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Terminal evaluation
of the project
“Strengthening
agroclimatic monitoring
and information systems
to improve adaptation
to climate change and
food security in the
Lao People’s Democratic
Republic”



**Project Evaluation Series
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**Terminal evaluation of the project
“Strengthening agroclimatic monitoring
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security in the Lao People's Democratic
Republic”**

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Abstract

This report is the terminal evaluation of the project “Strengthening agroclimatic monitoring and information systems to improve adaptation to climate change and food security in the Lao People’s Democratic Republic”. The project was funded by the Global Environment Facility (GEF) and implemented by the Food and Agriculture Organization of the United Nations (FAO). It covers the full five-year project period from 26 May 2017 to 30 June 2022.

The intended primary users of this report are: the Project Management Unit (PMU); FAO in the Lao People’s Democratic Republic; the project steering committee; the Project Task Force; and the Ministry of Natural Resources and Environment, the Ministry of Agriculture and Forestry and their associated departments. Other key users include the FAO-GEF Coordination Unit.

The methods to assess the project and compile this report include a desk review, focus group discussions (FGDs), semi-structured interviews and field visits. The main findings are grouped under the standard GEF criteria.

The project supported the originally targeted national strategies and was consistent with those of FAO and the GEF’s Least Developed Countries Fund (LDCF). It aligned with existing interventions in the Lao People’s Democratic Republic and its efforts to build climate resilience among smallholder farmers. The project went beyond expectations: it generated a Python agroecological zoning (PyAEZ) tool of global relevance. Indeed, the project achieved many of its outputs – some of which went beyond the indicators and exceeded the targets. It was very successful in securing co-financing and engaging other actors in complementary efforts. The project drew on an evolving range of government and other collaborating agencies.

In addition, the project improved a network of weather stations through the establishment and rehabilitation of manual weather stations. A laboratory to calibrate the sensors of automatic weather station (AWS) systems was fully established. The project also developed the Lao Climate Service for Agriculture (LaCSA). This is a decision-making tool for agrometeorological advisories and early warnings. It can be found at www.lacsa.net.

The project also significantly strengthened agroclimatic monitoring and information systems to improve climate change adaptation and food security. In fact, knowledge platforms were developed: the Land Resources Information Management System (LRIMS) database at <https://lrims-dalam.net/> that integrates national agroecological zoning (AEZ), a socio-agricultural and vulnerability analysis (SAVA), and systems at risk (SAR) information to support the assessment of policy options and trade-offs. Further, training for over 500 staff members was carried out to strengthen institutional capacity.

There are three recommendations on institutionalization. This involves further project development, future investment and steps to strengthen sustainability, design and learning.

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Finally, the terminal evaluation benefited from community stakeholder inputs in the project areas. These are the male and female farmers who gave their valuable time to meet with the Evaluation Team and discuss different facets of project implementation and progress in their villages.

Abbreviations

AEZ	agroecological zoning
AWS	automatic weather station
CAWA	Climate Adaptation in Wetland Areas
CIAT	International Center for Tropical Agriculture
FAO	Food and Agriculture Organization of the United Nations
FFS	Farmer Field School
FGD	focus group discussion
GCF	Green Climate Fund
GEF	Global Environment Facility
LaCSA	Lao Climate Service for Agriculture
LDCF	Least Developed Countries Fund
LRIMS	Land Resources Information Management System
M&E	monitoring and evaluation
MTR	mid-term review
PIR	Programme Implementation Report
PMU	Project Management Unit
PPR	project progress report
PyAEZ	Python agroecological zoning
SAMIS	Strengthening Agroclimatic Monitoring and Information System
SAR	systems at risk
SAVA	socio-agricultural and vulnerability analysis
WFP	World Food Programme

Executive summary

Introduction

1. The “Strengthening agroclimatic monitoring and information systems to improve adaptation to climate change and food security in the Lao People’s Democratic Republic” project was implemented by the Food and Agriculture Organization of the United Nations (FAO) from 26 May 2017 to 30 June 2022. The terminal evaluation was conducted both remotely and in the Lao People’s Democratic Republic from 7 November 2022 to 31 December 2022. The lead consultant joined the national consultant in country to carry out field investigations. The subject matter specialist participated in the evaluation remotely. This report presents the findings of the independent terminal evaluation of the project.
2. The project aimed to: i) enhance the monitoring, analysis, communication and use of agrometeorological data and information at the national and provincial levels for decision-making in agriculture and food security; and ii) improve the monitoring and analysis of agricultural production systems by strengthening the Land Resources Information Management System (LRIMS) and agroecological zoning (AEZ) for agricultural policies and climate change adaptation. To achieve these objectives, the project was structured into three components:
 - i. strengthen agroclimatic monitoring, analysis, communication, and the use of data and information for decision-making in agriculture and food security;
 - ii. strengthen institutional and technical capacity for the monitoring and analysis of agricultural production systems and the development of the LRIMS and the AEZ; and
 - iii. provide knowledge management, dissemination and the application of information at the local level, including the integration of lessons learned into planning and monitoring and evaluation (M&E).
3. The project was implemented with a national focus.
4. The purpose of the evaluation was to provide FAO and stakeholders with evidence of the most productive agroclimatic approaches for the Lao People’s Democratic Republic. This concerns the policy and planning work undertaken by the project. The primary intended users of the evaluation include FAO personnel and government ministries of the Lao People’s Democratic Republic. The secondary intended users are the participating communities, local authorities, partner organizations, other donors, academia and sectoral experts.
5. The scope of the evaluation covered the project’s full five-year period from 26 May 2017 to 30 June 2022. It includes all aspects of the project components. Its geographic focus is national.
6. The terminal Evaluation Team used a mix of qualitative and quantitative methodological approaches in order to address the evaluation questions. These methods were chosen for the triangulation of results that they provide. Qualitative information gained from focus group discussions (FGDs) and semi-structured interviews using core questions were

complemented wherever possible by quantitative data from the project and other sources. The team conducted key informant interviews with stakeholder samples drawn from the national, provincial and district levels. The Evaluation Team also had in-depth discussions with service provider representatives who supported the project on various technical aspects. The community-level FDGs were organized with beneficiary communities, particularly with regard to assessing the relevance, effectiveness and sustainability of activities.

Main findings

7. The following details the main findings of the terminal evaluation, as guided by the evaluation questions.

Relevance. To what extent has the project proven relevant to the needs of stakeholders – national and subnational government priorities, participating communities, FAO in the Lao People’s Democratic Republic Country Programming Framework, the United Nations Partnership Framework, the Global Environment Facility (GEF) strategies and relevant Sustainable Development Goal aims?

8. The project’s key deliverables contributed in varying ways to its overall objective: strengthen agroclimatic monitoring and information systems for improved climate change adaptation and food security in the Lao People’s Democratic Republic.
9. The project supported the originally targeted national strategies and was consistent with those of FAO and the GEF’s Least Developed Countries Fund (LDCF). The project complemented existing interventions in the Lao People’s Democratic Republic and efforts to build climate resilience among smallholder farmers. The project, beyond original expectations, generated a Python agroecological zoning (PyAEZ) tool of global relevance.
10. The project’s relevance is rated as Satisfactory.

Effectiveness. To what extent have project objectives been achieved against plans? What were the contributing factors of achieving and not achieving the expected objectives?

11. The project improved the weather station network through the establishment of 15 automatic weather station (AWS) systems and the rehabilitation of 15 existing manual weather stations. A laboratory to calibrate the AWS sensors was fully established. Further, the project developed the Lao Climate Service for Agriculture (LaCSA), which is a decision-making tool for agrometeorological advisories and early warnings. It can be found at www.lacsa.net. **The progress towards Outcome 1.1 is rated as Highly Satisfactory.** The project significantly strengthened agroclimatic monitoring and information systems to improve climate change adaptation and food security.
12. Standard operating procedures were developed for the Climatology and Agrometeorology Division of the Department of Meteorology and Hydrology. These were endorsed by the Ministry of Natural Resources and Environment and the Ministry of Agriculture and Forestry. More than 300 technical staff members were trained in a standard operating procedure. Over 200 staff members were trained in bulletin production, agrometeorology and station management. **The progress towards Outcome 1.2 is rated as Highly Satisfactory.** The project significantly strengthened the institutional capacity of both the Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment and the Department of Agricultural Land Management of the Ministry of

Agriculture and Forestry in terms of monitoring, analysis, communication and advice on agricultural production systems at the national, provincial and local levels.

13. Knowledge platforms were developed. This included the LRIMS database, which is found at <https://lrims-dalam.net/>. In fact, this integrated the national AEZ, a socio-agricultural and vulnerability analysis (SAVA) and systems at risk (SAR) information to support the assessment of policy options and trade-offs. The LRIMS is a web-enabled geospatial system to design policy options and guide land management planning that sustainably enhance food security and support risk response in a context of current and future climate change. Although the website for hosting the LRIMS was fully developed, the accompanying application to support land suitability assessments for agriculture was still under development. **The progress towards Outcome 2.1 is rated as Satisfactory.** The project made a significant contribution to the creation of decision-making tools that provide integrated climate, natural resources and agriculture data and analyses for strategic foresight and scenario-based planning.
14. The project strengthened the technical capacity of government officials. This involved the sustained operation and use of outcomes that support policy and adaptation planning for the country's agricultural sector. **The progress towards Outcome 2.2 is rated as satisfactory.** The project made a good contribution towards greater technical capacity among government officials regarding the sustained operation of decision-making tools that support agricultural production systems at the national, subnational and local levels. This included alternative futures and anticipatory governance.
15. The project's knowledge management activities were as follows: meteorology television shows; agricultural television shows; 115 872 beneficiaries reached through loudspeakers; Facebook campaigns; and public and private media presence through newspaper and television. Other activities included multiple workshops, policy and village meetings. The Evaluation Team reviewed the logframe, which showed that the project had a target to design and utilize the M&E plan and knowledge management strategy by midterm. Accordingly, the M&E plan was designed as scheduled. This guided the operationalization of the project's M&E system. The knowledge management plan was developed during the project's first year. It was continuously updated throughout the project's life cycle.
16. Overall, the project achieved good coverage of weather information through the loudspeaker system. In fact, it successfully brought in other actors who took on activities and expanded coverage. However, specific adaptation strategies that were supposed to be based on Component 2 activities were not applied. **The progress towards Outcome 3.1 is rated as Moderately Satisfactory.**
17. The overall effectiveness is rated as Satisfactory.

Efficiency. To what extent has the project been implemented efficiently, cost-effectively and in a timely manner?

18. Integrating Components 1 and 2 was clearly planned for two pilot areas. This would be aided by the establishment of 20 Farmer Field School (FFS) initiatives and overlap with FAO's Climate Adaptation in Wetland Areas (CAWA) project in the south of the country. However, this particular activity underperformed in terms of Component 3 (see Component 3 results under the effectiveness section).

19. The project had a one-year no-cost extension. The first half (from July 2020 to December 2020) of the no-cost extension was due to delays caused by the coronavirus disease 2019 (COVID-19). The second half of the no-cost extension (from June 2022 to December 2022) was mainly due to funding availability under Component 1.
20. During the project's inception workshop in September 2017, it was decided that significantly more villages would be targeted for Component 3 on weather announcements. The FFS made this possible, as well as low-cost dissemination channels like community loudspeakers, World Food Programme (WFP) school drawings and posters, and farmer groups. Loudspeakers are a traditional, culturally appropriate tool for community announcements.
21. The project's efficiency is rated as Satisfactory.

Sustainability. What is the likelihood that the project results and positive changes will be sustained after the end of the project, and what are the key factors related to these conclusions?

22. There were no risks to socioeconomic sustainability. This aspect is rated as Likely. At the national level, the project strengthened the capacity to monitor and analyse agricultural production systems. This led to adaptive actions that negate the impacts of climate change in agriculture. At the local level, the project results led to greater resilience towards climate change among farmers. Further, the project increased income among farmers by reducing post-harvest losses and increasing yields.
23. There were moderate risks to financial sustainability. At the central government level, both the Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment and the Department of Agricultural Land Management of the Ministry of Agriculture and Forestry experienced substantial budgetary limitations. However, a senior political leader from the Ministry of Natural Resources and Environment informed the Evaluation Team that the Green Climate Fund (GCF) would bear the cost of a second version of this project: Strengthening Agroclimatic Monitoring and Information Systems to Improve Adaptation to Climate Change and Food Security in the Lao People's Democratic Republic 2 – hereinafter referred to as Strengthening Agroclimatic Monitoring and Information System 2 (SAMIS 2). It was expected that the government would then continue supporting the LaCSA. Project management took proactive steps to ensure project sustainability. The LaCSA was under operational guarantee for ten years, while the LRIMS was for five. At the time of evaluation, the remaining operational guarantee period was eight and three years for the LaCSA and the LRIMS, respectively. At the community level, there were various initiatives to ensure that community members receive the agrometeorology information beyond project closure.
24. The project's institutional and technical capacity sustainability is rated as Likely.
25. The project strengthened the institutional and technical capacity of the Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment and the Department of Agricultural Land Management of the Ministry of Agriculture and Forestry. This involved monitoring, analysis and communication for agricultural production systems. Additionally, the project developed the technical capacity of government officials for the sustained operation and use of the LRIMS, SAVA, the AEZ and SAR for policy formulation and adaptation planning in agriculture.

26. The evaluation found that some of the AWS systems and their associated equipment were not operational. This was due to either the non-existent budget for operation and maintenance of the equipment or difficulty in finding spares.
27. The project's sustainability is rated as Likely.

Factors affecting performance. To what extent were the M&E plans appropriate, adaptable to changing needs and practical, with resourcing sufficient to contribute to reporting, timely decisions and fostering learning during project implementation?

28. It took a long time for the project to establish a functional M&E system. For example, some of the planned activities in the M&E plan were delayed for over two years while others were never implemented. The project's theory of change was developed at the mid-term review (MTR). However, the project established an effective partnership arrangement for implementation with other relevant stakeholders such as government counterparts.
29. The project's M&E plan is rated as Satisfactory.
30. The project was implemented by FAO under a direct execution modality. Implementation was carried out in close consultation with the Ministry of Natural Resources and Environment and the Ministry of Agriculture and Forestry. A Project Management Unit (PMU) was established to manage the day-to-day activities. FAO, in consultation with the Ministry of Natural Resources and Environment and the Ministry of Agriculture and Forestry, delivered procurement and contracted services under FAO rules and procedures.
31. The project's direct management approach is rated as Satisfactory.

Environmental and social safeguards. To what extent were environmental and social concerns taken into consideration in the design of the project, and were these reflected on and adapted as necessary during implementation?

32. Project implementation was guided by FAO's procedures on environmental and social safeguards. At the time of project preparation, an environmental and social safeguards assessment was undertaken. The project was also classified as Category C. This involves a pre-approved list of projects that are excluded from detailed assessment since they have minimal or no adverse environmental or social impacts.

Gender and equity. To what extent were gender issues and other key equity considerations (Indigenous Peoples, people with disabilities, marginalized and vulnerable people) effectively assessed and factored into designing and implementing the project?

33. The project document stated that a gender analysis was to be part of the FFS initiatives and climate change adaptation strategies (Component 3.1.1) developed under Component 2. However, as reported under effectiveness, the Evaluation Team noted that the Component 3.1.1 activities were not implemented. Possible shortcomings of a gender analysis included certain risks: women may have been inadvertently excluded due to limited access to agrometeorological information; the division of labour among men and women during farming activities; and the ownership of productive assets like land. The project logframe had gender-segregated indicators. The project team tried to include as many female participants in the training and capacity building sessions as possible. However, female participation was relatively lower than male participation. This is mainly because there were fewer female employees in the government departments that were targeted for

the training and capacity building initiatives. The project's documents estimated that at least 30 to 40 percent of participants in the trainings, workshops and project implementation activities at the central and provincial levels were women. Further, the LaCSA is an online system and a smartphone application. The evaluation found that the ownership of smartphones did not lead to any difference in the access of agrometeorological information between men and women. All farmers that the Evaluation Team met with received agrometeorological information via loudspeakers.

Co-financing. To what extent did any expected co-financing materialize (government and donor), and what were the critical factors underlying this?

34. The project had a total investment of USD 21 759 452, of which USD 5 479 452 was from the LDCF grant and USD 16 130 000 from FAO, the Japan International Cooperation Agency, the Asian Development Bank, the Centre for Development and Environment and the Lao People's Democratic Republic Government as executing agencies. There was additional co-financing from the International Center for Tropical Agriculture (CIAT), China, the Republic of Korea, Switzerland and Germany. FAO also contributed significantly to various aspects of information technology products and international entity involvement.
35. The critical success factors for the realization of co-financing by partners mainly involved their core working areas like agriculture, food security and climate change adaptation, and project or subproject success rate. The project established partnerships for the implementation of activities with government counterparts and other relevant stakeholders. Some of these partnerships were based on international stakeholder interest and co-financing. This included partnerships with national and international universities and institutions to support activities like training and capacity building for government officials, development partners and non-governmental organizations. Although quite a few of the project's attempted local collaborations did not work well, the WFP programme that piloted the use of magnetic LaCSA bulletins for school meal programmes proved successful.

Progress towards impact. To what extent may any discernible progress towards long-term impact be attributed to the project (including programming and policy areas)?

36. The project strengthened the agroclimatic monitoring, analysis, communication and use of data and information for decision-making in agriculture and food security. However, the project logframe and theory of change focused on the strengthening of agroclimatic monitoring, analysis, communication and the use of data and information as key results but with no clear links to food security, income or revenue for the targeted farming communities. The risks to future progress towards long-term impact mainly related to ownership of the LaCSA database, data sharing arrangements, post-project funding, and the limited capacity of farmers to deal with pests and diseases that could threaten the sustainability of project benefits.

Knowledge management. How effectively is the project assessing, documenting and disseminating its experiences, results and lessons learned, and what can be said on the quality and appropriateness of these for the intended audiences?

37. The project's M&E plan indicated that the project was to be monitored through standard quarterly and annual monitoring. There were provisions for the preparation of the project progress reports (PPRs) and the Programme Implementation Reports (PIRs). The PIR combined both FAO and the GEF reporting requirements. Provisions were also made in the

project design for an independent MTR and terminal evaluation. The project's documents indicated that all of these planned activities were implemented to regularly assess, document and disseminate results, experiences and lessons learned. The project design had provisions for the organization of a number of workshops on knowledge and information sharing, mainly through the FFS. As observed during the MTR, the information provided in the PIRs against this indicator did not relate to organizing knowledge and information sharing workshops. For example, the PIRs and the MTR reported that knowledge sharing workshops organized by the project included the following activities: i) the drafting and continuous revision of the knowledge management strategy; ii) the production of multiple awareness assessment products (leaflet, video, webpage, publications); iii) consultation workshops; iv) standard operating procedure meetings; and v) training in the LaCSA, questionnaire design and AWS cleaning and maintenance.

Additionality (for the GEF programmes only). What can be concluded on the added value of project interventions compared to comparable alternatives?

38. The Evaluation Team adopted the GEF's definition of additionality: a) changes in the attainment of direct project outcomes upon project completion that can be attributed to the GEF's interventions; b) effects that go beyond the project's outcomes, which may stem from systemic reforms, capacity development and socioeconomic changes; and c) clearly articulated pathways to achieve the broadening of impact beyond project completion that can be associated with the GEF interventions. The GEF's additionality to the project in the Lao People's Democratic Republic came in three forms: i) legal, policy and regulatory; ii) institutional and governance; and iii) environmental. The three major technological innovations by the project were the LaCSA, the LRIMS and the PyAEZ.

Conclusions

Conclusion 1. Relevance: the project's underlying concepts related to climate change adaptation by: i) integrating agrometeorological data and information monitoring and analysis; and ii) analysing agricultural production systems through the strengthened LRIMS, which are as relevant now as they were in 2017.

Conclusion 2. Effectiveness: the project supported the Ministry of Natural Resources and Environment and the Ministry of Agriculture and Forestry by strengthening their skillsets, knowledge base and understanding of the impacts of climate change and the adaptive options to negate them. The project increased the availability and quality of agrometeorological information across the country through the successful establishment of the AWS network. However, the project would have benefited from a more integrated implementation approach to tackle the country's most pressing climate change challenges: recurrent droughts and floods.

Conclusion 3. Efficiency: while the project's overall efficiency was satisfactory, the fact that the project required a no-cost extension to make up for lost time reduced efficiency. Some outputs under Component 2, such as those related to hardware issues, were delayed for over a year.

Conclusion 4. Sustainability: there is a concrete plan to scale up the project's results and benefits through SAMIS 2. This involves expanding climate-responsive planning and decision-making for resilient agriculture and livelihoods in the Lao People's Democratic Republic.

Conclusion 5. Factors affecting performance: it took a long time for the project to establish a functional M&E system and a theory of change. For example, some of the planned M&E activities were delayed for more than two years while others were never implemented.

Conclusion 6. Other factors affecting performance: the project established an effective partnership arrangement for implementation with relevant stakeholders such as government counterparts. This included partnerships with national and international universities and institutions that support Component 2 activities, as well as training and capacity building for government officials.

Conclusion 7. Cross-cutting issues: the project did not have adverse environmental or social impacts. It was fully compliant with FAO's environmental and social safeguards. These were defined by the integration of precautionary principles into project management cycles. The project was developed to address the needs of local communities, including vulnerable populations. However, this did not happen as they were never identified in the first place. Possible shortcomings from the lack of a gender analysis included risks: women may have been inadvertently excluded due to limited access to agrometeorological information; the division of labour among men and women during farming activities; and the ownership of productive assets like land.

Conclusion 8. The project used several communication channels to disseminate information about its activities. Knowledge management included: meteorology television shows; agricultural television shows; 115 872 beneficiaries reached through loudspeakers; Facebook campaigns; and public and private media presence through newspaper and television. Other activities included multiple workshops and policy and village meetings. The project also used the FAO website to share information about its work: www.fao.org/in-action/samis/overview/zh/. This involved booklets, knowledge products and other publications. Further, the project's Facebook page highlighted lessons learned and experiences. The project, however, did not target varying beneficiary factors like age, gender and location.

Overall project rating: Satisfactory

39. Despite a shift in focus and priority, the project remained relevant to its original objectives. The project had good coverage for weather information through the loudspeaker system. In fact, this successfully brought in other actors who took on activities and increased coverage. Overall, the project was efficiently implemented by a small PMU and a variety of partners that brought added value. However, the project would have benefited from a more integrated implementation approach to tackle the country's most pressing climate change challenges: recurrent droughts and floods. Greater involvement on behalf of all stakeholders, including beneficiaries, service providers and line ministries, would generate commitment and partnership to fight drought and desertification, as well as nurture potential positive effects.

Recommendations

Recommendation 1. The planned follow-up project, SAMIS 2, should scale up climate-responsive planning and decision-making for resilient agriculture and livelihoods in the Lao People's Democratic Republic. This is based on the project's positive results in delivering agrometeorological information to farmers at selected locations. The SAMIS 2 should seek to institutionalize the successful decision-making tools that were developed under this project. This should be done in close collaboration with the Ministry of Natural Resources and Environment (see the effectiveness section).

Recommendation 2. In order to strengthen sustainability, future project designs should:

- i. ensure a more integrated implementation approach towards project components and the complementary work of other partners in order to tackle the country's most pressing climate change challenges: recurrent droughts and floods (see Conclusion

2 on the plan and budget for operation and maintenance as part of a sustainability plan, adapted as needed, and Finding 4.6);

- ii. carefully consider prospects for the government (or others) to continue essential activities; and
- iii. invest in environmental and social safeguards and gender expertise to ensure that cross-cutting issues are properly designed and proactively feed into implementation (see Findings 6.2 and 7.2).

Recommendation 3. In order to strengthen learning and M&E, future project designs should:

- i. Ensure that a theory of change is developed during the design stage and within the overall design and M&E development. This should be deeply embedded in a context that reflects the mechanisms that influence changes sought locally and in policies and practices. Its logic should be revised and revalidated over time to ensure that either the project is on the right track or that outputs and outcomes require adjustments (see Finding 5.2).
- ii. Build an M&E plan into the design with baselines and specific, measurable, achievable, relevant and time-bound indicators at the earliest stage possible. Avoid M&E as an “add on” during implementation (see Finding 5.1).

The GEF rating table

Executive Summary Table 1. Terminal evaluation ratings and achievements

The GEF criteria/subcriteria	Rating	Summary comments
A. STRATEGIC RELEVANCE		
A1. Overall strategic relevance	S	Despite a shift in focus and priority, the project remained relevant to its original objectives (Paragraph 47).
A1.1 Alignment with the GEF and FAO strategic priorities	HS	In general, the project aligned well with the GEF and FAO priorities (Findings 1.3 and 1.4).
A1.2 Relevance to national, regional and global beneficiary needs	S	The project supported the originally targeted national strategies (Finding 1.2).
A1.3 Complementarity with existing interventions	HS	The project complemented a number of ongoing programmes and entities like the Netherlands Development Organization (SNV), the Adventist Development and Relief Agency, the FAO France project, the FAO Japan project and the WFP, among others (Finding 1.5; Paragraph 40).
B. EFFECTIVENESS		
B1. Overall assessment of project results	S	The project developed technological innovations: the LaCSA; the LRIMS; and the PyAEZ tool of global importance. This provided a framework for decision-making to improve climate change adaptation and food security for farmers in the Lao People's Democratic Republic (Paragraph 76; Appendix 5).
B1.1 Delivery of project outputs	S	The project delivered most of its outputs – others were overachieved. However, a few deliverables were not achieved, for example: Output 3.1.1, where specific adaptation strategies to be based on Component 2 activities were not applied as expected (Finding 3.1). Although the website for hosting the LRIMS was fully developed, the accompanying application to support

The GEF criteria/subcriteria	Rating	Summary comments
		land suitability assessments for agriculture was still under development (Finding 2.3; Appendix 5).
B1.2 Progress towards outcomes and project objectives	S	Overall, most outcomes were achieved – except for Outcome 3.1, which did not perform as expected (Finding 3.1; Appendix 5).
-Outcome 1.1	HS	The project significantly strengthened agroclimatic monitoring and information systems to improve climate change adaptation and food security (Paragraph 50).
-Outcome 1.2	HS	The project significantly strengthened the institutional capacity of both the Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment and the Department of Agricultural Land Management of the Ministry of Agriculture and Forestry in the monitoring, analysis, communication and advice regarding agricultural production systems at the national, provincial and local levels (Paragraph 54).
-Outcome 2.1	S	The project made an important contribution to the creation of decision-making tools that provide integrated climate, natural resources, and agriculture data and analyses for strategic foresight and scenario-based planning (Paragraph 56).
-Outcome 2.2	S	The project made a good contribution towards greater technical capacity of government officials. This involved the sustained operation of decision-making tools that support agricultural production systems at the national, subnational and local levels for alternative futures and anticipatory governance (Paragraph 60).
-Outcome 3.1	MS	During project design, local communities were to conduct FFS initiatives under Component 3.1.1 and deliver location-specific adaptation practices at pilot locations. These communities were to be targeted through consultations in order to understand their issues and needs during implementation. However, under Output 3.1.1, the project did not address their specific needs as they were never identified. Specific adaptation strategies, which were to be based on Component 2 activities, were not applied as expected (Finding 2.5).
Overall rating of progress towards achieving objectives/outcomes	S	The project developed technological innovations: the LaCSA, the LRIMS and the PyAEZ tool of global importance, which provided a framework for decision-making to improve climate change adaptation and food security for farmers in the Lao People's Democratic Republic. However, the project would have benefited from a more integrated implementation approach to tackle the country's most pressing climate change challenges: recurrent droughts and floods (Paragraph 48).
B1.3 Likelihood of impact	S	The project strengthened the institutional capacity of both the Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment and the Department of Agricultural Land Management of the Ministry of Agriculture and Forestry in the monitoring, analysis, communication and advisory service of agricultural production systems at the national, provincial and local levels. Identified risks

The GEF criteria/subcriteria	Rating	Summary comments
		mainly related to ownership of the LaCSA database. In fact, this could threaten the sustainability of the project benefits (Paragraph 134).
C. EFFICIENCY		
C1. Efficiency	S	The project, through a small PMU and partners, largely achieved its objectives. Despite COVID-19 and the delayed delivery of some expected results under Component 2, the project was implemented efficiently (Paragraph 81).
D. SUSTAINABILITY OF PROJECT OUTCOMES		
D1. Overall likelihood of risks to sustainability	L	In the interim, the Lao Government approved the project's second phase, SAMIS 2, to be financed through the GCF. Beyond SAMIS 2, the government committed to making further investments in the systems established by this project (Paragraph 96).
D1.1 Financial risks	ML	At the central government level, both the Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment and the Department of Agricultural Land Management of the Ministry of Agriculture and Forestry experienced substantial budgetary limitations. However, during a meeting with a senior political leader at the Ministry of Natural Resources and Environment, the Evaluation Team was informed that the cost of SAMIS 2 would be borne by the GCF. In the future, however, it was expected that the government would continue supporting the LaCSA (Paragraph 86).
D1.2 Socioeconomic risks	L	At the national level, the project strengthened the capacity to monitor and analyse agricultural production systems. This led to adaptive actions that negate the impacts of climate change on agriculture. At the local level, the project created greater resilience among farmers towards such impacts. Further, the project generated more income for farmers by reducing post-harvest losses and increasing yields (Paragraph 84).
D1.3. Institutional and governance risks	L	The project strengthened the institutional and technical capacity of the Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment and the Department of Agricultural Land Management of the Ministry of Agriculture and Forestry on monitoring, analysis and communication for agricultural production systems. Additionally, the project developed the technical capacity of government officials on the sustained operation and use of the LRIMS, SAVA, the AEZ and SAR. This involved policy formulation and adaptation planning for the country's agriculture sector. Weather station operations and the collection, compilation and analysis of weather data and forecasting on agroclimatic conditions are the responsibilities of the Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment. A standard operating procedure was signed between the Ministry of Natural Resources and Environment and the Ministry of Agriculture and Forestry to facilitate data sharing between these two

The GEF criteria/subcriteria	Rating	Summary comments
		government entities and other stakeholders (Paragraph 88).
D1.4. Environmental risks	L	The Evaluation Team found that the project developed policy proposals on cassava, coffee and other crops to address land degradation. The Governor of Champasack approved a law to ban the cultivation of crops and trees that are likely to deteriorate soil quality in the coffee-rich Pakxong District. Project management reported that this was due to using the project's policy proposals as a base. The banned crops include cassava, large bananas (<i>kuay hom</i>), Jatropha and eucalyptus (Paragraph 94; Finding 4.7).
D2. Catalysis and replication	S	The project did well in delivering agroclimatic information to farmers at selected sites. There is a plan to replicate and scale up project results at the national level. The proposed follow-up project, SAMIS 2, was approved by the Lao Government and will leverage this project's good results and impacts (Finding 4.2).
E. FACTORS AFFECTING PERFORMANCE		
E1. M&E	S	The M&E plan was well articulated and sufficient to monitor results and track the progress towards achieving the objectives (Finding 5.1).
E2. Quality of project implementation	S	The project was implemented by FAO under a direct execution modality. Implementation was carried out in close consultation with the Ministry of Natural Resources and Environment and the Ministry of Agriculture and Forestry. A PMU was established to manage the project's day-to-day activities (Finding 5.4).
E3. Quality of execution	S	The project followed the management arrangements as per the project document. The PMU, in collaboration with FAO in the Lao People's Democratic Republic, played a critical role in promoting a harmonious working relationship between the Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment and the Department of Agricultural Land Management of the Ministry of Agriculture and Forestry on project implementation (Finding 5.4).
E4. Financial management and mobilization of expected co-financing	S	Overall, the project successfully leveraged co-financing that went well beyond commitments made at the time of the CEO endorsement (Finding 8.1).
E5. Project partnership and stakeholder engagement	S	There was an effective partnership arrangement to implement the project with other relevant stakeholders like government counterparts (Finding 5.4).
E6. Knowledge management, communications and public awareness	MS	The project conducted quarterly and annual M&E activities to assess, document and disseminate its results, experiences and lessons learned. The project used several communication channels to disseminate information about its activities. However, the project did not fit knowledge dissemination to different target beneficiary needs like age, gender and location. Additionally, the effectiveness of the project's communications activities may have been limited due to the lack of a knowledge management strategy to guide an effective learning agenda (Finding 10.1).

The GEF criteria/subcriteria	Rating	Summary comments
E7. Overall assessment of factors affecting performance	S	The factors affecting performance were mostly supportive of project implementation, especially stakeholder engagement and partnerships. The M&E system and knowledge management strategy were developed too late to support the project's communication needs (Findings 10.1 and 10.2).
F. CROSS-CUTTING ISSUES		
F1. Gender and other equity dimensions	MU	Gender concerns were integrated to a certain extent but with too little consideration for enabling conditions that would encourage women's participation and decision-making. Possible shortcomings involved the project's lack of a gender analysis, which included risks: women may have been inadvertently excluded due to limited access to agrometeorological information; fully understanding the realities of the division of labour among men and women during farming activities; and the ownership of productive assets like land (Finding 7.2).
F2. Indigenous Peoples	MU	The project design's level of ambition was higher in comparison to its relevance among smallholder farmers, women and Indigenous Peoples (Findings 2.5; 7.1).
F3. Environmental and social safeguards	S	Please see sections D1.4 and F1 in this table.
Overall project rating	S	Despite a shift in focus and priority, the project remained relevant to its original objectives. It achieved good coverage of weather information through the loudspeaker system. In fact, this successfully brought in other actors who took on activities and increased coverage. Overall, the project was efficiently implemented by a small PMU and a variety of partners that brought added value. However, the project would have benefited from a more integrated implementation approach to tackle the country's most pressing climate change challenges: recurrent droughts and floods (Paragraph 152).

Source: FAO. 2022. *Terminal Evaluation of the Project Strengthening agroclimatic monitoring and information systems to improve adaptation to climate change and food security in the Lao People's Democratic Republic* – Project document. Bangkok.

1. Introduction

1. The Food and Agriculture Organization of the United Nations (FAO) implemented the project “Strengthening agroclimatic monitoring and information systems to improve adaptation to climate change and food security in the Lao People's Democratic Republic” from 26 May 2017 to 30 June 2022. The Global Environment Facility (GEF) supported implementation through its Least Developed Countries Fund (LDCF). As required for all of the full-sized GEF projects, the project’s terminal evaluation was carried out by a team of independent consultants: a lead evaluator; a sustainable land use expert as the subject matter specialist; and a national consultant as the land use planning expert. The terminal evaluation was conducted both remotely and in the Lao People’s Democratic Republic from 7 November 2022 to 31 December 2022. The lead consultant travelled to the Lao People’s Democratic Republic and joined the national consultant to carry out field investigations. The subject matter specialist participated in the evaluation remotely through online platforms like Microsoft Teams and email. This report presents the findings of the independent terminal evaluation of the project.

1.1 Purpose of the terminal evaluation

2. This terminal evaluation took place at the end of the project cycle, as required by FAO and the GEF. This was almost five years after project launch and marked an important point for FAO, partners and stakeholders to objectively assess progress. The evaluation’s purpose involves accountability and learning to guide future investments.
3. The evaluation had both summative and formative aspects. The summative aspect captured and documented progress through this investment. However, the evaluation’s main focus was formative. In fact, it provides FAO and stakeholders with evidence of the most productive approaches for this sector in the Lao People’s Democratic Republic – and even more widely, which is of interest to both FAO and the Lao Government. In particular, this involves the project’s policy and planning work.

1.2 Intended users

4. The evaluation’s primary intended users are FAO personnel and other stakeholders. They are expected to consider the evaluation’s findings and outcomes and use these to account for the investment and shape future initiatives in this sector. Table 1 also outlines some secondary users that may be interested in using the evaluation’s findings.

Table 1. Intended users of the terminal evaluation

Primary users		Likely uses
FAO	Budget Holder Lead Technical Officer Members of the Project Task Force In particular, the team preparing the Global Climate Fund (GCF) and the next “Strengthening agroclimatic monitoring and information systems to improve adaptation to climate change and food security in the Lao People’s Democratic Republic” project – hereinafter referred to as Strengthening Agroclimatic Monitoring and Information System 2 (SAMIS 2) FAO Office of Evaluation for country programming and thematic and strategic evaluations	Contribute to accountability to the donor Respond to the information needs and interests of policymakers and other actors with a decision-making role Trace the project’s legacy and inform potential future investments
	The GEF Coordination Unit The GEF project formulators	Improve programme and organizational development, making use of valuable information for managers or others responsible for programme operations and the design of future initiatives Support accountability for the GEF funds
Government ministries	Ministry of Natural Resources and Environment, Ministry of Agriculture and Forestry, and associated departments	Provide insight and learning for future investments, decisions on scaling up and policy development
Secondary users		
Participating communities and local authorities	Communities engaged in the project and local officials working closely with them	Convey their assessment of progress and advocate for continued support and improvement
Partner organizations	Partners active in this sector	Provide insight and learning for the future design of initiatives and advocacy work
Other donors	Donors active in this sector	Provide insight and learning for possible future investments
Academia, networks and sectoral experts	Institutional and individual experts	Provide insight and learning for wider research and advocacy work, including specialized research and analysis on wetland management

Source: Elaborated by the Evaluation Team.

1.3 Scope and objectives of the evaluation

5. The scope of the evaluation included:
 - i. the project’s full five-year period from 26 May 2017 to 30 June 2022;
 - ii. all aspects of the project’s components;
 - iii. a national, geographic focus; and
 - iv. engagement with a sample of informants from key stakeholder groups.

6. The objectives of the evaluation were to:
- i. examine the extent to which the project achieved its stated objectives and outcomes by the terminal evaluation;
 - ii. provide an assessment of the project's performance, achievements disaggregated by gender and vulnerable and targeted groups, and the implementation of planned activities and outputs against actual results;
 - iii. determine the likelihood of progress being sustained following project interventions and the contribution of tools and investments towards that end;
 - iv. understand the critical enablers for progress and the barriers to progress for the project components, activities and future investments in strengthening agroclimatic monitoring and information systems;
 - v. identify project successes in order to promote replicability and progress made on replication; and
 - vi. synthesize lessons learned that may help in the design and implementation of future FAO and FAO-GEF related initiatives in this sector, as well as inform scalability considerations.

1.3.1 Main evaluation questions

7. The main evaluation questions of the approved terms of reference are presented in Table 2.

Table 2. Terminal evaluation questions as provided in the terms of reference

Evaluation criteria	Evaluation questions
1) Relevance (rating required)	<p>Evaluation question 1. To what extent has the project proven relevant to the needs of stakeholders – national and subnational government priorities, participating communities, FAO in the Lao People's Democratic Republic Country Programming Framework, the United Nations Partnership Framework, the Global Environment Facility (GEF) strategies and relevant Sustainable Development Goal aims?</p> <p>Evaluation question 2. To what extent has the project been able to cope with significant changes in the context relevant to its design and goals, and how well did the project and stakeholders appropriately respond to these changes and ensure continued relevance?</p>
2) Effectiveness (rating required)	<p>Evaluation question 3. To what extent have project objectives been achieved against plans? What were the contributing factors of achieving and not achieving the expected objectives?</p> <p>Evaluation question 4. What were the most significant achievements and what can be learned from these?</p> <p>Evaluation question 5. What particular added value can be identified in FAO's contributions to the results achieved – both planned and adapted as the context changed?</p>
3) Efficiency (rating required)	<p>Evaluation question 6. To what extent has the project been implemented efficiently, cost-effectively and in a timely manner?</p> <p>Evaluation question 7. Has management been able to adapt to any changing conditions to improve the efficiency of project implementation?</p>
4) Sustainability (rating required)	<p>Evaluation question 8. What is the likelihood that the project results and positive changes will be sustained after the end of the project, and what are the key factors related to these conclusions?</p>

Evaluation criteria	Evaluation questions
	<p>Evaluation question 9. Were there any efforts made to establish a financial mechanism to sustain the project outcomes, and what are the risks to sustainability going forward?</p> <p>Evaluation question 10. What key learning (including the identification of risks) can be captured for informing sustainability planning for SAMIS 2?</p>
5) Factors affecting performance (rating required)	<p>Evaluation question 11. To what extent were the monitoring and evaluation (M&E) plans appropriate, adaptable to changing needs and practical, with resourcing sufficient to contribute to reporting, timely decisions and fostering learning during project implementation? (What effect did the mid-term review [MTR] have on this?)</p> <p>Evaluation question 12. To what extent was the direct management approach appropriate for managing this project, compared to alternatives?</p>
Environmental and social safeguards	Evaluation question 13. To what extent were environmental and social concerns taken into consideration in the design of the project, and were these reflected on and adapted as necessary during implementation?
Gender and equity	<p>Evaluation question 14. To what extent were gender issues and other key equity considerations (Indigenous Peoples, disability, marginalized and vulnerable) effectively assessed and factored into designing and implementing the project?</p> <p>Evaluation question 15. Was the project implemented in a manner that ensures equitable participation and benefits?</p>
Co-financing	Evaluation question 16. To what extent did any expected co-financing materialize (government and donor), and what were the critical factors underlying this?
Progress towards impact	<p>Evaluation question 17. To what extent may any discernible progress towards long-term impact be attributed to the project (including programming and policy areas)?</p> <p>Evaluation question 18. What existing or potential barriers or other risks can be identified that may prevent future progress towards long-term impact?</p>
Knowledge management	Evaluation question 19. How effectively is the project assessing, documenting and disseminating its experiences, results and lessons learned, and what can be said on the quality and appropriateness of these for the intended audiences?
Additionality (for the GEF programmes only)	Evaluation question 20. What can be concluded on the added value of project interventions compared to comparable alternatives?

Source: Elaborated by the Evaluation Team.

1.4 Methodology

8. The evaluation adhered to the United Nations Evaluation Group’s norms and standards and aligned with the FAO Office of Evaluation manual and methodological guidelines and practices. A team of independent consultants conducted the terminal evaluation according to the approved terms of reference. The Evaluation Team was supported by the Evaluation Manager throughout the evaluation process. The evaluation adopted a consultative approach with internal and external stakeholders throughout the evaluation process. The Evaluation Team respected the anonymity of evaluation participants as required.
9. The Evaluation Team used a mix of qualitative and quantitative methodological approaches in order to address the evaluation questions. These methods were chosen for the triangulation of results that they provide. Qualitative information gained from semi-structured interviews and focus group discussions (FGDs) using core questions were complemented wherever possible by quantitative data from the project and other sources. The team conducted key informant interviews with stakeholder samples drawn from the national, provincial and district levels. The Evaluation Team also had in-depth discussions

with service provider representatives who supported the project in various technical aspects. The FDGs at the community level were organized with beneficiary communities, particularly with regard to assessing the relevance, effectiveness and sustainability of activities. A total of 73 people were involved in interviews and the FDGs.

10. The main methods used are detailed as follows:

i. document and report analysis

- project progress reports (PPRs);
- mid-term review (MTR) and management response;
- project implementation review and assessment, results achieved at the village, district, provincial and national levels, challenges, and adopted solutions;
- curricula, manuals and handbooks produced by service providers for the project;
- reports and other documentation produced by service providers under letter of agreement;
- relevant academic and grey literature on the project's subject matter;
- relevant strategy documents from the Lao People's Democratic Republic;
- quantitative data from the Project Management Unit (PMU) and service providers related to activity coverage;
- six project steering committee meeting minutes until March 2022;
- maps and photos from the PMU, the Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment and the Department of Agricultural Land Management of the Ministry of Agriculture and Forestry; and
- project website at www.fao.org/in-action/samis/en.

ii. interviews with project stakeholders (see Appendix 1)

- key informant interviews with the Lao Government officials at national, provincial and district levels;
- key informant interviews conducted online with service provider representatives and project partners from the Lao People's Democratic Republic, Italy, the Republic of Korea, Thailand and Viet Nam;
- interviews with the Budget Holder and the FAO Representative in the Lao People's Democratic Republic, the project's Lead Technical Officer and the GEF Funding Liaison Officer;
- interviews with project staff members;
- interviews with the GEF focal point;
- interviews with the Vice Dean from the Faculty of Water Resources, National University of Laos; and
- semi-structured FDGs with beneficiary community members in two villages.

1.5 Limitations

11. The project, implemented with a national focus, had a modelling component to produce national results. However, due to time constraints, the Evaluation Team conducted interviews with a stakeholder sample drawn from two provinces with two villages in two districts. Fieldwork was planned for only ten days, from 7 November 2022 to 16 November

2022. This may have generalized the evaluation results but was mitigated by conducting comprehensive desk reviews of project reports and interviews with a representative sample of project stakeholders at the national level – including service provider representatives.

12. COVID-19 travel restrictions meant that the subject matter specialist operated remotely to conduct the evaluation. A physical mission to meet the stakeholders in person and visit the project sites for verification could not take place. However, the consultant conducted an intensive desk review followed by stakeholder consultation that was done remotely. This provided the required level of information to make a reasonable assessment of project achievements. The lead evaluator, together with the national consultant, was based in the Lao People's Democratic Republic. They met the stakeholders in person and facilitated their discussions with the subject matter specialist using online meeting platforms. Such an arrangement was considered sufficient to deal with the COVID-19-related limitations.

2. Background and context of the project

Box 1. Basic project information

- **The GEF project ID number:** 5462
- **Recipient country:** Lao People's Democratic Republic
- **Implementing agency:** FAO
- **Executing agency:** Ministry of Agriculture and Forestry
- **The GEF focal area:** Climate Change Adaptation (LDCF)
- **The GEF strategy/operational programme:** Climate Change Adaptation-2 on increasing adaptive capacity: increase adaptive capacity to respond to the impacts of climate change, including variability, at the local, national, regional and global level; and Climate Change Adaptation-3 on adaptation technology transfer: promote the transfer and adoption of adaptation technology
- **Project Identification Form approved:** November 2016
- **Date of CEO endorsement:** July 2016
- **Date of Programme Review Committee endorsement:** September 2016
- **Date of project start:** May 2016
- **Execution agreement signed:** February 2017
- **Execution agreement amended:**
- **Initial date of project completion (original no-cost extension):**
- **Revised project implementation end date:** 30 June 2022
- **MTR date:** March 2021

Source: Elaborated by the Evaluation Team.

13. The project document noted challenges for the Lao Government to manage the likely impacts of climate change, climate variability and related food security issues. The monitoring and analysis of climate variability and climate change impacts in agriculture are constrained by the following factors:
 - i. insufficient agrometeorological information from which to map risks and detect long-term trends;
 - ii. insufficient information on climate conditions to support regional decision-making and provide climatic information to regions not covered by the agrometeorological stations;
 - iii. limited use of climatic forecasts on seasonal timescales in the agricultural sector;
 - iv. lack of understanding on current and potential future distribution among the areas and populations most vulnerable to climate change and food insecurity;
 - v. lack of appropriately formatted information and agrometeorological services for different audiences to inform risk reduction efforts on behalf of policymakers and farmers; and

- vi. lack of trained personnel to run and maintain the Land Resources Information Management Systems (LRIMS) effectively.
14. In order to address these factors, the “Strengthening agroclimatic monitoring and information systems to improve adaptation to climate change and food security in the Lao People's Democratic Republic” project was designed. It directly related to the 2030 Agenda’s Sustainable Development Goal 2 (end hunger, achieve food security and improved nutrition and promote sustainable agriculture) and Sustainable Development Goal 13 (take urgent action to combat climate change and its impacts).
15. The project was a four-year project that was extended. It ran for five years, from May 2017 to June 2022. It was a full-sized GEF project with a total funding of USD 5.5 million.
16. FAO, through the direct execution modality, was to implement the project in close collaboration with the Ministry of Natural Resources and Environment and the Ministry of Agriculture and Forestry. The Ministry of Natural Resources and Environment and the Ministry of Agriculture and Forestry became the main executing partners for project implementation. The main collaborating departments were the Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment and the Department of Agricultural Land Management of the Ministry of Agriculture and Forestry at the central level with provincial and district field offices. At the local level, key stakeholders and beneficiaries were the respective field offices of the Ministry of Natural Resources and Environment, the Ministry of Agriculture and Forestry, and community-based organizations.
17. The targeted project beneficiaries were poor, marginalized communities and small-scale farmers who were the most vulnerable to climate risks. The project also targeted the whole country through two smartphone applications and their associated activities. Locally, the weather, climate, land resources and climate change impact information was disseminated to farmer groups through Farmer Field School (FFS) initiatives. This was also done through smartphone applications, loudspeakers, and television and radio programming.
18. The intention was that climate and land resources information would be generated through the project and made available in most of the country’s vulnerable areas. This included areas that: were exposed to climate impacts; had no or low access to information, knowledge and education; lacked resources, assets or income sources; and relied on marginal land that was degraded or prone to climate risk.

2.1 Project objective and components

19. The project’s objectives were to: i) enhance the monitoring, analysis, communication and use of agrometeorological data and information at the national and provincial levels for decision-making in agriculture and food security; and ii) improve the monitoring and analysis of agricultural production systems by strengthening the LRIMS and agroecological zoning (AEZ) for agricultural policies and climate change adaptation.

20. To achieve these objectives, the project was structured into three components:
- i. strengthen agroclimatic monitoring, analysis, communication, and the use of data and information for decision-making in agriculture and food security;
 - ii. strengthen institutional and technical capacity for the monitoring and analysis of agricultural production systems and the development of the LRIMS and the AEZ; and
 - iii. provide knowledge management, dissemination and the application of information at the local level, including the integration of lessons learned into planning and monitoring and evaluation (M&E).
21. The project aimed to address the monitoring, observation, analysis, data storage and development of value added information products. It also aimed to promote sharing so that agricultural decision-making processes can be better informed. The national, provincial and local staff members from the Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment and the Department of Agricultural Land Management of the Ministry of Agriculture and Forestry were trained on agroclimatic and land resources information systems. It was intended that the information systems would benefit multiple sectors and be developed in close collaboration with other development partners working in similar areas.

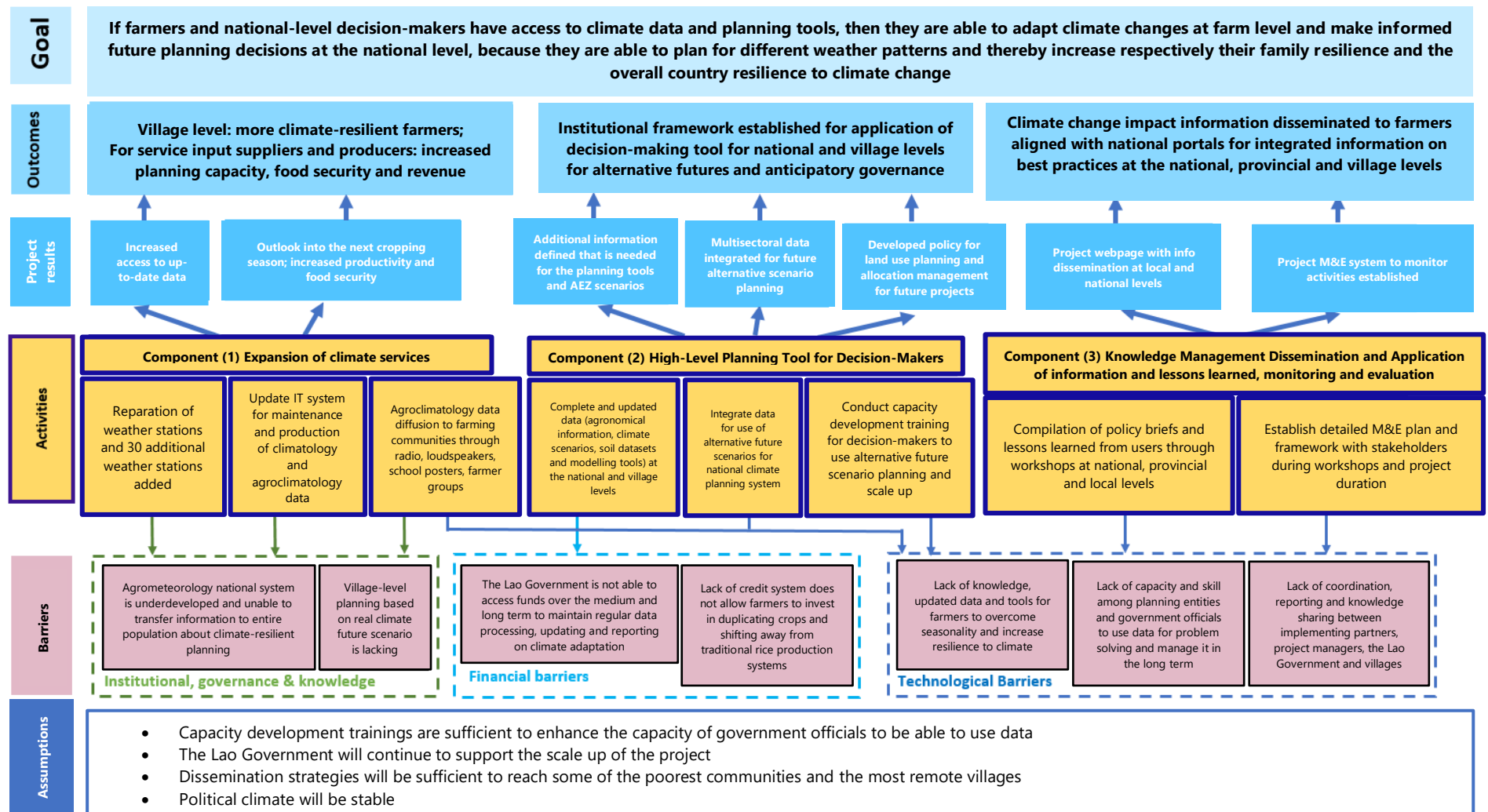
2.2 Geographic areas targeted by the project

22. The project was implemented with a national focus at the central level. The project's modelling and information technology processes were responsibilities of the national institutions. The project's modelling component aimed to produce national-level results. The project would cover the whole country through two applications. Some locations were selected as pilots. Component 1 of the project had 15 locations in 12 provinces to install the automatic weather station (AWS) systems under the auspices of the Ministry of Natural Resources and Environment. Component 2 activities were piloted in the Saravan Province, but only with the Provincial Agriculture and Forestry Office and the District Agriculture and Forestry Office. More than 85 percent of the project budget was devoted to modelling activities under Components 1 and 2. This included the installation of field equipment and local testing. Under Component 3, the piloting of the agrometeorological system was initially planned for the Savannakhet and Champasack Provinces. However, the pilots were in five provinces for better agroecological coverage and different activities (see Figure 1).

3. Theory of change

23. The project's theory of change was not available in the project document, but one was developed by the project team during the MTR.
24. The project's objectives aimed at enhancing capacities to gather, process, analyse and share climatic and geospatial information. This way, it could be applied to planning and decision-making processes on climate change adaptation in agriculture. The concept had two levels of decision-making. First, the project built infrastructure and comprehensive agroclimatic monitoring and information capacity to boost sustainable production by optimizing smallholder farmer resilience to climate change. Second, the project addressed the future provision of crop distribution and productivity, as well as the socioeconomic acceptability of farming and cropping systems due to climate change impacts. The latter level had national relevance.
25. Figure 2 details the project's theory of change.

Figure 2. Theory of change



Source: PMU, December 2022.

4. Key findings by evaluation questions

26. This section presents the main findings that answer the evaluation questions. It includes an analysis of the relevant cross-cutting issues.
27. It is important to note that the project had a number of changes during implementation. These changes impacted the focus and priority within the original objectives. In fact, these changes were made in response to either an agreed upon strategic change (for example, the location and number of FFS initiatives to be established) or unforeseen impediments (for example, the restricted availability and accessibility of some large data banks and data sharing issues among stakeholders while adhering to the respective or sometimes restrictive mandates of stakeholders).

4.1 Relevance

Evaluation question 1. To what extent has the project proven relevant to the needs of stakeholders – national and subnational government priorities, participating communities, FAO in the Lao People’s Democratic Republic Country Programming Framework, the United Nations Partnership Framework, the Global Environment Facility (GEF) strategies and relevant Sustainable Development Goal aims?

Evaluation question 2. To what extent has the project been able to cope with significant changes in the context relevant to its design and goals, and how well did the project and stakeholders appropriately respond to these changes and ensure continued relevance?

28. Despite some changes, the project remained relevant to both its objectives and various supported stakeholder strategies from the project document. However, these changes diminished the relevance to certain areas of concern. Alternatively, they fostered a significant national capacity and interest in using spatial forecasting tools for policymaking and planning.

Finding 1.1. The project’s key deliverables contributed in various ways to the project’s overall objective to strengthen the country’s agroclimatic monitoring and information systems for better climate change adaptation and food security.

29. Briefly summarized, the key deliverables entailed:
- i. the expansion of distribution and the functional enhancement of weather monitoring stations with a laboratory for calibration;
 - ii. capacity building and the establishment of weather monitoring and short-term forecasting;
 - iii. the launch of evolving LRIMS, AEZ and socio-agricultural and vulnerability analysis (SAVA)¹ tools to facilitate climate change adaptation and socioeconomic and environmentally sustainable agricultural and food security policymaking and planning;

¹ In various project documents, the LRIMS is presented as encompassing the AEZ and SAVA – or the three are mentioned separately. For sure, the three are interlinked and meant to feed into each other eventually. This situation seems to indicate that the package is still very much under development.

- iv. capacity building on the use and further development of such policymaking and planning tools; and
- v. the establishment of various dissemination practices and tools to raise awareness and provide services based on these deliverables.

Finding 1.2. Through these deliverables, the project supported the originally targeted national strategies.

30. Vision 2030 from the Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment focuses on: i) improving and expanding the network of hydrological and meteorological stations that pertain to agriculture in order to strengthen natural disaster risk reduction activities; ii) improving numerical weather prediction and forecasts of flood water levels and droughts; iii) strengthening capacity among the Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment for analysis between meteorology and hydrology; and iv) building technical cooperation with international and regional agencies.
31. Key Lao Government documents related to climate change in agriculture include the 2015 intended nationally determined contributions, the National Adaptation Programme of Action and the 2019 Decree on Climate Change. The intended nationally determined contributions and the National Adaptation Programme of Action identify agriculture, forestry, water resources and health as the most vulnerable sectors. These are therefore priorities for adaptation. Both documents highlight floods and droughts as primary climate hazards that have adverse impacts on agriculture, livelihoods and food security. The intended nationally determined contributions are incorporated in the Ninth National Socioeconomic Development Plan to ensure the continued mainstreaming of climate-related policy in the overall national plans.
32. The country's 2025 Agriculture Development Strategy and 2030 Vision has two complementary goals. Goal 1 focuses on food production, and Goal 2 focuses on agricultural commodity production. Climate risks in agriculture were mainstreamed in the 2025 Agriculture Development Strategy and the 2030 Vision. This prevents, controls and addresses the impacts of natural disasters.
33. The Ninth National Strategy for Socioeconomic Development and the 2030 Vision prioritize the agriculture sector as key in innovative, green and sustainable economic growth. Outcome 4 on environmental protection and natural disaster risk reduction, and Output 3 on disaster preparedness, prioritized the mainstreaming of climate change adaptation and mitigation in sectoral and local development plans. This involved implementing natural disaster and climate change management and preventive measures, such as early warning, prevention and emergency response systems.

Finding 1.3. The project supported the originally targeted relevant FAO strategies.

34. Regarding FAO's Strategic Objective 2, the project contributed to Organizational Outcome 1, producers and natural resource managers adopt practices that sustainably increase and improve the provision of goods and services in agricultural production systems. The project also contributed to Organizational Outcome 2, stakeholders in member countries strengthen governance – the policies, laws, management frameworks and institutions that are needed to support producers and resource managers in the transition to a sustainable agricultural production system.

35. FAO Strategic Objective 5 involves greater resilience of livelihoods to threats and crises. The project promoted climate monitoring and access to information systems so that decisions on risk reduction could be better informed and aligned with Organizational Outcome 2: countries and regions deliver regular information and trigger timely actions against potential, known and emerging threats to agriculture, food and nutrition.
36. FAO's Country Programming Framework Priority Outcome 4 involves enhanced climate change adaptation and mitigation capacity among the government and communities, as well as the reduction of natural disaster vulnerabilities related to agriculture, forestry and fisheries.
37. FAO's 2022–2031 Strategy on Climate Change involves resilient agrifood systems regarding the current and future impacts of climate change, as well as learning from good practices to promote transformative adaptation policies, plans and actions.

Finding 1.4. The project also supported the originally targeted GEF LDCF strategies.

38. Climate Change Adaptation-2 on increasing adaptive capacity dealt with greater adaptive capacity to respond to the impacts of climate change, including variability, at the local, national, regional and global levels.
39. Climate Change Adaptation-3 on adaptation technology transfer promoted the transfer and adoption of adaptive technology.

Finding 1.5. The project complemented the country's existing interventions.

40. The project leveraged a number of the country's co-financing opportunities and other existing interventions, such as the World Bank's Disaster Risk Management programme to upgrade a weather forecasting facility. This was implemented by the Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment. Another complementary initiative was FAO's Climate Adaptation in Wetland Areas (CAWA) project in Savannakhet. The International Center for Tropical Agriculture (CIAT) implemented a project to apply seasonal climate forecasting and innovative solutions for climate risk management through DeRisk SE Asia. The project focused on agrometeorology as a complimentary activity to support these efforts. Specifically, this aimed to address the lack of agrometeorology capacity, strengthen systems and improve the flow of information to farmers.

Finding 1.6. The project built climate resilience among smallholder farmers.

41. The Lao People's Democratic Republic is highly vulnerable to climate change. Climate hazards such as floods, droughts, crop pests and diseases have had significant adverse impacts on agricultural production, food security and income.
42. A study led by the CIAT, FAO, the Ministry of Agriculture and Forestry, and the Ministry of Natural Resources and Environment showed that about 78 percent of farmers in the Lao People's Democratic Republic were aware of climate change. Drought, hotter temperatures and less rain were most commonly cited as the probable future effects of climate change in their village. However, to a lesser extent, increased rainfall was cited by some respondents as a probable future effect of climate change. Most respondents stated that losses in agricultural production from extreme weather (80.25 percent) were followed by a loss of income.

43. The project supported the implementation of national policies, strategies and legislation that recognized these challenges for farming communities and sought to provide timely information for them to be factored into their farming practices. The project utilized various appropriate channels to disseminate agrometeorological information to the farmers. This included loudspeakers, FFS initiatives and local radio stations. The project also worked with schools where it reached out to youth.

Finding 1.7. The project went beyond expectations and generated a Python agroecological zoning (PyAEZ) tool of global relevance.

44. The development of the PyAEZ was a globally relevant project achievement. This was done through co-financing from the FAO Regional Office for Asia and the Pacific and the work of the Asian Institute of Technology's Geoinformatics Center. This provided a standard framework for land resource inventory and appraisal, which adhered to the established FAO land evaluation framework. The underlying algorithm of the PyAEZ uses numerous data inputs in simulated crop cycles to assess the suitability and productivity of selected crops. It also estimates the maximum yield under particular climate, soil and terrain conditions.
45. Overall, the project contributed to the objective of strengthening agroclimatic monitoring and information systems for improved climate change adaptation and food security in the Lao People's Democratic Republic. Despite these positive results, the evaluation found that the project lost focus over time. In fact, there was more scattered geographic targeting. Ultimately, this shifted the focus and priority of the original objectives.
46. **The project's relevance is rated as Satisfactory.**
47. The Satisfactory rating was based on the fact that, overall, the project remained relevant to its original objectives – despite its shift in focus and priority. Future scale up and sustainability endeavours could correct the identified shortcomings relatively easily. Existing spatial modelling tools can be redirected, upgraded or prioritized accordingly. These could be linked to a more intensified feedback and engagement mechanism with local communities. Despite its shortcomings on relevance, the project established a satisfactory platform where more relevant future activities can be developed.

4.2 Effectiveness

Evaluation question 3. To what extent have project objectives been achieved against plans? What were the contributing factors of achieving and not achieving the expected objectives?

Evaluation question 4. What were the most significant achievements and what can be learned from these?

Evaluation question 5. What particular added value can be identified in FAO's contributions to the results achieved – both planned and adapted as the context changed?

48. The project strengthened agroclimatic monitoring, forecasting and dissemination capacity using data and tools. These tools are suitable for decision-making processes on improving climate change adaptation and food security in the Lao People's Democratic Republic. However, the project would have benefited from a more integrated implementation approach to tackle the country's most pressing climate change challenges: recurrent droughts and floods.

49. Appendix 5 provides details on assessing the level of achievements of project outcomes and outputs. The rating on progress towards the achievement of results is provided.

4.2.1 Findings on Component 1

Finding 2.1. Under Component 1, the project successfully achieved most of the planned efforts under Outcomes 1.1 and 1.2. Outcome 1.1 involved the improvement of a network of weather stations through the establishment of 15 AWS systems and the rehabilitation of 15 existing manual weather stations. A laboratory to calibrate the AWS sensors was fully established. The Lao Climate Service for Agriculture (LaCSA), found at www.lacsa.net, is a decision-making tool that was developed by the project to provide agrometeorological advisory services and early warnings.

50. The progress towards Outcome 1.1 is rated as Highly Satisfactory. The project made a significant contribution towards strengthening agroclimatic monitoring and information systems. This improved climate change adaptation and food security.

Finding 2.2. The following deliverables were achieved under Outcome 1.2: i) a standard operating procedure was developed for the Climatology and Agrometeorology Division of the Department of Meteorology and Hydrology that was endorsed by the Ministry of Natural Resources and Environment and the Ministry of Agriculture and Forestry in December 2022;² and ii) 500 government staff members were trained (300 in the standard operating procedures and 200 in bulletins, agrometeorology and station management).

51. The project developed agrometeorology advisory bulletins on forecasts, farming management recommendations and short-term early warnings in both English and the Lao language. The services were made available for decision-makers at the national and provincial levels and for the public through the Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment dissemination channels. This involved the LaCSA system. The services were made available in the following forms: i) a seasonal bulletin for each of the 17 provinces, updated at the end of every month; and ii) a weekly bulletin for each district with weather forecasts. A total of 141 bulletins were automatically produced in English and the Lao language every week by the LaCSA system. The bulletins have been produced and distributed since May 2019.
52. The PPR for the period from July to December 2019 reported an increase in the average rice yield³ of FFS initiatives from 3.94 t/ha to 6.5 t/ha in the Champone District. This is in comparison to previous years. In addition, in the Sing District, the reported average rice yield increased to 5.4–6.5 t/ha from an average yield of 4.34 t/ha.
53. Although impossible to categorically state the causality between project initiatives and progress reported by farmers, one can reasonably conclude that the project contributed to these outcomes. There is evidence that the benefits of strengthening institutional and technical capacity of both the Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment and the Department of Agricultural Land Management of the Ministry of Agriculture and Forestry to enable improved data sharing, analysis and the interpretation of agrometeorological information were felt by end users.

² The standard operating procedure was signed during the project's closing event on 5 and 6 December 2022 in Vientiane.

³ This was calculated by using data from 2005 to 2018 from the District Ministry of Agriculture and Forestry Statistics Office.

54. **Progress towards Outcome 1.2 is rated as Highly Satisfactory.** The project significantly contributed to strengthening the institutional capacity of both the Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment and the Department of Agricultural Land Management of the Ministry of Agriculture and Forestry. In fact, this strengthened the monitoring, analysis and communication of and advice on agricultural production systems at the national, provincial and local levels.
55. According to the project's logframe, **Component 2** was to strengthen the institutional and technical capacity for the monitoring, analysis and communication of agricultural production systems and the development of decision-making tools to support policy and adaptation planning for the country's agriculture sector. Outcome 2.1 was to develop the following decision-making tools: i) the LRIMS; ii) a high-resolution AEZ; iii) SAVA; and iv) agricultural production systems at risk (SAR), which were developed based on agricultural resources such as climate, land, soil, water and crops. Outcome 2.2 was to develop the technical capacity of government officials for the sustained operation and use of the LRIMS, SAVA, the AEZ and SAR for policy formulation and adaptation planning in agriculture.

4.2.2 Findings on Component 2

Finding 2.3. At the time of the evaluation, most of the outputs under Outcome 2.1 were fully delivered. Knowledge platforms were developed, which included the LRIMS database at <https://lrims-dalam.net/> for the national AEZ, SAVA, SAR, and policy options and trade-offs. According to the sixth Project Steering Committee meeting, the LRIMS information system was launched in November 2021 but had been available since the first year of project implementation in 2017. The LRIMS is a web-enabled geospatial system used to design policy options and guide land management planning. This aims to sustainably enhance food security and support risk response in a context of current and future climate change.

56. **Progress towards Outcome 2.1 is rated as Satisfactory.** The project made an important contribution towards the creation of decision-making tools that provide integrated climate, natural resources and agriculture data and analyses for strategic foresight and scenario-based planning.

Finding 2.4. Under Outcome 2.2, the project strengthened the technical capacity of government officials. This involved the sustained operation and use of outputs developed under Outcome 2.1 to support policy and adaptation planning for the country's agriculture sector.

57. A review of the Programme Implementation Report (PIR) for the period from 1 July 2019 to 30 June 2020 indicated that more than 180 staff members were trained in a multiplicity of advanced geographic information systems. This was against the original project closure target of 100 staff members (30 female and 70 male). The geographic information system trainings covered the LRIMS, the AEZ and SAVA. Additional trainings on SAVA and anticipatory governance were also completed.
58. Some trainings, particularly those by international faculty and trainers, were to be held in an actual demonstration or hands-on format. Instead, these were delivered online due to the COVID-19 pandemic. During interviews, some of the training beneficiaries cited difficulties as both the trainings and the education materials were in English.
59. Following the LRIMS trainings, the project's documents reported that experts from the Department of Agricultural Land Management of the Ministry of Agriculture and Forestry

could upload, modify, tag and include metadata independently. A specialized company, however, was still responsible for server management. According to senior government officials at the Department of Agricultural Land Management of the Ministry of Agriculture and Forestry, this was a first among least developed countries. Indeed, the Lao People's Democratic Republic could implement the LRIMS independently with national experts using regional, national and international data supported by international experts.

60. **The progress towards Outcome 2.2 is rated as Satisfactory.** There was greater technical capacity among government officials. This involved the sustained operation of decision-making tools that support agricultural production systems at the national, subnational and local levels. This also provided alternative futures and anticipatory governance.
61. **Component 3** focused on knowledge management and the dissemination of information and lessons learned for decision-making processes, planning and evaluation. This component had one outcome with three interrelated indicators and three outputs. Outcome 3.1 related to knowledge and information sharing for local application, agriculture and food security planning and programming, and the M&E of project results to ensure sustainability. This outcome had three indicators: i) 3.1a framework for knowledge sharing and the packaging of lessons learned and experiences developed or improved; ii) 3.1b trainings and workshops delivered; and iii) 3.1c number of training materials, products, publications, guidelines, books, handbooks, flyers and websites. The outputs were: i) 3.1.1 the local application of climate information and location-specific adaptation strategies facilitated through the FFS initiatives in close coordination with the CAWA project activities; ii) 3.1.2 knowledge and information sharing workshops conducted, and best practices and key lessons disseminated via publications and project websites to facilitate wider awareness and use in other climate-sensitive sectors; and iii) 3.1.3a project M&E system established to monitor activities and outputs systematically at all levels (national, provincial, local) and outcomes evaluated.

4.2.3 Findings on Component 3

Finding 2.5. The needs of the local communities and vulnerable populations were considered in the project. The project's documents had defined local communities to include Indigenous Peoples, ethnic minorities and the most vulnerable populations. The Lao Government recognizes over 100 ethnic subgroups within 49 ethnic groups. Indigenous Peoples are the most vulnerable group in the country, representing 93 percent of its poor. From the project design, local communities were to conduct the FFS initiatives under Output 3.1.1 and deliver location-specific adaptation practices at pilot locations. These communities would be targeted through consultations to understand their issues and needs during project implementation. However, under Output 3.1.1, the project did not address their specific needs since these were never identified. Specific adaptation strategies, which were to be based on Component 2 activities, were not applied as expected. Nevertheless, the project raised the awareness of local communities on agrometeorology using various dissemination channels.

62. The project adopted a multichannel dissemination approach for agrometeorological information using the LaCSA system, loudspeakers for villages, local radio and social media platforms like Facebook and WhatsApp.
63. The PIR report for the period from July 2019 to June 2020 indicated that the LaCSA products⁴ were distributed in 30 pilot villages of five provinces through loudspeakers. This

⁴ These were weekly and seasonal bulletins on agrometeorology and short-term early warnings.

- reached more than 32 000 inhabitants. The PPR for the period from July to December 2019 also reported that a government-managed Facebook campaign under Component 3 reached over 100 000 people in the Vientiane Province, resulting in 2 714 page followers.
64. The CIAT study reported that television, radio and loudspeakers were reported as the most valuable sources of agrometeorological information among farmers. The study further showed that a higher percentage (about 77 percent) of female respondents identified radio and loudspeakers as the most valuable, which is probably due to limited smartphone ownership among this demographic.
 65. The Evaluation Team found low smartphone ownership among women. For example, in an FGD in the Phonthon Village of the Feuang District, the Evaluation Team found that only two out of eight female participants had smartphones but all five male participants owned them. Only one male participant had the LaCSA installed on his phone. Despite smartphone ownership status, all 13 group members that the Evaluation Team met with had received agrometeorology information through the village loudspeakers.
 66. Feedback from farmers during the FGDs highlighted their perceptions of the value of the agrometeorology information disseminated by the project. In one FGD with 12 rice farmers (seven men and five women) in the Phonthon Village of the Feuang District, the farmers revealed that all (100 percent) 120 households in the village had accessed the agrometeorology information through the village loudspeakers. Additionally, 80 percent of households used the information to inform farm production decisions. This included decisions on when to plant rice, especially in the June/July season, and when to harvest during the month of November. Compared to previous years, the group reported a 20 to 30 percent increase in rice yields among those who utilized the agrometeorology information. These figures were based on a collective estimate by the FGD members – not on actual yields.
 67. During the Evaluation Team's field visit to the Phakkoudyai Village of the Lao Ngam District, agrometeorology information was announced over loudspeakers twice daily – in the morning and the evening. The focus group stated that farmers used the information to decide on the best time to harvest coffee and when to dry the beans. The farmers reported that the use of agrometeorology information had improved the quality of the coffee, which then brought more income. The community members reported that there had been benefits from using the agrometeorology information since May 2019 – when the project started to disseminate it.
 68. The PIR for the period from 1 July 2019 to 30 June 2020 showed that the project raised awareness of agrometeorology among 11 023 Indigenous Peoples (5 418 female) in the Luang Namtha and Saravan Provinces. This involved the FFS beneficiaries through village meetings, village loudspeakers and local radio.
 69. The benefits of the agrometeorology information for farmers are also noted under Finding 2.2.

Finding 2.6. The project utilized the FAO website and Facebook to disseminate lessons learned and experiences. The Evaluation Team could not establish the overall traffic to these sites in terms of the number of visitors and hits, nor the number of times the website documents were downloaded. However, a 25 August 2022 back-to-office report states that during the six-day Lao

Youth Radio Training organized by the Department of Agricultural Land Management of the Ministry of Agriculture and Forestry, a total of 17 news stories were produced and ran on Facebook. These stories received 1 225 783 views, 8 922 likes and 2 947 comments and were shared 3 711 times. In addition, the PPR for the period from July to December 2019 reported that a government-managed Facebook campaign reached over 100 000 people in the Vientiane Province, resulting in 2 714 page followers.

70. Some project events were covered in newspapers and on the radio. National counterpart officials from the Ministry of Natural Resources and Environment and the Ministry of Agriculture and Forestry also disseminated lessons learned at regional and international fora.
71. The project established a partnership with the Laos National Radio to broadcast agrometeorology information on a weekly basis in the five project provinces. Through multiple internal collaborations, the Weather Forecast Division supported the production of a weekly (every Monday) television show on agrometeorology. However, the Evaluation Team could not verify the outreach or anything about the effectiveness of the various dissemination channels utilized by the project. Feedback from the FGDs indicated that the majority of community members received agrometeorological information via the project's loudspeakers.

Finding 2.7. It is estimated that the project disseminated agrometeorology information to 32 682 beneficiaries (16 264 male and 16 418 female) in 4 286 households through loudspeakers. However, through partnerships with relevant ongoing programmes and entities like the Netherlands Development Organization (SNV), the Adventist Development and Relief Agency, the FAO France project, the FAO Japan project, and the World Food Programme (WFP), the project reached a total of 115 872 beneficiaries (58 055 male and 57 817 female) in 20 067 households against the 1 200 beneficiaries that had been targeted in the project document (see Table 3).

Table 3. Project outreach through loudspeakers

No.	Organization	Funder	Households	Male	Female	Total
1	Strengthening agroclimatic monitoring and information systems to improve adaptation to climate change and food security in the Lao People's Democratic Republic project		4 286	16 264	16 418	32 682
2	Cooperation Committee with Laos	European Union	395	1 025	1 081	2 106
3	FAO project in Luang Prabang	Japan	4 077	11 032	10 781	21 813
4	FAO project in Oudomxay	Japan	3 429	9 477	9 277	18 754
5	FAO project in Attapeu	Republic of Korea	7 069	17 993	17 942	35 935
6	WFP		709	1 635	1 736	3 371
7	Climate Action Enhancement Package	World Resources Institute	102	56	46	102
8	SNV			573	536	1 109
	Total		20 067	58 055	57 817	115 872

Source: PMU, December 2022.

Finding 2.8. Essentially, project management reported the following knowledge management activities: a weekly five-minute meteorology television spot for two years; a five-minute agricultural television spot for nine months; 115 872 beneficiaries reached through loudspeakers; Facebook campaigns; and public and private media presence (40 times) through newspaper and television. Other activities included multiple workshops, policy and village meetings.

Finding 2.9. The Evaluation Team's review of the logframe showed that the project had a target to design and utilize an M&E plan and knowledge management strategy by midterm. Accordingly, the M&E plan was designed as scheduled. This guided the operationalization of the project's M&E system. The knowledge management plan was developed in the project's first year, and it has been continuously updated throughout the project's life cycle.

72. **The progress towards Outcome 3.1 is rated as Moderately Satisfactory.**

73. Local communities were to conduct the FFS initiatives under Outcome 3.1.1 and deliver location-specific adaptation practices at pilot sites. However, these activities were not implemented, and specific needs of local communities were not addressed as planned. Specific adaptation strategies, which were to be based on Component 2 activities, were not applied as expected. Nevertheless, the project raised awareness of agrometeorology among local communities through various dissemination channels.

74. Overall, the project had good coverage on weather information through the loudspeaker system. In fact, it successfully brought in other actors who took up activities and increased coverage. The information provided appears to have been valuable to farmers. User uptake and the appropriateness of the application was less clear. FAO played an important role in providing technical skills and experience and in convening a wide range of government and non-government actors to meet the project's objectives.

75. **The project's effectiveness is rated as Satisfactory.**

76. The project developed technological innovations of global importance: the LaCSA, the LRIMS and the PyAEZ. This provided a decision-making framework to improve climate change adaptation and food security for farmers in the Lao People's Democratic Republic.

4.3 Efficiency

Evaluation question 6. To what extent has the project been implemented efficiently, cost-effectively and in a timely manner?

Evaluation question 7. Has management been able to adapt to any changing conditions to improve the efficiency of project implementation?

77. Overall, the project was efficiently implemented by a small PMU and a variety of partners that brought added value. However, the fact that the project required a one-year no-cost extension reduced efficiency.

Finding 3.1. Integrating Components 1 and 2 was clearly planned for fieldwork at two pilot sites. This would be supported by the establishment of 20 FFS initiatives and overlap with the CAWA project in the south of the country. However, this particular activity under Component 3 underperformed.

78. The project document presented a somewhat less important role for Component 3. It refers to Components 1 and 2 as the two prime project components. For both components, a

responsible person was expected. The responsibility for Component 3 was to be shared by both. As for the establishment of the FFS initiatives, however, it was unlikely that either of the two responsible departments, the Department of Meteorology and Hydrology and the Department of Agricultural Land Management, would have had the right capacity to promote this activity. In a Project Steering Committee meeting, one of the members urged for the involvement of additional land use planning departments and emphasized the need to lean more on the CAWA project in order to reduce the FFS workload. It appears that no actions were taken as per this member's advice.

Finding 3.2. The project had a one-year no-cost extension. The first half, from July 2020 to December 2020, was due to delays caused by the COVID-19 pandemic. This was approved during the fifth Project Steering Committee meeting on 20 July 2020. The second half, from June 2022 to December 2022, was approved during the sixth Project Steering Committee meeting on 22 March 2022. This extension was mainly due to available funds under Component 1 as the budget for Component 2 was nearly exhausted. The sixth Project Steering Committee meeting recommended that further activities related to flood risk and livestock health risk monitoring be added to the LaCSA as part of Strengthening Agroclimatic Monitoring and Information System 2 (SAMIS 2). The second no-cost extension was also used to complete the installation of the manual weather measurement sensors under Component 1.

Finding 3.3. During the September 2017 project inception workshop, it was decided that significantly more villages than initially targeted would be involved under Component 3 (weather announcements). This was made possible by working through not only the FFS initiatives but also low-cost dissemination channels like community loudspeakers, the WFP school drawings and posters on school meal programmes, and farmer groups.

79. The project evolved over its time frame. It had a small PMU with a varied, complex mix of partners and allies that brought added value. The project seems to have taken reasonable adaptive measures to deliver and maintain relevance to needs. In fact, it called on senior management to advocate for engagement at key times. Further, there was a need to adapt to COVID-19 restrictions. This involved taking unavoidable steps like online training, even though this presented some difficulties for users.

80. **The project's efficiency is rated as Satisfactory.**

81. Through a small PMU and partners, the project largely achieved its objectives. Despite COVID-19 and the delayed delivery of some of the expected results under Component 2, the project was implemented efficiently.

4.4 Sustainability

Evaluation question 8. What is the likelihood that the project results and positive changes will be sustained after the end of the project, and what are the key factors related to these conclusions?

Evaluation question 9. Were there any efforts made to establish a financial mechanism to sustain the project outcomes, and what are the risks to sustainability going forward?

Evaluation question 10. What key learning (including the identification of risks) can be captured for informing sustainability planning for SAMIS 2?

82. The project's sustainability is rated as Likely. In the interim, the Lao Government approved the second phase, SAMIS 2, to be financed through the Global Climate Fund (GCF). Beyond

SAMIS 2, the government is committed to making further investments in the systems established by the project.

83. The key risks to project sustainability as assessed by the Evaluation Team are outlined in the following points.

4.4.1 Socioeconomic

Finding 4.1. There were no risks to socioeconomic sustainability. This aspect is rated as Likely.

84. The project strengthened the capacity to monitor and analyse agricultural production systems at the national level. This led to adaptive actions that negate the impacts of climate change in agriculture. At the local level, the project created greater resilience to climate change among farmers. Further, the project generated more income levels for farmers by reducing post-harvest losses and increasing yields.
85. The FDGs with senior government officials from the provinces, the Ministry of Labour and Social Welfare, and the Ministry of Natural Resources and Environment established that the Lao people had been doubtful of the early warning system until a major wind storm struck the country in 2019. Some anecdotal evidence from the Evaluation Team's community visits revealed that farmers had sought information. For instance, those that missed the loudspeakers called the announcers by telephone to get forecast updates.

4.4.2 Financial

Finding 4.2. There were moderate risks to financial sustainability.

86. At the central government level, both the Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment and the Department of Agricultural Land Management of the Ministry of Agriculture and Forestry experienced substantial budgetary limitations. During a meeting with a senior political leader from the Ministry of Natural Resources and Environment, the Evaluation Team was informed that the GCF would bear the cost of SAMIS 2. In the future, however, it is expected that the government continue supporting the LaCSA.

Finding 4.3. On a more positive note, project management took proactive steps to ensure project sustainability.

87. The LaCSA was under operational guarantee for ten years, while the LRIMS was for five. At the time of the evaluation, the remaining operational guarantee period was eight and three years for the LaCSA and the LRIMS, respectively. The national e-government system was not well developed, and there was a dependence on unreliable national power systems. As a result, the LaCSA and the LRIMS databases were not available on the e-government system. Rather, they were on iCloud, which was managed by a specialized firm based in the Republic of Korea. This was a deliberate choice by the Department of Agricultural Land Management of the Ministry of Agriculture and Forestry and the project because iCloud has 24-hour service. Overall, there was a need to plan for sustainability beyond the years of this agreement.

Finding 4.4. At the community level, there were various initiatives to ensure that the community members continued to receive the agrometeorology information beyond project closure. For example, the Evaluation Team visited the Phonthon Village of the Feuang District, where it found that each of the 120 households contributed LAK 10 000 (USD 0.6) every month for loudspeaker repair and maintenance.

4.4.3 Institutional and technical capacity

Finding 4.5. The project's institutional and technical sustainability is rated as Likely.

88. The project strengthened the institutional and technical capacity of the Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment and the Department of Agricultural Land Management of the Ministry of Agriculture and Forestry. This involved the monitoring, analysis and communication of agricultural production systems. Additionally, the project developed the technical capacity of government officials for the sustained operation and use of the LRIMS, SAVA, the AEZ and SAR for policy formulation and adaptation planning in agriculture. Weather station operations, the collection, compilation and analysis of weather data, and the forecasting of agroclimatic conditions are the responsibilities of the Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment. A standard operating procedure was signed between the Ministry of Natural Resources and Environment and the Ministry of Agriculture and Forestry to facilitate data sharing between these two government entities and other stakeholders.
89. At the community level, the evaluation found that the village focal points in charge of announcing agrometeorology information through loudspeakers in the Phakkoudyai Village of the Lao-Ngam District had challenges in understanding the seasonal forecasts. As a result, they did not read the announcements to the community members. They only announced the daily and weekly forecasts, which they understood relatively better, and cited just limited details on seasonal forecasts. This fact was further supported by a senior government official in the Feuang District:
- "We have two main challenges here – first, agrometeorology is a new knowledge. Some people still do not pay attention to the information. Second, the community focal persons are not so knowledgeable about agrometeorology, and therefore, this limits knowledge transfer."
90. In order to sustain operations beyond the project, it is important that the two government departments have good coordination of the activities. Additionally, SAMIS 2 needs to strengthen farmer capacity on the effective utilization of a range of agrometeorological information, including seasonal and daily forecasts.

Finding 4.6. The Evaluation Team found that some of the AWS systems and their associated equipment were not fully operational.

91. The project equipped the District Agriculture and Forestry Office and the District Office for Natural Resources and Environment in the target provinces with equipment like motorbikes, grass cutters and laptops connected to the AWS. These tools were meant to support AWS operation and maintenance in the districts. The Evaluation Team's visit to the districts found that the budget for motorbike operation and maintenance was personally taken on by the Technical Officer assigned to use it. The budget for the operations and maintenance of other equipment was provided by the District Office for Natural Resources and Environment through the Provincial Office of Natural Resources and Environment. The latter was responsible for AWS operations and maintenance, including the dissemination of agrometeorology information.
92. The evaluation found that some equipment either broke down or became inaccessible due to missing passwords for laptops. This had happened for over four years. For example, the laptops at the District Office for Natural Resources and Environment in the Feung District

of the Vientiane Province and the Kongxedon District of the Saravan Province did not function. This had been due to either a mechanical breakdown or a missing password since 2018. Additionally, the Evaluation Team found that some of the equipment did not work due to difficulty in finding spare parts. For example, a grass cutter in the Lao-Ngam District of the Saravan Province had not been repaired for some time as the local repair shops could not find spare parts. In a similar case, a primary school in the Saravan Province was given tablets to support the dissemination of agrometeorology information and early warnings. However, there were no repairs for any broken tablet screens because there was no operation and maintenance budget for them.

93. Some of the AWS systems were not fully operational. This raises questions as to whether the current weather data were of much use in modelling the agrometeorology and early warning information, and whether these data were being added to the country's historical database.

4.4.4 Environmental

Finding 4.7. The environmental issues are detailed under the environmental and social safeguards section. During field visits to, for example, the Saravan Province, the Evaluation Team established that cassava – a project-supported priority crop – presented both problems and opportunities. Although cassava was expected to be a relatively climate-resilient crop, its production comes with a wide variety of short- and long-term risks for agriculture and natural resources.

94. The Evaluation Team established that the project developed policy proposals on crops such as cassava and coffee to address land degradation. Project management reported that SAMIS served as a base for policy proposals. In fact, the Governor of Champasack approved a law that bans the cultivation of crops and trees that are likely to deteriorate soil quality in the coffee-rich Pakxong District. The banned crops included cassava, large bananas (*kuay hom*), *Jatropha* and *eucalyptus*.
95. Overall, the government needed to make further investments in the systems established by the project to increase sustainability prospects.
96. The project's sustainability is rated as Likely. In the interim, the Lao Government approved the second phase of the project, SAMIS 2, which will be financed by the GCF. Beyond SAMIS 2, the government committed to making further investments in the project's systems.
97. At the community level, various initiatives help to ensure that project benefits continue. However, institutional and technical capacity presents shortcomings and a challenge to sustainability. Although SAMIS was technically functioning and effective, capacity building among farmers should be the next focus to enhance the likelihood of sustainability.

4.5 Factors affecting performance

Evaluation question 11. To what extent were the M&E plans appropriate, adaptable to changing needs and practical, with resourcing sufficient to contribute to reporting, timely decisions and fostering learning during project implementation? (What effect did the MTR have on this?)

Evaluation question 12. To what extent was the direct management approach appropriate for managing this project, compared to alternatives?

98. It took a long time for the project to establish a functional M&E system. For example, some of the planned M&E activities had been delayed for over two years while others were never

implemented. The project's theory of change was developed at the MTR. However, the project established an effective partnership arrangement for implementation with the other relevant stakeholders, including government counterparts.

4.5.1 Monitoring and evaluation plan

Finding 5.1. The M&E plan was developed and has been used since the first report in June 2018. The M&E plan was well articulated and sufficient to monitor results and track progress towards achieving the objectives. The M&E progress in achieving the project's results and objectives was based on targets and indicators that had been established in the results framework.

99. The project's logframe provided the objectives, expected outcomes and outputs alongside the corresponding indicators. The indicators for different outputs and outcomes were specific, measurable, achievable, relevant and time-bound. Annual PIRs and biannual PPRs were produced regularly using the indicators of the logframe.

Finding 5.2. The project's theory of change was not in the project document but was developed by the project team at the time of MTR. While individual components were relevant, their theories of change were disconnected from overarching objectives to improve climate change adaptation and food security in the country. The project did not quantify the expected benefits like higher yields for farmers through use of the LaCSA services. Data on farmers' level of production and productivity were not available. The lack of data on farmers' production levels therefore limited the estimation of project outcomes. The Evaluation Team's visit to the Ministry of Agriculture and Forestry in the Saravan Province found that the technical team had expressed the need for baseline data in order to benchmark progress towards the desired outcomes.

100. A letter of agreement was signed with the Department of Planning and Finance of the Ministry of Natural Resources and Environment to monitor the progress of project activities under Output 3.1.1 in the logframe. This also provided feedback to the PMU.

Finding 5.3. Some of the planned M&E activities were either delayed or never implemented. For example, the MTR was delayed for more than two years due to a number of reasons – including the COVID-19 pandemic. Baseline and impact studies, planned for the period from October to December 2017 and at the end of the third year, respectively, were never implemented. The lack of baseline data made it difficult to estimate project outcomes at the time of the terminal evaluation. This was further emphasized during the FGD with the technical team at the Provincial Office of Natural Resources and Environment in the Saravan Province. The technical team reported that they did not have baseline data to support them in benchmarking progress towards the desired outcomes.

101. The project's M&E plan is rated as Satisfactory.

4.5.2 Direct management approach

Finding 5.4. The project was implemented by FAO under the direct execution modality. Project implementation was carried out in close consultation with the Ministry of Natural Resources and Environment and the Ministry of Agriculture and Forestry. A PMU was established to manage the project's day-to-day activities. FAO, in consultation with the Ministry of Natural Resources and Environment and the Ministry of Agriculture and Forestry, delivered procurement and contracted services to the project under FAO rules and procedures. The project followed the management arrangements as per the project document.

102. The project established an effective partnership arrangement to implement the project with other relevant stakeholders and non-government counterparts. This involved a partnership

with national and international universities and institutions to support Component 2 activities, as well as training and capacity building sessions for government officials.

103. Documents indicated that FAO played an important role in providing technical skills and experience and in convening a wide range of government and non-government actors to meet the project's objectives. Feedback from interviews with senior government officials from the Ministry of Agriculture and Forestry and the Ministry of Natural Resources and Environment acknowledged the capacity building that they had received from FAO in various thematic areas of the project.
104. The PPRs showed that the PMU, in collaboration with FAO in the Lao People's Democratic Republic, played a critical role in promoting a harmonious working relationship between the Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment and the Department of Agricultural Land Management of the Ministry of Agriculture and Forestry in project implementation. The PMU and FAO also helped the government raise project visibility among partners other than the Ministry of Natural Resources and Environment and the Ministry of Agriculture and Forestry. This helped to ensure government buy-in.
105. The evaluation found that the project had challenges with the internal approval system for awareness raising publications through the FAO Office of Communications. The publication of training materials, for example, was delayed for one year. A SAMIS video was never produced. In addition, there was weak managerial and technical competence at the Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment, as well as challenges in interministerial data sharing. This threatened the project's sustainability.
106. The project's direct management approach is rated as Satisfactory.

4.6 Environmental and social safeguards

Evaluation question 13. To what extent were environmental and social concerns taken into consideration in the design of the project, and were these reflected on and adapted as necessary during implementation?

107. The project, as Category C, would have minimal or no adverse environmental or social impacts. In fact, the project fully complied with FAO's environmental and social safeguards. These were defined by the integration of precautionary principles into project management cycles.

Finding 6.1. Project implementation was guided by FAO's environmental and social safeguards. At the time of project preparation, an environmental and social safeguards assessment was undertaken and the project was classified as Category C. This involved a pre-approved list of projects that are excluded from detailed assessment since the project has minimal or no adverse environmental or social impacts.

108. The PIR for the period from 1 July 2018 to 30 June 2019 rated the project's overall environmental and social management risks as low. As per the project document, a detailed assessment was carried out in all 15 locations with new AWS systems. No negative impacts were identified.

4.7 Gender and equity

Evaluation question 14. To what extent were gender issues and other key equity considerations (Indigenous Peoples, disability, marginalized and vulnerable) effectively assessed and factored into designing and implementing the project?

Evaluation question 15. Was the project implemented in a manner that ensures equitable participation and benefits?

109. The project did not conduct a gender analysis as per the project document. In addition, there was no gender expertise to address possible risks related to gender norms and stereotypes that usually constrain opportunities for both women and men throughout the project's life cycle. Nevertheless, the project team tried to include as many female participants in the trainings and capacity building activities as possible.

Finding 7.1. The project document stated that a gender analysis was to be part of the FFS initiatives. This involved the promotion of climate change adaptation strategies under Component 3.1.1, as developed by Component 2. However, the Component 3.1.1 activities were not implemented.

Finding 7.2. The project's lack of a gender analysis included risks: women may have been inadvertently excluded due to limited access to agrometeorological information; fully understanding the realities of the division of labour among men and women during farming activities; and the ownership of productive assets like land.

110. The FGDs with farmers found that farming decisions were largely male dominated. Most of the "hard work" was considered men's work, whereas "light work" was for women. For example, land preparation, rice planting and irrigation maintenance were mostly done by men. Activities like planting cucumbers, tomatoes, lettuce and beans, as well as rice replanting, harvesting and weeding, were usually done by both women and men.

Finding 7.3. The project logframe had gender-segregated indicators. The project team tried to include as many female participants in the training and capacity building sessions as possible. However, female participation was relatively lower than male. This was mainly due to fewer female employees in the targeted government departments for the training and capacity building initiatives. Documents estimated that at least 30 to 40 percent of participants in the trainings, workshops and project implementation activities at the central and provincial levels were women.

Finding 7.4. The LaCSA is an online system and a smartphone application. As stated, smartphone ownership did not appear to cause any difference between men and women in accessing agrometeorological information. This was largely due to low usage of the application. All farmers that the Evaluation Team met with had received agrometeorological information via loudspeakers. The Evaluation Team also found that youth mostly used social media platforms like Facebook, but older people had less smartphone use due to a limited understanding of applications.

111. These findings indicate that loudspeakers were the preferred communication channel for agrometeorological information. However, the FGDs with farmers showed that the use of loudspeakers had limitations as some of the villages were geographically large. In such cases, the current loudspeakers could not cover the entire village. This left distant households without agrometeorological information. Also, the timing of the weather forecast announcements on the loudspeakers did not favour some village members due to their engagement in activities that often took them away from the village. However, the Evaluation Team established that some of the distant households, including those that lived

near the loudspeakers but could have missed the announcements, often called the village focal person over the phone for weather forecast updates. The Evaluation Team found this to be good information seeking behaviour on behalf of the villagers.

4.8 Co-financing

Evaluation question 16. To what extent did any expected co-financing materialize (government and donor), and what were the critical factors underlying this?

112. Overall, the project successfully leveraged co-financing well beyond the commitments made upon CEO endorsement. While some collaborations that the project attempted to establish did not work well, others proved successful. The project had a total investment of USD 21 759 452, of which USD 5 479 452 came from the LDCF grant and USD 16 130 000 came from FAO, the Japan International Cooperation Agency, the Asian Development Bank, the Centre for Development and Environment, and the Government of the Lao People's Democratic Republic as executing agencies, as well as other partners.

113. Appendix 4 details the actual funding realized by the terminal evaluation.

Finding 8.1. The project had a total investment of USD 21 759 452, of which USD 5 479 452 came from the LDCF grant and USD 16 130 000 came from FAO, the Japan International Cooperation Agency, the Asian Development Bank, the Centre for Development and Environment, and the Lao Government as executing agencies. There was additional co-financing from the CIAT, China, the Republic of Korea, Switzerland and Germany. FAO also contributed significantly to various aspects of information technology products and the involvement of international entities.

114. Funding from bilateral and multilateral agencies corresponded to the planned expenditure of these agencies under their various related projects in the country. Planned government funding was mainly through in-kind contributions from the Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment. This came in the form of office facilities and time from key staff members.

115. The PIR for the period from 1 July 2020 to 30 June 2021 indicated that some co-financing was beyond expectations. Other co-financing was below expectations but was covered by additional budgets. Overall, the project successfully leveraged co-financing well beyond the commitments that had been made upon CEO endorsement.

Finding 8.2. There were critical success factors to realize co-financing from partners. This mainly involved their core working areas of agriculture, food security and climate change adaptation, as well as project or subproject success rates. For example, the PIR for the period from 1 July 2019 to 30 June 2020 reported that some co-financing went beyond expectations and materialized over time, depending on the success of the planned activities.

Finding 8.3. Table 4 shows the project's planned expenditure and distribution among different components.

Table 4. Project cost in USD

No.	Co-funders	Component 1	Component 2	Component 3	Project management	Total
1	Japan International Cooperation Agency	4 900 000	-	-	-	4 900 000
2	Asian Development Bank	3 020 000	-	2 210 000	-	5 230 000
3	Centre for Development and Environment	-	4 500 000	-	-	4 500 000
4	Government	500,000	500 000	-	-	1 000 000
5	FAO	-	-	250 000	250 000	500 000
6	The GEF	2 440 659	2 137 986	639 881	260 926	5 479 452
	Total	10 860 659	7 137 986	3 099 881	510 926	21 609 452

Source: PMU, December 2022.

Finding 8.4. The project established partnerships for the implementation of activities with government counterparts and other relevant stakeholders. Some of these partnerships were based on international stakeholder interest and co-financing. This included partnerships with national and international universities and institutions to support training and capacity building initiatives of government officials, development partners and non-governmental organizations.

116. The project's core co-financing collaboration was with the CIAT-financed international climate initiative of DeRisk SE Asia. The following points outline the major co-financing collaborations.

4.8.1 Component 1 collaborations

117. The CIAT in the Philippines prepared and tested an agronomical questionnaire for weather station staff and built the capacity of staff members from the District Office for Natural Resources and Environment.

118. The Department of Agricultural Land Management of the Ministry of Agriculture and Forestry, the National Agriculture and Forestry Research Institute of the Ministry of Agriculture and Forestry and the CIAT under DeRisk SE Asia developed a decision tree for the LaCSA. This enabled farmers to select climate-smart technologies in the LaCSA. The National Agriculture and Forestry Research Institute of the Ministry of Agriculture and Forestry provided translation support for questions through a contract with the CIAT.

119. The CIAT team also developed a flip chart for rice crop stages in Pasa Lao. This was distributed to the District Office for Natural Resources and Environment so that non-experienced officers can identify plant growth stages.

120. The Department of Agricultural Land Management of the Ministry of Agriculture and Forestry, the National Agriculture and Forestry Research Institute of the Ministry of Agriculture and Forestry, and the Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment collaborated with the CIAT and the project to organize a workshop: Participatory Mapping of Agricultural Livelihoods and the Identification of Climate Risks for Establishing Climate Service Priorities in the Lao People's

Democratic Republic. This was held in four southern provinces: Salavan; Champasack; Xekong; and Attapue. This activity was also part of Component 2.

4.8.2 Component 2 collaborations

121. The FAO Regional Office for Asia and the Pacific's regular programming co-financed the project's AEZ work. The Asian Institute of Technology provided technical support to develop the necessary routines and parameterization for the AEZ.
122. The Climate Change Research Centre at the National Agriculture and Forestry Research Institute of the Ministry of Agriculture and Forestry collected crop indicators for the AEZ modelling.
123. Utrecht University and the University of Southampton supported scenario development and assessment exercises by applying the project's AEZ outputs.
124. FAO in the Lao People's Democratic Republic supported the Data for Policy initiative so that the government could utilize already available datasets. This also demonstrated how existing data could be used to prepare a holistic picture and inform key decisions and policies on the use of land and natural resources.
125. Based on the training needs assessment, the following trainings and capacity building initiatives were held: geographic information system and AEZ modelling from the Asian Institute of Technology; and Participatory Mapping of Agricultural Livelihoods and the Identification of Climate Risks for Establishing Climate Service Priorities in the Lao People's Democratic Republic, co-financed by the CIAT.

4.8.3 Component 3 collaborations

126. The project trained staff members from the Provincial Agriculture and Forestry Office and the District Agriculture and Forestry Office to undertake the LaCSA awareness raising activities. This was done through a public announcement system with the Laos National Radio.
127. An expert from the Laos National Radio trained 40 technical staff members (14 female) from the District Agriculture and Forestry Office, the Provincial Agriculture and Forestry Office and the District Office for Natural Resources and Environment in agrometeorology news development. A script guided village authorities to read weekly bulletins through the loudspeakers.
128. The local application of climate information and adaptation strategies was facilitated through the FFS initiatives and in close coordination with the CAWA project activities. The FFS initiatives took place during the rainy season in two provinces: i) Savannakhet Province in the south, covering the four villages of Laonard, Kadarn, Nonsithan and Xakheun-Neua; and ii) Luang Namtha Province in the north, covering the two villages of Chiangmoun and Namai.

Finding 8.5. Although quite a few local collaborations attempted by the project did not work well, the WFP collaboration that piloted the use of magnetic LaCSA bulletins for school meal programmes proved successful.

129. Documents reported weak support from the lead consultant on Component 2 activities.

130. There were failed partnerships. For example, the International Food Policy Research Institute was contracted by the project to support the AEZ modelling. However, this scientific research institute failed to deliver the contract, which led to further delays in the project's activities.
131. For Component 3, project reports indicated that none of the foreseen collaborations with non-governmental organizations in the field were realized. The project examined why these non-governmental organization projects did not adopt the LaCSA since it was assumed that its use would improve crop production. The results of this examination are still in progress.
132. The PPR for the period from July to December 2019 reported that some village authorities were either not ready or hesitated to read the climate and weather information over the loudspeakers.
133. The PPR also reported that rice field demonstrations under the FFS in three villages (Xakheun, Nonsithan, Laonard) of the Champhone Province were flooded. The rice plants were then destroyed. This led to crop failure, and the FFS had to be abandoned. There was no evidence of project support to those affected by the flooding. This highlighted the ongoing need to help farmers cope with such events.

4.9 Progress towards impact

Evaluation question 17. To what extent may any discernible progress towards long-term impact be attributed to the project (including programming and policy areas)?

Evaluation question 18. What existing or potential barriers or other risks can be identified that may prevent future progress towards long-term impact?

134. The project strengthened the institutional capacity of both the Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment and the Department of Agricultural Land Management of the Ministry of Agriculture and Forestry. This included the monitoring, analysis, communication and advisory service of agricultural production systems at the national, provincial and local levels. However, sustainability of the project benefits was threatened by risks related to ownership of the LaCSA database and data sharing arrangements.

4.9.1 Progress towards long-term impact

Finding 9.1. The project strengthened the agroclimatic monitoring, analysis, communication and use of data and information for decision-making in agriculture and food security. However, the project logframe and theory of change focused on these aspects as key results. There was no clear link to food security or income generation for the targeted farming communities.

135. The project also strengthened the institutional framework for decision-making tools that support agricultural production systems at the national, subnational and local levels. This provided alternative futures and anticipatory governance.
136. The LRIMS could be used by the country to develop a dataset and indicators to monitor the targets of the national agriculture development strategy on climate resilience.
137. Through the PIRs and the FGDs, the terminal Evaluation Team found that the project's agrometeorological information for farming communities positively impacted their

earnings. In fact, post-harvest losses on, for example, coffee and cassava plantations were avoided. There were also greater yields for crops like rice at the pilot locations. The Lao Government should consider extending these benefits to other farmers across the country with minimal incremental efforts.

4.9.2 Risks to future progress towards long-term impact

Finding 9.2. The risks to future progress towards long-term impact mainly related to ownership of the LaCSA database and data sharing arrangements. In fact, this could threaten the sustainability of the project's benefits.

138. The Lao People's Democratic Republic had weak information technology and telecommunications infrastructure. The national e-government system was not fully developed to provide services like cloud platforms for climate information data. As a result, the agrometeorological database was hosted on iCloud by a firm in the Republic of Korea and not in the country's e-government system. Beyond this hosting agreement, the future of the database is unclear. This presents a risk to the continued provision of weather and climate information services by the government.
139. The project's documents indicated that a major constraint to the implementation of agrometeorology activities related to the lack of coordination and cooperation among the involved agencies: the Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment and the Department of Agricultural Land Management of the Ministry of Agriculture and Forestry. This challenge was compounded by the fact that the country had limited access to accurate information, data and in-depth studies. In fact, it had no specific agency to address climate change, early warning activities and surveillance. However, the development of the standard operating procedure is encouraging. This was endorsed by the Ministry of Natural Resources and Environment and the Ministry of Agriculture and Forestry to facilitate data sharing with clear roles and responsibilities for both the Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment and the Department of Agricultural Land Management of the Ministry of Agriculture and Forestry.

4.10 Knowledge management

Evaluation question 19. How effectively is the project assessing, documenting and disseminating its experiences, results and lessons learned, and what can be said on the quality and appropriateness of these for the intended audiences?

140. The project used several communications channels to disseminate information about its activities. However, it did not meet the various knowledge dissemination needs like age, gender and location of the target beneficiaries.

Finding 10.1. The project's M&E plan indicated that the project was to be monitored quarterly and annually. There were provisions for the preparation of the PPRs and the PIRs. The PIR combined both FAO and the GEF reporting requirements. Provisions were also made to the project design for an independent MTR and terminal evaluation. The project's documents indicated that all of these planned activities were implemented to regularly assess, document and disseminate its results, experiences and lessons learned.

141. The project used the FAO website to disseminate information about its work: www.fao.org/in-action/samis/overview/zh. According to the project team, this is because

FAO does not allow a project-specific website. The FAO website was used for disseminating the information booklets, knowledge products and other publications. The project also had a Facebook page to share lessons learned and experiences (see Findings 2.3, 2.6 and 2.8).

142. The Evaluation Team found that Facebook was used more among young people. The project, however, did not target different categories like age, gender or location.

Finding 10.2. The project design (logframe Indicator 3.1.2) outlined the organization of a number of workshops for knowledge and information sharing, mainly through the FFS. As observed during the MTR, the information provided in the PIRs against this indicator did not relate to organizing workshops on knowledge and information sharing. For example, the PIRs and the MTR reported that the project's knowledge sharing workshops had the following activities: i) the drafting and continuous revision of the knowledge management strategy; ii) the production of multiple awareness assessment products (leaflet, video, webpage, publications); iii) consultation workshops; iv) standard operating procedure meetings; and v) training in the LaCSA, questionnaire design, and AWS cleaning and maintenance.

143. The Evaluation Team also noted the lack of fora to unite various project beneficiaries and implementers. This would have facilitated the sharing of reflections, lessons learned and experiences for joint recommendations on project improvements.

4.11 Additionality (for the GEF programmes only)

Evaluation question 20. What can be concluded on the added value of project interventions compared to comparable alternatives?

144. The GEF's additionality to the project came in three forms: legal, policy and regulatory; institutional and governance; and environmental. This involved three innovations of global importance: the LaCSA; the LRIMS and the PyAEZ. Indeed, this would not have occurred without the project.

Finding 11.1. The Evaluation Team adopted the GEF's definition of "additionality": a) changes in the attainment of direct project outcomes at project completion that can be attributed to the GEF's interventions – these can be reflected in an acceleration of the adoption of reforms, the enhancement of outcomes or the reduction of risks and greater viability of project interventions; b) effects beyond project outcomes that may result from systemic reforms, capacity development and socioeconomic changes; and c) clearly articulated pathways to broaden the impact beyond project completion that can be associated with the GEF interventions.

Finding 11.2. The GEF's additionality to the project came in three forms: i) legal, policy and regulatory; ii) institutional and governance; and iii) environmental.

145. **Legal, policy and regulatory additionality:** the project contributed to policy developments that would not have occurred without the project. For example, the LRIMS was expected to strengthen policy and decision-making at the national, subnational and local levels. This aimed to improve climate-responsive planning and development by incorporating long-term projections of climate change impacts on crop suitability and the exposure of agricultural systems to climatic hazards.

146. **Institutional and governance additionality:** the project enhanced interministerial cooperation. The Project Steering Committee developed cooperative relationships among ministries and their related departments such as the Department of Meteorology and

Hydrology of the Ministry of Natural Resources and Environment and the Department of Agricultural Land Management of the Ministry of Agriculture and Forestry. According to the FGDs with senior government officials, the project also contributed significantly to capacity building with support from national and international consultants at both the Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment and the Department of Agricultural Land Management of the Ministry of Agriculture and Forestry. This involved the monitoring, analysis, communication and advisory service of agricultural production systems at the national, provincial and local levels. Without the GEF-funded intervention, the Lao Government would have been unable to organize the tangible activities to strengthen agroclimatic monitoring and information systems for better climate change adaptation and food security.

147. **Environmental additionality:** under the project, the use of improved agrometeorology advice from the LaCSA was expected to result in the adoption of good agricultural practices. For example, this involved: the correct use of agricultural inputs such as water, fertilizer and pesticide to generate water savings and reduce water and soil pollution (Sustainable Development Goal 6); and the reduction of land degradation. The use of climate-responsive anticipatory planning by the Lao People's Democratic Republic was expected to lead to a more sustainable use of natural resources through an integrated LRIMS. For example, this involved: water, land and forest investments for better water efficiency in regions that are likely to suffer from future water shortages. According to the interviewed government officials, the likelihood of establishing both the LaCSA and the integrated LRIMS would have been low without the project. However, the project design's lack of appropriate indicators to measure baseline data and counterfactuals means that measuring the project's environmental outcomes is not possible. This led to a possible underestimation of progress and the GEF's additionality.

Finding 11.3. Innovation is a key area of additionality: the project's three major technological innovations were the LaCSA, the LRIMS and the PyAEZ.

148. The LaCSA is a technological innovation that provides agrometeorological advisories and early warnings to farmers and policymakers for better decision-making processes. In fact, this reduced the risk of economic loss and diversified and strengthened livelihoods. This related to information on meteorology, seasonal forecasts, the best use of crop varieties, and weekly advice on crops and pest and disease management.
149. The LRIMS is a web-enabled geospatial system to design policy options and guide land management. This aimed to sustainably enhance food security and support risk response in the context of current and future climate change and variability. The LRIMS is customized for full use by the Department of Agricultural Land Management of the Ministry of Agriculture and Forestry. The experts at the Department of Agricultural Land Management of the Ministry of Agriculture and Forestry could upload, modify, tag and include metadata independently, while a specialized company was still responsible for server management. According to senior government officials at the Department of Agricultural Land Management of the Ministry of Agriculture and Forestry, this was the first case among least developed countries for implementing the LRIMS independently by national experts using regional, national and international data with support from international experts.
150. The PyAEZ is an innovation of global importance. Developed by the project, this tool provides a standard framework for land resource inventory and appraisal. It also adheres to the FAO land evaluation framework.

5. Conclusions and recommendations

5.1 Conclusions

Conclusion 1. Relevance: the project's underlying concepts related to climate change adaptation by: i) integrating agrometeorological data and information monitoring and analysis; and ii) analysing agricultural production systems through the strengthened LRMS, which are as relevant now as they were in 2017.

Conclusion 2. Effectiveness: the project supported the Ministry of Natural Resources and Environment and the Ministry of Agriculture and Forestry by strengthening their skillsets, knowledge base and understanding of the impacts of climate change and the adaptive options to negate them. The project increased the availability and quality of agrometeorological information across the country through the successful establishment of the AWS network. However, the project would have benefited from a more integrated implementation approach to tackle the country's most pressing climate change challenges: recurrent droughts and floods.

Conclusion 3. Efficiency: while the project's overall efficiency was satisfactory, the fact that the project required a no-cost extension to make up for lost time reduced efficiency. Some outputs under Component 2, such as those related to hardware issues, were delayed for over a year.

Conclusion 4. Sustainability: there is a concrete plan to scale up the project's results and benefits through SAMIS 2. This involves expanding climate-responsive planning and decision-making for resilient agriculture and livelihoods in the Lao People's Democratic Republic.

Conclusion 5. Factors affecting performance: it took a long time for the project to establish a functional M&E system and a theory of change. For example, some of the planned M&E activities were delayed for more than two years while others were never implemented.

Conclusion 6. Other factors affecting performance: the project established an effective partnership arrangement for implementation with relevant stakeholders such as government counterparts. This included partnerships with national and international universities and institutions that support Component 2 activities, as well as training and capacity building for government officials.

Conclusion 7. Cross-cutting issues: the project did not have adverse environmental or social impacts. It was fully compliant with FAO's environmental and social safeguards. These were defined by the integration of precautionary principles into project management cycles. The project was developed to address the needs of local communities, including vulnerable populations. However, this did not happen as they were never identified in the first place. Possible shortcomings from the lack of a gender analysis included risks: women may have been inadvertently excluded due to limited access to agrometeorological information; the division of labour among men and women during farming activities; and the ownership of productive assets like land.

Conclusion 8. The project used several communication channels to disseminate information about its activities. Knowledge management included: meteorology television shows; agricultural television shows; 115 872 beneficiaries reached through loudspeakers; Facebook campaigns; and public and private media presence through newspaper and television. Other activities included multiple workshops, policy and village meetings. The project also used the FAO website to share information about its work: www.fao.org/in-action/samis/overview/zh/. This involved booklets, knowledge products and other publications. Further, the project's Facebook page highlighted lessons learned and experiences. The project, however, did not target varying beneficiary factors like age, gender and location.

151. Overall, the project is rated as Satisfactory.
152. This rating was based on the GEF protocol for relevance, effectiveness and efficiency. Despite a shift in focus and priority, the project remained relevant to its original objectives. The project had good coverage of weather information through the loudspeaker system. In fact, it successfully brought in other actors who took up the activities and expanded coverage. The project was efficiently implemented by a small PMU and a variety of partners that brought added value. However, it would have benefited from a more integrated implementation approach to tackle the country's most pressing climate change challenges: recurrent droughts and floods. A greater level of involvement of all stakeholders – including beneficiaries, service providers and line ministries – would generate commitment and partnership to fight drought and desertification, as well as nurture potential positive effects.

5.2 Recommendations

153. The recommendations are for the FAO Budget Holder, the FAO Regional Office for Asia and the Pacific, and the Lead Technical Officer. They are also directed at the FAO Office of Climate Change, Biodiversity and Environment at headquarters and the PMU in the Lao People's Democratic Republic.

Recommendation 1. The planned follow-up project, SAMIS 2, should scale up climate-responsive planning and decision-making for resilient agriculture and livelihoods in the Lao People's Democratic Republic. This is based on the project's positive results in delivering agrometeorological information to farmers at selected locations. The SAMIS 2 should seek to institutionalize the successful decision-making tools that were developed under this project. This should be done in close collaboration with Ministry of Natural Resources and Environment (see the effectiveness section).

Recommendation 2. In order to strengthen sustainability, future project designs should:

- i. ensure a more integrated implementation approach towards project components and the complementary work of other partners in order to tackle the country's most pressing climate change challenges: recurrent droughts and floods (see Conclusion 2 on the plan and budget for operation and maintenance as part of a sustainability plan, adapted as needed, and Finding 4.6);
- ii. carefully consider prospects for the government (or others) to continue essential activities; and
- iii. invest in environmental and social safeguards and gender expertise to ensure that cross-cutting issues are properly designed and proactively feed into implementation (see Findings 6.2 and 7.2).

Recommendation 3. In order to strengthen learning and M&E, future project designs should:

- i. Ensure that a theory of change is developed during the design stage and within the overall design and M&E development. This should be deeply embedded in a context that reflects the mechanisms that influence changes sought locally and in policies and practices. Its logic should be revised and revalidated over time to ensure that either the project is on the right track or that outputs and outcomes require adjustments (see Finding 5.2).
- ii. Build an M&E plan into the design with baselines and specific, measurable, achievable, relevant and time-bound indicators at the earliest stage possible. Avoid M&E as an “add on” during implementation (see Finding 5.1).

6. Lessons learned

154. It is important to undertake wide stakeholder consultation while guaranteeing proper quality control during project formulation stages. This will ensure that the project's design is consistent, has clear, logical pathways towards results, and provides useful guidance for the implementing teams and counterparts. Efforts should be made to shorten the length of the project's documents. This would present a succinct overview and clear logical argument from problem and opportunity analyses to outcomes and objectives.
155. An integrated implementation approach enhances the project's outcomes by tackling the most pressing climate change challenges: recurrent droughts and floods.
156. It is important to adopt a two-pronged approach in project implementation, starting with a long inception phase to build awareness at all levels of project objectives and planned activities. Creating strong PMUs in the country during inception and hosting them within the relevant line ministries or national agencies guarantees greater post-project sustainability.
157. It is important to double check the validity of the project document and its results framework, theory of change and key performance indicators during the inception phase – especially if there was a longer delay between formulation and project launch. This is a highly appropriate point to validate the theory of change with key stakeholders.

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Appendix 1. People interviewed

No.	Surname	First name	Designation/position	Organization	Where met (if not virtually)
1	Atsapangthong	Thattheva	Deputy Director General of the Department of Agricultural Land Management of the Ministry of Agriculture and Forestry	Department of Agricultural Land Management of the Ministry of Agriculture and Forestry	Department of Agricultural Land Management of the Ministry of Agriculture and Forestry, Geographic Information Systems Unit
2	Barlis	Angelica	Coordinator, DeRISK SE Asia(the LaCSA and Livelihoods Atlas)	CIAT	Online, Viet Nam
3	Beresnev	Nick	SAMIS 2 Preparation Team Leader		Online, Thailand
4	Boulapha	Chanthanet	Vice Minister	Ministry of Natural Resources and Environment	Ministry of Natural Resources and Environment
5	Bounkhampong		Deputy Head, Plant Protection Centre	Plant Protection Centre of the Ministry of Agriculture and Forestry	Online
6	Bounteum		Head of the Weather Forecast Division	Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment	Early Warning Building, Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment
7	Bounyavong	Oudaphone	Technical Officer	District Office for Natural Resources and Environment, Lao Ngam District	District Office for Natural Resources and Environment, Lao Ngam District
8	Bounyong	Souphaxay	Deputy Director General of the Provincial Office of Natural Resources and Environment	Provincial Office of Natural Resources and Environment, Salavan	Provincial Office of Natural Resources and Environment, Salavan
9	Champakham	Anoulack	Director General of the Provincial Agriculture and Forestry Office	Provincial Agriculture and Forestry Office, Salavan	Provincial Agriculture and Forestry Office, Salavan

Appendix 1. People interviewed

No.	Surname	First name	Designation/position	Organization	Where met (if not virtually)
10	Chomvisan	Thongdee	Deputy Head, District Agriculture and Forestry Office	District Office for Natural Resources and Environment, Feuang District	District Agriculture and Forestry Office, Feuang District
11	Franceschini	Gianluca	Consultant Supervisor, Component 2	FAO	Online, Italy
12	Gunasekara	Kavinda	AEZ Consultant		Online, Thailand
13	Hayat	Nasar	FAO Representative to the Lao People's Democratic Republic	FAO, the Lao People's Democratic Republic	FAO Country Office, Vientiane
14	Inthipunya	Khambane	Project Agrometeorologist	FAO, the Lao People's Democratic Republic	Project Office, Vientiane
15	Keo-oudom	Khamphan	Technical Officer	District Agriculture and Forestry Office, Lao Ngam District	District Agriculture and Forestry Office, Lao Ngam District
16	Keoboualavan	Soubin	Deputy Head of Environment and Climate Change Section	Provincial Office of Natural Resources and Environment, Salavan	Provincial Office of Natural Resources and Environment, Salavan
17	Keodouangsy	Sakda	Director General of the Provincial Office of Natural Resources and Environment	Provincial Office of Natural Resources and Environment, Salavan	Provincial Office of Natural Resources and Environment, Salavan
18	Keokhamphui	Keoduangchai	Vice Dean	National University of Laos, Faculty of Water Resources	Faculty of Water Resources
19	Khounserk	Neu	Head Teacher	Saneuna Primary School, Lao Ngam District	Saneuna Primary School, Lao Ngam District
20	Kim	Kwang Hyung	Consultant Supervisor, Component 1 Modelling		Online, Republic of Korea
21	Lialiangcer	Reeher	Head of District Agriculture and Forestry Office	District Agriculture and Forestry Office, Feuang District	District Agriculture and Forestry Office, Feuang District
22	Liengsone	Somphathay	Technical Officer, Project Monitoring Information System	Department of Planning of the Ministry of Agriculture and Forestry	Department of Planning

Terminal evaluation of the project "Strengthening agroclimatic monitoring and information systems to improve adaptation to climate change and food security in the Lao People's Democratic Republic"

No.	Surname	First name	Designation/position	Organization	Where met (if not virtually)
23	Maiphou		Head of the Climatology and Agrometeorology Division	Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment	Early Warning Building, Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment
24	Maitrichith	Aousack	The GEF Focal Point	Department of Planning and Finance of the Ministry of Natural Resources and Environment	Dansavan, hotel
25	Manivong	Viengxay	National Project Director/Deputy Director General of the Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment	Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment	Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment Office, Vientiane
26	Mosky	Sone	Project Administration	FAO, the Lao People's Democratic Republic	FAO Country Office, Vientiane
27	Nguyenphuong	Oanh	Transport Manager	FAO, the Lao People's Democratic Republic	FAO Country Office, Vientiane
28	Oudomvilay	Ninepapha	Administration	FAO, the Lao People's Democratic Republic	FAO Country Office, Vientiane
29	Oudone	Vongkham Keo	Head of the Network Division	Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment	Early Warning Building, Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment
30	Panytham	Soudchai	Technical Officer, AWS	District Office for Natural Resources and Environment, Feuang District	District Agriculture and Forestry Office, Feuang District
31	Peou	Rathana	Foresight and StoryMaps Scenario Development Expert	CGIAR Research Program on Climate Change, Agriculture and Food Security	Online, Cambodia

Appendix 1. People interviewed

No.	Surname	First name	Designation/position	Organization	Where met (if not virtually)
32	Petri	Monica	Project Coordinator	FAO, the Lao People's Democratic Republic	FAO Country Office/SAMIS Office, Vientiane
33	Phommachanh	Lamdouangkeo	Technical Officer	District Office for Natural Resources and Environment, Lao Ngam District	District Office for Natural Resources and Environment, Lao Ngam District
34	Phonesavanh		Director General of the Department of Disaster Management	Ministry of Labour and Social Welfare	Department of Disaster Management of the Ministry of Labour and Social Welfare
35	Phothichanh	Phommachanh	Project M&E Specialist	FAO, the Lao People's Democratic Republic	Project Office, Vientiane
36	Phothiyalay	Vandy	Training Manager		Project Office, Vientiane
37	Phouangmachanh	Chanhtho	Technical Officer, WFP	WFP, Salavan Province	WFP, Salavan Province
38	Phoukhaothong		Technical Officer	Plant Protection Centre of the Ministry of Agriculture and Forestry	Online
39	Phoummilay	Kanya	Technical Officer	District Office for Natural Resources and Environment, Lao Ngam District	District Office for Natural Resources and Environment, Lao Ngam District
40	Phouvisouk	Latsamy	Head of the Socioeconomic Unit and Climate Change Research Centre	National Agriculture and Forestry Research Institute of the Ministry of Agriculture and Forestry	Online
41	Pongmala	Chanthalath	Assistant FAO Representative to the Lao People's Democratic Republic	FAO, the Lao People's Democratic Republic	FAO Country Office, Vientiane
42	Sayavong	Saysongkham	Head of Component 2	Department of Agricultural Land Management of the Ministry of	Department of Agricultural Land Management of the Ministry of Agriculture and Forestry, Geographic

No.	Surname	First name	Designation/position	Organization	Where met (if not virtually)
				Agriculture and Forestry	Information Systems Unit
43	Sengsouliya	Viengkham	Technical Officer	Plant Protection Centre of the Ministry of Agriculture and Forestry	Online
44	Sengsouly		Technical Officer, StoryMaps	Department of Planning of the Ministry of Agriculture and Forestry	Department of Planning
45	Sengtaheunghong	Oloth	Project Agronomist	FAO, the Lao People's Democratic Republic	Project Office, Vientiane
46	Sibounman	Bounmy	Head, Provincial Agriculture Land Management	Provincial Agriculture and Forestry Office, Salavan	Provincial Agriculture and Forestry Office, Salavan
47	Solaty		Geographic Information Systems Technical Officer	Department of Agricultural Land Management of the Ministry of Agriculture and Forestry	Department of Agricultural Land Management of the Ministry of Agriculture and Forestry, Geographic Information Systems Unit
48	Somsamai		Technical Officer, StoryMaps and the LaCSA Standard Operating Procedure	Department of Planning of the Ministry of Agriculture and Forestry	Department of Planning
49	Sy-a-khasone	Khonesavan	Deputy Director General	Provincial Agriculture and Forestry Office, Vientiane Province	Provincial Agriculture and Forestry Office, Vientiane Province
50	Sybounhieng	Khaophone	Technical Officer	District Agriculture and Forestry Office, Lao Ngam District	District Agriculture and Forestry Office, Lao Ngam District
51	Sysamoud	Nokda	Teacher	Saneuna Primary School, Lao Ngam District	Saneuna Primary School, Lao Ngam District

Appendix 1. People interviewed

No.	Surname	First name	Designation/position	Organization	Where met (if not virtually)
52	Vanhthanam	Bountham	Head, District Office for Natural Resources and Environment	District Office for Natural Resources and Environment, Lao Ngam District	District Office for Natural Resources and Environment, Lao Ngam District
53	Vikham		Geographic Information Systems Technical Officer (for the LaCSA)	Department of Agricultural Land Management of the Ministry of Agriculture and Forestry	Department of Agricultural Land Management of the Ministry of Agriculture and Forestry, Geographic Information Systems Unit
54	Villagers [FGD 1: 12 people (five men and seven women)]		Users of the LaCSA	Phonthon Village, Feuang District	Phonthon Village, Feuang District
55	Villagers [FGD 2: seven people (six men and one woman)]		Users of the LaCSA	Phakkoudyai Village, Lao Ngam District	Phakkoudyai Village, Lao Ngam District
56	Vongthilath	Somsamay	Deputy Director General	Department of Planning of the Ministry of Agriculture and Forestry	Department of Planning

Appendix 2. The GEF evaluation criteria rating table

The GEF criteria/subcriteria	Rating	Summary comments
A. STRATEGIC RELEVANCE		
A1. Overall strategic relevance	S	Despite a shift in focus and priority, the project remained relevant to its original objectives (Paragraph 47).
A1.1 Alignment with the GEF and FAO strategic priorities	HS	In general, the project aligned well with the GEF and FAO priorities (Findings 1.3 and 1.4).
A1.2 Relevance to national, regional and global beneficiary needs	S	The project supported the originally targeted national strategies (Finding 1.2).
A1.3 Complementarity with existing interventions	HS	The project complemented a number of ongoing programmes and entities like the SNV, the Adventist Development and Relief Agency, the FAO France project, the FAO Japan project and the WFP, among others (Finding 1.5; Paragraph 40).
B. EFFECTIVENESS		
B1. Overall assessment of project results	S	The project developed technological innovations: the LaCSA; the LRIMS; and the PyAEZ tool of global importance. This provided a framework for decision-making to improve climate change adaptation and food security for farmers in the Lao People's Democratic Republic (Paragraph 76; Appendix 4).
B1.1 Delivery of project outputs	S	The project delivered most of its outputs – others were overachieved. However, a few deliverables were not achieved, for example: Output 3.1.1, where specific adaptation strategies to be based on Component 2 activities were not applied as expected (Finding 3.1). Although the website for hosting the LRIMS was fully developed, the accompanying application to support land suitability assessments for agriculture was still under development (Finding 2.3; Appendix 4).
B1.2 Progress towards outcomes and project objectives	S	Overall, most outcomes were achieved – except for Outcome 3.1, which did not perform as expected (Finding 3.1; Appendix 4).
-Outcome 1.1	HS	The project significantly strengthened agroclimatic monitoring and information systems to improve climate change adaptation and food security (Paragraph 50).
-Outcome 1.2	HS	The project significantly strengthened the institutional capacity of both the Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment and the Department of Agricultural Land Management of the Ministry of Agriculture and Forestry in the monitoring, analysis, communication and advice regarding agricultural production systems at the national, provincial and local levels (Paragraph 54).
-Outcome 2.1	S	The project made an important contribution to the creation of decision-making tools that provide integrated climate, natural resources, and agriculture data and analyses for strategic foresight and scenario-based planning (Paragraph 56).
-Outcome 2.2	S	The project made a good contribution towards greater technical capacity of government officials. This involved the sustained operation of decision-making tools that support agricultural production systems at the national, subnational and local levels for alternative futures and anticipatory governance (Paragraph 60).

Appendix 2. The GEF evaluation criteria rating table

The GEF criteria/subcriteria	Rating	Summary comments
-Outcome 3.1	MS	During project design, local communities were to conduct FFS initiatives under Component 3.1.1 and deliver location-specific adaptation practices at pilot locations. These communities were to be targeted through consultations in order to understand their issues and needs during implementation. However, under Output 3.1.1, the project did not address their specific needs as they were never identified. Specific adaptation strategies, which were to be based on Component 2 activities, were not applied as expected (Finding 2.5).
Overall rating of progress towards achieving objectives/outcomes	S	The project developed technological innovations: the LaCSA, the LRIMS and the PyAEZ tool of global importance, which provided a framework for decision-making to improve climate change adaptation and food security for farmers in the Lao People's Democratic Republic. However, the project would have benefited from a more integrated implementation approach to tackle the country's most pressing climate change challenges: recurrent droughts and floods (Paragraph 48).
B1.3 Likelihood of impact	S	The project strengthened the institutional capacity of both the Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment and the Department of Agricultural Land Management of the Ministry of Agriculture and Forestry in the monitoring, analysis, communication and advisory service of agricultural production systems at the national, provincial and local levels. Identified risks mainly related to ownership of the LaCSA database. In fact, this could threaten the sustainability of the project benefits (Paragraph 134).
C. EFFICIENCY		
C1. Efficiency	S	The project, through a small PMU and partners, largely achieved its objectives. Despite COVID-19 and the delayed delivery of some expected results under Component 2, the project was implemented efficiently (Paragraph 81).
D. SUSTAINABILITY OF PROJECT OUTCOMES		
D1. Overall likelihood of risks to sustainability	L	In the interim, the Lao Government approved the project's second phase, SAMIS 2, to be financed through the GCF. Beyond SAMIS 2, the government committed to making further investments in the systems established by this project (Paragraph 94).
D1.1 Financial risks	ML	At the central government level, both the Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment and the Department of Agricultural Land Management of the Ministry of Agriculture and Forestry experienced substantial budgetary limitations. However, during a meeting with a senior political leader at the Ministry of Natural Resources and Environment, the Evaluation Team was informed that the cost of SAMIS 2 would be borne by the GCF. In the future, however, it was expected that the government would continue supporting the LaCSA (Paragraph 86).

The GEF criteria/subcriteria	Rating	Summary comments
D1.2 Socioeconomic risks	L	At the national level, the project strengthened the capacity to monitor and analyse agricultural production systems. This led to adaptive actions that negate the impacts of climate change on agriculture. At the local level, the project created greater resilience among farmers towards such impacts. Further, the project generated more income for farmers by reducing post-harvest losses and increasing yields (Paragraph 84).
D1.3. Institutional and governance risks	L	The project strengthened the institutional and technical capacity of the Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment and the Department of Agricultural Land Management of the Ministry of Agriculture and Forestry on monitoring, analysis and communication for agricultural production systems. Additionally, the project developed the technical capacity of government officials on the sustained operation and use of the LRIMS, SAVA, the AEZ and SAR. This involved policy formulation and adaptation planning for the country's agriculture sector. Weather station operations and the collection, compilation and analysis of weather data and forecasting on agroclimatic conditions are the responsibilities of the Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment. A standard operating procedure was signed between the Ministry of Natural Resources and Environment and the Ministry of Agriculture and Forestry to facilitate data sharing between these two government entities and other stakeholders (Paragraph 88).
D1.4. Environmental risks	L	The Evaluation Team found that the project developed policy proposals on cassava, coffee and other crops to address land degradation. The Governor of Champasack approved a law to ban the cultivation of crops and trees that are likely to deteriorate soil quality in the coffee-rich Pakxong District. Project management reported that this was due to using the project's policy proposals as a base. The banned crops include cassava, large bananas (<i>kuay hom</i>), <i>Jatropha</i> and eucalyptus (Paragraph 94; Finding 4.7).
D2. Catalysis and replication	S	The project did well in delivering agroclimatic information to farmers at selected sites. There is a plan to replicate and scale up project results at the national level. The proposed follow-up project, SAMIS 2, was approved by the Lao Government and will leverage this project's good results and impacts (Finding 4.2).
E. FACTORS AFFECTING PERFORMANCE		
E1. M&E	S	The M&E plan was well articulated and sufficient to monitor results and track the progress toward achieving the objectives (Finding 5.1).
E2. Quality of project implementation	S	The project was implemented by FAO under a direct execution modality. Implementation was carried out in close consultation with the Ministry of Natural Resources and Environment and the Ministry of

Appendix 2. The GEF evaluation criteria rating table

The GEF criteria/subcriteria	Rating	Summary comments
		Agriculture and Forestry. A PMU was established to manage the project's day-to-day activities (Finding 5.4).
E3. Quality of execution	S	The project followed the management arrangements as per the project document. The PMU, in collaboration with FAO in the Lao People's Democratic Republic, played a critical role in promoting a harmonious working relationship between the Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment and the Department of Agricultural Land Management of the Ministry of Agriculture and Forestry on project implementation (Finding 5.4).
E4. Financial management and mobilization of expected co-financing	S	Overall, the project successfully leveraged co-financing that went well beyond commitments made at the time of the CEO endorsement (Finding 8.1).
E5. Project partnership and stakeholder engagement	S	There was an effective partnership arrangement to implement the project with other relevant stakeholders like government counterparts (Finding 5.4).
E6. Knowledge management, communications and public awareness	MS	The project conducted quarterly and annual M&E activities to assess, document and disseminate its results, experiences and lessons learned. The project used several communication channels to disseminate information about its activities. However, the project did not fit knowledge dissemination to different target beneficiary needs like age, gender and location. Additionally, the effectiveness of the project's communications activities may have been limited due to the lack of a knowledge management strategy to guide an effective learning agenda (Finding 10.1).
E7. Overall assessment of factors affecting performance	S	The factors affecting performance were mostly supportive of project implementation, especially stakeholder engagement and partnerships. The M&E system and knowledge management strategy were developed too late to support the project's communication needs (Findings 10.1 and 10.2).
F. CROSS-CUTTING ISSUES		
F1. Gender and other equity dimensions	MU	Gender concerns were integrated to a certain extent but with too little consideration for enabling conditions that would encourage women's participation and decision-making. Possible shortcomings involved the project's lack of a gender analysis, which included risks: women may have been inadvertently excluded due to limited access to agrometeorological information; fully understanding the realities of the division of labour among men and women during farming activities; and the ownership of productive assets like land (Finding 7.2).
F2. Indigenous Peoples	MU	The project design's level of ambition was higher in comparison to its relevance among smallholder farmers, women and Indigenous Peoples (Findings 2.5; 7.1).
F3. Environmental and social safeguards	S	Please see sections D1.4 and F1 in this table.
Overall project rating	S	Despite a shift in focus and priority, the project remained relevant to its original objectives. It achieved good coverage of weather information through the loudspeaker system. In fact, this successfully brought in other actors who took on activities and increased

The GEF criteria/subcriteria	Rating	Summary comments
		<p>coverage. Overall, the project was efficiently implemented by a small PMU and a variety of partners that brought added value. However, the project would have benefited from a more integrated implementation approach to tackle the country's most pressing climate change challenges: recurrent droughts and floods (Paragraph 152).</p>

Appendix 3. Rating scheme

Project results and outcomes

Rating	Description
Highly Satisfactory (HS)	The level of outcomes achieved clearly exceeds expectations and/or there were no shortcomings.
Satisfactory (S)	The level of outcomes achieved was as expected and/or there were no or minor shortcomings.
Moderately Satisfactory (MS)	The level of outcomes achieved was more or less as expected and/or there were moderate shortcomings.
Moderately Unsatisfactory (MU)	The level of outcomes achieved was somewhat lower than expected and/or there were significant shortcomings.
Unsatisfactory (U)	The level of outcomes achieved was substantially lower than expected and/or there were major shortcomings.
Highly Unsatisfactory (HU)	Only a negligible level of outcomes was achieved and/or there were severe shortcomings.
Unable to Assess (UA)	The available information does not allow for an assessment of the level of outcome achievements.

Project implementation and execution

Rating	Description
Highly Satisfactory (HS)	There were no shortcomings and the quality of implementation or execution exceeded expectations.
Satisfactory (S)	There were no or minor shortcomings and the quality of implementation or execution met expectations.
Moderately Satisfactory (MS)	There were some shortcomings and the quality of implementation or execution more or less met expectations.
Moderately Unsatisfactory (MU)	There were significant shortcomings and the quality of implementation or execution was somewhat lower than expected.
Unsatisfactory (U)	There were major shortcomings and the quality of implementation or execution was substantially lower than expected.
Highly Unsatisfactory (HU)	There were severe shortcomings in the quality of implementation or execution.
Unable to Assess (UA)	The available information does not allow for an assessment of the quality of implementation or execution.

Sustainability

Rating	Description
Likely (L)	There is little or no risk to sustainability.
Moderately Likely (ML)	There are moderate risks to sustainability.
Moderately Unlikely (MU)	There are significant risks to sustainability.
Unlikely (U)	There are severe risks to sustainability.
Unable to Assess (UA)	Unable to assess the expected incidence and magnitude of risks to sustainability

Appendix 4. The GEF co-financing table

Sources of financing	Name of co-financer	Type of co-financing	Amount confirmed at CEO endorsement/approval	Amount reconfirmed/newly materialized during implementation	Actual amount of co-financing materialized at the MTR	Expected total co-financing by project closure
The GEF/LDCF/Special Climate Change Fund allocation		Grant	5 479 452			
Bilateral aid agency	Japan International Cooperation Agency	In-kind	4 900 000	5 221 681	4 900 000	321 681
Other	CIAT/CGIAR DeRisk SE Asia	In-kind		250 000	40 000	210 000
National government	Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment	In-kind	1 000 000	721 876	66 840	597 838
The GEF	Asian Development Bank through the Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment	Grant	5 230 000	184 440		
The GEF	World Bank through the Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment	Grant		21 466		
Bilateral aid agency	China through the Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment	Grant		5 774 354		5 460 701
Bilateral aid agency	Republic of Korea through the Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment	Grant		175 000		
The GEF	World Bank through the Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment	Loan		1 846 508	1 846 508	
National government	Department of Agricultural Land Management of the Ministry of Agriculture and Forestry	In-kind		656 580	303 520	353 060

Appendix 4. The GEF co-financing table

Sources of financing	Name of co-financer	Type of co-financing	Amount confirmed at CEO endorsement/approval	Amount reconfirmed/newly materialized during implementation	Actual amount of co-financing materialized at the MTR	Expected total co-financing by project closure
Bilateral aid agency	Switzerland through the Department of Agricultural Land Management of the Ministry of Agriculture and Forestry (The Agrobiodiversity Initiative)	In-kind		466 850	346 850	120 000
Bilateral aid agency	Germany through the Department of Agricultural Land Management of the Ministry of Agriculture and Forestry	In-kind		65 837	27 358	38 479
The GEF	FAO Regional Office for Asia and the Pacific regular programming	In-kind	500 000	234 000	234 000	
Bilateral aid agency	France through the Department of Agricultural Land Management of the Ministry of Agriculture and Forestry	In-kind		50 045		50 045
Bilateral aid agency	Republic of Korea through the Department of Agricultural Land Management of the Ministry of Agriculture and Forestry	In-kind		20 000		20 000
The GEF	FAO Regional Office for Asia and the Pacific regular programming	Grant		348 617		348 617
The GEF	Ministry of Agriculture and Forestry through the International Fund for Agricultural Development and FAO	In-kind		99 000		99 000
Centre for Development and Environment	Department of Agricultural Land Management of the Ministry of Agriculture and Forestry	In-kind	4 500 000			
		TOTAL	16 130 000	16 136 254	7 765 076	7 619 421

Source: PMU, December 2022.

Appendix 5. Results matrix for assessing the achievement level of project outcomes

Expected outcomes and outputs	Indicators	Baseline	End-of-project target	Achievement rating	Justification for rating
Component 1. Strengthen agroclimatic monitoring, analysis, communication and the use of data and information for decision-making in agriculture and food security					
Outcome 1.1 Improved agrometeorological monitoring, communication and analysis facilities established at the national and provincial levels	Indicator 1.1 A fully renewed Climatology and Agrometeorology Division within the Department of Meteorology and Hydrology functioning with clear roles and responsibilities	Very old systems and no climate or agrometeorology services to meet the needs of farmers	A fully renewed Climatological and Agrometeorological Division within the Department of Meteorology and Hydrology connected with all of the AWS systems and the database	HS	The project established a network of 30 weather stations (15 AWS systems and 15 manual). A laboratory to calibrate the sensors of the AWS was fully established.
	<i>Adaptation Monitoring and Assessment Tool Indicator 2.1.1: relevant threat information disseminated to stakeholders on a timely basis (Yes/No)</i>	0 = No	1 = Yes	S	National-level system functioning and updated continuously
Output 1.1.1 Agrometeorological station networks improved/rehabilitated with both conventional and AWS systems to increase coverage in the major agricultural production areas	Indicator 1.1.1 Number of new automated stations and rehabilitated manual stations	0	30 (15 new and 15 rehabilitated) (Total of 51 [increased to 101] stations overall in combination with other baseline projects)	HS	All 30 were fully established (15 new and 15 rehabilitated).
Output 1.1.2 Improved data coding and communication facilities upgraded to enhance the	Indicator 1.1.2a Number of AWS systems connected with an Early Warning System Unit	All manual stations and no realtime data transfer and use for weather forecasts	All 15 (total of 51) stations connected to early warning system centre and receiving realtime data (second year)	HS	Fifteen newly installed AWS systems were connected to early warning systems and sending realtime data.

Appendix 5. Results matrix for assessing the achievement level of project outcomes

Expected outcomes and outputs	Indicators	Baseline	End-of-project target	Achievement rating	Justification for rating
connectivity of the Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment with provincial-level subunits in major agricultural production areas	Indicator 1.1.2b Formal collaboration with the Ministry of Telecommunications	No formal collaboration with the Ministry of Telecommunications and private communication service providers	At least two memorandum of understanding agreements signed by the Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment to facilitate communications	S	One memorandum of understanding signed with Lao Telecommunications
Output 1.1.3 Laboratory for agrometeorological analysis, instrument calibration and geospatial climate data access, monitoring and processing facilities established and functioning at the Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment in Vientiane	Indicator 1.1.3a Rehabilitated facility (building) for the Climatology and Agrometeorology Division of the Department of Meteorology and Hydrology with a laboratory for calibration tools in working condition and spare parts for sensor maintenance	Very old building and no instrumentation or calibration laboratory in the Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment	New office facility running within the Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment (Climatology and Agrometeorology Division) and the availability of calibration tools and procedures for all essential sensors	HS	The rehabilitation of the building is complete. The new office facility was rehabilitated and runs within the Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment (Climatology and Agrometeorology Division). The calibration tools and procedures for all of the essential sensors were installed.
	Indicator 1.1.3b A climate data analysis access and analysis facility with necessary hardware and software	0 (Only one personal computer available with the Climatology and Agrometeorology Division for storing all data and six desktops for data entry)	High-performance computing systems for data archiving and analysis established with at least five nodes for data entry personnel Connected to the early warning system Also equipped to receive data from the AWS	S	The high-performance computing systems were delivered, and the information technology system of the laboratory was fully completed.

Expected outcomes and outputs	Indicators	Baseline	End-of-project target	Achievement rating	Justification for rating
	Indicator 1.1.3c Number of near-realtime numerical weather prediction products accessible	Four weather forecast systems, no agrometeorology forecast	Five new (nine total)	S	Agrometeorology bulletin products included One seasonal, one monthly and one weekly forecast
	<i>Adaptation Monitoring and Assessment Tool Indicator 2.1.2.1: type and number of monitoring systems in place</i>	Four	<i>Three new (seven total)</i> <i>One seasonal, one monthly (including forecast) and one decadal forecast</i>	S	Three = one seasonal, one monthly and one weekly forecast
	Indicator 1.1.3d Comprehensive climate atlas prepared using available data	No climate atlas available	Climate atlas available	S	A climate atlas was available.
Outcome 1.2 Institutional and technical capacity strengthened to facilitate data sharing, archiving, analysis and the interpretation of agrometeorological information products to users at all levels	Indicator 1.2 Improved and new climate and agrometeorology products available with users	No system in place to communicate and receive feedback from users	A fully renewed Climatology and Agrometeorology Division of the Department of Meteorology and Hydrology connected to all of the AWS and the database	HS	A standard operating procedure was developed for the Climatology and Agrometeorology Division of the Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment. It was endorsed by the Ministry of Natural Resources and Environment and the Ministry of Agriculture and Forestry. Weekly and monthly bulletins have been produced and distributed since May 2019. > 300 technical staff members trained in the standard operating procedure > 200 staff trained in bulletins, agrometeorology and station management
	<i>Adaptation Monitoring and Assessment Tool Indicator 2.2.1: number of targeted institutions with increased adaptive capacity to reduce</i>	0	<i>Agriculture</i> <i>One environment</i> <i>One meteorology</i> <i>One telecommunications</i>	S	Officials of these targeted four institutions were trained as part of the awareness creation efforts under the project. • <i>Four Department of Agricultural Land Management of the Ministry of Agriculture</i>

Appendix 5. Results matrix for assessing the achievement level of project outcomes

Expected outcomes and outputs	Indicators	Baseline	End-of-project target	Achievement rating	Justification for rating
	<i>risks of and respond to climate variability (Number) [to be summed up with Outcomes 2.2 and 3.1]</i>		<i>(Staff members trained and capacity improved)</i>		<p><i>and Forestry, PPC, Provincial Agriculture Land Management, District Agriculture and Forestry Office</i></p> <ul style="list-style-type: none"> • <i>One Department of Climate Change</i> • <i>One Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment</i> • <i>Two Department of Planning and Cooperation from the Ministry of Agriculture and Forestry and the Ministry of Natural Resources and Environment</i> • <i>One National Agriculture and Forestry Research Institute of the Ministry of Agriculture and Forestry</i> • <i>One Lao Telecommunications</i>
Output 1.2.1 Standard operating procedures for the Climatology and Agrometeorology Division of the Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment and guidelines for the installation of instruments and observation, data coding and maintenance developed and staff	Indicator 1.2.1a Standard operating procedure for the Climatology and Agrometeorology Division of the Department of Meteorology and Hydrology	No standard operating procedure for the Climatological and Agrometeorological Division of the Department of Meteorology and Hydrology		S	A standard operating procedure was developed for the Climatology and Agrometeorology Division of the Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment. It was endorsed by the Ministry of Natural Resources and Environment and the Ministry of Agriculture and Forestry.
	Indicator 1.2.1b Number of guidelines	Four existing guidelines	One new, one updated	S	Various booklets and guidelines were prepared and disseminated.
	Indicator 1.2.1c Number of staff members trained	No regular trainings within the Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment	At least 65 technical staff members trained (at least 25 women)	HS	Target surpassed: 210 technical staff members trained (55 women)

Expected outcomes and outputs	Indicators	Baseline	End-of-project target	Achievement rating	Justification for rating
members trained (at least 65 technical staff members trained)	<i>Adaptation Monitoring and Assessment Tool Indicator 2.2.1.1: number of staff trained on technical adaptation themes (disaggregated by gender) [to be summed up with Outcomes 2.2 and 3.1]</i>	<i>No regular trainings within the Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment</i> <i>Some project trainings on hydrometeorology or meteorology, but not in agrometeorology</i>	65	HS	Target surpassed: 210 technical staff members trained (55 women)
Output 1.2.2 The development and delivery of training packages relevant to climatology and agrometeorology, communication and the application of climate and agrometeorological information by users	Indicator 1.2.2a Training needs assessment		One needs assessment undertaken	S	A training needs assessment was conducted prior to the trainings.
	Indicator 1.2.2b Number of trainings organized and integrated into the Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment's regular activities	No formal training programmes One Master of Science in agrometeorology ongoing, but no Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment staff members participating	At least four formal training programmes organized	S	Various formal training programmes were organized.
	Indicator 1.2.2c Number of staff trained in each training programme	About 50 staff trained through nationally and internationally sponsored events every year	At least 100 technical staff members out of 205 trained (at least 30–40 percent women)	HS	> 180 staff members trained in a multiplicity of advanced geographic information systems, including the LRMIS, the AEZ and SAVA. This included a vulnerability assessment and participatory mapping.

Appendix 5. Results matrix for assessing the achievement level of project outcomes

Expected outcomes and outputs	Indicators	Baseline	End-of-project target	Achievement rating	Justification for rating
	Indicator 1.2.2d Number of training manuals prepared and printed	No Lao-specific training manuals available	At least four Lao-specific training manuals	S	Various training manuals were produced.
	Indicator 1.2.2e Number of print and media staff trained	No trainings for print and media staff	At least 50 print and media reporters trained	S	Target achieved
	Indicator 1.2.2f Number of staff at the interministerial level trained	No training on the use of climate information for policy integration No staff trained	At least 50 national personnel trained	S	186 (137 male and 49 female) trained
	Indicator 1.2.2g Number of Ministry of Agriculture and Forestry staff trained on the forecast application	No application trainings	Two	S	Target achieved
Component 2. Strengthen institutional and technical capacity for the monitoring and analysis of agricultural production systems and the development of the LRIMS and the AEZ					
Outcome 2.1 Integrated LRIMS, high-resolution AEZ and agricultural production SAR developed based on agricultural resources (climate, land, soil, water and crops)	Indicator 2.1 Number of information systems available	Several scattered information systems based on partner activities No dedicated information systems for the comprehensive structure of the Ministry of Agriculture and Forestry information and communications technology strategy in place	At least two new systems developed and delivered	S	The LRIMS and the PyAEZ were developed. A multiplicity of spatial and tabular datasets were made available to the project and uploaded to the LRIMS.

Expected outcomes and outputs	Indicators	Baseline	End-of-project target	Achievement rating	Justification for rating
	<i>Adaptation Monitoring and Assessment Tool Indicator 2.1.1: relevant threat information disseminated to stakeholders on a timely basis (Yes/No)</i>	0 = No	1 = Yes	S	National-level system functioning and updated continuously
	<i>Adaptation Monitoring and Assessment Tool Indicator 3.2.1: policy environment and regulatory framework for adaptation-related technology transfer established or strengthened (Score)</i>	1 = No policy	2 = Discussed and formally proposed	S	A standard operating procedure was developed for the Climatology and Agrometeorology Division of the Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment. It was endorsed by the Ministry of Natural Resources and Environment and the Ministry of Agriculture and Forestry.
Output 2.1.1 The LRIMS and customized applications designed, developed, tested and delivered with computing facilities for the monitoring and assessment of land suitability	Indicator 2.1.1a Number of dedicated systems available for the LRIMS	No dedicated system available with the Department of Agricultural Land Management of the Ministry of Agriculture and Forestry	The LRIMS for the Lao People's Democratic Republic available	S	The LRMIS system is available at the URL: http://52.77.158.217/ and has two main tabs for the AEZ and SAVA.
	Indicator 2.1.1b Number of customized application software delivered	No customized application software available	At least two customized applications/software delivered	S	1) A PyAEZ that provides a standard framework for land resource inventory and appraisal was developed. This adheres to the established FAO land evaluation framework. 2) A set of scripts in Python and the NCAR Command Language for climate downscaling were provided by the Asian Institute of Technology.
Output 2.1.2 Available data and information on land, soil, water, crops and socioeconomic aspects	Indicator 2.1.2a Number of categories of data available in the database	Data available in paper form and fragmented within the Ministry of Agriculture and Forestry	Major categories of data integrated into the database	S	The collection and synthesis of available data, including soil, a crop/land cover map, climate-downscaled maps, and a national vulnerability dataset were done.

Appendix 5. Results matrix for assessing the achievement level of project outcomes

Expected outcomes and outputs	Indicators	Baseline	End-of-project target	Achievement rating	Justification for rating
synthesized and the national AEZ and an information portal developed, tested and delivered	Indicator 2.1.2b National AEZ developed and available for use	No AEZ methodology adopted at the national level for multiple cropping systems Only a small area is covered or only main crops are covered (multiple rice systems, maize, rubber, cassava, sugarcane), or low resolution is used.	The national AEZ methodology adopted and used	MS	A national AEZ methodology developed The adoption of the methodology at the national level could not be realized within the project's time frame.
	Indicator 2.1.2c Data and information portal hosted by relevant institution	A Geographic Information Systems Unit exists but an online spatial information system is not available through the Department of Agricultural Land Management of the Ministry of Agriculture and Forestry	One spatial information system functioning and accessible	S	Portal available at the Department of Agricultural Land Management of the Ministry of Agriculture and Forestry
Output 2.1.3. Impact scenarios of water availability, crop yield and socioeconomics for all major AEZs assessed and	Indicator 2.1.3a Number of AEZs having scenarios of physical, biophysical and socioeconomics	The AEZ did not consider a comprehensive national assessment using national data	Scenarios available for at least seven major production zones prioritized by the Ministry of Agriculture and Forestry	S	A national AEZ methodology developed

Terminal evaluation of the project “Strengthening agroclimatic monitoring and information systems to improve adaptation to climate change and food security in the Lao People's Democratic Republic”

Expected outcomes and outputs	Indicators	Baseline	End-of-project target	Achievement rating	Justification for rating
adaptation strategies developed	<p>Indicator 2.1.3b Number of policy/planning processes using the climate change impact scenarios</p>	<p>Low-resolution scenarios are being used for the National Adaptation Programme of Action, national communication and relevant land suitability classifications</p> <p>Some part of the project is producing high-resolution datasets</p>	<p>Four new scenarios used for third national communication or other relevant national and local documents</p>	<p>S</p>	<p>Target achieved</p>
	<p><i>Adaptation Monitoring and Assessment Tool Indicator 3.2.2.1: number of policies developed or strengthened</i></p>		<p><i>Scenarios included in policies/plans/bylaws and proposed to competent authority</i></p>	<p>MS</p>	<p>Scenarios developed yet not included in policies/plans/bylaws. However, policy recommendations and advised actions in the story maps can help policymakers to establish a resilient, future-proof production system.</p>

Appendix 5. Results matrix for assessing the achievement level of project outcomes

Expected outcomes and outputs	Indicators	Baseline	End-of-project target	Achievement rating	Justification for rating
	<p>Indicator 2.1.3c Number of vulnerability and risk analyses and reports that use the LRIMS and the national AEZ information</p>	<p>Currently available risk and vulnerability products are either with low resolution, not updated, too generalized or not harmonized with the full set of agricultural data available.</p> <p>One national vulnerability assessment produced by international partners might serve as input</p>	New vulnerability and risk profiles available with high resolution	S	<p>One national-level risk and vulnerability assessment completed</p> <p>New vulnerability and risk profiles available with high resolution</p>
	<i>Adaptation Monitoring and Assessment Tool Indicator 2.1.1.1: updated risk and vulnerability assessment</i>		<i>One vulnerability assessment</i>	S	Achieved
	<i>Adaptation Monitoring and Assessment Tool Indicator 2.1.1.2: risk and vulnerability assessment conducted</i>		<i>Risk and vulnerability assessment</i>	S	Achieved
Outcome 2.2 Technical capacity developed for the sustained operation and use of the LRIMS, SAVA, the AEZ and agricultural production SAR for policy formulation and adaptation planning in the agriculture sector	Indicator 2.2 Department of Agricultural Land Management of the Ministry of Agriculture and Forestry staff members trained to maintain and provide or apply the LRIMS/national AEZ information (gender disaggregated)	<p>0 female 0 male Some Department of Agricultural Land Management of the Ministry of Agriculture and Forestry senior staff know the AEZ's theoretical concepts</p>		HS	> 180 staff members trained in a multiplicity of advanced geographic information systems, including the LRMIS, the AEZ and SAVA, as well as vulnerability assessment and participatory mapping

Terminal evaluation of the project “Strengthening agroclimatic monitoring and information systems to improve adaptation to climate change and food security in the Lao People's Democratic Republic”

Expected outcomes and outputs	Indicators	Baseline	End-of-project target	Achievement rating	Justification for rating
Output 2.2.1. Training resources on the LRIMS, the AEZ and SAVA scenario development, the selection of main indicators developed and training programme conducted	Indicator 2.2.1a Number of training programmes organized	No training organized on the topics relevant to the component	Four	HS	(67 female and 237 male) were trained in the following: <ul style="list-style-type: none"> •Participatory Mapping of Agricultural Livelihoods and the Identification of Climate Risks for Establishing Climate Service Priorities in the Lao People’s Democratic Republic (31 female and 164 male) •Presentation of the project’s status report for the Department of Agricultural Land Management of the Ministry of Agriculture and Forestry staff members (34 female and 51 male). •Training in the advanced use of ArcGIS (network analysis and 3D analysis (11 female and 18 male) •Training in crop area mapping and production modelling using satellite and ArcPy and biomass estimation by the Asian Institute of Technology (9 female and 23 male)
	Indicator 2.2.1b Number of staff members from the Ministry of Agriculture and Forestry and the Ministry of Natural Resources and Environment trained	Very few staff from the National Agriculture and Forestry Research Institute of the Ministry of Agriculture and Forestry trained and undertaking crop modelling		HS	Core staff members from the Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment, the Department of Agricultural Land Management of the Ministry of Agriculture and Forestry, and the National Agriculture and Forestry Research Institute of the Ministry of Agriculture and Forestry (64 female and 120 male) participated in the trainings.
	Indicator 2.2.1c Number of training manuals available for further use			HS	Various training materials and reports developed

Appendix 5. Results matrix for assessing the achievement level of project outcomes

Expected outcomes and outputs	Indicators	Baseline	End-of-project target	Achievement rating	Justification for rating
Output 2.2.2 Capacity development resources on the assessment of impact scenarios and adaptation strategies developed based on the revised LRIMS, SAVA and the national AEZ and integrated into the major agriculture development policies and plans	Indicator 2.2.2a Number of relevant adaptation strategies identified and documented	Individual adaptation practices are identified and demonstrated	Five	S	Various adaptation strategies identified and documented in the four crop (maize, cassava, coffee and banana) story maps
	Indicator 2.2.2b Number of Ministry of Agriculture and Forestry staff trained on new/innovative adaptation strategies	Staff trained depending on their role in projects (project-based training)		S	Twenty-five participants from the Ministry of Agriculture and Forestry trained
	Indicator 2.2.2c Number of policies and plans prioritized the new adaptation strategies	Matrix of adaptation strategies aligned with national agriculture policies are not available		S	Policy briefs and policy narratives developed using crop scenarios for the future
Component 3. Knowledge management and the dissemination of information and lessons learned for local application, planning and M&E					
Outcome 3.1 Knowledge and information sharing for local application, agriculture and food security planning and programming and project outcomes/outputs monitored and evaluated to ensure sustainability	Indicator 3.2.2 Strengthened capacity to transfer appropriate adaptation technologies, disaggregated by gender (Score)	1 = No capacity	2 = Moderate capacity (50–75 percent)	S	There was satisfactory publication and sharing of awareness raising materials by the project. However, the project did not address the specific needs of local communities, including the vulnerable populations.
	Indicator 3.1a Framework for knowledge sharing and the packaging of lessons learned and experiences developed/improved	Obsolete or no sharing and dissemination of knowledge and information platform available	1	S	The project used several communications channels to disseminate information about its activities. Knowledge management activities undertaken by the project were: meteorology television shows; agricultural television shows; 115 872 beneficiaries reached through loudspeakers; Facebook campaigns; and public and private media presence in newspaper and television. Other activities included multiple workshops, policy and village meetings.

Terminal evaluation of the project “Strengthening agroclimatic monitoring and information systems to improve adaptation to climate change and food security in the Lao People's Democratic Republic”

Expected outcomes and outputs	Indicators	Baseline	End-of-project target	Achievement rating	Justification for rating
	Indicator 3.1b Trainings and workshops delivered	No relevant workshops on climate change adaption	19	MU	See Indicator 3.1.2a in this table.
	Indicator 3.1c Number of training materials, products, publications, guidelines, books, handbooks, flyers, websites, etc.	Limited products, guidelines, publications and information related to climate change adaption issues	16	S	Various awareness raising materials (e.g. leaflets, video, webpage, publications) were published by the project despite reported challenges due to an internal approval system for publication.
	Indicator 3.1d Framework for knowledge sharing and the packaging of lessons learned and experiences developed/improved	Obsolete or no sharing and dissemination of knowledge and information platform available	1	S	The FAO website and the project's Facebook page were the main platforms for the dissemination of lessons learned and experiences.
Output 3.1.1 The local application of climate information and location-specific adaptation strategies facilitated through FFS initiatives in close coordination with CAWA project activities	Indicator 3.1.1a Number of FFS initiatives organized and implemented	No FFS in relation to climate change adaptation ongoing The National Agriculture and Forestry Research Institute of the Ministry of Agriculture and Forestry works with dynamic crop calendars in seven villages	Twenty FFS initiatives with a climate component implemented	MU	The project was developed with attention to the needs of local communities, including vulnerable populations. However, under Output 3.1.1, the project did not address their specific needs as they were never identified in the first place. Specific adaptation strategies, which were to be based on the Component 2 activities, were not applied as expected.

Appendix 5. Results matrix for assessing the achievement level of project outcomes

Expected outcomes and outputs	Indicators	Baseline	End-of-project target	Achievement rating	Justification for rating
	At the local level, the number of people that have increased knowledge of climate change through the piloting of information	Number of farmers aware of climate change adaptation technologies and information system (to be assessed with CAWA)	1 280	S	The project raised awareness of 11 023 Indigenous Peoples (5 418 female) in the Luang Namtha and Saravan Provinces about agrometeorology of the beneficiaries involved in the FFS through village-level meetings, village loudspeakers and a local radio.
	<i>Adaptation Monitoring and Assessment Tool Indicator 3.2.1.1: number of individuals trained in adaptation-related technologies</i>		1 280	S	11 023 (5 418 female) individuals benefited
	Indicator 3.1.1b Number of facilitators trained (gender disaggregated)		20 (six female); 40–50 percent female	S	43 facilitators (8 female) Although the target was achieved, the participation by female facilitators was limited.
	<i>Adaptation Monitoring and Assessment Tool Indicator 2.2.1.1: number of staff trained on technical adaptation themes (disaggregated by gender) [to be summed up with Outcomes 1.2 and 2.2]</i>	0	40	HS	>180 staff trained in a multiplicity of advanced geographic information systems, including the LRMIS, the AEZ and SAVA, as well as a vulnerability assessment and participatory mapping
	Indicator 3.1.1c Number of FFS climate forecast curricula available for upscaling	No FFS curriculum with climate information available One Save and Grow curriculum available for rice	One FFS curriculum with climate forecast information and relevant adaptation practices developed and tested	S	One FFS agrometeorology curriculum for rice was prepared and under finalization

Expected outcomes and outputs	Indicators	Baseline	End-of-project target	Achievement rating	Justification for rating
	Package of lessons learned	0	One package	MU	As reported in the PPR for June 2020, these activities have been impacted by issues linked to approval by the FAO Office of Communications and the complexity of FAO rules on publications.
	<i>Output 2.1.2.1. Systems in place to disseminate timely risk information</i>	0	Ten	S	National-level system functioning and updated continuously
Output 3.1.2 Knowledge and information sharing workshops conducted, and best practices and key lessons disseminated via publications, project websites and other channels to facilitate wider awareness and utilization in other climate-sensitive sectors	Indicator 3.1.2a Number of knowledge and information sharing workshops organized	Some ongoing/past project already captured the linkage of climate information services and land resources information systems, but there is no harmonization on the results uptaking to the planning. There are limited products and publications available. A previous GEF project has produced training materials that are available online.	At least five (19) knowledge sharing workshops organized and information sharing meetings conducted	MU	Most of the events mentioned in the PIR against this indicator are not truly knowledge sharing workshops. E.g. project reported knowledge sharing workshops organized: 1. FGDs in six villages (9 female and 46 male) and three districts in the Luangnamtha Province 2. drafting and continuous revision of a knowledge management strategy 3. the production of multiple awareness assessment products (leaflet, video, webpage, publications) 4. consultation workshop in Saravan 5. internal workshop on the LRIMS 6. second project steering committee meeting 7. use of historical meteorology data 8. third project steering committee meeting 9. first standard operating procedure meeting 10. co-publishing agreement signature event and FFS master training by Indonesian and Nepalese experts 11. FFS curricula in Champhone 12. FFS curricula in Sing 13. standard operating procedure in the Vientiane Province

Appendix 5. Results matrix for assessing the achievement level of project outcomes

Expected outcomes and outputs	Indicators	Baseline	End-of-project target	Achievement rating	Justification for rating
					<p>14. standard operating procedure in the Bokeo Province 15. agrometeorology news 16. fourth project steering committee meeting 17. using the LaCSA for agrometeorology services 18. training in agrometeorology and questionnaire 19. training in the LaCSA, questionnaire and the AWS cleaning and maintenance</p> <p>However, the project used the available opportunity in these events to disseminate the information by increasing the number of participants. For example, project steering committee participation was also by the stakeholders and not just the project steering committee members.</p> <p>The project supported participation and presentations at global conferences/events.</p>
	<p>Indicator 3.1.2b Number (training materials, products, publications, guidelines, books, handbooks, flyers, websites, smartphone application, radio, television, awareness raising event activities with community) of awareness raising and information sharing publications produced and disseminated</p>	<p>There are limited products and publications available.</p>	<p>At least ten (16) publications printed and available for distribution</p>	<p>S</p>	<p>Target achieved</p>

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Expected outcomes and outputs	Indicators	Baseline	End-of-project target	Achievement rating	Justification for rating
<p>Output 3.1.3 Project M&E system established to monitor activities and outputs systematically at all levels (national, provincial and local) and outcomes evaluated</p>	<p>Indicator 3.1.a M&E plans established for ongoing use within each partner institution (the Department of Agricultural Land Management of the Ministry of Agriculture and Forestry and the Department of Meteorology and Hydrology of the Ministry of Natural Resources and Environment)</p>	<p>The Departments of Planning and Cooperation, Inspection and Finance monitor the Ministry of Natural Resources and Environment activities</p>	<p>At least six events organized</p>	<p>S</p>	<p>The M&E plan was designed as scheduled, which was utilized to guide the operationalization of the project's M&E system.</p>
	<p>Indicator 3.1.3b Number of national, provincial and local-level monitoring carried out by the PMU and the community monitoring units (CMUs)</p>		<p>At least twice in a year monitoring visits organized and feedback provided</p>	<p>S</p>	<p>Monitoring visits were conducted by the PMU.</p>

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