance that small-scale water management infrastructures function fully; 2) target farmers changed their perception of rice farming from an endeavor for subsistence to be a full scale agro-enterprise; 3) additional interventions are in place to hearten locals' attention on capacity development in climate resilient agriculture and entrepreneurship, and 4) enhancement of market information and/or institutionalization of agricultural cooperative to reduce unnecessary variability, ensure realistic market access and price, as well as to inspire locals' commercial spirits.

Likewise, incomes from sale of raised domestic animals and home-garden produces have potential for more increase if the beneficiaries started to perceived these livelihoods / production as a permanent means for supplementary income generation in addition to merely for HH consumption. Presently, beneficiaries seem to prefer animal raising to growing vegetables, which is reasonable as this livelihood can provide them with larger and faster cash while they have limited plots of land for home-gardening that is also seemed to be much dependent on water availability. Yet, target beneficiaries' capacity for entrepreneurial poultry production also remains limited, especially with regard to day-to-day care and potential risk/disease management. Yet, beneficiaries' knowledge and capacities in natural and safe vegetable production remain insufficient as well, especially with regard to post-harvest / post-production care, disease management, safe packaging and transportation, etc.

In the present situation, when COVID-19 pandemic seems to help reducing Cambodia's dependency on imported chemical agricultural produces from the neighboring countries and the rise of health conscious markets with trend in consuming natural or safe agricultural production, the local people have a good chance to enhance such production and sell their produces with more reasonable prices. Besides, the issues of water shortage for home-gardening can also be reduced / solved with further intervention in additional smart agricultural technologies (e.g. raised-bed garden with sprinkler drip system, etc.).

5.2. Recommendations

According to all analyses, although the SRL project does not have full positive impacts presently due to a variety of confounding factors, limitations and challenges, there is still a high hope that the impacts will increase much more and can be sustained provided there is an extension of project timeframe and the following further interventions / mechanisms are established:

1. Ensuring that the provided small-scale water management infrastructures function at full capacity from 2021 onward, so they can ensure additional access to water during periodical drought, can rapidly assist in draining flood from rice fields in case of heavy rainfalls, and can store large amount of water for HH consumption, animal feeding, and some vegetable sprinkling;
11. Providing some complementary appliances. Some of the built or renovated infrastructures supported by the SRL project need additional backup ancillaries / appliances for their full functionality and sustainability. In the context of WUGs, access and utilization of

community pond water is limited or completely impossible due lack of other enabling facilities, such as water hoses, pumping machine, etc.;

12. Formalizing WUGs/FWUGs, and if possible, aligning them with other established WUC/FWUC (Farmer Water User Committee since this is a format officially recognized by MOWRM), as well as establishing the financing mechanisms for CBOs to ensure equitable distribution of available water and local ability to properly maintain provided infrastructures;
13. Offering more capacity building to WUG/FWUG management committee in knowledge and skills especially those related to relevant regulations, coordination, conflict management, and financial management, etc.;
14. Enhancing capacity building in supplementary skills for resilient or smart rice production (e.g., SRI), especially with regard to smart seed selection, safe production (i.e. less fertilizer use), post-harvest management (so that farmers need not sell their rice immediately for whatever price after harvesting to prevent damage), etc.;
15. Delivering additional interventions in establishment of agricultural cooperative should be implemented in order to encourage larger scale of agricultural production and rural entrepreneurship development (for either rice, vegetable or poultry, etc.). One of the factors that may inspire rural people to engage more actively in agricultural production close to home is for them to see such livelihoods as a form of enterprise that generate steady income, not just a traditional activity they do for subsistence. The most suitable CBO, as already designed and recognized in the Project Document, for AC candidate can be either SLG or FWUC/WUCs.
16. Delivering additional interventions in building capacities for CBO members (can be more frequent and rigorous echo-trainings and demonstration practices) in order for them to be better prepared, whilst their management systems need to be further strengthened with support from the project, project partners, and especially from relevant SNA authorities.
17. Providing additional training for SG members specifically as they seemed to be quite immature, less motivated and less inclined to adopt any alternative / supplementary livelihoods due to a difficult reason that they were not able to become LIG members (when they are SG members). SG members and management appeared to be unclear of what they can use the borrowed money for beside keeping the money and ensuring that members can equally access to safe loan.
18. Providing supplementary supports (in monetary if possible) and technical trainings for LIG and SLG members by paying specific attention to skills and techniques related to: 1) business concept; 2) during production care; 3) risk / disease prevention and management; 4) post-harvest disease prevention; 5) safe storage, packaging and transportation, etc.
19. Provide complementary trainings to supporting SNAs, especially key persons (especially those key persons that have been newly replaced the trained ones in SRP) to enhance their capacity and skills so that they may be able to adequately support and coordinate intervention and implementation at local level.

References

- CADTIS. (2018). *Annual Report from April to December 2018*. Siem Reap.
- CADTIS. (2018). Chicken raising technic [PowerPoint Slides].
- CADTIS. (2018). Frog raising technic [PowerPoint Slides].
- CADTIS. (2018). Reference document on establishing livelihood improvement group.
- CADTIS. (2018). Rice seed choosing technic [PowerPoint Slides].
- CADTIS. (2018). Vegetable plantation technic [PowerPoint Slides].
- CADTIS. (2019). *Action Report 2019 of SRL project*. Kampong Thom.
- CADTIS. (2019). SRL Project Mid-Term Report. NCDDs, MOI.
- CADTIS. (2020). Completion Report of SRL project 2018-2020. NCDD.
- Center for Excellence in Disaster Management and Humanitarian Assistance. (2017). Cambodia Disaster Reference Management Handbook. CFE-DMHA
- GSSD and NCDDs. (2017). Vulnerability and Risk Assessment (VRA) and Farmer Need Assessment (FNA) Report in Kampong Thom and Siem Reap.
- MAFF. (2013). Plan of Action for Disaster Risk Reduction in Agriculture 2014-2018. Phnom Penh, Cambodia.
- Ministry of Water Resource and Meteorology. (2020). By-law of water user group / farmer water user group.
- Ministry of Water Resources and Meteorology. (2012). Climate Change Strategic Plan of the Ministry of Water Resource and Meteorology (MWRM-CCSP). Phnom Penh.
- Ministry of Women. (2013). Gender and Climate Change Strategic Plan of the Ministry of Women's Affairs (MWA-GCCSP). Phnom Penh.
- MOA. (2016). Climate Change Action Plan of the Ministry of Agriculture, Forestry and Fisheries (MAFF-CCAP). Phnom Penh.
- MOE. (2006). National Adaptation Programme of Action to Climate Change (NAPA). Phnom Penh, Cambodia.
- MOE. (2015). Cambodia's Second National Communication. Phnom Penh.
- MOE. (2016). Annual Conference to Review Progress on Environmental Achievements in 2016 and Plan for 2017. GSSD-NCSD. Phnom Penh.
- MOE. (2019). Report of Environmental Status number 3. Phnom Penh.
- MOE. Department of Planning and Investment. (2020). Progressing report of SRL project in Siem Reap 2018-2019. Siem Reap Provincial Administration.
- NCCC. (2013). Cambodia Climate Change Strategic Plan 2014-2023. Phnom Penh, Cambodia.
- NCDD. (2010). Commune Database Online. Retrieved from <http://db.ncdd.gov.kh/cdbonline/home/index.castle>
- NCDD. (2019). Number of Beneficiary of Constructing and/or Restoring Dig Canal or Community Pond at Siem Reap Province.
- NCDD. (2019). Number of Beneficiary of Constructing and/or Restoring Dig Canal or Community Pond at Kampong Thom Province.
- NCDD. (2020). List of Target District Which is Get Benefit from Small Scale Water Infrastructure Project and LIGs of SRL project 2017-2019.
- NCDD. (2020). Monitoring on Project Progress of Small Scale Water Infrastructure 2017-2019 of Siem Reap Province.
- NCDD. (2020). Monitoring on Project Progress of Small Scale Water Infrastructure 2017-2019 of Kampong Thom Province.
- NCDDs. (2017). FWUG Training on Management Structure of FWUG.

- NCDDs. (2018). *SRL Annual Report 2017 from April to December 2018*.
- NCDDs. (2019). *SRL Annual Report 2018 from April to December 2019*.
- NCDDs. (2020). *SRL Annual Report 2019 from April to December 2020*.
- NCDDs. (2020). *SRL Quarterly Report 2020*. Phnom Penh.
- NCDM & MOP. (2008). Strategic National Action Plan for Disaster Risk Reduction 2008-2013. Phnom Penh, Cambodia.
- NCGG & MOE. (2013). National Strategic on Green Growth 2013-2030. Phnom Penh, Cambodia.
- Nesbitt, H.J., ed. (1997). Rice production in Cambodia. Manila (Philippines): International Rice Research Institute. 112 p.
- RGC. (2008). Strategic National Action Plan for Disaster Risk Reduction 2008-2023. Phnom Penh, Cambodia.
- RGC. (2010). Policy Paper on the Promotion of Paddy Production and Rice Export. Phnom Penh, Cambodia.
- RGC. (2010). The Rice Policy (2010-2015). Phnom Penh.
- RGC. (2011). National Social Protection Strategy for the Poor and Vulnerable (2011 – 2015). Phnom Penh, Cambodia.
- RGC. (2013). Cambodia 2013: Post-Flood Early Recovery Need Assessment Report.
- RGC. (2013). Cambodia Climate Change Strategic Plan 2014-2023. Phnom Penh.
- RGC. (2013). National Action Plan for Disaster Risk Reduction 2014-2018. Phnom Penh, Cambodia.
- RGC. (2014). Cambodian Rectangular Strategy and the National Strategic Development Plan (NSDP 2014-2018). Phnom Penh.
- RGC. (2014). National Strategic Development Plan 2014-2018. Phnom Penh, Cambodia.
- RGC. (2014). National Social Protection Strategy for the Poor and Vulnerable (NSPS 2011-2015). Phnom Penh.
- UNDP. (2015). Reducing the vulnerability of Cambodian rural livelihoods through enhanced sub-national climate change planning and execution of priority actions. Project document.
- UNDP. (2019). Canal Project is Helping Communities Balance Economic Growth and Sustainable Agricultural Development. Phnom Penh.
- UNDP. (2019). Canal Project is Helping Communities Balance Economic Growth and Sustainable Agricultural Development. Phnom Penh.
- UNDP. (2019). Climate Change, Cambodia and Canals: Learn How Communities in Kampong Thom are Persevering in the Face of Drought and Flooding. Phnom Penh.
- UNDP. (2019). Rehabilitated Canals in Kampong Thom Help Mitigate Effects of Climate Change. Phnom Penh.
- UNDP. (2019). Rehabilitated Water Irrigation System Helps Farmers Double crop to Increase Income. Phnom Penh.
- UNDP. (2019). Small Scale Infrastructure Climate resilient. Phnom Penh.
- USDA. (2013). Cambodia: Seasonal Flooding Impacts Wet Season Rice Production in 2013. Commodity Intelligence Report. Foreign Agricultural Services.
- Watt, B. Chhuon K. and Chea C. (2012). The Stage of Climate Change in Cambodia. The Proceeding of the 5th AUN/SEED-Net Regional Conference on Global Environment
- MEF and NCSD. (2018). Addressing Climate Change Impacts on Climate Change in Cambodia.

Appendices

Appendix A: Guiding Questions for Key Informant Interviews

Date: Time: Interviewer's Name:

- 1. Name:
- 2. Contact Information:
- 3. Position:
- 4. Organization:
- 5. Your overall roles and responsibilities in your organization:
.....
.....
- 6. What are your / your institution's main activities in project initiation, project implementation, and project M&E?
In project initiation:
In project implementation:
In project M&E:
- 7. To what extent do you think SRL Project contribute to increasing SNA capacity in climate change adaptation and climate resilient livelihood planning? How? Give some examples.
.....
.....
.....
- 8. To what extent do you think SRL Project address community livelihood needs as well as their livelihood vulnerabilities and shocks? How? Give some examples.
.....
.....
.....
- 9. To what extent do you think SRL Project contribute to reducing climate change vulnerability among beneficiary households in the target provinces? How? Give some examples.
.....
.....
.....
- 10. What do you think about the contribution of SRL Project to community livelihood improvement and diversification, especially to helping them increase their annual household incomes in the project coverage areas? How? Give some examples.
.....
.....
.....
- 11. Do you think SRL Project has enhanced people's access to water for domestic consumption and agriculture in the target areas? Why and why not? Give some examples.
.....
.....

12. Give two (2) best practices or good lessons learnt about the following project interventions:
- Climate change adaptation planning among target SNAs*
 1)
 2)
- Income generation capacity among beneficiary households in the target areas*
 1)
 2)
- Improvement and diversification of climate resilient or adaptive livelihoods among beneficiary households in the target areas*
 1)
 2)
- Improvement of local access to water for domestic use and agriculture among beneficiary households in the target areas*
 1)
 2)
- Increase in SNA and community capacities in addressing climate change vulnerability and impacts in the target areas*
 1)
 2)
- Improvement of community involvement in land management and use for agricultural production among beneficiary and non-beneficiary households in the target areas*
 1)
 2)
13. Give three (3) best practices or good lessons learnt about positive impacts of SRL Project on non-beneficiary households' livelihoods and climate change adaptation capacity in the target provinces:
 1)
 2)
 3)
14. What do you think are the main challenges for SRL project implementation in the target areas / provinces? And what are the effective mitigation strategies you think important to tackle these challenges?
Main challenges:

Mitigation strategies:

15. In general, do you think the project is successful? Yes ▪ No ▪
 Why or why not? Give some examples.

16. Please rate each of the following outputs of SRL project interventions by circling one of the given scaling items below (1 = strongly disagree,

2 = disagree, 3 = partially agree, 4 = agree, 5 = strongly agree).

No.	SRL Project Interventions and Outputs	Scaling Items				
1	The target SNAs (commune and district councils) have the capacity to develop and implement climate change adaptation planning	1	2	3	4	5
2	Climate change adaptation and climate resilient livelihood improvement frameworks have been integrated into commune development plan and commune investment plan	1	2	3	4	5
3	Climate smart and adaptive water infrastructure choices have been well initiated and developed in the target areas based on their priority and relevance to local context	1	2	3	4	5
4	Agriculture-related income (on an annual basis) of beneficiary households in the target provinces has increased due to project interventions	1	2	3	4	5
5	Non-agriculture-related income (on an annual basis) of beneficiary households in the target provinces has increased over time and space	1	2	3	4	5
6	Community livelihoods in the target villages have been improved and diversified as a result of project interventions	1	2	3	4	5
7	Out-migration for works among local beneficiary households has been reduced or declined as a result of project interventions	1	2	3	4	5
8	Local beneficiary households in the target provinces have increasingly adopted agriculture-based income generation activities in their areas	1	2	3	4	5
9	Community access to water for domestic use and agriculture has been improved as a result of project interventions	1	2	3	4	5
10	Capacity of local beneficiary households in managing land for agricultural production has been improved	1	2	3	4	5
11	Local exposure to impacts of climate change or climate vulnerability / hazard has been reduced considerably	1	2	3	4	5
12	The target SNAs have the capacity to plan, develop, and manage climate change adaptation and climate resilient projects in a timely and successful manner	1	2	3	4	5
13	Local beneficiary households have the capacity to adapt to climate change impacts and could address their climate vulnerabilities in a timely and proper manner	1	2	3	4	5
14	SRL Project has demonstrated many good examples to non-target SNAs and non-beneficiary households in adapting to and addressing climate change impacts on local livelihoods and development	1	2	3	4	5

17. What are the strategies you would recommend or suggest to make this SRL Project successful and sustainable?

.....

**Appendix B:
Guiding Questions for Focus Group Discussion**

Templates for Focus Group Discussion with Beneficiary Households in T Villages

Date: Time: Village: Commune: District: Province:

Table 1: Occupation, Income, and Participation

No.	Agriculture-Related Occupation	% of Participating HHs of the Established CBO	Yield	% of HHs Selling Their Product / Catch	Average Annual Income (Riel / Dollar)	Comparison of Annual Income with Previous Year (Increased / Decreased)	Reasons for Increase or Decrease in Annual Income
1	Wet rice farming		.....t/ha		Average: Maximum: Minimum:		- -
2	Dry rice farming		.....t/ha		Average: Maximum: Minimum:		- -
3	Poultry raising		N/A		Average: Maximum: Minimum:		- -
4	Cattle raising		N/A		Average: Maximum: Minimum:		N/A
5	Cassava planting		.....t/ha		Average: Maximum: Minimum:		- -
6	Cashew nut planting		.....t/ha		Average: Maximum: Minimum:		- -
7	Mung-bean growing		.....t/ha		Average: Maximum: Minimum:		- -
8	Sesame growing		.....t/ha		Average: Maximum: Minimum:		- -

9	Maize / corn planting		.....t/ha		Average: Maximum: Minimum:		- -
10	Other strategic / cash cropping (specify:)		N/A		Average: Maximum: Minimum:		N/A
11	Home-gardening		N/A		Average: Maximum: Minimum:		- -
	Non-Agriculture Related Occupation	% of Participating HHs of the Established CBO	Yield		Average Annual Income (Riel / Dollar)	Comparison of Annual Income with Previous Year (Increased / Decreased)	Reasons for Increase or Decrease in Annual Income
12	Out-migration works		N/A		Average: Maximum: Minimum:		- -
13	Wage labor works (non-migration)		N/A		Average: Maximum: Minimum:		- -
14	Fishing		..... kg / year		Average: Maximum: Minimum:		- -
15	NTPP collection (Specify:)		N/A		Average: Maximum: Minimum:		- -

Table 2: Ability in Using Agricultural Land

No.	Type of Land	Average Land Size	Average Land Use Size	Frequency / Average Time of Land Use	Reasons for Conducting Farming More Than 1 Time / Year	Average Size of Land Left Fallowed	Reasons for Leaving Land Fallowed
1	Wet rice farmland	..... ha	..... ha	..... Time	- -	..... ha	- -
2	Dry rice farmland	..... ha	..... ha	..... Time	- -	..... ha	- -
3	Strategic / cash crop farmland	..... ha	..... ha	..... Time	- -	..... ha	- -
4	Home-garden	..... m ²	..... m ²	..... Time	- -	..... m ²	- -

Table 3: Water Access and Use Ability

No.	Source of Water	Type of Small Scale Water Infrastructure Support	% of Dependence or Use among the Established CBO	% of Domestic Use	% of Agricultural Use	Distance from Water Source for Agriculture	Average Time Spend for Fetching or Collecting Water	Average Cost for Buying Water for HH Consumption	Average Cost for Buying Water for Agriculture
1	Rainwater	N/A				N/A	N/A	N/A	N/A
2	Well water	N/A				N/A	..... mins / hrs	N/A	N/A
3	Natural pond	N/A					..... mins / hrs	N/A	.....riel/time
4	Stream or river nearby residence	N/A					..... mins / hrs	N/A	.....riel/time
5	Dug pond (non-project support)	N/A					..... mins / hrs	N/A	.....riel/time
6	Canal (non-project support)	N/A					..... mins / hrs	N/A	.....riel/time
7	Small scale water infrastructure supported by SRL project (i.e. canal, dam, flashflood dam, watergate, dug pond, etc.)	- - - -					..... mins / hrs	N/A	.....riel/time
8	Buy water from local supplier	N/A					N/A	..... riel	N/A
9	Buy water from private dealer	N/A				N/A	N/A	..... riel	N/A

Table 4: Vulnerability to Climate Change

No.	Type of Natural Disaster	Exposure / Existence (Yes / No)	Level of Exposure (Lowest = *, Highest = ****)	% of Vulnerability for Agricultural Production	% of Vulnerability for HH Properties	% of Vulnerability for Human and Animal Lives	% of Vulnerability for Local or Community Livelihoods
1	Flood						
2	Drought						
3	Windstorm						
4	Rainstorm						
5	Lightning						

Table 5: Access to Project Interventions, Perceptions and Suggestions / Proposals

No.	Type of Project Intervention	Receipt / Access to Project Intervention (Yes / No)	Inputs from Project Intervention	Perceptions on Benefits of Project Intervention	Perceptions on Challenges of Project Intervention	Suggestions / Proposals to Make the Project Successful and Sustainable
1	Livelihood (LIP)		- -	- -	- -	- -
2	Saving Group (SG)		- -	- -	- -	- -
3	Water User Group (WUG)		- -	- -	- -	- -
4	Farmer Water Use Committee (FWUC)		- -	- -	- -	- -
5	Small Learner Group (SLG)		- -	- -	- -	- -
6	Small Scale Water Infrastructure		- - -	- - -	- - -	- - -

**Appendix C:
Household Survey Questionnaires**

Endline Assessment of SRL Project

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

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
7. SRL-established CBO management committee 8. Other

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:
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. Indigenous people (*specify:*)
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. Are you an in-migrant? 1. Yes 2. No **(If no, skip to Q9)**
8a. If yes, where do you and your family migrate from?
8b. Year of migration into the area:
8c. 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:*)
9. How many children do you have (or are there in your family)?
9a. How many sons? How many daughters?
10. How many members are there in your family?
10a. How many male members? How many female?

PART2: Participation in SRL Project Intervention

2A: Small-Scale Water Infrastructure and Organization

11. Does your village receive any small-scale water infrastructure from SRL Project?

1. Yes 2. No **(If no, skip to Q14)**

11a. If yes, what type of small-scale water infrastructure does your village receive?

Types of Group	Existence	Year of Intervention	Purpose of Intervention
<input type="checkbox"/> Constructing new canal	1. Yes <input type="checkbox"/> 2. No <input type="checkbox"/>		(Can tick more than one) <input type="checkbox"/> For household consumption <input type="checkbox"/> For strategic or cash cropping <input type="checkbox"/> For home-gardening / vegetable growing <input type="checkbox"/> For rice farming in dry season <input type="checkbox"/> For rice farming in both dry and rainy seasons
<input type="checkbox"/> Restoring old canal	1. Yes <input type="checkbox"/> 2. No <input type="checkbox"/>		
<input type="checkbox"/> Digging new pond	1. Yes <input type="checkbox"/> 2. No <input type="checkbox"/>		
<input type="checkbox"/> Restoring natural pond	1. Yes <input type="checkbox"/> 2. No <input type="checkbox"/>		
<input type="checkbox"/> Constructing flashflood dam	1. Yes <input type="checkbox"/> 2. No <input type="checkbox"/>		
<input type="checkbox"/> Restoring dam/ water gate / drainage structure	1. Yes <input type="checkbox"/> 2. No <input type="checkbox"/>		

12. Does your village have any water-related group or CBO organized by SRL project?

1. Yes 2. No **(If no, skip to Q14)**

12a. if yes, what type of water-related group of CBO has been established in your village?

Types of Group	Existence	Purpose of Establishment
Water user group (WUG)	1. Yes <input type="checkbox"/> 2. No <input type="checkbox"/> Year of establishment:	(Can tick more than one) 1. For managing water resources for equitable use by WUG members <input type="checkbox"/> 2. For managing water resources for equitable use by non-WUG members <input type="checkbox"/> 3. For maintaining water quantity and quality for domestic use <input type="checkbox"/> 4. For maintaining water quantity and quality for agriculture <input type="checkbox"/> 5. For addressing extreme climate hazards or events <input type="checkbox"/> 6. For collecting water user fee to sustain water infrastructure maintenance and development activities <input type="checkbox"/>
Farmer water user committee (FWUC)	1. Yes <input type="checkbox"/> 2. No <input type="checkbox"/> Year of establishment:	(Can tick more than one) 1. For managing water resources for equitable use by inter- and intra-village/commune FWUC members <input type="checkbox"/> 2. For managing water resources for equitable use by non- inter- and intra-village/commune FWUC members <input type="checkbox"/> 3. For maintaining water quantity and quality for domestic use <input type="checkbox"/> 4. For maintaining water quantity and quality for agriculture <input type="checkbox"/> 5. For addressing extreme climate hazards or events <input type="checkbox"/> 6. For collecting water user fee to sustain water infrastructure maintenance and development activities <input type="checkbox"/>

12b. Do you or does your family belong to any SRL's organized water-related group?

1. Yes 2. No **(If no, skip to Q14)**

12b1. if yes, what type of group are you / is your family affiliated with?

Types of Group	Membership	Type of Membership	Perceived Significance of Group
WUG	1. Yes <input type="checkbox"/> 2. No <input type="checkbox"/>	1. Management committee <input type="checkbox"/> 2. Ordinary member <input type="checkbox"/>	1. Not significant at all <input type="checkbox"/> 2. Not significant <input type="checkbox"/> 3. Partially significant <input type="checkbox"/> 4. Significant <input type="checkbox"/> 5. Very significant <input type="checkbox"/>
FWUC	1. Yes <input type="checkbox"/> 2. No <input type="checkbox"/>	1. Management committee <input type="checkbox"/> 2. Ordinary member <input type="checkbox"/>	1. Not significant at all <input type="checkbox"/> 2. Not significant <input type="checkbox"/> 3. Partially significant <input type="checkbox"/> 4. Significant <input type="checkbox"/> 5. Very significant <input type="checkbox"/>

13. Have you or has your family attended any WUG/FWUC related training and awareness raising program supported by SRL Project?

1. Yes 2. No **(If no, skip to Q14)**

13a. If yes, what benefits do you get from WUG/FWUC related training, event, or awareness raising program? *(Can tick more than one answer)*

1. Increase knowledge and understanding of management of water resources in the village / commune
2. Understand about roles and responsibilities being a WUG / FWUC management or member
3. Develop WUG or FWUC by-law and / or any other related regulations
4. Know about how to use water user fee as a sustainable financing mechanism to manage and maintain SRL supported small scale water infrastructure in the long-run
5. Understand how to sustainably manage and use small scale water infrastructure to adapt to or cope with climate change impacts in the area
6. Others *(specify:)*

2B: Livelihood Improvement Group (LIG)

14. Do you or does your family belong to any LIG organized by SRL Project?

1. Yes 2. No ***(If no, skip to Q17)***

14a. If yes, which of the groups/CBOs below do you or does your family belong to? You may tick more than one answer.

Types of LIG	Type of Membership	Perceived Significance of LIG
<input type="checkbox"/> Rice production group	1. Management committee <input type="checkbox"/> 2. Ordinary member <input type="checkbox"/>	1. Not significant at all <input type="checkbox"/> 2. Not significant <input type="checkbox"/> 3. Partially significant <input type="checkbox"/> 4. Significant <input type="checkbox"/> 5. Very significant <input type="checkbox"/>
<input type="checkbox"/> Chicken raising group	1. Management committee <input type="checkbox"/> 2. Ordinary member <input type="checkbox"/>	1. Not significant at all <input type="checkbox"/> 2. Not significant <input type="checkbox"/> 3. Partially significant <input type="checkbox"/> 4. Significant <input type="checkbox"/> 5. Very significant <input type="checkbox"/>
<input type="checkbox"/> Vegetable cultivation group	1. Management committee <input type="checkbox"/> 2. Ordinary member <input type="checkbox"/>	1. Not significant at all <input type="checkbox"/> 2. Not significant <input type="checkbox"/> 3. Partially significant <input type="checkbox"/> 4. Significant <input type="checkbox"/> 5. Very significant <input type="checkbox"/>
<input type="checkbox"/> Small learner group	1. Management committee <input type="checkbox"/> 2. Ordinary member <input type="checkbox"/>	1. Not significant at all <input type="checkbox"/> 2. Not significant <input type="checkbox"/> 3. Partially significant <input type="checkbox"/> 4. Significant <input type="checkbox"/> 5. Very significant <input type="checkbox"/>
Others <i>(Specify:)</i>	1. Management committee <input type="checkbox"/> 2. Ordinary member <input type="checkbox"/>	1. Not significant at all <input type="checkbox"/> 2. Not significant <input type="checkbox"/> 3. Partially significant <input type="checkbox"/> 4. Significant <input type="checkbox"/> 5. Very significant <input type="checkbox"/>

15. Have you or has your family attended any of the following LIG-related trainings / awareness raising programs supported by SRL Project? You can tick more than one answer.

1. Training / awareness raising on climate adaptive / resilient chicken raising technique and practice 1. Yes 2. No
2. Training / awareness raising on organic or natural chicken raising technique and practice 1. Yes 2. No
3. Training / awareness raising on climate adaptive or resilient vegetable growing / home-gardening technique and practice 1. Yes 2. No
4. Training / awareness raising on organic or natural vegetable growing / home-gardening technique and practice 1. Yes 2. No
5. Training / awareness raising on climate adaptive or resilient rice farming technique and practice 1. Yes 2. No
6. Training / awareness raising on organic or natural rice farming technique and practice 1. Yes 2. No
7. Participated in a study visit inside the project coverage areas 1. Yes 2. No
8. Participated in a study visit outside the project coverage areas 1. Yes 2. No
9. Others *(specify:)* 1. Yes 2. No

16. What benefits or inputs have you received from being a LIG member? *(Can tick more than one)*

1. Capacity building on animal raising technique and practice
2. Capacity building on vegetable growing technique and practice
3. Capacity building on climate adaptive or resilient agriculture

- 4. Capacity building on organic or natural agricultural production
- 5. Have received a start-up fund for chicken raising
- 6. Have participated in a study visit inside the project coverage areas
- 7. Have participated in a study visit outside the project coverage areas
- 8. Have improved and diversified livelihood strategies
- 9. Have increased household income from agriculture-related activities
- 10. Others (*specify*:)

2C: Community Saving Group

17. Do you or does your family belong to a community saving group organized by SRL Project? 1. Yes 2. No (*If no, skip to Q21*)
18. Have you or has your family attended any of the following SRL supported training awareness raising activities related to community saving group? You can tick more than one answer.
- 1. Training / awareness raising on establishment of saving group management structure and members 1. Yes 2. No
 - 2. Training / awareness raising on formulation of saving group by-law and other related regulations 1. Yes 2. No
 - 3. Training / awareness raising on bookkeeping and reporting of saving group practice 1. Yes 2. No
 - 4. Training / awareness raising on management of saving fund and interest to sustain the saving group 1. Yes 2. No
 - 5. Others (*specify*:) 1. Yes 2. No
19. What benefits or inputs have you / has your saving group received from being a member? (*Can tick more than one*)
- 1. Have received a start-up fund from the project for operating the saving group
 - 2. Capacity building on saving group processes and practices
 - 3. Capacity building on establishment of saving group and related by-law
 - 4. Capacity building on bookkeeping and reporting skills related to saving practices
 - 5. Increasing saving members in the village / community
 - 6. Increasing fund for members to borrow and use community loan to support their agriculture-based livelihood options
 - 7. Using community service to address community livelihood problems
 - 8. Increasing trust, reciprocity and networking among saving members / villagers
 - 9. Reducing local dependence on external financial service providers
 - 10. Others (*specify*:)
20. Do you agree that SRL intervention on saving group is important?
- 1. Strongly disagree 2. Disagree 3. Partly agree
 - 4. Agree 5. Strongly agree

2D: Smallholder Learning Group

21. Do you or does your family belong to a smallholder learning group organized by SRL Project? 1. Yes 2. No (*If no, skip to Q21*)
22. Have you or has your family attended any of the following SRL supported training awareness raising activities related to smallholder learning group? You can tick more than one answer.
- 1. Training / awareness raising on establishment of smallholder learning group management structure and members 1. Yes 2. No
 - 2. Training / awareness raising on chicken raising techniques at farmer field schools 1. Yes 2. No
 - 3. Training / awareness raising on vegetable growing technique at farmer field schools 1. Yes 2. No

4. Training / awareness raising through local study tours for smallholder farmers
1. Yes 2. No
5. Others (*specify:*) 1. Yes 2. No

23. What benefits or inputs have you / has your smallholder learning group received from being a member? (*Can tick more than one*)
1. Capacity building on animal raising technique and practice
 2. Capacity building on vegetable growing technique and practice
 3. Capacity building on climate adaptive or resilient agriculture
 4. Capacity building on organic or natural agricultural production
 5. Have received a start-up fund for chicken raising
 6. Have participated in a study visit inside the project coverage areas
 7. Have participated in a study visit outside the project coverage areas
 8. Have improved and diversified livelihood strategies
 9. Have increased household income from agriculture-related activities
 10. Others (*specify:*)
24. Do you agree that SRL intervention on smallholder learning group is important?
1. Strongly disagree
 2. Disagree
 3. Partly agree
 4. Agree
 5. Strongly agree

PART 3: Impacts on Livelihood, Income and Productivity

3A. Land Availability

25. Does your family have residential land? 1. Yes 2. No (*If no, skip to Q26*)
If yes, indicate the size of your residential land: m²
26. Does your family have home-garden? 1. Yes 2. No (*If no, skip to Q27*)
If yes, indicate the size of your home-garden: m²
27. Does your family have farmland? 1. Yes 2. No (*If no, skip to Q28*)
If yes, answer the followings:

Types of Land	Availability	Quantity	Amount of Land Cultivated / Used
Plantation farmland (fruit and cash / strategic crops)	1. Yes <input type="checkbox"/> 2. No <input type="checkbox"/> m ²	..... m ²
Dry season rice paddy	1. Yes <input type="checkbox"/> 2. No <input type="checkbox"/>ha	.....ha
Wet season rice paddy	1. Yes <input type="checkbox"/> 2. No <input type="checkbox"/>ha	.....ha

- 27a. If no land for rice/crop cultivation or agricultural production, do you / does your family normally rent the land? 1. Yes 2. No (*If no, skip to Q28*)
- 27b. If yes, how much do you spend for the rent? Riel..... per ha/year
- 27c. If yes, how many times do you rent per year?
1. One time
 2. Two times
 3. More than two times

3B. 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*)

28. Rice cultivation 1. Yes 2. No (*If no, skip to Q30*)
29. Type of rice yield and sale:

Types of Rice	Size of Cultivated Farm / Plot	Quantity Produced	Average Sale

1. Rain-fed wet rice <input type="checkbox"/>ha	Quantity/ha:..... t	Average annual sale: Riel
2. Dry season rice <input type="checkbox"/>ha	Quantity/ha:..... t	Average annual sale: Riel

29a. Number of rice farming effort per year:

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

29b. 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

30. Home-gardening production: 1. Yes 2. No (*If no, skip to Q31*)

30a. What type of vegetable cultivated:

30b. What year did you start growing vegetable?

30c. What month do you normally grow vegetable/home-gardening?

30d. Purpose of home-gardening and average sale:

Purposes	Average Annual Sale
1. For HH consumption only <input type="checkbox"/>	Sale in Riel
2. For selling to market only <input type="checkbox"/>	
3. For both household consumption and selling to market <input type="checkbox"/>	

31. Strategic or cash cropping: 1. Yes 2. No (*If no, skip to Q32*)

31a. If yes, which types:

Types of Crop	Size of Cultivated Farm	# of Effort per Year	Quantity Produced	Average Annual Sale
1. Cassava <input type="checkbox"/> ha	1. One time <input type="checkbox"/> 2. Two times <input type="checkbox"/>t/year	Average sale in Riel
2. Mung-bean <input type="checkbox"/> ha	1. One time <input type="checkbox"/> 2. Two times <input type="checkbox"/>t/year	Average sale in Riel
3. Sesame <input type="checkbox"/> ha	1. One time <input type="checkbox"/> 2. Two times <input type="checkbox"/>t/year	Average sale in Riel
4. Maize/corn <input type="checkbox"/> ha	1. One time <input type="checkbox"/> 2. Two times <input type="checkbox"/>t/year	Average sale in Riel
5. Peanut bean <input type="checkbox"/> ha	1. One time <input type="checkbox"/> 2. Two times <input type="checkbox"/>t/year	Average sale in Riel
6. Cashew nut <input type="checkbox"/> ha	N/A	.....t/year	Average sale in Riel
7. Others <input type="checkbox"/> ha	N/A	.....t/year	Average sale in Riel

31b. 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

32. Poultry farming: 1. Yes 2. No (*If no, skip to Q33*)

32a. What year did you start to raise poultry?

32b. If yes, which types, for what purposes, and average sale:

Types (can tick more than one)	Purposes	Average Annual Sale
1. Chicken <input type="checkbox"/> 2. Duck <input type="checkbox"/>	1. For HH consumption only <input type="checkbox"/> 2. For selling to market only <input type="checkbox"/> 3. For household consumption and selling to market <input type="checkbox"/>	Sale in Riel

33. Cattle & other animal raising besides poultry: 1. Yes 2. No (If no, skip to Q34)

Types (can tick more than one)	Purposes	Average Annual Sale
1. Cow <input type="checkbox"/> 2. Buffalo <input type="checkbox"/> 3. Pig <input type="checkbox"/>	1. For HH consumption only <input type="checkbox"/> 2. For selling to market only <input type="checkbox"/> 3. For household consumption and selling to market <input type="checkbox"/>	Sale in Riel

34. Fishing: 1. Yes 2. No (If no, skip to Q35)

34a. Purpose of fishing and average sale:

Purposes	Average Annual Sale
1. For HH consumption only <input type="checkbox"/> 2. For selling to market only <input type="checkbox"/> 3. For household consumption and selling to market <input type="checkbox"/>	Sale in Riel

35. Seasonal labor in nearby plantation: 1. Yes 2. No ■ Annual income: Riel.....
36. Permanent labor in nearby plantation: 1. Yes 2. No ■ Annual income: Riel.....
37. Land leasing: 1. Yes 2. No ■ Annual income: Riel.....
38. Work in construction sector: 1. Yes 2. No ■ Annual income: Riel.....
39. Work in garment industry: 1. Yes 2. No ■ Annual income: Riel.....
40. Work with government: 1. Yes 2. No ■ Annual income: Riel.....
41. Work with I/LNGOs: 1. Yes 2. No ■ Annual income: Riel.....
42. Work with private sector: 1. Yes 2. No ■ Annual income: Riel.....
43. Business (e.g. SME,): 1. Yes 2. No ■ Annual income: Riel.....
44. Work in tourism industry: 1. Yes 2. No ■ Annual income: Riel.....
45. Out-migration work: 1. Yes 2. No (If no, skip to Q46)

45a. If yes, please answer the followings:

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

45b. 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.....

3C. Expenses and Adequacy for Household Needs

46. 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
47. Does your family have enough rice for consumption the whole year?
 1. Yes 2. No **(If yes, skip to Q48)**
- 47a. If No, how many months have your produced rice lasted?
- 47b. If No, when does your family normally experience food shortage? **(Can tick more than one)**
 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:.....)
48. Do you or does your family borrow money from others?
 1. Yes 2. No **(If no, skip to Q49)**
- 48a. 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:.....)
- 48b. If yes, is it difficult to repay them? 1. Yes 2. No
- 48c. 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:.....)
49. What is your family's average annual spending? Riels
- 49a. What is your family's average daily spending? Riels
- 49b. What is your family's average weekly spending? Riels
- 49c. What is your family's average monthly spending? Riels

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

3D: Impacts on Water Infrastructure and Access

50. Does your family have access to water for household use?
 1. Yes 2. No **(If no, skip to Q51)**
- 50a. If yes, what are the sources of water for your access? **(Can tick more than one)**
 1. Rainfall 2. Well 3. Natural pond 4. SRL Small-scale water infrastructure
 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

51. How do you or does your family access to clean water supply?
 1. Free of charge (for public) 2. By purchasing from SRL's FWUC (Membership Fee)
 3. By paying to the government 4. By purchasing from private water supplier
52. If your family buys water for household consumption, how much do you spend?
 Per time: Riel/US\$..... OR Membership Fee: Riel/US\$.....
 52a. Which season does you normally buy water for household consumption?
 1. Dry season 2. Rainy season 3. Both dry and rainy seasons
53. Does your household have access to water for crop cultivation and agricultural activities?
 1. Yes 2. No
 53a. If yes, what are the main sources of water? (**Can tick more than one**)
 1. Rainfall 2. Well 3. Natural pond 4. SRL Small-scale water infrastructure
 5. Nearby river 6. Natural stream & creek system in the locality
 7. Public water irrigation (e.g. canal, dyke, reservoir, etc.)
 8. Buy water from local supplier / owner 9. Buy water from private water supplier
54. 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
55. 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
56. 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 Q57**)
 56a. If yes, when do you normally experience it?
 1. Rainy season 2. Dry season 3. Both rainy and dry seasons
 56b. Since over the last 2 years, what has been the condition of water shortage or scarcity in your area?
 Year 2018: 1. High 2. Medium 3. Low 4. No idea
 Year 2019: 1. High 2. Medium 3. Low 4. No idea
57. 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 Q58**)
 57a. If yes, how much do you normally spend for irrigating your rice paddy per hectare or per time?
 Riels: / ha OR Riels: / time
 57b. If yes, when do you normally buy water for agricultural production?
 1. Rainy season 2. Dry season 3. Both rainy and dry seasons
 57c. 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

3F: Local Perceptions of Livelihood Vulnerability

58. 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 | <input type="checkbox"/> |
| 2. Diseases (<i>curable, waterborne, and epidemic</i>) | <input type="checkbox"/> |
| 3. Conflicts over land & NR access and use | <input type="checkbox"/> |
| 4. Decline or loss of livelihood sources | <input type="checkbox"/> |
| 5. Competition with new in-migrants/newcomers | <input type="checkbox"/> |
| 6. Rapid economic development | <input type="checkbox"/> |
| 7. Domestic violence | <input type="checkbox"/> |
| 8. Lack of off-farm job opportunities | <input type="checkbox"/> |
| 9. Lack of markets and market mechanisms for agriculture | <input type="checkbox"/> |
| 10. Indebtedness | <input type="checkbox"/> |
| 11. Limited land for agricultural production | <input type="checkbox"/> |
| 12. Increasing out-migration | <input type="checkbox"/> |
| 13. Lack of labor productivity for agriculture | <input type="checkbox"/> |
| 14. High cost for agricultural production | <input type="checkbox"/> |

15. Security and safety (e.g. drug use, gangster, thief, etc.)
16. Lack of labor productivity for farming
17. Others (*specify:*)

59. Have your family and community ever encountered natural disasters and extreme weather hazards in your area? 1. Yes 2. No (***If no, skip to Q60***)

59a. 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 <input type="checkbox"/> 2. No <input type="checkbox"/>	1. High <input type="checkbox"/> 2. Moderate <input type="checkbox"/> 3. Low <input type="checkbox"/>	1. High <input type="checkbox"/> 2. Moderate <input type="checkbox"/> 3. Low <input type="checkbox"/>	1. High <input type="checkbox"/> 2. Moderate <input type="checkbox"/> 3. Low <input type="checkbox"/>	1. High <input type="checkbox"/> 2. Moderate <input type="checkbox"/> 3. Low <input type="checkbox"/>	1. High <input type="checkbox"/> 2. Moderate <input type="checkbox"/> 3. Low <input type="checkbox"/>
Droughts	1. Yes <input type="checkbox"/> 2. No <input type="checkbox"/>	1. High <input type="checkbox"/> 2. Moderate <input type="checkbox"/> 3. Low <input type="checkbox"/>	1. High <input type="checkbox"/> 2. Moderate <input type="checkbox"/> 3. Low <input type="checkbox"/>	1. High <input type="checkbox"/> 2. Moderate <input type="checkbox"/> 3. Low <input type="checkbox"/>	1. High <input type="checkbox"/> 2. Moderate <input type="checkbox"/> 3. Low <input type="checkbox"/>	1. High <input type="checkbox"/> 2. Moderate <input type="checkbox"/> 3. Low <input type="checkbox"/>
Thunder storms / rain storms	1. Yes <input type="checkbox"/> 2. No <input type="checkbox"/>	1. High <input type="checkbox"/> 2. Moderate <input type="checkbox"/> 3. Low <input type="checkbox"/>	1. High <input type="checkbox"/> 2. Moderate <input type="checkbox"/> 3. Low <input type="checkbox"/>	1. High <input type="checkbox"/> 2. Moderate <input type="checkbox"/> 3. Low <input type="checkbox"/>	1. High <input type="checkbox"/> 2. Moderate <input type="checkbox"/> 3. Low <input type="checkbox"/>	1. High <input type="checkbox"/> 2. Moderate <input type="checkbox"/> 3. Low <input type="checkbox"/>
Wind storms	1. Yes <input type="checkbox"/> 2. No <input type="checkbox"/>	1. High <input type="checkbox"/> 2. Moderate <input type="checkbox"/> 3. Low <input type="checkbox"/>	1. High <input type="checkbox"/> 2. Moderate <input type="checkbox"/> 3. Low <input type="checkbox"/>	1. High <input type="checkbox"/> 2. Moderate <input type="checkbox"/> 3. Low <input type="checkbox"/>	1. High <input type="checkbox"/> 2. Moderate <input type="checkbox"/> 3. Low <input type="checkbox"/>	1. High <input type="checkbox"/> 2. Moderate <input type="checkbox"/> 3. Low <input type="checkbox"/>

60. Do you agree that SRL Project has substantially benefiting and assisting your family and community in addressing climate related livelihood vulnerability through increasing agriculture-related income and climate adaptive and resilient livelihood strategies?

1. Strongly disagree 2. Disagree 3. Partly agree
4. Agree 5. Strongly agree

61. In general, do you think SRL Project is helpful? 1. Yes 2. No

Thank you for your time and collaboration!

**Appendix D:
List of CBO Members and Selected Sample for HH Survey**

No.	Names of Selected Villages	Total Number of Respondents for Each Selected Villages			Total
		# T HHs Surveyed During Baseline Against Short Lists	Actual # of HHs in Each CBO	Types of Established CBO	# of HHs Estimated for Endline Assessment
<i>Kampong Thom Province</i>					
1	Pongro	25	25 (F:14)	LIG	20
2	Serei Sameakki Kandal	25	27 (F:25)	LIG & SG	20
3	Damnak	27	17 (F:7)	LIG	17
4	Trapeang Areak	28	38 (F:23)	LIG	20
5	Kab Thlok	25	30 (F:22)	LIG & WUG	20
6	Voa Yeav	25	32 (F:25)	LIG	20
7	Trapeang Knong	26	31 (F:30)	LIG	20
8	Chey	21	20 (F:18)	LIG	17
9	Rumpuh	27	24 (F:10)	LIG & WUG	20
10	Rovieng	25	30 (F:18)	SG	20
11	Veal Pring Leu	28	27 (F:14)	LIG	20
12	Ou Kohkir	27	29 (F:15)	LIG	20
13	La'ak	25	24 (F:22)	LIG & WUG	20
14	Prampir Meakkakra	27	19 (F:12)	LIG	19
<i>Siem Reap Province</i>					
1	Rolum Svay	26	29 (F:18)	SG	20
2	Roung Kou	25	25 (F:14)	LIG	20
3	Lhong	30	29 (F:23)	LIG	20
4	Stueng	25	23 (F:15)	LIG	20
5	Roluos Kaeut	25	24 (F:24)	LIG	20
6	Ruessei Sanh	25	28 (F:24)	LIG	20
7	Slaeng Kong	25	21 (F:16)	LIG	20
8	Thlok	26	27 (F:16)	LIG	20
9	Sakda	25	23 (F:21)	LIG	20
10	Chob Kraom	26	30 (F:20)	LIG	20
11	Rohal / Kra Nhoung	26	30 (F:20)	LIG	20
12	Kouk Chan	29	26 (F:20)	SG	20
13	Voat / Wat	26	22 (F:11)	LIG	20
14	Rumduol	26	27 (F:23)	LIG	20
Total		726	737 (Avg. = 26 HHs / village)		553 (75% of Number of Established CBOs)

No.	Names of Selected Villages	Total Number of Respondents for Each Selected Villages			Total
		Treatment Village	Control 1 Village	Control 2 Village	
<i>Kampong Thom Province</i>					
1	Boeng Khang Tbound	0	0	20	20
2	Pongro	20	20	0	40
3	Pongro Ling	0	0	20	20
4	Serei Sameakki Kandal	20	20	0	40
5	Damnak	17	0	0	17
6	Trapeang areaks	20	20	0	40
7	Kab Thlok	20	0	0	20
8	Voa Yeav	20	20	0	40

9	Bou Pueng	0	0	20	20
10	Sangvat	0	0	20	20
11	Trapeang Knong	20	0	0	20
12	Chey	17	20	0	37
13	Thnal	0	0	20	20
14	Tuek Vil	0	0	20	20
15	Rumpuh	20	20	0	40
16	Rovieng	20	20	0	40
17	Veal Pring Leu	20	0	0	20
18	Ou Kohkir	20	0	0	20
19	L'ak	20	20	0	40
20	Pnov	0	0	20	20
21	Prampir Meakkakra	19	0	0	19
22	Trapeang Trom	0	0	20	20
Siem Reap Province					
23	Chanlas Dai	0	0	20	20
24	Rolum Svay	20	20	0	40
25	Roung Kou	20	0	0	20
26	Lhong	20	0	0	20
27	Phlang	0	0	20	20
28	Stueng	20	20	0	40
29	Ta Koy	0	0	20	20
30	Souphi	0	0	20	20
31	Roluos Kaeut	20	0	0	20
32	Ruessei Sanh	20	20	0	40
33	Slaeng Kong	20	0	0	20
34	Klang Hay	0	0	20	20
35	Thlok	20	20	0	40
36	Sakda	20	0	0	20
37	Chob Kraom	20	20	0	40
38	Rohal	20	20	0	40
39	Thmei	0	0	20	20
40	Kouk Chan	20	20	0	40
41	Ou Tey	0	0	20	20
42	Srae Nouy	0	0	20	20
43	Voat	20	0	0	20
44	Rumduol	20	20	0	40
Total		553	320	320	1,193

Type of Villages	Total Number of Respondents Per Target Province				Total	
	KPT Baseline	KPT Endline	SRP Baseline	SRP Endline	Total Baseline	Total Endline
T village	361	267	365	284	726	551
	46%	44%	47%	46%	46.4%	45%
C1 village	211	170	211	169	422	339
	27%	28%	27%	27%	27%	28%
C2 village	210	164	205	165	415	329
	27%	27%	26%	27%	26.6%	27%
Total	782	601	781	618	1,563	1,219
	100%	100%	100%	100%	100%	100%

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







