ບໍລິການ-ສົ່ງເສີມກະສິກຳຮອບດ້ານ ขสกธ
LURAS Lao Upland Rural Advisory Service

Meta-study of climate adaptation measures tested by upland farmers in Laos

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National Agriculture and Forestry Research Institute (NAFRI)

December 2022

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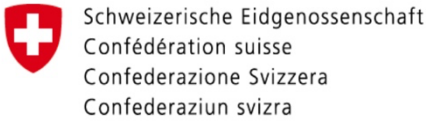
The views expressed in this report are those of the author and do not necessarily reflect the official policy or position of the donor or implementing partners of the LURAS project.



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Executive Summary

The present study was undertaken with the objective to analyse climate adaptation measures already tested by upland farmers in Laos. Although seven projects were initially selected for the study, due to a lack of sufficient information, only five were included. These are:

1. Improving the Resilience of the Agriculture Sector in Lao PDR to Climate Change Impacts (IRAS), FAO;
2. Eco-Friendly Intensification and Climate Resilient Agricultural Systems in Lao PDR (EFICAS), CIRAD;
3. Climate Protection through Avoided Deforestation (CliPAD), GIZ;
4. Northern Uplands - Promoting Climate Resilience (NU-PCR), CARE/CCL/SAEDA;
5. Strengthening Agro-climatic Monitoring and Information Systems (SAMIS) to improve adaptation to climate change and food security in Lao PDR, FAO.

A brief summary of the above projects is included in this report. After reviewing these projects and the climate change adaptation measures used in these studies, the measures were broadly classified into the following ten categories:

- Capacity building of stakeholders through knowledge transfer and training
- Climate/disaster vulnerability assessment
- Weather forecasting
- Land use planning
- Improved water management
- Improved livestock management
- Improved forest management
- Introducing new crop varieties
- Participatory action research/testing agroecological practices
- Gender/women's empowerment

The different activities undertaken in these projects were then listed under the above categories. It is vital to emphasize that the activities carried out by these initiatives are specifically tailored for the location, the crop, the culture, and the specific disaster to which the affected area is vulnerable. Futhermore, it is significant to keep in mind that the implementing partners have diverse focus areas and capacities.

The following table shows the projects that undertook activities related to the ten categories of climate change measures, according to the information that was available. Activities related to capacity building of stakeholders through knowledge transfer and training and land use planning were the two most frequently used methods by the projects included in the study. These were followed by weather forecasting, improved water and livestock management, participatory action research/testing agroecological practices and gender/women's empowerment. The measures least employed were climate/disaster vulnerability assessment, improved forest management and introduction of new crop varieties.

No	Measures	Projects
1	Capacity building of stakeholders through knowledge transfer and training	IRAS, EFICAS and NU-PCR
2	Climate/disaster vulnerability assessment	NU-PCR
3	Weather forecasting	NU-PCR and SAMIS
4	Land use planning	IRAS, EFICAS and SAMIS
5	Improved water management	IRAS and EFICAS
6	Improved livestock management	EFICAS and NU-PCR
7	Improved forest management	CliPAD
8	Introducing new crop varieties	IRAS
9	Participatory action research/ testing agroecological practices	EFICAS and NU-PCR
10	Gender/women's empowerment	IRAS and NU-PCR

A SWOT (strengths, weakness, opportunities and threats) analysis was conducted for all the activities in each measure. Though this analysis was subject to the availability of information, it permitted a better understanding of the activities and could be useful for future project managers, planners and policymakers who are making decisions about climate adaptation. An attempt was made to prioritize these measures at different levels i.e. national, sectoral and community level.

Capacity building of stakeholders has been attempted through training events and study tours for staff of various organizations at national, provincial, and district levels. Providing staff with regular access to technical training and innovative methods like gaming was also found to be effective.

The climate/disaster vulnerability assessment to understand the key hazards faced by the communities form a very important preliminary step. The key hazards were: crops most affected; communities' struggles with animal pests and poor hygiene conditions; other types of risks related to market prices of inputs and crops; market access and relationships with buyers and contracts. This requires training of the staff involved and retention of individual staff for the long term.

Seasonal and short-term weather forecasts have changed the farmers' planning of the farming calendar and practices. Farmers acknowledged the importance of informed decision making and proactively seeking and sharing this information. However, this measure is dependent on local capacity building processes to understand, interpret and act on this information.

Participatory Land Use Planning (PLUP) has been used with very effective results in some of these projects. Its utility has also been improved by modifying it to include land vulnerable to flooding, drought and erosion. This shows that existing tools can be scaled up and used efficiently to combat climate change effects.

Improved water management is another important measure which can not only protect crops from climate change effects, but can promote resilient livestock production. Small-scale community irrigation was found to have a visible effect on climate change resilience and livelihood diversification. Irrigation infrastructure construction/rehabilitation should ideally be allocated to irrigation development projects.

Livestock management is a pillar of resilience for communities. Effective actions include: support for permanent fencing to separate livestock areas from crop production areas; the establishment of forage

plots to improve livestock feeding; animal housing and water access; also improvement of animal health through organic feed, herbal medicine and vaccination.

Improved forest management is another measure that aids in balancing economic and forest cover goals, as well as understanding the sources of forest decline. One of the pilot solutions implemented is the provision of communal land rights to village land through the use of existing resources such as PLUP. Lessons learned from implementing this strategy could provide a solid foundation for the construction of community land titles to enhance sustainable resource management.

Four drought-tolerant rice varieties (TDK1, TDK 1/1, TDK 8 and TDK 11) piloted in flood/drought prone areas have shown better yield compared to the local seed used before. Participatory action research includes PLUP and the transformation of these plans into action plans and on-farm experiments and demonstrations related to crops, livestock, and forest-integrated management.

In gender/women's empowerment, activities such as: encouraging women to participate in local Provincial Agriculture and Forestry Office (PAFO) and District Agriculture and Forestry Office (DAFO); organising gender-specific events; and creating village savings and loan groups for women engaged in farming, have strengthened women's agency and their involvement in decision making which was found to be particularly fruitful.

Some of the measures such as gender/women's empowerment, land use planning, weather fore-casting, and improved water management were acknowledged by the farmers as well as the programme heads to be successful.

In conclusion, vulnerability assessment could be one of the first and most fundamental actions to take. Various situations in farming communities require specific adaption plans. Our advice is to make use of the opportunities offered by the previously tried adaptive measures and apply the lessons learnt to future projects. While many of these adaptive measures produced positive results, it was found throughout the study that they were neither maintained nor scaled up. This significantly implies the need for effective policy, institutional leadership, cross-sector collaboration, and resource availability. The opportunities provided by the previously tried adaptive methods should be utilised, and future projects should include the lessons learned. Throughout the planning stage, it is essential to assess the viability of measures and to set up processes for expanding them.

ມາດຕະການ ການປັບຕົວເພື່ອຮັບມືກັບການປ່ຽນແປງດິນຟ້າອາກາດທີ່ໄດ້ທົດສອບແລ້ວໂດຍຊາວກະສິກອນເຂດເນີນສູງໃນ ສປປ ລາວ

ບົດສະຫຼຸບໂດຍຫຍໍ້

ການດຳເນີນການສຶກສາຄົ້ນຄ້ວານີ້ ມີເປົ້າໝາຍວິເຄາະບັນດາມາດຕະການຕ່າງໆທີ່ກ່ຽວຂ້ອງກັບການຮັບມືກັບການປ່ຽນແປງດິນຟ້າອາກາດທີ່ໄດ້ທົດສອບແລ້ວໂດຍຊາວກະສິກອນເຂດເນີນສູງໃນ ສປປ ລາວ. ໃນເບື້ອງຕົ້ນໄດ້ຄັດເລືອກເອົາ 7 ໂຄງການທີ່ກ່ຽວຂ້ອງກັບການປັບຕົວເພື່ອຮັບມືກັບການປ່ຽນແປງດິນຟ້າອາກາດ ແຕ່ເນື່ອງຈາກບໍ່ມີຂໍ້ມູນພຽງພໍດັ່ງນັ້ນ ມີພຽງແຕ່ 5 ໂຄງການເທົ່ານັ້ນທີ່ສາມາດນຳມາວິເຄາະການຄົ້ນຄ້ວາ ເຊິ່ງລວມມີ:

1. ໂຄງການສ້າງຄວາມເຂັ້ມແຂງໃນຂະແໜງກະສິກຳ ເພື່ອຮັບມືກັບຜົນກະທົບຈາກການປ່ຽນແປງດິນຟ້າອາກາດ (IRA), FAO;
2. ໂຄງການ ລະບົບກະສິກຳທີ່ປັບຕົວຕາມການປ່ຽນແປງຂອງດິນຟ້າອາກາດ ແລະ ເປັນມິດກັບສິ່ງແວດລ້ອມ (EFICAS), CIRAD;
3. ໂຄງການປ້ອງກັນດິນຟ້າອາກາດໂດຍຫຼີກລ່ຽງການທຳລາຍປ່າໄມ້/ການຈັດຕັ້ງປະຕິບັດການຄຸ້ມຄອງປ່າໄມ້ແບບພູມິທັດ ແລະ ສິ່ງເສີມຊີວິດການເປັນຢູ່ຂອງຊາວກະສິກອນ (CliPAD), GIZ;
4. ໂຄງການສິ່ງເສີມການປັບຕົວເຂົ້າກັບການປ່ຽນແປງດິນຟ້າອາກາດເຂດເນີນສູງພາກເໜືອໃນ ສປປ ລາວ (NU-PCR), CARE/CCL/GIZ.
5. ການເສີມສ້າງຄວາມອາດສາມາດໃຫ້ແກ່ລະບົບການຕິດຕາມສະພາບອາກາດ ແລະ ຂໍ້ມູນຂ່າວສານກະສິກຳເພື່ອການປັບຕົວເຂົ້າກັບການປ່ຽນແປງດິນຟ້າອາກາດ ແລະ ຄວາມໝັ້ນຄົງທາງດ້ານສະບຽງອາຫານ ໃນ ສປປ ລາວ (ໂຄງການ SAMIS), FAO

ບົດສະຫຼຸບໂດຍຫຍໍ້ຂອງບັນດາໂຄງການຂ້າງເທິງນັ້ນ ໄດ້ສັງລວມຢູ່ໃນບົດລາຍງານນີ້. ພາຍຫຼັງໄດ້ທົບທວນຄືນບັນດາໂຄງການ ແລະ ມາດຕະການຕ່າງໆ ທີ່ນຳໃຊ້ເພື່ອຮັບມືກັບການປ່ຽນແປງດິນຟ້າອາກາດ ຈຶ່ງໄດ້ຈັດແບ່ງອອກບັນດາມາດຕະການເຫຼົ່ານັ້ນອອກເປັນ 10 ໝວດໃຫຍ່ ດັ່ງຕໍ່ໄປນີ້:

1. ການສ້າງຂີດຄວາມສາມາດໃຫ້ພາກສ່ວນທີ່ກ່ຽວຂ້ອງ ໂດຍຜ່ານການຖ່າຍທອດຄວາມຮູ້ ແລະ ການຝຶກອົບຮົມ
2. ການປະເມີນຄວາມສ່ຽງດ້ານໄພພິບັດ / ສະພາບດິນຟ້າອາກາດ
3. ການພະຍາກອນອາກາດ
4. ການວາງແຜນການນຳໃຊ້ທີ່ດິນ
5. ການປັບປຸງການຄຸ້ມຄອງນ້ຳ
6. ການປັບປຸງການຄຸ້ມຄອງການລ້ຽງສັດ
7. ການປັບປຸງການຄຸ້ມຄອງປ່າໄມ້
8. ການແນະນຳແນວພັນພືດໃໝ່ໃຫ້ມີຄວາມຫລາກຫລາຍ
9. ການຄົ້ນຄວ້າຜ່ານການປະຕິບັດຕົວຈິງແບບມີສ່ວນຮ່ວມ / ການທົດລອງການປະຕິບັດດ້ານນິເວດວິທະຍາ.
10. ບົດບາດຍິງ-ຊາຍ/ການສ້າງຄວາມເຂັ້ມແຂງໃຫ້ແມ່ຍິງ

ຫຼັງຈາກນັ້ນ ໄດ້ມີການຈັດແບ່ງກິດຈະກຳຕ່າງໆຂອງໂຄງການ ເປັນໝວດໝູ່ທີ່ກ່າວມາຂ້າງເທິງ. ສິ່ງສຳຄັນທີ່ຕ້ອງຮັບຮູ້ໄວ້ ກໍ່ຄື ກິດຈະກຳເຫຼົ່ານີ້ ໄດ້ຖືກອອກແບບ ແລະ ປັບໃຫ້ສອດຄ່ອງກັບສະພາບຕົວຈິງຂອງແຕ່ລະທ້ອງຖິ່ນ, ພືດພັນ, ວັດທະນະທຳ ແລະຄວາມສ່ຽງຈາກໄພພິບັດໃນເຂດປະສົບໄພ. ນອກຈາກນັ້ນ, ຍັງຕ້ອງຮູ້ໄວ້ວ່າ ບັນດາຄູ່ຮ່ວມຈັດຕັ້ງປະຕິບັດ ລ້ວນແຕ່ມີຈຸດສຸມ ແລະ ຄວາມອາດສາມາດທີ່ຫຼາກຫຼາຍ.

ຕາຕະລາງຕໍ່ໄປນີ້ສະແດງໃຫ້ເຫັນເຖິງບັນດາກິດຈະກຳທີ່ແຕ່ລະໂຄງການ ຈັດຕັ້ງປະຕິບັດບັນດາມາດຕະການ ການຮັບມືກັບການປ່ຽນແປງດິນຟ້າອາກາດ ພາຍໃຕ້ແຕ່ລະ 10 ໝວດ ຕາມຂໍ້ມູນທີ່ມີຢູ່. ໂດຍລວມແລ້ວ ກິດຈະກຳທີ່ກ່ຽວຂ້ອງກັບການສ້າງຄວາມອາດສາມາດໃຫ້ພາກສ່ວນກ່ຽວຂ້ອງ ໂດຍຜ່ານການຖ່າຍທອດຄວາມຮູ້ ແລະ ການຝຶກອົບຮົມ ແລະ ການວາງແຜນການນຳໃຊ້ທີ່ດິນ ແມ່ນສອງວິທີການທີ່ຖືກນຳໃຊ້ຫຼາຍທີ່ສຸດ. ລຳດັບຕໍ່ມາແມ່ນການພະຍາກອນອາກາດ, ການປັບປຸງການຄຸ້ມຄອງນ້ຳ ແລະ ການລ້ຽງສັດ, ການຄົ້ນຄວ້າແບບມີສ່ວນຮ່ວມ/ ການທົດສອບການປະຕິບັດດ້ານນິເວດວິທະຍາ ແລະ ບົດບາດຍິງ-ຊາຍ/ການສ້າງຄວາມເຂັ້ມແຂງໃຫ້ແມ່ຍິງ. ສ່ວນມາດຕະການທີ່ນຳໃຊ້ໜ້ອຍທີ່ສຸດແມ່ນ ການປະເມີນຄວາມສ່ຽງດ້ານໄພພິບັດ/ສະພາບດິນຟ້າອາກາດ, ການປັບປຸງການຄຸ້ມຄອງປ່າໄມ້ ແລະ ການແນະນຳແນວພັນພືດໃໝ່.

ລຳດັບ	ຕົວຊັດຜົນ	ໂຄງການ
1.	ການສ້າງຂີດຄວາມສາມາດໃຫ້ພາກສ່ວນທີ່ກ່ຽວຂ້ອງ ໂດຍຜ່ານການຖ່າຍທອດຄວາມຮູ້ ແລະ ການຝຶກອົບຮົມ	IRAS, EFICAS and NUPCR
2.	ການປະເມີນຄວາມສ່ຽງດ້ານໄພພິບັດ/ສະພາບອາກາດ	NUPCR
3.	ການພະຍາກອນອາກາດ	NUPCR and SAMIS
4.	ການວາງແຜນນຳໃຊ້ທີ່ດິນ	IRAS, EFICAS and SAMIS
5.	ການປັບປຸງການຄຸ້ມຄອງນ້ຳ	IRAS and EFICAS
6.	ການປັບປຸງການຄຸ້ມຄອງການລ້ຽງສັດ	EFICAS and NUPCR
7.	ການປັບປຸງການຄຸ້ມຄອງປ່າໄມ້	CliPAD
8.	ແນະນຳແນວພັນພືດໃໝ່	IRAS
9.	ການຄົ້ນຄວ້າທົດລອງປະຕິບັດຕົວຈິງແບບມີສ່ວນຮ່ວມ / ການທົດສອບການປະຕິບັດດ້ານນິເວດວິທະຍາ	EFICAS and NUPCR
10.	ບົດບາດຍິງ-ຊາຍ/ການສ້າງຄວາມເຂັ້ມແຂງໃຫ້ແມ່	IRAS and NUPCR

ສຳລັບທຸກໆກິດຈະກຳ ໄດ້ມີການນຳໃຊ້ເຄື່ອງມື SWOT ເພື່ອວິເຄາະ ຈຸດແຂງ, ຈຸດອ່ອນ, ໂອກາດ ແລະ ອຸປະສັກ ຂອງແຕ່ລະມາດຕະການ. ເຖິງແມ່ນວ່າການວິເຄາະດັ່ງກ່າວ ແມ່ນອີງໃສ່ຂໍ້ມູນທີ່ມີຢູ່ ແຕ່ຜົນຈາກການສຶກສາດັ່ງກ່າວ ຈະເປັນປະໂຫຍດ ແລະ ສາມາດຊ່ວຍໃຫ້ຜູ້ຮັບຜິດຊອບໂຄງການ, ຜູ້ວາງແຜນ ແລະ ຜູ້ກຳນົດນະໂຍບາຍ ມີຄວາມເຂົ້າໃຈກ່ຽວກັບກິດຈະກຳຮັບມືການປ່ຽນແປງດິນຟ້າອາກາດໄດ້ດີຂຶ້ນກ່ວາເກົ່າ. ນອກຈາກນັ້ນແລ້ວ ບົດສຶກສານີ້ ຍັງໄດ້ພະຍາຍາມຈັດລຽງລຳດັບຄວາມສຳຄັນຂອງແຕ່ລະມາດຕະການ ຢູ່ລະດັບຕ່າງໆ ເຊັ່ນ: ລະດັບສູນກາງ, ລະດັບຂະແໜງການ ແລະ ລະດັບຊຸມຊົນ. ສະຫຼຸບຜົນຈາກການວິເຄາະແຕ່ລະມາດຕະການແມ່ນດັ່ງນີ້:

ການສ້າງຄວາມສາມາດ ໃຫ້ພາກສ່ວນກ່ຽວຂ້ອງ ແມ່ນດຳເນີນຜ່ານກິດຈະກຳຝຶກອົບຮົມ ແລະ ການທັດສະນະສຶກສາໃຫ້ແກ່ພະນັກງານຈາກອົງການຕ່າງໆ ຈາກຂັ້ນສູນກາງ, ຂັ້ນແຂວງ ແລະ ຂັ້ນເມືອງ. ການໃຫ້ພະນັກງານເຂົ້າເຖິງການຝຶກອົບຮົມດ້ານວິຊາການຢ່າງເປັນປົກກະຕິ ແລະ ຜ່ານວິທີການທີ່ສ້າງສັນແບບໃຫມ່ ເຊັ່ນຜ່ານການຫຼິ້ນເກມ ແມ່ນເຫັນວ່າມີປະສິດທິຜົນຫຼາຍ.

ສ່ວນການປະເມີນຄວາມສ່ຽງດ້ານດິນຟ້າອາກາດ/ໄພພິບັດ ເພື່ອເຂົ້າໃຈເຖິງໄພອັນຕະລາຍ ທີ່ຊຸມຊົນ ປະເຊີນຢູ່ ແມ່ນເປັນບາດກ້າວທີ່ສຳຄັນທີ່ເປັນພື້ນຖານເບື້ອງຕົ້ນ. ໄພອັນຕະລາຍທີ່ພົບພໍ້ສ່ວນໃຫຍ່ໃນຊຸມຊົນຄື: ພືດຜົນທີ່ໄດ້ຮັບຜົນກະທົບສູງສຸດ, ຊຸມຊົນພົບກັບບັນຫາສັດຕູພືດ ແລະ ສັດ, ສຸຂະພາບສັດ ແລະ ຄວາມສ່ຽງອື່ນໆ ທີ່ກ່ຽວຂ້ອງ ກັບລາຄາຕະຫຼາດຂອງປັດໄຈການຜະລິດ ແລະ ພືດຜົນ, ການເຂົ້າເຖິງຕະຫຼາດ ແລະ ການພົວພັນກັບຜູ້ຊື້ ແລະ ສັນຍາ. ສິ່ງດັ່ງກ່າວນີ້ຕ້ອງຮຽກຮ້ອງໃຫ້ມີການຝຶກອົບຮົມໃຫ້ພະນັກງານທີ່ກ່ຽວຂ້ອງ ແລະ ການຮັກສາພະນັກງານ ໄວ້ບໍ່ໃຫ້ຍົກຍ້າຍໄປບ່ອນອື່ນ.

ການພະຍາກອນສະພາບຟ້າອາກາດໃນລະດູການ ແລະ ໃນໄລຍະສັ້ນ, ເຫັນໄດ້ເຖິງຄວາມປ່ຽນແປງໃນການວາງແຜນຂອງຊາວກະສິກອນໃນການເຮັດກະສິກຳ ແລະ ການຈັດຕັ້ງປະຕິບັດ. ຊາວກະສິກອນ ຮັບຮູ້ເຖິງຄວາມສຳຄັນ ຂອງການຕັດສິນໃຈອີງໃສ່ຂໍ້ມູນທີ່ໄດ້ຮັບ ການກະຕຶ້ລຶ້ລົ້ນຄົ້ນຫາຂໍ້ມູນເພີ່ມເຕີມ ແລະ ການແບ່ງປັນຂໍ້ມູນ. ແຕ່ສຳລັບມາດຕະການນີ້ ຜົນໄດ້ຮັບແມ່ນອີງໃສ່ຂະບວນການສ້າງຂີດຄວາມອາດສາມາດໃຫ້ທ້ອງຖິ່ນເພື່ອເຂົ້າໃຈ ຕີຄວາມໝາຍ ແລະ ນຳໃຊ້ຂໍ້ມູນທີ່ໄດ້ຮັບເພື່ອຈັດຕັ້ງປະຕິບັດ.

ການວາງແຜນນຳໃຊ້ທີ່ດິນແບບມີສ່ວນຮ່ວມ (PLUP) ແມ່ນນຳໃຊ້ຢ່າງມີປະສິດທິພາບໃນບາງໂຄງການ. ສ່ວນປະສິດທິຜົນໄດ້ຮັບການປັບປຸງໂດຍການລວມເອົາທີ່ດິນ ທີ່ມີຄວາມສ່ຽງຕໍ່ໄພນ້ຳຖ້ວມ, ໄພແຫ້ງແລ້ງ ແລະ ການເຊາະເຈື່ອນຂອງທີ່ດິນ ເພີ່ມເຂົ້າຕື່ມ. ສິ່ງນີ້ສະແດງໃຫ້ເຫັນວ່າເຄື່ອງມືທີ່ມີຢູ່ແລ້ວ ສາມາດນຳໄປຜັນຂະຫຍາຍ ແລະ ນຳໃຊ້ຢ່າງມີປະສິດທິຜົນເພື່ອຫຼຸດຜ່ອນຜົນກະທົບຈາກການປ່ຽນແປງດິນຟ້າອາກາດ.

ມາດຕະການທີ່ສຳຄັນອີກອັນໜຶ່ງ ແມ່ນການປັບປຸງການຄຸ້ມຄອງນ້ຳ ເຊິ່ງບໍ່ພຽງແຕ່ສາມາດປົກປ້ອງພືດທີ່ໄດ້ຮັບຜົນກະທົບຈາກການປ່ຽນແປງດິນຟ້າອາກາດເທົ່ານັ້ນ ແຕ່ຍັງສາມາດສົ່ງເສີມການລ້ຽງສັດໃຫ້ມີຄວາມທົນທານໄດ້. ນອກຈາກນັ້ນ, ຊຸມຊົນລະປະທານຂະໜາດນ້ອຍ ສົ່ງຜົນໃຫ້ເຫັນຢ່າງຊັດເຈນວ່າສາມາດສ້າງຄວາມທົນທານຕໍ່ການປ່ຽນແປງດິນຟ້າອາກາດ ແລະ ຄວາມຫຼາກຫຼາຍໃນການດຳລົງຊີວິດ. ສ່ວນການກໍ່ສ້າງ/ຟື້ນຟູພື້ນຖານໂຄງລ່າງຊຸມຊົນລະປະທານ ຄວນຈັດສັນເປັນໜ້າທີ່ຂອງໂຄງການພັດທະນາຊຸມຊົນລະປະທານ.

ການຄຸ້ມຄອງການລ້ຽງສັດເປັນເສົາຄ້ຳຂອງຊຸມຊົນທີ່ມີຄວາມເຂັ້ມແຂງທົນທານ. ການຈັດຕັ້ງປະຕິບັດທີ່ມີປະສິດທິຜົນ ປະກອບດ້ວຍການສະໜັບສະໜຸນການເຮັດຮົ້ວຖາວອນເພື່ອແຍກເຂດລ້ຽງສັດ ແລະ ເຂດຜະລິດພືດ, ການຈັດແບ່ງເຂດປູກຫຍ້າ ເພື່ອປັບປຸງອາຫານສຳລັບລ້ຽງສັດ, ຄອກສັດ ແລະ ການເຂົ້າເຖິງນ້ຳ; ແລະ ການເອົາໃຈໃສ່ສຸຂະພາບສັດຜ່ານການໃຫ້ອາຫານຊີວະພາບ, ຢາສະໝຸນໄພ ແລະ ການສັກຢາວັກຊີນ.

ການປັບປຸງການຄຸ້ມຄອງປ່າໄມ້ ເປັນອີກມາດຕະການໜຶ່ງ ທີ່ຊ່ວຍໃຫ້ມີຄວາມດຸ່ນດ່ຽງໃນການເປົ້າໝາຍດ້ານເສດຖະກິດ ແລະ ການປົກຫຸ້ມຂອງປ່າໄມ້ ພ້ອມທັງເຂົ້າໃຈເຖິງແຫຼ່ງທີ່ມາຂອງການຫຼຸດລົງຂອງປ່າໄມ້. ຫນຶ່ງໃນວິທີການທົດລອງແກ້ໄຂ ທີ່ປະຕິບັດແມ່ນການສະຫນອງສິດການນຳໃຊ້ທີ່ດິນຊຸມຊົນໃນບ້ານ ໂດຍຜ່ານຂະບວນການວາງການນຳໃຊ້ທີ່ດິນແບບມີສ່ວນຮ່ວມ (PLUP). ບົດຮຽນທີ່ຖອດຖອນໄດ້ຈາກການຈັດຕັ້ງປະຕິບັດຍຸດທະສາດ

ດັ່ງກ່າວ ສາມາດສ້າງພື້ນຖານອັນໜັກແໜ້ນໃຫ້ແກ່ການອອກໃບຕາດິນຊຸມຊົນ ເພື່ອເປັນການຄຸ້ມຄອງ ຊັບພະຍາກອນແບບຍືນຍົງ.

ແນວພັນເຂົ້າທີ່ທົນທານຕໍ່ໄພແຫ້ງແລ້ງ 4 ແນວພັນ (TDK1, TDK 1/1, TDK 8 ແລະ TDK 11) ທີ່ໄດ້ທົດ ລອງນຳໃຊ້ໃນເຂດທີ່ມີຄວາມສ່ຽງຕໍ່ໄພນ້ຳຖ້ວມ/ໄພແຫ້ງແລ້ງ ເຫັນວ່າໄດ້ຜົນຜະລິດດີ ເມື່ອທຽບໃສ່ກັບແນວພັນ ເຂົ້າທ້ອງຖິ່ນທີ່ເຄີຍໃຊ້ມາກ່ອນ. ການຄົ້ນຄວ້າແບບມີສ່ວນຮ່ວມ ລວມທັງການນຳໃຊ້ຮູບແບບ PLUP ແລະ ການ ຫັນປ່ຽນບັນດາແຜນງານຕ່າງໆ ໄປສູ່ແຜນປະຕິບັດງານ ການທົດລອງ ແລະ ການສາທິດກ່ຽວກັບການປູກພືດ ການ ລ້ຽງສັດ ແລະ ການຄຸ້ມຄອງປ່າໄມ້ແບບປະສົມປະສານ.

ສຳລັບວຽກງານບົດບາດຍິງ-ຊາຍ/ການສ້າງຄວາມເຂັ້ມແຂງໃຫ້ແມ່ຍິງ ຕົວຢ່າງຂອງກິດຈະກຳທີ່ຈັດຕັ້ງປະຕິບັດລວມ ມີ: ການສະໜັບສະໜູນໃຫ້ແມ່ຍິງເຂົ້າຮ່ວມກິດຈະກຳໃນທ້ອງຖິ່ນທີ່ຈັດຕັ້ງປະຕິບັດໂດຍພະແນກກະສິກຳ ແລະ ປ່າໄມ້ແຂວງ ແລະ ຫ້ອງການກະສິກຳ ແລະ ປ່າໄມ້ເມືອງ, ການຈັດຕັ້ງປະຕິບັດກິດຈະກຳສະເພາະວຽກງານຍິງ-ຊາຍ ແລະ ການສ້າງກຸ່ມເງິນທ້ອນຢູ່ຂັ້ນບ້ານໃຫ້ແກ່ແມ່ຍິງທີ່ປະກອບອາຊີບກະສິກຳ ເປັນການສ້າງຄວາມເຂັ້ມແຂງໃຫ້ແກ່ ແມ່ຍິງ ໂດຍສະເພາະແມ່ນການມີສ່ວນຮ່ວມໃນການຕັດສິນໃຈ ເຫັນວ່າ ໄດ້ຮັບຜົນດີເປັນພິເສດ.

ສ່ວນມາດຕະການ ທີ່ໄດ້ຮັບການຍອມຮັບຈາກຊາວກະສິກອນ ແລະ ບັນດາຫົວໜ້າໂຄງການ ວ່າເປັນມາດຕະການ ທີ່ປະສົບຜົນສຳເລັດ ລວມມີ ວຽກງານບົດບາດຍິງ-ຊາຍ/ການສ້າງຄວາມເຂັ້ມແຂງໃຫ້ແມ່ຍິງ, ການວາງແຜນນຳໃຊ້ທີ່ ດິນ, ການພະຍາກອນອາກາດ ແລະການປັບປຸງການຄຸ້ມຄອງນ້ຳ .

ສະຫຼຸບແລ້ວ ການປະເມີນຄວາມສ່ຽງຂອງການປ່ຽນແປງດິນຟ້າອາກາດ ເປັນໜຶ່ງໃນການດຳເນີນການຂັ້ນພື້ນຖານ ທີ່ຈຳເປັນທີ່ຈະຕ້ອງຈັດຕັ້ງປະຕິບັດ. ແຕ່ລະຊຸມຊົນທີ່ຜະລິດກະສິກຳລ້ວນແຕ່ຢູ່ໃນສະພາບການທີ່ແຕກຕ່າງກັນ ຈຶ່ງຈຳເປັນຕ້ອງມີແຜນການພັດທະນາຮັບມືສະເພາະສຳລັບຊຸມຊົນນັ້ນ. ສະນັ້ນ, ເຮົາຄວນນຳເອົາບົດຮຽນທີ່ໄດ້ຮັບ ຈາກບັນດາມາດຕະການຮັບມືທີ່ໄດ້ຈັດຕັ້ງປະຕິບັດມາແລ້ວ ເພື່ອນຳມາປັບໃຊ້ກັບໂຄງການຕ່າງໆທີ່ຈະຈັດຕັ້ງ ປະຕິບັດໃນອະນາຄົດ ເພື່ອໃຫ້ເກີດຜົນປະໂຫຍດສູງສຸດ. ເຖິງແມ່ນວ່າບາງມາດຕະການ ໄດ້ຮັບຜົນດີໃນການຈັດຕັ້ງ ປະຕິບັດ ແຕ່ຜົນຈາກການຄົ້ນຄວ້າຍັງພົບວ່າ ມາດຕະການເຫຼົ່ານັ້ນ ຍັງບໍ່ໄດ້ນຳມາໃຊ້ຢ່າງເປັນທາງການ ຫຼື ຖືກນຳໄປ ຜັນຂະຫຍາຍ ເຊິ່ງເປັນການຊີ້ໃຫ້ເຫັນເຖິງຄວາມຕ້ອງການ ການສະໜັບສະໜູນຈາກຂັ້ນເທິງ, ການສະໜັບສະໜູນ ທາງດ້ານນະໂຍບາຍ, ການຮ່ວມມືລະຫວ່າງຂະແໜງການຕ່າງໆ ແລະ ຄວາມຕ້ອງການທາງດ້ານຊັບພະຍາກອນ. ຕະຫຼອດໄລຍະຂັ້ນຕອນການວາງແຜນ ຈຳເປັນຕ້ອງປະເມີນຄືນບັນດາມາດຕາການທີ່ມີຢູ່ ແລະ ກຳນົດຂະບວນການ ສຳລັບການຜັນຂະຫຍາຍ.

List of acronyms

ACIAR	Australian Centre for International Agricultural Research
adjREL	Adjusted Reference Emission Level
ADS	Agriculture Development Strategy
AEZ	Agro-Ecological Zones/Zoning
AFC	Agriculture and Forestry Conservation
AFD	Agence Française de Développement (French Development Agency)
BIIE	Building Income, Independence and Empowerment for Farmers
BMZ	Federal Ministry for Economic Cooperation and Development, Germany
CADP	Community-based Agricultural Development Plans
CAEP	Climate Action Enhancement Package
CAMKID	Community Association for Mobilizing Knowledge in Development
CARE	CARE International – International Non-Governmental Organization (INGO)
CBA	Community Based Adaptation
CCA	Climate Change Adaptation
CCL	Comité de Coopération avec le Laos (French INGO)
CCTAM	Climate Change Training and Adaptation Module
CDAIS	Capacity Development for Agricultural Innovation Systems
CEO	Chief Executive Officer
CIRAD	French Agricultural Research Centre for International Development
CliPAD	Climate Protection through Avoided Deforestation
COVID-19	Coronavirus disease caused by SARS CoV-2 virus
CRED	Climate Resilient Extension Development
CSA	Climate Smart Agriculture
CSIRO	Commonwealth Scientific and Industrial Research Organization
CSO	Civil Society Organization
CVCA	Climate Vulnerability and Capacity Analysis
DAF	Development Adjustment Factor
DAFO	District Agriculture and Forestry Office
DALAM	Data Assimilation Limited Area Model
DCC	Department of Climate Change
DCC	Dynamic Crop Calendars
DGIS	Directorate-General for International Cooperation (Netherlands)
DMH	Department of Meteorology and Hydrology
DONRE	Departmental Office of Natural Resources and Environment
DOPC	Department of Planning and Cooperation
DLPD	Department of Land Planning and Development
DRR	Disaster Risk Reduction
EFICAS	Eco-Friendly Intensification and Climate Resilient Agricultural Systems in Lao PDR
ENUFF	Enhancing Nutrition of Upland Farming Families
ENSO	El Nino Southern Oscillation
ER-PIN	Emissions Reduction Programme Idea Note
FAO	Food and Agriculture Organization of the United Nations
FCPF	Forest Carbon Partnership Facility
FFS	Farmer Field School
FPIC	Free, Prior and Informed Consent
GAEZ-v4	Global Agro-Ecological Zones/Zoning – version 4
GIS	Geographic Information System
GIZ	German Development Cooperation
GDP	Gross Domestic Product
GMO	Genetically Modified Organism
GoL	Government of Laos

GPS	Global Positioning System
IEC	Information, Education and Communications
INFORM	Index for Risk Management
ILO	International Labour Organization
IRAS	Improving the Resilience of the Agricultural Sector in Lao PDR to Climate Change impacts
JNRI	Jurisdictional Nested REDD Initiative
LaCSA	Laos Climate Service for Agriculture
LAK	Lao Kip (currency of Lao PDR)
Lao PDR	Lao People's Democratic Republic
LBA	Lao Biodiversity Association
LDC	Least Developed Country
LDCF	Least Developed Countries Fund
LRIMS	Land Resources Information Management System
LURAS	Lao Upland Rural Advisory Service
LWU	Lao Women's Union
MAF	Ministry of Agriculture and Forestry of Laos
MDG	Millennium Development Goals
MLSW	Ministry of Labour and Social Welfare
MONRE	Ministry of Natural Resources and Environment, Lao PDR
MOU	Memorandum of Understanding
NAEZ	National Agro-ecological Zones
NAFRI	National Agriculture and Forestry Research Institute
NEM	New Economic Mechanism
NGO	Non-Governmental Organization
NPA	Non-Profit Association
NRM	Natural Resource Management
NSEDP	National Socio-Economic Development Plan
NTFP	Non Timber Forest Product
NTPC	Nam Theun 2 Power Company
NUDP	Northern Uplands Development Programme
NU-PCR	Northern Uplands – Promoting Climate Resilience
PAFO	Provincial Agriculture and Forestry Office
PIR	Post-Implementation Review
PMERL	Participatory Monitoring, Evaluation, Reflection and Learning
PONRE	Provincial Office of Natural Resources and Environment
PLUP	Participatory Land Use Planning
PSP	Participatory Scenario Planning
REDD+	Reducing Emissions from Deforestation and Forest Degradation plus
SAEDA	Sustainable Agriculture and Environment Development Association
SAMIS	Strengthening Agro-climatic Monitoring and Information Systems
SAR	Systems at Risk
SAVA	Socio-Agricultural Vulnerability Analysis
SDG	Sustainable Development Goals
SNV	SNV - Netherlands Development Organization
SRI	Sustainable Rice Intensification
SRS	Sustainable Rice System
SWOT	Strengths, Weaknesses, Opportunities, Threats
TOR	Terms of Reference
ToT	Training of Trainers
TSC	Technical Service Centre
UNDP	United Nations Development Programme
UXO	Unexploded Ordnance
VLMC	Village Land Management Committee
VSLA	Village Savings and Loan Associations
VVW	Village Veterinary Workers

1. Introduction

1.1 Background

The Lao Upland Rural Advisory Service (LURAS) response to climate change is Climate Resilient Extension Development (CRED), which adds community-based adaptation to the portfolio of Green Extension activities developed in Phases I and II. Communities will be involved in CRED's assessments of local susceptibility to climate change, such as flash floods and droughts, as well as decision making about adaptive strategies.

This meta-study aims to summarise the lessons learned from completed or on-going projects that supported climate adaptation among small farmers in the uplands of Laos. This results of this study will help improve the design and implementation of the CRED activities of LURAS and other initiatives to reduce the vulnerability of rural communities to floods, droughts and other impacts of climate change.

The adaptive measures were reviewed based on their suitability to the different conditions experienced by local farmers. These included: alternative products (e.g. perennial crops, drought-tolerant varieties); alternative production techniques (e.g. terracing, intercropping); post-harvest facilities (e.g. drying beds and storage facilities); repairs or upgrading of essential infrastructure (e.g. reinforcing irrigation channels, installing solar-powered pumps); and a range of socio-economic activities (e.g. market studies, training and exchanges, group development).

Despite technological advances, such as improved varieties, genetically modified organisms (GMOs), and irrigation systems, climate is still a key factor in agricultural productivity. This adds on to the already existing constraints affecting agriculture in Laos, such as low agricultural productivity, competition from neighbouring countries and the need to meet high, international quality standards.

The effects of climate change on agriculture can take place through changes in average temperatures; rainfall; and climate extremes (e.g. droughts and floods); changes in pests and diseases; changes in the nutritional quality of some foods etc. Another important factor that determines the effects of climate change is the type of crops grown in Laos and their resilience against and resistance to climate change. Today, 72 percent of the total cultivated area is dedicated to rice. Most of the provinces deficit in rice have surplus maize production. Other important economic crops include coffee, sugarcane, cassava, sweet potato and industrial tree crops (such as rubber, eucalyptus and acacia). Therefore, climate change effects on agriculture are unevenly distributed across Lao PDR.

The analysis of the completed project documents included the expected results with respect to multiple targets for each year. The strengths and weaknesses of the projects and the measures implemented were ascertained by comparing the actual results with those expected. The results were considered alongside the objective(s) of the project and also examined to see if they were in line with the needs of the crop producers. It also included the variation in the result in each year as the characteristics of the targets (effect of climate change, crop, target population etc.) change. To date, many projects have demonstrated the intended results of measures such as: resource management; crop improvement; appropriate land use for suitability for agricultural production. However, these indicators may not have been exactly in line with the target for each sector. Hence, the appropriateness of these indicators was also analysed. In addition, the role of these projects in working towards the Sustainable Development Goals: SDG 10 (reduced inequalities), SDG 13 (climate action) and SDG 17 (partnerships for the goals) was analysed.

These lessons and policies drawn from previous projects are important stepping stones for forthcoming projects with similar objectives. A sound understanding of each project, including: the target region, crop, community, the problem the project aims to resolve, the methods used, the lessons

learnt, and the policies recommended can help develop a range of policies for climate change adaptation that may reduce the risk of negative climate change impacts on agriculture.

The implications of this review depend on a thorough analysis of the projects. The success or failure of each project in achieving its predetermined objective(s) and the reasons behind it will provide the much-needed information to improve future projects with similar objectives. This review can also help the stakeholders to develop projects in line with the urgent needs and also make use of the most efficient measures that may be tailor made for a particular region and population.

1.2. Rationale of the study

The 17 Sustainable Development Goals (SDGs) were agreed on in 2015 by the Member States of the United Nations to create a better world by 2030. In 2016, the Government of Lao PDR formally launched the national SDG 18, 'Lives safe from UXO'. These goals embody the urgency to take on actions against poverty, hunger, inequality, climate change and biodiversity decline. Governments, the private sector and civilians are taking up the SDGs to indicate the societal value of their projects. This review of complete and on-going projects examines the effectiveness of multiple, relevant, climate adaptation measures tested by upland farmers in Laos with implications for the future setting of target goals and potentially the achievement of the relevant SDGs.

1.3. Objectives

The overall goal of this analysis is to provide a comprehensive review of literature and climate adaptation measures already tested by upland farmers in Laos and analyse these.
In particular, the study has the following objectives:

- to provide a list of projects involving climate adaptation measures projects that were already completed or are ongoing;
- to provide a summary including the objectives, strategies, activities and results achieved of each of these projects;
- to conduct a strength, weakness, opportunities, and threats (SWOT) analysis of the measures employed;
- to conduct a meta-analysis of the measures.

1.4. Research scope

The following review consists of a few selected projects dealing with climate adaptations:

Completed projects

- Improving the Resilience of the Agriculture Sector in Lao PDR to Climate Change Impacts (IRAS), FAO
- Eco-Friendly Intensification and Climate Resilient Agricultural Systems in Lao PDR (EFICAS), CIRAD
- Northern Uplands Promoting Climate Resilience (NU-PCR), CARE/CCL/SAEDA
- Climate Smart Agriculture in Laos (CSA), SNV

Ongoing projects

- Climate Protection through Avoided Deforestation (CliPAD), GIZ
- Strengthening Agro-climatic Monitoring and Information Systems (SAMIS) to improve adaptation to climate change and food security in Lao PDR, FAO

1.5. Beneficiaries

This study aims to enhance the ability of policy makers and policy writers to make informed decisions regarding plans and strategic allocation of resources. Such planning may be customized to each region, based on: different agricultural practices; climate changes; crops grown; topography; socio economic status etc. It is hoped that it will be beneficial to organizations aiming to combat the effects of climate on agriculture. This study will also help farmers to employ the best agriculture practices to reduce the ill effects of climate change. In the long run, this may help to alleviate poverty and uplift the economy of the country that has been affected by the COVID-19 pandemic in the last few years.

2. Literature Review

2.1. General information on Lao PDR

Laos is a landlocked country in Southeast Asia that borders Vietnam, Cambodia, Thailand, Myanmar, and China. It is situated close to the South China Sea. Laos has a surface area of 91,429 square miles (236,800 square kilometres) [1] with a total population of 7.5 million made up of 50 ethnic groups.[2]

The monsoon pattern and tropical savanna dominate the climate. From May to October, there is a distinct rainy season, which is followed by a dry season from November to April. Because the last two months of the climatologically defined dry season are substantially hotter than the first four, local custom says that there are three seasons: rainy, cool, and hot.

In 2021, the Gross Domestic Product (GDP) of the Lao People's Democratic Republic (Lao PDR) was estimated to be worth 18.83 billion US dollars, according to the World Bank, with the agriculture, fisheries, forestry sector accounting for about 17 percent. Growth in the agriculture, fisheries, forestry sector was recorded at almost 3 percent in 2022, with agricultural exports of 870 million US dollars in the second half of the year, following the lifting of restrictions linked to the Covid pandemic.[3] According to the most recent economic update from the World Bank for the Lao PDR, while some areas of the Lao economy are starting to recover from the slowdown brought on by COVID-19, the nation still faces significant difficulties because of persistent macroeconomic imbalances. If ongoing debt negotiations are successful and harsh COVID-19 containment measures do not reappear, the Lao PDR's GDP is predicted to develop by 3.8 percent in 2022, up from a projected 2.5 percent in 2021. The nation continues to draw international investment and currently has a trade surplus. While agriculture and manufacturing exports are bolstered by robust international demand and rising commodity prices, the oil and mining industries have experienced growth. Domestic services are also anticipated to gradually improve.[4]

The Laos-China Railway was a stepping stone for Laos in achieving its ambition of becoming a "land linked country" rather than a "land locked country". Laos is expecting to use the potential offered by this transport route to boost its export of agricultural products, which may have a significant impact on the country's economy.

2.2. Overview of the agriculture sector of Lao PDR

The Lao PDR has a small population and an abundance of fertile land. Its diverse geography and climate are ideal for growing a wide range of agricultural crops. Over 60% of the population is employed in agriculture and forestry, which is a key component of the Lao PDR's development strategy.[5] A total of 2.4 million hectares (ha) are thought to be utilised for agriculture in the Lao PDR, of which only 59 percent (1.4 million ha) are categorised as arable, 4 percent are planted with perennial crops, and 37 percent are used for grazing and meadows., The agricultural land area of the Lao PDR accounts for only around 10% of the total land area, one of the smallest percentages among Southeast Asian nations. Crop production, the sale of livestock, and the sale of forest products account for the majority of income in

[1] "Laos Population 2022 (Demographics, Maps, Graphs)", World Population Review, https://worldpopulationreview.com. Accessed 12 July 2022.
[2] https://kpl.gov.la/EN/detail.aspx?id=42092
[3] Vientiane Times, 9th January 2023 "Laos records 3 percent growth in agriculture sector."
[4] https://www.worldbank.org/en/news/press-release/2022/05/12/lao-pdr
[5] ILO (International Labour Organization). 2022. Employment by sex and economic activity – ILO modelled estimates, November 2019. In: ILOSTAT explorer. Geneva. Cited 5 May 2022.

rural Lao PDR households. Food, particularly rice, accounts for about 50% of the general household consumption, and about a 60% share of the low-income households. [6]

In the lowlands, rain-fed and irrigation-based rice systems predominate, along with integrated mixed-crop systems of vegetables, groundnuts, and fruit trees. A mixed farming approach is used by many smallholder farm households, especially in the uplands of the northern provinces where shifting agriculture is most common. Vegetables, groundnuts, starchy crops, and tropical fruits are all grown by farmers along with rice in the central and southern provinces. Commercial crops such as maize, sugarcane, cassava, and rubber have recently been added to the list of plants that are being cultivated in several areas of the country.

Despite this, agriculture contributes only 16% of the nation's GDP, due to low productivity and outdated practices.[7] The agriculture industry is marked by an ageing population, as young people relocate more frequently in search of better opportunities. These choices are heavily influenced by persistent poverty, food insecurity, and a lack of opportunities in rural areas.

2.3. Effect of climate change on agriculture in Lao PDR

Lao PDR has a tropical climate that is affected by the southeast monsoon, which produces high humidity and 70% of the country's yearly rainfall. There are two different seasons: the dry season from mid-October to April and the rainy season, or monsoon, from May to mid-October. The annual average amount of precipitation might reach 3,000 millimetres (mm). The plateaus and northern and eastern mountainous regions record a mean annual temperature of 20°C, whereas the plains record a higher temperature of 25–27°C.

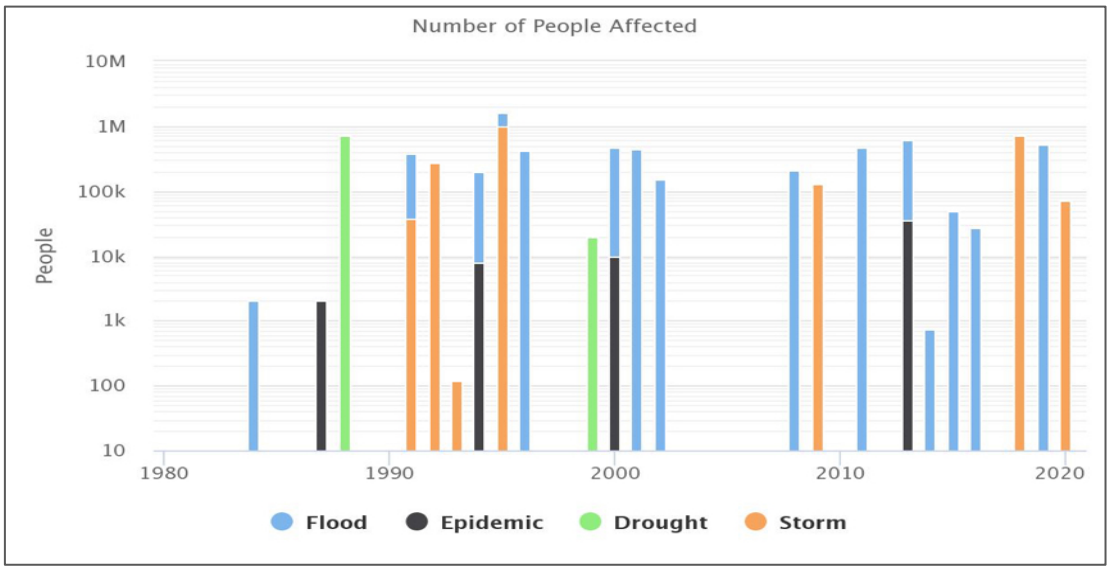
Lao PDR is divided into three different climatic zones, as follows: (1) the northern mountainous areas above 1,000 metres; (2) the central mountainous regions in the Annamite Chain ranging in altitude from 500 to 1,000 metres; (3) the tropical lowland plain and floodplains along the Mekong River and its main tributaries. The northern uplands which are of greatest interest to this study, are relatively dry, with an average rainfall between 1,500 and 2,000 mm. Temperature ranges are also lower than the rest of the country. El Nino Southern Oscillation (ENSO) has been found to affect temperature and precipitation rates, though generally to a smaller extent than in other Southeast Asian countries.

According to the World Bank's Climate Profile for Laos,[8] published last year, Lao PDR faces high disaster risk levels and is ranked 69th out of 191 countries by the 2019 INFORM Risk Index.[9] Lao PDR, is particularly vulnerable to flooding, including riverine and flash flooding. Lao PDR is also marginally exposed to tropical cyclones and the dangers they pose. Due to the hydrology of the area being dramatically altered by hydropower development on the Mekong River, drought exposure is lower, but it still needs to be monitored. Lao PDR's poor capacity for coping and, to a lesser extent, the population's vulnerability, together with its overall score on the INFORM risk index, are aggravating factors. Recent incidents have highlighted the risks of disaster connected to climatic hazards in Lao PDR. Hundreds of thousands of people were impacted by back-to-back tropical storms in 2011, which necessitated a substantial humanitarian response, especially to address concerns over hygiene and sanitation brought on by flooding, landslides, and related infrastructure damage. Over 350,000 people were impacted by the extreme flooding in 2013, which also destroyed thousands of animals and damaged 15,000 acres of

[6] Asian Development Bank (ADB). 2017a. Lao PDR: Accelerating Structural Transformation for Inclusive Growth. Country Diagnostic Study.
[7] World Bank. 2022. Agriculture, forestry, and fishing, value added (% of GDP). In: World Bank Open Data. Washington, DC. Cited 5 May 2022. https://data.worldbank.org/indicator/NV.AGR. TOTL.ZS
[8] Climate Risk Country Profile: Lao PDR (2021): The World Bank Group and the Asian Development Bank.
[9] European Commission (2019). INFORM Index for Risk Management. Lao PDR Country Profile. URL: https://drmkc.jrc.ec.europa.eu/ inform-index/Countries/Country-Profile-Map 32

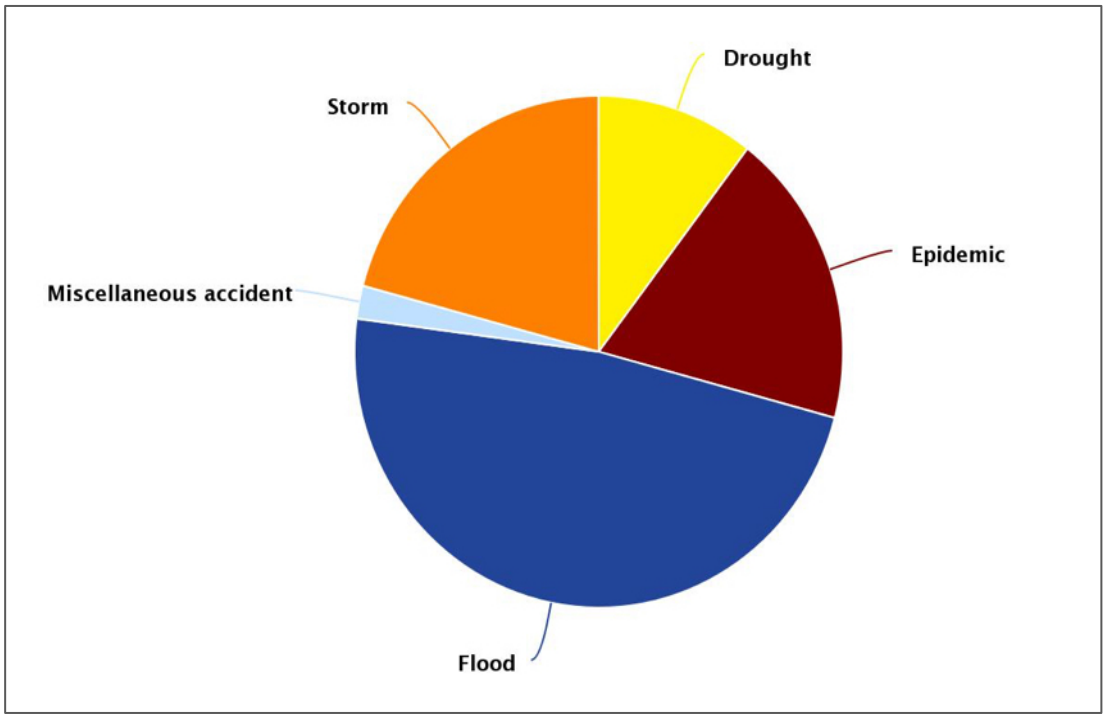
rice crops, in addition to key national infrastructure including bridges and schools.[10] Tens of thousands of hectares of upland, rice, and fruit crops suffered damage in 2015, due to a serious drought that was partially caused by a severe El Nino event.[11]

Figure 1. Key Natural Hazard Statistics for 1980-2020



Source: https://climateknowledgeportal.worldbank.org/country/lao-pdr/vulnerability

Figure 2. Average Annual Natural Hazard Occurrence for 1980-2020



Source: https://climateknowledgeportal.worldbank.org/country/lao-pdr/vulnerability

[10] Reliefweb (2013). Lao People's Democratic Republic – Humanitarian Report.
[11] Sutton, W., Srivastava, J., Rosegrant, M., Koo, J., Robertson, R. (2019). Striking a balance: Managing El Niño and La Niña in Lao PDR's Agriculture. World Bank Group.

Climate change may have an impact on food production, through having both direct and indirect effects on agricultural growth processes. Modifications to the availability of carbon dioxide, precipitation patterns, and temperatures are examples of direct effects. The advent of invasive species, changes in pest and disease profiles, soil erosion, effects on the availability and seasonality of water resources, and loss of arable land due to flooding or desertification are examples of indirect consequences. Even on lower emission pathways, these effects are predicted to harm critical staple crop yields globally. Tebaldi and Lobell (2018) predict that even if the Paris Climate Agreement is fulfilled and warming is kept to 1.5°C, global wheat and maize yields will drop by 5 and 6 percent, respectively.[12] The magnitude and speed of these changes will depend on the emissions pathway, but changes in the optimal and viable spatial ranges for some crops are also unavoidable. Paddy rice farming takes up the majority of the agricultural land in Lao PDR, although maize production is also on the rise. In the Lao PDR, rice is still a key component of family food security. Several studies have hypothesised that climate change may have some positive effects on the net primary productivity of rice plants.[13]

The forecast for rice output as a whole is unclear. If they coincide with crucial phases near the beginning and end of the cropping cycle, changes in the onset, duration, and intensity of the rainy season, as well as an increase in the frequency of droughts and heatwaves, may have severe negative effects on rice production overall and its dependability as a source of calories and income. Rice is highly susceptible to high minimum night-time temperatures.[14] Lao PDR's minimum temperatures are anticipated to climb significantly more quickly than the country's mean temperatures. According to one study, local rice yields may be reduced by 5–20% by the 2040s due to changes in temperature and rainfall patterns, with losses being typically greater under higher emission scenarios.[15] The poorest and most vulnerable smallholders may not be able to adopt the adaptations that have been identified, due to financial and technical obstacles. The impact of climate change on labour force productivity and health has an additional impact on agricultural production. According to Dunne et al. (2013), the global labour productivity during peak months has already decreased by 10% as a result of warming, and under the highest emissions scenario, a decline of up to 20% may be anticipated by the middle of the century (RCP 8.5 pathway).[16] Combining the aforementioned processes will very certainly result in significant changes to national food consumption patterns, both directly affecting domestic agricultural operations and indirectly affecting the global supply chain.

2.4. Current policy support for agriculture in Lao PDR

The Lao PDR's socioeconomic development changed from its traditional (self-sufficient) economy to a more market-oriented one after the introduction of the open-door policy under the New Economic Mechanism (NEM), placing great importance on agriculture and forestry as the foundation for industrialization. As more money was invested in building irrigation systems, reservoirs, and water stations across the nation, agricultural growth grew, allowing farmers to enjoy two seasons of cropping and to diversify their crops. Swidden rice production (i.e. slash and burn) was widespread in

[12] Tebaldi, C., & Lobell, D. (2018). Differences, or lack thereof, in wheat and maize yields under three low-warming scenarios.
[13] Russell, A., Foppes, J., Behr, D., Ketphanh, S., Rafanoharana, S. (2015). How Forests Enhance Resilience to Climate Change: The Case of Smallholder Agriculture in Lao PDR.
[14] Welch, J. R., Vincent, J. R., Auffhammer, M., Moya, P. F., Dobermann, A., & Dawe, D. (2010). 'Rice yields in tropical/subtropical Asia exhibit large, but opposing sensitivities to minimum and maximum termperatures.'
[15] Li, S., Wang, Q., & Chun, J. A. (2017). Impact assessment of climate change on rice productivity in the Indochinese Peninsula using a regional-scale crop model, International Journal of Climatology.
[16] Dunne, J. P., Stouffer, R. J., & John, J. G. (2013). Reductions in labour capacity from heat stress under climate warming.

the uplands of Laos for hundreds of years, providing a foundation for food security for many ethnic groups. The practice has been actively discouraged by the Government in recent decades, while promoting cash crops (rubber, maize, bananas, cassava etc.) that provide farmers with higher income.

To secure the sustainable production of food and commercial commodities, the eighth National Socioeconomic Growth Plan (NSEDP) 2016-2020 placed a strong emphasis on the development of the agriculture and forestry sectors. It focused on the application of new technology to improve processing of products, such as international standard rice mills and furniture factories for wood products, to increase value added. Some of its established methods include land zoning to distribute land for certain crops, land registration to prevent the conversion of irrigated rice fields, and the issue of agricultural land titles to farmer families. The Government's Vision and Goals for this agriculture sector are given below.

Agricultural Development Strategy to the Year 2025 and Vision to the Year 2030

Vision of the Agriculture Sector:

"Ensuring food security, producing comparative and competitive potential agricultural commodities, developing clean, safe and sustainable agriculture and shift gradually to the modernization of a resilient and productive agriculture economy, linking with rural development contributing to the national economic basis".

Overall Goals:

1. Economy has grown strongly in line with industrialization and modernization direction; comprehensive infrastructure, ensuring economic growth at a constant level; effective, stable, and assured food security which strongly ensures quality in terms of nutrition; and producing agricultural products with quantity and quality that are highly competitive as well as adaptable to climate change.
2. Agricultural production is in line with sanitary principles, clean, safe for producers' and consumers' health, and environmentally friendly.
3. Agricultural production has made contribution in many aspects such as creation of employment, income generation for people, reduction of gap between cities and rural areas, construction of new rural areas alongside the protection of symbolic cultures of all ethnic people, environmental protection, and stability and balance of the ecological system.

Source: *Ministry of Agriculture and Forestry (2015b)*

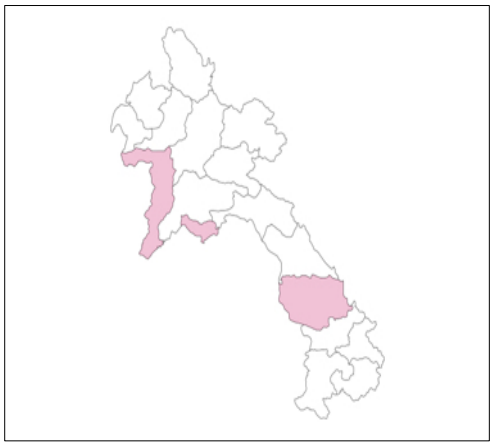
2.5. An overview of on-going and completed relevant research projects

2.5.1. Improving the Resilience of the Agriculture Sector in Lao PDR to Climate Change Impacts (IRAS), FAO

Key information
Period: 2012 – October 2015 **Donors**: United Nations Development Programme (UNDP) and Least Developed Countries Fund (LDCF) **Implementing Partners**: Ministry of Agriculture and Forestry (MAF), Lao PDR, through the National Agriculture and Forestry Research Institute (NAFRI) **Target locations**: *Vientiane Capital, Xayaboury and Savannakhet provinces*

Objectives:
To minimize the food insecurity resulting from climate change in Lao PDR and to reduce the vulnerability of farmers to extreme flooding and drought events.

Strategy:
Working in one drought-prone province in the south and one flood-prone province in the north, this project worked on reducing the vulnerability of farmers to extreme flooding and drought events through the introduction of an applied ecosystems-based approach to agriculture. The project engaged at several levels. At the community and farmer levels, it promoted a combination of new and traditional climate resilient cropping methods. At provincial and district levels, it strengthened the skills of planners, policymakers and extension workers. On the national level, it helped to introduce a climate risk information system as a basis for comprehensive long-term planning for climate risks.



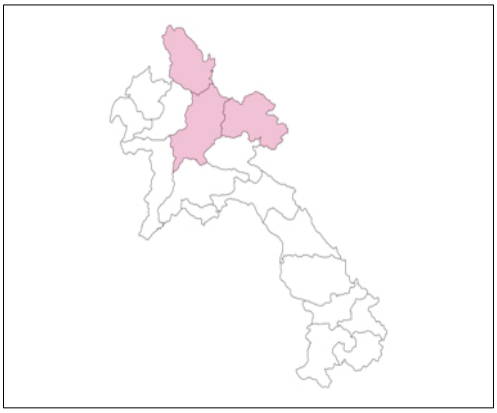
Activities:
- Improved national knowledge and information base on climate change and its impacts;
- Increased awareness and understanding of planners, extension workers and producers about climate risks in the agriculture sector;
- Diversified and adaptive agricultural practices.

Results:
- Climate change information generated, collected and uploaded into the website for public access. More than 180,000 clicks into the website observed in October 2013.
- 26 training activities on: basic climate change adaptation knowledge; geographic information systems (GIS); gender; and climate change adaptation etc.; held in Vientiane Capital, Xayaboury and Savannakhet provinces, allowing 803 (307 female) participants from government agencies, students and farmers to have exposure to and improve significantly their knowledge and understanding of climate change issues.
- Developed planning tools for forecasting and development of climate change scenarios on district and watershed level (several GIS layers, water balance assessment). Developed two land use maps with climate change characteristics for Paklay and Outoumphone districts.
- Integrated climate change criteria into formal village land use planning by Department of Land Planning and Development of the Ministry of Natural Resources and Environment, Lao PDR (DLPD/MONRE).

- Developed four Climate Change Training and Agriculture Adaptation Modules (CCTAMs) on: climate resilient cropping; livestock management; fisheries and vegetable practices; and implemented trials at pilot sites.
- 637 households (10%) of the project target farmers accessed technical support service from government extension officers during the piloting of 29 adaptive agricultural practices such as frog raising, duck raising, native chicken raising, pig raising, onion growing etc.
- Supported communities in drought-prone areas with 126 large jars (1,000 -1,600 litre units), 288 well tube rings (1000 litre units), and seven steel tanks (3,000 litres units) for rain water harvesting. Constructed 15 small scale reservoirs with capacity ranging from 80-7,500 cubic metres (Xayaboury province) and four fish ponds with capacity of 1,350-4,500 cubic metres (Savannakhet province).
- Flood/drought tolerant rice varieties (TDK1, TDK 1/1, TDK 8 and TDK 11) piloted in an area of about 110 hectares in four target districts. The average yield reached 3.6 tons per hectare (about one ton higher than local seed used before the project).
- Climate change knowledge is increasingly understood as a long-term challenge to the country in terms of potential impacts on infrastructure, agriculture, the economy and livelihoods.
- Produced and disseminated two climate change videos and numerous posters, booklets, brochures, and T-shirts.

2.5.2. Eco-Friendly Intensification and Climate Resilient Agricultural Systems in Lao PDR (EFICAS), CIRAD

Key information
Period: 2014 - 2019
Donors: The European Union (EU) and the French Development Agency (AFD)
Implementing Partners: French Agricultural Research Centre for International Development, France (CIRAD) and the Department of Agricultural Land Management, Laos (DALAM)
Target locations: *Phongsaly, Luang Prabang and Houaphan Provinces*



Objectives:

The general objective of this project is to support eco-friendly and climate-resilient agriculture intensification through participatory development and extension of conservation agriculture farming systems in Lao PDR. The specific objectives are to:

- Make Lao northern upland farming communities more resilient to external shocks (climatic, economic);
- Co-design and disseminate agricultural production systems that are more eco-friendly;
- Make agroecology visible on the map i.e. show that agroecology can be applied on a large scale;
- Build the capacity of extension agents, so that they can play the role of facilitators in landscape level negotiation processes.

Strategy:

Recognizing that in many cases the constraints to the adaptation of innovative cropping practices lie in the multiple components of the livelihood systems, a landscape approach to sustainable agricultural intensification is promoted in three targets provinces. Within these three provinces, six target districts, and 12 intervention villages have been selected to develop and test project landscape approach. In addition, 12

control villages are also monitored to assess project specific impact on village community livelihood and vulnerability to climate change.

Activities:

- Village landscape management: Engaging village communities in designing low-carbon emission strategies;
- Participatory innovation network: Engaging development stakeholders in testing agroecological practices adapted to local contexts;
- Multi-stakeholder communication platform: Creating an enabling environment to broad scale dissemination of alternative production systems through participatory learning approaches, and formulation of evidence-based policies.

Results:

- Participation of villagers in the innovation process is high: 92% of villagers (58% of whom were women) participated in the activities planning and assessment meetings, with 84% of them being involved in at least one the planned activities;
- The sensitivity of farming community to external shocks is decreased: Crop damages related to animals roaming and animal death related to disease outbreak were decreased by 38% and 22% respectively as compared to baseline;
- The capacity of the different stakeholders is increased: 20 extension agents were trained on participatory land use planning (PLUP) and innovation process facilitation;
- About 1,400 farmers trained on alternative eco-friendly practices, seed collection/ preservation;
- The intervention method is recognised as promising: The landscape participatory approach developed by the project is mentioned positively in third party documents (e.g. FAO-CDAIS, SNV-ENUFF, ACIAR-Maize projects).

2.5.3. Climate protection through avoided deforestation (CliPAD), GIZ

Key information
Period: 2009 - 2026
Donor: Federal Ministry for Economic Cooperation and Development, Germany (BMZ)
Implementing partners: Ministry of Agriculture and Forestry (MAF) Ministry of Natural Resources and Environment (MONRE)
Target location: *Houaphan Province*

Objectives:

Provide policy advice and capacity development supporting national and provincial Reducing Emissions from Deforestation and Forest Degradation Plus (REDD+) framework and REDD+ plan processes:

- Pilot mitigation activities;
- Develop pro-poor REDD+ mechanisms and sustainable financing models.

Strategy:

The strategy involves working together with authorities at national and sub-national levels, as well as non-state actors, to improve conditions for sustainable forest management and specifically for REDD+.

Activities:

- Baseline studies on the current state of forests in Laos have been completed, including an

assessment of technical and financial REDD+ feasibility and a detailed study on the drivers of deforestation and forest degradation in Houaphan province.

- Support was provided in the form of capacity building measures for the establishment of REDD+ institutions at both national and sub-national levels.
- The National REDD+ Taskforce, as well as the REDD+ Office and REDD+ Division have started their operations.
- Six REDD+ technical working groups have been established.
- Support was provided for the forest law revision process to establish the legal framework for REDD+. In this, the Ministry of Natural Resources and Environment (MONRE) was the lead organisation, being responsible for REDD+ and the overall policy framework.
- A needs assessment and human resource development plan have been completed in order to identify capacity requirements in the forestry sector. All the departments involved in forest-related matters (MONRE and MAF) contributed to this.
- The creation of REDD+ institutional structures in Houaphan has begun, as has the provision of special REDD+ training for the partners' staff (technical departments of MONRE and MAF).
- A provincial REDD+ Taskforce and Office have been established with the support of CliPAD.
- The programme has carried out training courses and developed concepts and procedures for the establishment of reference levels for emissions (as a baseline for REDD+). It has also developed monitoring, reporting and verification systems at national and sub-national levels.
- A base-line map of forest cover has been drawn up, and a biomass assessment was completed for the calculation of possible emission reductions from avoided deforestation in Houaphan province.
- In close cooperation with the partners, the programme has developed a concept with guidelines and materials for the implementation of the free, prior, and informed consent (FPIC) approach. This will ensure the active participation of local communities in REDD+ mitigation measures through village forest management agreements.
- A guideline on village forest management planning has been developed with the district, province and national level government staff.
- A concept for village forest management agreements has been produced, providing the basis for sustainable management practices that will allow villagers to benefit financially from their efforts to protect the forests and reduce emissions. This takes into consideration the necessary safeguards as well as the FPIC approach.
- Mitigation activities have been introduced, such as forest law enforcement and agriculture extension measure in selected pilot villages. Meanwhile, the FPIC approach has been conducted in a number of villages, thereby ensuring that local communities are aware of the implications of REDD+ and consent to its implementation.
- In several pilot villages in the two districts of Houaphan province, village forest management plans and agreements have been completed.
- The programme provided support for the preparation of a so-called Emission Reductions Program Idea Note (ER-PIN), covering six provinces of northern Laos, including Houaphan. This has since been accepted into the pipeline of the World Bank's Forest Carbon Partnership Facility (FCPF) Carbon Fund.

Results:

German Development Cooperation (GIZ) conducted studies on the current state of forests in Laos. It also provides policy advice on revising forestry laws. In the future, people will receive financial rewards for protecting their forests. Farmers in 17 villages learned new agricultural techniques to increase their income, such as raising livestock, and how to produce bio-charcoal to increase soil fertility. Participatory land use led to the establishment of new boundaries for the Nam Phui national protected

area. Government officials received training in forest law enforcement and participatory land use planning. GIZ is initiating a forest carbon monitoring system. It is currently in the process of introducing a scheme that shares the benefits of REDD+ compensation payments with local villages by providing their community with financial incentives for preserving forest carbon and work contracts in forest conservation.

Dr. Somthong Vilaiphon, Director, Provincial Office of Natural Resources and Environment (PONRE) in Xam Neua, Huaphan province said: "We all hope the REDD+ program will be successful in Huaphan. The climate is changing because of the impact of humans on the environment. Implementing a REDD+ program in Laos will contribute to climate protection at a global level and support local livelihoods through new income-generating opportunities in order to lower the pressure on the forest. We will be able to distinguish different forest types and agricultural areas to finally reduce deforestation and protect the forest."[17]

2.5.4. Northern Uplands - Piloting Climate Resilience (NU-PCR), CARE/CCL/SAEDA

Key information
Period: March 2014 - March 2018
Donor: European Union (EU)
Implementing Partners: CARE Denmark, Sustainable Agriculture and Environment Development (SAEDA) and Comite de Cooperation avec le Laos (CCL)
Target locations: *Phongsaly, Gnot Ou, Samphan and Mai districts.*

Objectives:

The overall objective of the project is to enable improved resilience of remote ethnic upland communities, in particular women, to the impact of climate variability and change, and contribute to the achievement of Millennium Development Goals (MDGs) 1, 3 and 7.

Specific Objectives include:

- Improved capacity of local stakeholders to assess, plan, and implement community-based adaptation (CBA) in a participatory and gender sensitive manner;
- Improved community resilience through the implementation of climate change adaptation (CCA) and disaster risk reduction (DRR) pilot interventions that benefit women in particular;
- Comprehensive documentation informs mainstreaming and an enabling climate change policy environment for the Northern Uplands.

Strategy:

For that purpose, a highly innovative and at the same practical framework was defined, focusing on ten broader domains. These are:

(1) Farmers' long-term planning;
(2) Male/female participation in public decision making;
(3) Disaster preparedness;
(4) Male/female access to agro-climate information services; (5) Livelihood diversification; (6) Male/Female access and control over assets; (7) State of natural resources; (8) Livelihood recovery rate; (9) Division of labour and shared work load among women and men; and (10) Women's agency.

[17] file:///D:/LURUS/giz2015-0099en-lao-german-development-cooperation.pdf

Although the project was not meant to work on all of these domains, and despite the relatively short-term duration to promote required changes in attitudes, mind-set and practices (besides improvement of the institutional framework), it accomplished significant and lasting achievements.

Activities:

- Engage Non-Profit Associations (NPAs) in Climate Vulnerability and Capacity Analysis (CVCA) design and implementation, and support NPA capacity strengthening in key areas.
- Develop appropriate tools and training curricula for the CVCA in Phongsaly, and carry out training for partner and NPA staff.
- Undertake the CVCA process in the project districts.
- Organize local consultations, and district and provincial inception meetings to review CVCA analysis; and organize provincial steering committees.
- Identify target villages and strengthen village leadership capacity.
- Review village and district development plans based on CVCA analysis, and organize three community based adaptation (CBA) design workshops.
- Develop training modules, coaching and follow up protocols, and supporting information, education and communication (IEC) materials for agriculture activities.
- Develop capacity-building approaches on key resilience themes.
- Establish and strengthen farmer groups.
- Deliver agricultural training packages, provide inputs and follow up to farmer groups and local government extension workers in three districts.
- Establish a voucher system to link farmers with input sellers.
- Implement capacity building on key aspects of resilience, and improve local disaster resilience.
- Undertake a review of infrastructure, messaging and dissemination channels for short-range weather information, seasonal forecasting and early warning and preparedness in Phongsaly, and support community-based opportunities for improvements.
- Establish village savings and loan groups in target communities for women in project farming.
- Develop linkages between farmers, and service and input providers in the value chain.
- Maintain comprehensive process documentation on project activities, using elements of CARE's participatory monitoring, evaluation, reflection and learning (PMERL) approach.
- Mixed method assessments to build evidence base on resilient livelihood models for advocacy and scale.
- Organize learning opportunities in project districts, among districts in Phongsaly, and with other initiatives in the Northern Uplands Development Programme (NUDP) area.
- Develop and implement a project advocacy strategy.
- Contribute to global knowledge base on climate change adaptation.

Results:

- Strengthening the competences, skills and awareness on climate change issues of three local civil society organizations (CSOs) and especially on the setting up of CVCA;
- Improvement setting up of CBA activities by government agencies at local levels;
- Improvement of agriculture diversification activities at community level;
- Improvement of long-term adaptation planning by district community-based organisations;
- Production and dissemination of policy review and impact assessment related to climate change issues and setting up of a seasonal weather information system to support smallholder farmers in their seasonal livelihood activities' planning;
- Improved capacity of local stakeholders to assess, plan, and implement CBA in a participatory and gender sensitive manner.

2.5.5. Climate Smart Agriculture in Laos (CSA), SNV

Key information
Period: 2013 - 2015 **Donors**: Directorate-General for International Cooperation, Netherlands (DGIS); Rabo Bank **Implementing Partners**: SNV, Department of Industry and Commerce (DOIC), PAFO, Rice millers and farmers **Target location**: *Nongbok, Mahaxay and Xaybouathong districts in Khammouan province.*

Objectives:
This project aims to assess, define and apply adaptation and mitigation initiatives at the production and post-harvest levels of the value chain. The addition of Climate Smart Agriculture (CSA) to the Building Income, Independence, and Empowerment for Farmers (BIIE) project is intended to test the integration of CSA at the enterprise level and how rice mills applying the Inclusive Business approach could make themselves and their supply chains more "climate proof".

Strategy:
The CSA activities in Laos focus on rice in Nongbok, Mahaxay and Xaybouathong districts in Khammouan province.
(The rice value chain is highly susceptible to climate change as good yields largely depend on favourable weather conditions.)

Activities:
Alongside activities aimed at raising awareness and strengthening adaptive capacity through improved knowledge, three technological solutions piloted in Khamouane province to make rice value chains climate smart included:
- A participatory weather monitoring system to help farmers pick up weather data at various crop stages and link it to crop calendars. It likewise offered potential scenarios to proactively adapt to expected weather conditions;
- Water harvesting through the use of water ponds for vegetable production, fish farming and raising seedlings in nurseries;
- Use of manure (bio-fertiliser) to improve soil fertility and crop productivity.

Results:
As of 2014, almost 280 households (1790 people) have reaped benefits from CSA activities such as awareness raising, water harvesting, improved soil management and conservative pest control.

2.5.6. Strengthening Agro-climatic Monitoring and Information Systems (SAMIS) to improve adaptation to climate change and food security in Lao PDR, FAO

Key information
Period: 2018 – 2022 Phase II expected to start in 2023 **Donor**: Least Developed Countries Fund (LDCF) **Implementing Partners**: Project CEO approved/endorsed, but not operationally active yet; Ministry of Agriculture and Forestry (MAF) Ministry of Natural Resources and Environment (MONRE) **Target locations**: *Luang Prabang, Houaphan provinces*

Objectives:

- To enhance national and provincial levels of monitoring, analysis, communication and use of agro-meteorological data and information for decision making in relation to agriculture and food security;
- To improve monitoring and analysis of agricultural production systems by strengthening Land Resources Information Management Systems (LRIMS) and Agro-Ecological Zoning (AEZ) to support agricultural policies and climate-change adaptation.

Strategies:

- Agroclimatic monitoring and analysis: The project enhances the existing agro-meteorological networks and develop the infrastructure, procedures and capacity to provide high quality data and information services.
- Land Resources Information Management Syste (LRIMS): Design policy options; guide land management planning; supporting risk response in a context of current and future climate change.
- Knowledge management and dissemination: Improved ability to apply climate information, create scenarios and test and adapt resilient strategies.

Activities:

- Agro-meteorological station network: 15 stations will be installed and 15 will be upgraded.
- Improved data coding and communication: Connectivity between stations, provincial and national centres will be enhanced.
- Standards for monitoring, processing and analysis: a calibration laboratory and required analytical capability will be established;
- Standard operating procedures: harmonization of procedures; update of guidelines and handbooks; appropriate staff training.
- SAMIS will use the Land Resources Information Management System (LRIMS), the National Agro-Ecological Zoning (NAEZ) and the Socio-Agricultural Vulnerability Analysis (SAVA) to analyse Systems at Risk (SAR).
- SAMIS will improve local level climate information services and will share them together with production scenarios to support local level planning and smallholder's adaptation strategies through appropriate Farmer Field School (FFS) curricula for climate change adaptation.

Results: (as of June 2021):

- Significant progress was made during this reporting period on Laos Climate Service for Agriculture (LaCSA) development. Key achievements include the continued production of weekly and monthly

bulletins in a regular manner, at national level, for multiple crops and with the distribution of LaCSA products in 30 pilot villages in five provinces through loudspeakers reaching more than 32,000 inhabitants.

- Significant progress has been made on the development of information systems to support policy analysis and decision-making. The main new dataset includes a new national soil map, the downscaled historical climate dataset to a resolution of 5 arc minutes, and the development of three future scenarios. In addition, the preparation of suitability maps of present and future suitability maps for maize and cassava is completed.
- The international role of Lao PDR in this process has been recognized by the Food and Agriculture Organization of the United Nations (FAO). In fact, together with three other countries, the Data Assimilation Limited Area Model (DALAM) was invited to present the activities at the launch of the Global Agro-Ecological Zoning version 4 (G-AEZ v.4) which was held online in June 2021. The LRMIS is up and running with an attractive and user-friendly visual interface. It includes approximately 90% of the foreseen bio-physical, agronomical and socio-economic data and scenarios. The LRMIS is customized for use by DALAM. DALAM experts can upload, modify, tag and include metadata independently, while a specialized company is still responsible for the server management. Globally, this is the first case of an LDC country implementing LRMIS independently by national experts and with national data only.
- LRIMS scope and targets:
  Collect, store and protect data, customized for agriculture sector needs, user friendly and portable, distribute data, base for poly recommendations;
  Improve monitoring and analysis of agricultural production system;
  Support agricultural policies and climate change adaptation.
- Significant progress was made during this reporting period on LaCSA field-level rollout and scale-up through collaborating partners. Key achievements include the involvement of one French financed FAO project entitled ‘Cash assistance and support to the resilience of flood-affected communities in the South of the country’ - Attapeu and Sekong province that has covered 2,123 households with loudspeakers.
- In addition, the project has started collaboration with the following:
  SNV in Oudomxai and Huaphanh with a potential impact on more than 50 villages;
  The Department of Climate Change (DCC) in Phongsaly with a potential impact on 7 villages;
  FAO Climate Action Enhancement Package (CAEP) with a potential impact on 4 villages.

The total impact of these activities will be estimated at the end of the season and reported more accurately in the next post-implementation review (PIR).

3. Materials and Methods

Steps

Step 1: Data Collection

The relevant project details were obtained from the relevant websites and by contacting concerned authorities related to the projects mentioned in the previous chapter.

Step 2: Classification of adaptive measures

Key themes of the project activities were identified and developed based on the literature available.

Step 3:

SWOT Analysis of each activity was performed based on the available information.

3.1. Extract the adaptive measures (technologies and processes) employed in the projects

The adaptive activities employed by the projects were classified into the following adaptive measures:

No.	Category of adaptive measure
1	Capacity building of stakeholders through knowledge transfer and training
2	Climate / disaster vulnerability assessment (e.g. CVCA method)
3	Weather forecasting (e.g. setting up participatory weather monitoring system
4	Land use planning (e.g. GIS-based mapping)
5	Improved water management (e.g. rainwater harvesting)
6	Improved livestock management (e.g. control animal roaming)
7	Improved forest management (e.g. village forest management plans as part of REDD+)
8	Introducing new crop varieties (e.g. drought to tolerant rice)
9	Participatory action research / testing agroecological practices (e.g. preparation of bio-fertilizers)
10	Gender / women's empowerment (women's saving and loan groups).

3.2. Describe strengths and weaknesses of each measure and possible constraints

Table showing the SWOT analysis of each activity in brief. Each colour signifies a particular project as given below.

- IRAS
- EFICAS
- NUPCR
- SAMIS
- CliPAD

No	Adaptive Measure	Activity	Strength	Weakness	Opportunity	Threat
1	Capacity building of stakeholders through knowledge transfer and training	Training events and study tours for staff	Learning by doing	Unfamiliarity with climate change terminologies	Partnerships between locals and staff	Maintaining the built capacity
			Wide coverage	Bias in the self-assessment	Use of IRAS tools and methods in other projects.	
				Small sample	Specialist staff	
				Time constraints		
				Lack of job descriptions		
		Capacity building of Provincial Agriculture and Forestry Office (PAFO) and District	Learning by doing	Lack of personnel	Upscaling the staff	High turnover rate of staff
			Access to training sessions specifically for farmers	Disparity in motivation		

		Agriculture & Forestry Office (DAFO) staff				
		Serious Game	Multifunctional tool	Only a few people can play	Coupling with other facilitation tools	Lack of skills
			Playful approach	Time consuming		
		Capacity strengthening of Non-Profit Associations (NPAs) in Climate Vulnerability and Capacity Analysis (CVCA) design and implementation.	Involvement of multiple NPAs	-	Cross learning and relationship building	Low capacity of local organizations
			Most participants got a good grasp of the tools and their expected output.			
2	Climate/disaster vulnerability assessment	Undertake CVCA process in the project districts and disseminate and use its results	Key hazards faced by communities revealed	Length of survey questionnaire	Documentation for future use	Difficulty in retaining government counterpart staff
			Results disseminated to government counterparts	Skewed response from villagers		
			Adaptation options based on CVCA results			
3	Weather forecasting	Development of infrastructure, messaging and dissemination channels for short-range weather information, seasonal forecasting and early warning and preparedness	Sharing of advisories through Participatory Scenario Planning (PSP) and Dynamic Crop Calendars (DCC)	Accuracy and capacity of weather forecasts	Support of local processes	Sustainability
			Cross checking the accuracy of forecasts		Addition of information, multiple media and communication tools	

			Change in the farmers planning of farming calendar and practices		Requirement of multi-sectoral and related institutional coordination	
		Laos Climate Services for Agriculture (LaCSA)	Wide outreach		Independent use of LaCSA	Requirement of information and tools
			High percentage of farmers listening to forecasts		The "citizen data" tool	Lack of quality and high resolution data on climate change impact on agriculture resources
			Use of mobile application to disseminate information			
4	Land use planning	Land zoning	Resolution of boundary disputes	Cost	Government recognition	Changing land use
			Uses an already existing and endorsed tool	Time and staff requirement	District land zoning maps	
		Support Participatory Land Use Planning (PLUP) and the transformation of these plans into action plans - Community-based Agricultural Development Plans (CADP)	Articulation with other programs	Neighbouring villages	Checking adherence to PLUP	Community mobilization
			Participatory approach	Leadership capacity		Non-compliance
			Progressive implementation			
			Community leaders' involvement	Access to collective watering point		
			Documentation			
		Land Resources Information Management System (LRIMS)	Multiple sources of data	Lack of quality & high resolution data on climate	Evidence based policy	Requirement of information and tools

			Accessibility	Lack of integrated information	Monitor approved legislations	
					Easier investment in agriculture	
5	Improved water management	Increase the level of engineering quality assurance for rehabilitation and construction of small-scale community irrigation systems and ensure user group arrangements are established	Key knowledge development	Uncertain conclusion	Focus on upland areas	Sustainability
			Enhanced knowledge			
			High success rate			
		Support for irrigation infrastructures	Tailored efforts	Varying quality	Resilient livestock production	Maintenance and replacement
				Cost	Delegation to specialized projects	
				Match between water retention capacity and area of field		
6	Improved livestock management	Livestock intensification	Defined livestock raising areas in PLUP	Discrepancy in the fodder resources and number of animals	Capacity building	Power supply affecting vaccine stock
			Main constraints to livestock production considered		Better integration between livestock system and cropping system	Other risks in herding (e.g long cold periods)
			Acceptance of the villagers		Alternate or additional source of income	Variation in capacity to invest in livestock production

				Visible achievements re permanent fencing		Increase in fodder areas	Sustainability
				Village participation in forming collecting /collection rules regarding animal roaming		Support mechanisms to make livestock farming more inclusive.	
				Tailored establishment of forage plots		Coordination with other projects	
				Inclusion of animal health component			
		Small livestock raising		Interest of the villagers	High rates of mortality	Food diversification for households	Further diversification is not meaningful
				Collective provision of material and labour		Capacity building	
				Inclusion of vaccination		Involvement of women	
7	Improved forest management	Reducing emissions from deforestation and forest degradation (REDD+)	Identifying and assessing the provincial level drivers of forest loss.	Identification of the key factors for deforestation	Variability of available data	Help in development and support of strategies for reducing deforestation	Balance between economic and forest cover goals
			Communal land titles in the Lao PDR	Use of existing conditions	Non uniform collection of data	Provide a basis for sustainable resource use	The dynamic legal and policy environment for land issues
						Social accountability and support for forest protection efforts	
8						Tangible indicators	

	Introducing new crop varieties	Flood/drought tolerant rice varieties (TDK1, TDK 1/1, TDK 8 and TDK 11) piloted	Regular monitoring and evaluation	Lag in reporting time and language barriers	Better data if authorities worked closely with local farmers Close observance to avoid corruption	
9	Participatory action research/ testing agro-ecological practices	Village communities are engaged into the design and the implementation of low-carbon emission strategies at landscape level	Good coordination	Sustainable rice intensification (SRI) resulted in no clear yield increase	Willingness to try SRI again	Labour intensiveness of compost fabrication may be a deterrent in its use for increasing paddy production
			Participative innovation Community engagement	SRI found to be labour intensive	Compost fabrication could be facilitated by livestock increase and stalling	
		Intensification of paddy rice production (terracing)	Improvement in yields		More households developed interest	Pest management
10	Gender/women's empowerment	The project launched gender-specific activities and encouraged females to get involved	Enhanced economic visibility of women Tailored awareness and training modules Communication and information activities highlighted the aspects of gender specific experiences and gender equity			
		Establishment of village savings and loan groups for women in project farming	Importance to women Recognition from higher authorities	Time intensive		

			Successful in empowering women			
			Women assessed the savings group positively			
		Overall programme	Change of attitude in men		Establishing women's small livestock raising group	Women's literacy
			Vulnerability of women assessed			
			Joint decision-making between husband and wife a key aspect of resilience			
			Leadership roles provided for women in the farmer groups			

4. Conclusions

4.1. Meta-analysis

In terms of benefits, although it is hard to make a fair judgment because of the variations in reporting and the measurement of the results, some of the measures have stood out more than others from the farmers' point of view. These measures include:

1. Gender/women's empowerment
2. Land use planning
3. Weather forecasting
4. Improved water management

Considering the different functions of men and women in agriculture and farming households, climate change impacts men and women differently. Lack of access to information regarding climate change and their limited role in decision making, makes women more vulnerable in crisis situations. Activities such gender-specific activities and encouragement of females to get involved with the local PAFO and DAFO has improved their agency and their role in decision making. Another important activity that the women found most fruitful was the establishment of village savings and loan groups for women in project farming. This improved their economic visibility and also led to change in the men's attitude towards them. It has improved their role in decision making regarding climate change impacts. This activity was also positively assessed by the women involved, as well as the village authorities. Though it is limited by women's literacy and active involvement, this provides an opportunity to test measures such as the establishment of women's small livestock raising groups. Hence, this forms one of the most important measures to be investigated further, considering its high potential in building resilience against climate change.

Participatory Land Use Planning (PLUP) has been used with very effective results in a few of these projects. Its effectiveness has also been improved by modifying it to include land vulnerable to flooding, drought and erosion. This shows that existing tools can be scaled up and used effectively to combat climate change effects. PLUP has helped resolve boundary disputes and also has been used to define which area is dedicated to which use, which the farmers find valuable. The villagers confirm the importance and value of PLUP. Since it is an already existing and endorsed tool, it can be scaled up to district land zoning, with adequate support and cooperation from stakeholders.

Seasonal and short-term weather forecasts have changed the farmers' planning of the farming calendar and practices. The farmers increasingly acknowledge the importance of informed decisions (planning) and proactively seek and share information. Though this measure is dependent on local processes that build capacity to understand, interpret and act on this this information, it has helped them plan for their livelihoods.

Another important measure is to identify areas that are sensitive to flood and/or drought in the uplands and develop mitigation plans for drought-prone areas, including investments in water harvesting (irrigation, ponds, tanks, jumbo jars etc.). Some of the projects that piloted water management/harvesting techniques (irrigation, reservoirs, dams, containers) linked to agricultural techniques for which regular and controlled water supply is required (vegetables, fish, frogs) have found them to be very successful. Since these measures need specialized engineering, knowledge and skills, the work needs to be taken on by suitably qualified organizations, in order to have the desired impart on farmer's lives.

4.2. Priorities

Lao PDR is extremely susceptible to flooding, including riverine and flash flooding, and has a high risk of disasters. Food production could be impacted by climate change. Changes in the timing, length, and severity of the rainy season, as well as a rise in the frequency of heatwaves and droughts, may have detrimental consequences on rice production in general and its reliability as a source of calories and money. Due to financial and technological barriers, the poorest and most vulnerable smallholders might not be able to adopt the identified adjustments. Thus, the aforementioned processes will undoubtedly lead to considerable changes in national food consumption patterns, having an impact on both local agricultural operations and the global supply chain, both directly and indirectly.

Several projects have been undertaken to build resilience against climate change among the farmers of Laos. It is important to note that the measures employed by these projects are tailor-made for the region, the crop, the culture, and the particular disaster that the concerned area is most prone to. Also, it is important to note that since the implementing partners have varied focus areas and different capacities, it is difficult to prioritize the measures overall. Even if they had similar objectives the methods of measuring the output were different, making this judgment hard. However the SWOT analysis of the measures does help prioritize measures at different levels.

4.3. National Level

At the national level, measures related to the personnel and services play an important role. Capacity building of the stakeholders is very important in this case. Training for staff at national, provincial and district levels to increase the awareness and capacity of staff to address climate change in terms of flooding, drought and erosion and their potential impacts on livelihood development and food security is vital. Focus should be on: learning about participatory landscape approaches through the negotiation of village PLUPs; learning about eco-friendly and climate-smart innovations through their implementation and assessment in target villages; Global Positioning System (GPS)/remote sensing data management; agroecology practices; and participation in technical training provided in target villages.

Regarding services, two measures that can be effectively employed at the national level are land use planning and weather forecasting. Laos Climate Services for Agriculture (LaCSA) is one such service that archives and processes agro-meteorological and climatological data and provides agro-meteorological services to end-users. It produces seasonal and weekly bulletins which contain weekly weather forecasts, climate smart agriculture recommendations and pest and diseases alerts. LaCSA has already reached more than 110,000 farmers in the country. It has been demonstrated that, of the listeners, 85% of the farmers have changed their farming practices thanks to LaCSA. An expanded use of this tool could help farmers to build resilience against climate change.

The Land Resources Information Management System (LRIMS) is another service that can bring about a significant change to the farmers. LRIMS is a web-enabled, geo-spatial system containing data on agricultural land cover, land use, soil and livelihoods of farmers. In addition, it contains climate scenarios and crop scenarios for the present and for the future. LRIMS can be used to make better decisions, and better plans. Also, LRIMS data will be used to monitor the success of the approved legislations. It also makes investing in agriculture in Laos easier and less risky, potentially attracting more investors.

Another important measure that should be undertaken at the national level, is the periodic climate/disaster vulnerability assessment, which helps in revealing the key hazards and risks faced by the communities directly and indirectly related to climate change. This forms an important foundation in decision making at different levels in developing adaptation plans.

4.4. Sectoral level

At the sectoral level, measures that have been already tested include improved water and forest management. These measures have to be customized to the needs and hazards faced by the farming communities of different regions.

Improved water management requires local knowledge of hydrology, topography, soil type, the farming system etc., all of which must be considered in the design, construction and maintenance of small-scale irrigation systems. This is a challenging and specialized task, but could prove to have the greatest benefit in terms of resilience against climate change, while enabling enhanced productivity and the diversification of livelihoods.

Improved forest management is another measure that helps in finding the balance between economic and forest cover goals. One of the pilot measures introduced in Laos has been community land titling, based on a well-tested process like PLUP. The lessons learnt in the implementation of this measure could provide a strong basis for further application in the uplands, such as areas where rotational swidden is practiced, along with communal grazing land, and sustainable utilization of forest products (i.e. as part of community-based natural resource management).

4.5. Community level

Some of the activities in line with low-carbon emission strategies at landscape level included:

- Support for Participatory Land Use Planning (PLUP) and the transformation of these plans into Community-based Agricultural Development Plans (CADP);
- Support for on-farm experiments and demonstration plots related to crops, livestock, and forest integrated management;
- Facilitation with traders, local agricultural services (DAFOs, PAFOs, Technical Service Centres), and other projects to increase the efficiency and the sustainability of the actions.

These participatory and progressive approaches involved community leaders. This improved the number of households acting in accordance with village land use and development plans and a number of village leaders were identified who dedicate more than 10 days per year to coordinate the implementation of village land use and development plans. These approaches were well received by the villagers for their good coordination the implementation of activities. Though PLUP met with a good reception, measures like sustainable rice intensification (SRI) resulted in no clear yield increase and the villagers felt that the labour intensiveness of compost fabrication might be a deterrent with regard to its use for increasing paddy production.

4.6. Final Comments

The comprehensive evaluations of the climate change adaptation measures tested on upland farmers are the strength of this study. However, the classification system used for this study may have overlooked a few measures that did not fall into one of the ten categories specified. Nonetheless, this study provides an overall view of the adaptive measures that have been tried thus far.

To develop effective adaptation plans, it is critical to understand each community's particular circumstances in terms of existing agricultural methods, climatic hazards, cultural variations, and so on. A thorough vulnerability assessment could be one of the first and most fundamental actions to take. Various situations in farming communities necessitate specific adaption plans. The preceding efforts have helped to lay the groundwork for this.

Throughout the study, it was discovered that, while many of these adaptive measures yielded promising results, they were not sustained, nor scaled up. This strongly suggests the need for robust

policies, institutional leadership, sectoral cooperation, and the availability of resources. It was also discovered that measures incorporating participatory actions and a bottom-up approach yielded superior results.

Our advice is to make use of the opportunities offered by the previously tried adaptive measures and apply the lessons learnt to future projects. It is critical to evaluate the sustainability of the measures throughout the planning phase and to put in place procedures for scaling up these measures.

APPENDIX: Detailed SWOT analysis

1. Capacity Building of stakeholders through knowledge transfer and training

IRAS

Activity:

Training events and study tours for staff:

- Through IRAS, various training events and study tours have been organized for staff of the Ministry of Agriculture and Forestry of Laos (MAF), the Ministry of Natural Resources and Environment, Lao PDR (MONRE) and the Ministry of Labour and Social Welfare (MLSW) at national, provincial and district levels to increase their awareness and capacity to address climate change in terms of flooding, drought and erosion and their potential impacts on livelihood development and food security.

Strengths:

Learning by doing:

- Through the development and application of the tools, the engaged staff have gained concrete experiences of issues dealt with and feedback reactions of the villagers. So beside the more theoretical parts - the applications of the tools on local levels have given the staff practical exposures through “learning by doing”.

Wide Coverage:

- Another important part of capacity building has been the Training of Trainers (ToT) of district and Technical Service Centre (TSC) staff as well as community leaders for them to be able to further use and spread knowledge related to Climate Change Adaptation (CCA). IRAS has not only provided ToT training within the target districts but to staff from all districts in Xayabury and Savannakhet.

Weaknesses:

Unfamiliarity with climate change terminologies:

- Unfamiliarity with climate change terminologies and lack of knowledge of respondents made it hard for them to respond to certain questions.

Bias in the self-assessment:

- Bias in the self-assessment is a problem as some people saw the “list of skills” and were so enthusiastic that they wanted to tick everything; others were shy to admit they do not know things, whilst others may have been overconfident.

Small sample:

- Only a sample of staff could be interviewed.

Time constraints:

- Only a small amount of time spent in each organization.
- Data collection was very time consuming and at times frustrating. In many cases despite follow-up communication, data was not made available at this time.

Lack of job descriptions:

- The lack of job descriptions made it impossible to analyse exactly the job roles of those interviewed. Additionally, roles and responsibilities are constantly changing as Government of Lao (GoL) staff take on duties to support development projects.

Opportunities:

Partnerships between locals and project staff:

- The operation of the IRAS team will be more sustainable by the focus on "partnerships" between local and short-term expatriate staff (and written into TORs).

Use of IRAS tools and methods in other projects:

- As an example of use of IRAS results outside IRAS target areas, it can be mentioned that the Korea- supported Rural Development Project in Lao PDR is studying IRAS ToT procedures and the Climate Change Training and Adaptation Modules (CCTAMs) for development of their own tailor-made training material. This is an indication of the possibilities to expand use of IRAS tools and methods to other projects.

Specialist staff:

- IRAS should makes provision for the employment of a Lao Capacity Building Specialist (IRAS Board).
- That the IRAS Project Leader allocates the responsibility of Gender coordinator to a suitable staff member and additional training and/or mentoring in this area as required.

Threats

Maintaining capacity

- It is now essential to find ways to maintain the capacity developed and further expand the capacity through initiatives by the Government bodies to stimulate other projects and donors to support follow on projects.

EFICAS

Activity:

Capacity building of Provincial Agriculture and Forestry Office (PAFO) staff and District Agriculture and Forestry Office (DAFO) staff:

- Capacity building of DAFO staffs (turning DAFO staffs from lecturers to facilitators);
- Learning-by-doing; learning about participatory landscape approaches through the negotiation of village Participatory Land Use Planning (PLUP), the negotiation, annual review and adaptation of village Community-based Agricultural Development Plans (CADPs); learning about eco-friendly and climate-smart innovations through their implementation and assessment in target villages;
- Formal training: GPS/remote sensing data management, agroecology practices, participation to technical training provided in target villages
- Study tours to learn from other initiatives
- Capacity building at PAFO level, is the same as that at DAFO level. One PAFO coordinator was identified for each province and fully collaborated in EFICAS activities (coordination between DAFO staff and EFICAS coordination at national level, participation to key activities such as inputs and equipment distribution).

Strengths:

Learning by doing:

- EFICAS project approach regarding capacity building for DAFO/PAFO staff was learning by doing (strong methodological support, regular missions of technical assistants, facilitation of technical trainings and facilitation of serious games).

Access to training sessions for farmers that were specifically designed for them:

- DAFO/PAFO staff also had the opportunity to attend all the technical trainings for example on different technical topics like composting, animal health, Sustainable rice intensification (SRI) organized for farmers. A few training sessions were specifically organized for DAFO staff on Geographic information system (GIS) use and soil analysis.

Weaknesses:

Lack of personnel:

- The capacity building at DAFO staff level is a challenge because of the high turn-over and the chronic lack of personnel.

Disparity in motivation:

- The extent to which DAFO staff took advantage of EFICAS support to build on their capacities is quite different from a person to another. The personal motivation is quite decisive. The most involved staff improved their capacity in innovation facilitation.
- Regarding the EFICAS experience, the Phoutong village case is exemplary. The DAFO staff member worked very closely with EFICAS project and is regularly present in the village (he learned the local language). After two years working with EFICAS project, he developed a very comprehensive understanding of landscape approach. He also changed his posture, trying to coach farmers in the innovation process instead of acting like a lecturer (he regularly participates in farmers' activities to demonstrate techniques; he is very interested by facilitation methods like "serious games").

Opportunities:

Upscaling of PAFO/DAFO staff:

- Upscaling of EFICAS approach must be progressive (in accordance with PAFO/DAFO staff availability) and technical assistance is required for methodology support (PLUP/CADP elaboration, participative innovation facilitation, monitoring and evaluation).

Threats:

High turn-over of personnel:

- Considering the lack of staff at PAFO and DAFO level (understaffing in most of the districts), the up-scaling method must be progressive (impossible to work in many different clusters at the same time) in accordance with DAFO staff availability. Furthermore, the transition towards intensive eco-friendly agricultural system requires technical skills regarding agriculture, but also specific skills for overall coordination, land use planning and participative facilitation of the process.

Activity:

Serious Game:

- The serious game was designed to simulate agrarian transformation and landscape evolution as innovations (new practices, development of cash crops) are adopted. The simulation game was a role play designed regarding uplands context (parameters have to be adapted to each context). 8 to 10 players have to make decision every year about how they use their resources (forest, land) and which crops and practices they want to implement on their fields. Climatic and market hazards are also integrated in the simulation game. The game is played in several rounds to highlight medium-term trajectories of agricultural change. The decision of each player is discussed after each round, making it possible to better understand individual strategies

Strengths:

Multifunctional tool:

- It is a multifunctional tool (including diagnosis, scenario building and facilitation).

Playful approach:

- The playful approach makes it possible to better involve local communities and DAFO staff and make conceptual questions more accessible.

Weaknesses:

Only a few people can play:

- Each session can be played by only a few people. Therefore, it is difficult to get all the villagers to play.

Time Consuming|:

- Each session lasts several hours.

Opportunities:

Coupling with other facilitation tools:

- Couple the simulation game with other facilitation tools (in a playful approach) such as forum theatre.

Threats:

Lack of skills

- The threats to this tool are the skills required to parameter and facilitate the game.

NU-PCR

Activity:

Capacity strengthening of Non Profit Associations (NPAs) in Climate Vulnerability and Capacity Analysis (CVCA) design and implementation:

- In addition to the project partners (SAEDA and CCL), three local NPAs were selected and trained to participate in the Climate Vulnerability and Capacity Analysis (CVCA) process (this includes the development of curricula and ToT to conduct the CVCA process):
- Community Association for Mobilizing Knowledge in Development (CAMKID) has a strong background in working with ethnic communities on rural development. They are based in Bokeo province and supported the CVCA process in Samphan district.
- Lao Biodiversity Association (LBA) – they have an environmental background and are based in Vientiane. LBA participated in CVCA process in the Gnot Ou district.
- Agriculture and Forestry Conservation (AFC) – are also based in Vientiane and worked with CARE and SAEDA on the CVCA in Mai district.
- Tools and training curricula developed.

Strengths:

Involvement of multiple NPAs:

- The involvement of multiple NPAs for participating in the CVCA countered the threat of low capacity of local organizations to manage a multi-stakeholder process and the restricted time availability.

Most participants got a good grasp of the tools and their expected output:

- The six-day training for 33 participants included conceptual tools, such as the CARE community-based adaptation framework, as well as practical field tests of the five tools of the CVCA manual. The training was successful in teaching participants how to use the CVCA tools and their expected output.

Opportunities:

Cross learning and relationship building among NPAs:

- Cross learning and relationship building among NPAs was a valuable indirect benefit from the activity.
- Based on their extensive knowledge and experience in conducting and adapting CVCA, the Raks Thai – national CARE representation in Thailand – was contracted to facilitate a CVCA training for CARE, CCL, SAEDA, CAMKID, LBA and AFC staff as well as participants from the government. As Thai and Lao language are very similar, communication was not an issue and participants appreciated the possibility to ask questions about the experience of Raks Thai on CVCA.

Threats:

Low capacity of local organizations:

- The reason for selecting three rather than one NPA, as originally planned, for participating in the CVCA was the low capacity of local organizations to manage a multi-stakeholder process in three different districts and the limitations in their time availability.
- A single NPA would have had to commit throughout a period of several months and none of them could shift their normal programming to the extent of being able to do so.

2. Climate/disaster vulnerability assessment

NU-PCR

Activity:

Undertake CVCA process in the project districts and disseminate and use its results:

- The CVCA analysis was done by a team of about 10-15 staff from CARE/CCL, SAEDA, three NPAs and government counterparts (province and district representatives from departments of Natural Resources and Environment (PONRE/DONRE), Agriculture and Forestry (PAFO/DAFO) and the Lao Women's Union (LWU). All representatives also acted as facilitators with mixed NGO and government teams. The facilitation of the analysis took around one day per village, with further analysis and discussion during the evenings. The results were documented by the local NPAs who led the process, with support of the project teams.

Strengths:

Key hazards faced by the communities were revealed:

- The key hazards faced in communities are floods (flash floods during the rainy season and flooding from rivers), droughts and storms (destroying crops and houses). Rain coming too late or too much at the same time was identified as key change in all three districts. In the historical timeline exercise, resettlement in the past was identified as key change to the village – leaving people without access to their fields. This issue has a high impact on long-term planning and adaptive capacity and affects many communities.
- What also came up strongly from hazards analysis (although not necessarily related to climate) was that communities struggle with animal pests, leaving households depending on livestock extremely vulnerable, as well as poor hygiene conditions.
- Crops most affected by more unpredictable and erratic weather and hazards are upland rice and paddy rice, coffee, not-shaded cardamom, fruit trees, benzoin, oily climber and Job's tears.
- It is important to stress that in addition to weather related stresses, farmers experience other types of risks related to market prices of inputs and crops, market access (e.g. no road access during rainy season in many villages) and relationships with buyers and contracts (e.g. coffee company failing on buying in Mai and Samphan).

Results disseminated to government counterparts:

- Two workshops organized to report CVCA findings to District Steering Committee: one in Mai (12 participants, 5 women); and one in Samphan (20 participants, 7 women). The workshops provided a venue to report preliminary findings on community vulnerability to climate change and impacts of climate change on livelihoods. It also presents farmers' thoughts in terms of adaptation plan at village level. Participants discussed and added more comments on the results so that they could be used as the basis for developing village adaptation plans, district disaster prevention and control, and district socio-economic development plan.
- Four Provincial Steering Committees meetings were held to report progress, results, expenditures, planned activities and budgets to people from central level, provincial and districts. Some issues, tools, methodologies and lesson learnt were presented at the meeting.

Adaptation options based on CVCA results:

- Adaptation plans developed for 30 villages in three districts, which identified and analysed livelihood options together with farmers and government staff from the perspective of increasing livelihood diversification to promote food and cash crops with low sensitivity to climate change risks based on the CVCA results.

Weaknesses:

Length of survey questionnaire:

- The household survey questionnaire was 20 pages long. A shorter questionnaire with fewer families interviewed would improve the efficiency of data collection and analysis without significantly impairing the results.

Skewed response from villagers:

- Obtaining correct information from villagers is sometimes skewed by respondents replying to questions with answers they believe the interviewers would like to hear.

Opportunities:

Documentation for future use:

- Processes documented for key adaptation planning activities, such as the CVCA and are available for future use.
- CVCA documentation: extensive documentation in Lao language (per village).

Threats:

Difficulty in retaining government counterpart staff:

- The project experienced difficulties in seconding and retaining government counterpart staff.
- The lack of continuity in assigning personnel to the project has limited the effectiveness of building government capacity in climate change adaptation.

3. Weather forecasting

NU-PCR

Activity:
Development of infrastructure, messaging and dissemination channels for short-range weather information, seasonal forecasting and early warning and preparedness:

- In order to improve access to Agro-Climate Information Services, CARE established a formal partnership with the Department of Meteorology and Hydrology (DMH) and the National Agriculture and Forestry Research Institute (NAFRI) to support on developing a seasonal forecast that includes agricultural advice appropriate to each area.
- The piloted agro-climate information service builds on seasonal and short-term weather forecasts produced by DMH, subsequently translated into farming advisories.

Strengths:
Sharing of advisories through Participatory Scenario Planning (PSP) and Dynamic Crop Calendars (DCC):

- The advisories are shared and discussed with farmers through Participatory Scenario Planning (PSP) and Dynamic Crop Calendars (DCC) developed by NAFRI based on the forecasts.
- From each target village, two representatives joined the Farmer Learning Network aimed at improving cross-learning and sharing of weather-related information and issues.
- Information received from DONRE is broadcasted over loudspeaker systems provided by the project in all villages. Speaker systems are also used to announce agricultural planting and harvesting events based on weather forecasts from either DONRE or television.

Cross checking the accuracy of forecasts:

- In order to assess the accuracy of the forecasts, CARE in collaboration with DMH supported the instalment of automatic rain gauges and automatic weather stations at DONRE offices in three districts.
- These measure rainfall, wind speed, and temperature. In addition, one desktop and printer were handed over to the DONREs for use in compiling and sharing the data with the national DMH office, for analysis and comparison with the forecasts of the same period.

Change in the farmers planning of farming calendar and practices:

- On the positive side, it changed farmers planning of the farming calendar and practices. From a rather passive response to unpredictable weather, they increasingly acknowledge the importance of informed decisions (planning) and proactively seek and share information.
- Seasonal planning conducted in villages three times during the agricultural cycle - before planting, mid-cycle, and during harvesting.

Weaknesses:
Accuracy and capacity of weather forecasts:

- The accuracy of localised seasonal weather forecasts and the capacity to produce them are very limited.

Opportunities:
Support of local processes:

- Agro-climate information and forecasts should be supported by local processes that build capacity to understand, interpret and act on this this information. These processes must respond to communities' demand for forecasts, allowing them to provide feedback about the relevance and accuracy of forecasts, and ensure that local communities can use the information to plan for their livelihoods.

Addition of information and multiple media and communication tools:

- Agro-climate information needs to be shared using multiple media and communication tools to ensure it reaches both women and men with different levels of literacy and language skills.

- In addition to the broadcast and transmission of climate information, rural livelihoods should be supported by other information, including market trends. There are increasing opportunities to provide these through farmer-to-farmer peer networks and mobile phone technology.

Requirement of multi-sectoral and related institutional coordination:

- Farmers' tailored agro-climate advisories require closer (horizontal) multi-sectoral and related institutional coordination (e.g. agriculture and meteorology), and more efforts are required to improve local accuracy and timely delivery of agro-climate information.

Threats:

Sustainability:

- The sustainability and usefulness of this adaptive measure rely on exploring more simple and practical content and information channels to make such a service become useful in remote upland communities.

SAMIS

Activity:

Laos Climate Services for Agriculture (LaCSA):

LaCSA archives and processes agro-meteorological and climatological data. By means of such data, it interpolates and provides agro-meteorological services to end-users. The system generates and delivers agro-met services to farmers by analyzing the meteorological and crop cycle data. It produces seasonal forecast and 7-day bulletins. The 7-day bulletin contains weekly weather bulletin, climate smart agriculture recommendations and pest and diseases risk advisory.

Strengths:

Wide outreach:

- After three years of on ground application, the LaCSA has become an established reality in the digital agro-meteorological system of Lao PDR.
- LaCSA has already reached more than 110,000 farmers in the country, through projects of the UN Agencies and beyond. LaCSA has been disseminated to farmers groups, via loudspeakers, or school posters. This is without considering weekly TV broadcasts, radio and social media (e.g. Facebook posts).

High percentage of farmers listening to forecasts:

- Based on these results, around 78% of the farmers in the project targeted villages have been listening the weather news in LaCSA using loudspeakers. The study had demonstrated that of the listeners, 85% of the farmers have changed their farmer's practices thanks to LaCSA.

Use of mobile application to disseminate information:

- From the IT point of view, the web site has been continuously producing weekly and monthly bulletins since three years. An app is available both for Android and Apple, and using GPS location, farmers can get directly to the agro-meteorological recommendations related to their location.

Opportunities:

Independent use of LaCSA:

- In order to further expand the correct use of the LaCSA tools, Food Agriculture Organization (FAO), Ministry of Agriculture and Forestry (MAF) together with Department of Meteorology and Hydrology (DMH), Ministry of Natural Resource and Environment (MONRE) have produced the Training Manual Agrometeorology for Agricultural Extension Officers in LAO PDR is now public online though both web and mobile application. FAO hopes that with the use of such booklet, available both in English and Lao languages, any development partner will be able to use the tool independently from FAO.

The “citizen data” tool:

- As a new item at global level, the LaCSA is now trialling the so-called “citizen data”, which is a tool that is already online and allows DONRE, DAFOs and mostly importantly farmers to automatically upload information about the crop cycle, which is being managed by the Department of Agricultural Land Management (DALAM) that is the main MAF SAMIS partner.

Threats:

Requirement of information and tools:

- Requirements for customised information management, hardware, software and capacity development to support frameworks for environmental and social vulnerability scenarios.

Lack of quality and high-resolution data on climate change impact on agriculture resources:

- Lack of quality and high-resolution data on climate change impact on agriculture resources (land, soils, water and crops) under different scenarios.

4. Land Use Planning

IRAS

Activity:
Land zoning:

- In cooperation with MONRE/DLPD, the already developed and officially endorsed tool for Participatory Land Use Planning (PLUP) has, through IRAS been expanded from 8 categories of land to 11 through adding land vulnerable to flooding, drought and erosion.
- Based on this modified PLUP procedure, land use plans (more correctly - climate risk responsive land zoning) have been prepared for the 34 target villages of IRAS in cooperation between IRAS, Government and villages.

Strengths:
Resolution of boundary disputes:

- The villagers confirm the importance of and value of PLUP, and specially point out that village boundaries now are clear. Before, several villages faced difficult boundary disputes, which now have been eliminated.

Uses an already existing and endorsed tool:

- It uses the already developed and officially endorsed tool for PLUP and has through IRAS been expanded from 8 categories of land to 11 through adding land vulnerable to flooding, drought and erosion.

Weaknesses:
Cost:

- The cost for preparation of a village PLUP is of the order 10,000,000 Kip and it has to be borne by the government or by a development project.

Time and staff requirement:

- The plan preparation for a village is spread over a four months period, with involvement of National, Provincial and District staff besides villagers from the target villages and neighbor villages. This indicates that a widespread use is unlikely without the support from other projects.

Opportunities:
Government recognition:

- The modified PLUP tool now needs official recognition by the Government through full integration of the 3 added variables into the ordinary procedures.

District land zoning maps:

- If all villages in a district are covered, district land zoning maps could be prepared – which would be useful for prioritizing of land use on the district level.

Threats:
Changing land use:

- As use of land changes over time (new roads, new constructions, new dams etc) – the plans should also be updated regularly (may be with 5 years intervals).

EFICAS

Activity:
Support Participatory Land Use Planning (PLUP) and the transformation of these plans into action plans: Community-based Agricultural Development Plans (CADP).

- The first phase of EFICAS is dedicated to Participatory Land Use planning (PLUP) revision and validation with the whole community. This PLUP revision enables to define which area is dedicated to which use. This PLUP is fundamental: it structures the organization of the territory (lowlands for paddy fields, upland areas dedicated to crops production, areas dedicated to fruit-trees production, area dedicated to livestock raising, area of conservation forest…) and lays the foundation for coherent and sustainable territory development.
- It resulted in:

- Number of households acting in accordance with village land use and development plans (e.g. manage livestock in dedicated livestock areas) increased by 50% after project intervention.
- Number of village leaders who dedicate more than 10 days per year to coordinate the implementation of village land use and development plans increased by 50% in target villages

Strengths:

Articulation with other programmes:

- Regarding land use issues, there is a good articulation between Northern Uplands Development Programme (NUDP) component on land use planning and EFICAS. EFICAS and NUDP have worked jointly on PLUP elaboration process.

Participatory approach:

- EFICAS based its methodology on participative approach of land use planning and innovation at landscape level/

Progressive implementation:

- The implementation of activities was quite progressive (testing phase first, adoption at small level by "pioneers" and then wider diffusion of the innovation amongst the community).

Community leaders' involvement:

- Regarding the involvement of leaders in village land use and development plans, all the leaders met seem quite active.

Documentation:

- This document constitutes the foundation of the process. Both PLUP and CADP are available at Village Land Management Committee (VLMC) level. PLUP and CADP key information has been reworked graphically and printed on posters visible in each village meeting-room.

Weaknesses:

Neighbouring villages:

- In the visited target villages, villagers assure that the PLUP is mostly respected (but with frequent problems with villagers from neighbouring villages).

Leadership capacity:

- Nevertheless their capacities to mobilize the whole community (beyond their own family) are very different from a village to another. The local leadership style (different from a village to another) is a parameter EFICAS had to deal with.

Access to collective watering point:

- Fencing of individual plots implies that the access to collective watering point may become difficult.

Opportunities:

Checking adherence to PLUP:

- It would be interesting to check this information by other means (for example aerial photography to check if there is illegal clearing in conservation forest, monitoring of cattle to observe roaming area).

Threats:

Community mobilization:

- A first challenge was to involve the whole community (men and women) in the project approach.

Non-compliance:

- There is a social pressure as the PLUP is endorsed by village authorities: it means that villagers have to follow the PLUP but also that if there are some people disrespecting the PLUP, it can be hidden to give the impression that the village is compliant with official decisions.

SAMIS

Activity:

Land Resources Information Management System (LRIMS):

- The Land Resources Information Management System (LRIMS) is a web enabled geo-spatial system aimed to support policy options designing and land management planning. LRIMS contains data on agricultural land cover, land use, soil and livelihood of farmers. In addition, it contains climate scenarios and crop scenarios for the present and for the future. The launch of LRIMS was on Thursday 18th November 2021.

Strengths:

Multiple sources of data:

- Multiple data producers inputted data in the system to later become users of the modelling results, institutionalizing a virtuous cycle. Also, collaborative management is reinforced by clear mandates and collaborative standard operating procedures. Reckoning the power implicit in data management and the importance of multiple data users' points of view helps unbox sensitive issues. Strategical successes of SAMIS have already involved national processes for proper assignment of roles and responsibilities,

Accessibility:

- This innovative application, accessible through smartphones based on GPS position, will allow the investor to swipe between crops and select future scenarios, checking the expected productivity levels.
- The private sector can use LRIMS to access agricultural areas that will remain suitable over a long-time, regardless of climate change.

Weaknesses:

Lack of quality and high-resolution data on climate:

- Lack of quality and high-resolution data on climate change impact on agriculture resources (land, soils, water and crops) under different scenarios.

Lack of integrated information:

- Lack of integrated information to support decision-making processes, trade-offs and options appraisal to support decisions at all levels to support interventions, planning and policy development.

Opportunities:

Evidence Based Policy:

- Thanks to LRIMS, evidence-based policy will be used to make better decisions, and better plans.

Monitor approved legislations:

- Also, LRIMS data will be used to monitor the success of the approved legislations.

Easier investment in agriculture:

- Investing in agriculture in Laos will become easier and less riskier, potentially attracting more investors.

Threats:

Requirement of information and tools:

- Requirements for customized information management, hardware, software and capacity development to support frameworks for environmental and social vulnerability scenarios.

5. Improved water management

IRAS

Activity:

Increase the level of engineering quality assurance for rehabilitation and construction of small-scale community irrigation systems and ensure that user group arrangements are established:

- Rainfall capture, storage and adaptive irrigation and/or drainage management, and small-scale flood protection measures introduced in target drought-prone districts where rainfall is becoming more variable.
- It supported communities in drought prone areas with126 large jars (1,000 -1,600 liters/unit), 288 well tube rings (1,000 litre units), and seven steel tanks (3,000 litre units) for rain water harvesting. Constructed 15 small scale reservoirs with capacity ranking from 80-7,500 cubic metres (Xayaboury province) and four fish ponds with capacity from 1,350-4,500 cubic metres (Savannakhet province).

Strengths:

Key knowledge development:

- Lack of water management is in the upland areas a key constraint for poverty eradication and food security, and it had been a useful learning process for IRAS and GoL to be exposed to these conditions.

Enhanced knowledge:

- Through IRAS investments in water management, the villagers have enhanced knowledge of importance of water harvesting, and techniques that could be applied

High success rate:

- Among the most successful interventions are various water management/harvesting techniques (Irrigation, reservoirs, dams, containers) and linked to them agricultural techniques for which regular and controlled water supply is required (vegetables, fish frogs).

Weaknesses:

Uncertain conclusion:

- As piloting of the project only has taken place during 1 – 2 vegetation cycles, IRAS has had no time to systematically evaluate trials, to draw conclusions and propose possible modifications etc. This is essential and should be part of a follow-on project. At this stage it is therefore not possible to systematically conclude to what extent improvements in yields and water availability have been achieved.

Opportunities:

Focus on upland areas:

- The most vulnerable areas are the areas of the poor people are in the upland areas. So if a new project should link Climate Change Adaptation (CCA) with food security, nutrition and poverty alleviation, its focus of the water management components should be on upland areas in the parts of Laos where climate change creates most damage. A new project should therefore in cooperation with local government staff and villagers:
  a) Identify areas which are sensitive for flood and/or drought in the uplands.
  b) Develop mitigation plans for drought prone areas including investments in water harvesting (irrigation, ponds, tanks, jumbo jars etc.) with funding required.

Threats:

Sustainability:

- The project was too short to check the sustainability of the activities regarding water management.

EFICAS

Activity:

Support for irrigation infrastructures:

- EFICAS tried to meet villagers demand for small infrastructures construction.
- In Houyamoun village EFICAS project supported paddy bank reinforcement to limit the flooding of paddy rice.
- In the same village, EFICAS subsidized the purchase of motor-pomp for three groups of farmers in order to facilitate paddy irrigation in water shortage periods (especially in the early season when water stream is still weak).
- In Vangseng, EFICAS supported the building of a small water retention installation and subsidized the purchase of irrigation pipes.

Strengths:

Tailored efforts:

- EFICAS have worked in different ways in accordance with problem census in each village

Weaknesses:

Varying quality:

- The few achievements are of varying quality and underline the need of specific engineering at conception stage and technical support for building
- The quality of some of these infrastructures is questionable (insufficient height to completely protect paddy fields from the river flood during the rainy season, gabion baskets not correctly filled with stones and already in bad conditions).

Cost:

- The use of a motor-pump is costly due to gasoline and paddy production is profitable only if the motor-pump is used occasionally. The relevance of such equipment is questionable.

Match between water retention capacity and area of field:

- Villagers question the matching between the water retention capacity, the pipe diameter and the area of fields to be irrigated.

Opportunities:

Resilient livestock production:

- Small water supply systems (tank, pipes and troughs) for livestock watering are collective and make it possible to let livestock in pastures. Regarding animal housing, most of the initial stalls were collective. At present the trend is that each farmer builds stalls for its own herd (especially for fattening activity). Water supply systems and stalls contribute to make the livestock production more resilient (better access to water during the dry season, protection of animals during the winter).

Delegation to specialized projects:

- EFICAS support to irrigation infrastructures is quite limited because structural infrastructures (such as irrigation scheme, paddy terraces) require specific technical feasibility studies and important investments. It confirms that irrigation infrastructures building/rehabilitation should be delegated to projects specialized on irrigation development.

Threats:

Maintenance and replacement:

- There is no clear mechanism to define how maintenance and replacement will be done and who is going to contribute.

6. Improved livestock management

EFICAS

Activity:

Livestock intensification:

The actions conducted in all villages were:

- Support to permanent fencing (barbed wire or living fence) to separate livestock area and crop production area (700 ha permanently fenced);
- Support to the definition of collective rules regarding animal roaming;
- Support to forage plots establishment to improve livestock feeding (170 ha of improved pasture);
- Support to animal housing (180 stalls) and water access (7 water adduction systems);
- Support to animal health (3 veterinary workers per village, collective training on animal health) and specific focus on vaccination.

Strengths:

Defined livestock raising areas in PLUP:

- At strategic level, the principle to define livestock raising areas in the PLUP and to offer options to intensify livestock production systems is a key-point.

Main constraints to livestock production considered:

- All the main constraints to livestock production and risks have been considered and solutions discussed at community level: land use planning, feed improvement (fodder, mineral salts), animal health (vaccination, health practices), stalls and access to water for livestock watering.

Acceptance of the villagers:

- According to villagers, the most visible changes are linked to livestock intensification. Livestock was already a pillar of resilience for communities 'living savings' in case of crisis or problems with failure of rain-fed crops, but EFICAS project has contributed to increase livestock production performance.
- Although no data can yet confirm it, the development of fenced pasture and fodder plots is seen as a small revolution and raise enthusiasm of villagers.
- Thanks to the first actions on animal health, pasture fencing and fodder plots development, villagers say that livestock production has already increased. According to them, the reproduction rate is higher and animals have a better growth. As there is more control on herds, animal loss and theft have also decreased. This has two consequences: families have increased their herds, but are also able to sell more animals each year with a positive impact on their living standards (improvement of housing, education for children).
- Villagers compare the traditional model of livestock production and the model supported by EFICAS project. In the traditional model, livestock is free-roaming in fields and forest. It is quite difficult to catch animals to do vaccination and there is very little control on herd (no detection of sick animals).
- Villagers underlined the fact they used to spend several days in forest to catch the cattle (and sometimes to realize that cattle already died). The livestock production model supported by EFICAS project is also perceived as more efficient while saving time. Number of production areas that are permanently fenced: at least 2 production areas (agricultural or livestock areas) per target permanently fenced after 3 cropping seasons
- Number of villagers leaving their livestock roaming freely after main crops harvest (rice, maize) decreased by 50%.

- Percentage of livestock owners involved in improved livestock management (e.g. feeding systems, animal health, better housing) increased by 50%

Visible achievements regarding permanent fencing:

- Permanent fencing achievements regarding livestock management are visible in every target village. Most of the time, villagers have decided to fence the collective area of livestock production in accordance with the PLUP (this area is variable from a village to another).
- The permanent fencing is mainly made with barbed wire; living fences with shrubs like Jatropha curcas are less frequent.

Village participation in forming collection rules regarding animal roaming:

- The definition of collective rules regarding animal roaming was discussed in every village. These rules are about livestock management: when and where livestock is allowed to graze. These rules are important to reduce damages to crops by free-roaming livestock. The level of implementation of these rules is linked to the collective cohesion. The more households are involved in pasture fencing and "livestock group", better is the coordination regarding free-roaming animals.

Tailored establishment of forage plots:

- Forage plots establishment is a key-activity of EFICAS project. From one village to another, the options are different.
- In Houaphan province, most of the plots are collective.
- In Luang Prabang province the initial fodder plots were collective but the present trend is to cultivate individual fodder plots.

Inclusion of animal health component:

- Animal health improvement is also a key-action to improve livestock production resilience. In the traditional livestock raising system, there is very little concern regarding animal health.
- EFICAS provided training on animal health for the whole community and supported the implementation of 3 veterinary workers per village. These veterinary workers are in charge of animal health monitoring (detection of sick animals) and they provide service of preventive health, especially vaccination.
- In addition EFICAS has provided a fridge and a revolving fund in each village in order to have an easier access to vaccines. The level of vaccination has increased a lot (especially for buffaloes, cattle and goats with vaccination rate higher than 80%). In several villages, regular vaccination is set as a condition to access to collective pasture area.

Weaknesses:

Discrepancy in the fodder resources and number of animals:

- At present the constraint is the matching between fodder resources available in the livestock area (especially during the dry-season) and the number of animals to feed.

Opportunities:

Capacity building:

- Animal health is a major risk for livestock production. EFICAS project has achieved good progress regarding vaccination (almost all the buffaloes, cattle and goats vaccinated twice a year). Efforts on animal health should be continued and focused on capacity building of village veterinary workers at technical and logistical level (check the availability of vaccines in each village).
- In addition to visible changes due to livestock intensification, a second major change pointed by villagers is capacity building. The participative approach of innovation and the facilitation provided by EFICAS staff to test and assess new technics or crops have contributed to foster exchanges of experiences at village level.

- EFICAS should strength technical capacities (practical application of management technics) but also facilitation regarding collective organization to implement management practices in collective pastures and fodder plots (division of labour, rules for the regulation of livestock density). Set up management mechanisms adapted to each existing collective infrastructure EFICAS has supported the investment in many collective productive infrastructures (fences, livestock watering systems, stalls, greenhouse for vegetable gardens, etc.).
- At this stage, there is no clear mechanism to define how maintenance and replacement will be done and who is going to contribute. It would be necessary to identify collective infrastructures in each village. For each category of infrastructures, it would be necessary to define what is the maintenance to be done and how much it costs/ how many days of work are required every year.
- It is also necessary to evaluate depreciation costs and to define with the community how funds can be constituted for infrastructures replacement. The management and the governance of such funds should be 41 clearly defined and respect basic rules such as participative management, monitoring of incomes and expenses, transparency, mechanism of control

Better integration between livestock system and cropping system:

- The livestock intensification may be considered as a good first step towards eco-friendly and climate resilient agriculture, but the process must be completed. Next stages to reach are the higher diversification of cropping systems (including legumes) and the better integration between livestock system and cropping system to favour soil fertility management (manure collection, compost fabrication and use, agroforestry integrating livestock, for example orchards associated to fodder).
- The establishment of fenced livestock area and the better control of animal roaming set the condition for cropping system diversification (less dependence on upland rice production for food security, less damage on crops, more capital available, more manure available for soil fertility management).

Alternate or additional source of income:

- The intensification of livestock system production may be a first step to further evolution. As there is an important demand for meat (raising meat consumption in Laos and in neighbouring countries), livestock production is seen as a major opportunity. Several farmers met during the evaluation are investing in individual fodder plots in order to start or increase their livestock production and to reduce or even stop upland rice cultivation and buy rice with incomes from livestock.
- The size of the herd to be able to cover rice needs by selling animals depends on the type of animal (goats, cattle or buffaloes), the reproduction and mortality rate of the herd, the size of the family and the price fluctuations on the market. For example a farmer indicates that its herd of 8 heads of cattle is big enough to get a calf to sell every year and buy rice for the whole family (five people).
- In villages where the livestock group supported by EFICAS has gathered almost all the livestock owners, the change in livestock production system has already an indirect impact on cropping systems productivity. As the villagers put their livestock in a fenced livestock area, villagers say that damages on crops by free-roaming livestock have decreased (but not disappeared as livestock from neighbouring villages continues to damage crops).

Increase in fodder areas:

- As fodder plots are still being implemented, older fodder plots are set aside to produce fodder seeds and increase fodder area in the next years.

- The respect of rules regarding animal roaming is an ongoing process. At this stage most of the farmers say that there is no longer animal free-roaming during the rice season cultivation
- The area of fodder plots is increasing year after year, farmers continue to establish or increase fodder plots beyond EFICAS project support

Support mechanisms to make livestock farming more inclusive:

- First of all, it would be interesting to assess the level of inclusiveness of livestock activity (distribution of buffaloes, cattle and goats among families) and to have a typology of households regarding their capacity to invest and their guarantees (for example: capacity to invest by themselves, capacity to obtain a loan from a bank or a microfinance institution, capacity to obtain a loan from a project, etc.). It would also be interesting to identify which families would like to start livestock activities and what are the barriers to overcome.
- Secondly it is important to clarify what are the conditions to access collective livestock area and collective fodder plots. The conditions to be a member of the "livestock group" have also to be discussed in each village. These conditions have to be adapted to be as inclusive as possible (an investment made with EFICAS financial support cannot be "privatized" by few families setting conditions impossible to reach for other families to access the group and the collective infrastructures).
- Actions should be focused in villages where high level of inequalities between households are identified and where the access to "livestock group", collective pastures and fodder plots is the more restrictive (for example where many families owning livestock are not included in livestock group).

Coordination with other projects:

- Mechanisms could be developed to make it possible for each category of households to access quickly to livestock production. The coordination with other projects could be reinforced to give better access to specific loan to buy cattle/goats.
- Synergies with existing endogen mechanism of solidarity could be developed (combine subsidies from the project and counterparties from the community: heifer or young goat given or sold at reduced price to poorest households in exchange of new investment at village level). The coordination with NUDP should be continued. Provide support to collective pastures and fodder plots management (weed and shrubs control, livestock density control) At this stage, many households gave priority to investments in livestock production (fencing, fodder plots establishment).
- It is not clear how management practices are implemented to maintain good performances of pastures and fodder plots. A rapid assessment of collective pastures and fodder plots may be useful to check how collective pastures and fodder plots are evolving (level of shrubs and weed development, indicators of overgrazing, condition of the fencing, number of animals that can be sustainably raised without further forage improvement etc.) to better identify management challenges.

Threats:

Power supply affecting vaccine stock:

- Because of power cuts in villages, vaccines stock has been lost in several villages but the supply of vaccines by DAFO seems good enough to organize vaccination sessions at the good time.

Other risks in herding (e.g. long cold periods):

- Nevertheless, the livestock production remains exposed to different risks herders have to cope with (diseases that cannot be prevented by vaccines or loss of animals due to exceptional long cold period in winter time as happened in 2016) and strong specialization in livestock production is risky for smallholders. Many villagers took advantage of EFICAS support to

invest in livestock production but have also in mind to diversify cash-crops with higher added value products (fruit-trees, cardamom, vegetable gardening) in the coming years thanks to the incomes generated by livestock production.

- It is difficult for villagers to invest in several different activities at the same time (especially activities with no immediate return on investment such as fodder plot establishment, plantation of fruit trees or cardamom).
- Investments are progressive, according to capital and labour-force availability.
- Furthermore many villagers wait to see how "pioneer" farmers (usually village leaders and also families with more capital available) deal with innovation before investing in something new. The transition to more eco-friendly intensive resilient agriculture is a multi-year process (trend visible at pioneer families' level after 3 years but at least 5 years to observe changes at the whole community level

Variation in capacity to invest in livestock production:

- The capacity to invest in new activities, like livestock production, is different from one family to another and families who already have livestock were more able to catch EFICAS opportunities. The livestock intensification can be a factor of differentiation in the community: families with sufficient capital can invest and take advantage of EFICAS support to relatively quickly develop profitable livestock production in collective area while poorest families are left behind. This differentiation can become a source of conflicts. If the collective livestock area is profitable for only few families, the other families could call the use of this collective area into question. Furthermore families with no access to livestock production have less land available for cropping system rotation (even shorter fallow duration) and have reduced capacity to invest in cropping system diversification and intensification. At this stage, innovations supported by EFICAS for cropping system diversification and intensification do not appear as promising and performant as innovations regarding livestock production.
- It is quite clear that EFICAS project is not shaped to target the poorest or marginalized families who are really in survival strategy: the investment in agriculture is almost impossible for families with almost no labour force or access to land. Nevertheless it seems quite relevant to look for mechanisms to make investment (in livestock or in other income-generating activity) possible for the largest number of households active in agriculture sector.

Sustainability:

- Regarding livestock intensification different issues are identified regarding sustainability. At this stage, most of the improved pastures are recent (less than 2 years after implementation).
- At technical level, the pasture sustainability depends on management practices: weed control (regularly cut the weed left by livestock and in concurrence with fodder species), control the livestock density (avoid overgrazing). Until now, the involvement of livestock owners in pastures management is variable: many are still in an investment phase with limited labour-force and give priority to fodder plots extension. Nevertheless many of them are aware that weed control is important to maintain pasture quality. Some have already in mind to divide the pasture plot in 2 parts so one part can be grazed by livestock while in the other one fodder is growing.
- Regarding social sustainability, there is a specific issue about collective pasture and fodder plot governance: who has access to collective pasture and fodder plot and what are the conditions to use it. At this stage, there are no standard rules but the EFICAS project has facilitated the discussion amongst group of farmers. In few cases, households who want to be part of the "livestock group" and let their herd in the collective fenced area for livestock have to pay admission fee as these households did not participate to the fencing work. Rules should also be

adapted as the situation evolves (it seems quite difficult for villagers to anticipate coming problems and solutions).

NU-PCR

Activity:

Small livestock raising activities mainly focusing on:

- Organic feed and herbal medicine for improving chicken health
- Supporting farmers to build hen houses
- Supporting pig farmers for improved pig raising through fencing
- Supporting pig health through vaccination campaigns conducted by DAFO

Strengths:

Interest of the villagers:

- Small livestock raising is an activity for which farmers are very interested to get technical support (92% of farmers: Baseline 2016).
- In Mai and Samphan, after a ToT for project staff and DAFO technical staff, a chicken herbal medicine and feed training was conducted in all 20 target villages.
- All target villages raise chicken and were very interested in this technique, which allows for improved health outcomes with low inputs (farmers are usually not ready to pay for vaccination for small livestock such as chicken or ducks).

Collective provision of material and labour:

- The villagers contributed local materials and their labour. In Gnot Ou, CCL team started with 10 households from two villages on small livestock trainings and provided wire mesh for the medium income families and wire mesh and metal sheets to the poorest families in order to set up the henhouses.

Inclusion of vaccination:

- The team coordinated with DAFO to ensure the setting up of vaccination campaigns in the two villages before the rainy season (pest porcine, ivermectine, streptomycin) and one voluntary vet was trained, in order to ensure future vaccination campaign in the villages.
- Villagers have committed to pay for the second campaign.
- Vaccination for livestock has increased from 40.6 % at baseline to 66.5 % at the end of the programme.

Weaknesses:

High rates of mortality:

- The project has failed in combating high rates of livestock mortality.

Opportunities:

Food diversification for households:

- Improvement of small livestock raising has the potential to increase food diversification for households, meat consumption and incomes in the case where households sell some animals in the village or in the district markets.
- Small livestock raising can be an interesting option for poorest families who lack labour (single mothers, etc.) or who lack land as henhouses are set up near households' houses and do not require too much space.

Capacity building:

- CARE has developed an approach to reducing livestock mortality which combines capacity building for community-based Village Veterinary Workers (VVW) and improving farmers' willingness to pay for vaccinations. This approach has had proven results in projects implemented by CARE in Sayabuli and Sekong.

- Working with DAFO, CARE should introduce this model in all second phase project villages. The model involves a graduated phase-out subsidy program for livestock vaccination. The phase-out vaccination subsidy allows farmers to witness the efficacy of proper livestock vaccination and as the subsidies are withdrawn villagers willingly accept the cost of further livestock vaccinations.

Involvement of women:

- The second feature of the model involves training one female VVW responsible for small livestock and one male VVW responsible for large livestock in each village. Project and DAFO staff train village veterinarians in the: vaccination subsidy system; prevention and treatment of livestock disease; and proper use of vaccines and vaccination equipment. Female VVW in other projects have proven to be both diligent and competent village veterinarians.
- Establishing women as VVW is another component of CARE's support for rural ethnic women. CARE's village veterinary training and livestock vaccination approach is well documented for replication in project villages.
- To restore small livestock populations, a women's small livestock raising group could be established in villages which have no or very few chickens or ducks. It would be an activity specifically geared toward women from very poor households.
- Poor women would be provided with chickens or ducks and materials for housing.
- The activity would take the form of a small livestock revolving fund where women would share half their livestock offspring with other families. This activity has been successful in other CARE projects to provide support to the most destitute women.

Threats:

Further diversification is not meaningful:

- The initial value for the livelihood diversification indicator implies that many families were already involved in numerous livelihood activities, such as livestock raising, upland rice cultivation, vegetable production in swidden fields, non-timber forest products (NTFP) collection, food gathering, hunting, and to a limited extent cardamom, galangal, and tea production.

7. Improved forest management

CLiPAD

The Climate Protection through Avoided Deforestation (CliPAD) program is a development project of the Government of Lao PDR (GoL), supported by the Federal Government of Germany through technical and financial assistance, to both pilot incentive mechanisms for climate change mitigation within the framework of REDD+ and establish the Lao PDR's legal framework for REDD+ implementation. CliPAD supports Houaphan Province to establish a provincial REDD+ program based on the requirements of the 'jurisdictional nested approach' (JNR).

A key component of establishing the REDD+ program is an understanding of the drivers for deforestation in the province for the following purposes:

1. To be able to design appropriate mitigation measures to address the drivers of deforestation,
2. To provide necessary information to calculate a Development Adjustment Factor (DAF) and adjusted Reference Emission Level (adjREL).

Activity:

Identifying and assessing the provincial level drivers of forest loss:

- Two activities considered under this project are:

a. Identifying and assessing the provincial level drivers of forest loss;
b. Communal land titles in the Lao PDR: This study provides an analysis and comparison of the two first cases in the Lao PDR in which communities received collective land rights to village land. In Sangthong district (Vientiane capital), five villages received temporary land use certificates to village forest in 2011 as part of a bamboo value chain project. In Nakai district (Khammouane province), 14 hamlets resettled because of the Nam Theun 2 hydropower dam received permanent title to agricultural land, forestland, and other village areas in 2013.

Strengths:

Identification of key factors for deforestation:

- While drivers are considered separately in this study, it is typically the combination and interaction of a number of drivers that lead to deforestation and forest degradation. For deforestation, the most important combination of factors are:

1. Agricultural expansion, primarily maize production, linked with pioneering shifting agriculture using fire, and shortened fallow periods. The increase in maize production can lead directly to deforestation as upland maize field expand, and can also facilitate further forest cover loss by displacing upland rice production into new forest areas, and by increasing pressure to reduce fallow lengths. These reduced fallow lengths lead to a net decrease of regenerating fallow forest cover from year to year.
2. Infrastructure development, especially roads, and the increased pressure on forest areas due to improved access, leading to unsustainable timber extraction, and further clearing for agricultural expansion through pioneering shifting cultivation. Road building financed through allocated timber quotas also an important deforestation driver, especially when quotas and approved logging areas are not regulated effectively.
3. Hydropower development, however the scale of forest loss due to hydropower development will depend on the final number and size of the proposed hydropower projects, as well as regulations regarding the associated forest clearing that accompanies hydropower reservoir clearing. Hydropower projects in remote areas also necessitate improved access and roads, and relocated households will require new agricultural land.

The most important drivers of forest degradation are most likely:

1. Unsustainable wood extraction, through legal and illegal selective logging of high value trees.

2. Infrastructure development, specifically new roads, as people can access new areas for timber and NTFPs.

The most important underlying or indirect drivers are:

1. International demand for commodities, primarily maize for animal feed for Chinese and Vietnamese markets
2. Low law enforcement capabilities, leading to illegal timber extraction, poorly enforced conservation and protection forest areas, and the inability of officials to ensure that infrastructure, mining and hydropower projects abide by project conditions and quotas.
3. Poverty, which can lead to ongoing pressure to clear upland forest areas as poorer families try to produce sufficient rice. Poverty can also lead to illegal activities such as illegal timber and NTFP extraction as households seek additional income sources. 55
4. Inadequate boundary demarcation and limited management capacity, specifically the forest loss that occurs when boundaries between different villages forest land, and between village land and protection forest land, are not clearly demarcated or understood.

Weaknesses:

Variability of available data:

- Due to the variability of available data, and issues regarding the completeness and accuracy of datasets that area available, it is difficult to accurately quantify and rank the relative impact of each identified driver.

Opportunities:

Help in designing appropriate mitigation measures to address the drivers of deforestation:

- CliPAD is concentrating on the protection of intact forest landscapes by engaging subnational jurisdictions to develop and support strategies for reducing deforestation.
- In order to develop a provincial REDD+ strategy, it is essential to fully understand the drivers of deforestation and forest degradation comprehensively.

Threats:

Balance between economic and forest cover goals:

- Overall, the Lao PDR has a challenging road ahead to reach REDD+ readiness, including a country safeguards system. There will have to be serious decisions and trade-offs on the overall path of economic development and environmental protection. REDD+ will not be effective if it is "business as usual" in Laos with illegal logging and forest conversion for large scale concessions. If smallholders are the only ones who must change their economic behaviour to become REDD+ "compliant," then REDD+ in Laos will have an uncertain future.

Underlying drivers of deforestation and forest degradation from different sectors need to be urgently addressed:

- Implementation of the Cancun safeguards needs to balance economic and forest cover goals, while ensuring secure land tenure through PLUP and land zoning. There are some ways forward; the Cancun safeguards must be grounded in the rule of law with appropriate grievance mechanisms, full participation and the means to ensure transparent, fair benefits for local communities of all ethnic groups. Genuine VFM is an excellent mechanism for this.

Activity:

Communal land titles in the Lao PDR:

Strengths:

Use of existing conditions:

- Participatory land use planning process (PLUP)
- Clear boundaries and designated land use types are a pre-requisite for any village level land management. However, PLUP also served another purpose in these cases: participatory

meetings with the village members were a key step in discussing the proposed boundaries, establishing what benefit the villagers were going to receive from the collective land documents, and drafting a set of rules for accessing and using the collective land. In this way, potential conflicts seem to have been mostly defused before the actual titling process.

- In addition, an approved management plan for the village forest was already in place in the case of Sangthong
- The management plan complemented the PLUP process in Sangthong, since forest inventory, annual harvest volumes, and baseline information had already been established for the bamboo forest, and validated by community members and local government officials. As seen above, it is not clear to what extent the management plan is being followed (especially in the villages where households seem to harvest from their own land), but village forest management capacity is built through the processes involved in generating this knowledge, conducting field work, and discussing the results.
- Donor funding to finance the full project cost:
- The total cost of the certification/titling process was significant, since it could be argued to include PLUP and the management plan (in Sangthong), as well as survey, mapping, and demarcation of the collective land, participatory discussions with the communities, title registration, and staff costs. It seems highly unlikely that any village could finance this process by themselves.
- Support from local and provincial-level officials
- In both the Sangthong and Nakai district cases, the support of local as well as higher level government institutions was seen as key pre-requisite for formalized collective land rights by the respective project. In both cases, the government undertook all steps, with the projects providing financial and technical assistance. In Nakai district, the long-standing involvement of the World Bank, Asian Development Bank, and the existence of the NTPC, a private sector institution with an obligation to follow the requirements of the concession agreement, provided significant political pressure. The institutional backing also provided the funding to enable a multi-year process to develop the knowledge base and capacity, and to follow through on implementation of the collective titles. The RMU is currently working with the villages to draft village development plans for the land awarded with the goal to secure the long-term livelihoods of the resettled villages.

Weaknesses:

Non uniform collection of data:

- While this study contains information collected in interviews with community beneficiaries of the collective land use certificates in Sangthong district, it was not possible to conduct similar interviews with beneficiaries in Nakai district. These titles were awarded in January and March 2013, during the study period, and the initial dissemination work of rights and responsibilities associated with the titles only began at the end of the study period. Since village institutions to manage the land under title are only now being set up, and final mapping of the land under collective title was only concluded after the study period finished, it was too early to assess the impact in Nakai of the collective titles on use of the area, on village institutions, and on perceptions of communal management of natural resources. The number of interviewees per village is not high enough to support a statistical analysis of the responses.

Opportunities:

Provide a basis for sustainable resource use:

- Communal land titles (for land used by a group of people, such as rotational swidden agricultural land, grazing land, and forests) have been proposed as possible mechanism to

strengthen community tenure security and at the same time provide a basis for sustainable resource use

Social Accountability and support for forest protection efforts:

- Researchers have suggested that community engagement in the governance of natural resources can provide a higher degree of ownership, leading to social accountability for upholding land use regulations at the community level and thus supporting forest protection efforts

Threats:

The dynamic legal and policy environment for land issues:

- Since the draft National Land Policy and the revisions to the Land and Forest Laws are still under discussion, the legal and policy environment for land issues in the Lao PDR is dynamic. This complicates drawing conclusions about the applicability of the experiences from Sangthong and Nakai for other areas of the Lao PDR.
- The ongoing discussions are also seen to impede progress in replicating collective land titles in other projects. In some cases these projects have not been able to move forward with their own activities promoting communal land tenure because stakeholders from the government institutions involved are waiting for more definite information on communal land tenure. The prevailing opinion seems to be that collective land titling can only move forward once these three policy documents have been finalized and approved.

8. Introducing new crop varieties

IRAS

Activity:

Flood/drought tolerant rice varieties (TDK1, TDK 1/1, TDK 8 and TDK 11) piloted:

- in an area of about 110 hectares in 4 target districts. The average yield reached 3,6 tons per hectare (about one ton higher than local seed used before the project.

Strengths:

Regular monitoring and evaluation:

- There are monitoring and evaluation scheme in the project and is regularly monitored.

Weaknesses:

Lag in reporting time and language barriers:

- Reporting late from any party causes to project data maintain. Beside this report language also has a problem which all parties should report with the same language as English.

Opportunities:

Tangible indicators:

- To find tangible indicators of the project, advisors should be more attentive to technical staff and partners in terms of the content of concept note and proposal planning.

Better data if authorities worked closely with local farmers:

- In order to get properly data especially indicators of each activity in local areas, advisors must work closely with local authorities as well as farmers.

Close observance to avoid corruption:

- Sometime, activities implementation need some advice and close monitoring by project staff to avoid corruption or mismanagement.

9. Participatory action research/ testing agroecological practices

EFICAS

Activities: in line with low-carbon emission strategies at landscape level include:

- Support Participatory Land Use Planning (PLUP) and the transformation of these plans into action plans (Community-based Agricultural Development Plans – CADP),
- Support on-farm experiments and demonstration plots related to crops, livestock, and forest integrated management,
- Facilitation with traders, local agricultural services (DAFOs, PAFOs, Technical Service centers), and other projects to increase the efficiency and the sustainability of the actions.

Strengths:

Good coordination:

- Regarding the orientations defined in CADP, the villagers emphasized the good coordination for activities implementation.
- The VLMC met during the evaluation process stressed (in comparison with other projects working in the same village) the good coordination of EFICAS activities (specifically the good accordance with agricultural planning, not late planning or delivery of inputs) and the regular presence of EFICAS staff in the field.

Participative Innovation:

- The chosen option was participative innovation with farmers. Many different "technical packages" have been proposed by EFICAS project in accordance with each village context (altitude, existing production, access to market…). Villagers have tested many different things (some abandoned, some adopted at small scale and some adopted and disseminated).

Community Engagement:

- The process of participative testing was organized in a very classic manner. Before the agricultural season, EFICAS propositions (activities and terms and conditions for each activity) were presented during a village assembly. Each villager was free to join a group for a given activity (for example improved pasture, SRI testing, cardamom planting). EFICAS project provided technical support, inputs (seeds, seedlings, barbed wire, etc.). Participative monitoring and evaluation enabled to assess results after the agricultural season, discuss opportunities and difficulties and adapt the next year activities planning.

Weaknesses:

Sustainable rice intensification (SRI) resulted in no clear yield increase:

- Sustainable rice intensification was tested in 2 villages by 16 households. At this stage, the SRI remains at testing level. The households who have tested it said that there is no clear yield increase even if the rice grains are bigger.

SRI found to be labour intensive:

- Furthermore, this practise is perceived by farmers as more labour-intensive than the conventional one.

Opportunities:

Willingness to try again:

- Nevertheless, as they have tested SRI only during one or two agricultural season, they seem interested to try it again.

Compost fabrication could be facilitated by livestock increase and stalling:

- Regarding compost fabrication and use, many farmers have been trained. This practice could be facilitated by livestock increase and stalling (manure available and easy to collect around stalls to make a good quality compost).

Threats:

- Labour intensiveness of compost fabrication may be a deterrent in its use for increasing paddy production
- As compost fabrication is labour-intensive, compost is used in priority for cash-crops with higher added-value (and also more sensitive to organic fertilization) such as vegetables and fruit-trees. So far it cannot be expected an increase of paddy production due to compost use at this stage.

NU-PCR

Activity:

Intensification of paddy rice production (terracing):

- Paddy rice is less sensitive than upland rice, in line with government policy and more productive than upland rice on the same surface. Combining upland with paddy provides farmers an additional safety net. In consequence, the project is promoting extension of irrigated areas when it is possible as well as intensification of rice production in paddy fields through Sustainable Rice System (SRS) planting methods (spacing of crops), exploring combination with fish raising, seed selection and off season use. Gnot Ou team started to train households (HH) on SRS techniques in 2015 and Mai in 2016.

Strengths:

Improvement in yields:

- As shown in the table below, this simple technique leads to significant improvement in yields.

District	# HH	Seed (kg)	Production (ton)	Year I: Traditional yield	Year I: SRS yield	Year II: Traditional yield	Year II: SRS yield
Gnot Ou	78	722	9	2.2-2.3 t/ha	3.7-4.1 t/ha	2.3-3.30 t/ha	4.3-5 t/ha
Mai	42	438	3	n.a	n.a	3.0-4.3 t/ha	4.5-6 t/ha

Opportunities:

More households developed interest:

- Many more households are interested in applying it (and HHs which apply it now use it for their entire paddy surface rather than a test plot).

Threats:

Pest management:

- However, some farmers faced some pest management issues with invasion of snails in paddy field forcing farmers to spend more time in paddy fields to control snails.

10. Gender/women's empowerment (e.g. women's savings and loan groups)

IRAS

Activities:

The project launched gender-specific activities and encouraged females to get involved:

- Females were encouraged to get involved with the local PAFO and DAFO.
- Moreover, training on gender and climate change adaptation was also organized with 88 participants of which 61 were females.

Strengths:

Enhanced economic visibility of women:

- The "economic visibility" of women in the farming household and the agricultural production cycle has been enhanced with some extension activities in the field.

Tailored awareness and training modules:

- The awareness and training modules developed targets the different functions of men and women in agriculture and farming household, and women were strongly encouraged to participate in the training.

Communication and information activities highlighted the aspects of gender specific experiences and gender equity:

- Extension activities actively addressed the different gender functions. Communication and information activities highlight the aspects of gender-specific experiences and gender equity, not only related to Climate Change but also in the general access to natural resources like water and land.

NU-PCR

Activity:

Establishment of village savings and loan groups for women in project farming:

- Establish village savings and loan groups in target communities for women in project farming. It resulted in 21 Village Savings and Loans Association (VSLA) functioning independently in three districts, with 410 members (all women), generating about EUR 10,000 savings over 2-years period.

Strengths:

Importance to women:

- Women considered this as one of the most important activities promoted by the project. They said they are now able to take small loans at reasonable interest rates and earn money from their savings. Members of VSLG pay 3% monthly on loans (each group is free to decide the interest rate to apply). Previously families had to pay 10% per month on bank loans and even as much as 20% from moneylenders. Loans are typically taken to cover unexpected medical expenses, support children attending school, and in a few cases setting up small village shops.

Recognition from higher authorities:

- Women are proud to be managing the savings and loans groups. This activity has been extremely successful as a means to empower women. The district vice governor of Mai recognized the value of this activity and requested that the project support LWU to establish village savings and loans groups in all district villages

Successful in empowering women:

- This activity has been extremely successful as a means to empower women for the following reasons:

  1. The savings and loans method promoted by CARE is easy for women to understand;

2. Job responsibilities for operating VSLA are spread across a committee involving seven women with distinct roles;
3. Interest rates for loans are 3% per month compared to other methods of borrowing which typically charge 10% per month;
4. Women can earn money from their savings;
5. The project does not provide seed money that is often the reason for savings and loans schemes to fail in other projects.
6. The CARE team has also trained the Lao Women's Union counterparts and Gnot Ou team / CCL on the methodology and CCL has started to set up and train 5 groups.

Women assessed the savings group positively:

- After the first year, women assess the savings groups very positively and more members joined in the second cycle:
- Members have learned on finance planning and recording of income and expenditure
- They have saved small amounts of money every month, which is feasible also for poor families. At the end of the year, this leads to amounts of savings and some interest, which are significant enough to be of interest for women (approx. 150.000 kip to 300.000 kip of capital per member).
- The groups provide a safe space for women to talk on other issues – members report "increased solidarity" and are looking forward to the meetings.
- Depending on the trust in the groups, many members were still reluctant to take loans for fear of not being able to pay back or owing to others. As the group's solidarity progresses, the savings and loan rates are significantly higher. Loans are mainly for small purchases or emergency expenses (such as schoolbooks, going to the hospital, etc.). Only some members have borrowed for small business, such as chicken raising or buying and selling groceries.

Weaknesses:

Time intensive:

- The support to groups is very time intensive, as it includes six training modules per group during which the constitution and key regulations are set up in a participatory way. After that, the team joins each month's meeting of the group at least during the first 6-8 months, depending on the strength of the group

Activity:

Overall programme:

- The greatest achievements refer to improvement on women's agency (not least through the establishment of VSLAs), farmers' long term planning, division of labour through gender equitable shared workload, access to agro-climate information services and livelihood recovery rate.

Strengths:

Change of attitude in men:

- Men's attitudes and behaviour toward women have changed dramatically because of gender training and their understanding that in order to move out of poverty men and women must work together.
- Men now realize that women can make valuable contributions as decision-makers in the family and community. Project staff have helped women to increase their self-esteem and confidence. Both men's and women's attitudinal and behavioural changes are permanent and will most likely evolve into greater empowerment of women.

Vulnerability of women assessed:

- Discussing gender issues was integrated by asking for each hazard whether it impacted men or women and how, who had access to information, etc. It became clear that women and children

are amongst those most vulnerable in situation of crisis, but also that workloads increasing after hazards affect the entire family.

- Women are only involved in village level discussion and planning to a very limited extent.
- While conducting the CVCA, the team observed that in Khmu and Thai Dam communities, women were more actively involved in discussions than in Akha villages, where it proved extremely difficult to include them.

Joint decision-making between husband and wife a key aspect of resilience:

- The NU-PCR resilience framework identifies joint decision making between husband and wife as key aspect of resilience. Gender considered a key aspect of resilience. Joint household level decisions on livelihoods and women's participation at community level are key elements of sustainable livelihoods – decisions that do not include 50% of the people concerned are simply not as good. CARE previously had a gender negotiation-training module 1 and a module 2 developed (under another project). Furthermore, CARE gender advisor helped to develop a workload monitoring tool for workload sharing within households. Ongoing discussion on workload for each activity integrated in the selection of agriculture activities.

Leadership roles provided for women in the farmer groups:

- 34 Farmers groups established in 30 villages (10 in Mai with 457 households, 14 in Gnot Ou with 683 households and 10 in Samphan with 638 households).
- Of these groups, 14 focused on production techniques and 17 on marketing and negotiation.
- Each group has a five-member management committee with at least two women having leadership roles.

Opportunities:

Establishing women's small livestock raising group:

- To restore small livestock populations, a women's small livestock raising group could be established in villages which have no or very few chickens or ducks. It would be an activity specifically geared toward women from very poor households. Poor women would be provided with chickens or ducks and materials for housing. The activity would take the form of a small livestock revolving fund where women would share half their livestock offspring with other families. This activity has been successful in other CARE projects to provide support to the most destitute women.

Threats:

Women's literacy:

- Women's illiteracy in Lao language was discussed during interview sessions with village women.
- Women stated that they felt disadvantaged by not being able to speak Lao. They said they would be able to communicate better with project staff and participate more fully in negotiating with traders if they knew how to speak Lao. Women mentioned that their children are now learning Lao and that they had no opportunity to attend school while growing up.
- Women from Akha, Kheu, and Yao villages expressed a keen and sincere interest in learning to speak Lao.
- Women in Khamu villages said that they know a little Lao and do not encounter communication problems since most of their contacts speak Khamu. Khamu women interviewed were not interested in further learning Lao language. A second phase of the project could pilot Lao literacy training for women who express an interest in learning Lao.