Australia Awards Cambodia [AAC]
Alumni Research Grant – Round 4

RESEARCH REPORT ON

Women's Perceptions on the Climate Change impacted their livelihoods: *the preparedness strategy for the adaptation to climate change*

Submission on 15 January 2025

Acknowledgements

The author would like to express our gratitude and acknowledgment for their time and contribution to this research:

- Government of Australia through the Australia Awards Cambodia [AAC] for Alumnia research grant and Tetra Tech International Development for technical coordination and support this research process.

- Two provincial departments of Environment in Kampong Cham and Kampong Thom Provinces for their effective coordination and kind support the field activities in their provices.

- Four communes and four districts authorities in Kampong Cham and Kampong Thom Provinces for their facilitation of the field activiites including all women and their leaders for spending their time to not only meet the survey team, but also to share their expressions, views, concerns, and suggestions. All of the above contributions are truly help to produce this report.

The Research Team member:

1. Ms. Range Sokha-Team Leader, AusAID Aluminia
2. Mr. Hout Khieu, Technical Advisor
3. Ms. Lim Somaly- Team Member
4. Mr. Pin Chanratana- Team Member

'Disclaimer: This research is/was supported by the Australian Government through a small grant through Australia Awards Cambodia. The opinions expressed in this research are those of the author(s) and do not necessarily reflect the views of the Australian Government or Australia Awards Cambodia.'

ការមិនទទួលស្គាល់៖ ការស្រាវជ្រាវនេះ គឺ/ត្រូវបានគាំទ្រដោយរដ្ឋាភិបាលអូស្ត្រាលី តាមរយៈការផ្តល់ជំនួយតូចមួយតាមរយៈកម្មវិធីអាហាររូបករណ៍អូស្ត្រាលីប្រចាំនៅកម្ពុជា។មតិដែលបានបង្ហាញក្នុងការស្រាវជ្រាវនេះ គឺជាមតិរបស់អ្នកស្រាវជ្រាវ នឹងមិនឆ្លុះបញ្ចាំងពីទស្សនៈរបស់ រដ្ឋាភិបាល អូស្ត្រាលី ឬ កម្មវិធីអាហាររូបករណ៍អូស្ត្រាលីប្រចាំនៅកម្ពុជានោះទេ។

CONTENTS

List of figures

List of tables

Acronyms and abbreviations

AAC	Australia Awards Cambodia
AC	Agriculture Cooperative
AS	Adaptation Strategy
ASPIRE-AT	Agriculture Services Programme for an Inclusive Rural Economy and Agricultural Trade
CAAM	Cambodia's Australian Alumni Members
CC	Climate change
COP	United Nations Climate Change Conference
CW	Control Women (for those who does not det support/involve in project)
DHS	Demographic and Health Survey
FGD	Focus Group Discussions
GDP	Gross Domestic Products
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
HH	Household
IFAD	International Fund for Agricultural Development
KPC	Kampong Cham province
KPT	Kampng Thom Province
KII	Key Informant Interview
MAFF	Ministry of Agriculture, Forestry and Fisheries
MOE	Ministry of Environment
NCSD	The National Council for Sustainable Development
RAND	Randon Selection
RGC	Royal Government of Cambodia
SDG	Sustainable Development Goal
SOP	Standard Operation Procedure
SPF	Strategy Planning Framework
TW	Target Women (for those who get support/involve in development activities)
UN	United Nations

Executive Summary

This is a research project is taken appropriate of 6 months in the last two quarters of 2024 and titled **"Women's Perceptions on the Climate Change impacted their livelihoods" and the preparedness strategy for the adaptation to climate change".** The first draft of report was submitted in mid-January 2025.

The Report was summarized by four (04) headings: i) introduction and methodology, ii) research findings and discussions, iii) adaptation strategy and iv) conclusion, recommendations and lessons learned. Details provided in this Report.

Introduction and Methodology

Cambodia located in a South East Asian country where agriculture is dominant sector because of the majority of the rural population being involved in agriculture and faced seasonal droughts frequently occured when this phenomena is affected agriculture development sector in particular. So, the country is classified as one of the vulnerable countries in the world to be addressed.

The 2023 UN Climate Change Conference held from 30 November to 12 December 2023 with participation from all state members agreed to mitigate and reduce the impact of climate change through addressing climate change issues by prompt actions for example merging technology transformation with participation of women/girls. This is in line with the Pentagon Strangely of the RGC and other sectoral policies such as sustainable agricultural development.

The main objectives of the research are to i) understand the women's perceptions in the target research communes on the climate change impact on their livelihoods mainly on agricultural development; ii) assess the affected women's knowledge and skills on climate change issues and how those are adapted and/or addressed and iii) prepare a climate-resilient and adaptation strategy to address climate change and agricultural value chain issues.

A total of 199 individual women from four agriculture communities of Kampong Cham and Kampong provinces were interviewed. The Focus Group Discussions (FGD) and field observations were organized to gather qualitative information and views of local setting and conditions. Two analysis methods were designed including descriptive statistics (i.e. frequency and percentage) and chi-square analysis presenting in tables and charts, and other graphs. Note that the Chi-Square analysis method was explored in case of the data provided in Annex 3 were observed likely significantly differences among two groups.

Research Findings and Discussions

Under this section, a short summary of the main research findings with the questions of overall characteristics of the interviewees, their perception and outlooks, their practices

and their current knowledge and skills to adapt to climate change and more details provided in the Chapter 3 of the report.

- During the interview, about ½ were met at the age between 46–60 yrs and this may mean that the aged group is more likely available and the target stakeholders for the intervention. Among all, 23% were told that they had no education and 40.3% had primary, while the report from 2011 to 2019 informed that for Cambodia wed 87%. Their HH size is mostly from 3-5 persons. Regarding occupation, 97.6% considered themselves farming although few did other non-farm jobs while 65.5% were confident themselves as farmers.
- Regarding farming methods 80% said that they still like the traditional methods although 20% said they may prefer a new technique. In this response, two methods should be focused on improving the traditional techniques to meet the current challenges, and/or promoting new agricultural techniques requires additional efforts.
- However, they considered themselves as farmers or doing farming activities. Interestingly, 70% like to allow their children to work in the city to support family income and/or education.
- 85% feel that drought and flood are more likely affected by climate change and 15% said they do not know about it. The interesting information gathered during the FGD is that drought and flood are common phenomena and so this attitude even if it is true, may bring planners and/or change agents into attention when working with the community if aiming at shifting their mindset. However, 97% said that climate change issues impact their livelihoods. Among the three phenomena, drought is their biggest concern. So farming is considered a risky business because of drought and even worse under climate change issues which affect their life and livelihoods for instance shortage of water for dry season rice and domestic use; poor harvesting, loss of income, heating, lack of seeds, animal diseases, migration. 85% said they like new crop varieties and innovative technology to increase their productivity and have a good market for selling their products. The research found that almost 50% of HH have at least one member migrated of which adult children are the most dominant migrants.
- The research also found that building and/or rehabilitating drainage systems and using improved agricultural techniques can be adapted to climate change. Credit is also a mechanism to address the issue. The common sources for accessing credit are public and/or private banks, the next sources are from relatives, NGOs, villagers, and family members.
- 63.3% judged themselves at the medium level of their current knowledge and skill to adapt to climate change in farming. 1 out of four interviewees considered themselves on this K&S as at a low level and need to learn and get more practice on the adaptation methods, preferably through local authorities, their neighbors, other farmers, change agents, and provincial officers (ranked from the most down lower ranking) and training at village is the preferred typed learning and exchange K&S, next through visiting successful farmers, technical Centre, research stations, study at school.

To conclude, first, there are no significant differences in perceptions, outlooks, and attitudes including their current practices and knowledge and skills to adapt to climate change and agricultural productivity techniques between the two groups, however, community leaders are evaluated better K&S than their members. Second, promoting community members' knowledge and skills as well as shifting their behavior require two tactics and action: 1) provide key roles and responsibilities to members as much as possible and 2) encourage their participation and engaement in all related development activities.

Cmilate Change Adaptation Strategy

Based on the research findings and analysis results in Chapter, the following are suggested ations to be taken into consideration and/or inserted to the every stqge of the project/programme development cycle when and where possible. In addition to them, there is suggested for enhancement strategy to be proposed as a result of the reviews from the agricultural best practices in Cambodia:

- Encourage participation of youth and women in the intervention by which gender analysis and then integrate it into relevant legislations, regulations, policies, and framework to ensure equal benefits for men, women, and youth in the project and/or community planning and participation including deciding on community-based livelihoods enhancement development and management. Strengthening coordination and encouraging women in leadership. Careless gender creates more roles and responsibilities in the community so more people can get involved and effectively engage in any events as much as possible either inside and/or outside the villages.
- Knowledge of climate change and its impact should be continuously provided while their mindset and perceptions on new technology and climate change. Therefore, improve individual and community management and technical capacity through awareness and education in climate change agricultural resilience, marketing, networking, etc.
- Drought is their higger concern than the flood. Therefore, any development program especially infrastructure such as irrigation, and clean water should be prioritized and facilitate the market of sale products as well as crop diversification and selection resilient to heat shock for example, disease or pest, market demand, water management/improving irrigation efficiency at the community level, adjusting fertilizer rates to maintain quality and lower cost input. The research found that seeds and other agricultural inputs and marketing remain challenges to be addressed in the quality and cost-effectiveness project. Credit is one of the other alternative solutions that HH still uses from various sources. The change agents should play a bridger/connector between money lenders and borrowers including support for the successful business enterprise before loaning.

Four enhancement strategies in complementary of the above strategies and actions:

i) Promoting awareness raising on climate change impact and adaptation,

ii) Increasing participatory in diagnosis & planning, and management,
iii) Creating and promoting learning the innovation and technology, and
iv) Identifying and implementing other associated agricultural, gender, climate change issues and also addressing other associated factors. Detailed approaches and actions are given in Chapter 3.

Of course there would be additional enhancement strategy and/or actions to be taken where appropriate and see more details in the Chapter 4 of the report.

Conclusion, Recommendations, and Lessons Learned

The research is evaluated as completed against its research objective. As a result of the findings, climate change issues and resilience and practices are quite well known and somehow applied by communities but several questions to be asked and addressed for effectiveness, efficiency, and sustainability. The hypothesis is assumed that a significant diffrences of the perception, practices and knowledge and skills of both TW and CW are in similarity acorss almost questions, however, the TW in overall shows a bit positive than the CW.

General observation and data/information gathered on climate change were understood to be manageable although with several challenges yet severe conditions and threats by drought affected the communities' agricultural systems and food security. Any interventions from diverse stakeholders would be needed to put into actions. The most worries and concerns if those impacts are beyond their coping adaptive capacity.

Three recommendations provided i) th study serves only foundations and guided implmentation and an indepth study and/or specific research should be put into consideration before the project interventions, ii) a result of this study should be shared even othr communites and development partners who worked with communities with similar issues and sectors and iii) bear in mind that climate change adaptation is involved has a root in social, cultural and political and other factors, not only technology and innovation.

Four lessons learned[1] are provided in the Report and those included: i) focus on administrative arragement, ii) get involved the provincial department's young officers in research, iii) process of develpment of questionnaire and iv) optimized time for the effectuve interviews.

[1] the first lesson learned is about building connection with local authorities, next is on involve youth provincial department in the data collection team, then the process of finalization of the questionnaires and last, interviewed time is important.

1. Introduction

1.1. Background and Justifications

Cambodia is located in a South Asian Region where agriculture is classified as a dominant sector due to the minority (80%) of the population involved in agriculture which is vulnerable to climate change mainly droughts (sour: AI overview) and pest and disease outbreaks affecting production and sale (Ros, Nang, & Chhim, 2011). It is similar to the survey conducted in 2011 and 2015 by MoE indicated that 98% of the rural population had faced climate variabilities and extreme weather change for instance increasing temperatures and irregular rainfall in their regions (MoE, 2016). It is recorded that between 1980-2020, Cambodia's main agricultural productivity was caused by floods and droughts in 2016 affected at least 260,000 families with a shortage of clean water, covering 18 out of 25 provinces. In 2015, a dry season reduced rice production, leading to food shortages in some provinces. Those challenges in general are due to limitations on adaptation capacity, particularly in the agricultural sector (De Young, Soto, Bahri, & Brown, 2012), In addition, communities understanding of the root causes and how to approach the adaptation methods to climate change is relatively low (MoE, 2016; NCSD, 2020).

Drought in particular becomes more evident almost everywhere in Cambodia, especially in the research sites where most interviewees ranked it as the most concerning their cropping practices, greatly impacting agricultural productivity and rural livelihoods (Ancha, S, 2018). Similar to the Asia Pacific Networks (APN) science Bulletin posted in 2021 farmers' perceptions regarding the serious impacts of climate change on their agricultural production, particularly rice crops affecting their livelihoods required a strengthening climate change adaptive capacity and planning for the poverty reduction strategy.

The future climate change projections (2025 and 2050) particurlarly found that most of Cambodia's agricultural areas will be exposed to intense flooding in raining season and higher drought risks in the dry season (Cambodia's Second National Communication Report, 2015) and so it would be severe. It is, therefore, critical to enable vulnerable farmers and their local communities to cope with not only the current conditions but would be advantageous for future impacts. Any research findings would to some extent be significantly valuable inputs for policy and strategy formulation as well as useful information for the project/program level interests.

The 2023 UN Climate Change Conference held from 30 November to 12 December 2023 agreed to engage all concerned parties and people including women/girls to plan and implement the COP 28 for Sustainable Development and Sectoral Development Goals (SDGs) as much as possible to merge technology transformation to address climate change issues with prompt action. As same as the Pentagon Strangely of the RGC, the country's development agenda and growth towards a middle-class income country by 2030 and high income by 2050, require Cambodia to address various issues including the vulnerability of climate change impacted agriculture as it is one of the major local

livelihoods of rural Cambodian, serving the main sources of income of around 74.89% of rural households (Leander von K, 2024).

1.2. Research Objectives and Scope of the Research

Three specific objectives of the research are designed: i) to understand the women's perceptions in the target research communes on the climate change impact on their livelihoods mainly on agricultural development; ii) to assess the affected women's knowledge and skills on climate change issues and how those are adapted and/or addressed, and iii) to develop a climate-resilient agricultural development strategy to adapt and mitigate the climate change issues and impact on their livelihoods.

To meet the objectives, the questionnaires focus on three research themes: i) perceptions of women on climate change ii) current knowledge and best practices to adapt to climate change issues, and iii) how climate-resilient agricultural skill development can effectively address the climate change challenges. More details guided in-depth individual women interview questionnaires and guided FGD provided in Annex 1 and 2.

The scope of research is narrow so addressing all complicated issues in the communities and elsewhere is impossible. It would serve as a guide and useful ideas and options for the programmer, planners, and policymakers to take and advocate this research result in integrating/emerging on the agricultural development and climate change reduction strategy when and where applicable. 200 target women in four agriculture climate change resilient communities of KPC and KPT provinces were selected for the research. Quantitative and qualitative data were collected.

2. Research Methodology

2.1. Introduction

This part provides descriptions of the research methodology. Four communes of two provinces: Kampong Thom and Kampong Cham selected for the study. The sample size was applied equally to each targeted province (i.e. 100 samples/province). These provinces were identified as Cambodia's most vulnerable to climate change (Yusuf, 2010).

The statistical software/SPSS was used to analyze data, mainly descriptive statistics (frequency and percentage). Microsoft Excel was used to generate tables and figures to present in the report. Four main activities undertaken include, but are not limited to the following:

1) Desk review through meeting key informants and collecting useful information about the research locations sites, target ASPIRE-AT project intervention areas, and other relevant documents.
2) Pre-data collection comprises three main phases: 1) survey design work includes developing, reviewing, and finalizing the questionnaires for an individual survey and FGD, determining the sample frame for interviewees, computerizing a random method to selecting 4 communes/ agriculture climate change resilience communities from the given list supported by ASPIR-AT program funded by IFAD/MAFF, ii) conduct first visit to the provincial department of environment and local authorities including the leader of the communities to inform about research purpose and making schedule for the meeting, interviewing and discussions; iii) prepare the Standard Operation Procedure (SOP) for the survey and interview including provide an orientation to the numerators and testing the questionnaires and finalize them and printing.
3) Data collection (during the survey) comprises of i) field arrangement and appointment, ii) interviewing and FGD following field supervision, wrap-up meeting, thanks for the respondents, and check the completion of the questionnaire.
4) Post-data collection (post-survey) follows by i) data collection review; compilation, cleaning, and sorting and ii) preparing for the analysis through determining the analysis framework, iii) prepare a draft research report and finalization including iv) presenting and disseminating the result of the research. Figure 1 describes the main activities of the field research.

2.2. Survey Design

The study is based on women's in-depth interviews and focus group discussion data collected in the last two quarters of 2024. 200 women farmers from four communes in Kampong Cham and Kampong provinces were determined through randomized and computerized sampling technique RAND of 23 communes supported by the ASPIRE

AT program. The sites normally faced seasonal floods and drought, and people experienced these phenomena.

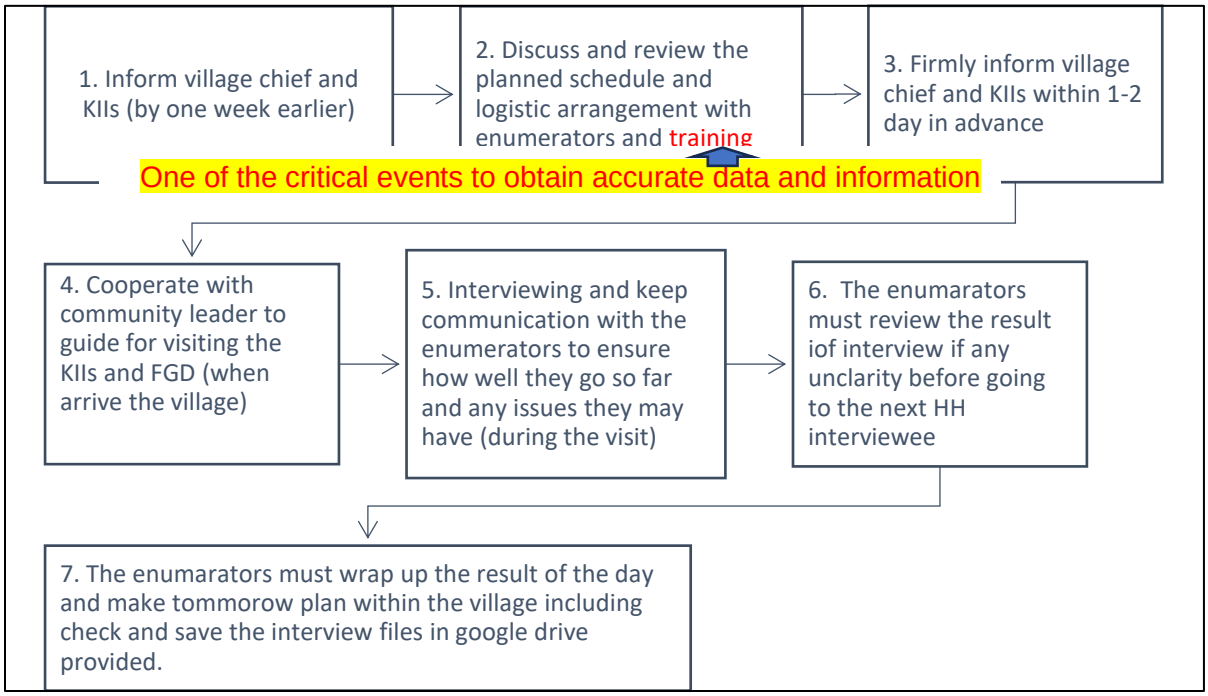


Figure 1. main field activities

A semi-structured questionnaire (see Annex 1) was designed and tested to collect a range of information categorized by i) women's perceptions of climate change's impact on their livelihoods, ii) women's current knowledge and best practices to adapt the climate change on their main agricultural commodities, and iii) what are the climate-resilient agricultural skill development that can effectively address the climate change challenges? In addition, the FGD-guided questions were also designed to gather quantitative information from the communities (Annex 2).

2.3. Training and Testing of Questionnaires

Two types of training are approaching: 1) Indoor and 2) outdoor. The indoor training focuses on Stargazed Operation Procedure[2] (SOP) and introduces the concept and the rationale of the research and its purpose through questionnaire clarity and discussion survey scheduling, logistic arrangement, and coordination during the field activities. The agenda of the orientation/indoor meeting included:

- Introduce the research project, theme, and the importance of this research;
- Explain agriculture, climate change, gender issues, etc.
- Discuss the draft questionnaires for clarity and the SOP;

[2] This SOP is prepared according to past experiences and were oriented to data collectors and team before field research conducted and it is available upon request.

- Discuss conducting the survey and the use of questionnaires for interviews; keep the results safe and
- Discuss the actual field survey schedules and other preparations for the survey.

When the indoor meeting is ended, next to carry out outdoor (it means testing the questionnaires with the selected few women with similar conditions). The testing should be in other villages (i.e., not the research sites being determined).

The survey focuses on correctness, consistency, logical sequence, and system operations. After the testing, a feedback session on the questionnaires was revised and recirculated to everyone again for their proofreading. Note that the training is one of the critical events of the entire survey process to ensure a proper interview, questioning, and getting the right answers.

2.4. Data Analysis Framework

All data collected are downloaded in an Excel file for validation, and analysis, and generate a matrix and chats. There are Seven main steps to be undertaken for the data analysis (Figure 2) included:

The dataset will be classified by 1) locations, 2) group of interviewees (i.e. TW, CW), and 3) series of questions in logical order and numbering. When it is ready, an in-depth analysis of the data is the proceedings.

1. Clean, download data in Excel, and classify the dataset.
2. Design an analysis framework.
3. Once the datasets are classified and then grouped the data by topic and a score for each question and answer, the scoring will be used to measure the selected answers yes, no, other, unknown.
4. Identify the correct answers to each question and make calculations by a percentage of all types of Responders.
5. Analyze the Target and Control women interviewees. Identify and select appropriate charts, graphs, tables to present data and information.
6. Organize a structure and write a draft report, including preparing a PowerPoint presentation on the first draft and seeking any comments from the Project team and other relevant if necessary.
7. Finalize the report on the feedback and
8. Printing and disseminating the report through social media, gathering, etc. as required by the donor. See Figure 2 a chart presetting the key steps of post data collection.

Two analysis methods were explored for this research: is chi-square ($\chi 2$) statistic which is a measure of the difference between the observed and expected frequencies of variables following the formula below.

$$\chi^2 = \sum \frac{(O_i - E_i)^2}{E_i}$$

X^2= chi square

Q_i= observed value

E_i= expected value

Computerized Chi-Square Calculator method is explored through a chi-square value of the degrees of freedom DF = (r-1)(c-1) where r = number of rows and c = number of columns, and *p* value is equal above 0.05.

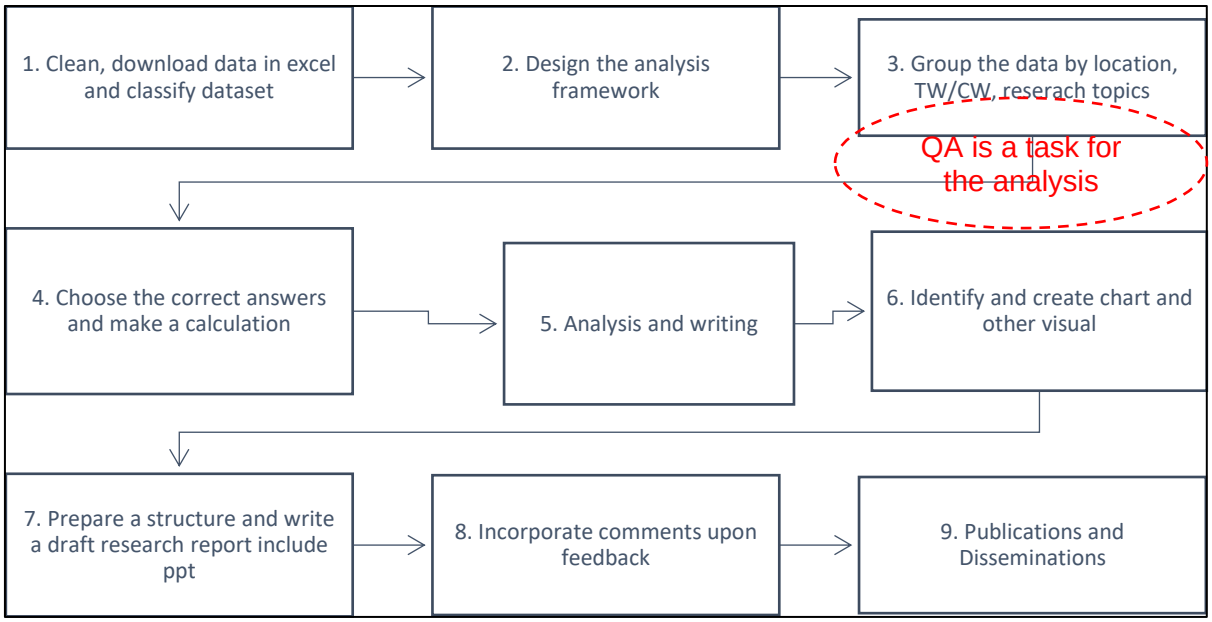


Figure 2. main steps in data preparation, analysis and reporting (post field)

3. Research Findings and Analysis

This Chapter presents the research statistical analysis based on data collected from both groups of women correspondences: 1) Control Women group (CW) and 2) Target Women group (TW). Four (04) main questions are analysed as follows:

1. General characteristics of the research sites
2. Female perceptions, outlooks, and attitudes on the climate change impact
3. Climate change disaster and the adaption practices and
4. Knowledge and skills to adapt the climate change on responders' farming.

The data sheet are provided in **Annex 3** for the verifications.

3.1. General Characteristics of the Research

Information provided in this section included: a) the research sites, b) the number of interviews, and c) the general interviewees' characteristics.

Target Women group interviewee (TW) refers to those who gained support/participated in the development programme provided by any development partners such as ASPIRE AT, Programme whereas the Control Women group interviewee (CW) refers to those who said they never get any supports/interventions from any development partners.

The main purpose of the analysis with and without support from development partners would be interesting whether there have variance/difference and/or the significance of the perceptions and outlooks; current agricultural climate change practice and current knowledge and skills of the interviewees. Besides the interviews, two focus group discussions and conducted the field observations to the rice field, important infrastructure projects such as irrigation scheme, storage for cashew nuts, and rice mile have a aim of getting additional ideas why and how importance of the infrastructure to their livelihood.

a. Research sites

Four communities were selected for this research of which two are located in Kampong Cham and the other two in Kampong Thom province (This does not mean that only these two provinces are more likely to be affected by flood and/or drought than other provinces in Cambodia. According to MoE 2010, higher drought risks have occurred in most of Cambodia's agricultural areas (MoE 2010).

Figure 3 is a research map and Table 1 is a list of research sites).

This does not mean that only these two provinces are more likely to be affected by flood and/or drought than other provinces in Cambodia. According to MoE 2010, higher drought risks have occurred in most of Cambodia's agricultural areas (MoE 2010).

Figure 3. locations of the research sites

Table 1. locations of the research sites

District	Commune	Village	Community
Kampong Cham province			
Batheay	Tang Krasang	Stock Thom	Apiwat Moulthan Yeoung
Prey Chhor	SoSen	Trapaing Thnoat	Apiwat Srok
Kampong Thom province			
Santuk	Ko Koh	Chey Sbay	Phnom Santuk
Prasat Balang	Sala Visay	O Krouch	Sala Visay

b. Size of Interviewees

A total number of interviewed women is planned for 200 (i.e. 100 for each group) however due to data collection and entry process, it was encountered that one interviewee was not accepted because missing and confusing in data records. However, one missing interviewee does not affect the analysis result.

Figure 4 indicates that 199 respondents were interviewed for both provinces which comprsing of 87 TW and 112 CW interviewees. Less number for the TW is found in Kampong Cham province where during the interview, the survey team was quite hard to get a sufficient number.

The main purpose of both analysis with and without support would be to demonstrate the variance/difference and/or the significance of their perceptions and outlooks; their current agricultural climate change-based knowledge and skills and their future needs. Besides the interviews, two focus group discussions were held to gather qualitative information in addition, the team also visited the field, communities, and other important infrastructure projects such as irrigation scheme, storage for cashew nuts, and rice mile for the aim of getting additional ideas why and how importance of the infrastructure.

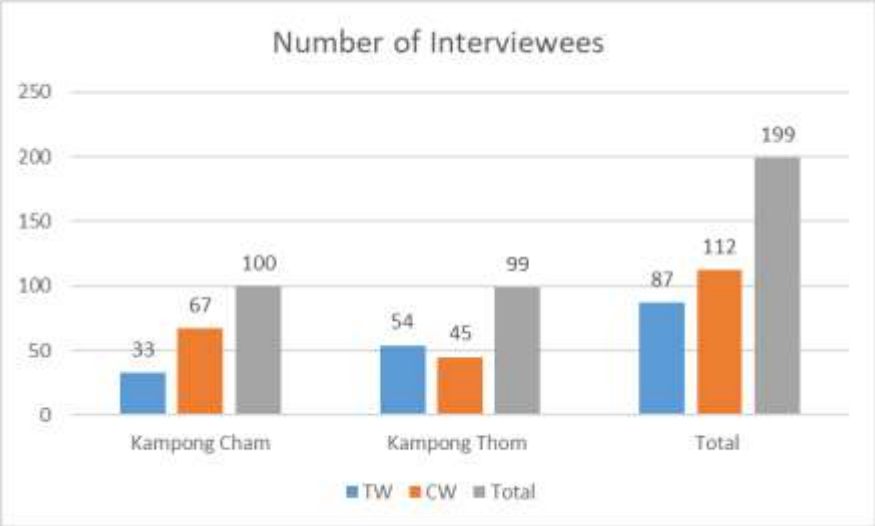


Figure 4. number of interviewees

c. General characteristics of the interviewees

The interview found that 60% of the interviewees are a head of household and about 40% are members of household (Figure 5).

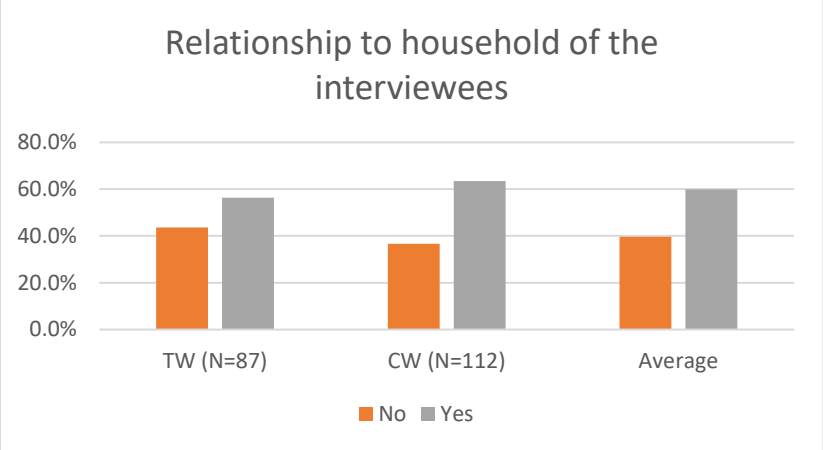


Figure 5. relationship of the interviewees to their household

The age of the interviewees is occassionally[3] dominated between 46–60 yrs with 46.1%, followed by the 31-45 yrs group with 27% (Figure 6). FAO/GSO/MoP (2010) reported that the age group between 30–50 years is active age for Cambodian agriculture due to their experience in farming, power of the HH, and education level to compre to other aged groups. This is parallel with the research finding is that people is 50 years who had limited access to education whereas young (Figure 7).

[3] Without any appointments in advance to meet the group aged

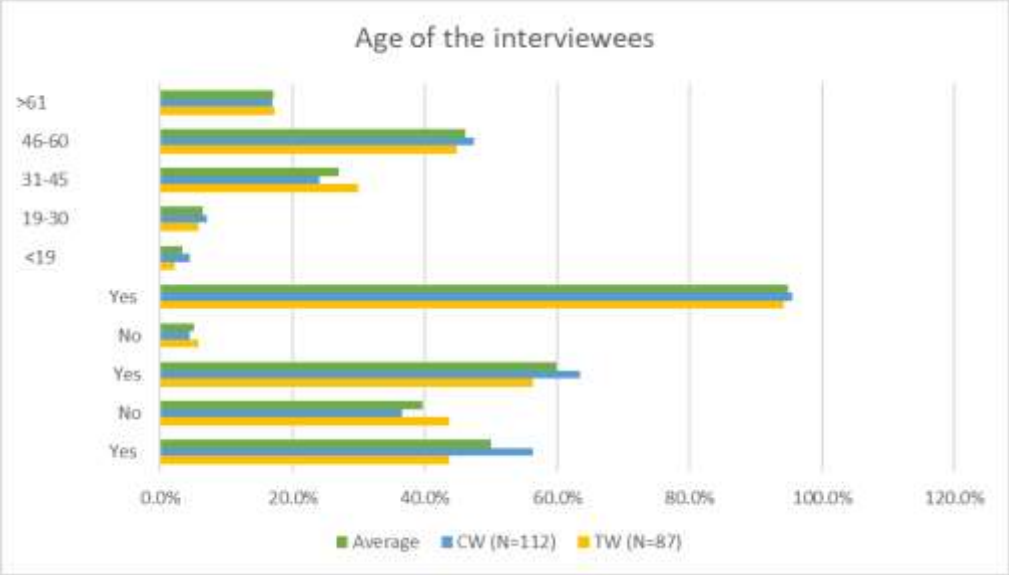


Figure 6. age of the interviewees

The respondents' education shown in **Figure 7** indicated that 23% had no education, 40.3%, 22.4%, and 6.3% had primary, secondary, and above secondary education. The illiteracy found in the survey in among of 23% poses challenges in the effective and efficient information transformation under any awareness raising and education program, especially on new agricultural technologies and implementation of the strategies to adapt to climate change. In this regard, awareness materials should be well prepared for the group mainly and of course for other if needed. Based on statistical data, from 2011 to 2019, the primary school completion rate of females in Cambodia was 87%, and then between 2012 and 2019, it was over 90% where whereas the research sites show around 70% as lower than the country rate of about 20%. So, if necessary and be relevant, a further study on this should be held.

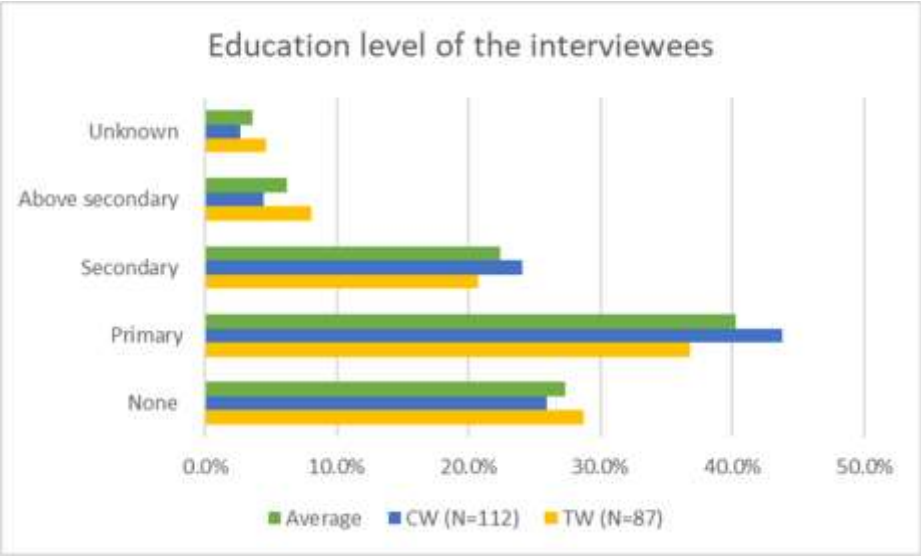


Figure 7. education level of the interviewees

Per analysis of the differences of both groups on educational level, the chi-square statistic is calculated at 3.4136 with a p-value is .491144. This, the result analysis is not significant at p < .05 between both groups in terms of their education to participate or not participate in the development intervention.

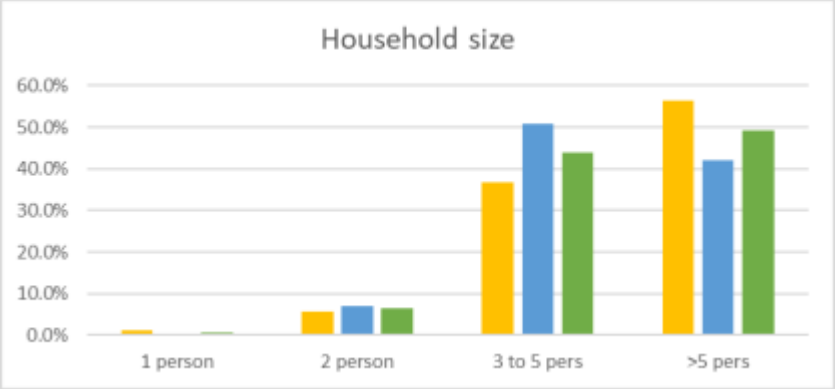


Figure 8. household sizes of the interviewees

The household average size is majority from 3-5 persons per household consisting of almost 50% and 44% of TW and CG respectively (Figure 8). The household size shows 63%, 19%, and 18% of the respondents had four to six members, over seven members, and less than three members, respectively.

The figures 7& 8 can tell that the above women-aged and HH size groups are more likely available and who should be expected to meet/consult at any interventions for example: community meetings, training, and other related activities.

According to the General Population Census of Cambodia in 2019, about 63 percent of all households in the country carried out agricultural activities while in 2023, the rural population is estimated at 74.43% of total population who rely on agriculture as their primary source of food and income (GIZ, 2020). The finding in the target survey site, among 199 interviewed females, about 97.6% told they still consider themselves or their HH as carrying farming activity. This indicates that about 15% is higher than the country average. It can be proved that farming/agricultural activities were their local livelihood. About 20% are doing business and a tiny percentage are doing other income generation.

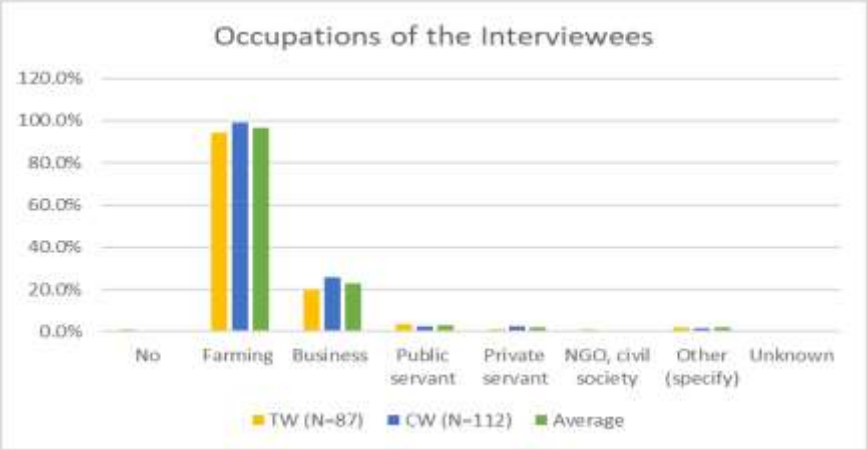


Figure 9. occupations of the interviewees

3.2. Perceptions, Outlooks and Attitude of Climate Change

This sub-topic has fourteen (14) questions and Annex 3 provides data sheets for verification and analysis.

Question 1 (I am more likely as a farmer), there are no differences in responding between both groups. However, Figure 10 shows that 65.5% of all interviewees are confident that they are more like to be farmers than other types of occupations and this percentage mostly replies as same as the country average. Only 12.8% said they are not really a farmer who occupy non-farm jobs such as local merchandize and other off-farm works.

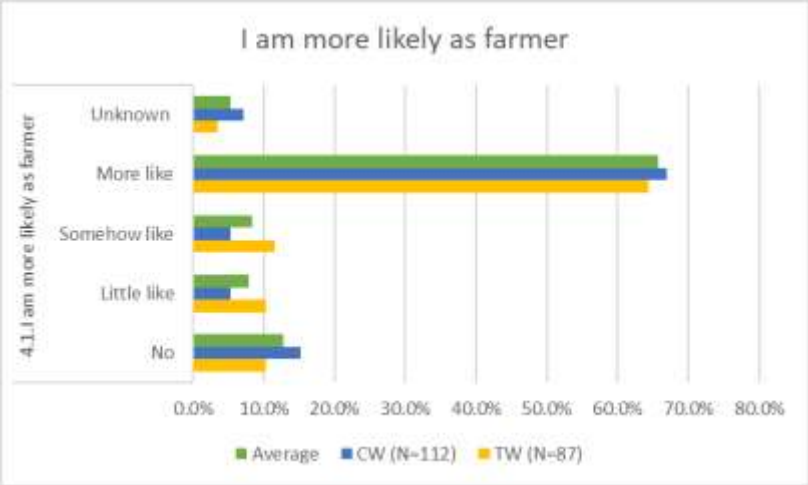


Figure 10. I am more likely a farmer

Question 2 (I am more likely traditional agricultural methods of farming than new techniques). The analysis also shows no significant difference between both groups about using of agricultural methods. However, the graph shows that majority (80%) still like to use the traditional methods although about 20% said they may prefer a new technique or other (Figure 11). This analysis result can be explained that a new orientation of new

technique and/or innovation is significant for minority, however, there is no harm to introduce new techniques or integrate them into traditional techniques.

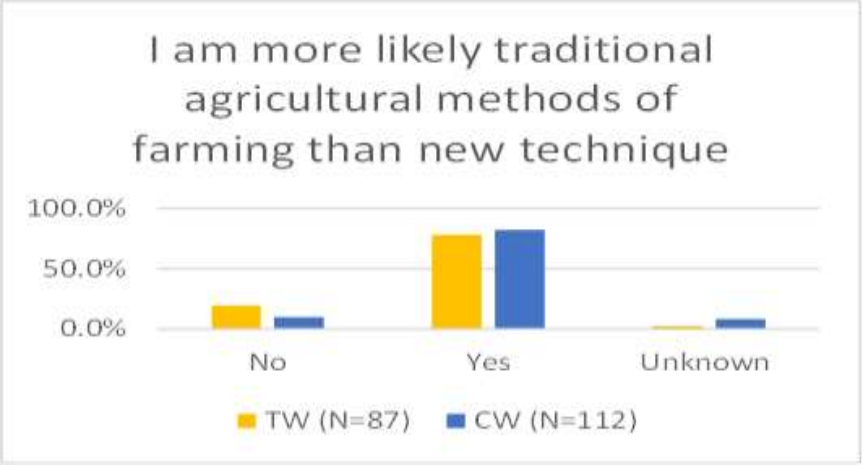


Figure 11. methods for agriculture

Question 3 (I like to let my children move to the city to work in the future). The analysis shows that almost 70% are more likely to allow their children to work in the city while about 15% said no and another 15% are unknown where are the best choices. They believed that working in the city would provide their family with additional income to support family and even during poor living condition. According to the graph, there maybe no significant difference in responded from both groups (Figure 12).

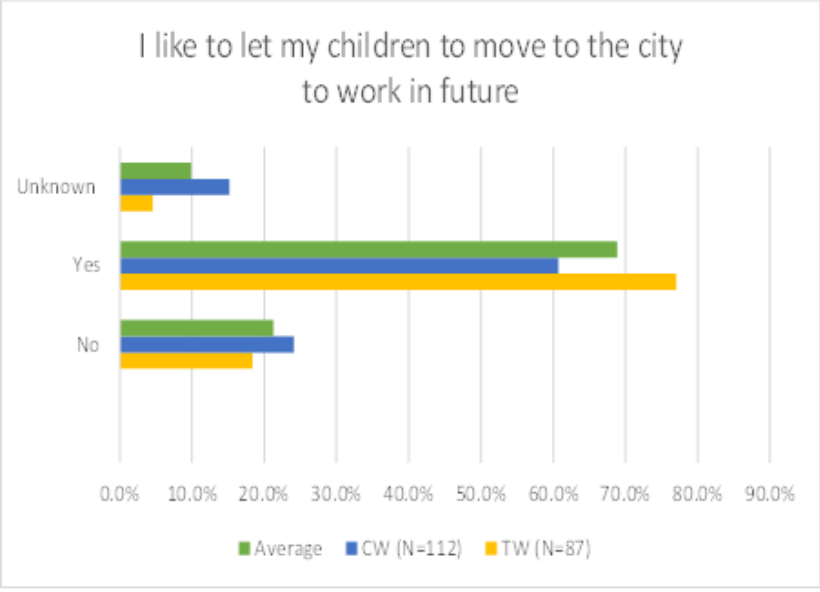


Figure 12. behavior about children to work in city

Question 4 (I know climate change is related to drought and flood). 85% said they know about drought and flood caused by climate change and 15% accumulate together said that they do not know and drought and flood are common (Figure 13), said by the majority

during the FGD. Therefore, the 15% even small number are significantly the target on the awarness and education. For our observation during the interview wven 85% said they know about it, but no specific knowledge on the climate change and so the awareness riasing and education should focus on all.

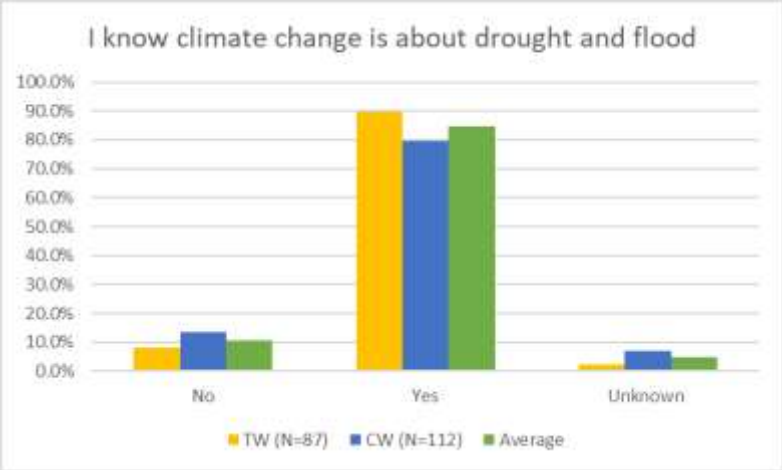


Figure 13. overall knowledge on climate change

Question 5 (I know about the climate change issues and its impact on my livelihoods). 97% said they know about climate change issues impacting their livelihoods and only a few said no or unknown (Figure 14). However, as mention the above, education on the topic should be encouraged if significantly increase productivities and change mind set.

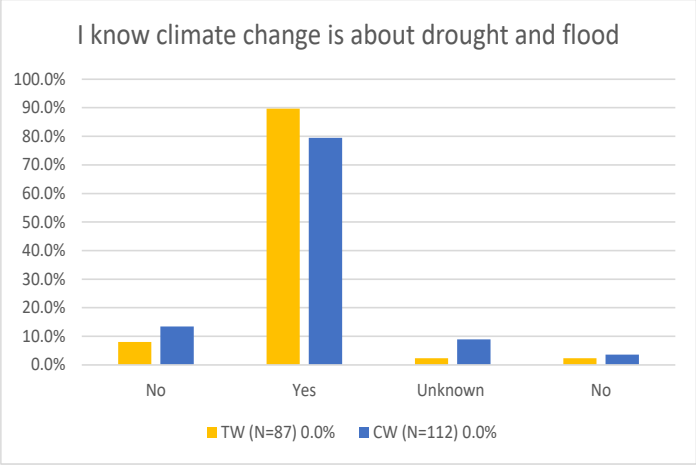


Figure 14. knowledge of climate change issue and impact to livelihood

Question 6 (Climate change: drought and flood and other disasters are my biggest concern). It is similar to question 5, their biggest concerns of climate change in their community including agriculture, infrastructure, etc.

Question 7 (I am more likely concerned about drought than flood). 95.6% said yes and only a few said no and unknown for the group who had low land than other upper land

where some years has flooded, but in general and the majority considered drought is frequently occured and affected their local livelihoods and should be addressed.

Question 8 (Farming is a very risky business because of climate issues). The survey prove that almost 100% agree with the risk of climate change affecting their life and local livelihoods. So, it is important to concentrate on reducing their worry and with appropriate interventions. Question 9 (The weather determines my crop yields) and question 10 (The weather determines my livelihoods) show similar results as question 8. (see details in Annex 3). Question 11 (Farming is a very risky business because of market issues) has a similar result as question 8 and the majority concern about it (ref: Policy for Agriculture Development 2022-2030) while the policy is aiming to drive the development of modern agriculture with a competitive, sustainable, and inclusive approach by further developing market access for local agriculture products and modernize the agriculture sector.

Question 12 (I like to try a new crop variety) and question 13 (I like innovative technology and new techniques of farming). The majority (about 85%) said they like new crop varieties and innovative technology to increase their productivity.

Question 14 (if you propose solutions to address agricultural climate change issues what likely do you prefer the best solution). Figure 15 shows that there are no best solutions suggested to address agricultural climate change issues because a similar percentage is provided. However, it is important to conduct in-depth discussion and analysis when starting the intervention to determine what are critical issues and best solutions to address those issues. However, the Policy for Agriculture Development 2022-2030 suggests to promote a modern agriculture with a competitive, sustainable, and inclusive approach including addressing good market access.

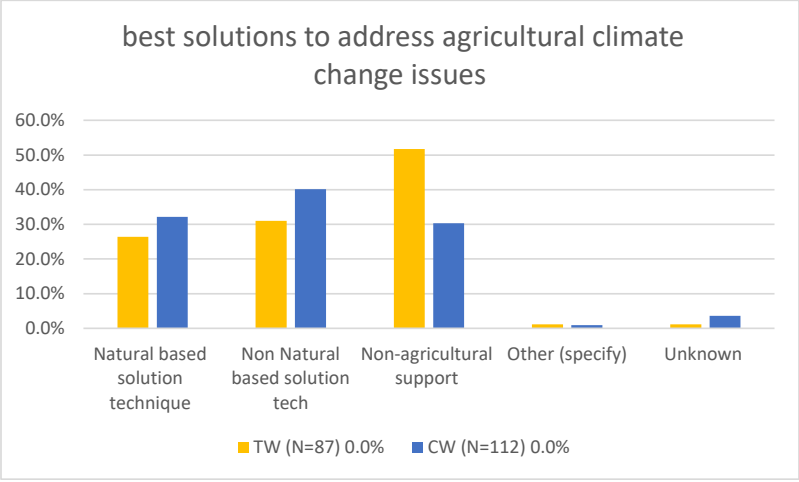


Figure 15. solutions to address agricultural climate change issues

3.3. Climate Change Disaster and Adaption Practices

Sixteen (16) questions are provided under this section and the results gives detail in Annex 3.

The first questions is what are climate change-related disasters you faced? Figure 16 shows that drought is considered the most frequent phenomenon while floods and gusts of wind or thunder are subsiquent concern. So for the intervention in the target areas, drought should be prioritized even a few villagers said during the FGD that droughts and other disasters such as floods and winds are common for their livelihoods. Most of their needs are included the development/improvement of the irrigation system for dry rice cultivation, second priority is clean water and other needs are listed in the adaptation strategy in Chapter 4 of the report.

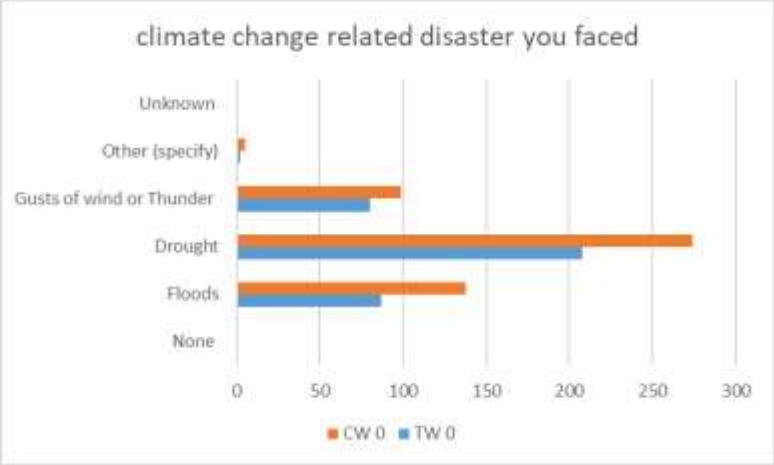


Figure 16. types of climate change/disaster phenomena community faced

Next question what is the impact of the drought you faced? Normally, the drought leads to several effects on the communities and Figure 17 indicates that the most concerns of drought impact are firstly related to (ranking according to the number of responses) the shortage of water for both dry season rice and clean water for domestication and gardening. Of course, water shortage face severe challenges in productivities especially rice. The second impact is associated with loss of income, heating, lack of seeds, animal diseases, migration, and so on. Based on global literature, the most negative impacts of drought such as crop failure, mass migration of people, economy of HH, and other factors.

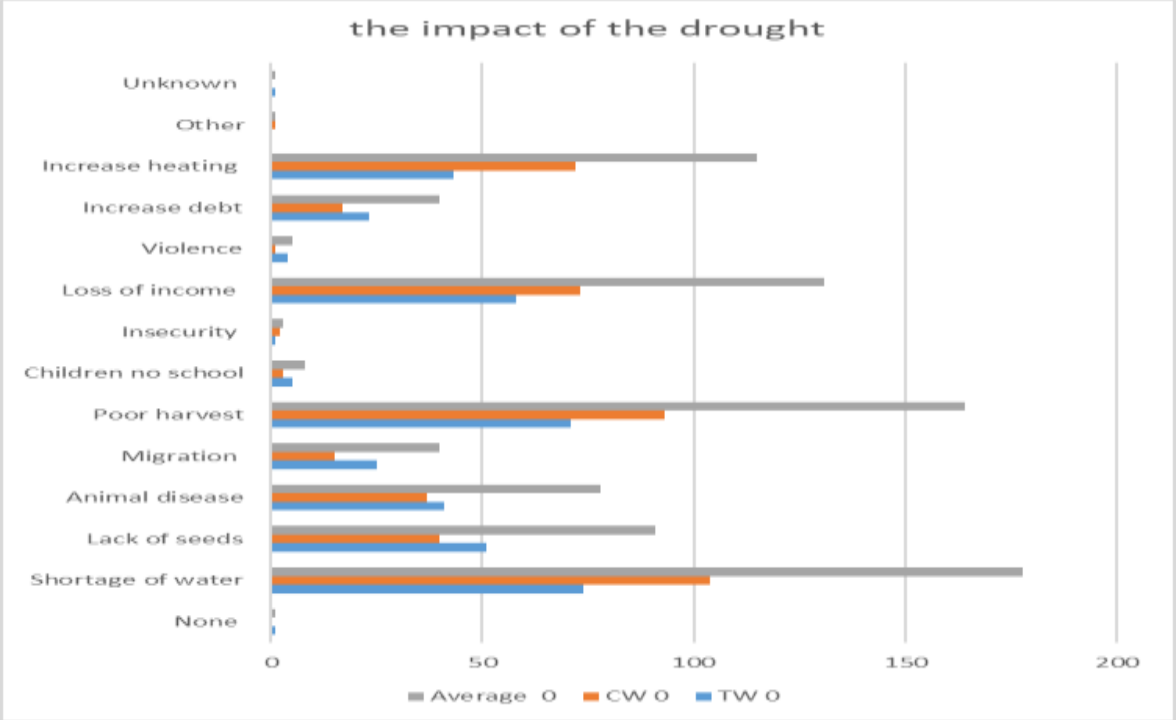


Figure 17. negative impacts of drought

What is the impact of the flood you faced? The impact from floods provided by the respondents included (ranking by the highest number of respondents to the lowest): first is related to poor harvest, nest is shortage of water, then low income, lack of seeds, animal disease, destruction of infrastructure, and so on (Figure 18). However, it is interesting to see that a quite high number of respondents said that no impacts affect their livelihood. This is clear that the main concerns are about drought whereas floods do not normally affect their community, especially rice fields because most of their rice fields are in upland although few.

What was the adaption method you practiced? It is true and almost similar to other areas when people face poor living conditions, they must find alternative solutions to address them. The adaptation methods in Figure 19 below show that building/rehabilitation of drainage systems is considered a high priority while 96% of interviewees consider themselves farmers. The next priority is about improving agricultural techniques. infrastructure gaps through the Country Partnership Framework (CPF). This is similar to the WB group, 2019 stated that reducing poverty and sharing prosperity is required to promote in particular involve private sector to cooperate with public sector in the development of human capital, improve agricultural productivity and be resilience to climate change. UNCC stated that adaptation should adjust the ecological, social, or economic systems in response to actual or expected conditions and their effects/impacts by changing processes, practices, and structures to moderate potential damages or to benefit from opportunities through developing adaptation solutions and implement actions to respond to current and future climate change impacts. While the research shows that

seasonal migration, off-farm jobs, and selling of HH property are the second options while several said unknown and did nothing.

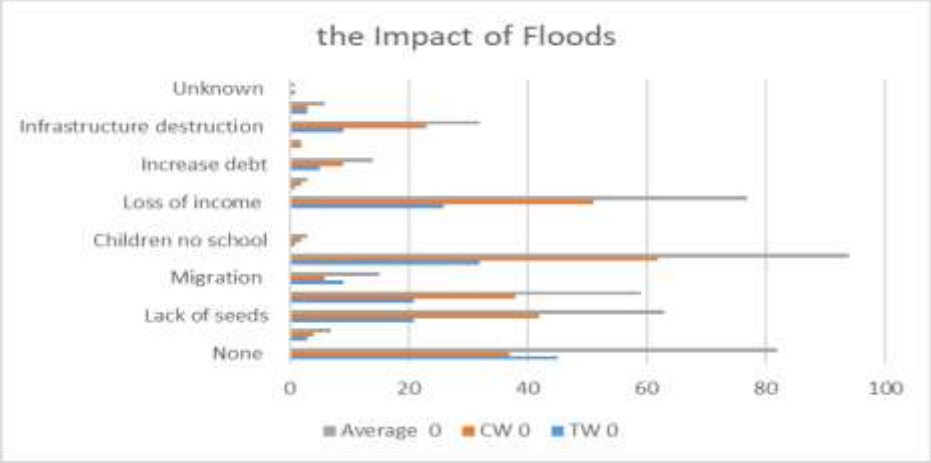


Figure 18. negative impacts of floods

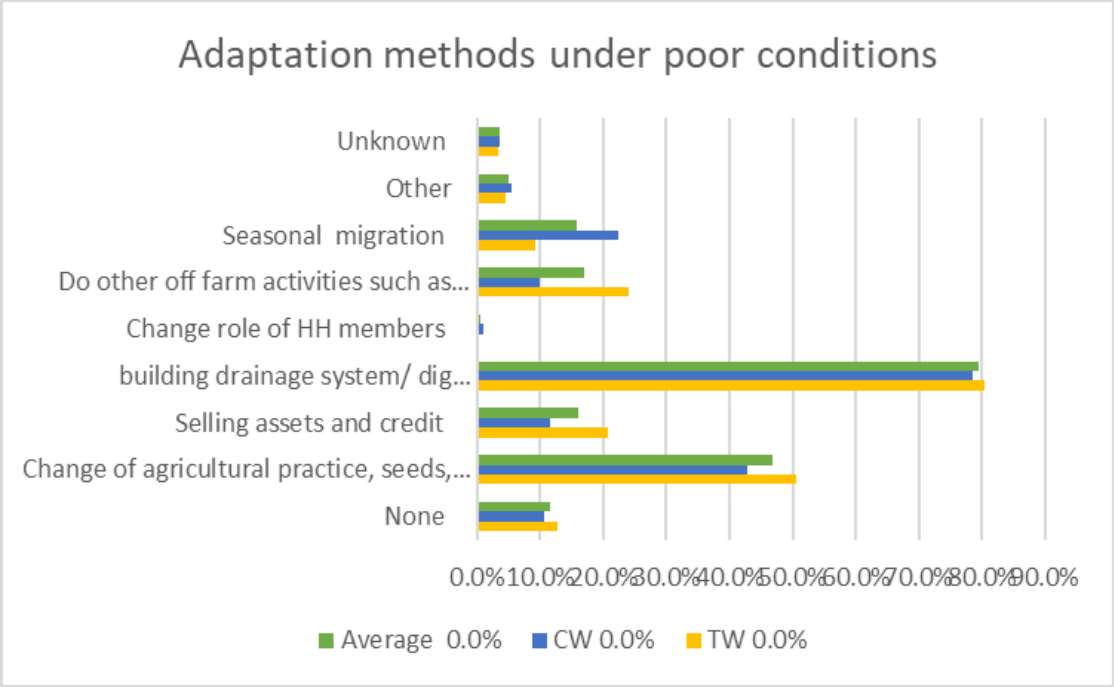


Figure 19. adaptation methods when in poor conditions

A question on where they take credit? The research found that while they faced disaster conditions such as drought and floods, credit is one of the best solutions to address their loss of income and poor harvest. However, they concern that credit to some extent impact their life. Both groups responded that the most common sources to get credit is from the public and/or private bank. Other credit sources are from relative and from NGOs, villagers, family members. Figure 20 observed some variations of responses between TW and CW and so to realize the significance of the difference between both groups the chi-sqaure was made and shows

Per analysis of the differences of both groups on taking credit sources, the chi-square statistic is calculated with the p-value is .055778. The result is not significant at p < .05.between both groups although obsered data shown.

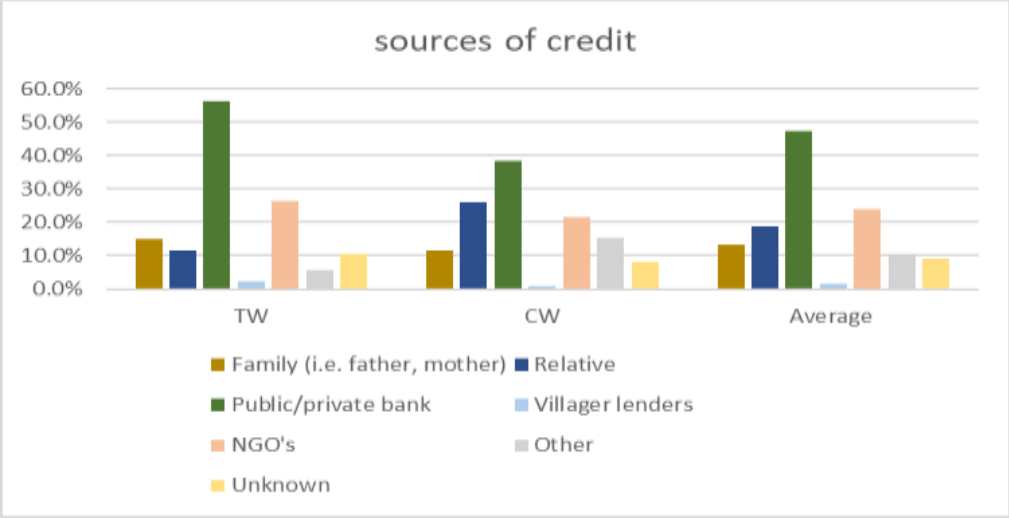


Figure 20. sources of credit

Question about who are your family members who did migrate last year? Migration is one of the topics for Cambodia that remains challenged by limited employment opportunities in domestic labor while IOM reported in Cambodia approximately half of all Cambodian cross-border migrants going to Thailand and other countries especially from Siem Reap, Battambang, and Banteay Meanchay, and other provinces. Based on the survey, an average almost 50% of HH migrated seasonal and temporary. So it means every 2 HHs has its members migrated especially children of HH either female or male are the most dominant migrants as compared to other members. While compared to the country's youth migrants, the target research sites are about 25% less than the country's average (IOM 2022). The next migration of HH members refers to HH head male consisting of 10% while the HH head female at 2.4%. Traditionally female of HH are a person who take care of their family (Figure 21).

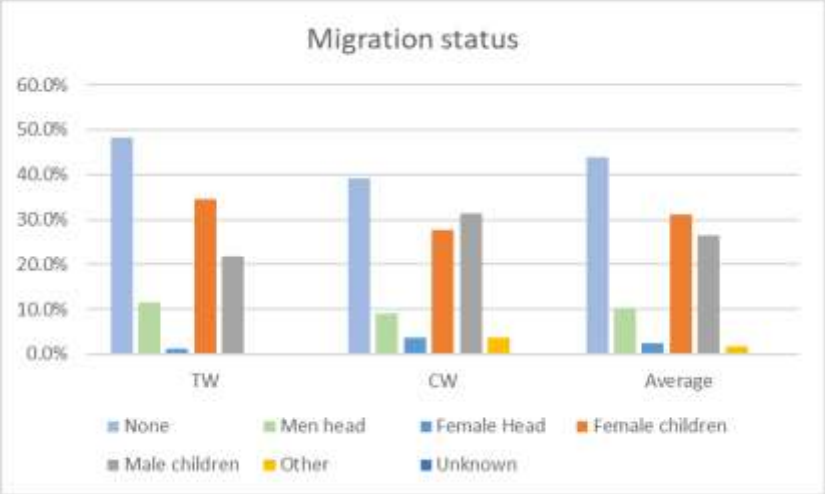


Figure 21. household's members migration

Next question is related to the ability of rice cultivation by five specific questions related to ability to: 1) access the quality of seed,2) properly control crop pests, weeds, and diseases, 3) have adequate fertilizer, 4) seek good market and/or good sale products and 5) ranking the most challenges among four challenges abilities.

Annex 3 shows that on average of the four abilities, there are very close answers at 87.6%, 96.1%, 92.6%, and 75.9% respectively for both groups to have ability to get all four main inputs/service while among the four, ability to access a good markets shows a bit lower ability than other three abilities and so market would be the most issue to be addressed on rice value chain. Similar to animal raising the Annex 3 also shows the similarity for either TW or CW. Interestingly, their ranking, a properly controlled crop pests challenges ranked first, while ability to access good market is second challnge and others as the minor challenges such as seeking quality of babies, checks. However, the seed quality should not be ignored and their answers may relate to the question of what the quality of seeds means. Per AI overview, Cambodia has a number of challenges with quality seeds in agriculture, including limited availability of improved varieties. In 2019, the supply of quality rice seeds was only 20% of the annual demand. For other crops, such as cassava, corn, and cashews, seeds are often imported.

Per analysis of the differences of both groups on their ability in rice cultivation, the chi-square statistic is calculated with the p-value is 272107. The result is not significant at p < .05.between both groups

3.4. Current Knowledge and Skills to Adapt Climate Change

This part of the research questions focuses on the current knowledge and skills to adapt to climate change in their farming. Four (04) main questions were set included: i) how do your current knowledge and skill levels adapt to climate change in your farming? If you have (if the above answer from 1-3 levels, what are they? ii) who are your community's

good, useful, and trusted information sources in your community? iii) how can you learn, and exchange knowledge and skills on climate change issues and solutions? and iv) what are good information sources you wish to see and/or get? Table 6 presents the summary of the analysis.

First question is how are interviewees current knowledge and skill levels to adapt to climate change in farming, the research found that an average of 63.3% judged themselves at the medium level, 2.6% said they are at high level, but very interested ¼ of the interviewees considered themselves at low level and need to learn and get practice more about the adaptation methods (Figure 22).

The current knowledge and skills in adaptation level show a bit higher percentage for the TW than CG. This may prove that their participation/involvement in the development program would benefit them. However, additional researches on behavior changes and local livelihoods should be further studied for details. In the analysis of their types of knowledge and skills, Figure 22 explained that traditional methods remain the dominant knowledge and skills and about ½ of the total interviews said they still use both methods and/or only new technology/innovation.

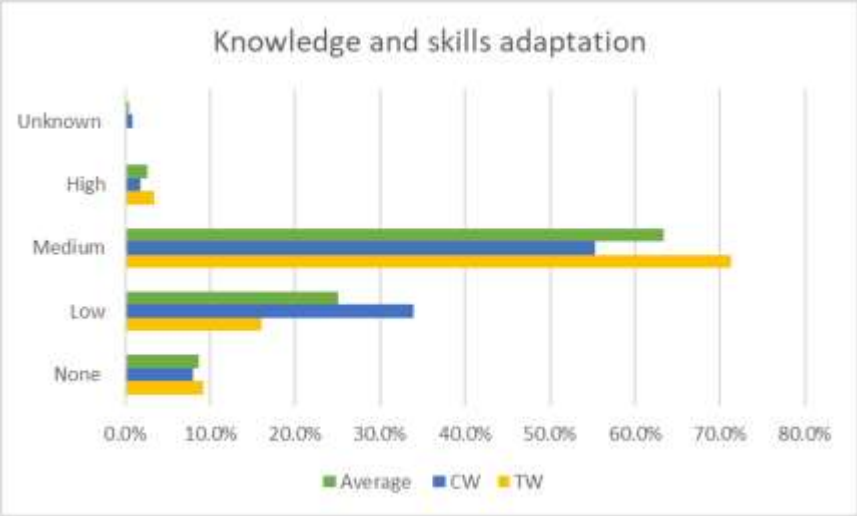


Figure 22. measure the current knowledge and skills to adapt climate change to farming

Figure 243 tells who could provide the good, useful, and trusted information sources in their community and to help any development partners and their field staff to concentrate the main sources of information flows into the community and individual. Figure 24 provides the analysis and finds that the first useful and trusted information for the community and the first is through local authorities, their neighbors/other farmers in the villages, similar to their relatives as well as from development partners/NGOs and provincial officers concerned.

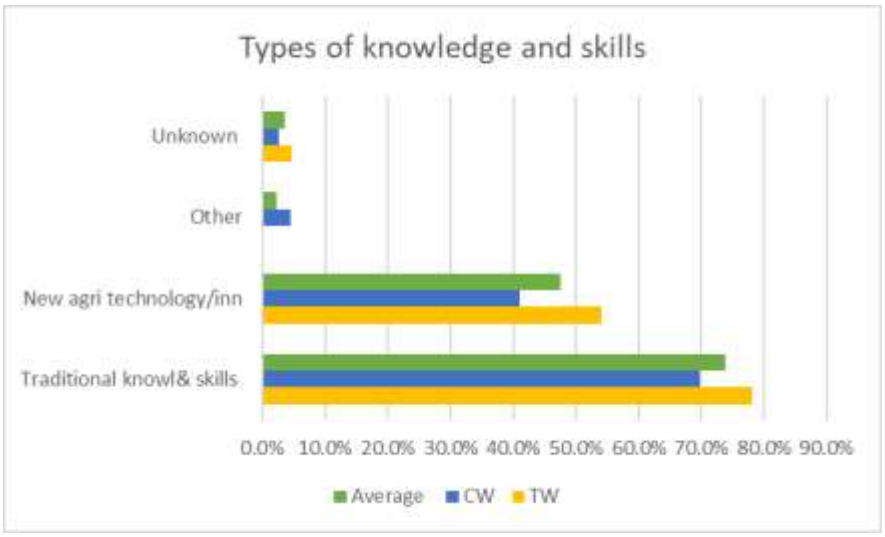


Figure 23. types of knowledge and skills they normally applied in their farming

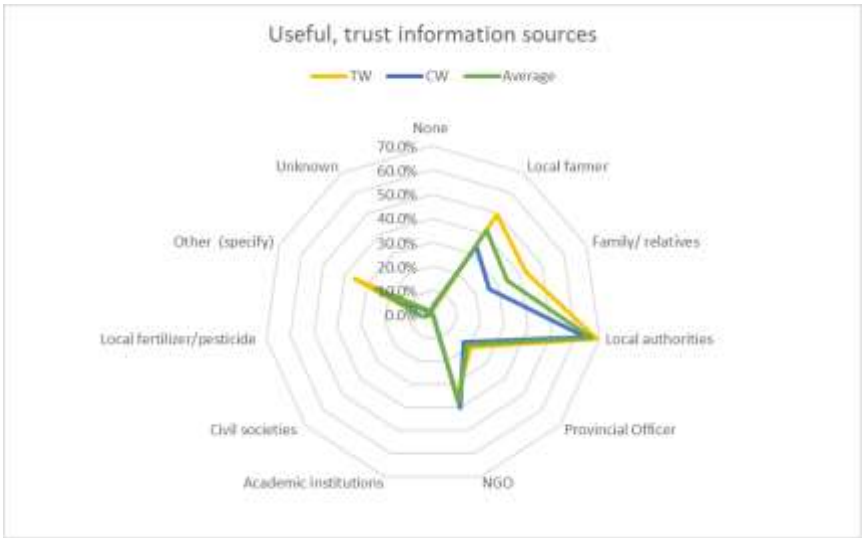


Figure 24. useful and trust information sources, community like and get the information

The next question is to answer the best ways they learn and exchange knowledge and skills on climate change issues. Figure 25 shows the analysis of this topic that the learning and exchange they mostly (63.3% on average) propose first training in the village, Next, about 18% like learning through visiting other successful farmers and other few parentages such as a visit to technical Centre, research stations, study at school and other. Both responded none and unknown consists of about 10% would be interested even if small, however, the promotion of learning and exchange of knowledge remains an important element for their farming activities and local livelihood. Based on Figure 25, it can be seen that there is no significant difference between both groups of respondents.

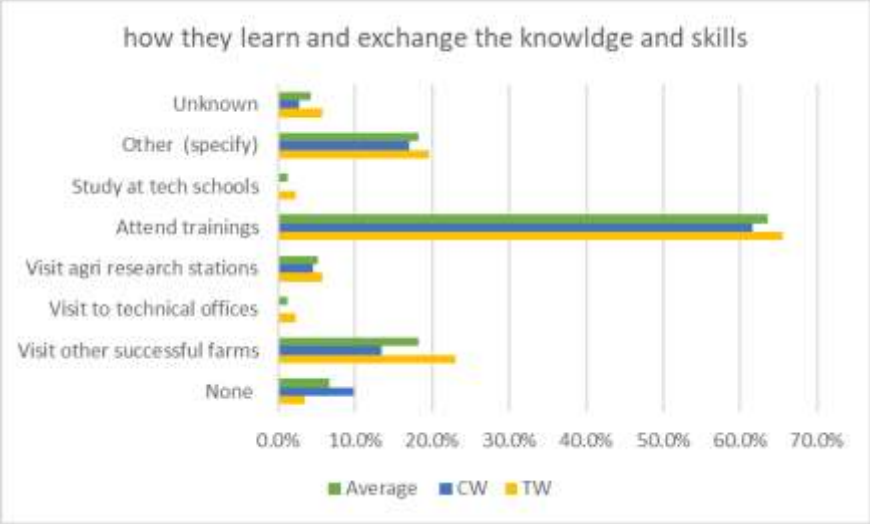


Figure 25. how they learn, exchange the knowledge and skills and wish to

4. Adaptation Strategies

This chapter, there are two gropus of adaptation startegies to be taken into consideration for the project formulation, planning and implementation include policy formualtion drrawing from: 1) findings and analysis results from individual survey served as a core strategy and 2) results of FGD as enhancement strategy (Figure 26).

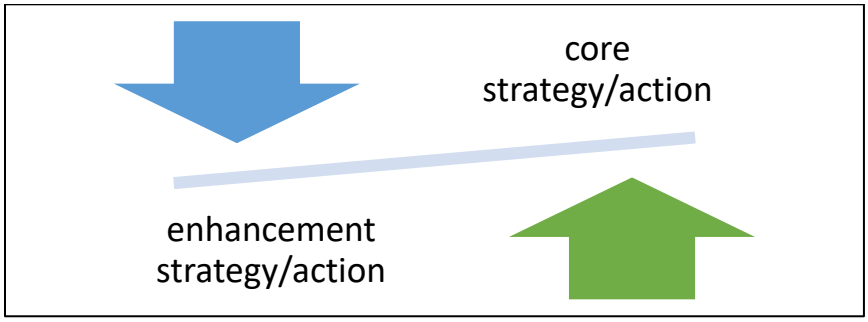


Figure 26. proposed strategy/action

4.1 Core Adaptation Strategy

Based on the analysis, the following points should be served as a core strategy/action to be taken at any phases of the project cycle, included but are not limited to:

- FAO/GSO/MoP (2010) reported that the age group between 30–50 years is active age for Cambodian agriculture while the survey found that most of the groups are migrated and are more likely educated than widely access to information mainly new technology and other useful and update information for the aged group over 50 their education is limited and the survey found that 23% and 40.3% had no education and primary education respectively. So, for outreach and awareness raising as well as any related education events, the education and/or extension materials either offline or online should be prepared in the target group.
- In the survey, 97.6% remained focused on the farming activity of which at least 65.5% of total interviewees classified themselves as a farmer, and remaining farming is their main local occupation. 20% are doing business alone or mixed up with agricultural activities. In this regard, it would be more effective to design the program on agricultural improvement by considering the challenges/bottlenecks of the value chain including climate change matters and of course with small business enterprises if possible. It is suggested that both traditional and new agricultural methods and techniques should be promoted without ignorance. Thus integrated agricultural methods and/or approaches should be encouraged. Knowledge of climate change and its impact should be continuously provided More advanced knowledge of the

agricultural value chain products challenges. In addition, the FGD during the survey event the team found that the majority of the group mentioned that drought and flood are common phenomena in their community whether a change of climate or not.

- As a mindset of considering the normal, it would be required to put efforts to change their behavior, and perception of new technology and innovation as well as climate change. In this regard, it is important to continue to emphasize education and awareness raising for the aim of changing the id set from the normal/common into what it can be said that shifting the common thinking and practices from negative to positive proactive and prepared for the adaptation of either current and future challenges, especially on agricultural value chain-based climate change conditions. However, the survey shows that 97% knew about climate change's impact on their livelihood. If not necessary the topic can be skipped but prioritized for the main challenges encountered in the survey results.
- In the two provinces, especially in the target research sites and nearby, the program should focus on drought issues and their impact on agriculture especially on rice and cashew nuts (both crops are their main) as a result 95.6% said drought is their most concern than flood. Therefore, any development program especially infrastructure such as irrigation for agriculture, clean water for domestics such as rainfall collection, boreholes, wells including water use management, etc. should be prioritized and apply climate change adaption methods or solutions such as building/rehabilitation of drainage systems and improving agricultural techniques and facilitating market of sale products.
- The majority (~85%) said they like new crop varieties and innovative technology to increase productivity. Therefore, the program may put more effort into the new crop variety tolerated/ or be resilient to pest, disease, and drought conditions and produce high yields. Three main crop management approaches should be put more into planning:
    1) seed reservation through selection, sorting, and prevention
    2) crop purchasing from good quality seeds.
    3) Seed research either on farms or agricultural research centers/stations.
- Another adaptation solution when facing poor living conditions and/or drought issues poor harvesting etc., credit is one of the other alternative solutions although they know the impact of getting the credit mainly from public and microfinance institutions), a second source of credit is from their relative and NGOs, villagers, and their family members. To minimize the impact of credit, any development program/project should play a role in bridging the gaps between credit sources and borrowers which
    1) Supports the ways to have credit without any complicated procedure and requirements,
    2) Finds ways of low interest rate and

3) Provide an opportunity to use the loan for business and with good returns and so provide knowledge of the credit, and support the vocational training skills including marketing the products etc.

- In Chapter 3, an average of almost 50% of HH (1/2 of every interviewee) have their family members migrated although seasonally and/or temporarily, and among the migration members are adult children either female and/or male. The research sites may lack a labor force (i.e. youth) to support or be involved in agricultural activities. The research proved that almost ½ of the people interviewed are elderly (over 46 years).
- The ability to cope with agricultural activities (rice and cashew nut) although the findings found that the majority said that they can address all value chains of agricultural products (especially the market of products) however, there remains doubt about quality and cost efficiency issues including the sustainability and therefore, the support projects either the existing and new may conduct more detailed research on the three dimensions above. is similar to the above, the ability of animal raising to cope with four main areas is shown a bit lower than the rice and cashew nut value chain. The biggest challenge for animal-raising is related to the ability to control the disease whereas the crop is about marketing ability to sell rice.
- The analysis of both groups shows no significant differences in perceptions, outlooks, and attitudes and the current practices and their knowledge and skills adapted to climate change and agricultural productivity techniques. However, community leaders are more likely to be better than their group members. It can be concluded that they have legitimate roles and responsibilities as well as their roles they are more likely involved/invited to development events. In this connection, to promote the knowledge and skills including changing the behavior, two things to be in mind or take action: 1) as much as possible to provide key roles of the members and 2) encourage their participation in any events organized by key development partners and government agencies.

4.2 Enhancement Strategy

The overall framework for the improvement of the local livelihoods to address to agricultural commodities value chain and climate change conditions through four core strategies and with enhancement strategies falling under enlabling environment, include good governance, parnership, development and use of community instruments and management, financing and sustainable financing and other cross cutting activities.

- Strategy 1. Promoting awareness on climate change impact and adaptation
- Strategy 2. Increasing stakeholders' participation and capacity building in climate change problem diagnosis, planning and management
- Strategy 3. Creating and promoting learning of the Innovation technology and climate change adaptation

- Strategy 4. Identifying and implementing other associated agricultural, gender, climate change issues.

Enhancement Strategy 1. Promoting Awareness on Climate Change Impact and Adaptation

Collins, (2022) defines adaptation as the act of changing something or behavior to make it suitable for a new purpose or situation addressing the effect and the cause of the problem. Jennifer M et al (2023) said that people's belief in climate change and their feelings on meteorological changes is the main contributors to the adaptation of agriculture and livelihood. However, during interviews and FGD, several people said that floods and droughts commonly occur and live with them. This belief may affect the community's engagement and endorsement of decision-making and/or flood-related adaptation strategies (Daniela S, 2019). However, their beliefs are not worked out unless seriously taken into practice by allocating all their means including resources to address/respond to the disaster rather than relying on whatever the weather is (AI is experimental and found in webpage/ scholarly articles for agricultural climate change adaptation strategy).

The concept and practice of adaptation would be more guarantee of success in the implementation while the community agrees that the adaptation strategy to be taken as much as possible for generating families' income from agriculture and another off-farm job that can help them for at least ability to cope with their current environmental issues and climate change to avoid any social acts such as mass migration and more debts. The adaptation allows communities to adapt themselves gradually to the effect/impact of the changing environment and climate change where they used to or lived whether high, fair, or low capacity.

For the income-generating activity's purpose, migration can be described as one of the sources of income while taking in the social context and family relationship and other negative aspects such as Gender Violence (GBV) or negative health impact/economic mobility (IOM report in Africa) and lose the status, especially women attached to their family and increased workload (MoP, 2013), then the migration may be a harmful act.

To promote such strategy, a common growth is included: Several steps to be taken:

1) Review and assess are key messages of shafting perceptions,
2) Develop a simple capacity programme and prepare materials including selecting suitable audio-visual methods and materials,
3) Test and finalize the point 2&3 of the above,
4) If possible and/or necessary, formulate and train a core/champion/facilitation group,
5) Implement the awareness and education program including outreach, 6) Evaluation and finalization of the program and materials.

Enhancement Strategy 2. Increasing Stakeholders' Participatory in Climate Change Problems Diagnosis & Planning and Management

If a strong belief and/or positive perception are at a high level then it would be convenient to move to another step whereas with no belief it would be hard to implement and easy to get success.

It is a fact that the issues from one community to another may be the same, similar, or different. In this regard, it is important to think, analyze, and determine together in the form of participation, contribution, and inputs to agree on major issues and threats of climate change within the community and how those can be responded to or addressed and then plan and implement together. It is important to identify and analyze the actual issues of agriculture within each geographical location before designing, developing, and implementing the program (FAO, 2000).

For many successful projects, it is hard for individuals to address community problems alone, but in a collaborative, cooperative, and coordinated manner. Climate change such as drought and floods does not cause only individual households but many households (for instance: household who has upland may be less affected by floods than those whose lowland). Moreover, for the effective response to drought on rice for example it is impossible to construct irrigation for one or few households, and the construction of a canal of course must involve many who have land devoted to construction. It is clear that many successful programs required pluralism approach and it means involved all parties in the process especially in the diagnosis and planning steps included:

- All local people and many households as much as possible including women
- Other key players (i.e. agricultural inputs suppliers, agricultural products buyers, development partners, provincial, district, commune, and communities in the agricultural value chain process. This is a good example that the IFAD-supported programs for MAFF and MoC using a multi-stakeholders approach and all concerned key actors for the agricultural value chain projects should be involved. The various communication and/or dialogue mechanisms included: F2F, MSP, and Other gathering mechanisms.

In the case of KPT, Prasat Balang commune where ILP even though with a small number, engages them fully in the program and benefits their families, it is important to consider:

- Using local languages and culture when communicating with them
- They must be members of any groups and their voices in the planning and implementation
- Promoting ID at local registration and recognize ILO by local authorities
- Having hope and representative,
- Establishing ILP committee/network and identifing their needs (not mixed with other local Khmer)
- Enganing representative of ILP in the community involvement

- Enganing ILP women and Youth including all vulnerable groups as well as reputation villagers.

MAFF/PDAFF develops and adopts the VRA tool in the project and scales out this practice in other climate change-related projects in the country as the tools is more simplified and effective in vulnerability assessment in the community. Integrating value-chain analysis & climate change resilience into sustainable farming systems.

The program design should be based on the above and integrated planning rather than implemented by individual sectors, subsectors, or individual persons but by community and multi-stakeholders or actors (i.e. all concerned key players and those involved in the value chain and to those guarantee of success of the intervention, not one or two or few alone).

Climate change is complex and impacts any development activities. The community needs to work with its partners to integrate at least the work plan for addressing climate change adaptation and mitigation into the plan. Any successful program is inviable and inclusive of these emerging issues and thrives.

If so, coordination mechanisms at different levels such as sub-national and communities should be established and closely monitored. Without such coordination, the development would be challenging and obstacles. However, servicing farmer group needs is a flexible approach and should be accorded to level of social capital. For the ASPIRE agricultural development program the community is applying a community management approach through establishing an effective mechanism for community development to address the agricultural value chain and climate change conditions.

In common practices, a main type of adaptation here is to have an adaptation plan however, the plan in some circumstances, the individual farmer can have an adaptation plan by themselves with prompt actions for example people change crops or harvest their products based on market demand including alternative adaption new technology capacity of the agricultural system to tolerate the current climate change, knowledge and skills transfer, farmers research and extension and so on.

Develop community action plans for disaster risk reduction and introduce climate-sensitive planning, budgeting, and execution at the sub-national level, specifically focusing on gender equality and empowering female-led households. In this connection, exchanging/strengthening core community facilitators, mainly selection from members of the community and or others from the village such as elders, teachers, monks, and reputation would be an option.

MAFF is approaching one official/technical staff to facilitate one commune. S/he is expected to be a core digital agricultural trainer/vacillator implemented by SEEDS Project ". The project focuses on the following four key areas:

a. Role of Community-Based Digital Agriculture Assistant (DAA)
b. Fundamentals of research and analysis
c. Community involvement and facilitation methods
d. Leading information gathering discussion group with the support from commune agricultural officer.

(source: MAFF, 2024)

Enhancement Strategy 3: Creating and Promoting Learning of Innovation Technology and Climate Change Adaptation

It would be suited to have even though at the perception and diagnosis and planning and when the above have consensus, it is a time to create any innovation and new technology for the agricultural and another livelihood alternative income generation activities and so innovative should include for at least five innovation areas:

- Agricultural inputs
- Agricultural methods and equipment and machinery
- Agricultural knowledge and skills and service
- Agricultural market
- Agricultural services and so on.

The agricultural inputs that can be included (East-West Seed, 2018) are the resources for producing farm goods, including seeds, fertilizers, pesticides, equipment, etc. Under marketing needs and climate change conditions, those elements are critical to select to tolerate and improve productivity including resilience. Research even in farms or off-farm would be an important factor in adapting, testing, and wider implementation upon success and/or a high rate of success.

Under MAFF/PDAFF projects, they scale up the climate-smart agriculture project because the climate change issues are happening in most rural areas of Cambodia and

technologies are new so demonstrations are the starting points on the following as examples:

- Nets and drip irrigation.
- Small scale diversified vegetable production
- Large scale rotation crop production
- Seed conservation of leaf onion
- Sola powered water with ASPIRE AT support project
- Chicken Production and
- Agro-clinic shops.

The survey results shows some are the same and other are added to the above. The list below was ranking by number of respondents the highest are placed on the top.

- Training and extension on agricultural production and other related farming activities including marketing
- Climate change management and natural-based solutions
- Clean water and seed
- General management, good environment, pesticide control, and general infrastructure such as road, boreholes, and ponds.

More demonstrations and learning for innovation and technology can be explored with the project and another successful agricultural project in Cambodia. It is encouraged if funding is available, exposure visits to those projects should be taken the visit somehow could change perception and adapt the technology to their communities, and learning from the community is also encouraged. The proverb says that hearing one hundred times equals seeing one time and seeing one hundred times equals doing one time.

Agricultural techniques and equipment including machinery can be mobilized in enhancing extension delivery systems, information sharing and communication, community trainers, appropriate technology such as agricultural digital at community through digital solutions (ref: SEEDS project), community participation and contributions, etc. From the scholar article searching the agricultural knowledge and skills include service are related to:

- Prioritizing agricultural research to adapt the climate change patterns and development and management of market innovation platforms,
- Developing innovative information and knowledge systems that everyone can draw and learn from including sharing their experiences and best practices such as from on-farm learning experiences and other related activities including farm notebooks and other on-farm demonstrations,
- Accessing and adopting new and innovative research outcomes;
- Strengthening the capacity of communities to manage their resources (e.g. Savings, credit schemes, agricultural inputs, agricultural production, land use);
- Enhancing the use of technological options to manage climate variability-associated risks (e.g. disaster information management system);

- Improving support services and capacity building to crop production resilient to climate change by promoting research, trials, and up-scaling climate-smart farming systems that increase resilience to CC and extreme weather events
- Supporting public authorities to improve their support services and to develop policies and regulations that promote inclusiveness sustainability and
- Encouraging different types of books/resources documents and leaflets were collected to put in each agro-clinic.

SWISS contact project for Sustainable agriculture in Cambodia stated that expanding our reach through empowering farmers to increase their production and improve their adaptive capacities by providing them with relevant skills, know-how, and networks. The capacities can be related to enterprises and local service providers to develop quality products and services. For the agricultural market can be considered:

- The need and opportunity to engage with the private sector and NGO's
- Active marketing and promotion
- Development and management of market innovation platforms
- Contract farming

Houston L., (2023) stated that using technology to create a culture of innovation and change is one of the full advantages of technology to transform learning and requires effective leadership capable of which all educational community members feel a part. They need to understand how technology can impact learning to enable transformative learning into new opportunities for accomplishing and practicing those and outreach. Moreover, this is also personalized professional learning. When they create or initiate the technology and training it would be highly possible to use the technology and learn from it and then improve their agricultural commodities value chain by developing their technology implementation plans to accomplish this.

Creating and learning innovation and technology needed support from either research and/or academic institutions and/or agricultural extension/researchers at national, provincial, and community levels. As MAFF create one commune agricultural facilitator who will play this role in the future and work with the community to create and learn the research and exchange to other communities.

Enhancement Strategy 4. Identifying and implementing other best practices of agricultural value chain, inclusive gender, youth and climate change adaptation

Minimizing the impact of climate change and adopting innovative technology for the improvement of agricultural products on a large scale, it is important to conduct trial/pilot testing. Innovation technology after research, is commonly not 100 percent effective and efficient.

Technology adaptation is one of the desired strategies in the adaptation to climate change mainly to cope with or be resilient to agriculture practices mainly in three main agricultural value chain stages:

i) Pre-production value chain stage, land preparation, selection of seeds etc.
ii) Production value chain stage and
iii) Post harvesting value chain stage (i.e., harvesting, processing and marketing).

It is the first step to believe that reducing the impact of floods and droughts, would be hard for the community itself to do but it can be done by the concerned parties involved. Naturally, adaptation allows communities to adapt slightly to the changing environment and conditions they are used to live with. This would be considered the best strategy or way for everyone in any business and farming.

Second, the community should agree that migration as an adaptation option and strategies to be taken as much as possible for generating families' income from agriculture and other available off-farm income-generating activities that can help them at least ability to cope with their current environment in spire serious, fairly and low risks to avoid any harmful and undesired works and acts such as migration, increase debt and so on. According to the research, about 50% of households have at least one member to seasonal or temporary migrate for off-farm jobs in towns, cities, and other countries.

Stage 1. Pre-production Considerations

The following actions involved in the adaptation included but not limit to:

- Study and determine the seasonal changes and showing dates;
- Select different or new crop variety or species that suit to the locations and market; and
- Use various types of low inputs such as fertilizer, tillage methods, grain drying, other field operations;

Mixed cropping involves growing two or more crops in proximity in the same field. The system is commonly practiced in Tanzania where cereals (maize, sorghum), legumes (beans), and nuts (groundnuts) are grown together. The advantages of mixing crops with varying attributes are in terms of maturity period (e.g. maize and beans), drought tolerance (maize and sorghum), input requirements (cereals and legumes), and end users of the product (e.g. maize as food and sunflower for cash).

Research conducted by Mendelsohn et al. (2000) on analyzing adaptations made in Africa reveals that in all countries apart the planting of different varieties of crops would be one of the most important adaptations.

- Climate change adaptation for agricultural cropping systems requires resilience against excess water and lack of water (due to extended drought periods).
- Improving local agro-input suppliers to become village agro-clinic service providers for farmer knowledge development in agriculture

- Preventing post-harvest losses through storage for the kampong study sites (cashew) to ensure a good market for local products, especially cashew nuts that are nothing goes to waste.
- Adapting to climate change indicated a need to have different adaptation strategies including changes in planting/harvesting date, ice varieties, investment in the irrigation system, and changing level of input. These adaptation strategies were similar to findings from research conducted in the region near Cambodia.
- Green Climate Fund. This initiative targets four agricultural value chains in Kampong Cham, Tbong Khmum, Kampot, and Takeo provinces. It will enhance the resilience and productivity of crops, and increase agricultural competitiveness and household incomes in the targeted provinces.

The common agricultural adaptation strategies used by farmers were the use of drought-resistant varieties of crops, crop diversification, changes in the cropping pattern and calendar of planting, conserving soil moisture through appropriate tillage methods, improving irrigation efficiency, and afforestation.

Farm-level strategies such as crop diversification, crop rotation, short-maturing crops, and tree growing are the rural households' primary choices of climate change adaptation strategies. Low inputs would allow Cambodia to be competitive with other countries when the high costs would not make it hard to be a champion for the cashew Nut export (source: Apsara media service).

- Adopting soil conservation measures that conserve soil moisture through the use of zero-tilling practices in cultivation, mulching, and other soil management techniques. Natural mulches moderate soil temperatures and extremes, suppress diseases and harmful pests and conserve soil moisture. Before the advent of chemical fertilizers, local farmers largely depended on organic farming,
- Planting of trees (afforestation) and agroforestry: Tree planting is the process of transplanting tree seedlings, generally for forestry, land reclamation, or landscaping purposes. It differs from the transplantation of larger trees in arboriculture, and from the lower cost but slower and less reliable distribution of tree seeds. It involves planting seedlings over an area where the forest has been harvested or damaged by fire or other factors. Rural farmers in most of the African countries have been planting trees as a way of adapting to the effect of climate change.
- Livestock adaptation strategies Livestock producers and management systems have traditionally adapted to various environmental and climatic changes by building on their in-depth knowledge of the environment in which they live.
- Production adjustments: Changes in livestock practices could include: diversification, intensification and/or integration of pasture management, livestock and crop production:
    - Altering the timing of operations;

  - Conserving nature and ecosystems;
  - Modifying stock routings and distances;
- Introducing mixed livestock farming systems, such as stall-fed systems and pasture grazing and so on.

Breeding strategies: Many local breeds are already adapted to harsh living conditions. However, developing countries are usually characterized by a lack of technology in livestock breeding and agricultural programs that might otherwise help to speed adaptation. Adaptation strategies address not only the tolerance of livestock to heat but also their ability to survive, grow ,and reproduce in conditions of poor nutrition, parasite,s and diseases and therefore:

- Identifying and strengthening local breeds that have adapted to local climatic stress and feed sources and
- Improving local genetics through cross-breeding with heat and disease-tolerant breeds. If climate change is faster than natural selection, the risk to the survival and adaptation of the new breed is greater.
- Research for the development and enhancement of agricultural productivity, quality, and transfer through strengthening of crop variety conservation and new crop variety release responding to the impacts of climate change. See more Adaptation Technologies Guide– Agriculture (MAFF, 2019).

Stage 2. Production Considerations

Under production orientation strategy there are number of ways to take into considerations for the adaptation of the agricultural climate change included:

- Improving the techniques on chicken raising and hatchery with a low rate of mortality by using both vaccination and ecological medicine, and improving feeding and caging management;
- The climate-smart agriculture techniques applied by demonstration farmers should be replicated in other rural areas where appropriate techniques can be used. Those techniques included a drip irrigation system, using rice straw as soil mulching, appropriate pesticides and fertilizer, and vaccination through improved feeding regimes. - Collaborating with research institutions to support the development of products that increase productivity and resilience.
- Establishing climate-resilient production methods through collective dissemination of innovative ideas and concepts via F2F, multi-stakeholder dialogue between the different actors,
- Minimizing the greenhouse gas emission produced by using water pump machines, should encourage the farmers (who have the ability to afford the cost) to use solar water pumps instead of pumping machines.

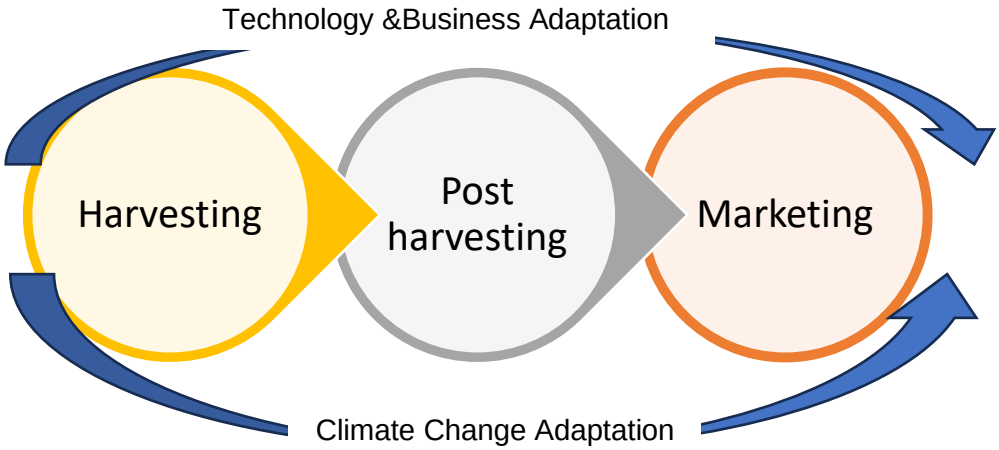
With the main issues of high costs of fertilizer and pesticide, a lack of access to irrigation infrastructure, low incomes, low-quality seeds, and labor shortages, the following can be effective farming practices for small-scale farmers, included:

- Combination of harvester machines and planting in the case of rice. This kind of mechanization is also important when the labor shortages and if individual farmers struggle with the cost, the group may be taken into account.
- Using drones to spray pesticides. This kind of method can save both labor and safety people when they use dangerous chemicals.

Stage 3. Harvesting and Post Harvesting Technology Adaptation

Three main steps for adaptation and increasing income through:

1. Improved quality-safety harvesting technology adaptation,
2. Post harvesting technology adaptation and
3. Marketing/business enhancement technology adaptation.



3.1. Harvesting Technology Adaptation

Beyond the preparation and production technology adaptation is crucial, however the harvesting is also key element to consider and adopt in the context of best practices such as in the Adaptation Technologies Guide– Agriculture (MAFF, 2019) include adopting machinery typed harvesting technology preferably at the scale for small farmers, rainwater harvesting technology, harvesting calendar suited with marketing calendar.

3.2. Storage and Processing Technology Adaptation

For the quality of agricultural products and a good market, it is crucial to streamline the suitable harvesting technology practices to reduce the harvesting losses and to increase the products' price in the market. There are several harvesting technologies to be explored for instance:

- Making a selling calendar for the demanded price rather than by ad hoc basis
- Listening to agricultural products news sources.
- Adopting machinery harvesting technology: a future of farming and modernizing Cambodia's agriculture sector, said the Minister of MAFF, H.E Veng Sakhon in connection to the decreased workforce in agriculture. In addition, he said using harvesting technology would support a good market for agricultural products.

Enhance their bargaining power, product marketing, and marketing knowledge sharing. So, farmers should join a group and have the same voices rather than compete with each other. Said the community leader in KPT province.

Cashew Nuts local storage, case in Phnom Santuk Village, of Chey Sbay Commune of Phnom Santuk District, KPT

Package and labeling (agrowell, 2023) are not difficult aspects but significantly impact the safety, quality, marketability, and profitability of products. Learn more about ways to package label and process including the best practices for packing and labeling agricultural products. Proper packing and labeling are essential for not only the success of the agriculture products of the highest quality and price. See details on the Agrowell website for more information.

3.3. Marketing Technology Adaptation

Building climate change resilience on cashew nut products for quality and market demand price. In the case of KPT where cashew nut storage is built.

MAFF/PDAFF program encourages the replication of the agro-clinic shop business model and building capacity of the clinic owners on the appropriate use of agro-inputs/materials with embedded consultation services to farmers so that the clinic shops serve as not only the place for selling agro-inputs but also a place for providing consultation and help farmers to get a better understanding in using more properly and effectively their farming inputs.

Functioning of market systems by building on the incentives of local actors to address these challenges at three levels: including developing quality products and services First-movers to encourage new technologies or business models.

Enabling private enterprises to be involved in developing and introducing improved and climate-smart products including providing good services would be a suggested strategy tailored to the needs of smallholders. For instance, contract farming esp. cashew nut.

- Tie with local private companies
- Support in building storage community for everyone sells large volumes so the cost can be higher
- Build a link between the Local community and the private sector on agricultural value change mainly on agricultural inputs, and products' marketing which can be an agricultural products market resilient solution.

Government policy on increasing rice production has led to large-scale land acquisition for contract farming. Contract farming is one key issue for water management since the development plan still focuses on rice exports, which need extended irrigation infrastructure. The challenge is to work out how to use water to support economic development while also supporting poverty reduction through food security and sanitation at a local level.

5. Conclusion and Recommendations

5.1 Conclusion

The study is completed according to its research objective, and the work plan although the analysis findings and discussion would limit guidance on further studies. However, the hypothesis of the research in assuming significant differences of the perception practices knowledge and skills from both TW and CW in similarity across almost all questions was rejected overall for these target research communities, however, the TW overall shows a bit more positive than the CW but in parallel trends (i.e. high or low are the same).

Climate resilience is critical to not only agriculture, and livelihood but also sectors such as health education, and culture and affects every aspect of life although most people believe that these phenomena are quite common in such long-term history.

Inspite in the current situation, the change of climate is manageable, but not realistic for future climate change may have a severe effect and impact on Cambodia communities' agricultural systems, food security, biodiversity, and ecosystem services in Cambodia and worldwide when the temperature rise between 1.5 to 2.0˚C (The IPCC report in 2018) and the long term strategy to address the issue significantly to increase perceptions of local communities on the climate change and of course other factors.

Due to the above reason, more attention should bear in mind and even more action from everyone including international communities and the RGC as well as other concerned parties at all levels to identify, plan, and prepare to thrive this warming issue.

So, adaptation strategy and action should be at least in the planning stage to confront rising and severe floods and drought and then emerge from the perspective and system into adapted practice where and what the problems and threats to the community's livelihood mainly agriculture within the coping adaptive capacity if not would be the most worry.

5.2. Recommendations

The result of the research would not well represent for everywhere and at any different circumstance and farming issues, but overall findings and strategy to take further approach.

- For better outcome of the project improvement, further in-depth or specific research should be taken although this study gives foundations and guided information.
- Experiences and practices from this study should be circulated to other communities and/or development partners who work directly with the communities and
- This study reminds the success of climate change adaptation is required not only in technological adoption but also in its deeply rooted in social, cultural political, and other factors.

6. Lessons Learned

According to this field survey, some lessons were learned, observed, and recorded although they may not be news for researchers, it can be a refresher for them to learn and practice although the following may not be suitable to apply for various situations.

- It is important and necessary to manage the administrative work from the provincial level to the local level such as district, commune, and village, and especially the community leaders with several days and one day before and during the survey about the purpose of the survey, who funded, locations including explaining several main questions to not only get their support but also to avoid any risks and problems that may arise during the survey.

- An opportunity to involve the provincial department's young officers in research is a good approach for capacity building in research and strengthening cooperation and good field facilitators because they know well the research sites and already built a connection with local authorities.

- Concerning the questionnaire development and obtaining specific information from the community, it is essential to have such a process through first the preparation of questionnaires, discussions with numerators as many times possible, and then testing the questionnaires with the assigned numerators to find out if they can read the words as same as local people and the content of the question and what they can answer, and then adjust questions. This made the interviews easier and took less time.

- The interviewees do not have much time and the best for the interview should last 45 minutes, preferably about 30 minutes during the farmer's busy time such as in the planting season, or festivals. The numerators need to be clear about the questions and be able to interpret and clarify when needed, with good examples to all interviewees but avoid leading answers.

Reference

- ADB (2021). Promoting Climate Smart Agricultural Initiatives in Cambodia
- Ancha, S (2018). Community Based Climate Change Adaptation through Agriculture: Experiences from Cambodia.
- ASPIRE-AT (2024): List of intervention areas
- CDRI. (2021). State of gender equality and climate change in Cambodia.
- GIZ (2024). Improving climate resilience in agriculture in Cambodia and Viet Nam
- GIZ, (2020). Partnership Ready Cambodia: Agriculture and Food Processing
- IFAD (2023). Integrated farming strengthens climate resilience in Cambodia
- MAFF (2019). Increasing Resilience to Climate Change for Farmers in Rural Cambodia through Climate-Smart Agriculture Practices (IR-CSA) Project. *Report on Project Final Review*
- MoE (2019). The Cambodia Climate Change Alliance (CCCA) - Phase II programme document: Increasing Resilience to Climate Change for Farmers in Rural Cambodia through Climate-Smart Agriculture Practices (IR-CSA)
- MoE (2016). A second study on understanding public perception of climate change in Cambodia: Knowledge, attitudes and practices.
- NCSD (2018). Projects on Climate Change
- NCSD/MoE. (2020). A third study on understanding public perceptions of climate change in Cambodia: Knowledge, attitude, and practice.
- Tohura K (2022). Sustainable agriculture
- UNDP (2024). Building Climate Resilience Across Cambodia
- Daniela S & Samuel P (2019): International Journal of Disaster Risk Reduction. Volume 41 publishing on December 2019
- MAFF (2019) : Adaptation Technologies Guide– Agriculture
- Sydney Soutt Asia Centre (2022). Agricultural Innovation in Cambodia
- Lia R et al (2023). Disaster Risk Profile. Assessment of disaster risk under climate change
- MoE (2019). Report of Gender Assessment and Gender Action Plan

Annexes

Annex 1. Guided questionnairs

Australia Awards Cambodia [AAC]- Alumni Research Grant – Round 4		
GUIDED QUESTIONNAIRES FOR INDIVIDUAL WOMEN INTERVIEW		
Confidential		
1. General information		
Province:		
District:		
Commune:		
Village:		
GPS location if any (x,y):		
Date:		
Time:		
Name of Interviewer:		
2. Introduction		
• Hello, I am (Your name) working for MOE, Cambodia, funded by the AusAID Cambodia. • We are conducting small survey to get understanding about women's perceptions on the climate change impacted their livelihoods towards the preparedness strategy for the climate change reduction for funding in future. • We would like to ask you some questions regarding about 1) your perception of the climate change impact on their livelihoods; 2) your current knowledge and best practices adapting the climate change on your main agricultural commodities and 3) your climate-resilient agricultural skill development can effectively address the climate change challenges in your villages. • We would like to request your cooperation for approximately 30 minutes. • Your answer is kept confidential, and will not be shared with anyone. • Your participation in this survey is voluntary, and you can skip any question that you don't want to answer or to pause or terminate the interview at any time. • Please keep in mind that there are no right or wrong answers. • If you have any questions about this survey, you can contact AusAID Cambodia/MoE. • Do you have any questions for me?		
Consent: Do you agree to be interviewed?	No (end of interview)	0
	Yes	1
3. Respondent's characteristic (women only)		
Code (1,2,3,,,,,)		
Name of the interviewee if possible		
Telephone number of interviewee		
3.1. Are you a woman in the HH involved with the development organization?	No	0
	Yes	1
3.2. Are you a head of HH/family (can be wife of head, window head)	No	0
	Yes	1

3.3. Are you a person to do farming?	No	0
	Yes	1
3.4 Age of respondent (you can guest or ask)	<19	1
	19-30	2
	31-45	3
	46-60	4
	>61	5
3.5. How many members in your family?	1	0
	2	1
	3 to 5	2
	>5	3
3.6. What is your educational level	None	0
	Primary	1
	Secondary	2
	Above secondary	3
	Unknown	88
3.7. Have you participated in any agriculture projects in the past 2 years?	Yes	1
	No	0
	Unknown	88
3.8. What are your main farming activities? Can have multi answers	No	0
	Farming	1
	Business	3
	Public servant (government job)	4
	Private servant	5
	NGO, civil society	6
	Other (specify…….....)	99
	Unknown	88
4. Female's perceptions, outlooks and attitude on the climate change impact		
4.1.I am more likely as farmer	No	0
	Little like	1
	Somehow like	2
	More like	3
	Unknown	88
4.2. I am more likely traditional agricultural methods of farming than new technique	No	0
	Yes	1
	Unknown	88
4.3 I like to let my children to move to the city to work in future	No	0
	Yes	1
	Unknown	88
	No	0

4.4. I know climate change refers to long-term shifts in temperatures and weather patterns leading to drought and/or flood that impact you your livelihoods	Yes	1
	Unknown	88
4.5. I know about the climate change issues and its impact to my livelihoods	No	0
	Yes	1
	Unknown	88
4.6. Climate change: drought and flood and other disaster are my most concern	No	0
	Yes	1
	Unknown	88
4.7.I more likely concern about drought than flood	No	0
	Yes	1
	Unknown	88
4.8. Farming is a very risky business because of climate issue	No	0
	Yes	1
	Unknown	88
4.9. The weather determines my crop yields	No	0
	Yes	1
	Unknown	88
4.10. The weather determines my livelihoods	No	0
	Yes	1
	Unknown	88
4.11. Farming is a very risky business because of market issue	No	0
	Yes	1
	Unknown	88
4.12.I like to try a new crop variety	No	0
	Yes	1
	Unknown	88
4.13. I like innovation technology, new technique of farming	No	0
	Yes	1
	Unknown	88
4.14. if you propose solutions to address agricultural climate change issues what likely you prefer the best solution	Natural based solution technique	0
	Non-Natural based solution technique	1
	Non-agricultural support such as credit, vocation training, water sanitation, road, and other related	2
	Other (specify…....)	99
	Unknown	88
5. Climate change disaster and the adaption practices		
5.1. What is climate change related disaster you faced? Can have multi answers and which one of the above	None	0
	Floods	1
	Drought	2

answers is regular occurred (*** mostly, ** sometimes, * rare)	Gusts of wind or Thunder	3
	Other (specify…..)	99
	Unknown	88
5.2. What is the impact of the drought you faced? Can have multi answers	None	0
	Shortage of water	1
	Lack of seeds	2
	Animal disease	3
	Migration	4
	Poor harvest	5
	Children no school	6
	Insecurity	7
	Loss of income	8
	Violence	9
	Increase debt	10
	Increase temperature/heating	11
	Other (specify…..)	99
	Unknown	88
5.3. What is the impact of the flood you faced? Can have multi answers	None	0
	Children/old people die	1
	Lack of seeds	2
	Animal disease	3
	Migration	4
	Poor harvest	5
	Children no school	6
	Insecurity	7
	Loss of income	8
	Violence	9
	Increase debt	10
	Homeless	11
	Infrastructure destruction	12
	Other (specify…..)	99
	Unknown	88
5.4. What were the adaption method you practiced? Can have multi answers	None	0
	Change of agricultural practice, seeds, production techniques etc.	1
	Selling assets and taking credit	2
	building drainage system/ dig pond/wells/ boreholes, make water harvesting tanks	3
	Change role of HH members	4

	Do other off farm activities such as fishing, selling labour, carpentry, blacksmithing, make a homestay (underline the one they chose)	5
	Seasonal or temporary migration	6
	Other (specify…....)	99
	Unknown	88
5.5. In case of taking credit, where they took from? Can have multi-answers	Family (i.e. father, mother, brother,...)	1
	Relative	2
	Public/private bank	3
	Villager lenders	4
	NGO's	5
	Other (specify…....)	99
	Unknown	88
5.6. If migration who is your family members did migrated last year?	None	0
	Men head	1
	Female Head	2
	Female children	3
	Male children	4
	Other (specify…....)	99
	Unknown	88
5.7. Ability to have seed quality	No	0
	Yes	1
	Unknown	88
5.8. Ability to properly control crop pests, weeds and diseases	No	0
	Yes	1
	Unknown	88
5.9. Ability to have adequate fertilizer	No	0
	Yes	1
	Unknown	88
5.10. Ability to find good market and/or good sale products?	No	0
	Yes	1
	Unknown	88
5.11. Other challenges	if yes specify….....	
5.12. Ranking the most challenges among four challenges above (1=not serious; 2= low serious; 3= serious, 4=most serious	5.7	1
	5.8	2
	5.9	3
	5.10	4
5.13. Ability for baby, fingerling etc.	No	0
	Yes	1

	Unknown	88
5.14. Ability for suitable livestock feeds	No	0
	Yes	1
	Unknown	88
5.15. Ability to control livestock diseases	No	0
	Yes	1
	Unknown	88
5.16. Ability to find good market and/or good sale products?	No	0
	Yes	1
	Unknown	88
5.17. Ranking the most challenges among four challenges above (1=not serious; 2= low serious; 3= serious, 4=most serious		1
		2
		3
		4
6. Current knowledge and skills to adapt the climate change on your farming		
6.1. How you evaluate your current knowledge and skills levels to adapt the climate change on your farming?	None	0
	Low	1
	Medium	2
	High	3
	Unknown	88
6.2. If you have (if the above answer from 1-3, can you tell us what are they? Can have multi-answers	Traditional knowledge and skills	1
	New agricultural technology/innovation	2
	Other (specify…….....)	99
	Unknown	88
6.3. Who are the good, useful and trust information sources in your community? Can have multi-answers	None	0
	Local farmer	1
	Family/relatives	2
	Local authorities	3
	Provincial Officer	4
	NGO	5
	Academic institutions	6
	Civil societies	7
	Local fertilizer/pesticide supplier	8
	Other (specify…….....)	99
	Unknown	88
6.4. How can you learn, exchange the knowledge and skills on climate change issues and solutions by? Can have multi-answers	None	0
	Visit other successful farms	1
	Visit to technical offices, programmes	2
	Visit agricultural research stations	3
	Attend trainings	4

	Study at technical schools/ colleagues	5
	Other (specify…....)	99
	Unknown	88
6.5. What are good Information Sources you wish you see and/or get? Can have multi-answers	None	0
	Newspapers	1
	Farm magazines, bulletins etc.	2
	Any publications	3
	TV	4
	Radio	5
	Mobile phone	6
	Web/Internet	7
	Other (specify…....)	99
	Unknown	88

7. Do you have any three comments and/or suggestions? Write down in word here

Thank you very much for your time and help us to complete this survey!!!

Annex 2. Guided focus group discussion

Australia Awards Cambodia [AAC]- Alumni Research Grant – Round 4

WOMEN FOCUS GROUP DISCUSIONS

---

1. Location (write before or after the FGD):

Province: ……District:…… ……..
Commune……Village: ……
GPS location if any ……
Date……..……Time……
Total number of participants: ……. (among all how many are female…….)
Name of facilitator(s): ……..

2. Introduction (max 5 mins)

- Hello, we are (our name) working for ……. Cambodia, and this small research received fund from AusAID Cambodia.
- A main purpose of this FGD is to get understanding about women's perceptions on the climate change, issues and how they can be addressed.
- We have several questions and will take approximately 30 minutes
- Note that your answer is kept confidential, and will not be shared with anyone.
- This is voluntary, and you can skip any questions we ask.
- Our questions are not sensitive and no right or wrong answers.
- Do you have any questions before meeting is conducted?

3. Experience as Farmers (max 10 mins)

1. When this village was created? What are types of disasters you had faced so far? What are the most concerns? such as shortage of rain, no water, flood, drought, pandemic etc. and how often they occurred? Every five years, 10 years, 20 years, every year etc.
2. What is main income generating activities in this community? and put in order from the most to the less.
3. Why motivates you to be a farmer?
4. What are the worse things about being a farmer?
5. How many % of HHs in your village/commune are now carrying out farming? and how is about the last 10-20 years ago?
6. Are there any about experiences as farmer you like to tell us more.

4. Farming Challenges (max 15 mins)

7. What are the common challenges or problem facing as farmers in your community (i.e. climate change, market, production technology, fertilizer, insecticide, credit/financing etc).
8. What are the biggest challenges or problem (identify 2 from the above)?
9. How the above challenges you are addressing?

10. What are negative outcomes/impact because of drought, flood you may know?
11. What are other responses relating to farming challenges and problems?

5. Problems solving (max 15 mins)

12. Please provide us any information sources you receive so far?
13. Which of the above information sources you trust the most (and why) for instance crop variety selection?
14. Which of the above information sources you trust the most (and why) for instance improving crop production technology?
15. Which of the above information sources you trust the most (and why) for instance processing technology if any?
16. Which of the above information sources you trust the most (and why) for instance better marketing?
17. Which of the above information sources you trust the most (and why) for instance the trust financing institution if any?
18. Could you tell us any innovation techniques you knew and/or learned so far? And did you applied/adopted in your farming?
    - If yes what are main reasons?
    - If no what are main reasons?
19. How can you learn, exchange the knowledge and skills with and/or from other on climate change issues and solutions?
20. What are other questions/comments you would need to make your current farming better?
21. If you face any unfavourite living conditions or livelihoods, floods, drought etc…
    a) what are adaptation activities/practices you did so far? Can be related to: technique, structure, financial, gender role, socio-economic, livelihood, etc.
    b) what are adaptation activities/practices will you decide in future?

6. Other Comments and Suggestions If any (max 5 mins)

Thank you very much for your time!

Annex 3. Data sheets

Guided Questionnaires/Number of Interviewees		TW (N=87)	CW (N=112)	Both (N=199)
3. Respondent's characteristic				
3.1. Are you a woman in the HH with the supported by various organization?	Yes	54	45	99
	No	33	67	100
3.2. Are you a head of HH/family?	No	38	41	79
	Yes	49	71	120
3.3. Are you a person to do farming?	No	5	5	10
	Yes	82	107	189
3.4. Age of respondent (you can guest or ask)	<19	2	5	7
	19-30	5	8	13
	31-45	26	27	53
	46-60	39	53	92
	>61	15	19	34
3.5. How many members in your family?	1	1	0	1
	2	5	8	13
	3 to 5	32	57	89
	>5	49	47	96
3.6. What is your educational level	None	25	29	54
	Primary	32	49	81
	Secondary	18	27	45
	Above secondary	7	5	12
	Unknown	4	3	7
3.7. Have you participated in any agriculture projects in the past 2 years?	Yes	60	24	84
	No	26	88	114
	Unknown	1	0	1
3.8. What are your main income generating activities?	No	1	0	1
	Farming	82	111	193
	Business	17	29	46
	Public servant	3	3	6
	Private servant	1	3	4
	NGO, civil society	1	0	1
	Other (specify……)	2	2	4
	Unknown	0	0	0
4. Female's perceptions, outlooks and attitude on the climate change impact				
4.1.I am more likely as farmer	No	9	17	26
	Little like	9	6	15
	Somehow like	10	6	16
	More like	56	75	131
	Unknown	3	8	11
4.2. I am more likely traditional agricultural methods of farming than new technique	No	17	11	28
	Yes	68	92	160
	Unknown	2	9	11
4.3 I like to let my children to move to the city to work in future	No	16	27	43
	Yes	67	68	135
	Unknown	4	17	21
4.4. I know climate change is about drought and flood	No	7	15	22
	Yes	78	89	167
	Unknown	2	8	10

4.5. I know about the climate change issues and its impact to my livelihoods	No	2	4	6
	Yes	84	105	189
	Unknown	1	3	4
4.6. Climate change: drought and flood and other disaster are my most concern	No	0	1	1
	Yes	86	109	195
	Unknown	1	2	3
4.7.I more likely concern about drought than flood	No	1	0	1
	Yes	84	108	192
	Unknown	2	4	6
4.8. Farming is a very risky business because of climate issue	No	1	0	1
	Yes	86	111	197
	Unknown	0	1	1
4.9. The weather determines my crop yields	No	0	0	0
	Yes	86	112	199
	Unknown	0	0	0
4.10. The weather determines my livelihoods	No	1	1	2
	Yes	84	110	194
	Unknown	2	1	3
4.11. Farming is a very risky business because of market issue	No	13	16	29
	Yes	73	94	167
	Unknown	1	2	3
4.12.I like to try a new crop variety	No	8	15	23
	Yes	77	94	171
	Unknown	2	3	5
4.13. I like innovation technology, new technique of farming	No	10	17	27
	Yes	76	92	168
	Unknown	1	3	4
4.14 if you propose solutions to address agricultural climate change issues what likely you prefer the best solution	Natural based solution technique	23	36	59
	Non-Natural based solution tech	27	45	72
	Non-agricultural support	45	34	79
	Other (specify……)	1	1	2
	Unknown	1	4	5
5. Climate change disaster and the adaption practices				
5.1. What is climate change related disaster you faced? Can have multi answers and which one of the above answers is regular occurred	None	1	0	1
	Floods	87	138	225
	Drought	208	274	482
	Gusts of wind or Thunder	80	99	179
	Other (specify……)	2	5	7
	Unknown	0	1	1
5.2. What is the impact of the drought you faced? Can have multi answers	None	1	0	1
	Shortage of water	74	104	178

	Lack of seeds	51	40	91
	Animal disease	41	37	78
	Migration	25	15	40
	Poor harvest	71	93	164
	Children no school	5	3	8
	Insecurity	1	2	3
	Loss of income	58	73	131
	Violence	4	1	5
	Increase debt	23	17	40
	Increase heating	43	72	115
	Other (specify……)	0	1	1
	Unknown	1	0	1
5.3. What is the impact of the flood you faced? Can have multi answers	None	45	37	82
	Children/old people die	3	4	7
	Lack of seeds	21	42	63
	Animal disease	21	38	59
	Migration	9	6	15
	Poor harvest	32	62	94
	Children no school	1	2	3
	Insecurity	0	0	0
	Loss of income	26	51	77
	Violence	1	2	3
	Increase debt	5	9	14
	Homeless	0	2	2
	Infrastructure destruction	9	23	32
	Other (specify……)	3	3	6
	Unknown	1	0	1
5.4. What were the adaption method you practiced? Can have multi answers	None	11	12	23
	Change of agricultural practice, seeds, production techniques etc.	44	48	92
	Selling assets and credit	18	13	31
	building drainage system/ dig pond/wells/ boreholes, make water harvesting tanks	70	88	158
	Change role of HH members	0	1	1
	Do other off farm activities such as fishing, selling labor, carpentry, blacksmithing, make a homestay (underline the one they chose)	21	11	32
	Seasonal migration	8	25	33
	Other (specify……)	4	6	10
	Unknown	3	4	7
5.5. In case of taking credit, where they took from? Can have multi-answers	Family (i.e. father, mother)	13	13	26
	Relative	10	29	39
	Public/private bank	49	43	92
	Villager lenders	2	1	3
	NGO's	23	24	47

	Other (specify……)	5	17	22
	Unknown	9	9	18
5.6. If migration who is your family members did migrated last year?	None	42	44	86
	Men head	10	10	20
	Female Head	1	4	5
	Female children	30	31	61
	Male children	19	35	54
	Other (specify……)	0	4	4
	Unknown	0	1	0
5.7. Ability to have seed quality	No	10	5	15
	Yes	74	101	175
	Unknown	3	6	9
5.8. Ability to properly control crop pests, weeds and diseases	No	6	8	14
	Yes	76	95	171
	Unknown	5	9	14
5.9. Ability to have adequate fertilizer	No	4	2	6
	Yes	78	107	185
	Unknown	5	3	8
5.10. Ability to find good market and/or good sale products?	No	7	23	30
	Yes	70	80	150
	Unknown	10	8	18
5.11. Other challenges	if yes specify……	0	1	1
5.12. Ranking the most challenges among four challenges above (1=not serious; 2= low serious; 3= serious, 4=most serious	5.7	120	166	286
	5.8	153	275	428
	5.9	163	236	399
	5.10	152	254	406
5.13. Ability for baby, fingerling etc.	No	9	25	34
	Yes	59	71	130
	Unknown	19	16	35
5.14. Ability for suitable livestock feeds	No	14	27	41
	Yes	54	68	122
	Unknown	18	18	36
5.15. Ability to control livestock diseases	No	24	42	66
	Yes	43	54	97
	Unknown	20	16	36
5.16. Ability to find good market and/or good sale products?	No	14	26	40
	Yes	48	62	110
	Unknown	25	24	49
5.17. Ranking the most challenges among four challenges above (1=not serious; 2= low serious; 3= serious, 4=most serious	5.13	87	149	236
	5.14	101	160	261
	5.15	155	207	362
	5.16	112	177	289

6. Current knowledge and skills to adapt the climate change on your farming				
6.1. How you evaluate your current knowledge and skills levels to adapt the climate change on your farming?	None	8	9	17
	Low	14	38	52
	Medium	62	62	124
	High	3	2	5
	Unknown	0	1	1
6.2. If you have (if the above answer from 1-3, can you tell us what are they? Can have multi-answers	Traditional knowledge & skills	68	78	146
	New agricultural technology/ innovation	47	46	93
	Other (specify……)	0	5	5
	Unknown	4	3	7
6.3. Who are the good, useful and trust information sources in your community? Can have multi-answers	None	2	4	6
	Local farmer	43	38	81
	Family/ relatives	37	29	66
	Local authorities	60	72	132
	Provincial Officer	18	19	37
	NGO	31	45	76
	Academic institutions	0	0	0
	Civil societies	0	0	0
	Local fertilizer/pesticide	4	5	9
	Other (specify……)	31	19	50
	Unknown	2	1	3
6.4. How can you learn, exchange the knowledge and skills on climate change issues and solutions by?	None	3	11	14
	Visit other successful farms	20	15	35
	Visit to technical offices	2	0	2
	Visit agricultural research stations	5	5	10
	Attend trainings	57	69	126
	Study at tech schools	2	0	2
	Other (specify……)	17	19	36
	Unknown	5	3	8
6.5. What are good Information Sources you wish you see and/or get? Can have multi-answers	None	1	4	5
	Newspapers	1	0	1
	Farm magazines, bulletins	0	0	0
	Any publications	3	0	3
	TV	10	15	25
	Radio	7	17	24
	Mobile phone	78	93	171
	Web/Internet	3	9	12
	Other (specify……)	13	21	34

Training orientation before going to field

Meeting with authorities for field organization and gathering general information

Focus group discussion

Individual interview

Community cashew nuts storage

Field observation to vegetable garden