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Lao People's Democratic Republic



ອົງການສະຫະປະຊາຊາດເພື່ອການພັດທະນາ
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Implementing Entity/Responsible Partner:

National Agriculture and Forestry Research Institute, NAFRI

United Nations Development Programme

Guidelines for Farmer Organizations / Cooperatives for preparation of Climate Change Adaptation Action Plans

Project ID:00076176 / ATLAS Award ID 60492

Improving the Resilience of the Agriculture Sector in Lao PDR to Climate Change Impacts (IRAS Lao Project)



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The views, analysis and opinions expressed in this report are those of the author at the time of the study implementation. They should not be interpreted as representing views or position of IRAS project, UNDP or any other government institution, international organization or project.

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I. Project Information and Resources

Project number and title:	# 76176 “Improving the Resilience of the Agriculture Sector in Lao PDR to Climate Change Impacts” (IRAS Project)
Implementing Partner:	Ministry of Agriculture and Forestry, MAF, Vientiane, Lao PDR, through the National Agriculture and Forestry Research Institute, NAFRI
Responsible Parties (if applicable):	<ol style="list-style-type: none"> 1. National Agriculture and Forestry Research Institute (MAF/NAFRI) 2. National Agriculture and Forestry Extension Service (MAF/NAFES) 3. Ministry of Natural Resource and Environment (MONRE) 4. Department of Land Use and Development / MONRE (DLUD) 5. National Disaster Management Office (NDMO) 6. Private Sector, NGOs, Mass Organizations, other GoL/MAF parties
Donors:	GEF, UNDP

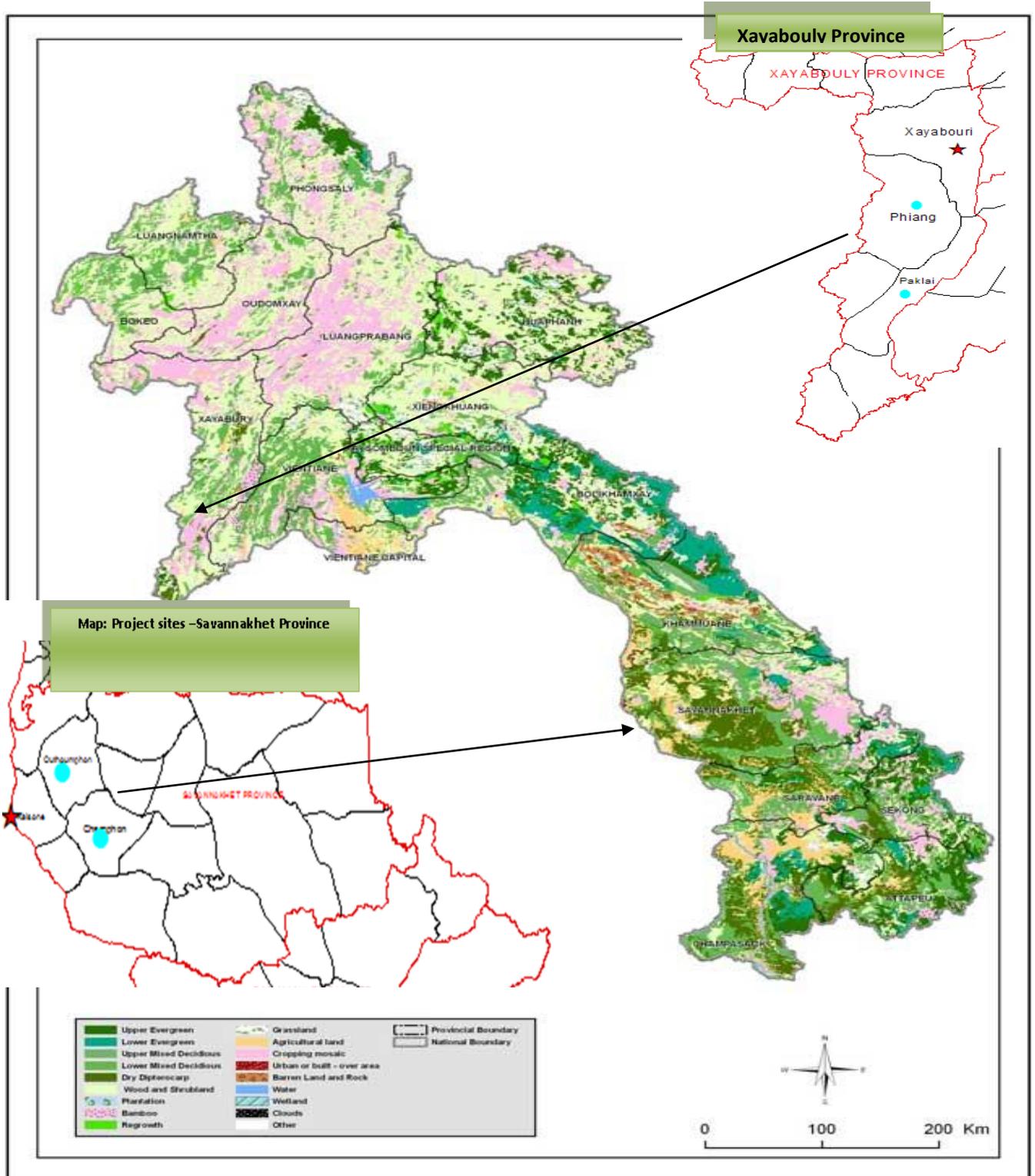
Project Starting date		Project completion date	
Originally planned	Actual	Originally planned	Current estimate
May 2011	10 th of May 2011	April 2015	April 2015

Total Budget	Original Budget (US\$)	Latest Signed Revision (US\$)
	12,163,998 (including Co-Finance)	

Resources	Donor	Amount \$
	GEF (LCDF)	4,445,450
GoL (in-kind CoF)	378,320	
GoL (parallel CoF)	4,764,969	
UNDP (parallel CoF)	2,575,259	

II. Map of Target Areas: Savannakhet and Xayaboury Provinces

Agriculture and Forest Coverage in Lao PDR (source NAFRI)



III. Project Purpose

Main Objectives of the Project: *(as per the approved UNDP Country Programme Document and Country Programme Action Plan and/or Project Document)*

This project will contribute to achieving the following Country Programme Outcome as defined in CPAP or CPD: UNDP Laos CPAP 2007-2011

1. **Outcome 2:** Enhanced ownership and capacity for pro-poor planning, implementation and harmonized aid coordination, and disaster management

Output 2.4: Increased capacity within the Government to prepare and respond to natural as well as man-made disasters at all levels

Country Programme Outcome Indicators (UNDP Laos CPAP 2007-2011):

Capacities on sustainable land management, drought and flood preparedness enhanced through participatory adaptation and monitoring activities in selected provinces.

Project Objective and Outcomes are aligned with UNDP's thematic focus on adaptation to climate change and are matching or do correlate to Goal, expected Impact and Indicators of the GEF LDCF/SCCF Result-Based Management Framework Adaptation to Climate Change.

Project Objective

Food insecurity resulting from climate change in Lao PDR minimized and vulnerability of farmers to extreme flooding and drought events reduced.

Food insecurity resulting from climate change in Lao PDR will be minimized and vulnerability of farmers to extreme flooding and drought events will be reduced as part of an overall approach designed to introduce new adaptive techniques to farmers while encouraging a diversification of livelihood strategies at community level. This will be achieved by overcoming key policy, communication & information, institutional and economic barriers, relating to agriculture and food security as identified in the NAPA as requiring immediate action. Thus, under Outcome 1 the information base for understanding climate risks and vulnerability will be strengthened and organised in way that it can effectively inform agricultural sector policies and planning. Outcome 2 addresses the need to develop the capacity of planners at different levels of government to use this information in the planning and allocation of resources. Outcome 3 focuses on Lao PDR's agricultural extension services and demonstrating new techniques to build resilience at the community level including targeted training modules to ensure that these techniques take hold and become widely applied. Under Outcome 4 lessons learned and adaptation knowledge generated through the project will be systematically compiled, analyzed and disseminated nationally and internationally, thereby supporting further up-scaling and replication.

Acronyms

AA ₂ CC	Agriculture Adaptation to Climate Change
ACIAR	Australian Centre for International Agricultural Research
ADB	Asian Development Bank
ADPC	Asia Disaster Preparedness Centre
ADS	Agriculture Development Strategy
AFD	French Agency for Development
AGPC	Association of Coffee Producer Groups on the Bolaven plateau
ANR	Agriculture and Natural Resources
APB	Agricultural Promotion Bank
AVSF	<i>Agronome and Vétérinaires Sans Frontières</i>
CA	Conservation Agriculture
CBO	Community Based Organization
CC	Climate Change
CCA	Climate Change Adaptation
CCTAM	Climate Change Training and Adaptation Modules
CFA	Climate Forecasts Application
CGIAR	Consultative Group on International Agricultural Research
CMF	Commodity Management Facility (a tool of the LEAP project)
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DAEC	Department of Agriculture Extension and Cooperatives
DAFO	District Agriculture and Forestry Office
DICO	District Industry and Commerce Office
DLF	Department of Livestock and Fisheries
DLUD	Department of Land Use and Development
DM	Disaster Management
DMC	Direct seeding Mulch based Cropping System
DNDMCC	Department of National Disaster Management and Climate Change
DoA	Department of Agriculture (of MAF)
Dol	Department of Irrigation
DoP	Department of Planning (of MAF)
DRR	Disaster Risk Reduction
DS	Dry Season
FAO	Food and Agriculture Organization of the United Nations
FFS	Farmer Field School
FG	Farmer Group
FO	Farmer Organization
FPG	Farmer Production Group
GEF	Global Environment Facility
GFAR	Global Forum on Agricultural Research
GoL	Government of Laos
GRET	<i>Groupe de Recherche et d'Echanges Technologiques</i>
IDS	Irrigation Diagnostic Study (2008)
IFAD	International Fund for Agriculture Development
IFAP	International Federation of Agricultural Producers
IFPRI	International Food and Policy Research Institute
IMT	Irrigation Management Transfer
IPCC	Intergovernmental Panel on Climate Change
IPM	Integrated Pest Management
IRAS	Improving the Resilience of Agriculture Sector to Climate Change Project
IRRI	International Rice Research Institute

ISF	Irrigation Service Fee
IUCN	International Union for Conservation of Nature
IWMI	International Water Management Institute
IWRM	Integrated Water Resources Management
JCFC	Jhai Coffee Farmer Cooperative
LDCF	Least Developed Countries Fund (of GEF)
LEA	Lao Extension Approach
LEAP	Lao Extension Approach Project (Helvetas/DAEC)
LMB	Lower Mekong Basin
LUP	Land Use Planning
MAF	Ministry of Agriculture and Forestry
MLSW	Ministry of Labour and Social Welfare
MONRE	Ministry of Natural Resources and Environment
MPI	Ministry of Planning and Investment
MRC	Mekong River Commission
NAFES	National Agriculture and Forestry Extension Services (now replaced by DAEC)
NAFRI	National Agriculture and Forestry Research Institute
NAPA	National Adaptation Programme of Action to Climate Change
NDMC	Natural Disaster Management Committee
NDMO	National Disaster Management Office
NGO	Non-Governmental Organization
NLMA	National Land Management Authority
NORMAI	Non Profit Association for Rural Mobilization and Improvement
NPA	Non-Profit Association
NRM	Natural Resources Management
NSEDP	National Socio-Economic Development Plan
NTFP	Non-Timber Forest Products
PAFO	Provincial Agriculture and Forestry Office
PDR	People Democratic Republic
PIM	Participatory Irrigation Management
PIS	Provincial Irrigation Section
PLUP	Participatory Land Use Planning
PMO	Prime Minister Office
RIMES	Regional Integrated Multi-Hazard Early Warning System
RPIP	Rice Production Improvement Project
SAEDA	Sustainable Agriculture and Environment Development Association
SDC	Swiss Agency for Development and Cooperation
SNC	Second National Communication
SWGAB	Sub-Working Group on Farmer and Agribusiness
SWOT	Strengths, Weaknesses, Opportunities and Threats
TC	Technical Coordinator
ToR	Terms of Reference
ToT	Training of Trainers
UNDP	United Nations Development Program
UN/ISDR	United Nations / International Strategy for Disaster Reduction
UNOPS	United Nations Office for Project Services
VDF	Village Development Fund
VSF	<i>Vétérinaires Sans Frontières</i> (now « AVSF »)
WS	Wet Season
WUA	Water User Association
WUG	Water User Group

Executive Summary (English version)

Lao smallholder farmers are exposed to various climate hazards such as flood and drought. Climate change is likely to increase the frequency and amplitude of extreme events: more intensive rainfalls and a longer dry season are foreseen as the main local effects of Climate Change in Laos, and a moderate increase of average temperatures is also expected.

To address climate change challenges in Lao agriculture sector, it is essential to raise farmers' awareness on climate change issues and stakes, and to develop farmer-owned adaptation action plans. The proposed approach enhances the work with Farmer Groups and Farmer Organizations. It is based on a participatory and collective analysis of risks and search for solutions. The frame of analysis enhances the knowledge and experience of farmers about the past hazards and the damages they have caused (exposed elements and vulnerability), in order to ensure a good understanding and appropriation of the reflection.

Having this reflection with groups of farmers is intended to stimulate solidarity and partnership among farmers in the search for solutions and to give rise to the possible roles of farmer organizations. To consider the possibilities of exchanging experiences, developing collective services or mutualizing resources (including, possibly, labor and capital) will indeed open new paths and unlock new opportunities to address the challenges of Climate Change Adaptation:

- From the technical point of view, action-research programs can be developed with farmer groups in order to test different adaptation options, exchange on results, and develop *ad hoc* services to sustain the use of efficient solutions. Farmer groups can secure the supply of seeds of flood or drought-tolerant varieties or of cover crops used to prevent erosion and maintain the soil fertility and water-holding capacity. They can also preserve the diversity of traditional varieties. Land development can be initiated and managed by Farmer Organizations, in particular for flood protection or irrigation infrastructures (managed by Water User Groups or Associations)...
- Smallholder farmers resilience can be improved thanks to the diversification of on-farm productions, which can be driven by Farmer Groups (ease supply of new seeds and inputs, identify market opportunities for new productions). Farmer Groups can also be key players of the preservation of natural resources as NTFP which exploitation is often a way to secure minimum incomes. Last, farmer organizations can also develop locally managed "safety nets" such as rice-banks or saving and credit mechanisms. In a longer term and more ambitious vision, federation of such initiatives could lead to a better spreading of risks and a strengthening of the response capacities.
- Farmer organizations can be associated to local authorities in the disaster management system. Adequate climate or weather forecasts can be relayed by farmer groups to their members, associated with tailored recommendation or instructions adapted to specific local conditions.

An 11-steps-process of participatory analysis of risks and elaboration of a climate change adaptation action plan is proposed, as follows:

1. Analysis of the context and define perspectives and challenges.
2. Identify preliminary (or on-going) actions to reach the overall objective.
3. Hazard identification.
4. Analysis of climate related risks.
5. Current coping strategies and impact on livelihood.
6. Integration of perspectives and trends.
7. Identification of strategic orientations and list possible measures for adaptation.
8. Selection / Prioritization of Adaptation Measures / Actions together with other development actions.
9. Inclusion of disaster management measures.
10. Planning of implementation process.
11. Addressing conditions for long term sustainability.

In order to ensure farmers' mobilization, it is essential to integrate climate change issue in a broader vision of farmers' development goals and vision. The step 2 above is intended to take farmers' main concerns and interests into account, even if, at first glance, the relation with Climate Change Adaptation is not obvious.

The selection of adaptation measures (step 8) shall take into consideration feasibility and cost-effectiveness, but also the structural positive effects the action can have for the development of the Farmer Organization.

The planning and implementation process shall be cautiously defined and shall well identify the resources to be mobilized and in particular the contributions of farmers (costs, human resources, and responsibilities). The monitoring of the action shall also mobilize a strong participation of farmers as it is part of the learning process.

Executive Summary (Lao version)

Introduction (context of the mission and purpose of the report).

The support mission on “Effective Management of Farmer Organizations for Agriculture Adaptation to Climate Change”

The GEF, the UNDP and the Government of Lao PDR are co-funding the IRAS project (“Improving the Resilience of the Agriculture Sector in Lao PDR to Climate Change Impacts”). The overall objective of IRAS project is to minimize food insecurity resulting from climate change in Lao PDR and to reduce the vulnerability of farmers to extreme flood and drought events.

This mission on “effective Management of Farmer Organizations for Agriculture Adaptation to Climate Change” is a contribution to the project implementation, in particular to the Output 3 of the IRAS project (see the 4 outcomes in the “Project Purpose sheet”, page iv).

The objective of the mission is to identify relevant roles that could be played by Farmer Organizations regarding, specifically, the Adaptation of Agriculture to Climate Change and the upgrading of smallholder farmers / rural households resilience to extreme climate events. It also highlights the supports needed to strengthen FO capacities and improve their abilities to efficiently undertake the envisaged roles, and provide recommendations addressed to the project and to relevant support institutions. The implementation of the mission¹ is based on a general assessment of the situation of Farmer Organizations in Lao PDR (based on secondary data) and on rapid field assessment of the situation of a few farmer organizations in one of the project target provinces (Savannakhet). It also refers to various experiences and “best practices” from various projects / FOs at the national, regional or international level.

Content of the present report

The support mission on “effective Management of Farmer Organizations for Agriculture Adaptation to Climate Change” has produced four reports:

1. “Analysis of conditions for Farmer Organizations and Cooperatives from a viewpoint of Climate Change Adaptation and Resilience, and recommendation for improvements”;
2. “Guidelines for Farmer Organizations / Cooperatives for preparation of Climate Change Adaptation Action Plans”;
3. “Farmer Organization / Cooperative Support Measures for Adaptation to Climate Change”;
4. A “Consulting Service Implementation Report”.

The present report is the 2nd of these four. It contains a brief review of the main features of foreseen possible impact of Climate Change for Lao agriculture (part 1), and guidelines for Lao Farmer Organizations and communities for an assessment of risks and vulnerabilities of farmers and Farmer Organizations (part 2). The following sections are identifying possible measures for AA₂CC and the role that could play Farmer Organizations in their implementation. This includes technical adaptation of agriculture, economical adaptation for the reduction of the vulnerability, and possible roles of FOs in term of Disaster management and emergency response.

¹ The mission is for a total duration of 5 weeks. It is implemented by Mr Jean-Marie Brun (jm.brun.kh@gmail.com) between mid-September and end of November 2012.

1. Main features of Climate changes scenarios, impacts and stakes on Lao Agriculture.

1.1. Climate Change Scenarios in Lao PDR and their foreseen consequences for Lao agriculture

The purpose of this report is not to detail the Climate Change scenarios for Lao PDR and the Mekong region². But it is important to briefly recall the main features of foreseen scenarios that have to be considered in adaptation strategies.

The main changes that are considered as highly probable and which will impact on Lao agriculture are the following:

- A moderate increase of annual mean temperatures (+0.1 to +0.3°C per decade),
- A longer dry season,
- Increased and more concentrated precipitations (more intensive rainfall events).

More severe and more frequent floods and drought are expected to occur (see: Box 1 below and Box 2 next page).

Box 1: Climate projection in Lao PDR

Climate change [in Lao PDR] is expected to have a range of impacts which include: increases in the annual mean temperatures by around 0.1-0.3°C per decade; a longer annual dry season; more intensive rainfall events; and more frequent and severe drought and flooding events. The 4th International Panel on Climate Change (IPCC) report indicates that the Mekong Basin is expecting increasing maximum monthly flows of 35-41% and decreasing minimum monthly flows of 17-24% over the course of this century, which will substantially increase flooding risks in the wet season and water scarcity in the dry season. The regional climate change scenario projects that hot periods with temperature higher than 33 °C will increase and cooler days with a temperature lower than 15 °C be reduced by 2-3 weeks a year.

[Source: Adaptation Knowledge Platform for Asia (2011), "Desktop study on Assessment of Capacity Gaps and Needs of South East Asia Countries in addressing Impacts, Vulnerability and Adaptation to Climate Variability and Climate Change, AIT-UNEP RRC.AP 2011, Bangkok]

It is anticipated that these changes will lead to more severe drought and flooding events, with, sporadically, heavy damages on crops and livestock. More systematically, higher temperatures are a factor of reduction of the productivity for several crops (including rice³) and livestock.

Changes in the environment will also modify the conditions of agriculture activities. For instance, "higher temperatures will increase evapotranspiration, raising the water needs of rain-fed and irrigated crops and pastures." (IWMI, 2010), and it is likely that damages by pests will be more frequent. Moreover, more frequent and more intense extreme climate events will not only have an effect on the production but also on the production factors, in particular on soils that will be more exposed to erosion, salinization and loss of fertility. In other words, climate change will have a structural impact and not only a sporadic effect on losses of production due to more frequent hazards.

² Details can be found in relevant scientific studies, and besides, it has to be noted that there are still a lot of uncertainties in these prospective climate studies.

³ According to some scientific sources (IWMI – 2010), rice yields decrease by 10% for every 1 °C increase in minimum temperature during the growing season.

It is possible that the changes in climate patterns also open new opportunities and improve the possibility to grow different crops that will suit better in the new climatic environment that they used to in the past. But little research has been done on these possible positive effects of climate change. Foreseen negative impact on existing agricultural production are much more studied.

Box 2: Climate Change scenarios for the Lower Mekong Basin and Lao PDR

Climate change is expected to result in modifications to weather patterns in the LMB in terms of temperature, rainfall and wind, not only in terms of intensity but also in terms of duration and frequency of extreme events. Seasonal water shortages, droughts and floods may become more common and more severe, as may saltwater intrusion. Such changes are expected to affect natural ecosystems and agriculture and food production, and exacerbate the problems of supplying increased food demand to growing populations.

Several studies have attempted to accurately identify the potential future climate situation that could result in the region from global warming. However most of these studies were not able to fully quantify the uncertainty around future climate projections. A recent study undertaken for CSIRO (Eastham et al., 2008) attempted to redress some of the limitations of earlier studies and based on the IPCC's Scenario A1B made the following predictions for the region by 2030:

- A basin wide temperature increase of 0.79°C, with greater increases for colder catchments in the north of the basin;
- An annual precipitation increase of 0.2 m, equivalent to 15.3%, predominantly from increased wet season precipitation;
- An increase in dry season precipitation in northern catchments and a decrease in dry season precipitation in southern catchments, including most of the LMB;
- An increase in total annual runoff of 21% which will maintain or improve annual water availability in all catchments, however with pockets of high levels of water stress remaining during the dry season in some areas such as northeastern Thailand and Tonle Sap;
- An increase in flooding in all parts of the basin, with the greatest impact in downstream catchments on the mainstream of the Mekong;
- Changes to the productivity of capture fisheries which require further investigation, although it is predicted that the storage volumes and levels of Tonle Sap, a major source of capture fisheries, will increase;
- A possible 3.6% increase in agricultural productivity but with overall increases in food scarcity as food production in excess of demand reduces with population growth; further investigations are required to take into account effects of flooding and crop damage on these predictions.

In Lao PDR an increase in mean annual temperature is predicted together with an increase in the severity, duration and frequency of floods; most probable in floodplain areas adjacent to the Mekong. The impacts of climate change are predicted to include agricultural and infrastructure losses due to increased storm intensity and frequency; land degradation and soil erosion from increased precipitation and a higher prevalence of infectious diseases.

[...]

Country specific information on the potential consequences of climate change is virtually non-existent; reported trends for the Mekong Basin as a whole are the most accurate predictions to date. These trends include a projected increase in temperature of 0.68°C to 0.81°C for 2030. An increase in the severity, duration and frequency of floods and droughts is the most probable risk posed by climate change in Lao PDR. [...] Land degradation is another potential impact of climate change. Lao PDR has a potentially cultivable land area of 5.9 million ha, of which 800,000 ha is cultivated for rice or secondary crops under both lowland terrace and upland shifting cultivation systems. Increased precipitation resulting from climate change could cause increased erosion, especially on steep slopes. Erosion effects would potentially be most significant in areas where shifting cultivation has already led to soil degradation, particularly in those areas where population pressure has led to a significant decrease in the rotation period or where traditional lowland farmers encroach on neighboring uplands to make up for low and often declining yields on their lowland paddy fields. Increased land degradation leading to lower productivity may also increase deforestation and new lands are still threatened by slash and burn cultivation.

[Source: MRC (2009) "Adaptation to climate change in the countries of the Lower Mekong Basin: regional synthesis report". MRC Technical Paper No. 24. Mekong River Commission]

The direct effects on climate change and climate hazards on the productivity of crops and livestock will impact the household economy and livelihood of Lao farmers and rural population. It is well acknowledged that losses of harvest for rural households can lead farmers to sell productive assets or contract debts, which will affect their future ability to produce and can be the starting point of a vicious cycle. The purpose of “increasing resilience” deals with the need to stop this vicious cycle by reducing the vulnerability to climate related hazards or increase the ability of farmers to recover from the losses that cannot be avoided. The Ministry of Agriculture and Forestry of Lao PDR has well identified these micro-economic stakes of Climate Change: *“The impacts of climate variability are taking their toll on local communities as they are experiencing reduced income due to increased mortality of crops from heat and water stress; reduced productivity of livestock due to declining fodder availability and heat stress. The potential loss of crops or crop productivity has significant consequences for the livelihoods of the rural population, including all of the factors that increase the vulnerability experiences of the poorer groups of society, largely the rural poor. Climate change related disasters have strong impacts on agricultural production and threat national development goals. Therefore, resilience to climate change and disaster risk management need to be integral parts of the Agriculture Master Plan.”*⁴

1.2. Climate Change Adaptation and Resilience for Farmer Organizations

Adaptation of agriculture to climate change and improvement of smallholder farmers’ resilience to climate change and related hazards may include a large range of practices and measures, at different levels:

- Technical measures at the **cropping system level**: technical adaptation of the existing crops (or livestock productions), for instance adaptation of cropping calendars and varieties or of cropping practices.
- Technical and economic measures at the **farming system level**, for instance: diversification of productions (including to consider new productions that may be favored by the changes in climate patterns), land use adjustments at farm level, crop rotation or association of different crops, compost/manure management, etc.
- Socio-economic measures at the **household level**: for instance development of complementary off-farm activities.
- Action and measures at the **community level** (village, organization, etc.): which can be technical and related to resources management (for instance collective irrigation or flood protection infrastructure and water management, inclusion of climate change/climate risks issues in land use planning, etc.) and/or safety nets measures (e.g. saving groups, seed banks...) or disaster preparedness and management measures (early warning systems, organization of safe haven/retention areas, etc...).

Farmer Organizations can play an important role to promote or to implement such measures, or to provide an enabling environment or relevant services that will build the ability of individual farmers to adapt the practices at farm level. But FO will play such roles only if they clearly identify and understand the risks and the stakes. The next section proposes some guidelines to implement a participatory risk analysis that shall be the starting point to identify stakes and adaptation measures.

⁴ MAF Strategy 2011-2020, p. 22.

2. Proposition of steps for participatory identification of climate related risks at the FO/FG level:

Farmers' awareness on "Climate Change" as a general concept is maybe limited, but farmers are generally very conscious of practical and locally visible effects of climate change, such as changes in the rainfall patterns, water level (and water level variation) in streams, etc.⁵ Farmer knowledge has to be enhanced and used as a starting point for the identification of climate risks and subsequent adaptation strategies. Yet the process can be facilitated with analytical guidelines that will be helpful to have a more systematic analysis of risks. In addition, element of information on the foreseen CC scenarios have to be provided in a concrete and practical way, and with reference to the farmers past experiences of climate risks. The experience of "Climate Field Schools" in Indonesia is a practical and interesting illustration of this approach (see Box 3 below).

Box 3: Climate Field Schools in Indonesia: enhancing local knowledges

Based on the successful concept of "Global Farmer Field Schools", Climate Field Schools were set up in two pilot areas in Indonesia between 2005 and 2007. The program, which is supported by the Indonesian Ministry of Agriculture, the Asian Disaster Preparedness Centre, the Indonesian Agency for Meteorology and Geophysics, and the University of Agriculture in Bogor, is designed to improve the farmers' knowledge on climate, climate variability and change as well as extreme events and advance responsive farming. The participatory approach takes the farmer's local knowledge (observation of changes in meteorological phenomena, crops and soil) and experiments and combines it with improved seasonal forecasts and other scientific information that is made available to the farmers in their respective local languages through professional mediators. They are also encouraged to document their observations for a better knowledge management and learning. This way the farmers are better able to manage their soil, water and crop resources (e.g. appropriate planting time for rice) for best effects. The overarching objective is to build long-term resilience in the farmers' livelihoods.

INSAM (The International Society for Agricultural Meteorology) (www.agrometeorology.org)
<http://www.preventionweb.net/english/professional/publications/v.php?id=7895>

[Source: Birkmann, Joern et al. (2009): "Addressing the Challenge: Recommendations and Quality Criteria for Linking Disaster Risk Reduction and Adaptation to Climate Change". In: Birkmann, Joern, Tetzlaff, Gerd, Zentel, Karl-Otto (eds.) DKKV Publication Series 38, Bonn.]

It has to be noted that this risk assessment can be done within **an existing Farmer Organization**, whenever a FO already exists and gather a significant number of members. It might be a particularly relevant and fruitful process when FO gathers members based on a well identified purpose and common interest: for instance water management in an irrigation scheme, or production and marketing of a specific agricultural product, because this specialization of the FO can help to be more focused and more specific in the risk analysis.

Yet, the same process can be applied with unorganized farmers / village communities. For IRAS project, two approaches regarding the work with FO can be applied⁶, either "by default" (whenever there is no established FO to work with in the targeted villages) or complementarily:

⁵ See "Box 6: Awareness of Lao Farmers about Climate Change" in the 1st report of the present mission "Analysis of Conditions for Farmer Organizations and Cooperatives from a viewpoint of Climate Change Adaptation and Resilience, and recommendation for improvements", page 25.

⁶ See § 4.4.2. in the 1st report of the present mission "Analysis of Conditions for Farmer Organizations and Cooperatives from a viewpoint of Climate Change Adaptation and Resilience, and recommendation for improvements", page 29.

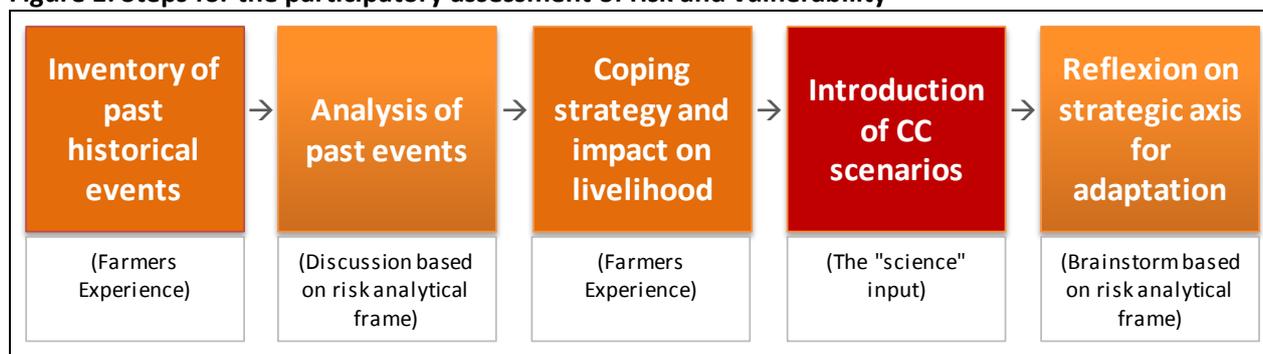
1. A work at community level to identify possible technical adaptation measures, then the possible establishment of Farmer Organizations whenever relevant, in particular to address obstacles to a sustainable adoption of those technical measures⁷.
2. An action specifically directed to support existing Farmer Organizations in order to help them to identify and address climate changer related risks.

In the first case, whenever there is no FO already established, the focus of Farmer Organization can be reintroduced while working on the strategy and measures for adaptation. The creation of Farmer Groups / FO can be justified at that stage to provide specific services (infrastructure or financial services management, input supplies, etc.) that will enable the implementation of these measures.

2.1. Assessment of risks and vulnerability

The following steps are proposed for a participatory assessment of risks and vulnerability. Details on each step are provided in the following pages.

Figure 1: Steps for the participatory assessment of risk and vulnerability



2.1.1. Analysis of the history of past events/experiences

Brainstorming for identification of farmers' past experiences of climate related risks

It is proposed to implement the assessment of risks and vulnerability by participatory meeting(s) with the members of the Farmer Organization⁸ (or of the village community). The starting point of the risk assessment process at the FO / community level can be a brainstorming on past remarkable climate events (or direct consequences of climate events⁹). The participants in the meeting try to establish together the list of past climate related hazards. At this preliminary stage, events can be flagged with only very basic information: type of event, year/month of its occurrence, and rough level of damage (low, medium, high)¹⁰.

⁷ For instance, a FO or Farmer Group can be established in order to sustain the supply of seeds of flood resistant varieties.

⁸ Or with representatives of the Farmer Organization in the case of a large scale organization, for instance for large scale WUA.

⁹ For instance the climate event can be heavy rainfalls, and the direct consequence can be a flood.

¹⁰ More practical guidelines for the facilitation of the assessment of past extreme climate events are proposed in the 3rd report of this mission "Farmer Organization / Cooperative Support Measures for Adaptation to Climate Change", §2.2., pages 13 to 15.

Ranking / Hierarchy of past events

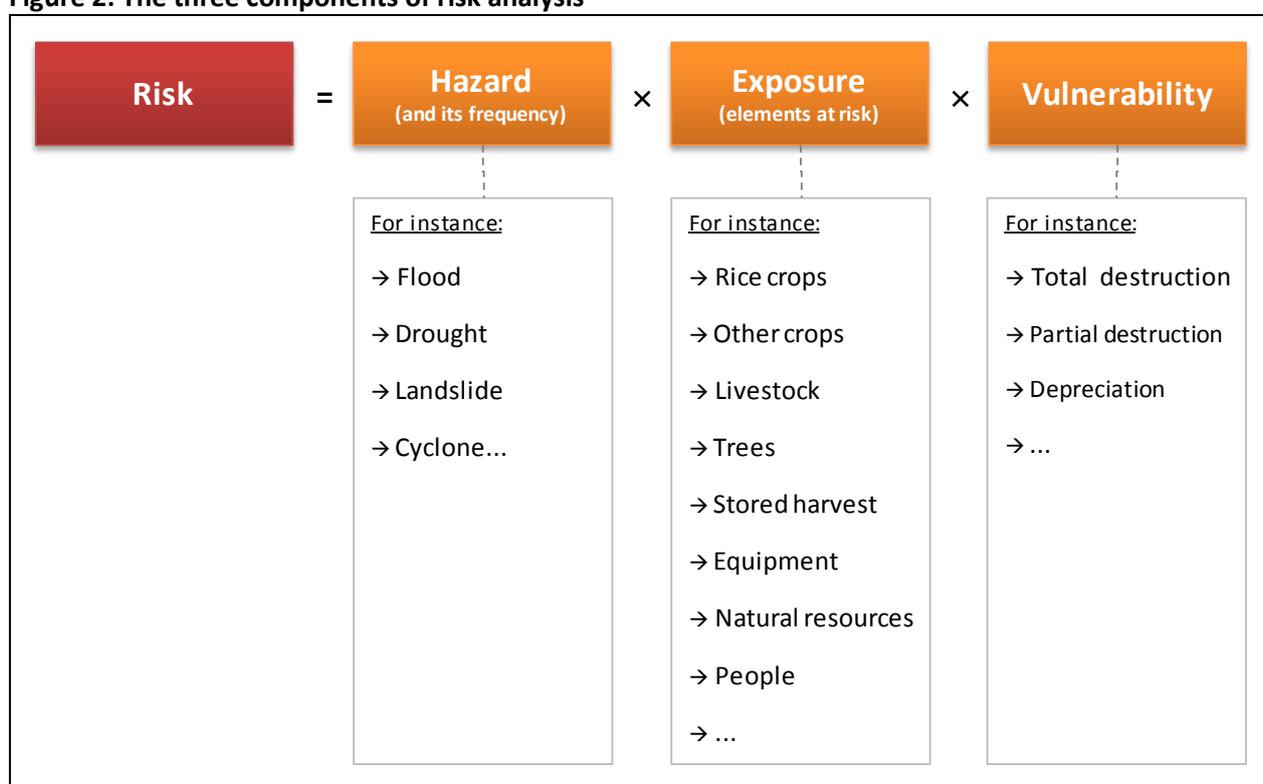
Based on this first listing of historical events, a preliminary analysis can be done with the participant to characterize: 1) the frequency of each category of climate hazard and 2) the importance of each category of climate hazard in term of damage caused (at this stage, this is done with a rough ranking of damages).

The events that are frequent and/or have caused severe damage in the past can be analyzed more in details, as follows.

Analysis of past experiences: event and direct consequences (losses)

The theoretical frame for risk analysis is based on a decomposition of risk in three components: the frequency of the hazard(s), the exposure (or the elements at risks) and the vulnerability (i.e. the level of damages/losses caused on the element at risks) – See Figure 2 below.

Figure 2: The three components of risk analysis



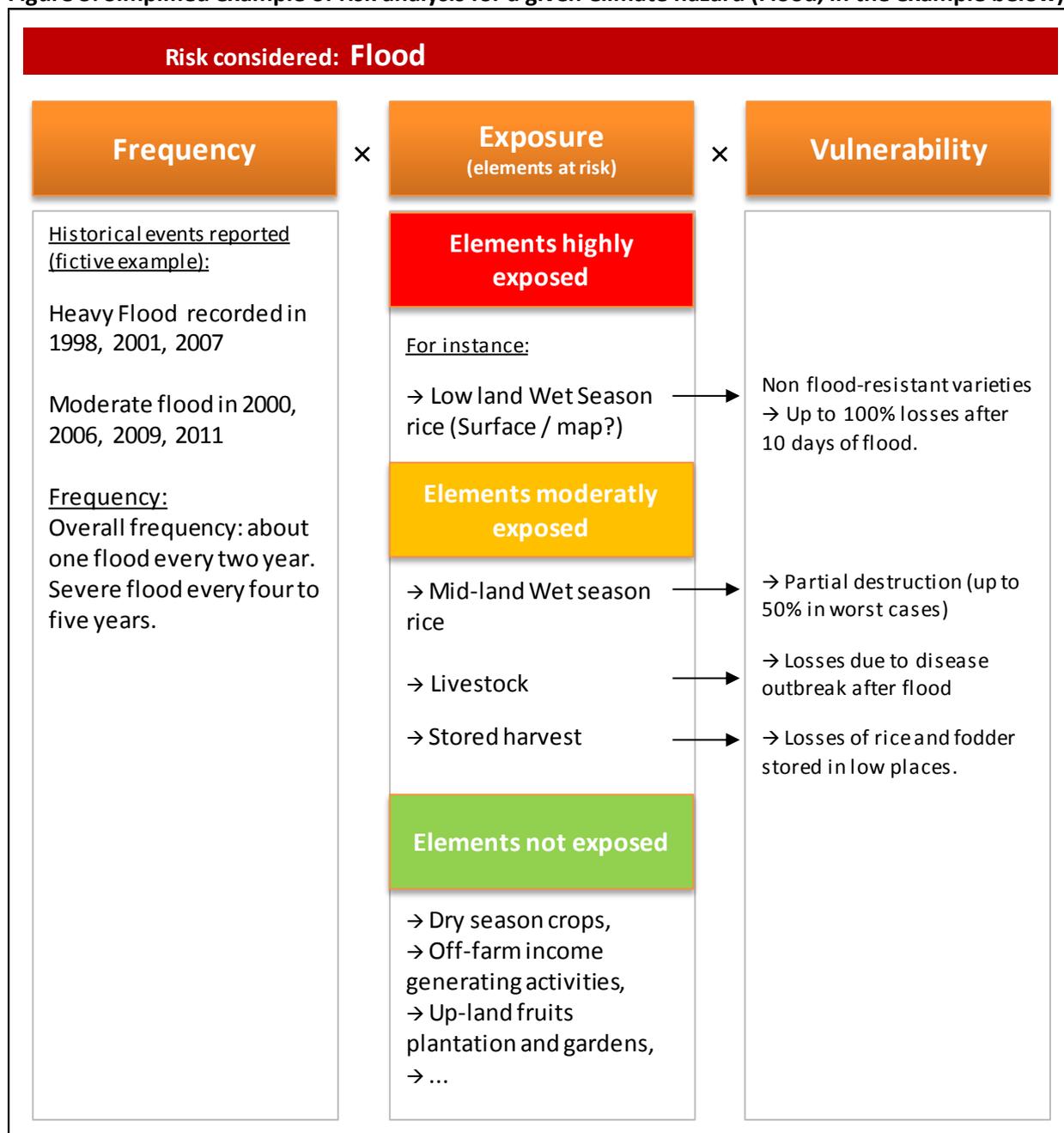
This frame of analysis can be used to assess the climate related risks that are affecting a farmer group or community. The first brainstorming on past events already gives an indication on the frequency of extreme climate events to which the farmers/villagers are exposed.

By a more detailed analysis of some of the past events, we can identify, for each category of climate hazard / disaster, what are the element at risks and the level of vulnerability of these elements. The frame of analysis above can be used to draw a chart for each significant past event in order to analyze the frequency of the category of events, the exposure and the vulnerability. An example of such an analysis is presented in the Figure 3 next page.

The focus on extreme climate events shall not overshadow other less spectacular effects that can be related to climate change, or that can be part of other trends observed which are likely to impact on the agricultural activities. Trends such as progressive reduction of soil fertility or

erosion of the agro-biodiversity have also to be considered as factors that will affect the vulnerability of agriculture.

Figure 3: Simplified example of risk analysis for a given Climate hazard (Flood, in the example below).



2.1.2. Assessment of impact on farmers’ livelihood and resilience

The previous level of analysis focuses on climate related hazards and their **direct effects**, in particular on agricultural activities and production.

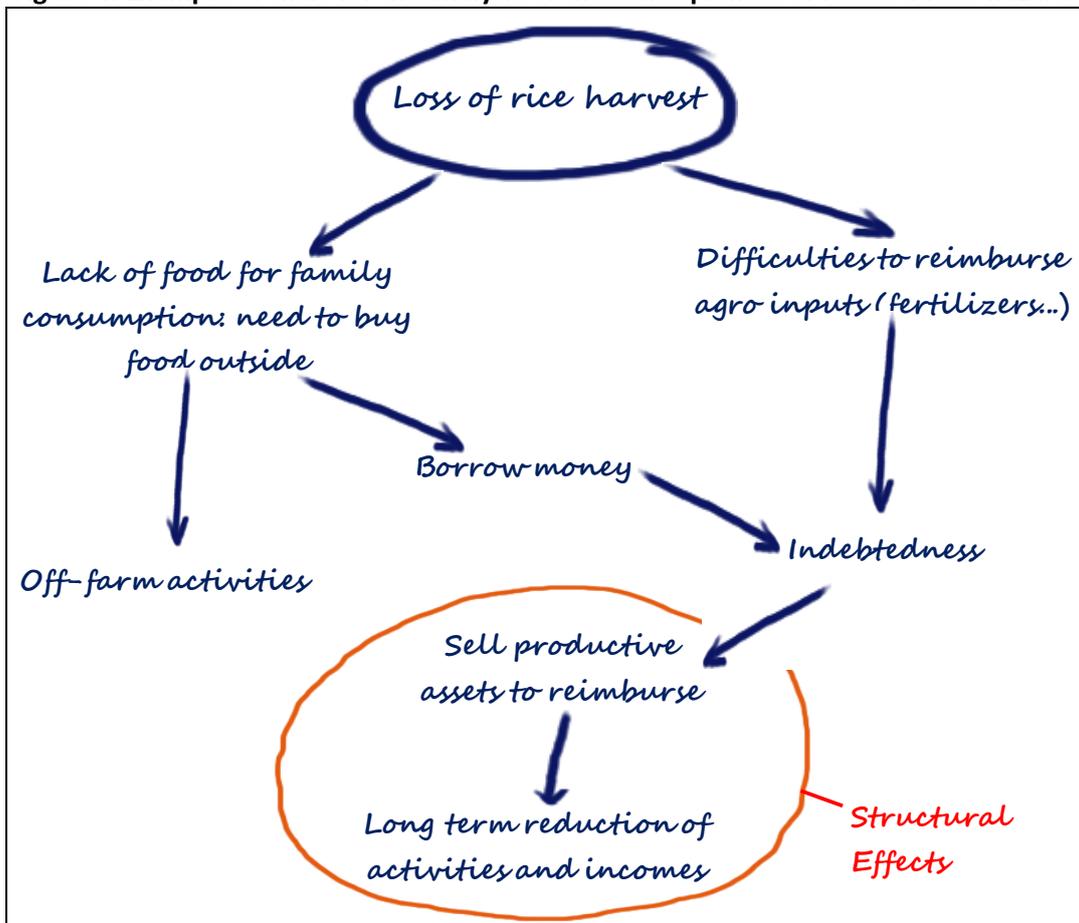
A second level of analysis consists in assessing **the impact of these events on livelihood**, and the ability of households to cope with such climate events and subsequent losses, and to recover.

A simple way to analyze this is to review the way the farmers/villagers have coped with previous effect of climate related disasters. This can be done through a focus group discussion, and by

drawing a chart to analyze the consequences (on the household economy) of the losses due to climate hazard.

The Figure 4 below illustrates the type of chart that can be used to represent the chain of consequences of the primary effect of climate related hazards. What is particularly important to identify is the possible **structural effects**, which may affect not only the production of a given year or season but the ability to sustain the farm activities.

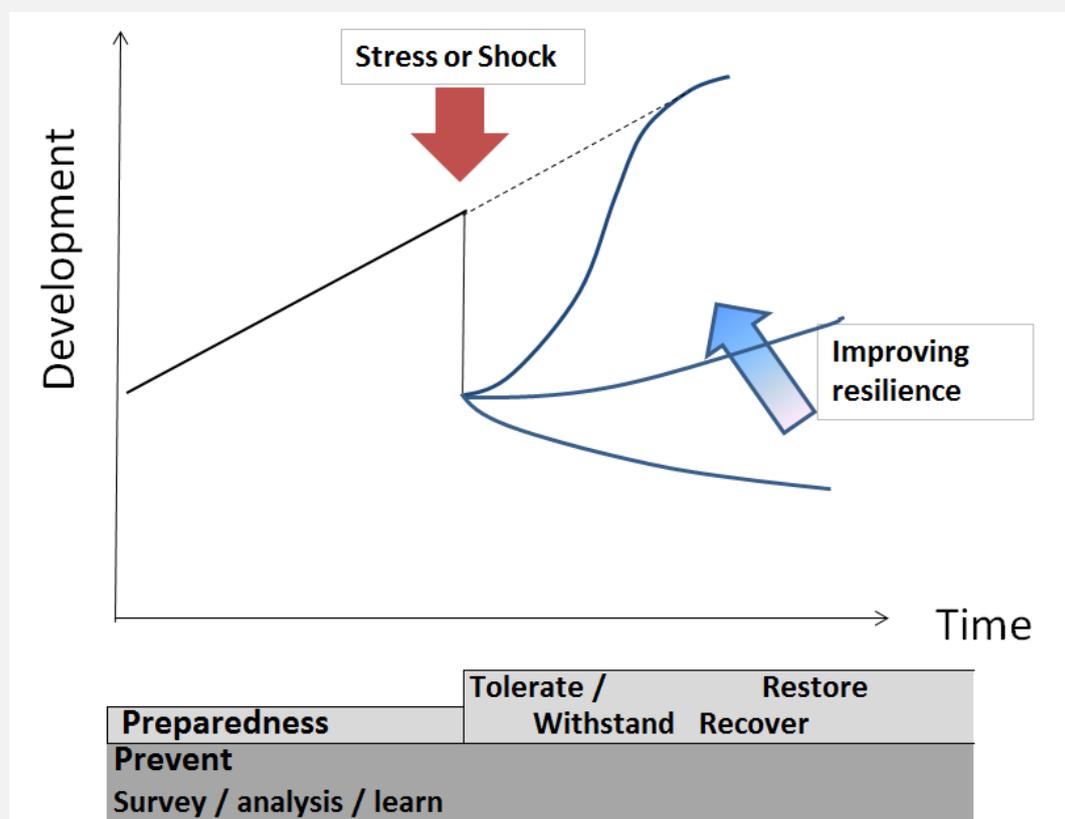
Figure 4: Example of chart for the analysis of the consequences of losses due to hazards



Heavy structural consequences of a climate related hazard will affect the capacity of people to recover. Such consequences are thereof particularly important to prevent in order to improve the farmers and communities' resilience. The analysis of the impact of a climate related hazard on the long term livelihood of household is important to set up priorities regarding the risks to be addressed and the way to address these risks. To avoid long term consequences shall be given a high priority in the development of FO or communities' climate change adaptation strategies.

Box 4: Recall of the concept of Resilience

Resilience is understood as “the capacity of agricultural development to withstand or recover from stresses and shocks and thus bounce back to the previous level of growth”.



[Source: Adapted from Montpellier Panel “Growth with resilience: opportunities in African Agriculture”, London, Agriculture for Impact - 03/2012]

2.2. Introduction of the existing information on Climate Change scenarios (and other trends) in the risk analysis

As indicated above, in order to be appropriated by farmers/villagers, the analysis of climate related risks has to be based on the people own experience of climate risks, on the consequences on their farming activities and, more broadly, on their livelihood.

Once this process (previous steps described above) is completed, the analysis of past events can be revised or “up-dated” by taking into account the foreseen changes of the environment. Climate change scenarios shall be introduced at that stage¹¹.

Climate change scenarios will mainly lead to adjustments in the “hazard” component of the risk analysis (See Figure 2 page 7). What is foreseen is mainly an increase of the frequency and amplitude of extreme climate events (flood, drought, storms...). The risk will increase because of a higher probability of these extreme events, enhancing the need for adaptation.

¹¹ This input shall be provided by IRAS project support team or implementing partners. It might be necessary to develop simple support document to present key patterns of climate change scenarios, that shall be understood by farmers.

At the same time and in order to have a holistic approach of risk management, it is also necessary to consider other trends or changes in the socio-economic context of farming activities, as these changes are likely to modify the “exposure” component of the risk analysis. For instance, the development of commercial agriculture is an important trend that may lead to a higher level of specialization of farmers. If the developed crops or production are exposed to the climate risks, it may modify the balance between highly exposed activities (and sources of income) and not exposed sources of income (as illustrated in the Figure 3 page 8).

2.3. Identification of strategic orientations for adaptation and risk reduction

The analytical frame proposed above (risk = hazard × exposure × vulnerability) can be used as a basis to develop risk reduction strategy and think the adaptation of agriculture (and more broadly of livelihood) at the household, FO or community level.

Climate change will impact on the hazard component of the risk analysis.

Strategies for risk reduction can play on the two other components: exposure and vulnerability.

2.3.1. Reduction of Exposure

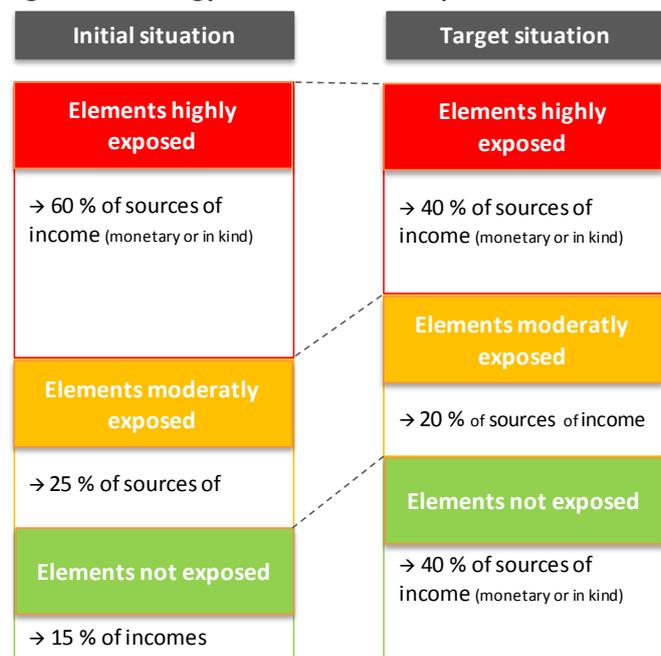
A first strategic orientation consists in reducing the exposure to the main climate related hazards.

For instance, if WS rice is exposed to flood and is the main activity and source of income for the farmers, a strategic option is to diversify or develop other activities / sources of incomes that are not likely to be affected by floods.

Another way to reduce the exposure is to shield the element at risk from the danger: for instance to protect the fields by flood protection dykes.

The proportion of the income generating activities exposed to the damages will thereof be reduced, and the resilience will be improved.

Figure 5: Strategy 1: reduction of exposure.



2.3.2. Reduction of vulnerability

Another strategic orientation is to reduce the vulnerability of the element at risk: in other words, to choose adaptation measures that will reduce the damages on the element at risk for a given climate event: This is for instance typically the case of selecting flood resistant varieties of rice: the element is still exposed (rice field) but is less vulnerable to flood. The part 3 of this report provides some examples of technical adaptation to reduce vulnerability of agricultural activities, and the possible roles of FO/FG to implement such measures.

2.3.3. Safety nets

If the direct effects of the climate hazards cannot be mitigated, its socio-economic impact on farmers' livelihood can be reduced by the creation of safety nets that will limit structural impact on household economies and improve the capacities of rural households to recover. Farmer Organizations can play an important role in this matter, for example by the management of rice banks or saving groups.

3. Technical Adaptation: Practical measures (in which FO/FG can play a role) to reduce the risks or its impact on their existing crops / productions

This part of the report focuses on possible measures that can contribute to reduce the vulnerability or the exposure of existing farming activities (crops, in particular) to climate related hazards. Different types of measures are explored (adaptation of varieties or cropping calendars, development of water storage and irrigation facilities, or of flood protection infrastructures, adoption of agro-ecological farming practices that contribute to reduce the vulnerability of crops, etc.). Of course, the adaptive measures mentioned hereafter are only illustrative. Technical options for adaptation are countless. Again, it has to be recalled that the purpose of this report is not to provide technical answers to adapt to climate change, but to look at how Farmer Groups and Organizations can get involved in the process.

Farmers' understanding and ownership on the measures to be implemented is a key factor of success. For this reason, it is essential for public services, development agencies or projects (such as IRAS) to facilitate a participatory diagnosis and a discussion and decision (at the farmer group or community level) on the possible solutions. The previous part of this report proposes tools to discuss and analyze climate risks issues.

Considering the fact that there are few existing Farmer Organizations in IRAS project targeted districts, this process of analysis of risks, opportunities and constraints for agriculture and development of adequate technical solutions shall be used as an opportunity to establish informal farmer groups that will be the vehicle of this reflection and of an action-research process to develop and test various solutions.

Farmers creativity and innovation capacity shall not be underestimated (as illustrated in the Box 5 below), but it has to be stimulated, and the proposed process shall enhance farmer innovations and encourage the expression of new ideas.

Box 5: Farmer-led technical innovation for CCA: an illustration from Nepal

In Nepal, resource-poor farmers developed crop-related innovations to cope with frequent flooding, changes in monsoon timing and increased incidence of landslides. In drier areas, farmers now plant garlic at the base of cut paddy, mulched with paddy straw, to minimize the use of irrigation water and to save on tillage costs. To produce more food, some farmers now grow millet in winter after the potato crop rather than leave the fields fallow. In flood-prone areas, farmers have created hanging nurseries on raised platforms to protect their seedlings. Through crossbreeding, farmers have developed maize varieties that withstand lodging and can be grown in wetter conditions.

[Source: Wettasinha C., Waters-Bayer A., "Strengthening local adaptive capacity – the key to sustainability in the face of Climate Change", GFAR (Global Forum on Agricultural Research), 05/2012.]
<http://www.egfar.org/news/strengthening-local-adaptive-capacity-key-sustainability-face-climate-change>

3.1. Adaptation of crops, varieties / cropping calendars, (FO/Cooperatives possible roles: supply of inputs – seeds – extension, etc.).

3.1.1. Principles

Adequate choice of varieties and cropping calendar are an important aspect of the agricultural risk management. Research institution and plant breeders have developed varieties (for rice notably) tolerant to flood or drought. Some of these varieties are already demonstrated on pilot plots as part of IRAS project.

Local varieties have also often some interesting characteristics regarding their adaptation to the local context. Besides, it is important to keep the diversity of local varieties which are the pool of genes for future adaptation of varieties.

Together with the choice of varieties goes the adjustment of cropping calendars. Short-term non-photoperiodic rice varieties are generally selected for dry season production, but can also be chosen in order to shorten the wet season rice cropping duration, for instance if the risk of an early ending of rains is identified.

3.1.2. Possible roles of Farmer Organizations

Action-research and extension

Farmers are likely to adopt new varieties or practices if they have been tested and if they have proven to be successful. Farmer Groups / Organizations can play an important role in the selection of techniques or varieties to be tested and in the implementation of demonstration / on-farm trial plots. The advantage of implementing such experimentation plots with Farmer Groups is that the results can be assessed and discussed between the members of the group, who interact together by comparing their practices and results. This action-research approach has often proven to be efficient for a quick adoption of adapted techniques, because farmers have a stronger ownership on the process and on the selection of the adequate technics to adopt. Farmers have to take part in the definition of the hypothesis and on the analysis of results of the crossed experimentations, in order to gain ownership on the results. Working with groups of farmers (10 to 20 people) to discuss the different technical options to be tested, implement, compare with traditional practices and share the conclusions has proven to be an efficient way to manage on-farm research and extension.

Whenever there is no Farmer Organization existing, **the launching of such an action-research activity can be a good opportunity to initiate an informal farmer group**, build confidence between members and raise their interest in working together. This informal farmer group can become the embryo of a more formal structure. The technical innovations proposed may require specific services (see below) to continue to be implemented in the long run, and this need can be the ground for the structuration of a sustainable farmer group. The experience of “Katalysis” project in Latin America (described in Box 6 next page) illustrate the interest of the exchange of experience among farmers about technical innovations, and how it can generate a group dynamic among farmers.

Box 6: Problem solving and learning-action approach: the case of “Katalysis” project in the Andes

In the Andes region of South-America, the Katalysis project (implemented in Bolivia and Ecuador) has enhanced the local knowledge of climate change and has facilitated the emergence of farmers’ solution to cope with it. The approach is based on the sharing of experience between farmers and on the principles of Farmer Field Schools (FFS). The FFS involve about 25 Farmers who manage “learning plots” and interact on their experiences.

In order to catch the interest of participants, the approach has to focus on problem-solving actions on issues of priority interest. The learning is based on exchange of experience, visits to innovative farmers, on-farms experimentations. Individual participants are also asked to define their own goals and describe what they would like to achieve on their own farm, after the exchange visits.

In Katalysis project, water management has appeared as an important issue for the adaptation to climate change, at different scales: field, farm, watershed levels. Practical experiences have been implemented to demonstrate the water holding capacity of organic matter in soils.

Over time, the Katalysis intervention has shifted from individual to collective action: individuals or groups took responsibility to monitor rainfall or water flows in different streams. Group members were also sharing labor to support each other for instance to install water catchment and storage facilities on different farms, or to organize training activities.

Based on first practical experiences and successes, some groups have started to address more ambitious challenges, such as the development of watershed management plans, or the creation of saving and loans funds to help finance the investments for instance for water harvesting and micro-irrigation equipment.

[Source: Adapted from Sherwood S. and Bentley J., “Katalysis: helping farmers adapt to climate change”, in IIED, “Participatory learning and action 60 – Community-based adaptation to climate change”, London 2009 (p.65-75)].

Seeds supply

The use of improved varieties require a regular renewal of seeds, in particular if hybrid varieties are used (case of TDK-11, PNG-3, PNG-5... tested by rice producer groups in Phinneua village¹² for instance). Farmer Groups can provide a service to their members in order to ease this supply and reduce the costs for individual farmers (in particular transportation costs, as the sources of supply are often far from the village, and possibility to negotiate lower prices if the orders are made in bigger quantities). This service can be fundamental to ensure a long term use of such hybrid varieties, because the distance to reach the supplier may dissuade farmers to continue to use them.

An important asset for adaptation to climate change is the ability of farmers to change their choice of varieties at the “last minute”. For instance, if the Wet Season is late to start, the conditions may not be fulfilled to prepare the seedbed or to transplant seedlings. Farmers may then decide to change the variety they are planning to grow, in order to adapt to a shorter cropping cycle. Seedlings may have also been destroyed (for instance by drought, or by heavy rains) and farmers need to be quickly re-supplied with seeds in order to save their seasonal crop. This requires reactivity, and the ability to manage a quick supply chain, which can be an important service provided by a FO. Ideally, this requires that the FO has either its own stock of seeds, in order to be able to supply its member immediately and on-demand. But the risk is that seeds are not used and cannot be kept until the next season. Another option is that the FO can order and be supplied in short delay by a seed provider. But this cannot be as reactive as having its own stock of seeds, as the FO will group orders of several farmers (otherwise it presents no interest to make the purchase through the Farmer Group).

¹² See Annex 2-B of the 1st report of the present mission “Analysis of Conditions for Farmer Organizations and Cooperatives from a viewpoint of Climate Change Adaptation and Resilience, and recommendation for improvements”, pages VII to IX.

An associated service can be a short term credit to the members. The FO can negotiate delay of payment or may have enough cash-flow to advance the cost of the seed purchase, the get reimbursed by its member afterward. This short term credit service can be important in order to ensure the fast answer of the process.

Linked to the choice of varieties and cropping calendar date, another possible functions of FO/FG is to relay information on seasonal climate forecasts¹³ (if available) to their members in order to ease the choice of seeds and decision of cropping calendar.

Keeping seed diversity: seed bank management

Farmer Organizations can be active to ensure the conservation of local varieties in order to keep the genetic diversity which can be a source of further adaptation to climate change. Local varieties are often the fruit of the selection by generations of farmers of seeds that have proven to be well adapted to the local context. Whereas improve varieties can provide benefit, it is also desirable to preserve the genetic diversity. The cultivation of a range of different varieties is also part of a risk management strategy. It is generally wise to combine the use of improved varieties on part of the agricultural land, and to keep using local varieties on other plots. As stated in “Farmer Voices” (LEAD project), the Lao farmers are often aware of the importance of keeping alive the local varieties for risk management purpose (see Box 7 below).

Box 7: Lao Farmers’ interest to preserve agricultural biodiversity

« Suffice it to say that farmers are not laggards, blindly holding on to their local breeds and varieties. They are extremely logical and articulate in their analysis. They cannot risk everything on an unknown. But they are constantly testing, trying, selecting and adapting.

Nevertheless, they are trying to hold on to their local breeds and varieties, and they have strong reasons to do so. Farmers knew of no ‘improved’ rice varieties suitable for upland cultivation. They quite rightly assess that most newer varieties and breeds involve higher risk and/or investment.

Women in almost every village reported that native poultry and livestock breeds were much better investments than ‘improved’ breeds since they were already adapted to local conditions and thereby robust, reproduced well and reliable sources of food and income.

Similarly, even in villages where farmers were instructed to change cultivation methods, farmers had saved the seeds of their traditional rice and corn varieties.

But everything else appears to be pulling in the opposite direction. Some breeds and varieties are no doubt disappearing, and the rate will likely increase.

Laos is the source of over 13,000 samples of indigenous rice in the IRRI gene bank. A large portion of this collection comes from upland farming systems that are now being systematically ‘eradicated’.

Farmers in Sangthong district reported that they had thrown away seeds of the rice varieties they inherited from past generations ever since they received improved seeds from extension projects.

While new seeds no doubt result in more certain yields, traditional seeds are kernels of generations of experimentation, knowledge and capacity of farmers.

This loss of biodiversity will decrease the ecological resiliency of Lao farmers. »

[Source: LEAP, “Farmers Voices” – Part Two, page 2].

Farmer Organizations can organize the conservation of traditional varieties and manage their own “seed library” (See the example of “Biodiversity’s Hut in Mali, in the Box 8 next page)¹⁴.

¹³ See § 5.1.2., page 33-34.

Box 8: Biodiversity's Hut in Mali: An example of FO role in the conservation of traditional varieties

Convinced that the reduction of the number of varieties used was concentrating the risks on a limited number of exotic varieties, some Farmer Organizations in Mali have elaborated their own strategy of defense and preservation of local varieties, with the objective of developing a dynamic and autonomous management of local biodiversity. The process was supported by the National Coordination of Farmer Organizations, which has promoted the model of "biodiversity huts" managed by FOs at local level. An initial stage of the process consisted in collecting from farmers local varieties of various crops that were close to disappear, then to store seeds of these varieties in the "biodiversity hut". The germination capacity of the seed is maintained by cultivating a sample of seeds every year. The system is based on the responsibility and commitment of farmers who contribute to the program. Seeds are then made available to farmers who wish to diversify their crops or varieties.

[Translated and Adapted from: *Inter-réseaux, "Grain de Sel" n°49*, Paris, Jan-March 2010].

Coordination of practices between farmers

In some cases, the adoption of new varieties and the changes in cropping calendars may require coordination between farmers. This is likely to be the case when:

- there is a need to manage collective irrigation infrastructure,
- new varieties or newly adopted cropping patterns are characterized by a period of maturity different from the traditional practices: this may lead to a higher pest pressure (for instance damage by rats on the grains) which can be reduced if new practices are implemented in the same areas rather than in isolated plots.

Farmer Organizations / Groups can take the lead in organizing a consultation and coordination of the adoption of these new practices in order to enhance benefit of a coordinated implementation between farmers.

3.2. Irrigation and water management

3.2.1. Principles

The development of irrigation may contribute to two different categories of answers to climate change and climate risk management.

- It is a direct answer to drought issue: whenever rainfalls are not sufficient or irregular, the development of irrigation facilities will reduce the exposure of crops to drought / hydric stress.
- Irrigation development may also be part of a strategy of diversification of on-farm activities: for instance, in flood prone areas where wet season rice is at risk, the development of irrigation enable cultivation in dry season¹⁵ (of rice or other crops) so that households' economy gets less dependent from the crop at risk.

Irrigation may include a large range of technical solutions, at different scales and thereof requiring different level of management (household/farm level, small farmer group, village or larger).

¹⁴ In Laos, SAEDA has also worked with farmers on the selection and breeding of rice, with the support of MASIPAG, a Philippines based organization.

¹⁵ Provided that the water availability and storage capacity is sufficient.

3.2.2. Possible roles of Farmer Organizations

Depending on the type and size of irrigation infrastructures and water resources used, Farmer Organizations may play very different roles in the development of the irrigation and in its regular management. The Table 1 (below) presents basic roles that can be undertaken by a FO / Farmer Group depending on the type and scale of irrigation solutions developed.

Table 1: Possible roles of FOs in irrigation development and management

Irrigation type	Possible role of FO		
	Infrastructure development / equipment	Management, maintenance	Research / extension to support irrigated agriculture practices
Household individual pond / rainwater storage Farm-scale irrigation	The development of infrastructures and the equipment is done individually, but FO/Farmer Groups may play a role in facilitating the funding of the investment (credit/saving groups).	Household / farm level (no role of the Farmer Organization or Group).	Possibility to develop action-research / extension activities with farmer groups in order to optimize the use of the water available.
Community pond	Identification of the location and design the pond size. Mobilization of labor contributions in the community / group in order to dig the pond.	Management of the water resource: define and enforce the rules for the use of water (size of land irrigated, period of irrigation) + arbitration between different uses of the water available. Mobilize labor for regular maintenance.	Water saving practices can be tested and promoted (mulching, for instance) in order to reduce the water consumption and to be able to irrigate more surfaces with the same amount of water.
Group scale water storage and irrigation infrastructures ^(a)	Identification of the location and irrigated area. Mobilization of labor contributions + cash contributions in the community / group. Mobilize external technical and financial support.	Management of the water resource: define and enforce the rules for the use of water (size of land irrigated, period of irrigation) + arbitration between different uses of the water available. Collect water fees and/or mobilize labor for regular maintenance.	
Medium or large scale irrigation scheme ^(b)	Mobilize farmers to take part in the consultation for the design, and represent farmers for the consultation with irrigation services. Development of the institutional structure for the irrigation management (WUA) Upgrade infrastructure (convert from earth canals to concrete canals in order to reduce water losses).	WUA is in charge of the operation and maintenance of the irrigation schemes. (O&M responsibilities may be shared with the public services of irrigation, depending on the type and scale of irrigation scheme).	

^(a) Example: weir build in Nakaxork village (Outhoumphone district, Savannakhet) visited during the mission in September, used by direct pumping in the weir by a few dozens of farmers.

^(b) Large scale irrigation schemes are generally not developed on the initiative of a farmer group or community.

3.3. Flood protection, drainage and other water flow regulation infrastructures

3.3.1. Principles

Flood protection and drainage infrastructures are built in order to protect from the flood fields (or village area). They contribute to a strategy of reduction of the exposure of crops / livestock or other items to the risk of flood.

On slopes, construction of terrace is a good way to reduce soil erosion during heavy rainfall events, and to retain water and ease water infiltration in the soil while reducing the streaming.

3.3.2. Possible roles of Farmer Organizations

As for small scale irrigation schemes, the Farmer Groups or communities can be at the initiative of the development of flood protection or drainage infrastructures. But in most of the cases, such projects are rather initiated and managed by the local administration (village or district authorities). Excepted for very small scale projects, the building of such infrastructures may require external technical support, and possibly external funding. FO can play a role in the mobilization of such support (together with local authorities) and in the mobilization of the contribution of farmers who will benefit from the flood protection or drainage system developed.

The case of terraces construction is different, because it is much more frequently done based on individual farmers initiatives. Yet, it may require coordination and facilitation between neighboring farmers, in order for neighbors to agree on the delimitation and height of terraces, and to share construction efforts on the dividing earthworks. Small and informal neighbors groups can be organized to coordinate the operation, and to collaborate on the construction.

3.4. Agro-ecology, soil fertility and water preservation techniques

3.4.1. Principles

The term of “Agro-ecology” covers a wide range of practices aiming at enhancing the sustainable use of locally available resources in order to increase production and preserve the soil fertility.

In many ways, agro-ecological practices can contribute to the adaptation of agriculture to climate change. Among the benefits of agro-ecological practices, we can in particular mention:

- The preservation of water and of soil moisture, which reduce the volume of irrigation water used and reduce crops’ vulnerability to drought;
- The protection of soils against erosion.

More generally, what shall be encouraged with farmers is a reflection on their current practices and on the way they can increase the negative consequences of climate change on the crops and cropping systems, or on the opposite be used to mitigate the effects of climate change on the crops.

3.4.2. Possible roles of Farmer Organizations

Farmer Groups established for research and extension purpose are relevant partners to work on the improvement of agricultural practices in general and to reflect on how current agricultural practices may increase the effect of climate change on crops. This reflection can start with the identification of the visible or foreseen appearance of climate change effects (example: more

frequent heavy rainfalls have been noticed). Then participants in the discussion can try to identify what, in the agricultural practices, is likely to worsen the impact of such extreme climate events. Note that this reflection can be done on the field. Concrete observation of the crops and cropping methods will be useful to feed the discussion. Agrisud International has facilitated this kind of reflection on agricultural practices and climate change in Congo with farmer leaders (or also support organization agents) with interesting results (see Box 9 below).

Box 9: Example of analysis of the links between climate change and current cropping practices facilitated by Agrisud International in the province of Bas-Congo (RD Congo)

Through a group discussion, an analysis of the foreseen effects of climate change and on the linkages with current agricultural practices was done for the area of Gimbi in lower Congo region, with a particular focus on soil. The following elements were identified:

Main local effects of climate change:

- More frequent heavy rainfalls;
- Increase of maximum temperatures;
- Unevenness of rainfalls during wet season.

Examples of inadequate practices identified and their effects on soils:

- Practice 1: Implantation of cultivation rows in the slope direction. Consequences: erosion, poor retention of water, sedimentation in the lowlands.
- Practice 2: Slash and burn cultivation. Consequences: no vegetation cover on soil, high level of mineralization of organic matter and loss of fertility.
- Practice 3: Deep plowing (40 cm). Consequence: destruction of the soil structure, erosion, reduction of water retention and deep buying of organic matter present in the upper layer of the soil.

Linkages between these practices and the worsening of negative effects of climate change:

- Practice 1: worsening of the effect of heavy rainfall because soils are more erodible;
- Practice 2: worsening of the effect of rainfall unevenness because of the reduction of organic matter in the soil (and the consequent reduction of the water available in the soil): the crop become less tolerant to short period of drought;
- Practice 3: worsening of the effects of both heavy rainfall events and unevenness of rainfalls in wet season.

[Source: Adapted from Agrisud International: “Cycle d’apprentissage pour la diffusion des pratiques agro-écologiques”, *Adaptation du Secteur Agricole au Changement Climatique*, RD Congo, 2011].

Based on the results of the analysis of current practices, a number of possible improvements can be identified and tried, taking into consideration the ideas of the farmers, the inputs from the technical support staff and other experiences.

As already mentioned in the § 3.1., such a reflection can be conducted with existing farmer organizations. But whenever there is no FO established, the launching of such a reflection can be a good opportunity to initiate informal farmer groups. Depending on the actions identified following this analysis, collective action might be useful (or even necessary) and the group can progressively become a more formal organization and can undertake the required functions.

The adoption of agro-ecology technics does not necessarily require collective action and can be implemented at farm level. But FO or farmer groups can play an important role in the testing and promotion of such practices. Action-research groups can be set up to identify good practices, test the implementation on several farms and exchange about the results.

The purpose of this report is not to make an exhaustive list of agro-ecological technics. But the Table 2 (next page) presents some relatively classic agro-ecological practices, enhance how they can contribute to the adaptation of agriculture to climate change, and highlight possible roles of FO/farmer groups for the promotion and/or implementation of these practices.

Table 2: Agro-ecological practices, their contribution to AA₂CC and the roles of FO / farmer groups

Agro-ecological practices	Contribution to the adaptation of agriculture to climate change	Possible role of Farmer Groups / Farmer Organizations
Mulching	Improves the tolerance of crops to drought thanks to the preservation of water in soil (reduction of the evaporation). [Reduction of vulnerability to drought].	Action-research processes, exchange of experiences and support to extension.
Use of green manure and other organic fertilization	Improves fertility and improves the tolerance of crops to drought thanks to the improvement of the soil water-holding capacity. Improves yields and possibly reduce disbursement for chemical fertilizers, leading to an increase of economic benefit for farmers (thereof possibly their saving capacity).	Action-research processes, exchange of experiences and support to extension.
Vermicomposting	Improves the nutrient content and the water holding capacity of the soil.	Action-research processes, exchange of experiences and support to extension.
Crop association (intercropping) / agroforestry	The association of crops has multiple effects: technically, at the field level, cover crop can reduce the temperature and evaporation at the soil surface level. There are also possible synergies between the crops (e.g. bean + corn). [Reduction of vulnerability to drought; improve farm economic resilience through diversification of crops].	Action-research processes, exchange of experiences and support to extension. Ease the supply with seeds/seedling of new crops or trees introduced (including production of seedlings / tree nurseries...). Develop commercial contacts for new productions.
No-till and cover crop associated systems	Reduce the mineralization of organic matter in soils. Improve fertility and improve the tolerance of crops to drought thanks to the improvement of the soil water-holding capacity.	Action-research processes, exchange of experiences and support to extension. Ease the supply with seeds/seedling of new crops or trees introduced (including production of seedlings / tree nurseries...). Collective equipment for the material needed (e.g. seed drill...).
Hedging farmland	Reduction of the exposure of crops to strong winds / storms, reduction of local temperature and of evaporation. Protection against erosion. [Reduction of vulnerability to drought; reduce the exposure to wind/storm].	Action-research processes, exchange of experiences and support to extension. Ease the supply with seedling of trees used for hedging. Coordination among farmers to ease the hedging on farmland boundaries.
Terrace cultivation	Reduce erosion due to heavy rainfall events and improve the water infiltration in the soil and its water-holding capacity. Allow a better management of fertility. [Reduction of vulnerability to drought; reduce the exposure to landslide].	Action-research processes, exchange of experiences and support to extension. Coordination among farmers, and labor sharing to build the terraces.

3.5. Address factors of aggravation of risks

Local environment conditions (or trends in the evolution of these conditions) can be factors of aggravation of the risks. For instance, forests retain water during rainfall and reconstitute progressively this water, playing a buffer role in the water regime, and reducing the risks of flood and drought. Deforestation is therefore a factor of aggravation of risks.

Similarly, accelerated sedimentation in a stream or river can increase the risk of flood.

The preservation and maintenance of the environment is important to limit the risks, and local communities (possibly through farmer groups or “forest users” groups) can contribute to preserve the forest (regulate the forest exploitation, prevent fires, etc...) or organize the cleaning of the river bed.

3.6. Take climate risks and climate change into consideration in land use planning

3.6.1. Principles

The procedures for the preparation of land use planning Climate risks are generally not explicitly including climate risk management in the issues considered in the planning process. On the other hand, many observers or experts said that the climate risks are actually implicitly considered by participant in the process of Participatory Land Use Planning (as farmers or villagers are well aware of these risks).

Yet, it would be possible to consider the climate risks more explicitly and more systematically in the process. The risk analysis process proposed in § 2 of this report (“2. Proposition of steps for participatory identification of climate related risks at the FO/Cooperatives level” – from p.5) can be integrated in the PLUP. In addition, risks/hazards mapping could be included in the process. Decisions regarding land allocation shall take the climate risk analysis and mapping into consideration in order to reduce the risk and also to share the level of exposure and vulnerability among different users.

3.6.2. Possible roles of Farmer Organizations

Farmer Organizations can take initiatives or get involved in such processes. In Mozambique for instance, FO are playing a role in the revision of land allocation in order to spread the risk exposure among the members of the community (see Box 10 below).

Box 10: Farmer Organizations involved in land reallocation process to address Climate Change in Mozambique

In the village of Nwadhajane in Southern Mozambique, villagers are experiencing the effects of climate change and are taking significant measures to counteract the worst impacts. Several farmer organizations have been created to reassign a portion of lowland and highland, which differ in their productivity to each farmer. On lowland the crops are very productive, but are washed out by periodic floods while the highlands produce good crops in the flood years but poor crops during the droughts. The farmer associations are also carrying out experiments with drought-resistant crops.

[Source: The Montpellier Panel (2012), “Growth with Resilience: Opportunities in African Agriculture”, London: Agriculture for Impact]

Farmer Groups / Organizations shall be involved in this process, together with local authorities. In parallel of (or complementarily to) the land-use planning side measures can be defined in order to address risks. The PLUP process can be a good opportunity to introduce possible adaptation measures as the ones describes above. For instance, if climate risks are well considered in the process, measures associated to land use planning can be taken such as the development of water catchment and storage or the building of terrace to reduce erosion or landslide risks, etc.

FO have to take part in the decision making and may be formally identified as supporting or implementing partners for some of the proposed measures, which will not only contribute to the efficient implementation but will also contribute to enhance their role as local development actors and thereof strengthen their position.

4. Economical Adaptation / Preparedness: Practical measures (in which FO/FG can play a role) to reduce the impact of climate hazard on the Household Economy

The previous part of this report was focused on the possible ways to reduce the exposure and vulnerability of existing farming activities to climate related risks. This approach shall be a part of the strategy of adaptation of agriculture to climate change. Yet, the risks will not be eliminated and another complementary strategic orientation is to reduce the socio-economic impact of a loss of harvest (for instance) on the farmers' livelihood. As seen in the Figure 4 (page 9), what is essential in order to strengthen the resilience of smallholder farmers to climate change is to reduce the structural effects of a climate hazard on the farming systems.

In practice, a simple (yet major) strategic orientation to strengthen rural households' resilience to climate change is the diversification of income generating activities, which can be on-farm (diversification of productions) or off-farm (development of non-agricultural activities or off-farm employment) as detailed in the paragraphs 4.1. and 4.2. below.

4.1. Diversification of on-farm productions

The diversification of on-farm production has this important advantage that it does not only contribute to address climate risk but also economic risks such as agricultural commodities' prices variation, which are also a major risk for farmer livelihoods, and simply offers new income opportunities ("no regret" strategy). To promote agriculture diversification is thereof very wise and relevant. The diversification process may require some support (technical and/or financial), but the main thing is that it requires is a "driver". What will encourage or convince the farmers to diversify their productions?

4.1.1. Driver to farmers' diversification strategies

The analysis of risks and vulnerability proposed (in § 2) may encourage farmer to consider a diversification of their production in order to reduce their exposure and/or vulnerability to hazard. But it is doubtful if this consciousness of their vulnerability to an uncertain climate hazard will be a sufficient source of motivation for farmers to decide to start up new production, considering the difficulties inherent to this novelty (farmers may find that starting up a new production – in which they have no experience – even more hazardous than continuing with only their usual crop or livestock productions... especially if they need to invest a significant amount of time or capital in this new production).

The main attractiveness of on-farm diversification is the perspective of additional income generation, and therefore, most likely, the existence of a proven and profitable market for the new production is likely to be the main driver of the diversification¹⁶.

¹⁶ Of course diversification of production can also be for the family own consumption, but this is quite limited, especially when farmers already produce a significant part of what they eat (at least for rice as the primary food in the Lao diet).

Box 11: Criteria to be considered for the identification of diversification opportunities

Identification of options for diversification shall thereof consider different factors:

- Market opportunity: estimated profitability and potential demand at reasonably high prices;
- Technical suitability of the crop/production in the agro-ecological context;
- Low level of exposure or vulnerability to climate hazard (or vulnerability to climate hazards different than the ones to which the main existing production are exposed to).

4.1.2. Role of Farmer Organizations

Different type of Farmer Organizations could be associated to take part in a process of diversification of on-farm productions. It could notably be relevant to associate market-oriented FO (cooperatives, in particular, or producer groups oriented on the marketing of products).

The identification of market opportunities and the role of cooperatives or market-oriented FOs

Because the market potential is likely to be a strong driver of diversification, and because market-oriented farmer groups/organizations are already (more or less) familiar with the marketing of agricultural products, we believe that it is relevant to work with these market-oriented FOs on the strategic axis of the diversification of agricultural productions.

In the first report produced by this mission¹⁷, we have highlighted the fact that market-oriented farmer groups or FOs (often established in order to secure the supply of a specific buyer, possibly with contract-farming arrangement) are rather likely to be the drivers of a specialization of farms. But it might be possible to encourage these groups to consider a diversification of their activity and to focus on more than one agricultural product. The guideline for risk analysis (developed in Part 2 of this report) can be used for this. Moreover, it can be adapted to assess not only the risks at farm level, but also the level of vulnerability and resilience of the Farmer Organization itself. Obviously, a FO specialized on a single crop (for instance rice or corn) is likely to have a low resilience to a climate hazard that would strongly affect the production of its members. FO/Farmer Group leaders may be interested to reduce not only the vulnerability of their members, but also the vulnerability of the FO as an organization. For the organization own sake, FO leaders can be encouraged to work on the identification of possible opportunities for diversification (taking into consideration the different criteria listed in the Box 11 above).

In addition, the diversification can be an opportunity for the development of the cooperative / market-oriented farmer group. It can lead to a growth of the FO turnover and possibly to scale-economy as structural costs can be covered by the profits made on two different value chains instead of one. But on the other hand, the development of new activities is always accompanied by risks that have to be carefully considered. It is also the role of the supporting project to minimize these risks or propose mechanisms to cover a part of them, so that a possible failure in the attempt for diversification would not be lethal for the cooperative or FO.

¹⁷ See the box "Topic for Discussion 1: Possible limits of market-oriented FOs regarding CC Adaptation" page 7 in the 1st report of the present mission "Analysis of Conditions for Farmer Organizations and Cooperatives from a viewpoint of Climate Change Adaptation and Resilience, and recommendation for improvements".

Development of technical references and of farmer capacities and initial support to launch the new production

By definition, diversification means the introduction of new productions for which the farmers have little or no experience. For this reason, it requires a stronger level of technical (and possibly material) support.

Preliminary tests may be done with a few farmers in the village or target area, with different crops (or livestock productions) foreseen as possible options¹⁸. Linkages with research institution can also be tied in order to accelerate the identification of suitable production in the local (changing) environment.

Box 12: Demand driven diversification: the case of Krabey Riel farmer group

In Krabey Riel, a commune close to Siem Reap city in Cambodia, a group of vegetable producers have been created with the support of Agrisud International and has developed commercial relation with a luxury hotel of Siem Reap, to which they started to sell vegetables. Because of this direct relation with the hotel, they realized the much broader diversity of vegetables that the hotel was buying daily, and they have started to grow vegetables that were not traditionally produced in their locality. In this case, the process of diversification has been driven by the demand of the buyer, and thanks to the commercial relation established by the Farmer Group.

Then a larger extension process can be started to accompany a first group of farmers to start the implementation of production. Farmer training has to be practical and a Farmer Field School (FFS) approach is highly recommended. It can be envisaged to supply farmers with a first batch of inputs (seeds, in particular) to start the new production.

Here also, farmer organizations have to be involved. In particular, if a market oriented FO or group exists and took part on a decision of diversification of the productions (not only at farmer level, but also a diversification of the FO activities) as suggested in the above paragraphs, it is important to let the FO take the lead in the process of supporting its members for the introduction of the new crop or production. The project or the public services have indeed to provide technical support and possibly material support, but shall not substitute to what can be done by the FO/FG, in order to use this activity has a mean to strengthen the Farmer Organization and to develop its capacities.

Sustainable services to support the production

Once the activity is initiated (and as already mentioned for traditional productions¹⁹) FO can play a role in providing a range of services to farmers in relation with the new production, such as input supply (possibly with associated credit), support to pest control, etc. The sooner the FO starts to be involved and to take a part of responsibility, the easier it will be to sustain such services.

The Table 3 (next page) enhances possible steps in the process of diversification, and the respective role of the Farmer Group/organization and of support agencies (project or technical services of agriculture).

¹⁸ These preliminary tests may be done in parallel with the identification of market opportunities.

¹⁹ See § 3.1.2. in this report.

Table 3: Roles of FO / farmer groups in the support to diversification of on-farm production

Steps	Role of the Farmer Organization / Group	Project or Agriculture Services support
1. Preliminary discussion on the need and interest for diversification	Specific meeting can be organized with FO / Farmer Group members.	Discussion on diversification is based on the analysis of risks (see part 2 of this report).
2. Identification of market opportunities	Discussion with existing commercial partners of the FO (for market oriented groups). Identification of other potential buyers for foreseen productions. Assessment of volumes required, prices and prices variations.	Methodological support to FOs on how to assess market demand and opportunities and to identify marketing partners.
3. Identification of technical suitability	Participation in discussion with technician (farmers have to bring their knowledge of local constraints and past experiences).	Preliminary assessment of the technical suitability of proposed crops or production shall be done by technicians, in dialog with farmers (who may have former experiences of proposed productions and know well their environment). Possibly organize visits to existing producers of the proposed new crop in other areas. Linkages with research institutions.
4. Selection of new on-farm production to develop	In the case of a Farmer Group-led process (for instance for a market oriented farmer group who wish to diversify its production), the decision will be taken by the group.	Facilitation of the meeting (in particular if the process and decision is not led by a specific farmer group).
5. (Preliminary testing and capacity building of "pilot farmers")	Identification of "pilot farmers" who agree to conduct on-farm production tests for the new production.	Technical support to "pilot farmers".
6. (Confirmation of the selection of new productions)	In the case of a Farmer Group-led process (for instance for a market oriented farmer group who wish to diversify its production), the decision will be taken by the group.	Support to present the results of the preliminary test. Facilitate meeting.
7. Extension (FFS)	The Farmer Group (/FO) can take the lead in identifying and registering interested farmers who want to take part in the training. It can also be in charge of the practical organization of the FFS (logistic arrangements).	Provide technical support + possibly some initial "starting kits" (seeds, inputs...). Monitor results and advise on improvements.
8. Services to producers	The Farmer Group / FO shall continue to provide relevant services to its members in order to continue the production in the following years. This may include facilitation of input supplies, technical support to pest control, etc.	Capacity building to FO / Farmer Group leaders in term of management of the proposed services.
9. Marketing	Market oriented Farmer Groups may get involved in the marketing of the new products.	Capacity building to FO / Farmer Group leaders.

Note: if there is no doubt on the technical suitability of proposed crops or productions, and in particular if there are in the village some farmers already experienced with the new production (and who can be mobilized to support the extension), then steps 5 and 6 can be skipped, in order to save time (in particular if the production is annual, which would mean that the testing would add one year delay to the phase of broader extension (FFS).

Management of nurseries

Farmer Groups/Cooperatives can invest in the development of tree nurseries to supply young plants (of fruit-trees, multi-purpose trees, or shade trees) to their members (as part of the services to support farmers diversification – see point 8 in the Table 3, previous page), or as a commercial activity.

School gardens

A possible innovative activity consists in the development of school gardens. School gardens are used to initiate children to gardening and can be used as a model to promote the diversification of crops and the introduction of new practices. Besides, the production can be used to improve children diet or to support families in need. Farmer Organizations can well get involved in the management or technical support to school gardening. Reports from various experiences of school gardening throughout the world enhance the development of the community social capital as one of the important outcomes of these initiatives.²⁰

4.2. Development of off-farm activities

4.2.1. Relevance of the development of off-farm activities in the adaptation to climate change and strengthening of rural households' resilience

Other income generating activities can be developed off-farm by rural households. It is often observed that the time spent on off-farm activities (such as selling daily labor, sometime in the neighboring main city or sometime in more distant area, requiring a temporary migration)²¹ increases following a bad harvest season. Development of off-farm activities, complementary to agricultural production, is definitely a path to strengthen rural household resilience to climate related hazards²², as off-farm sources of income are likely to be the lifeline that will prevent the farmers to sell productive capital in order to face immediate needs.

The balance between off-farm and on-farm activities has to be well though at the farm level. Development of off-farm activities can either be seen as competing with the development of agricultural activities (competition for the allocation of labor force available) or seen as synergetic with on-farm activities as they can also be the source of cash that will be reinvested in the agricultural production.

4.2.2. Linkages with Farmer Organizations

Part of considered “off-farm” activities may have a direct connection with the agricultural activities, in particular regarding the processing and/or marketing of agricultural products (or possibly the distribution of inputs, as a commercial activity). For these cases, Farmer

²⁰ An interesting manual on school gardens can be downloaded on the FAO website – See the following link: <http://www.fao.org/docrep/009/a0218e/a0218e00.htm>

²¹ For instance, villagers met in Phinneau village, in Savannakhet province, mentioned that they spend more time selling their labor (in the construction sector, mainly) when their harvest have been affected by drought – See Annex 2-B of the 1st report of the present mission “Analysis of Conditions for Farmer Organizations and Cooperatives from a viewpoint of Climate Change Adaptation and Resilience, and recommendation for improvements”, page IX.

²² And other hazards as well, including possible drop off of agricultural prices for instance.

Organizations (in particular under the cooperative model) are a powerful tool to allow farmers to add value to their products and to create job opportunities. By merging capital and resources, members of a cooperative can invest in equipment (for processing, transportation,...) and develop activities that they would not be able to achieve individually.

Farmer Organizations or Groups (*stricto sensu*) have no obvious role in supporting the development of other off-farm activities with no connection with the local agriculture (for instance the selling of labor force in the construction sector). But there is possibly a benefit for FO/FG in the development of off-farm activities, especially if the FO/FG services to its members are based on an in-cash payment (for instance to pay for Irrigation Service Fees in the case of WUA, or for seeds or fertilizer supplied through the FO/FG). In that case, it is the interest of the FO/FG that its members have access to off-farm incomes (especially when on-farm incomes have been reduced) in order to continue to use (and pay for) its services.

A (marginal?) role of FO/FG related to the development of off-farm activities (in particular when these off-farm activities are linked to migration) could be to facilitate the use of the land of the temporary migrant (for instance during Dry Season) by making this land available (rental) for other farmers who do not migrate. Such arrangement are sometime found in Water User Association who encourage the use of land in DS in order to be able to collect the Irrigation Service Fee that they need to cover O&M costs.

If we consider gathering of NTFP as part of the off-farm activities, NTFP groups'²³ role in the sustainable management of the natural resources is essential to sustain this economic activity, which itself strongly contributes to the resilience of rural households. These groups can also be involved in the processing and marketing of NTFP (various examples of this exist in Laos, for instance with group processing bamboo shoots), generating more added value and more incomes to their members, and thereof optimizing the contribution of this off-farm activity to build the rural households resilience. NTFP groups have to address the issue of the sustainability of the use of the natural resources they exploit, and possibly to regulate the access to these resources in order to preserve them. Considering that NTFP are likely to be more exploited when rice or other crops have been affected by climate hazard, the variability of the pressure on the resources has to be taken into account in the management of the resources. For instance, in a year of good harvest, a NTFP group can allow a level of exploitation of the resource lower than the estimated limit of sustainable use, leading to an increase of the stock, and unlock the access to this additional reserve when the rural households need to increase their off-farm income to substitute the losses from damaged crops.

4.3. Credit / Saving mechanisms and safety nets

4.3.1. Role of credit, saving and safety nets mechanisms to improve farmer households resilience

When farmers have been affected by a climate hazard and have lost their crop or livestock, they need to be able to restart as quickly as possible their productive activities, while providing for their family daily needs. The worst is when farmers have to sell (or to pawn) their productive

²³ See § 2.5. of the 1st report of the present mission "Analysis of Conditions for Farmer Organizations and Cooperatives from a viewpoint of Climate Change Adaptation and Resilience, and recommendation for improvements", page 16.

capital (land, cattle...) to address immediate basic consumption needs, as this will have a structural effect on their livelihood²⁴. The best situation is when farmers have sufficient savings to face immediate needs and start to reinvest as soon as possible to restart their productive activities. In between these two extreme situations, access to direct compensation and/or to quick and relatively cheap loans is likely to be helpful in order to ease and faster the recovery.

4.3.2. Possible roles of Farmer Organizations / Groups

Saving / Credit groups

Quite often in South-East Asia, one of the first expectations of farmers when they establish farmer groups or organization is to be able to access credit / loans from the group.

There are countless experiences of such groups managing a revolving fund, constituted from initial savings of members, sometime topped-up with an additional capital provided by a project or an NGO. These saving & credit groups can be quite flexible and quickly adaptive to the credit needs of their members (if not in term of amount – the rotating capital being limited – at least in term of period and duration of the loans). Relatively small interests rate are charged to borrowers (compared to other commercial credit offer, or to the rate charged by money lenders), and the interests are used to increase the revolving capital (+ sometime, for a part of them, to pay for the work of the management committee). But, once inflation rate is considered, the low interest rates do not allow a quick increase of the capital available and the ability of saving and credit groups to increase the revolving capital and the amount of loans is very limited, which also limits the micro-economic impact of such groups on the livelihood of their members. Besides, when farmers have lost their harvest due to a climate event or pest attacks, it is likely that no funds are available because all the money is almost permanently lent out (no cash reserve to serve unforeseen demand)²⁵. The only support that can be provided to members is actually a revision of the delay for reimbursement of the money they have already borrowed.

The existence of such “self-helped groups” has a positive impact on farmer resilience because of the solidarity and reciprocity relations it contributes to build within the community, and the links it can help to build with local authorities. According to Thomas Mupetesi (Executive Director of the Farmers Association of Community Self-Help Investment Groups in Zimbabwe), this “social capital” of FO is in itself an asset that increases communities resilience (see Box 13 next page).

²⁴ See § 2.1.2. “Assessment of impact on farmers’ livelihood and resilience” page 8 of the present report.

²⁵ Yet it would be theoretically possible for a saving & credit group to freeze a part of its capital as a reserve fund (on a fix-term deposit in a bank, to generate interests, preferably), and to unlock this capital for loans to members only in disasters situation. But considering the demand for credit and the cost of borrowing money, it seems quite unlikely that members of the saving group would accept to leave a part of the capital unused.

Box 13: Social capital increases communities' resilience

“A small but growing body of literature links social capital to a healthier environment, but less has been said about its role in building resilience. Yet experience has shown that membership of a farmer organization helps individuals enter into reciprocity arrangements with friends, relatives, neighbors and local institutions – as we have seen within the Farmer Association of Community Self-Help Investment Groups (FACHIG) in Zimbabwe. These exchanges shape individual actions. Countless analyses have shown that, where social networks are present, households are better able to prepare and plant their land on time, or have a wider stock of seeds to rely on, and are thus less prone to risks. Reciprocity is crucial in poor and isolated communities, and plays an even more important role in these communities' responses to unexpected situations. Another important aspect here is what the literature refers to as “linking social capital”: organizations provide links to a region's authorities, helping farmers leverage resources and increasing their bargaining power”.

[Source: Thomas Mupetsi, (Executive Director of the Farmers Association of Community Self-Help Investment Groups, Zimbabwe), in “Farming Matters”, September 2012, p. 37].

Rice banks, seed banks

Many village rice banks have been established (often on projects or NGO initiatives) in South-East Asia in order to address the issue of rice shortage before rice harvest. They are generally self-managed organizations (i.e. managed and owned by their members who are also the users of the services). The main benefit for the users is that the cost of the short term in-kind loan is lower than what they could get from other lenders. Also, considering the intra-annual variation of rice price (price are likely to be higher 2-3 months before the main harvest than right after the harvest), the costs of such in-kind loan is lower than the borrowing of money to buy rice, then having to sell rice after harvest (at a lower price) to reimburse the loan. Such mechanisms can be helpful to help families to recover after an insufficient harvest. The main limit is that, after the strike of a severe climate event on a given village, virtually all villagers may be in need for such service. The limitation of the stock of rice may reduce the volume of each loan, and consequently reduce the importance of the help it provides to households in need.

A possible way to address this limit could be to “twin” rice banks in flood prone area and rice banks in drought prone areas, for instance, with hopefully a demand for rice loans that will not be very high at the same time and in the different areas. The rice bank in the less affected area can lend a part of its stock to the one in the severely affected area. The main obstacle is to build the trust between these village organizations which are far from each other and with no personal relationship between their leaders. Facilitation by a project and backstopping from district or provincial authorities may be required to succeed in such an initiative. The same idea can be more efficiently applied between unions of rice banks instead of individual units.

Seed banks are useful to help a fast recover after crops have been damaged by a drought or a flood, in particular when such an event occur very early in the season, leaving enough time to restart the crop. In that case, a seed bank can facilitate a quick access to seed (with delay of payment granted) in order to restart on time the crop.

Reserve funds

Farmer Organizations are encouraged to create a reserve fund in order to face unforeseen situations. In practice, this is not always implemented. Generally only quite formal Farmer Organizations (often legalized ones) have created such reserve funds. In Lao PDR, this shall in principle be the case for Cooperatives, as the Decree No: 136/PM on Cooperatives stipulates in its Art.40 that: “*Ten per cent of the net profits made by cooperative must be placed on reserve fund of the cooperative. This fund will be used to help the cooperative in case of deficit.*”

As indicated in the Decree, the first objective of the reserve fund is to prevent a deficit of the cooperative itself (which may be generated by climate related hazards and their consequences

on the cooperative members ability to produce and to pay for services). These reserve funds are first of all a tool to strengthen the resilience of the organization, and not of its members. But this is also an important objective to avoid that Farmer Organizations get bankrupted because of the consequences of hazards. This is also very important for Water User Associations, which may have difficulties to collect Irrigation Service Fees when their members have lost their harvest, yet shall continue to maintain the irrigation infrastructures in order to avoid that the next harvest is also jeopardized. The Box 14 below illustrates how such a reserve fund has been created and is managed by Prey Nup Polder User Community, one of the largest WUA in Cambodia.

Box 14: Reserve fund to compensate FO loss of incomes due to hazards: the example of Prey Nup Polder User Community in Cambodia

The Prey Nup Polder User Community (PUC) is a Water User Association which manages a large hydro-agricultural scheme of 10,500 ha in the South of Cambodia. The PUC is responsible for the water management inside the polders area and for the maintenance of most of the polders infrastructures (dykes, canals, sluice gates...). These activities are financed by service fees paid by land owners inside the polder area and collected by the PUC. With fees of about 11 USD/ha, the organization manages an annual budget of more than 100,000 USD.

In case farmer members have lost their harvest due to pests or other hazards, they can request and obtain (after an inspection of their field) an exemption of fee payment. Of course, this will not replace their harvest, but at least this reduces a bit the money they have to spend while they are facing such difficulties.

In a usual year (with reasonably good harvests) the PUC uses to grant exemptions for 300 to 400 ha out of the 10,500 ha (about 3% of the total surface). These foreseen exemptions of payment are taken into consideration while the PUC prepares its annual budget and defines the ISF tariff that land owners shall pay per hectare of land.

In 2008, due to severe pest attacks and viral diseases on rice, the PUC had to grant fee exemption for a surface of more than 3,000 ha (nearly 30% of the total surface), causing a deficiency in the budget of the organization.

After this experience, the PUC has established a specific reserve fund to cover this risk. Since then, their annual budget is established with a prevision of exempted surface of 1,000 ha. As actual exemption is normally lower, this means that the PUC will have a surplus of financial resources in a "normal" year. This surplus is provisioned on the reserve fund (materialized by a specific bank account), which is used to cover the costs of exceptional exemptions (when more than 1,000 ha have to be exempted) in years of disasters.

This system provides a limited help to PUC members who have lost their harvest due to hazard, but it strongly strengthen the resilience of the PUC as an organization. This is essential, in order to maintain the hydraulic infrastructure in good condition, and to avoid that the following years harvests are affected by poor water management service, because the maintenance of the scheme could not be done properly.

[Source: Based on the experience of MOWRAM/GRET, Prey Nup Polder Rehabilitation project.]

4.3.3. Agricultural insurance

Agricultural insurance is not well developed in South-East Asia and is difficult to establish. In particular, if it has to cover climate related risks, it cannot be started locally and at a small scale, as the principle is to compensate members for losses of harvests with the premium paid by other members who have not suffered losses. At a local scale, if all members are exposed to the same risks at the same time, the system will be bankrupted at the first severe flood or drought encountered. To set up an agricultural insurance system is probably out of reach of a single project like IRAS, but IRAS could play a role in promoting the idea. Networks such as the Sub-Working Group on Farmer and Agri-business could be a good place to discuss this issue. Linkages with the development of contract farming could also be wise, for reasons already explained²⁶.

²⁶ See the box "Topic for discussion 4: CCA and contract farming" in the 1st report of the present mission "Analysis of Conditions for Farmer Organizations and Cooperatives from a viewpoint of Climate Change Adaptation and Resilience, and recommendation for improvements", page 14.

5. Possible role of FO/FG in Disaster emergency response.

5.1. Early warning and preparedness

5.1.1. Preparedness

Lao Farmers are generally well aware about climate risks to which they are exposed in flood prone or drought prone areas, and have already and individually their own practices for disaster preparedness. Yet farmer organization can encourage their members to undertake appropriated measures, and undertake (at the organization level) preparedness actions, in consultation with local authorities.

For instance, in flood prone area, fodder storage can be prepared in places where cattle are usually displaced during heavy flood. If necessary, and depending on the evaluation of the risks, animal vaccination campaign can be organized²⁷ considering that the risks of diseases outbreak can increase during and after the flood period, due to the flooded environment and to the concentration of livestock on higher places.

Measures are taken by the public sector at village or village cluster (= *kumban*) levels (under the National frame of the Disaster Prevention and Control Committee) to develop disaster preparedness plans. Trainings and awareness raising activities are organized. The process can include the development of hazard maps and response plans. Whenever farmer groups or farmer organizations exists (and even if they are not yet formally legalized) their participation in this process shall be encouraged, as their knowledge of the agricultural stakes can be useful to be taken into account, and as they can also take some responsibilities in the implementation of preparedness and response plans.

5.1.2. Early warning

Climate forecasts

The Regional Integrated Multi-Hazard Early Warning System (RIMES) supports meteorological services in South-East Asia and prepares seasonal forecasts, with 1 month or more lead-time. RIMES is also developing "Climate Forecast Applications", which purpose is to make these seasonal climate forecasts available at local level, tailored to the users needs, and to build capacities of local stakeholders so that they know how to use and what decision to make with the forecast bulletins.

Farmer Organizations can become users of these climate forecast information which can be (if accurate) very valuable for seasonal planning of agricultural activities. Sub-seasonal forecasts, with 10-25 days lead time, helps in planting, weeding, and harvesting decisions.

Whenever there are already relatively well-established Farmer Groups or organizations in target areas, IRAS project could consider how to facilitate a linkage of those FO/FG with RIMES²⁸ in

²⁷ If vaccinations are not done systematically.

²⁸ RIMES focal point in Lao PDR is Mr. Singthong Pathoummady, Director of Division, Meteorological Station Network and Telecommunications / Department of Meteorology and Hydrology, Luang Prabang Road, Barn Akart, Wattay, Vientiane Capital City, Lao PDR ; Tel: +856 21 215010 ;

order to provide them access to seasonal climate forecasts. This can be particularly relevant with WUG/WUA in charge or the management of irrigation.

Weather forecasts

In the shorter term, weather forecasts (established with a 3 to 5 days lead-time) are useful information for farmers. For instance they can be considered in the decision making for fertilizer or pesticide application. If Farmer Organizations can have access to reliable weather forecast, they can also relay this information and provide adequate consequent practical recommendations to their members.

5.2. Response and recovery

Farmer Groups or Organizations can also play an important role in response to extreme climate events, in order to:

- 1) limit the impact on crops and livestock, and/or
- 2) help farmers to quickly recover or restart a crop if there is still enough time to do it or reconstitute the stock.

It is difficult to systematically list possible interventions of FO/FG for these purposes of quick response and recovery, as these interventions can be quite diverse and need to be defined case by case (but not in the last minute: preparedness phase shall have defined clear action plans to be triggered when a certain alert level is reached). But we can list a few examples as illustration of what can be done by Farmer Organizations:

In order to limit the impact of the hazard:

- For instance if a field area is protected by a flood protection dyke which is threaten to break or to be spilled over by the flow, the FO/FG (possibly a WUA or WUG) can mobilize its members (the farmers who benefit from this protection) to work on an emergency consolidation of the dyke or to raise the dyke level with bags filled with earth in order to limit the flow over the dyke. In term of preparedness, this mean that the FO (WUA or WUG for instance) has already purchased and stored bags (and maybe shovels) and has identified where the earth will be taken from (possibly has stored earth along the dyke).
- In case of flood or drought that caused loss of fodder for livestock, the FO can organize transportation of fodder from another area and distribute (or sell) to its members in order to reduce the livestock mortality during the critical period.

In order to fasten the recovery:

- In case of heavy damages on rice (for instance) early in the season, the FO can organize a quick supply with seeds or seedling so that farmers can restart the crop on time (if a seasonal forecast is available (see § 5.1.2. on previous page) and a high risk of damage on the transplanted rice is foreseen – due to flood, for instance – the preparation of back-up seedlings can be anticipated on upper land in order to be able to quickly transplant again once water level goes down in the fields.
- Saving and credit groups or activities or seed-banks are services that are likely to facilitate a quick recovery of affected farms thanks to a quick access to inputs in order to restart the activity or start up a secondary activity to generate substitute incomes.

It is desirable to involve and support existing Farmer Organizations or Group in preparedness, emergency or post-emergency response, in order to consolidate these organizations instead of weakening them by externally driven relief actions. If a FO or cooperative has been established to provide input supply services to farmers, and then, because of an emergency situation, farmers receive free seeds or other agricultural inputs from an external organization, the local FO will be weakened and the benefit of having such an organization in the following years might be lost.

Innovative solutions have to be developed in emergency situations in order to strengthen local organizations while providing adequate support to limit the impact of the hazard or fasten the recovery. The Box 15 hereafter presents a good illustrative example of post-flood support to livestock owners in Cambodia.

**Box 15: A flexible mechanisms to address emergency needs while strengthening local organizations:
The case of post-flood animal health support designed by VSF in Cambodia**

In September and October 2000, Cambodia has faced severe floods. In the area of Ba Phnom (Prey Veng province), many farmers lost their rice harvest. While the water level was decreasing, one of the next challenge was to get prepared to the outbreak of animal diseases and avoid a high level of mortality in the livestock, which would worsen the impact on farmers livelihood. But farmers who have already lost their harvest are lacking cash to pay for vaccinations and treatments.

The first idea in order to help them was to provide free treatments to cure animal diseases. But this solution would have weakened the network of Village Animal Health Workers (VAHW) established in the area and organized in a district level association. Because of this concern, an innovative solution was developed: instead of receiving medicines for animal treatments, villagers that need such support received specially printed coupons, with which they were able to pay for the services of VAHW. The system was thereof more flexible, and instead of being a threat for the activity of VAHW, the relief operation has contributed to strengthen this service and to drive more people to use it. VAHW paid with the coupons could cash them back through their association, which was then refunded by VSF project.

[Source: Adapted from J.-M. Brun, « *Inondations au Cambodge : Faire face à l'urgence sans couler les acquis du projet* », in Habbanae n°58, p.7-8, VSF, Lyon, Dec. 2000.]

6. Synthesis and development of FO/Cooperatives strategies and action plans for adaptation and risk mitigation.

The part 2 of the present report has proposed a general frame for risk analysis, and, based on this analysis, definition of strategic orientations²⁹ that can include technical adaptation to reduce the exposure and vulnerability of agricultural production³⁰, economical measure or mechanisms to reduce the impact on livelihood and improve the resilience of rural households³¹, and possible roles of FO/FG in disaster management (preparedness, emergency response and recovery)³².

This last part of the report proposes to make a synthesis of these different elements and to come back on the elaboration of strategies and practical action plans at FO/FG level.

It is important to underline that, in the proposed approach, Farmer Organizations or Groups are not seen only as an “implementing partner” or a relay to implement some CCA actions that would have been identified and decided by others, but are playing an active role in the assessment of risks and vulnerabilities and in the identification, selection and implementation of CCA actions.

6.1. Definition of a Strategy at FO/FG level: Integrate climate change issue in a broader vision of farmers’ development goals and vision

The proposed process to define strategy and action plans is summarized in the Table 4 next page. This process can be started up with existing Farmer Organizations (whenever there are significant FO in the area of intervention – such as market oriented groups or WUA/WUG, for instance). But it can also be implemented with informal groups of farmers / community (it may incidentally lead to the progressive structuration of FG/FO if there is a comparative advantage to set up such groups in order to sustainably undertake part of the actions identified in the work plan that will come out of the process).

Climate risks and climate change are not the main drivers of change and source of motivation of farmers. Lao farmers may have other priorities or may face more immediate challenges that are more likely to mobilize them³³. It is essential to identify these other stakes and drivers and to incorporate climate change adaptation in a more holistic vision of the current situation and challenges to address at the farm level and farmer group (/FO) level. Otherwise, farmers will have no ownership on the plans developed, will not feel motivated enough to take part in the implementation, and the climate-adaptation action plans developed with farmer groups or community will go unheeded. The discussion process with farmers shall therefore start in a very open manner. It might be preferable to start to work on issues that are considered by the farmers as their major concern, even if not directly linked to climate change, in order to build the trust with farmers and to start up a process in which farmers will be truly committed.

²⁹ See § 2.3. “Identification of strategic orientations for adaptation and risk reduction”, page 11.

³⁰ See § 3, pages 13 to 23.

³¹ See § 4, pages 24 to 32.

³² See § 5, pages 33-35.

³³ Other challenges or driver of change may include, for instance :

- Increasing competition for the access to resources (land, water...);
- Access to market, development of commercial agriculture / contract farming;
- Demographic growth leading to a growing demand of urban areas and to a dividing up of farm land.

Table 4: Overview of the process of climate risks analysis and definition of a strategy and adaptation actions with farmer groups / communities

Steps	Objectives	Method
1. Analysis of the context and define perspectives and challenges.	Identify opportunities and challenges, and a stimulating mid-term vision of what farmers would like to achieve.	Discussion on the description of the situation, current productions and sources of incomes, context, perspectives and opportunities (+ SWOT analysis).
2. Identify preliminary (or on-going) actions to reach the overall objective	Identify existing FO action plans or possible actions foreseen to reach the FO goals.	FO present its current action plan (if it already has one), or brainstorming on possible actions to be undertaken to reach the FO goals.
3. Hazard identification	Identify climate hazards (already experienced by farmers).	Brainstorm in group discussion on the past experiences and “history” of climate hazards.
4. Analysis of climate related risks	Identify exposure and vulnerability for the different risks identified.	Brainstorm on what is affected in case of extreme climate events and how it is affected. Use analysis grid (Risk = Hazard × Exposure × Vulnerability).
5. Current coping strategies and impact on livelihood	Impacts of the hazards on economic activities, assets, resources and finally on livelihood. Rank the different risks by level of importance, starting from the most important.	Focus discussion on how farmers react when confronted to natural climate related disaster, how they cope with the consequences and the potential long term impact on their livelihood.
6. Integration of perspectives and trends	Fine-tune the analysis of risks with prospective scenarios on climate change, but also with other significant social, economic or technical trends that are likely to modify the risks, the exposure or the vulnerability.	Presentation of climate change scenario and their foreseen local consequences: consequence in the risk analysis (modify the hazard factor). Discuss current social, economic or technical trends that are likely to modify the exposure (e.g. specialization of farms on one principal crop) or the vulnerability.
7. Identification of strategic orientations and list possible measures for adaptation	For each element at risk (see the risk analysis) identify possible ways to reduce exposure of the element and/or reduce the vulnerability. If the risk cannot be reduced identify measures to limit its impact on livelihood (improve resilience).	Open discussion: systematic review of each element at risk. Identify current adaptation practices (highlight “best practices”) and brainstorm on possible new adaptation measures (farmer ideas + input from the project facilitator on existing experiences / solutions, “best practices”...)
8. Selection / Prioritization of Adaptation Measures / Actions together with other development actions	Based on the findings of previous step, select priority actions to be implemented. (Consolidate with the FO existing action plan – if any – based on its own development objectives).	For each proposed measure, rank the foreseen impact in term of risk reduction, and the level of difficulty and cost for implementation. Prioritize the measures which have the best ratio (foreseen positive impact / estimated difficulty & cost). Classify the proposed measures: technical adaptation of existing crops / land use and NRM / economic (/livelihood strategies) adaptation / safety nets / emergency disaster management...
9. Inclusion of disaster management measures	Integration of FO roles in disaster management plans.	Role of FOs in disaster management plans / emergency measures is likely to be discussed separately with authorities in charge of DM.
10. Planning of implementation process	Identify conditions required, resources to be mobilized, implementation steps, and plan implementation: action plan / calendar, assign responsibilities.	Participatory discussion: Prepare a format to list actions and tasks, identify person in charge, resources to be mobilized and indicate time schedule. (This step can be prepared with a smaller taskforce of FO leaders or volunteer villagers + local authorities)
11. Addressing conditions for long term sustainability	Identify the conditions required to sustain the action in the long run, in particular if some services initially provided by the project need to be taken over by a local organization / actor.	This step can be done at the end of the planning stage, or progressively, during the implementation phase. The facilitator has to support a reflection on the possible arrangement to sustain the required services / tasks.

Therefore, before to go through the assessment of risks and vulnerability (as proposed in § 2.1., page 6), it is important to analyze the current situation and context of agriculture, to identify opportunities and challenges, in order to define a stimulating mid-term vision of what farmers would like to achieve. This step is essential to raise interest, motivation and commitment of farmers: climate change issue shall be incorporated in a broader vision of the group's own development perspectives and "agenda".

The analysis of climate risks and the identification of possible adaptation measures will follow the process already described in the part 2 of this report, corresponding to the steps 3 to 6 of the table 4 (previous page).

A possible additional step is to organize field visits ("study tour") of some members of the groups to places where successful experiences of adaptation activities are already implemented, in order to provide concrete ideas of what can be done.

6.2. Criteria to be considered in the selection of priority actions

6.2.1. Estimate resources to be mobilized, costs and foreseen benefits

For the different possible actions identified, the farmer group can estimate the costs and benefits. This exercise is not easy, but it can start with a rough estimation which can then be fine-tuned progressively. The support of the project (facilitator and socio-economist) is definitely needed for this assessment. Basic recommendations for the project support team and simple format for cost benefit analysis are provided in the 3rd report of this mission³⁴.

6.2.2. Consider also feasibility and chances of success...

The cost-benefit analysis shall not be the only element considered in the prioritization of actions. First, because it is based on a number of assumptions that are difficult to verify (especially when it comes to the estimation of losses due to extreme climate events, which are difficult to estimate "in general"). Second, because the feasibility of the proposed scenario has also to be assessed and verified: an action may appear as very "cost-efficient", but the conditions to start its implementation are difficult to fulfill.

6.2.3. ... and structural positive effect on the Farmer Organization

If the objective is also to strengthen Farmer Organizations, it is important to start with actions that are easier to implement and that will not only bring a benefit for the farmers, but will also have a structural effect on the development of the FO as an organization, and will contribute to build the credibility and legitimacy of the organization and of its leaders. The assessment of the interest for a FO to launch the implementation of an activity can also consider the potential benefit for the organization in term of "social capital". Along the same lines, another side-benefit from some of the actions envisaged is their contribution to create or strengthen links/partnerships with other stakeholders. Among the envisaged actions, some may not benefit only to the farmers but also to other stakeholders which can be associated as partners. This can be the case with private sector stakeholders as illustrated in the Box 16 next page.

³⁴ See § 2.2.2. "Guidelines for cost-efficiency analysis of proposed options" page 14 of the 3rd report of this mission "Farmer Organization / Cooperative Support Measures for Adaptation to Climate Change".

Box 16: Negotiation with private partners to initiate win-win adaptation actions

A FO may mobilize its direct partner(s) to reflect on climate change adaptation issues, identify common interests and associate this (these) partner(s) in the implementation of adaptation actions.

For instance, a market-oriented farmer group may discuss with its main buyer (contractor, if there is a contract farming agreement) the possible need to review the choice of varieties or the cropping calendar in regard of climate change. In such a case, there is clearly a shared interest, as the interest of the buyer is to secure its supplies (this is generally what motivates the contract-farming approach). Considering this common interest, it may be possible to involve this commercial partner in co-financing field-trials of different varieties, or to discuss with him the opportunity of diversifying his commercial activities and contribute to a strategy of diversification that can secure his business as well as the farmers' incomes.

6.2.4. "No-regret" actions

Some actions or adaptations of practices can reduce the vulnerability or exposure to climate hazard, but are also beneficial for farmers even in a mild climate period (when no extreme events or hazards are encountered). Such "no-regret" measures might be given a higher priority by farmers³⁵.

6.2.5. Other criteria

Additional criteria can be considered in the selection of priority action, such as the inclusiveness of women, most vulnerable households, minorities, etc. or contribution to climate change mitigation ("smart agriculture adaptation").

6.3. Check the detail resources needed, financing plan, and develop the implementation modalities and time-schedule for activities selected

For each activity selected, the farmer group (still with the support of project facilitator, and inputs from technical staff if needed) will precise the quantitative objectives, list the resources required and define beneficiaries contributions and possible need for external support (see the illustration in Box 17 next page).

The planning and budgets for the different activities have then to be compiled and consolidated before a final validation with the FO/FG members³⁶.

It is important to verify that the action plan is not too ambitious and is manageable for the Farmer Group / Organization. In most of the cases, Farmer Groups IRAS project will work with are very young and have little experience and resources³⁷. It is preferable to lower the ambitions

³⁵ The (draft) chapter 3 of the SNC underlines the interest of such "win-win" or "no-regret" policy options which contribute at the same time to reduce poverty and improve climate resilience.

³⁶ In many cases, IRAS project may have to deal with very informal farmer groups. As part of an organizational capacity building process, it is important to promote a formal procedure for activities and budget planning and to have plans and budget discussed and approved with all members (General Assembly) if the group is not too large, or by an assembly of representatives for large farmer organizations. Evaluation and reporting on the implementation and outcomes have also to be shared and discussed with members / representatives.

³⁷ It is likely that a number of these groups are even nonexistent yet and will be set up through the project intervention, with the objective to undertake services required to sustain the adaptation activities.

during the first years, and reach success in the implementation of proposed activities and upscale progressively, than to expect too much from groups which need to be strengthened.

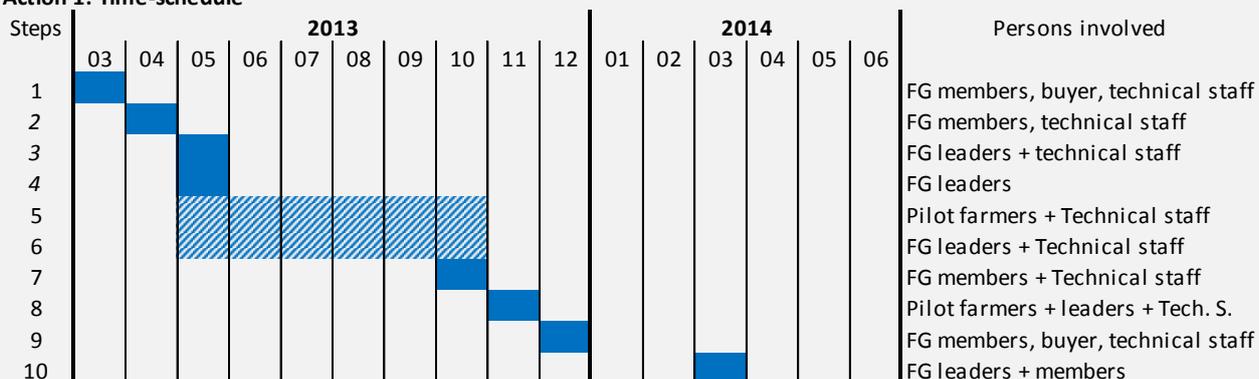
Box 17: Example of planning for one activity: case of the introduction of drought resistant varieties

Action 1: Experimentation of drought resistant rice varieties

Action 1: Protocol

1. Meeting with the project technician (or research institution) and the buyer with whom the group is linked and selection of two drought tolerant varieties to be experimented.
2. Selection of 10 farmer volunteer to test one drought tolerant variety (test on 10 ares, seeds provided to the farmers)
3. Purchase of the seeds: 2 representatives of the group go with the project agent to identify the supplier.
4. Delivery of seeds to farmers who volunteered for the experimentation.
5. Technical advise to "pilot" farmers by the project technical staff (or DAFO).
6. Joint monitoring by the farmer group leaders and project technical staff.
7. Field visits organized before harvest with all the group members, on the different experimentation plots.
8. Harvesting: measure of yields.
9. Analysis of results in term of productivity, but also discussion on the quality of the variety tested with the buyer.
10. Decision for the next season: inventory of members interested to use the variety and preparation of the order for seeds purchase for year 2.

Action 1: Time-schedule



Action 1: Resources and costs (for year 1)

	Unit	Unit cost	Qty	Amount	Source of funding
Human resources					1440000
Technical advisor	man day	120,000 Kips/d	12	1,440,000 Kips	Project
FG leaders	man day	-	28	-	Volunteer leaders
Pilot farmers (experimenters)	man day	-	80	-	Volunteer pilot farmers
Transportation, running costs					
Transportation for seed purchase	return trip	150,000 Kips	1	150,000 Kips	Project
Meeting (snack, flipcharts...)	set amount	100,000 Kips	2	200,000 Kips	Project
Equipment					
Seeds	kg	4,000 Kips/kg	50 kg	200,000 Kips	Project
Weight scale	unit	60,000 Kips	1	60,000 Kips	Project

This is a fictive example, to illustrate the format proposed to work with FO/FG. Figures are not accurate

6.4. Implementation, monitoring and evaluation

The implementation of activities has to be closely monitored by the leaders of the farmer group, assisted by the project team. It is important to give a sense of responsibility to these leaders and to build their management capacities. In order to facilitate this monitoring by group leaders, “checklists” can be prepared to verify the progresses made in the implementation.

Results from the activities shall be evaluated by the group (with support of project facilitators and/or technical staff). This can be done in several steps. For instance, regarding the testing of a specific variety or cropping practice, a visit of the field can be done with group members before the harvest, and a discussion can take place after the harvest, once records on yields and economic information are available and can be discussed.

The discussion on the evaluation of the results shall be followed by the planning of the following year / season activities. For instance, if the trials of drought resistant varieties have been convincing, the farmers interested to grow this variety the following year can register and organize the purchase together.

6.5. Identification of the most suitable format for FO

The process of support to Farmer Organizations shall include assistance/advisory service to the group of farmer regarding the selection of the most appropriated legal format³⁸ to establish and formalize the organization.

From our point of view³⁹ this question has to be addressed progressively during the first stages of development of the Farmer Group (when we work with newly established groups). In fact, the choice of a legal status will depend on the purpose of the organization and the nature of activities. In the first months or years of the life of a Farmer Group, the proposed activities and services are likely to evolve, and the need for a formal registration is not, most often, an absolute priority⁴⁰. For this reason, the question of the legal status can be addressed after at least a first round of “pilot activities”, which will also contribute to mature the project of organization. This support shall rather come in the phase of “consolidation”⁴¹ of the Farmer Group.

³⁸ Part 2 (“Typology and actual situation of FO in Lao PDR and relevance in relation with Climate Change adaptation and resilience”) of the 1st report of this mission (“Analysis of Conditions for Farmer Organizations and Cooperatives from a viewpoint of Climate Change Adaptation and Resilience, and recommendations for improvements”) describe the different status currently proposed by Lao PDR legal framework for Farmer Organizations, including Cooperatives, Associations, Water User Associations...

³⁹ And excepted when the purpose of the organization imposes a specific status (case of the WUA for the management of irrigation schemes, for example).

⁴⁰ Excepted if the FO needs to be recognized as a legal entity, to sign contracts or apply for loans from the commercial banking sector, for instance.

⁴¹ See report 3 of this mission (“Farmer Organization / Cooperative Support Measures for Adaptation to Climate Change”) § 1.4.3. pages 7-8.

Yet, farmer groups often need a minimum level of legitimacy and recognition relatively early in their “life”. For this reason it is important that the government (through local authorities) offer a simple process of registration or “recognition” of farmer groups, to give them a legitimacy at the local level (this practice already exist in Laos, as mentioned in the 1st report of this mission).

Annexes

Annex 1: References of relevant documentation

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