DEVELOPMENT AND IMPLEMENTATION OF PARTICIPATORY ECOSYSTEM-BASED ADAPTATION MEASURES, CLIMATE-SMART AGRICULTURE AND CLIMATE RISK MANAGEMENT FOR POOR HOUSEHOLDS IN VULNERABLE DISTRICTS OF HA TINH, VIET NAM

FINAL REPORT

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WORLD AGROFORESTRY (ICRAF VIET NAM)

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ABBREVIATIONS

BMUV: Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection, formerly BMU: Federal Ministry for the Environment, Nature Conservation and Nuclear Safety

BMWK: Federal Ministry for Economic Affairs and Climate Action

CARE: Care International in Viet Nam

CSA: Climate-Smart Agriculture

CLISM: Climate Service Menu for Southeast Asia

DARD: Department of Agriculture and Rural Development

DOF: Division of Finance and Planning, under DARD

DONRE: Department of Natural Resources and Environment

DOWR: Sub-department of Water Resources, under DARD

EbA: Ecosystem-based Adaptation

FAO: Food and Agriculture Organization of the United Nations

FU: Farmers' Union

GEF: Global Environment Facility

GIZ: Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH/German International Cooperation Agency

IPSARD: Institute of Policy and Strategy for Agricultural and Rural Development

ICRAF: International Centre for Research in Agroforestry; brand name: World Agroforestry

MARD: Ministry of Agriculture and Rural Development

MONRE: Ministry of Natural Resources and Environment

NAP: National Adaptation Plan

NRD: New Rural Development programme

PDCP: Provincial Sub-Department of Crop Production and Protection

PPC: Provincial People's Committee

VN-SIPA: Support to Viet Nam for the Implementation of the Paris Agreement

UNDP: United Nations Development Programme

EXECUTIVE SUMMARY

The project 'Development and Implementation of Participatory Ecosystem-based Adaptation Measures, Climate-Smart Agriculture and Climate Risk Management for Poor Households in Vulnerable Districts of Ha Tinh Province' was implemented as part of the larger project, Support to Viet Nam for the Implementation of the Paris Agreement (VN-SIPA, hereafter referred to as 'the Project'), between October 2019 and June 2022. The Project was implemented with Ha Tinh provincial partners, including Department of Agriculture and Rural Development (DARD) and Department of Natural Resource and Environment (DONRE), with World Agroforestry (ICRAF) commissioned as the implementing agency in charge.

The overall objective of the Project component in Ha Tinh was to enhance farmers' livelihoods and resilience to the impacts of climate variability and change, particularly, through piloting ecosystem-based adaptation and climate-smart agriculture (EbA/CSA) measures with the potential to be upscaled. Within the Project lifetime, it aimed to achieve the following specific objectives.

- Objective 1: a) Improve the adaptative capacity and livelihoods of female and male farmers in Ha Tinh Province through implementation of (locally proven and scientifically tested) EbA/CSA measures as well as gender-sensitive intensification approaches that have the potential to be upscaled; and b) Develop necessary capacities of key stakeholders for integration of community-based EbA/CSA as adaptation measures in relevant programmes and strategies.
- Objective 2: Advise, capacitate, and provide technical support for the process of national adaptation planning.
- Objective 3: Assist Viet Nam in providing technical advice to contribute to the international debate on Loss & Damage (L&D) under the United Nations Framework Convention on Climate Change (UNFCCC), including the preparation of case studies from Ha Tinh.
- Objective 4: Support Vietnamese partners to co-develop an adaptation project proposal, backed by financial plans in line with provincial and national targets.

Key results

Until June 2022, the Project achieved the following key results as per specific objectives.

OBJECTIVE 1

- *Implementation of EbA/CSA interventions*: Five EbA/CSA interventions were implemented in five districts (two pilot districts: Huong Son, Can Loc: three scaling districts Ky Anh, Huong Khe and Vu Quang). The interventions were 1) homegarden (fruit-tree-based agroforestry); 2) apiculture based on existing agroforestry and forestry systems; 3) crop rotation: local 'tam' onion and mung beans; 4) drought-tolerant grass; and 5) aquaculture rotation with giant freshwater prawn and fish, surrounded by agroforestry. A total of 3602 households (7070 females and 7062 males) in five districts implemented the five EbA/CSA practices during 2021–2022. The homegarden/fruit-tree-based agroforestry was scaled out the most followed by onion–bean rotation interventions; apiculture; drought-tolerant grass; and rotation of prawn and fish. The reasons were 1) fruit-tree-based agroforestry was incorporated in the Homegarden Improvement programme of the provincial government; 2) onion–bean rotation and grass are low-cost and easy-to-implement

practices; 3) apiculture needs technical training and market development for selling honey; 4) prawn and fish have higher investment costs than other practices.

The EbA/CSA interventions contributed to improvement of local livelihoods. The average income from onion–bean rotation was USD 3500 per ha per year (4–5 times higher than what a farmer received with rice farming on the same land before the Project). Drought-tolerant grass provided sustainable feed for livestock and helped reduce inputs, such as buying feed, because 1 ha of grass provided enough feed for 10 adult cattle per year. The average income from apiculture increased to at least USD 1000 per year following implementation, with the most successful beekeeper earning USD 1700. Average income from prawn and fish in aquaculture system was USD 5921 per ha, which is about 14 times higher than rice farming before the Project.

All interventions showed improvements in adaptation to several weather extremes (for example, droughts, hot spells, cold spells, heavy rain, whirlwinds, storms, floods) compared with before the Project. The homegarden systems included tree–crop–vegetable farming systems and tree-based agroforestry systems introducing circular practices, such as management of household waste and crop residues for composting, helping to reduce production and economic losses (by around 20% as reported by farmers) owing to extreme weather events.

- *Improvement of Agro-Climate Information Services (ACIS) for farmers' agricultural planning and decision-making*: Between December 2020 and June 2022, the Project organized 28 Participatory Scenario Planning (PSP) workshops to co-develop agro-advisories based on seasonal forecasts in the four districts. A total of 285 10-day weather forecasts, 35 seasonal forecasts and 35 agro-advisory posters were developed and disseminated in the four districts.
- *Establishment of Village Savings and Loans Associations for agriculture (VSLA-ag) groups and farmer learning networks*: The Project established 32 VSLA-ag groups with a total of 815 members (47% female and 53% male). As of June 2022, these 32 VSLA-ag groups saved a total of USD 23,173, of which USD 20,478 served as loans for 92 group members to implement CSA practices. The loans were primarily invested in fruit-tree-based agroforestry and livestock (chicken, buffalo, pig) in homegardens with waste-management systems for producing compost. At the same time, 13 Zalo groups with around 500 members were established as a network of farmers and technical staff of the FU and Extension Center to share information. The Project organized 71 training events, including technical courses, PhotoVoice and an introduction to EbA/CSA/ACIS for 2731 people (benefitting 50% women and men equally). See here.
- *Actions for marketing CSA products*: The Project supported 909 households in selling 527.50 tonnes of CSA products (mainly pomelo and oranges) to 16 agricultural stores, 70 organizations and 1200 individuals through market value-chain promotional activities, with prices at least 30% higher compared to similar products sold without the Project's marketing support.
- *Knowledge products and information dissemination:* The Project produced eight technical videos, 11 technical/extension manuals, one portfolio of five CSA practices, two policy briefs, four newsletters and two informational brochures and other communication material (news articles, blogs, documentary videos). See here. Project information was disseminated through multiple communication channels, with 90,000 clicks/views/downloads of online material and 40,000 people accessing the Project's material.
- *Project scaling*: EbA/CSA practices of the Project have been incorporated in five national and provincial policy programme: 1) Homegarden Improvement programme of Ha Tinh FU (01-/BKKTĐ-HNDT) (link); 2) Agricultural and household waste treatment for composting programme of Ha Tinh FU (No.1- NQ/HNDT) (link); 3) Provincial Digital Transformation Programme; 4) Supporting farmers in marketing 'safe' agricultural products under COVID-19 impacts; and 5) national programme, Planting One Billion Trees 2021–25 (Prime Minister's Decision No. 524/QD-TTg).

OBJECTIVE 2

- *Analysis of stakeholders involved in climate action planning and implementation process*: the analysis showed that the process of developing and updating the climate response plan in Ha Tinh was mainly done by a consultancy company with technical inputs from DONRE and partly from DARD. Other Government departments and agencies only provided comments in consultation meetings. There was no participation of mass organizations, non-governmental organizations or the private sector.
- *Assessment of capacity-building needs of relevant actors*: The assessment covered 25 respondents from various Government departments and the private sector in Ha Tinh Province. The results showed that in general there were many gaps in capacity (knowledge, skills and experience) related to the development and implementation of provincial climate response plans, particularly, in the area of technical tools to estimate emissions and sequestration of greenhouse gases (GHG). Other areas of capacity-building needs included assessment of L&D, ecosystems and ecosystem services, data collection methods from Agriculture, Forestry and Other Land Uses' (AFOLU) emission sources, climate adaptation in forestry and land use, and economic analysis of agriculture and forestry production systems (Link).
- *Provision of training for relevant actors*: Four training events were held in 2021 and 2022: 1) climate-change adaptation; 2) climate-change mitigation and GHG emission inventory; 3) L&D; and 4) proposal development for key provincial stakeholders. Owing to COVID-19 restrictions, most training was provided online and is therefore available for repetition and further uptake (Link).
- *Develop a policy brief on engagement of stakeholders in climate-change planning*: based on the work of the Project, a policy brief on stakeholder capacity and engagement in climate-change planning and implementation was prepared, with recommendations.

Overall, the training courses were able to respond to the needs of key stakeholders in the province and have provided them with initial knowledge and understanding for planning and implementation of climate actions. Yet there are still considerable gaps in knowledge and skills of local stakeholders to be filled in order to develop comprehensive climate-change-related plans. As part of the training, a core group for climate planning was created. The group can play an important role in the climate action planning and implementation process and urgently need to be capacitated to be more pro-active in climate planning, particularly, in the technical areas. Further, there was also a need for a platform for data, information and knowledge sharing among local stakeholders and with external actors.

OBJECTIVE 3

- *Identification of stakeholders related to/impacted by L&D and disaster risk reduction*: The Provincial Committee for Disaster Response, Search and Rescue oversees all disaster prevention and control in the province. The Standing Office of the Committee, hosted by the Sub-department of Water Resources (DOWR) and the Committee, is chaired by a representative of the Department of Agriculture and Rural Development (DARD) with representatives from various provincial departments. The Committee reports to the Provincial People's Committee (PPC). Gaps in current L&D data collection were also identified and recommendations made for improvement.
- Collection of data on L&D and risk mitigation strategies in the agricultural sector, assess L&D for selected farming systems, and prepare a case study on L&D from Ha Tinh: Owing to COVID-19 travel restrictions, data collection was undertaken via regular short telephone surveys with 91 selected households to monitor impact on interventions and livelihoods, both from L&D owing to natural disasters and of the pandemic. L&D data on recent disasters were also collected from provincial, district and communal levels. The telephone survey

was complemented with data from the baseline and endline surveys, which covered the same 330 households. Based on the collected data, sections on agricultural L&D were prepared to contribute to a report on L&D in Ha Tinh and Quang Binh provinces commissioned by GIZ. Further, a case study on Ha Tinh L&D data was also compiled based on collected data from surveys and stakeholder analysis mentioned above and additional data from interviews with farmers, particularly, regarding contribution of EbA/CSA interventions in avoiding L&D.

- *Develop a policy brief on gaps in current practice in L&D*: based on the L&D case study, a policy brief on gaps in current practice in L&D data collection and implication of EbA/CSA interventions with regard to avoided L&D was prepared, with recommendations.

OBJECTIVE 4

- *Provide training on proposal development for provincial partners*: training was provided to provincial stakeholders in 2022, helping participants to better understand if a call for proposals was appropriate for them to apply and how to prepare a proposal in response to a call.
- W*ork with local partners to develop adaptation proposals based on the Project's experience*: In total, 10 adaptation proposals (five submitted by Ha Tinh partners and five submitted by ICRAF and other partners) based on the Project's experience, valued at a total of USD 1.63 million, were submitted to international and national donors by project partners, local NGOs and ICRAF. Submitted proposals are available via this link. Among them, three proposals valued at USD 893,725 were approved for funding.
    1) Resilience Capacity and Climate-Smart Agriculture for Ethnic Minority Communities project proposal for EUR 99,998 (approximately USD 113,425) submitted by Center for Rural Development in Viet Nam and ICRAF to IKI Small Grants 2020/2021 on 9 February 2021.
    2) Integrated Approaches to Climate Resilience in the Uplands of Southeast Asia project proposal for SEK 781,000 (approximately USD 83,598) by Swedish Agriculture University, Hue University of Agriculture and Forestry and ICRAF to Swedish Research Council on 13 April 2021.
    3) People, Primates, Plants: Co-managing Biodiversity and Improving Livelihoods in Vietnam project proposal for GBP 565,179 (approximately USD 696,702) submitted by Botanical Garden Conservation International, ICRAF and Center for Highland Natural Resource Governance Research to Darwin Initiative on 31 January 2022.

Exit strategy

The Project delivered on all four exit strategies for ensuring continued action and expansion of scale after the Project termination.

- Strategy 1: Aligning interventions with Government programmes and projects and/or contributing to policies. CSA, agroforestry and EbA are now included in the Homegarden Improvement programme and Ha Tinh FU's annual plan (01-/BKKTĐ-HNDT) for 2022 (Link). CSA technology (composting) will be maintained through Ha Tinh FU resolution (Resolution No.1- NQ/HNDT) on agricultural and household waste treatment for composting (Link).

- Strategy 2: Supporting project partners to mobilise new resources such as writing proposal to apply for (international) calls. Future projects can be replicated by selecting social-ecological systems, develop portfolio for potential interventions and apply project innovations, key lessons learned and recommendations (see the following sections) Under their plan, FU will support 17,990 households and 229 farmers' groups and cooperatives with technical guidance, labour contribution, access to micro-credit funds, and in-kind support of seedlings and agricultural inputs, if available. Additionally, the Project supported local partners in preparation and submission of five proposals (valued at USD 257,500) to provincial, national and international funders (see Work Package 4).
- Strategy 3: Ensuring capacity to maintain farmers' interest groups (VSLA-ag groups managed by Ha Tinh FU) and social media networks. By the end of the Project, 32 VSLA-ag groups had been established with group savings schemes for implementation of CSA.
- Strategy 4: documenting the EbA/CSA interventions and preparing relevant capacity-building and awareness-raising material. Data related to EbA/CSA interventions were collected, analysed and prepared into a portfolio of CSA practices. Technical guidelines and videos guiding various steps in establishment, tending and maintenance of EbA/CSA interventions were prepared. All documents and videos are accessible to the public.

Innovations of the Project

- The Project piloted highly scalable EbA/CSA interventions, which were carefully selected from social-ecological systems (SESs) recommended in a previous study of GIZ; the results of the scoping study; the longlist of existing CSA interventions; shortlist of potential interventions based on scientific knowledge, local experience, and review of enabling policies for CSA implementation.
- The Project was able to successfully integrate its interventions into provincial partner's programmes, such as the Homegarden Improvement programme of Ha Tinh FU, Digital Transformation Programme, agricultural and household waste treatment for composting, supporting farmers on marketing 'safe' agricultural products under COVID-19 impact, and the national programme, Planting One Billion Trees 2021–2025.
- The dissemination of ACIS through various offline and online channels and platforms and the establishment of VSLA-ag groups enabled the adoption of EbA/CSA by more farmers.

Key lessons learned

- Using sets of indicators to select suitable communes and EbA/CSA interventions was an important step to make sure that the selected sites fit with the design of the Project, providing more guarantee for the Project success.
- Design of the EbA measures must not only take into account the biophysical features of the sites but also socio-economic and cultural conditions of the local people. This will ensure the buy-in of the farmers on the technologies from its start.
- Support to local people must be context specific. The Project support responded directly to the needs of the pilot households, based on participatory assessment and discussion with relevant actors.

- Regular technical backstopping is very important. After the first training, the Project continued to visit the pilot farmers on regular basis and provide on-site support to them.
- Farmer-to-farmer learning is essential for spreading the new knowledge among farmers. The Project promoted farmers' groups, which boosted the sharing of information of pilot farmers among themselves and with other farmers.
- Capacity building and strengthening relationships with project partners enabled the Project to achieve results despite travel restriction owing to COVID-19.
- The Project was very successful in scaling out interventions as it was able to integrate into provincial partner's on-going programmes. EbA interventions from the Project were incorporated into four on-going programmes of the provincial partners, which helped boost the adoption of the Project interventions.

Recommendations

- Not only the familiarities but also the complexities of the intervention need to be considered to scale out interventions. To encourage wider adoption, start with easy-to-implement measures, which do not cost a lot nor require detailed knowledge, to ensure 'quick wins' by early adopters. Farmers are more willing to adopt more complicated farming practices when and if they have already achieved initial success.
- Integrating viable financial options is key for sustainability because financial constraints and uncertainty about the effectiveness of the promoted EbA/CSA interventions were among the greatest constraining factors for farmers to adopt these technologies.
- Lessons learned from the Project should be used to contribute to development of provincial (and perhaps national) policy framework/s. The process of field demonstrations should be documented to be used for development of guidelines for implementation of climate-change adaptation and mitigation actions in the field.
- Markets and value chains for EbA/CSA products were not given sufficient attention. This needs to be a priority when scaling of up proven EbA/CSA measures.
- Various stakeholders need to be engaged more pro-actively and very early in climate planning; not just in coordination but also in technical development to make sure such plans match well with the needs of the province, sectors, businesses, and various social groups.
- Government agencies (for example the Agricultural Extension system) should take a step forward to institutionalize such the technical guidelines developed by the Project and promote within their system. This will allow government staff at the grassroot level to officially apply in their work.
- Farmer-to-farmer learning is essential for spreading the knowledge gained from training and experience to promote wide-scale adoption of proven EbA/ CSA technologies. This should be taken into account in designing the expansion of the Project interventions.

- A platform for data, information and knowledge sharing among local stakeholders and with external actors should be created. This will help planning agencies to obtain comprehensive, up-to-date data and information to develop various scenarios for climate change and development.
- The institutional capacity of the province in climate planning needs to be increased wherein line agencies must have sufficient resources (finance, human and technical resources) for climate-change planning tasks.
- For a full impact attribution at landscape level to create ecological benefits, the integration of a rigorously designed impact study will be important when taking the Project to scale.
- For transformational change of the landscapes, proven technologies should be implemented at wide scale. Priority should be given to the Project's sites where the intervention should be increased in scale to take in the whole village or commune to create 'engagement landscapes' of EbA/CSA practices.

1. INTRODUCTION

Viet Nam submitted its Intended Nationally Determined Contribution (INDC) to the United Nations on 31 October 2015. After the country approved the Paris Agreement on 3 November 2016, its INDC officially became a Nationally Determined Contribution (NDC). In July 2020, Viet Nam updated its NDC. The Government of Viet Nam is responsible for NDC implementation, subject to supervision and inspection by the international community.

On 3 September 2019, the project, Support to Viet Nam for the Implementation of the Paris Agreement (VN-SIPA, hereafter referred to as 'the Project'), was approved by the Ministry of Natural Resources and Environment (MONRE) (Decision 2241/QD-BTNMT), with funding from the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) through the International Climate Initiative (IKI), with counterpart funding from the Government of Viet Nam.

Ha Tinh, one of the provinces with difficult climatic conditions, was selected to be part of Component 3 for pilot implementation of EbA measures. World Agroforestry (ICRAF) was selected as a co-implementing partner to support "development and implementation of participatory ecosystem-based adaptation measures, climate-smart agriculture and climate risk management for poor households in vulnerable districts of Ha Tinh Province".

In Ha Tinh, the Project worked in two pilot districts from October 2019 to December 2021. The pilot sites were selected through a participatory consultation process with relevant actors in Ha Tinh Province, in accordance with agreed criteria.

EbA, as defined by the UN Environment Programme, is "the use of biodiversity and ecosystem services as part of an overall adaptation strategy to help people and communities adapt to the negative effects of climate change at local, national, regional and global levels" (UNEP WCMC and UN Environment 2019)[1]. EbA was the focus of a BMU-funded, GIZ project, Strategic Mainstreaming of Ecosystem-based Adaptation in Viet Nam, during 2017–2018. The Project worked at national level on mainstreaming EbA and at provincial level with Ha Tinh and Quang Binh on piloting.

Climate-smart agriculture (CSA) is an approach that helps to develop agricultural actions for the 'triple wins' of food security, adaptation and mitigation (FAO 2013)[2]. CSA was implemented by ICRAF in Ky Anh District, Ha Tinh Province during 2015–2018, through the CGIAR Research Program on Climate Change, Agriculture and Food Security.

In the Project, a modified working definition of CSA was adopted, which is closer to EbA than the original definition by FAO (2013), arguing that the three goals of CSA — food security, adaptation and mitigation — could be reached through improved environmental functions.

At the farm scale, CSA can be understood as farming practices that positively impact the resilience and livelihoods of a household.

[1] UNEP WCMC, UN Environment. 2019. Making EbA an effective part of balanced adaptation strategies: introducing the UN Environment EbA briefing notes. Briefing Note No. 1. Nairobi, Kenya: United Nations Environment Programme

[2] FAO. 2013. *Climate-smart agriculture sourcebook*. Rome, Italy: Food and Agriculture Organization of the United Nations. http.//www.fao/3/a-i3325e.pdf

At landscape scale, CSA contributes to maintain ecosystem functions, for example, water regulation; reducing the impact of floods and droughts through green barriers on slopes and contributions to payment for environmental services; and providing frameworks for policy, land-use planning and monitoring and evaluation.

1.1 Project objectives

The overall objective of the Project Component in Ha Tinh was to enhance farmers' livelihoods and resilience to the impacts of climate variability and change, particularly, through piloting EbA/CSA measures with the potential to be upscaled.

1.1.1 Specific objectives

- Objective 1: a) Improve the adaptative capacity and livelihoods of female and male farmers in Ha Tinh Province through implementation of (locally proven and scientifically tested) EbA/CSA measures as well as gender-sensitive intensification approaches that have the potential to be upscaled; and b) Develop necessary capacities of key stakeholders for integration of community-based EbA/CSA as adaptation measures in relevant programmes and strategies.
- Objective 2: Advise, capacitate and provide technical support for the process of national adaptation planning.
- Objective 3: Assist Viet Nam in providing technical advice to contribute to the international debate on Loss & Damage (L&D) under the United Nations Framework Convention on Climate Change (UNFCCC), including the preparation of case studies from Ha Tinh.
- Objective 4: Support Vietnamese partners to co-develop an adaptation project proposal, backed by financial plans in line with provincial and national targets.

1.2 Project outcomes and indicators

1.2.1a Outcome 1a

Smallholders and communities in project sites increase their resilience to the impacts of climate change through additional knowledge, improved farming practices, erosion and coastal protection measures, and livelihoods by the end of the project.

Indicator

- By the end of the project, at least 20% of households directly benefiting from project activities report increases of at least two new sources of agricultural income or return on investment in agriculture by at least X% (to be decided after baseline survey).
- By the end of the project, at least 50% of people trained by project and partner organizations report applying new knowledge/learning (on EbA/CSA) to their farming practices and erosion or coastal protection.

1.2.1B Outcome 1B

EbA/CSA approaches and measures are integrated/implemented by local partners through adaptation planning/programmes and policy.

Indicator

- By the end of the project, at least three organizations express interest in integrating/implementing EbA/CSA approach and measures.

1.2.2 Outcome 2

Experience from provincial adaptation planning in Ha Tinh is fed into the National Adaptation Plan (NAP) process, in the shape of policy recommendations.

Indicator

- By the end of the project, one policy brief on recommendations for stakeholder capacity development for climate-change planning in Ha Tinh province is available.

1.2.3 Outcome 3

A case study on L&D in Ha Tinh contributes to the international debate.

Indicator

- By the end of the project, the case study from Ha Tinh on local evidence for diversified and multifunctional adaptation responses in agriculture is shared in at least one international event/platform.

1.2.4 Outcome 4

One adaptation proposal with a financial investment plan is developed, in line with provincial and national targets (i.e. NRD program, NDC, REDD, NAP) to upscale the piloted measures.

Indicator

- By the end of the project, one adaptation proposal with a financial investment plan is developed, in line with provincial and national targets (i.e. NRD program, NDC, REDD, NAP) to upscale the piloted measures.

2. PROJECT RESULTS

2.1 Summary results of the Project

The Project achieved targets and fulfilled all expected outcomes and objectives and adapted well to the needs of farmers and local partners. The Project implemented adaptation planning to minimize the impact of the COVID-19 pandemic and natural disasters on field activities. Some training events were continuously adapting to online and/or semi-online formats to cope with the pandemic's travel and meeting restrictions in Ha Tinh Province and other sites in Viet Nam. Farmers, commune and district partners were strongly engaged in project implementation and M&E. The key results against project outcomes are presented in Table 1.

Table 1. Project achievements for key outcomes

Project outcomes	Status	Details of achievement
Outcome 1a: Smallholders and communities in project sites increase their resilience to the impacts of climate change through additional knowledge, improved farming practices, erosion and coastal protection measures, and better livelihoods by the end of the project *Indicator:* ▪ By the end of the project, at least 20% of households directly benefiting from project activities report increases of at least two new sources of agricultural income or return on investment in agriculture by at least X% (to be decided after baseline survey) ▪ By the end of the project, at least 50% of people trained by project and partner organizations report applying new knowledge/learning (on EbA/CSA) to their farming practices and erosion or coastal protection	Accomplished	▪ Five EbA/CSA interventions were successfully implemented regardless of a series of extreme weather events in Ha Tinh during 2020–2022, for example, droughts, storms and heavy rains, floods, cold spells and whirlwinds that affected the progress of implementation and achievements. ▪ EbA/CSA interventions increased economic benefits and resilience capacity to climate change compared to the practices before interventions (see CSA portfolio, post-training evaluation report, project progress reports, endline survey report and this report) ▪ More than 3500 households benefited directly from the Project and implemented EbA/CSA interventions (while the Project only targeted 1250 households as direct beneficiaries). Of the 242 HHs covered in the endline survey, 95% reported increases in agricultural income ▪ More than 40,000 people indirectly benefited from the Project (compared with only 10,000 as planned in the Project proposal) ▪ Total trained: 3062 farmers (core and collaborative groups). End-line survey showed that 97% and 93% of core and collaborative farmers, respectively, reported applying trained knowledge. Post-training evaluation conducted in June 2021 showed that 99/182 (52%) of interviewed farmers adopted and improved their management practices towards EbA/CSA after joining training provided by the Project

Outcome 1b: EbA/CSA approaches and measures are integrated/implemented by local partners through adaptation planning/programmes and policy. *Indicator:* ▪ By the end of the project, at least three organizations express interest in integrating/implementing EbA/CSA approaches and measures	Accomplished	Project scaling through integration of EbA/CSA and/or contribution to five main governmental programmes/projects: ▪ Homegarden Improvement programme of Ha Tinh FU (No.01/BKKTĐ-HNDT), which is contributing to the Provincial New Rural Development Programme ▪ Digital Transformation Programme in Agriculture in Ha Tinh Province ▪ Ha Tinh FU Resolution No.1-NQ/HNDT on agricultural and household waste treatment for composting ▪ Supporting farmers on marketing 'safe' agricultural products under COVID-19 impacts (Ha Tinh FU initiative) ▪ Government project, Planting One Billion Trees 2021–2025, approved by Prime Minster under Decision No 524/QD-TTg More than 12 main partners implemented and integrated EbA/CSA approaches and measures into their programmes/plans, including ▪ Ha Tinh FU ▪ Ha Tinh Extension Center ▪ Ha Tinh Hydrometeorological Center (adjusted forecast indicators and terms based on farmers' needs and feedback) ▪ District and commune FUs of Huong Son, Can Loc, Huong Khe and Ky Anh ▪ District and commune DARDs of Huong Son, Can Loc, Huong Khe and Ky Anh ▪ Village management boards
Outcome 2: Capacity in climate-change adaptation planning for provincial stakeholders in Ha Tinh Province improved through training *Indicator:* ▪ By the end of the project, one policy brief on recommendations for stakeholder capacity development for climate change planning in Ha Tinh Province is available	Accomplished	▪ Four training events were conducted for provincial partners based on the training-needs assessment: 1) climate-change adaptation; 2) climate-change mitigation and GHG emission inventory; 3) L&D; and 4) proposal development. Training reports available via this link. ▪ One policy brief on experience from Ha Tinh in provincial climate response planning and implementation, available via this link.
Outcome 3: A case study on L&D in Ha Tinh contributes to the international debate	Accomplished	The case study was developed together with GIZ and consultants and shared with MONRE and MARD to contribute to discussions on L&D at COP26

Indicator: ▪ By the end of the project, the case study from Ha Tinh on local evidence for diversified and multifunctional adaptation responses in agriculture is shared in at least one international event/platform		
Outcome 4: One adaptation proposal with a financial investment plan developed in line with provincial and national targets (that is, NRD programme, NDC, REDD, NAP) to upscale the piloted measures *Indicator:* ▪ By the end of the project, one adaptation proposal with a financial investment plan is developed, in line with provincial and national targets (i.e. NRD program, NDC, REDD, NAP) to upscale the piloted measures	Accomplished	▪ 25 staff from Ha Tinh Province (15 M/10 F) and four staff from CERGON and CRD (2M/2F) were capacitated by the Project in developing adaptation proposals, including financial investment plans ▪ Ten adaptation proposals (total value of USD 1.6 million) developed and submitted by the Project partners and/or ICRAF ▪ Three adaptation proposals valued at USD 893,725 were successfully approved to scale out EbA/CSA in Quang Binh, Thua Thien Hue and other provinces in Central Viet Nam

2.2 Work Package 1: Improve the adaptative capacity and livelihoods of female and male farmers through adoption/implementation of EbA/CSA practices as well as gender-sensitive intensification approaches

Activity 1.1: Review literature and, if necessary, update parts of the EbA vulnerability assessment (VA) report, develop M&E indicators and conduct baseline study

Activity 1.2: Participatory identification of pilot sites and suitable measures

Activity 1.3: Implementation, including field testing, maintaining and monitoring of pilots for building adaptive capacities of farmers in project sites

Activity 1.4: Establish a regular 'round table' or a technical working/advisory group (including local officials and implementers for project implementation and policy dialogues) and organize relevant CSA capacity-building activities (training, local study tour) for implementation partners

Activity 1.5: Systematically document and disseminate project outputs, results, and impacts to the main target group.

Table 2. Summary of key achievements of activities in Work Package 1

No.	Activity	Output See this link for all outputs	Status	Comment
1.1	**Review literature and, if necessary, update parts of the EbA vulnerability assessment (VA) report, develop M&E indicators and conduct baseline study**	▪ M&E indicators with a scheme for follow-up ▪ Baseline data and report with methodology, target values and time frame	**Accomplished (2020)**	Updates to EbA VA report: additional information for the EbA VA report was added into project progress reports, covering 1) enabling policy for CSA in Ha Tinh and nationally; and 2) planning for aquaculture sectors in Ha Tinh Province. In total, 14 key policies were reviewed in 2020. The review included 1) key policy objectives and content; 2) ranks for how each of the three CSA indicators of 'food security', 'adaptation' and 'mitigation' were captured within EbA; and 3) the mentioning of potential CSA practices being promoted in the policy. Baseline data collection. *Key deliverables* • M&E indicators and plan (see this link) • Baseline report: 25 February 2021_SIPA-baseline report_Rev2Feb2021_EN (English) (see this link) • Baseline video: 6 April 2021_The impacts of extreme weather events and adaptation strategies of local farmers (in Vietnamese) (see this link)
1.2	*Participatory identification of pilot sites and suitable* **measures**	▪ Pilot sites selected through participatory consultation process ▪ Location-prioritized and gender-sensitive EbA/CSA measures identified and farmer groups established	**Accomplished (2020)**	**The selection of project sites (Huong Son and Can Loc districts) was done through field visits and consultation meetings with key stakeholders (Taskforce; representatives of commune and district partners) based on the agreed site selection indicators. The final approval of the pilot communes and districts was officially made by Ha Tinh PPC on 21 July 2020 in document no.4795/UBND-NL2.** Five main EbA/CSA interventions were identified together with farmers and local partners: 1) homegarden (fruit-tree-based agroforestry); 2) apiculture based on existing agroforestry and forestry systems; 3) crop rotation: local 'tam' onion and mung beans; 4) drought-tolerant grass; and 5) giant freshwater prawn–fish rotation with agroforestry. **The key steps for identification of project interventions included identification of 1) the baseline information (main practices, land use, socio-economic trends/plans) for agriculture and natural resources; 2) the key problems and the causes of these problems; 3) longlist of existing CSA interventions; 4) shortlist of potential interventions based on scientific knowledge, local experiences and review of enabling policies for CSA implementation.** **Initially, 234 core-group farmers participating in implementation of selected EbA/CSA interventions were identified through field visits and meetings with**

				farmers, commune and district staff. **Establishment of VSLA-ag farmers' groups and farmer learning networks: the Project established 32 VSLA-ag farmers' groups with a total of 815 members (about 47% F/53% M). As of June 2022, these 32 VSLA-ag groups saved a total of USD 23,173, of which USD 20,478 served as loans to 92 group members to implement CSA practices, primarily fruit tree-based agroforestry and raising livestock (chicken, buffalo, pig) in tree-crop homegardens with waste management systems for composting. These VSLA-ag groups established 13 Zalo farmers' groups (around 500 members) for information sharing and learning among farmers and between farmers and technical staff.** *Key deliverables* • 23.7.2020_ Decision 4795/UBND-NL2 _Ha Tinh provincial PPC approving project sites_VN, link • 14.8.2020_Intervention selection report_VN, link • 11.9.2020_Farmers and farm location selection_VN, link • 26.11.2020_Minutes of kick-off workshop on agreement of selected EbA_CSA options in Huong Son District_VN, link • 27.11.2020_Minutes of kick-off workshop on agreement of selected EbA_CSA options in Can Loc District_VN, link
1.3	**Implementation, including field testing, maintaining, and monitoring of pilots for building adaptive capacities of farmers in project sites**	▪ Field trials and demonstration established and maintained ▪ More than 46 guidelines, technical instruments, and posters for implementation of EbA/CSA measures developed and disseminated ▪ Field evidence of piloted measures and impacts of project on farmers' adaptative capacities and livelihoods collected and analysed (progress reports and endline survey report) ▪ One portfolio of CSA	**Accomplished (2020–2022)**	Field trials and demonstrations: five main EbA/CSA interventions established firstly by 234 core-group households in Huong Son and Can Loc districts during 2020–2021 and then scaled out to a total of 3602 households in five districts (Huong Son, Huong Khe, Ky Anh, Can Loc, Vu Quang) during 2020–2022. All interventions were successfully implemented and maintained by farmers. Of the above-mentioned implementing households, 2381 implemented fruit-tree-based agroforestry through the integration of agroforestry models into the Homegarden Improvement programme with Ha Tinh FU during 2021–2022. The Project directly supported inputs (fruit-tree seedlings and probiotics for composting) and technical instruction to 3149 households in the five districts (Huong Son, Can Loc, Ky Anh, Huong Khe and Vu Quang) to implement fruit-tree-based agroforestry systems in their homegardens in 2021–2022. ACIS: The Project organized a total of 28 PSP events, developed and disseminated 285 ten-day weather forecasts, 35 seasonal forecasts and 35 different agro-advisory posters in the four districts, including Can Loc and Huong Son (the pilot districts) and Ky Anh and Huong Khe (the scaling districts). 3032 copies of the agro-advisory posters were printed and posted on commune information boards and in public areas of 83 communes in the four districts. Soft-copies (PDFs) of agro-advisory posters and weather forecast information were disseminated online via multiple channels such as

		practices for scaling, including cost-benefit analysis generated ▪ Experience and lessons learned from technical experience with adaptation solutions for upscaling at provincial level documented (indicated in the progress reports, and through about 70 communication outputs: newsletters, news and flyers, link) ▪ Endline survey report		the FU website, farmers' Zalo groups and Ha Tinh FU Zalo groups, several Facebook pages of FUs, FU meetings and through FU and/or extension staff in 83 communes in the four districts. *Key deliverables* • 24.11.2020_Introductory orientation on EbA CSA ACIS for extension staff from 14 northern provinces_VN (link) • 25.12.2020_Introductory orientation on EbA_CSA_ACIS for provinical_district_commune partners_VN (link) • 25.1.2021_ Introductory orientation on EbA, CSA, PSP and VSLA in Huong Khe, Ha Tinh_VN, (link) • 16.7.2021_Composting method_HaTinh FU_VN (link) • 9.9.2021_Training on organic-oriented fruit trees' cultivation_VN (link) • 35 different agro-advisory posters (Vietnamese, link) • 10.11.2021_Technical guide_Bee keeping_VN (link) • 10.11.2021_Technical guide_Safe local "Tam"onion_VN (link) • 10.11.2021_Technical guide_Orange-based agroforestry_VN (link) • 8.11.2021_ Technical guide on culture of Giant freshwater prawn_VN (link) • 8.10.2021_Standard designs for fruit-tree-based agroforestry systems on flat land and sloping land_EN (link) • Technical guides, 'how to' videos, presentations: – Pruning for orange and pomelo trees- episode 1, link – Pruning for orange and pomelo trees- episode 2, link – Beekeeping- episode 1, link – Beekeeping- episode 2, link – Beekeeping- episode 3, link – Beekeeping- episode 4, link • Endline survey report, link

				Communication outputs • 19.3.2021_'Tam' onion flyer_VN, link • 27.7.2021_Honey flyer_VN, link • 27.7.2021_The Project brochure on implementation of and scaling EbA/CSA practices _EN, link • 2020_Project brochure_VN, link • Other communication outputs such as newsletters, news on initial results on field implementation, flyer to promote CSA products, link
1.4	**Establish a regular 'round table' or a technical working/advisory group (including local officials and implementers for project implementation and policy dialogues) and organize relevant CSA capacity-building activities (training, local study tour) for implementation partners**	▪ Technical working group with identified responsibilities and regulations established ▪ Report of capacity building for extension services, FU, DARD and relevant departments, and NGOs to train and provide technical assistance on EbA/CSA design and adoption through participatory action research (PAR), education/ training and informative networks ▪ Guidelines and instruments for integrating EbA in land-use and development planning developed ▪ An exit and upscaling strategy for EbA/CSA prepared in cooperation with agricultural extension services or other relevant stakeholders	***Accomplished (2020-2022)***	***Technical working group (Taskforce) was established and approved by Ha Tinh's People's Committee by a Decision 1305/QĐ-UBND issued on 24 April 2020.*** The Taskforce includes representatives from six agencies; four sub-departments under DARD, namely the sub-departments of Water Resources (DOWR), of Forest Protection, of Crop Production and Protection, of Aquaculture, and the provincial Extension Center, and the sub-department of Sea, Island and Water Resources under DONRE. ***Capacity building: organized 71 training events covering technical topics, photovoice and an introduction to EbA/CSA/ACIS for 2731 persons (about 50% F, 50% M). The training and training evaluation reports are available at this*** link. Five field visits for core farmers, VSLA-ag groups members and agricultural staff were organised: • A one-day field trip for 30 farmers to learn more about how to process and market honey products and undertake VietGAP orange production in Huong Son and Vu Quang districts. A review of the trip is available at this link. • A one-day trip for 100 VSLA-ag farmers in May 2022. • Three field trips for 36 farmers, district and provincial partners, to visit ICRAF's agroforestry interventions in Son La Province and other provinces to encourage an understanding of the benefits of landscape-level agroforestry that would also be appropriate in Ha Tinh Province. (link) *Key deliverables* • 24.4.2020_Decision 1305/QĐ-UBND on approval of provincial Taskforce_VN (link for Decision) • Training report November 2020 to January 2021: 15.3.2021_ The Project-

				Training report-revised_EN (link) • Training report- March to December 2021: 23.2.2022_Training Report March to December 2021_EN (link) • Post-training Evaluation Report- Final_EN-20.8.2021_The Project (link) • Training report _March to June 2022_08.07.2022 (link)
1.5	**Systematically document and disseminate project outputs, results, and impacts to the main target group**	▪ Outcome stories, project experience and project impact videos on enhancing adaptive capacity and out-scaling strategies synthesized and widely shared with different stakeholders ▪ Policy brief, including policy recommendation on scaling EbA/CSA and capacity building at provincial level developed and shared (common outputs with policy brief for WP2 and WP3) ▪ Concept for scaling opportunities documented and developed	**Accomplished (2020–2022)**	The Project produced 8 videos, one CSA portfolio, 11 technical/extension material (e.g., standard designs of fruit-tree-based agroforestry for different terrain, technical manuals on management of project CSA practices (onion, honey bee, giant river prawn, orange, fruit trees), two policy briefs, and two information brochures, project impact video and about 72 webstories/news articles. For key publications and communication material from the the Project up until June 2022, see this link. Project information was disseminated through multiple communication channels such as 13 Zalo groups (500 members), Facebook pages of commune and district FUs (about 1500 followers), the Ha Tinh Extension Center and FU websites, TV, emails, and printed posters displayed in public areas, commune information boards, and FU meetings from village through to provincial levels as well as conference presentations and national sharing events. Communication and dissemination through multiple channels undoubtedly increased the Project's visibility, with 90,000 clicks/views/downloads of online material and 40,000 people accessing project material. The Project also contributed to improvement of two websites of Ha Tinh Extension Center and Ha Tinh FU to increase capacity for use in mobile versions, the contents covering EbA/CSA/ACIS, feedback mechanism and other matters. Five on-site scaling and sharing events were conducted by the Project: The Project organized four provincial sharing events to disseminate information about the Project's interventions, experience and results with 320 farmers, commune and district staff (130 F/190 M) in Huong Son and Can Loc districts. The events aimed to update farmers and Government staff on the progress of implemented interventions as well as generate ideas for scaling the interventions via local governmental plans. News about the events is available via this link. The Project organised one closing workshop with 65 people, including national partners and those from Ha Tinh and other provinces and projects (Quang Binh and Dak Lak). The Project joined more than seven off-site sharing events, such as the GIZ-SEARCA ASEAN Climate Leadership Programme 2021, the ASEAN Climate Resilience Network technical event, NbS for Policy Makers, among ASEAS bodies, organized by the ASEAN Secretariat and the ASEAN CRN Secretariat, the APEC/APCC Climate Service Workshop (See clip at 6.45.00), the Vietnam–UK Economic and Trade Forum, organized by the

				University of Economics (Vietnam National University, Hanoi) in collaboration with the Department of Climate Change, the 2nd Consultation Workshop on the ASEAN Guidelines for Promoting CSA Practices – Vol 3 and Implementation Framework hosted by the Malaysian Agricultural Research and Development Institute. Project scaling was promoted through integration and contribution to five main governmental programmes/projects: • Homegarden Improvement programme of Ha Tinh FU (No.01/BKKTĐ-HNDT), which is contributing to the Provincial New Rural Development Programme. Link • Digital Transformation Programme in Agriculture in Ha Tinh Province. • Ha Tinh FU Resolution No.1-NQ/HNDT on agricultural and household waste treatment for composting. Link • Supporting farmers on marketing 'safe' agricultural products under COVID-19 impacts (Ha Tinh FU initiative). Link • Government project, Planting One Billion Trees 2021–2025. Link *Key deliverables* • *Communication plan is available via this link.* • 6.5.2021_Cooperation plan with Ha Tinh Farmers' Union's Homegarden Program_EN link • 22.9.2021_Adjusted CSA events_under COVID-19 context_EN link

2.2.1 WORK PACKAGE 1: RESULTS BY ACTIVITY

2.2.1.1 Activity 1.1. Review literature and, if necessary, update parts of the EbA vulnerability assessment (VA) report, develop M&E indicators and conduct baseline study

Review of enabling policies for EbA/CSA implementation

In total, 14 key district- through to national-level policies supporting CSA in Ha Tinh Province were reviewed in 2020. The review covered 1) key policy objectives and content; 2) establishing a rank for how each of the three CSA indicators — food security, adaptation and mitigation — were captured in each policy; and 3) mentions of potential CSA practices in the policy (Annex 1.1a).

The review highlighted several enabling policies for EbA/CSA adoption in Viet Nam and, specifically, in Ha Tinh Province, for example, by

- providing general guidance for multiple sectors and provincial authorities on planning budgets for contributions to national targets for climate change, green growth, sustainable agricultural development, and new rural development programmes;
- providing instructions on scalable CSA technologies/practices to be integrated in local plans and programmes; and
- enabling national budgets for testing and scaling out CSA-related technology and practices, including agricultural models under national extension projects in Ha Tinh Province (QĐ3968/QĐ-BNN-KN; Annex 1.1a).

The review noted that the One Commune, One Product (OCOP) policy provided an opportunity to diversify agricultural products around one commercial product. However, at district level, policy support was often terminated after 1–2 years of implementation or updated depending on the budget available for the agricultural sector. Such practices could counter long-term commitments needed for establishing and maintaining diversified systems based on an OCOP crop.

Review of plans and statistical data for aquaculture

Statistical data and development plans for aquaculture were reviewed and shared in consultation with provincial partners (Table 3). Two observations were made with respect to potential inclusion of aquaculture in the the Project.

- The provincial plans for aquaculture development were shifting towards large-scale and intensive commercial production for salt and brackish water and on sand. ICRAF assessed that chances were limited for such interventions to benefit smallholders within the Project's timeframe.
- The current aquaculture plans for 'fresh water' and 'surface water, rice fish' (Table 3) offered opportunities for integrated farming systems at farm and landscape levels, which appeared promising as EbA interventions.

Based on these observations, the decision was taken to pilot an intervention with an affordable, smaller-scale, community-based model with aquaculture and agroforestry as an EbA practice that could withstand the main hazard risks and thereby provide economic resilience.

Table 3. Statistical data for aquaculture plans collected from the Department of Aquaculture, Ha Tinh Province

Data	Scale	Year	Comments for potential selected districts
Aquaculture area	District	2007–2011	
Freshwater aquaculture plan	District	Planned by 2020	Can Loc and Huong Son districts are in this category
Salt and brackish water aquaculture	District	Planned by 2020	Plans for large-scale commercial production
Surface water, rice–fish	Province, district	Planned by 2020	Can Loc and Huong Son districts are in this category
Aquaculture on sand	District	Planned by 2020	Plans for large-scale commercial production

2.2.1.2 Activity 1.2. Participatory identification of pilot sites and suitable measures

Table 4. Overview of EbA/CSA interventions with core farmers and interventions

Interventions	Number of core households	Area	Location
Integrated homegarden improvement	14	16 ha	Can Loc District: Dong Loc Commune; Huong Son District: Son Tien and Son Hong communes
Apiculture	36	360 beehives	Can Loc District: Dong Loc Commune; Huong Son District: Son Tien and Son Hong communes
Drought-tolerant grass for livestock	31	2.6 ha	Huong Son District: Son Tien Commune
Local onion and mung bean rotation, associated with OCOP product chain	147	7.3 ha	Can Loc District: Vuong Loc Commune
Giant river prawn and freshwater fish with tree crops	16	2 ha	Can Loc District: Vuong Loc Commune

Together with the five main EbA/CSA interventions above, the Project supported farmers – including non-core farmers – to improve their farming practices to be more resilient to climatic variations, through technical training in selection and management of trees and crops, consultations (pest and disease management, composting) and improved climate information services (forecasts and agro-advisories)

Site selection

The pilot communes and districts were approved by Ha Tinh PPC on 21 July 2020 (No.4795/UBND-NL2): Son Tien and Son Hong communes in Huong Son District and Dong Loc and Vuong Loc communes in Can Loc district.

The sites were selected together with Ha Tinh provincial Taskforce and partners, in consultation with GIZ. The selection was done in three steps: 1) Socio-Ecological Systems (SES); 2) districts; and 3) communes.

First, three out of ten SES were identified based on the VA report by ISPONRE, GIZ and ICEM (2016). This was done in consultation meetings with provincial leaders and partners. The selection was based on the consideration that the target beneficiaries should be Kinh and ethnic minority smallholders in climatically exposed areas with priority given to SES covering large areas, to maximize impact.

'Smallholders' here are loosely defined as Kinh and ethnic-minority households with small-scale production who depend on agriculture as a household income source. Given the location and common limitations in production — for example, small farm holdings, low land-use efficiency, limited access to investment capital or management/technology — The Project targeted key vulnerabilities to natural disasters and, by extension, climate variability and change impacts that could be reduced with EbA/CSA interventions. Three SES were approved by provincial leaders on 6 March 2020.

1) 3b: Kinh smallholder lowland floodplain with irrigated rice cultivation (7.2 % of the area)
2) 2b: Kinh and ethnic minority smallholder field and tree crops (6.5 %)
3) 2d: Kinh smallholder inland valley, paddy cultivation and tree crops (15.3 %)

Second, three districts were shortlisted, one per SES, from which two districts remained after the communes had been identified. At a consultation meeting on 19 May 2020, the Taskforce shortlisted Huong Son, Thach Ha and Can Loc as best fit with the selection criteria. That is, that the district

- was representative of coastal, lowland, and upland areas in Ha Tinh Province;
- was exposed and vulnerable to extreme weather events and represented areas with high climate-change impact;
- needed building of technical capacity to adapt agriculture to climate change;
- had potential to implement EbA/CSA demonstration models (area and beneficiaries); and
- leaders showed interest and active engagement.

Third, two communes per district in two districts were selected after a consultation meeting with district leaders and three field visits to 11 communes in the three districts (21–22 May and 10–11 June 2020).

The indicator results for each considered site are shown in Table 5. For more details, see Annex 1.2a. The period of selecting project sites was delayed owing to several factors beyond the control of implementing agencies, both during the set-up and for the duration of the Project.

Table 5. Summary of commune selection results based on indicators

Indicator / Communes	Potential to implement scalable EbA/CSA interventions	High risk of climate change exposure until 2040s, representative of the province	High impact of past disasters	High vulnerability	Strong partners	Willingness to participate
Huong Son District						
Sơn Tiến	✓	✓	✓	✓	✓	✓
Sơn Hồng	✓	✓	✓	✓	✓	✓
Can Loc district						
Thiên Lộc	✓	-	✓	-	✓	✓
Vượng Lộc	✓	✓	✓	✓	✓	✓
Phú Lộc	-	✓	✓	✓	✓	✓
Gia Hanh	-	✓	✓	✓	✓	✓
Đồng Lộc	✓	✓	✓	✓	✓	✓
Mỹ Lộc	o	✓	✓	-	✓	-
Thach Ha District						
Tân Lâm Hương	o	✓	✓	-	✓	✓
Thạch Khê	o	✓	✓	-	✓	✓
Thạch Liên	o	✓	✓	-	✓	✓

(✓) Meets the requirement; (^) Needs further consideration on social aspects; (o) does not meet the requirement.
Note: Communes highlighted in orange were selected.

EbA/CSA intervention selection

The overall approach for identification of interventions included identification of 1) the baseline information (main practices, land use, socio-economic trends/plans) for agriculture and natural resources; 2) the key problems and the causes of these problems; 3) longlist of existing CSA interventions; and 4) shortlist of potential interventions based on scientific knowledge, local experience and review of enabling policies for CSA implementation. The details follow.

Regarding the baseline information for agriculture and natural resources as well as the key problems, see Figure 1 for overall climatic issues) and causes.

The main challenges that farmers experienced with agricultural production and biophysical conditions, commune and district planning in relation to the proposed EbA interventions were identified through a scoping study, secondary data and reports, and baseline survey results conducted during July–September 2020. Summary reports of the EbA/CSA interventions and farmers' selection (provided in Vietnamese via this link) were shared with the focal point of the Taskforce and GIZ. The baseline survey results have been reported separately to GIZ.

Figure 1. Main extreme weather events in Ha Tinh Province

Longlist of potential CSA practices to be implemented in the province and selected districts

More than 150 EbA/CSA practices had been implemented in the province during 2014–2020 by Government, NGOs or CSOs or through local knowledge. The summary in Annex 1.2c provides documentation of available practices and insights into the potential scalability.

Shortlist and prioritized EbA/CSA interventions/options

Methods/approach: The EbA/CSA selection was done 1) with farmers, commune staff and district agricultural staff through focus group discussions, meetings and household surveys conducted by ICRAF and the provincial Extension Center; 2) through expert consultations with researchers and technical staff at ICRAF, Vietnam Institute of Fisheries Economics and Planning, the provincial Extension Center and district DARD, district leaders and provincial Taskforce members; and 3) by ensuring interventions were in accordance with Government planning and policies at different levels.

The interventions were identified using the following criteria.

- Farmers expressed interest to implement and co-invest (Report on farmers and farm location selection).
- The practice met EbA/CSA indicators (Annex 1.3b, Report on farmers and farm location selection).
- The practice had been tested in the SES that the project sites belonged to.
- Suitable for scaling with existing plans and policies of communes, districts, province and nationally (Annex 1.1a, Annex 1.3c, potential intervention selection report).
- The practice has potential to be replicated partly or fully in other areas of the province. Recommendations for scaling from the Project include economic and environmental cost–benefit and market assessments. Market indicators could be examined during the Project (for example, COVID-19 may have altered the market situation for this product).

Results of the selection process

The five main selected EbA/CSA interventions are presented in Annex 1.3c, summarised below.

1) ***Homegarden improvement*** to address multiple climate-related issues of droughts, hot spells, cold spells, storms, heavy rains, flash floods. The interventions integrated more species for diversification and/or sustainably intensified use of the homegarden, to restore ecosystem functions such as temperature regulation, reduced irrigation needs.
2) ***Apiculture*** using climate-suitable (native) honeybees in existing homegardens and forest ecosystems aimed to improve the quality of farmed honey and stop wild bee extraction from the forests. Overall, this was expected to contribute to more pollinators and raise awareness, contributing to a reduction in the use of pesticides.
3) ***Drought-tolerant grass*** was applied as conversion of un-used or low-productive rice/maize or cassava/bare land, combined with or without tree-based systems. This practice aimed to address droughts and whirlwinds. Nutritious fodder grass for livestock reduces soil erosion on slopes, is drought-tolerant to survive the dry season, regulates soil temperature and reduces direct evaporation from bare soils while enhancing soil moisture. Combined with fruit trees, this can reduce irrigation demand. Grass provides a sustainable source of feed for livestock year-round and has a quick recovery capacity after whirlwinds compared to rice, maize and cassava that were cultivated by farmers before.
4) ***Local onion and mung bean rotation*** saw the conversion of low-production monocultures of rice or annual crops to rotation of onion combined with soil-improving practices, including legume crops (for example, mung bean) and straw mulch for improved soil quality and

soil moisture retention. This practice aimed to address drought. A co-benefit is reduced straw burning and increased pest-repellent crops. The local onion is associated with the OCOP value chain.

5) ***Giant river prawn and freshwater fish aquaculture with agroforestry*** saw conversion of low-production rice monocultures or ponds into an aquaculture rotation of prawn and fish. The ponds are bordered by tree-crops providing windbreaks, cash crop on bunds and water plants providing phytoremediation functions. The rotation is a multipurpose strategy to reduce incidence of disease, diversify production and reduce the impact of economic and weather-related risks (for example, floods).

Together with the five interventions above, *improving climate information services* (access to seasonal and 10-day weather forecasts, agro-advisories) was a strategy to build adaptation capacity for EbA/CSA interventions and for scaling.

A few caveats are noted regarding the selections. Being listed as a climate-smart practice does not by default guarantee climate proofing. However, compared to conventional practices of intensive or low-production monocultures, the proposed systems should be viewed as initial steps towards adaptive planning processes with more climate resilient/stress-tolerant farming practices and more attention to landscape-level processes. Meeting policy boundaries, contributions to halt further environmental degradation while providing incomes and livelihood sources are viewed as feasible first steps towards overall better-functioning ecosystems. These adaptive learning processes were part of the Project's scaling strategy.

Establishment of Village Savings and Loans Association for agriculture groups

The Project aimed to establish 32 VSLA-ag groups, including 16 in Huong Son and Can Loc districts (the Project sites) and another 16 in Huong Khe and Ky Anh districts (in collaboration with the CLISM project[3] in Ha Tinh) as scaling districts.

The activities with VSLA-ag groups included providing ACIS, revolving micro-credit schemes, training in fund management and other technical training events, and receiving technical material.

These groups interacted with the core farmer groups through site visits, social media, PSP workshops and FU meetings.

- As of June 2022, the Project had established 32 VSLA-ag farmers groups with a total of 815 members (about 47% F/53% M). These 32 VSLA-ag groups saved a total of USD 23,173, of which, USD 20,478 served as loans to 92 group members to implement EbA/CSA practices, primarily fruit-tree-based agroforestry and raising livestock (chicken, buffalo, pig) in tree-crop homegardens with waste management systems for composting. See Annex 1.2a for more information about VSLA-ag groups.
- These VSLA-ag groups also have established 13 Zalo farmers' groups (around 500 members) for information sharing and learning among farmers and technical staff from the Taskforce, FUs and district DARD. This was considered as a new interactive platform for networking farmers as well as knowledge generation and dissemination. See Activity 1.5 for more information on learning and sharing via farmers' Zalo groups.

[3] Project funded by CCAFS for scaling climate services in Viet Nam. Implemented by ICRAF in Ha Tinh (2019–2021). In collaboration with CIAT and CARE.

2.2.1.3 Activity 1.3. Field implementation

EbA/CSA implementation involved three main groups of activities: 1) piloting the five selected EbA/CSA interventions; 2) integrating and scaling out EbA/CSA interventions through implementation of the Ha Tinh FU Homegarden Improvement programme in Huong Son, Can Loc, Ky Anh, and Huong Khe districts; and 3) ACIS.

Key results of five piloted EbA/CSA interventions

The calculated change in the number of livelihoods' sources from 2019 to 2021 shows that about 18% of the core and collaborative households — 9% each — were provided with at least two new sources of livelihood. This was about 95% of the Project target. The corresponding change for the control group was only 2%.

Table 6. Change in the number of on-farm and off-farm livelihood sources from 2019 to 2021 among the intervention groups

Change in the number of livelihood sources	Core (N=88)	Collaborative (N=160)	Control (N=82)
Increase by one	22%	15%	16%
Increase by two	6%	7%	1%
Increase by three	3%	2%	1%
No change	27%	34%	43%
Decrease by one	25%	28%	28%
Decrease by two	14%	11%	7%
Decrease by three	3%	4%	4%

The annual crop was the primary income source for the respondents followed by animal husbandry (Table 6). The proportion of smallholders with income from annual crops and animal husbandry remained more or less the same over the three years.

The proportion of respondents with income from other livelihoods' sources decreased, except apiculture for the core and collaborative groups.

The proportion of respondents with income sources from apiculture increased by the endline survey, more so for the core group, which increased from 28 to 34%, whereas the proportion of respondents who earned income from apiculture decreased from 9 to 5% for the control group.

The proportion of respondents with income sources from perennial crops, which included fruit from homegardens where the Project provided much of the support, was lower relative to the baseline. This may be due to the gestation period between planting and harvesting and the impact of such investment may not manifest in a short period. Similar trends can be seen in aquaculture where the Project provided support to direct beneficiaries.

Table 7. Households' sources of livelihoods in the years 2019–2022 by intervention group

Intervention group	Year	Annual crop	Perennial crop	Timber	Animal husbandry	Apiculture	Aquaculture	Off-farm income
Core (N=88)	2019	91	42	9	95	28	23	52
	2021	90	31	6	88	34	11	61
	2022	94	33	3	90	34	10	-
Collaborative (N=160)	2019	95	53	6	96	14	13	61
	2021	96	44	6	88	16	4	58
	2022	95	45	4	89	16	5	-
Control (N=82)	2019	96	50	1	100	9	11	68
	2021	98	43	1	95	5	4	59
	2022	94	40	1	96	5	2	-

Note: Unit = % of respondents

Table 8 summarizes the interventions and non-interventions associated with the extreme weather events that the farming systems had been coping with during 2020–2022.

The key results of the five piloted EbA/CSA interventions towards the three pillars of CSA are summarized in Table 9.

More information on adaptation to climate variability and avoided L&D via the interventions can be seen in the endline report and the case study on L&D (Work Package 3).

Table 8. Examples of farming systems with and without measures to reduce loss and damage 2020–2022

	Farming system	Cold spell	Drought	Heatwave	Tropical storm/ whirlwinds_	Heavy rain, flood	Pests, epi-/pandemic	Comment
Interventions	Fruit-tree-based with drip irrigation and grass cover Home gardens	●●	●	●●	●●	●	●●	Difficulties reaching markets; new approaches to local markets
	Apiculture	●	●	●	●(●)	●		
	Onion with mulch	●	●	●●		●●	●	
	Aquaculture	●		●●		●		
	Agroclimatic information	●	●	●	●	●●		Following weather forecasts and planning for different weather scenarios increased responsiveness
	Village savings and loans associations		●	●	●●			
Non-interventions	Rice	●	●●		●●	●●	●●	
	Cattle	●				●	●	Lumpy Skin Disease following 2020 floods led to mass culling
	Un-managed well homegarden or monoculture of crop/fruit	●●	●●	●●	●●	●●	●●	
	Maize		●		●	●●	●●	

Note
● Climatic (disaster) impact, more efficient responses still needed
● Climatic (disaster) impact with measures to prevent/reduce L&D

Source: Farmers' focus group discussions 2022 and case study on L&D.

Table 9. Key results of the five main EbA/CSA interventions

Intervention	Number of adopters (households) by June 2022	Observed benefits by participating farmers		
		Food security	Adaptation	Mitigation and ecosystem services
Apiculture ▪ Start: December 2020 ▪ Target number of adopters: 36 households ▪ Total adopters: 36 HHs by December 2020 ▪ Pilot location: Son Tien and Son Hong communes (Huong Son District), Dong Loc Commune (Can Loc District) ▪ In-kind support from the Project: 360 beehives (10 beehives/HH, 3 bee frames) and 12 honeybee extractors (1 extractor/3 HHs) ▪ Farmers' investment: labour, supplemental feed for bees, equipment for tending bees (e.g. bee suits, trough for bee feeding, smokers, knives, buckets and bottles for honey storage, additional bee frames, stainless steel wire)	55	▪ Diversified products: honey is an additional product and income source for implementing HHs ▪ Increased honey yield: project HHs gained 6–8 litres/beehive which is 1.5 times higher than that of traditional beehive (using log bar) ▪ Increased income: on average, income generated from apiculture of participating HHs increased about USD 1000 per year ▪ Income of 22/36 core HHs (in USD): – In 2019: 8084 – In 2021: 8286 – In 2022: 7791 ▪ Improved honey quality: farmers learned new knowledge and followed technical guidance from extension staff on management and harvesting of honey ▪ Increased resource-use efficiency (tree-crop ecosystem for bees) ▪ Increased productivity of fruit trees (increased pollination) ▪ Created additional jobs for HHs. Apiculture is not labour-intensive and maintenance could be done outside peak working hours	▪ Climate-suitable honeybee: species native to the area. Bees grew and developed well through hot spells (up to 60 days), cold spells/frost (up to 20 days) and storms/floods during 2021–2022. ▪ Reduced bee deaths and escapes (due to hot and cold spells and storms) by 90% compared without application of apicultural techniques trained by the Project. The technical guidance to shift from wild bees to honeybees with improved hives, correct stocking, feeding and hive maintenance (ventilation, coverage, cleaning) reduced deaths and escape rates. ▪ Increased microclimate regulation: trees provide shade for bees to cope with hot and cold spells. ▪ Risk diversification: spread harvesting time of products (honey can be harvested during March–July) and applied increased technical skills to the management of bees	▪ Maintained biodiversity of forest ecosystem (reduced wild bee extraction from forests and forest fire risk) ▪ Reduced use of chemical fertilizers and pesticides. Apiculture was used as a strategy to promote biological measures because bees are sensitive to pesticides ▪ Increased field biota: reduced impacts on natural predators and pollinators as a result of reduced chemical pesticides and improved soil organic matter (compost, bio-fertilizer, mulching, soil erosion control)

Intervention	Number of adopters (households) by June 2022	Observed benefits by participating farmers		
		Food security	Adaptation	Mitigation and ecosystem services
Homegarden (fruit tree-based agroforestry) ▪ Start: December 2020 ▪ Target number of adopters: 14 HHs ▪ Total adopters: 14 HHs in December 2020 ▪ Area: 16 ha ▪ Pilot location: Son Tien and Son Hong communes (Huong Son District), Dong Loc Commune (Can Loc District). ▪ Scale out to 2311 households in Huong Son, Can Loc, Huong Khe and Ky Anh districts during 2021–2022 (through Homegarden Improvement programme with FU). ▪ Scale out to Vu Quang District in 2022: 40 households (through Extension Center) ▪ In-kind support from the Project: seedlings such as pineapple and pinto peanut (Arachis pintoi), fertilizer, bio-pesticides.	2381 HHs (including those participating in the Homegarden programme, supported directly by the Project in collaboration with FU, mentioned in Activity 1.3.2)	▪ Diversified products and incomes: additional income sources from pineapple, more diversified fruit tree products (pomelo, orange, guava, jackfruit, etc), crops (Arachis pintoi, turmeric, ginger, lemongrass, sweet potato, etc) ▪ Average income from fruit trees of 12/14 core HHs: USD 2500 – Income of 12/14 core HHs (in USD): ○ In 2019: 10,086 ○ In 2021: 12,910 ○ In 2022: 11,647 ▪ Increased product quality: organic-oriented production using bio-fertilizer and pesticides ▪ Increased resource-use efficiency: compost (manure and crop residue) to crops, crop residue for mulching fruit trees ▪ Increased income in Year 4 (for newly established farming system) ▪ Reduced chemical fertilizers and pesticides by 30–50% compared to before project (organic-oriented production, netting, biological traps, and recycled bags as well as pruning trees appropriately to prevent pests and diseases in fruit trees. Updated weather forecasts helped farmers avoid spraying pesticides in unfavourable conditions	▪ Increased microclimate regulation: shade trees. Multifunctional trees provided shade and windbreaks (for example, mango and jackfruit trees) ▪ Reduced direct soil evaporation: trees, mulching, composting, canopies to shelter crops and beehives against rain, wind or sunshine ▪ Reduced soil erosion: cover crops (Arachis pintoi, grass, annual crops) and the pruned plant residues cover soil beds to prevent soil from being washed away ▪ Increased water-use efficiency ▪ Risk diversification: spread harvesting time of products and apply technical skills to the management of trees and crops ▪ Reduced losses due to extreme weather events	▪ Reduced soil erosion ▪ Increased recycled crop residue (used pruned plant residues, crop residues for composting and covering soil) ▪ Reduced chemical fertilizer and pesticides by 30–50% compared to before project (applied organic-oriented production and used netting, biological traps, and recycled bags as well as pruning trees appropriately to prevent pests and diseases in fruit trees. Updated weather forecasts help farmers avoid spraying pesticides in unfavourable conditions (e.g., rainy, too hot), and saved production costs ▪ Increased tree cover, aboveground biomass, field biota ▪ Improved soil-nutrient levels (applied bio-fertilizer, compost, soil erosion reduction methods, leguminous cover crops)

Intervention	Number of adopters (households) by June 2022	Observed benefits by participating farmers		
		Food security	Adaptation	Mitigation and ecosystem services
▪ Farmers' investment: labour, existing fruit trees, new tree seedlings if needed, compost, fertilizer and bio-pesticides, equipment for management of farming practices		(e.g., rainy, too hot), and saved production costs ▪ Reduced production and economic losses: after the homegarden interventions (in Ky Anh, Huong Son and Huong Khe) with diversification of trees, focus groups reported reductions in production and economic losses (note that smaller impact may be attributed to differences in exposure as well as adaptation measures), from 50% (worth VND 50 million) to 30% loss		▪ Connects diverse landscapes with trees and agroforestry
Local onion and mung bean rotation, associated with OCOP chains ▪ Start: August 2020 ▪ Target number of adopters: 147 HHs ▪ Total adopters: 147 HHs in August 2020 ▪ Area: 7.3 ha ▪ Pilot location: Vuong Loc Commune, Dong Loc District ▪ In-kind support from the Project: seeds, fertilizer, bio-pesticides ▪ Farmers' investment: labour, mulching materials, compost,	147 HHs	▪ Increased income from change to higher value crop: income from onion and bean was about USD 3500/ha/year which is 4–5 times higher than rice (before project) ▪ Income of 28/147 core HHs (in USD): – In 2019: 4618 – In 2021: 2912 – In 2022: 2399 ▪ Reduced crop losses due to extreme weather events by 10–30% compared to that of onion cultivated before project. ▪ Increased land-use efficiency (rotation) ▪ Improved product quality (safe production): organic-oriented production ▪ Evenly distributed labour (onion can be harvested and stored in the field for several months)	▪ Risk diversification: enabled extending harvest time of products ▪ Drought tolerant: mulch reduces direct soil evaporation and retains soil moisture for the subsequent crop. ▪ Flood adaptation: raised beds reduce risks associated with saturated soils after heavy rain and flooding ▪ Windproof: short/low-lying crops are resistant to strong winds ▪ Onion is pest repellent: reduced pest and disease problems during abrupt weather changes	▪ Using crop residues: straw mulch reduced straw burning and made plastic mulch redundant ▪ Soil improvement: organic mulch and compost build up soil organic matter, soil nutrients and biota. Some farmers already reported darker soils, indicative of higher organic content, which is beneficial to the soil's water-holding capacity during dry conditions ▪ Reduced use of chemical fertilizer and pesticide (used bio-fertilizer, compost, leguminous crop/beans and pest-

Intervention	Number of adopters (households) by June 2022	Observed benefits by participating farmers		
		Food security	Adaptation	Mitigation and ecosystem services
fertilizer		▪ Benefited both men and women		repellent crop/onion)
Giant river prawn and fish rotation with agroforestry ▪ Start: April 2021 ▪ Target number of adopters: 16 HHs ▪ Total adopters: 16 HHs in April 2021 ▪ Area: 2ha ▪ Pilot location: Vuong Loc Commune, Dong Loc District ▪ In-kind support from the Project: fingerlings (prawn and fish), feed (30%), probiotics if required (50%), oxygen fan, pH measurement tool (50%). ▪ Farmers' investment: labour, initial investment for setting up the pond system (pond clearance, embankment), probiotics (50%), feed (70%), pH measurement (50%), cost for agroforestry (seedlings, fertilizer, establishment labour) on pond banks	16 HHs	▪ Increased income: income from prawn and fish is about 14 times higher than rice (before intervention) ▪ Total income from prawn-fish/ha: VND 136,185,000 (USD 5,921). Of which, income from prawn/ha: VND 114,445,000 (USD 4975) ▪ Income of 11/16 core HHs (in USD): – In 2019: 11,360 – In 2021: 11,448 – In 2022: 17,768 ▪ Diversified income (fish, prawn)	▪ Risk diversification: spread harvesting time of products, good timing of implementation (harvest before flood risk period) ▪ Increased microclimate regulation: shade trees, windbreaks, dust and air-pollutant protection ▪ Can function as water-harvesting pond, if needed Barriers were successfully set up to prevent fish and prawns from escaping and liming was used to prevent disease. The fish yield (that is, the avoided loss) was estimated at 5–15 tonnes per hectare	▪ Increased tree cover and aboveground biomass ▪ Water-pollution control (phytoremediation ▪ Hedgerows, green fencing

Intervention	Number of adopters (households) by June 2022	Observed benefits by participating farmers		
		Food security	**Adaptation**	**Mitigation and ecosystem services**
Drought-tolerant grass (guinea grass) ▪ Start: November 2020, resown in February 2021 ▪ Target number of adopters: 31 HHs ▪ Total adopters: 31 HHs in November 2020 ▪ Area: 2.6 ha ▪ Pilot location: Son Tien Commune, Huong Son District ▪ In-kind support from the Project: seeds, fertilizer ▪ Farmers' investment: labour, compost	49 HHs	▪ Average yield: 140 tonnes/ha/year. ▪ Total revenue: about USD 2435/ ha/year, assuming VND 400/kg (USD 0.017/kg) of grass. ▪ Income of 15/31 core HHs (in USD): – In 2019: 5904 – In 2021: 5421 – In 2022: 5326 ▪ Reduced inputs of buying feed for livestock: 1 ha of grass can provide enough feed for 10 adult cattle per year, based on daily intake of 40 kg of fresh grass per head (14 tonnes per year). ▪ Increased quality feed for livestock ▪ Increased circular agriculture/resource use efficiency: grass provides feed for livestock and manure from livestock can be composted and applied to the grass ▪ Utilized bare land, poor or degraded soil and drought-prone areas because grass can be grown in wide range of soil types	Grass tolerated hot spells and drought very well (up to 60 days) in 2021 Grass still grew well under cold conditions in January 2022 More resistant to, and higher recovery capacity after, droughts, whirlwinds and storms than other crops (maize, cassava, rice): grass fell during a whirlwind in March 2021; no impact on growth or yield as farmers could simply cut the grass and let it regenerate Regulates soil moisture content (grass cover for 5–6 years continuously). Guinea is a perennial grass and if managed well can continuously cover the soil for a long time, contributing to regulation of soil moisture content	Less chemical fertilisers required than other crops and fruits No need for pesticides Maintains soil moisture (grass covers soil for 5–6 years continuously) Grass has well-developed roots, so it has good drought tolerance and reduces surface runoff and soil erosion

Note: HH = household

Source: Endline survey and focus group discussions 2022 and extension staff

Key results of EbA/CSA interventions through the Homegarden Improvement programme

The Project completed identification of households participating in the Project and types of fruit-tree seedlings based on farmers' preferences, enabling policies and consultations with local governmental staff and a national fruit-tree expert.

Numbers and types of fruit-tree seedlings are shown in Annex 1.3a. Pomelo, jackfruit, guava and litchi were the most preferred species followed by orange, mango, longan, sapote, custard apple and lime, with some requests for Gio jujube, coconut and persimmon.

Two training-of-trainers events (see training material and presentation) for 31 representatives from commune and district partners were organized in August and September 2021. The main content covered information on homegarden design and plot management for fruit trees towards organic production. In addition, two nursery visits were organized for representatives from local farms and technical partners to check the quality of seedlings against indicators of seedling quality before ICRAF signed contracts with seedling providers. See this link.

Implementation results

The interventions were implemented on 1) bare land; 2) unproductive and unmanaged homegardens; and 3) improved poorly managed homegardens.

During 2021–2022, the Project delivered 6289 packages of probiotics to 3149 households (Table 10) and provided 53,500 fruit tree seedlings to 2311 households (Annex 1.3a). The list of households that received in-kind material is available at this link.

Using the guidelines and technical manuals distributed by the Project, farmers made probiotics from readily available material (rice bran, syrup etc) for the compost. District and provincial technical staff trained by the Project instructed farmers in how to plant tree seedlings following technical guidance for organic-oriented fruit tree production and the standard design of fruit-tree-based agroforestry systems, both developed by the the Project team.

Table 10. In-kind support and number of households who received support from the Project

District	Probiotics	
	No. HHs receiving probiotics	No. of delivered probiotic packages
Can Loc	413	826
Huong Son	920	1840
Ky Anh	600	1200
Huong Khe	1216	2432
Total	**3149**	**6298**

Note: Out of 3149 households receiving probiotics, 2299 households received both fruit-tree seedlings and probiotics

Key results of fruit-tree-based agroforestry interventions associated with CSA indicators can be seen in Table 9.

To obtain the potential benefits of fruit-tree agroforestry at district level, the Project conducted an 'assessment of potential income and net emission benefits of fruit-tree agroforestry for homegardens in the four project districts'. This was carried out bearing in mind limitations in monitoring and evaluating benefits of long-term interventions (tree-based systems take longer to show clearer benefits).

Accordingly, ICRAF staff developed a tool[4] to estimate potential income[5] and net emission benefits of fruit-tree agroforestry models. Five different inputs for the tool as described in Figure 2. FU and Extension Center staff from different administrative levels and experts from the Vietnam National University of Agriculture and the Fruit and Vegetable Research Institute helped collect primary and secondary information for the inputs[6].

The tool features an annual crop and tree library that describes detailed components of the production costs and productivity of each of 17 annual crops[7] and 12 fruit trees[8]. The species were selected based on consultations with local partners — mainly FU and extension staff — to identify annual crop and tree species considered to have the potential to expand throughout the province[9]. The information on production cost and productivity of each species in the annual crop and tree library is differentiated between 'business-as-usual' and semi-organic practices. The former refers to the current plot management practices by farmers in the province that are generally chemical-input intensive while the latter refers to improved practices that reduce chemical inputs and add more organic inputs, such as compost and manure. In addition, the semi-organic practices prioritize the use of bio-pesticides.

The tool calculates net emission as a balance between carbon sequestration (or GHG removal potential)[10] and GHG emissions from plot management practices. The latter is estimated using emission factors of fertilizer and herbicide application obtained from the literature[11].

[4] Using Microsoft Excel

[5] Refers to net income

[6] Primary data collection relates to the 3rd input (i.e. branch measurement), in which local partners measured stem diameters of different tree species by age.

[7] Corn (Vietnamese: ngô ta gia súc, scientific: *Zea mays*), glutinous corn (ngô nếp, *Zea mays* var. ceratina), peanut (lạc, *Arachis hypogaea*), mung bean (đậu xanh, *Vigna radiata*), sweet potato (khoai lang, *Ipomoea batatas*), onion (hành tăm, *Allium cepa*), green bean (đậu cove, *Phaseolus vulgaris*), cucumber 1 (dưa chuột 1, *Cucumis sativus*), cucumber 2 (dưa chuột 2, *Cucumis sativus*), lettuce (xà lách, *Lactuca sativa*), mustard leaf (rau cải ngọt, *Brassica juncea*), cabbage (bắp cải, *Brassica oleracea*), tomato (cà chua, *Solanum lycopersicum*), pineapple (cây dứa, *Ananas comosus*), lemongrass (cây sả, *Cymbopogon*), turmeric (nghệ, *Curcuma longa*) and ginger (gừng, *Zingiber officinale*)

[8] Citrus (Vietnamese: cam chanh, scientific: *Citrus*), Bu orange (cam Bù, *Citrus X sinensis*), Phuc Trac pomelo (bưởi Phúc Trạch, *Citrus maxima*), mango (xoài, *Mangifera indica*), guava (ổi, *Psidium guajava*), Thai jackfruit (mít Thái, *Artocarpus heterophyllus*), Da Xanh pomelo (bưởi da xanh, *Citrus maxima*), longan (nhãn, *Dimocarpus longan*), lime (chanh, *Citrus × aurantiifolia*), persimmon (hồng, *Diospyros kaki*), lychee (vải, *Litchi chinensis*), sapote (hồng xiêm, *Pouteria sapota*)

[9] The local partners selected the species based on their observations and experience in relation to land and climate condition, market potential, farmers' willingness to cultivate the species etc.

[10] Terrestrial biomass was estimated using the observed stem diameters by tree age (see also Footnote 1), species' wood density obtained from ICRAF (http://db.worldagroforestry.org/wd) and the generic Kettering's allometric equation (Kettering QM, Coe R, Van NM, Ambagau Y, Palm C. 2001. Reducing uncertainly in the use of allometric biomass equation for predicting above ground tree biomass in mixed secondary forest. *Forest Ecology and Management* 146:199–209.

[11] To include emission factors from IPCC e.g. IPCC. 2006. *Guidance for agriculture, forestry and other land use*. Chapter 11. Geneva, Switzerland: Intergovernmental Panel on Climate Change. https://www.ipcc-nggip.iges.or.jp/public/2006gl/vol4.html.

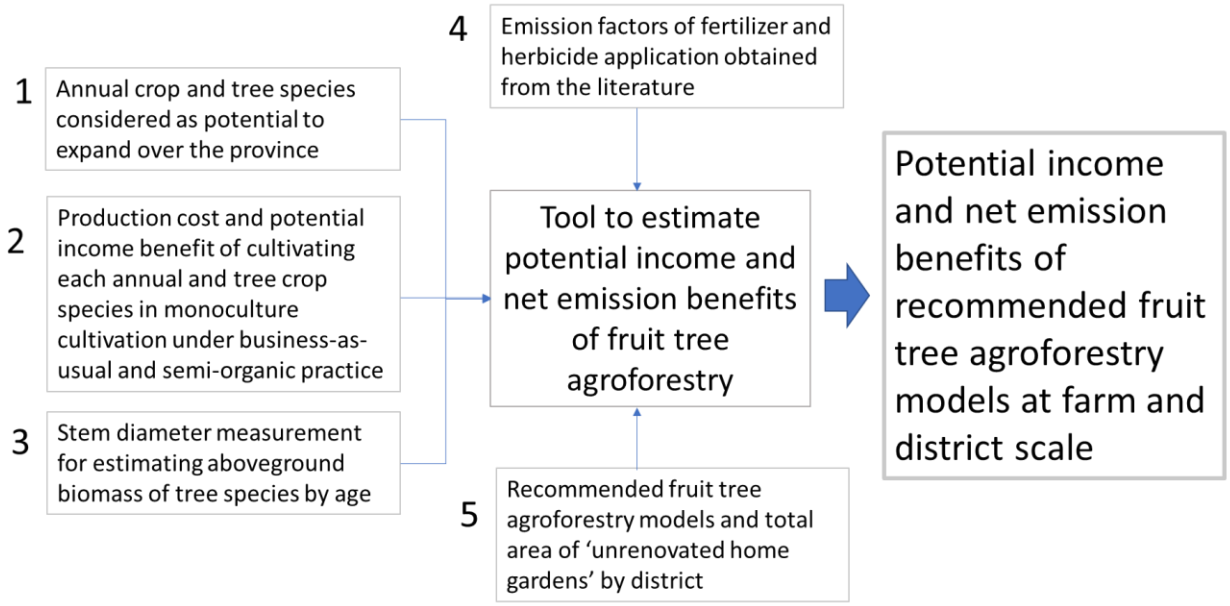


Figure 2. Five different inputs for estimating income and net emission benefits of fruit-tree agroforestry models using the tool

To estimate potential income and net emission benefits from expansion of fruit-tree agroforestry models in 'unrenovated' homegardens[12] in the Project's four districts, a workshop was held on 7 April 2020 to introduce the tool and work together with local partners from the Project's districts to identify fruit-tree agroforestry models[13] that were suitable to expand throughout the homegarden areas.

The local partners identified seven different models that could be assessed using the tool at farm (Table 11) or district (Table 12) scales.

All seven models apply semi-organic practices both for annual crop and tree species and the assessment was for a time context of 10-year cultivation.

The total area of unrenovated homegardens in the four project districts range from 105 ha in Can Loc to 10,178 ha in Huong Khe[14].

[12] From the local partners, we obtained information of total homegarden areas in each district and total areas of 'renovated' homegardens (i.e. renovated thanks to associated local policy implementation).
[13] Each model should integrate maximum five different annual-crop and five different fruit-tree species.
[14] 1807 ha in Huong Son and 1625 in Ky Anh districts

Table 12 describes the potential income and net emission benefits from expansion of the seven fruit-tree agroforestry models using the smallest and largest areas of unrenovated homegardens.

It is worth noting that the estimation using the tool ignores possible above- and belowground resource interaction among the various crop components. Assessment of resource interaction in agroforestry systems needs a separate tool beyond the scope of the Project.

Table 11. Potential income and net emission benefits of seven fruit-tree agroforestry models at farm scale

	Crop components		Estimation at farm scale (1 ha)			
Model	**Fruit-tree species**	**Annual crop species**	**Total production cost for 10 years (VND million)**	**Total net income for 10 years (VND million)**	**Sequestered carbon at Year 10 (tonne CO_2e)**	**Cumulative emissions for 10 years (tonne CO_2e)**
1	Thai jackfruit	Mung bean, green bean, cucumber var. 1	682	2129	30	7
2	Da xanh pomelo	Mustard leaf, lemongrass, ginger	970	3453	31	10
3	Sapote	Mustard leaf, tomato, ginger	410	2170	10	4
4	Phuc Trạch pomelo	Corn, glutinous corn, onion, turmeric, ginger	1052	2729	42	11
5	Da xanh pomelo	Corn, glutinous corn, onion, turmeric, ginger	971	3240	31	10
6	Thai jackfruit	Corn, glutinous corn, onion, turmeric, ginger	731	2041	22	5
7	Citrus, Bu orange	Lemongrass	1155	3369	30	14

Note: Exchange rate: USD 1 = VND 23,200

Table 12. **Potential income and net emission benefits of seven fruit-tree agroforestry models at district scale**

	Estimation at district scale			
Model	**Total production cost for 10 years (VND billion)**	**Total net income for 10 years (VND billion)**	**Sequestered carbon at Year 10 (tonne CO2e)**	**Cumulative emissions for 10 years (tonne CO2e)**
If the total area of unrenovated homegardens in the district is 105 ha				
1	71	223	3,138	742
2	101	362	3,221	1014
3	43	227	1011	422
4	110	286	4397	1187
5	101	340	3221	1097
6	76	214	2298	563
7	121	353	3198	1444
If the total area of unrenovated homegardens in the district is 10,178 ha				
1	6940	21,670	304,174	71,958
2	9869	35,141	312,226	98,319
3	4174	22,085	98,029	40,916
4	10,708	27,780	426,226	115,011
5	9885	32,979	312,226	106,360
6	7439	20,769	222,736	54,554
7	11,759	34,287	309,959	139,948

Agro-climatic information Services (ACIS)

- Between December 2020 and June 2022, the Project organized 28 PSP workshops to co-develop seasonal forecast-based agro-advisories in four districts: Can Loc and Huong Son (pilot districts) and Ky Anh and Huong Khe (scaling districts).
- As of June 2022, 285 10-day weather forecasts had been developed and disseminated plus 35 seasonal forecasts and 35 different agro-advisory posters in the four districts (one quarterly agro-advisory per district, except for Ky Anh with two, one for uplands and one for coastal zones). The agro-advisory posters were printed in 3032 copies and posted on information boards and in public areas of 83 communes in the four districts. Soft-copies (PDF) of agro-advisory posters and weather forecast information were disseminated online via multiple channels. such as the FU website, 13 farmers' and Ha Tinh FU Zalo groups, several Facebook pages of FUs, FU meetings and through FU and/or extension staff in 83 communes in the four districts.
- Benefits of ACIS: Forecasting information was used by the district agricultural office for agricultural planning and advice. Core farmers benefited the most from weather forecasts and agro-advisory even the percentage was not significant difference from other two groups. More than 75 percent of these farmers reduced yield loss. Similarly, more than 63 percent reporting the increase in farm productivity and the quality of agricultural produce. The reduction of chemical inputs and labour of these households were reported by about 50 and 30 percent of these farmers, respectively. Ha Tinh Hydrometrological Center adjusted forecast indicators and terminologies to meet farmers' needs based on farmers' feedback during PSP workshops and through Zalo groups. For example, instead of only sharing average temperature and rainfall, Center staff also shared maximum and minimum temperatures and rainfall. The key terms such as probability, scenario, maximum temperature and minimum temperature were simplified with participants through PSP workshops.

2.2.1.4 Activity 1.4: Capacity building

- Ha Tinh Extension Center, FU and ICRAF held 71 training events, including technical courses, photovoice and an introduction to EbA/CSA/ACIS for 2731 people (benefitting 50% women and men equally) (training and evaluation reports are available via this link).
- Five field visits for core farmers, VSLA-ag groups' members and agricultural staff were held.
- One-day field trip for 30 farmers to learn more about how to process and market honey products and undertake VietGAP orange production in Huong Son and Vu Quang districts (A review of the trip is available via this link).
- One-day field trip for 100 VSLA-ag farmers in May 2022.
- Three field trips for 36 farmers, district, and provincial partners to ICRAF's agroforestry interventions in Son La and other provinces to encourage an understanding of the benefits of landscape-level agroforestry that would also be appropriate in Ha Tinh. (link)

2.2.1.5 Activity 1.5: Project documentation, dissemination and scaling

Project documentation

The Project produced eight technical videos, one portfolio of five practices, 11 technical/extension publications, two policy briefs, four newsletters, two informational brochures and a considerable number of other communication material (news articles, webstories, documentary videos).

Publications until June 2022 are available via this link. Key outputs include the following.

- CSA portfolio (link)
- Standard designs for fruit-tree-based agroforestry on flat and sloping land (technical guide) (link)

- Technical manuals on management of CSA practices ('tam' onion, honeybee, giant river prawn, orange)
- Baseline video and endline video
- Communication videos on the progress of implemented CSA practices and the Project in general (link)

Information dissemination

Information about the work of the Project was disseminated through multiple communication channels, such as 13 farmers' and FU Zalo groups (500 members), the Facebook pages of commune and district FUs (about 1500 followers), the websites of the Ha Tinh Extension Center and FU, TV, emails, and printed posters displayed in public areas, on commune information boards and at meetings of FUs from village through to provincial level. Communication and dissemination through multiple channels undoubtedly increased the Project's visibility, with 90,000 clicks/views/downloads of online material and 40,000 people accessing project material.

The Project also contributed to improvements to the websites of Ha Tinh Extension Center and Ha Tinh FU to increase capacity for use in mobile versions, adding content on EbA/CSA/ACIS, a feedback mechanism and other technical upgrades.

Scaling and sharing events

MARKETING EBA/CSA PRODUCTS (ADJUSTED FROM CSA EVENT ACTIVITIES)

Since September 2021, EbA/CSA events were integrated into Ha Tinh FU activities on Supporting Farmers to Connect With and Sell Agricultural Products to Buyers in Ha Tinh and Other Provinces in the Context of COVID-19.

- *Background*: When working with farmers, the Project and Ha Tinh FU assessed that these households either could not sell their products or had to sell them at very low prices (50% lower than previous years), especially during the main harvesting season when the supply of fresh produce was high.
- *Activities*: In response and in collaboration with Ha Tinh FU, who organized a market fair, the Project displayed EbA/CSA products, distributed flyers to promote agricultural products and posted news on social media. Ha Tinh FU also sent flyers and letters to facilitate engagement from agricultural stores and organisations in a call to sell EbA/CSA products, conducted field visits for buyers, and guided product harvesting and packaging following the requirements of, for example, buyers with help from farmers (A news story from the event is available via this link).
- *Results*: Between September and December 2021, the Project supported 909 households in selling 527.50 tonnes of EbA/CSA products (mainly pomelo and orange) to 16 agricultural stores, 70 organizations (e.g., cooperatives, governmental departments, banks, universities) and 1200 direct individuals (e.g., direct consumers and traders) through several market value-chain promotional activities. The average selling price through the supported activities was at least 30% higher than without project support. For example, the average selling prices of orange and pomelo with project support were USD 0.95/kg and USD 1.05/kg, respectively. Meanwhile, the average selling prices of orange and pomelo without project support was USD 0.43/kg and USD 0.65/kg, respectively (a list of households and the EbA/CSA products that were supported by market links by is available via this link).

ON-SITE SHARING EVENTS

- Four provincial sharing events (in November 2021) presented the Project interventions, experience and results to 320 farmers, commune and district staff (130 F/190 M) in Huong Son and Can Loc districts. The events updated farmers and Government staff on the

progress of the EbA/CSA interventions and generated ideas for scaling via local governmental plans (news on the events is available at this link).

- One closing workshop with 65 people, including national partners and partners from Ha Tinh and other provinces (Quang Binh and Dak Lak) and projects was organised in June 2022. The event shared project results and experience and discussed scaling opportunities with provincial and national stakeholders.

OFF-SITE SHARING EVENTS

- GIZ-SEARCA ASEAN Climate Leadership Programme 2021: Promoting Climate-Smart Land Use for Implementing Nationally Determined Contributions (September 2021). The Project staff from ICRAF were invited to share examples from Ha Tinh to over 20 participants in the region (Link for information on the training).
- ASEAN Climate Resilience Network technical event, NbS for Policy Makers, 4–6 October 2021, hosted by the ASEAN Secretariat. The Project staff from ICRAF shared examples and a case study from Ha Tinh. The training was conducted in two sessions of three hours over three consecutive days. (Link to the training programme). Title: Simelton E**,** Le TT. 2021**.** *Nature-based Solutions in agriculture and forestry. Case study for training session. Unlocking the Potential of Nature-based Solutions for Climate Action and Green Recovery.* ASEAN Climate Resilience Network.
- The Project staff from ICRAF shared about the Project as invited speakers at several regional and global events on agro-climate advisory services.
    - APEC/APCC Climate Service Workshop (November 2021). Title: Simelton E, McCampbell M**.** 2021. *What apps are up for farmers?* (see video clip at 6.45.00).
    - The GrowAsia Digital Learning Series (December 2021). Title: McCampbell M, Simelton E. 2021. Drones and integrated pest management. ASEAN fall army worm action plan.
    - Vietnam–UK Economic and Trade Forum, organized by the University of Economics (Viet Nam National University, Ha Noi) in collaboration with the Department of Climate Change (MONRE) and CIFOR-ICRAF: ICRAF shared a case study, Nature-based Solutions in Agriculture: Implications on Sustainable Development and Climate Resilience (link).
    - Second Consultation Workshop on the ASEAN Guidelines for Promoting CSA Practices Vol. 3 and Implementation Framework, hosted by Malaysian Agricultural Research and Development Institute. ICRAF provided comments for development of the guidelines. An article, material and a recording of the workshop are available (link).

Integration of project results and approaches into governmental programmes/plans/policies

The Project contributed or integrated EbA/CSA into five main governmental programmes and projects.

1) Homegarden Improvement programme of Ha Tinh FU (01/BKKTĐ- HNDT), which is contributing to the Provincial New Rural Development Programme. As a result of aligning interventions with Government programmes, CSA, agroforestry and EbA are now included in the Homegarden programme and Ha Tinh FU annual plan (01-/BKKTĐ-HNDT) for 2022. Through the plan, FU will support 17,990 households and 229 farmers' groups/cooperatives with technical guidance, labour contribution, access to micro-credit funds, and in-kind support of seedlings and agricultural inputs, if available. (link)
2) Digital Transformation Programme in Agriculture in Ha Tinh Province: The Project contributed six trainings events on digital agriculture for 240 farmers and representatives of extension centres. With this, the provincial Digital Transformation Programme will continue

supporting farmers to improve their capacity to apply ICT in marketing and sales of agricultural products (e.g. using provincial websites www.buoiphuctrach.gov.vn and www.camhatinh.gov.vn).

3) Ha Tinh FU resolution (1-NQ/HNDT) on agricultural and household waste treatment for composting. The Project aligned with this resolution and supported 3149 households with probiotics and technical material to implement composting methods using crop residues, household waste and livestock manure. Ha Tinh FU will continue to implement this resolution and aims to support over 191,000 households by 2023 to implement composting. (link)
4) Supporting farmers in marketing 'safe' agricultural products under COVID-19 impacts (Ha Tinh FU initiative): given the successful experience during the Project, FU will continue to support farmers selling 600 tonnes of 'safe' agricultural products through improving their market links with the larger private sector, agricultural stores and consumers, using digital tools in marketing agricultural products and working more closely with the provincial post office (www.postmart.vn).
5) Government project, Planting One Billion Trees 2021–2025. As recognized by the provincial Taskforce, the Project planted more than 53,500 tree seedlings in the homegardens of farmers through the Homegarden Improvement programme with Ha Tinh FU.

Exit strategy

The Project delivered on all four exit strategies for ensuring continued action and scaling after the termination of the Project.

- **Strategy 1:** Aligning interventions with government programs/projects and/or contributing to policies. CSA/agroforestry and EbA are included in the Homegarden Program and Ha Tinh FU's action/annual plan (01-/BKKTĐ-HNDT) for 2022 (link). CSA technology (composting) will be maintained through Ha Tinh FU resolution (Resolution No.1-NQ/HNDT) on agricultural and household waste treatment for composting (link).
- **Strategy 2**: Supporting project partners to mobilise new resources. Through the 2022 plan, FU will support 17,990 households and 229 farmers' groups/cooperatives with technical guidance, labour contribution, access to micro-credit fund, and in-kind support of seedlings and agricultural inputs, if available. Additionally, local partners have submitted five proposals (valued at USD 257,500) to provincial, national and international funds (see Work Package 4).
- **Strategy 3:** Ensure capacity to maintain farmers' interest groups (VSLA-ag groups managed by Ha Tinh FU) and social media networks. At the end of the Project, 32 VSLA-ag groups had been established with group saving scheme for implementation of CSA.
- **Strategy 4**: documenting the EbA/ CSA interventions and preparing relevant capacity building/ awareness raising materials. Data related to EbA/CSA interventions were collected, analyzed and prepared into portfolio of CSA practices. Technical guidelines and video clips guiding various steps in establishment, tending and maintenance of EbA/CSA interventions were prepared. All documents and video are accessible to the public.

2.2.2 SUMMARY

In general, the Project accomplished all outputs of Work Package 1, particularly, tripling the number of direct beneficiaries despite social lockdown owing to the COVID-19 pandemic. Five EbA/CSA interventions were implemented in five districts (two pilot districts: Huong Son, Can Loc: three scaling districts Ky Anh, Huong Khe and Vu Quang). A total of 3602 households (7070 female and 7062 male) in five districts implemented the five EbA/CSA practices during 2021–2022.

The EbA/CSA interventions contributed to improvement of local livelihoods. The average income from onion–bean rotation was USD 3500 per ha per year (4–5 times higher than what a farmer would have received from rice farming on the same land before the Project). Drought-tolerant grass provided sustainable feed for livestock and helped reduce inputs, such as buying feed, because 1 ha of grass provided enough feed for 10 adult cattle per year. The average income from apiculture increased USD 1000 per year after following implementation, with the most successful beekeeper earning USD 1700. Average income from prawn and fish in aquaculture system was USD 5921 per ha, which is about 14 times higher than rice (before the Project).

All interventions showed improvements in adaptation to several weather extremes (for example, droughts, hot spells, cold spells, heavy rain, whirlwinds, storms, floods) compared with before the Project. The homegarden included tree–crop–vegetable farming systems and tree-based agroforestry systems introducing circular practices, such as management of household waste and crop residues for composting, helping to reduce production and economic losses (by around 20% as reported by farmers) owing to extreme weather events.

Social distancing caused some challenges for project implementation. Firstly, project staff could not travel frequently to the sites to monitor the interventions. Therefore, strengthening relationships with local partners (commune and district) and farmers was important to mobilise local human resources for implementation, e.g. assessing the progress of the implementing farmers and conducting household surveys for identifying the needs of farmers.

It was also essential to improve capacity in plot management and PAP for farmers and local partners from commune through to provincial levels, especially in the context of COVID-19 impacts. As travel restrictions were enforced between provinces and between communes, the more knowledge and skills in field implementation held by local partners, the better they were able to support the work on the ground.

Frequent updates, communication and sharing among project partners at both local and national levels was important so that project results could inform, and be integrated into, higher-level initiatives, programmes and policies.

Social networks played an important role in the Project because they served as interactive online learning and sharing platforms for farmers, agricultural technical/extension staff, FUs, Met Center officers and others. The Project team developed training material in digital formats and pre-recorded technical videos to help to avoid further delays in implementation of training and to reach farmers and partners directly through social networks, e.g. Zalo groups and Facebook pages.

Second, less familiar technologies or generally more complex technologies may more slowly spread farmer-to-farmer because information sharing becomes more complex and farmers may not be sufficiently comfortable with new technologies.

Third, lack of financial resources, labour and land limitations were the main issues for implementing EbA/CSA interventions. This could explain the lower rate of scaling of aquaculture rotation with giant freshwater prawn and fish even though the rate of return on investment was highest among the five implemented interventions.

Monitoring and evaluating impacts of EbA/CSA interventions takes time to see changes. It was challenging to capture all the benefits of the interventions in a short-term project.

2.3 Work Package 2: Advise, capacitate and provide technical support for the process of the National Adaptation Plan

Activity 2.1: Conduct desk reviews, workshops, meetings and interviews to explore current status, needs and gaps of NAP process in the province

Activity 2.2: Provide training on NAP process based on the needs of provincial stakeholders

Activity 2.3: Integrate experiences from EbA/CSA implementation into the NAP process at provincial level

Activity 2.4: Process learning experiences on EbA measures in Ha Tinh to inform the NAP process at national level

Changes in WP2: Developing knowledge and skills on climate-change adaptation and mitigation planning for provincial stakeholders

Activity 2.1: Conducting a stakeholder analysis for Ha Tinh's provincial action plan to implement the Paris Agreement

Activity 2.2: Conducting a capacity building needs assessment on climate change planning for provincial stakeholders in Ha Tinh Province

Activity 2.3: Provide a training workshop on climate-change policies and climate-change mitigation planning for stakeholders in Ha Tinh Province

Activity 2.4: Provide training on disasters and climate-change impacts and adaptation in agriculture sector for stakeholders in Ha Tinh Province

Activity 2.5: Provide training on assessment of loss and damage caused by natural disasters for stakeholders in Ha Tinh Province (benefits also WP3)

Activity 2.6: Provide training on climate-change proposal development for stakeholders in Ha Tinh province (benefits also WP4)

Activity 2.7: Develop a policy brief on engagement of stakeholders in climate-change planning in Ha Tinh Province

2.3.1 Introduction and background to the changes in Work Package 2

Between May and October 2020, various discussions were held among ICRAF, GIZ and DONRE. The final agreement was that updating the Province's Action Plan to Implement Paris Agreement (PAPPA) was the most appropriate support to DONRE within the Project's scope. Stakeholder mapping for PAPPA was developed.

In a VN-SIPA meeting, 16–17 November 2020, MONRE advised that the NAP was completed at national level and would not be conducted at provincial level in 2021. Following up this change, ICRAF, GIZ and the Taskforce proposed to reorient the focus of this work package to developing knowledge and skills on climate-change adaptation and mitigation planning for provincial stakeholders.

As agreed in the Taskforce meeting, ICRAF proposed activities that aligned with the framework of the Action Plan to implement the Paris Agreement in Ha Tinh Province (according to Decision 2914 / QD-UBND in 2017 of the PPC of Ha Tinh Province), focusing on *Task Group 3a: Preparing human resources, specifically Task 39.3: Training governmental officials and farmers to meet the needs of implementing the Paris*

Agreement and *Task 41.6: Disseminating information on climate change; and raising awareness of people and socio-political organisations on the implementation of the Paris Agreement in Ha Tinh Province*.

These were agreed by DONRE following its official letter dated 16 December 2020 (4412/STNMT-TNN&BĐ) supporting the change in Work Package 2 to "capacity development for local stakeholders on climate planning".

The revised activities under Work Package 2 were proposed by ICRAF and agreed by DONRE, Taskforce and GIZ at a Taskforce meeting held 23 March 2021.

2.3.2 Work Package 2: Results by activity

2.3.2.1 Activities 2.1, 2.2

In accordance with the above discussions, ICRAF agreed to provide a series of training workshops and exchange visits to enhance the capacity of provincial staff for climate-change planning. In preparation for this, an analysis of key stakeholders involved in climate action planning and the implementation process as well as a capacity-development needs assessment were implemented to tailor the capacity-development plan to key stakeholders. Ultimately, capacity development should contribute to the active and effective participation of provincial civil servants in policy dialogues on climate change at both provincial and national levels.

The analysis of key stakeholders involved in climate action planning and the implementation process was done together with a number of state agencies, including DONRE, Department of Planning and Investment (DPI), DARD, Department of Transport, and the Project Management Board on Investment in construction of civil and industrial works in Ha Tinh Province. The analysis showed that the process of developing and updating the climate response plan in Ha Tinh was mainly done by a consultancy company with technical inputs from DONRE and partly from DARD. Other Government departments and agencies only provided comments in consultation meetings. There was no participation of mass organizations, non-governmental organizations or the private sector. The lack of participation of different stakeholders in the planning process led to a low level of satisfaction with the content of the current climate response plan.

The training needs assessment focused on key stakeholders in the development and implementation of climate response planning in the province. An assessment framework with three main steps was developed: 1) identification of key contents for planning and implementation of climate response planning in the province; 2) assessment of (gaps in) current knowledge, skills and viewpoints of related stakeholders based on the key contents identified in Step 1; and 3) identification of the capacity-development needs of key stakeholders based on the gaps identified in Step 2 and their priorities, and recommendations for the capacity-development plan for concerned stakeholders.

A total of 25 respondents participated in the survey. The male/female ratio was close to balanced, with a total of 11 female respondents accounting for 44% of the total number of respondents. Most of the respondents (68%) were aged 30–40 with about 24% older (40–50) and only 8% under 30 years-old. None of the respondents was above 50 years-old. Most respondents were at the 'ideal' age for a professional career, with more than 10 years of working experience and more decades of service ahead. About 56% of respondents (14 people) were technical staff while 44% (11 people) held higher-ranked political positions in their respective institutions.

In general, respondents 'self-assessment of knowledge of climate change was in the middle (2.8) of a scale from 1 to 5. The highest knowledge scores were for general knowledge of GHG emission sources in agriculture, forestry and land use (AFOLU) (3.4 average score (AVG)) while the knowledge of technical tools/measures for estimating GHG emissions and sequestration was lowest (2.4 AVG). Compared to knowledge, the respondents self-rated their skills and experience generally lower (AVG for all fields was 2.7, compared to 2.8 for knowledge). The most-needed skills or practical experience (AVG <3) were: how to integrate ecosystem services in the planning process (2.3 AVG), data collection/measurement of GHG emissions (2.5 AVG); using modelling tools for developing climate, GHG emissions and climate-change adaptation scenarios (2.5 AVG); using participatory rural assessment methods (2.7 AVG); making economic analyses (including risk analyses) of production systems or value-chain analysis of agroforestry products (2.6 AVG); conducting L&D assessments of natural disasters (2.7 AVG); and developing project proposals (2.9 AVG). The highest-rated self-assessed skills/experience were integrating climate-change adaptation and mitigation in sector/field planning (3.1 AVG) and measures to ensure environmental and social safeguards in in climate-change adaptation and mitigation planning (3.1 AVG).

About 40% of the respondents said they can spend more than 30% of their working time on climate-change adaptation and mitigation planning and only one respondent less than 5% of their working time. This suggested a high level of commitment of respondents to the content of climate-change adaptation and mitigation planning; capacity-building activities in this field can be designed with a relative high frequency and flexible timing.

Based on our analysis of the respondents' capacities and priorities, the following training contents were be proposed: four basic contents in order of priority (where contents with similar priority were grouped together, or content with similar content can be combined into one training). For example, the part of the training related to disaster L&D assessment can be combined with training in ecosystem-based climate-change adaptation measures.

Table 13. Activities for capacity strengthening at Ha Tinh provincial level on climate change adaptation planning

No.	Training content	Time
1	Climate-change policies and analytical methods in climate-change mitigation and GHG emission inventory	Quarter 2/2021
2	Ecosystems, ecosystem services and ecosystem-based adaptation in AFOLU	Quarter 3/2021
3	L&D caused by natural disasters and climate change	Quarter 1/2022
4	Developing proposals on climate-change adaptation and mitigation	Quarter 1/2022

The results of the training needs assessment were synthesized in a report (link).

2.3.2.2 Activities 2.3, 2.4

Training in climate-change mitigation and GHG emission inventory

This first training course was held on 14 October 2021 in online mode. There were 21 key provincial stakeholders (11 F/10 M) who participated in the training, including representatives of DONRE, DARD, DOST, DOT, DPI, DOIT, Ha Tinh FU, Extension Center, Huong Son and Can Loc districts, and companies, such as Ha Tinh Civil & Industrial Construction PMU, Huong Son Hydropower, and Ha Tinh Rubber. The key objective of the training was to provide trainees with a basic understanding on how a GHG inventory is organized and implemented, key terms and requirements of the UNFCCC — specifically how an inventory is done for AFOLU — and how to identify and prioritize key mitigation measures using existing tools so that stakeholders would be able to understand the basic steps in GHG inventory and planning for mitigation measures and be able to analyse the way mitigation measures are developed.

The training contents are presented in Figure 3. In total 6 key lessons on GHGs Inventory and Mitigation Measures (informed by IPCC and UNFCCC training materials and software) were delivered during the training course. The training report, pre- and post-training evaluations, and technical material (including presentations, exercises/homework, reading material) are available at this link.

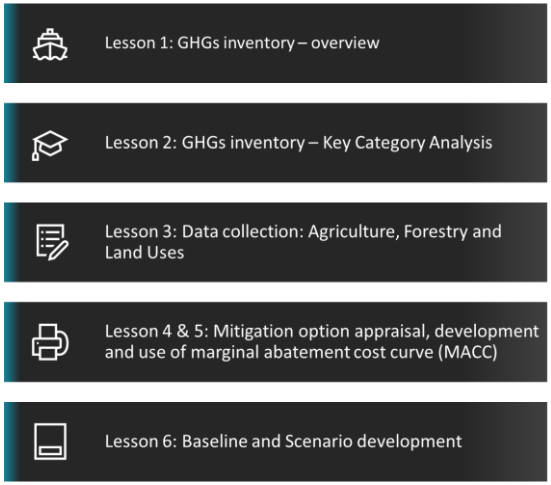


Figure 3. Contents of training in climate-change mitigation and GHG emission inventory

The training enhanced stakeholders' knowledge of GHG inventory and mitigation measures, areas that often receive less attention at subnational level. The average scores of pre- and post-tests were 3.4 and 4.0 out of 5, respectively. Participants evaluated that the course was good, met their expectations and was very practical in addition to addressing the urgent needs of the province. The training was well organized and provided useful and applicable knowledge. Feedback for improvement included 1) sometimes the internet link was poor; 2) the time

allotted for lessons was too short; 3) the course should be organized in offline mode to enhance efficiency; 4) participants need to spend more time preparing, researching and digesting the content because they don't have much experience in GHG inventory and mitigation assessments.

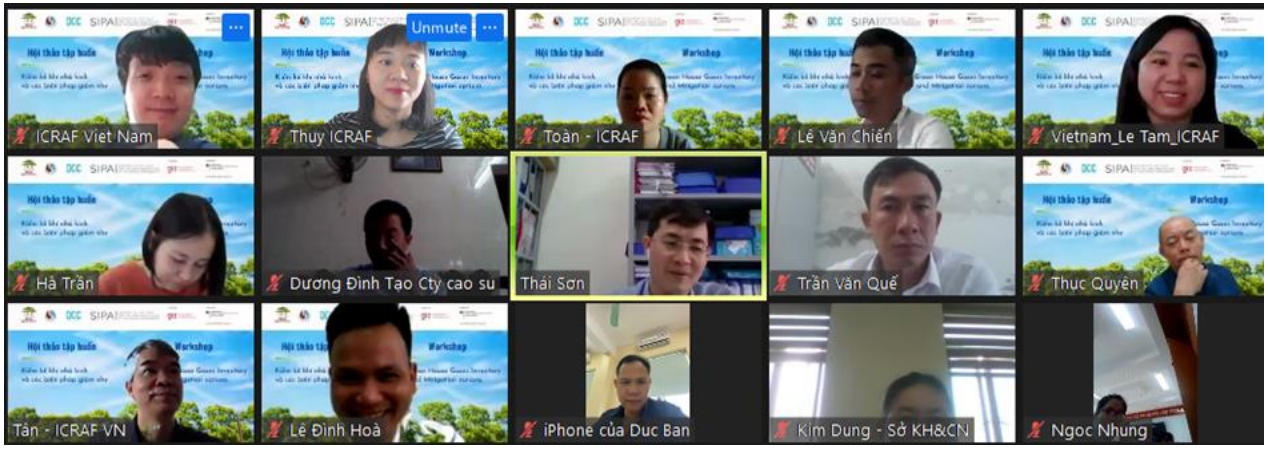


Figure 4. Screenshot of some of the participants

Training in disasters, climate-change impact and adaptation

This training course was also held online for 14 key provincial stakeholders (7 F/7 M) on 23 December 2021. Participants were a sub-set of the first training, including those from DONRE, DARD, FU, Extension Center, DOST and companies. The training aimed to 1) familiarize participants with terminologies and concepts related to natural disasters, climate change and climate-change adaptation; 2) enable participants to read and explain climate scenarios; 3) provide necessary knowledge and skills for participants to apply climate scenarios in their planning and analyse landscapes with a view to developing ecosystem-based adaptation measures.

Training contents included 1) review of natural disasters in Ha Tinh; 2) climate-change scenarios for Ha Tinh and their importance in natural disaster management; 3) climate-change policies and strategies; and 4) adaptation strategies of the agricultural sector. The training report, pre- and post-training evaluations and technical material (including presentations, exercises, reading material) are available via this link.

The participants evaluated that the course was good, met their expectations, was easy to understand and was very practical and applicable to their work. They will use the knowledge for proposal development, design and implementation of climate-change adaptation measures and integration of EbA/CSA into their programmes. The participants noted that the training was well organized and very interactive and the lecturers were very enthusiastic. Feedback for improvement was that face-to-face training would avoid participants being distracted by other work and provide more time to practise exercises. Knowledge gained after the training was validated by pre- and post-course testing: the average scores of the-tests were 8 and 9 out of 10, respectively. Four participants received 10/10 scores after the training while none received a 10/10 score in the pre-course test.

2.3.2.3 Activities 2.5, 2.6, 2.7

Training in L&D and on proposal development
These two training courses were held back-to-back on 7 April 2022. The training report, pre- and post-training evaluations and technical material (including presentations, exercises, reading material) are available via this link. and this link.

There were 20 provincial stakeholders (8 F/12 M) who attended the two training courses. These participants largely overlapped with the participants of the first two trainings courses. The two training courses aimed to 1) provide knowledge and skills on how the data on L&D were recorded and analysed to benefit the province's planning; and 2) knowledge and skills to develop successful climate-change proposals (with practice sessions).

The contents of the L&D training included 1) concept of natural disasters; 2) the key natural disasters that caused L&D in Ha Tinh Province; 3) the L&D due to natural disasters in Ha Tinh, including how to measure L&D in the agricultural sector; and 4) group discussion on disasters, L&D and how to measure L&D in the province.

The proposal-development training centred around 1) key steps in developing a proposal, including what one needed to know about proposal development; and 2) practice in developing an outline of a funding proposal on climate change.

Overall, the training courses were rated highly by participants, who noted that the training contents were well-matched with participants' learning needs; the use of practical proposals/projects; qualified and enthusiastic trainer; increased understanding of developing proposals; and the need for more training on this topic to help departments in Ha Tinh develop proposals.

Develop a policy brief on engagement of stakeholders in climate change planning in Ha Tinh Province
Based on the analysis of key stakeholders involved in climate action planning and the implementation process, the assessment of need for capacity development related to climate change, and the training courses provided by the Project in 2021–2022 to key stakeholders in Ha Tinh, a policy brief highlighting the status, issues, gaps and achievements with regards to climate response planning and implementation was prepared, including recommendations for the future. The brief is available via this link.

2.3.3 SUMMARY

Overall, it was observed that the changes in WP 2 were appropriate to the contexts and needs in Ha Tinh. The process of climate response planning in the province were undertaken by consultancy firm and there was weak participation of state departments in the whole process. Participation of non-state actors was nil. The needs for building capacities to participate in the planning and implementation of climate response plan was huge. The training courses were able to respond to the needs of key stakeholders in the province and have provided them initial knowledge and understanding for planning and implementation of climate actions. Yet, there are still considerable gaps in knowledge and skills of local stakeholders to be filled in order to develop comprehensive climate change related plans.

It is important to note that as part of the trainings, a core group of climate planning was created, consisting of representatives from key government agencies, mass organizations and private sector. The group can play an important role in the climate action planning and implementation process. There is urgent need to make this group more pro-actively climate planning, particularly in the technical areas to make

sure climate action plans match with needs of province, sectors, business and different social groups. There is also a need for a platform for data, information and knowledge sharing among local stakeholders and with external actors. This will help planning agencies to get comprehensive, most up-to-date data and information to develop the various scenarios of climate change and development.

2.4 Work Package 3: Assist Viet Nam in generating a case study that reflects the integration of evidence-based adaptation practices in Ha Tinh

Activity 3.1: Identify stakeholders related to/impacted by 'Loss & Damage' and disaster risk reduction in the province

Activity 3.2: Collect data on L&D in the agricultural sector to identify actual loss and the value of losses due to natural disasters, understand the procedures and protocols of L&D data collection and determine gaps in provincial L&D mechanisms

Activity 3.3: Collect and assess data on risk mitigation strategies in the communes or districts if feasible

Activity 3.4: Assess disaster L&D for selected farming systems at the project sites if feasible

Activity 3.5: Write up and present a case study on L&D from Ha Tinh at provincial and national events and liaise with the Department of Climate Change (DCC) and other key actors.

2.4.1 Introduction

Work Package 3 had minor adaptations to meet the changed needs of local partners and in response to delays. With the extension of the Project, however, data collection for disasters for activities 3.3 and 3.4, was extended to February 2022. The case study (Activity 3.5) was timed with global events, as required, in Quarter 3 or 4, 2021.

To enable more flexibility of timing for the capacity-building activities, where relevant, some activities under Work Package 3 were combined with work packages 2 and 4. Further, owing to travel restrictions related to the COVID-19 pandemic, some training was done online (see Activity 2.5, training on assessment of loss and damage caused by natural disasters for stakeholders in Ha Tinh province, under Work Package 2.

2.4.2 Work Package 3: results by activity

2.4.2.1 Activity 3.1

The process of L&D data collection has been outlined in Government Decree no. 43.

Consultations with L&D stakeholders in Ha Tinh are summarised below.

Data flow is one-directional (from commune to district to province to national) and not used for risk reduction strategies or adaptation planning. The data focus on L&D, which means interventions avoiding or reducing risk and damage are missed. Even for agricultural L&D reporting,

representatives from different authorities were involved in data collection and management. The formats (templates) for L&D are not uniform, which risks introducing errors when data is synthesised. For further details, see progress reports (link).

Information about L&D data collection procedures was gathered during meetings with DOWR, PDCP and interviews with key stakeholders at the village, commune, district and provincial levels. The steps for collecting and assembling agricultural L&D databases are illustrated in a flowchart (Figure 5) and described briefly below.

- Key actors: The Disaster Prevention Committee oversees all disaster prevention and control in the province. The standing office of the Committee, jointly hosted by DOWR and the Committee, is chaired by a representative of the provincial DARD, with representatives from various provincial departments (as approved by Ha Tinh PPC in Decision 25/2016/QĐ-UBND). The Committee reports to the PPC. The main tasks include issuing flood and storm alerts and gathering L&D data (for the PPC) when natural disasters occur in the province.
- During natural disasters, DOWR is responsible for collecting L&D data and reporting to the PPC on behalf of the Committee.
- In the committee, DOWR is in charge of collecting data on L&D for agriculture (Ag-L&D). DOWR collects the data through two channels:
    - by civil servants at commune and village levels, under the supervision of the Committee, and by commune and district DARD staff; and
    - by commune and district agricultural staff under the provincial PDCP.
- During major disasters, some NGOs may also collect data for humanitarian relief purposes rather than for the agricultural sector.

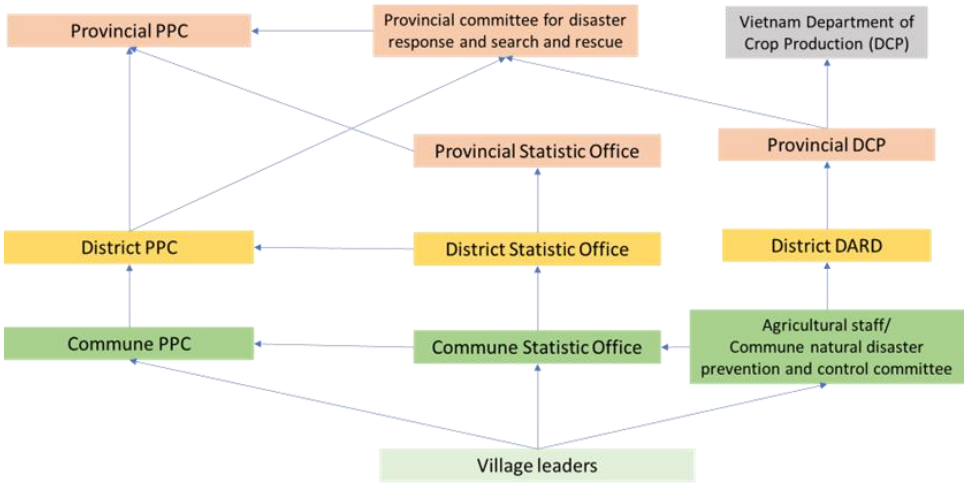


Figure 5. Flowchart of L&D data collection in Ha Tinh Province

The following information on L&D has been collected.

- *Damage statistics procedures*. Village and commune level information are first synthesized at the district level then the province accrues district-level data. For damage measurement in agriculture, DOWR collates two sources of data from district level and PDCP.
- *18 protocol/templates for data collection at village, commune and district level and raw data collected*. Reporting templates (Circular 43/TTLT-BNNPTNT-BKHDT)17 for L&D.
- According to the Circular, there are three types of disaster L&D reports:
    - A quick report is finished immediately after the occurrence of a disaster to provide an initial assessment of impact. The report is prepared by staff members in commune Commanding Committees for Natural Disaster Prevention and Control and Search and Rescue (CC-NDPCSR) and submitted to the commune people's committee and their corresponding CC-NDPCSR at district level before 17:00 hours. 17 Circular 43 / TTLT-BNNPTNT-BKHDT on guidelines for statistics and assessment of L&D caused by natural disasters, issued by MARD and the MPI on 19 June 2013.
    - District CC-NDPCSR combine the communes' information and submit to the district people's committee and CC-NDPCSR at provincial level before 18:00 hours. Province CC-NDPCSR collect information from all districts to write a quick report to the provincial people's committee and submit a provincial 'quick report' to the Central CC-NDPCSR before 19:00 hours.
    - A disaster period report is compiled at the end of each disaster.
    - Regular reports are prepared bi-annually and annually.
- The disaster period report and the regular report provide more accurate data on disaster L&D, after careful investigation by local governments. They have a similar reporting system, both following the administrative management system. Commune people's committees submit the report to the district people's committee who submit to the provincial people's committee who then report to the Prime Minister and to MARD for consolidating the information from all provinces.
- The L&D data for 2015–2019 from village to provincial levels were collected, including data from 1) DOWR; 2) PDCP; and 2) Can Loc District People's Committee (Table 13). This information typically covers: the type of (direct) disaster, area damaged (ha), degree of damage (%), and estimated value of the damage (VND).
- The needs and suggestions for improving the L&D data collection procedures were identified in consultation meetings with DOWR and the PDCP as well as key informant interviews with staff collecting L&D data. The following issues were highlighted in policy and practice.
    - *Limitations in policy*. Some biases already identified in Circular 43 include 1) hazard bias: focuses only on some types of disasters, such as storms and floods. Therefore, other types of disaster, such as droughts, are underreported; 2) temporal bias: gaps in historic records; 3) accounting bias: the data system only focuses on direct and/or monetized L&D; 4) threshold bias: there is no clear threshold to determine which event can be considered a disaster; 5) geographical bias: restricted data collection and accuracy in remote, often more vulnerable regions, such as the Northern Mountainous Region or Central Highlands, owing to traffic constraint and lack of human resources; 6) incentive bias: data collectors may have incentive to exaggerate (or diminish) the loss; and 7) poor data storage and analysis infrastructure.
    - Improving the clarity of data collection procedures under Circular 43 will require experts from MARD's science and technology department and the Directorate of Natural Disasters and Control under MARD to consolidate the data collection and case studies from Quang Binh and Ha Tinh, which contributed to the MARD study on methodologies, data requirements and gaps analysis on assessing L&D in the agriculture sector.

- Some of the identified gaps have been confirmed by focal points at MONRE and MARD.
- *Limitations in practice*. Given there are no uniform national guidelines for how to collect or estimate L&D data nor an assessment methodology, departments have different templates for collecting/reporting, intentions for collecting the L&D data are often unclear to those who are requested to do it, and the information collected is unsystematic and incomplete. Some specific practical issues are:
  - *Terminology*. Different templates for reporting L&D and different uses of terminology make the indicators easily confused. For example, the understandings of what counts as a 'loss' or 'damage', how to assess 'percent damage' or 'the value of the damage'.
  - Capacity. Limited resources and skills to collect and compile data correctly during a series of natural disasters. Currently staff gather a lot of information, but they are not sure what the information is used for. Specifically, field evaluators have limited training and may have vested interests in under/overreporting the damage.
  - *Verification and use for planning*. The collected information is rarely verified or cross-checked by the province. Aerial images are not used to assess the severity of damage or where to prioritize interventions nor for informing future adaptation measures. Despite the province being frequently affected by disasters, the Ag-L&D database is not used for evaluating Ag-L&D, for preparedness planning or for testing or monitoring adaptation measures. Furthermore, there is no systematic storage of the data, some are kept as soft copy (Excel) and some as hard copy (printed report).
- Recommendations for improving L&D data collection:
  - L&D data collectors requested a consistent, concise and user-friendly template.
  - A straightforward formula to estimate the value of the L&D.
  - Simplified terminology.
  - Decide on a minimum set of data to collect.

- At national level, MARD is the designated ministry to collect, evaluate and announce information related to disaster L&D. Staff members at the Directorate of Natural Disaster Prevention and Control are in charge of monitoring this type of data and could be considered as potential trainers.

ICRAF identified a need to define the roles and purposes of L&D data and let this inform the design of templates for data collection, develop clear guideline and properly train staff who collect and analyse data. In-depth analysis was conducted in certain communes of the Project, contributing to the case study on L&D of the agricultural sector in the province.

2.4.2.2 Activities 3.2, 3.3, 3.4, 3.5

Activities 3.2, 3.3 and 3.4 were mainly complementary data collection contributing to Activity 3.5 and are, therefore, combined together.

Initially, these activities were designed as field-based interactions. When travel restrictions owing to COVID-19 were imposed, the Project team initiated regular short telephone surveys with selected households to monitor impact on interventions and livelihoods, both from L&D of natural disasters and of the pandemic.

The questions were repetitive. Social interactions and mutual-learning opportunities were missing in the individual surveys and the team observed response fatigue during December 2021 and the final project evaluation (March to May 2022). The telephone interviews failed to give detailed descriptions but nevertheless captured the main events and enabled the team to stay in direct contact with participants.

Throughout the Project period, the following data and information about L&D were collected: 1) official L&D data from the Project's communes and districts; 2) status reports via short telephone surveys with 91 selected households and farmers' own photographic documentation; 3) selected baseline and endline questions comparing the same 330 households (Table 14).

Implementation occurred largely during a La Niña phase, which is colder and wetter than normal and evident in the types of production losses before and during the Project (Table 14), with unprecedented flood and storm events in October and November 2020 and less severe drought events overall. The cold and humid conditions explain in part why 45–72% of farmers (n=330), irrespective of collaboration and interventions, reported outbreaks of pests and diseases during the Project period. Only those farmers deploying drought-tolerant grass reported no losses to pests or diseases, a reduction in damage owing to flooding but an increase in frost and storm damage (for livestock). The interventions with fewer reports of L&D than before the Project and compared with the other two groups were 1) homegarden (frost, storm, pests and diseases); 2) apiculture (frost, storm, flood); 3) drought-tolerant grass (flood, forest fire); and 4) onion (frost, storm). The aquaculture core farmers reported more losses than the collaborative and control groups, which could mean that they attempted to extend the season and test new response measures.

Note that the survey focused on damage (one damage is enough to generate the response 'yes', whereas no incident is required for a 'no'). The response allowed comparison of the relative change in damage per household before and during the Project. When core farmers were contrasted with collaborative and control groups, this could imply whether interventions contributed to avoided or reduced losses, however, the groups were too small for statical significance.

Table 14. Households that lost production owing to frost, storm, flood, drought, forest fire or pests and diseases

Difference endline versus baseline (%)									Endline (n = HH reporting loss or damage)					
Improved homegarden														
Farmer	**Tot N**	**frost**	**storm**	**flood**	**drought**	**forest fire**		**pests & diseases**	**frost**	**storm**	**flood**	**drought**	**forest fire**	**pest & disease**
Core	12	-8	-17	8	-25	0	8		4	5	2	3	0	6
Collaborative	67	12	3	10	-27	4	21		26	32	18	11	4	34
Control	15	13	-7	-20	-47	0	20		5	4	2	6	0	7

Apiculture in homegardens														
Core	22	5	-18	-9	-23	0	23		8	4	5	5	1	10
Collaborative	54	15	13	28	-24	2	22		22	23	21	14	2	28
Control	28	36	18	0	-46	4	11		15	11	6	9	1	12
Drought-tolerant grass														
Core	15	40	53	-13	0	-7	0		10	11	2	6	0	7
Collaborative	12	25	42	-17	-33	0	33		6	9	1	1	0	7
Control	15	20	13	-13	-67	0	13		7	7	4	4	0	7
Local onion and mung bean rotation														
Core	28	-7	-7	7	-7	0	39		8	4	14	4	0	17
Collaborative	16	0	-6	6	-19	0	25		5	3	4	4	0	6
Control	16	25	0	25	0	0	19		7	2	5	2	0	6
Aquaculture with prawn and fish rotation, agroforestry														
Core	11	55	45	36	0	0	55		8	7	7	2	0	7
Collaborative	11	-9	0	9	-27	-9	27		3	4	6	1	0	8
Control	8	-13	0	25	25	0	50		3	3	4	2	0	5

Note: Time period is within the 5 years prior to the Project (baseline) and during the Project (endline). Left panel shows % change between endline and baseline. Right panel shows number of households per category reporting L&D. Total number of respondents: 330 households

In addition, ICRAF contributed sections on agricultural L&D to a report on Ha Tinh and Quang Binh provinces commissioned by GIZ. The contributions were in accordance with reports under Activity 3.1. (link).

A case study on Ha Tinh L&D data compiled and synthesised information from activities 1 and 3 and additional collected data through farmer interviews, contributing lessons learned from the Project towards improving L&D data collection and avoiding L&D from natural disasters (link).

Based on the case study, a policy brief was also prepared. The brief highlighted current practices and gaps in L&D data collection in Ha Tinh, the L&D in recent disasters, and how EbA/ CSA interventions from the Project can contribute to mitigate such L&D (link).

2.4.3 SUMMARY

Overall, activities under Work Package 3 contributed to creation of a good case study on L&D in Ha Tinh. The process of data collection had to be adapted to the changing context of the COVID-19 pandemic. The data collection was undertaken via regular short telephone surveys with 91 selected households to monitor the impact on interventions and livelihoods, both from L&D of natural disasters and of the pandemic. L&D data on recent disasters were also collected from provincial, district and communal levels. The telephone survey was complemented with data from baseline and endline surveys, which covered the same 330 households. Based on the collected data, sections on agricultural L&D were prepared to contribute to a report on L&D in Ha Tinh and Quang Binh provinces commissioned by GIZ. Further, a case study on Ha Tinh L&D data was also compiled based on collected data from surveys and stakeholder analysis mentioned above and additional data from farmer interviews, particularly, contribution of EbA/CSA interventions in avoiding L&D. Various gaps in L&D data collection were highlighted in the case study and recommendations were provided to address these gaps. Based on the case study, a policy brief on gaps in current practice in L&D data collection and implication of EbA/CSA interventions with regard to avoided L&D was prepared, with recommendations to policy makers.

2.5 Work Package 4: Support Vietnamese partners to develop an adaptation proposal, backed by financial investment plans in line with provincial and national targets

Activity 4.1: Organize training workshops for governmental officials on project development

Activity 4.2: Organize meetings with local agencies to synthesize needed information and materials, co-develop a provincial adaptation proposal outline and specify tasks for each actor

Activity 4.3: Organize write-shops to co-develop a provincial adaptation proposal and financial investment plan based on experiences, lessons learnt, and ground evidence gathered during project implementation, and continuously support the drafting process of the proposal

2.5.1 INTRODUCTION

This work package was part of the exit strategy to sustain the EbA/CSA interventions from the Project and to scale up/out beyond the Project's sites. From its beginning, the Project worked closely with key partners in the province to develop proposals to submit to donors. Various training workshops, meetings with local agencies and write-shops were held. Overall, the Project submitted ten proposals and three out of these ten proposals were approved for funding.

2.5.2 Work Package 4: results by activity

2.5.2.1 Activities 4.1, 4.2, 4.3

In total, the Project trained and coached 29 provincial staff (17 M/12 F).

1. In 2021: ICRAF provided on-the-job coaching for adaptation proposal development for two staff (1 F/1 M) from Ha Tinh Extension Center, 12 staff, including six (2 F/4 M) from Ha Tinh FU; four staff (2 F/2 M) from CRD and CERGON. The results of these coaching sessions were eight submitted proposals and two approved proposals (See Annex 2.1: List of submitted proposals by the Project partners and ICRAF).
2. In April 2022: The Project provided half-day training on proposal development (see Work Package 2) for 20 provincial staff (8 F/12 M) (including 2 M/1 F from Ha Tinh FU and Extension Center, respectively, who participated in the on-the-job training). The main contents of the training were 1) steps to develop a proposal and a need-to-know list; 2) developing proposals related to climate change; and 3) Proposal writing: group practice. Overall evaluation of the training: training contents well-matched with participants' learning needs; practical proposals/projects; qualified and enthusiastic trainer; better understand about developing proposals; need more training on this topic to help departments in Ha Tinh develop proposals.

2.5.2.2 Activities 4.2 and 4.3

- In total, 10 adaptation proposals (including five proposals submitted by Ha Tinh partners and five proposals submitted by ICRAF and other partners) based on the Project experience, valued at USD 1.63 million, were submitted to funders by project partners, local NGOs and ICRAF. A summary of the submitted proposals is available in Annex 2.
- Three proposals valued at USD 893,725 were approved.
    - People, Primates, Plants: Co-managing Biodiversity and Improving Livelihoods in Viet Nam. Implemented by ICRAF, Botanic Gardens Conservation International, and Center for Highland Natural Resource Governance Research (2022–2025), funded by the Darwin Initiative (USD 696,702).
    - Climate-Smart Agriculture for Ethnic Minorities in Central Viet Nam: implemented in Hue Province by the Center for Rural Development (2021–2023). Funded by the IKI Small Grants programme (USD 113,425).
    - Integrated Approaches to Climate Resilience in the Uplands of Southeast Asia, a research network with the Swedish University of Agricultural Sciences, Hue University of Agriculture and Forestry and ICRAF (2022–2023). Funded by Swedish Research Links (USD 83,598).
- In addition, ICRAF provided technical assistance in Nghe An Province (July 2021–June 2022), commissioned by FAO, conducting a feasibility study for nature-based solutions. Some of the interventions under consideration complemented the Project approach and opened the possibility for field visits and sharing. FAO drew on some of ICRAF's recommendations for nature-based solutions from the Project, including the standard designs for fruit-tree-based agroforestry systems (link).
- GIZ acknowledged that the objective of Work Package 4 had been fulfilled, at the Project coordination meeting on 7 July 2021.

3. PROJECT MANAGEMENT

3.1 Progress, including key events and milestones

3.1.1 Activity 0.1. Project planning and reporting

- ICRAF and its implementation partners coordinated progress and planning, monthly. (project operational plan: link; progress reports: link)
- ICRAF sent monthly updates to GIZ and Taskforce members (link).
- Project coordination meetings between ICRAF and GIZ were organized quarterly.

3.1.2 Activity 0.2: Establish a regular 'round table' or a technical working/advisory group/taskforce

- *Set up project support team, regulations, tasks distributed to members*: after delays owing to the administrative establishment of the Project in the province, the Project was approved by Ha Tinh PPC on 6 March 2020. The provincial Taskforce was formed on 24 April under Decision No. 1305/QĐ-UBND issued by Ha Tinh's PPC. The Taskforce included representatives from six agencies; four sub-departments under DARD (Water Resources (DOWR), of Forest Protection, of Crop Production and Protection, of Aquaculture, and the provincial Extension Center); and the sub-department of Sea, Islands and Water Resources under DONRE.
- *Organise project Taskforce meetings*: six Taskforce meetings were held during 2020–2022. Taskforce meetings provided opportunities for the Project team to discuss issues, progress and solutions to move forward with provincial partners. The Taskforce leader (DOWR) also represented the Project and shared and reported implementation results to provincial leaders and the national project steering committee.

Table 15. Specific tasks of provincial partners per each work package as identified by the Taskforce

Work package (WP)	Key partner and responsibilities
Overall project management and implementation	▪ Project focal point DOWR: responsible for coordinating all work packages
WP1: Implementation and upscaling EbA/CSA	▪ Provincial Agriculture Extension Center: responsible for technical support to farmers in the field, support to implement EbA/CSA ▪ FU: responsible for establishing farmers' groups and their operations, supporting PSP workshops and disseminating agro-climatic information services and EbA/CSA

WP2: Support the development of provincial NAP	▪ DONRE Ha Tinh: responsible for leading the process in WP2, main contact point with ICRAF
WP3: Loss & Damage case study	▪ Project focal point DOWR: responsible for implementation of WP3
WP4: Develop adaptation proposals	▪ Project focal point DOWR: responsible for implementation of WP4

The success of the Project would not have been possible without the provincial Taskforce. Overall, Taskforce members were highly dedicated and accountable for the implementation of interventions. During the social distancing and travel restrictions owing to the COVID-19 pandemic that prevented the ICRAF team from traveling to Ha Tinh, Taskforce members, particularly Provincial Agricultural Extension Center and FU, effectively implemented activities in the field and scaled up EbA/CSA interventions to other districts.

3.1.3 Activity 0.3. Inception and closing workshops

- Two inception workshops were held, 26–27 November 2020, at the two project sites, Huong Son and Can Loc districts, with 40 participants in each district. The workshops were delayed owing to two separate COVID-19 travel restrictions. In agreement with GIZ, provincial Taskforce and district leaders, the workshops were rescheduled to be conducted after the scoping study (conducted July–August) and household baseline survey (conducted in September), in order to present key findings from field activities. After the workshops, ICRAF sent minutes of the agreements on selection of EbA/CSA interventions to DOWR on 3 December 2020, for reporting to Ha Tinh PPC. The workshop presentation can be found via this link.
- The closing workshop was merged with the national sharing workshop in Ha Tinh Province (with field visits to the Project's sites) during 23–24 June 2022, with 65 people, including national partners and partners from Ha Tinh and other provinces (Quang Binh and Dak Lak) and projects. The event shared project results and experience and discussed scaling opportunities with provincial and national stakeholders. Workshop agenda and presentation can be found via this link.

3.1.4 Activity 0.4: Monitoring and evaluation

ICRAF and its partners monitored farmers' adoption of EbA/CSA and compiled information in monthly updates. The methods of data collection included the following.

- Field visits and observations by the Ha Tinh Extension Center, Ha Tinh FU, commune agricultural staff and ICRAF staff.
- Participatory photo monitoring by farmers, project partners and ICRAF staff and performance documentation (logbooks) from a representative number of households.
- Sharing of results, feedback and experience by farmers and commune agricultural staff through social networks (e.g. farmers' Zalo groups)

- Documentation of the number of people who the Project reached through different outputs and communication channels.
- Project baseline and endline surveys (household survey, key informant interviews, focus group discussions). The baseline and endline reports are reported separately.
- Training evaluations done via 1) before-and-after training tests; and 2) household survey. Training evaluation report can be found via this link.
- Project M&E can be found via this link.

Project beneficiaries as of June 2022 (*see Box 1 for descriptions of direct and indirect beneficiaries and groups*): The Project achieved the targeted number of beneficiaries.

- Direct beneficiaries: 3602 households (with household participants totalling 14,132 people: 7062 male and 7070 female) directly benefited from the Project (Figure 6 and Table 16)
- Indirect beneficiaries*:* The Project reached over 40,000 people and generated 90,000 views/clicks/visits/copies/downloads of online materials (Figure 6 and Table 17).

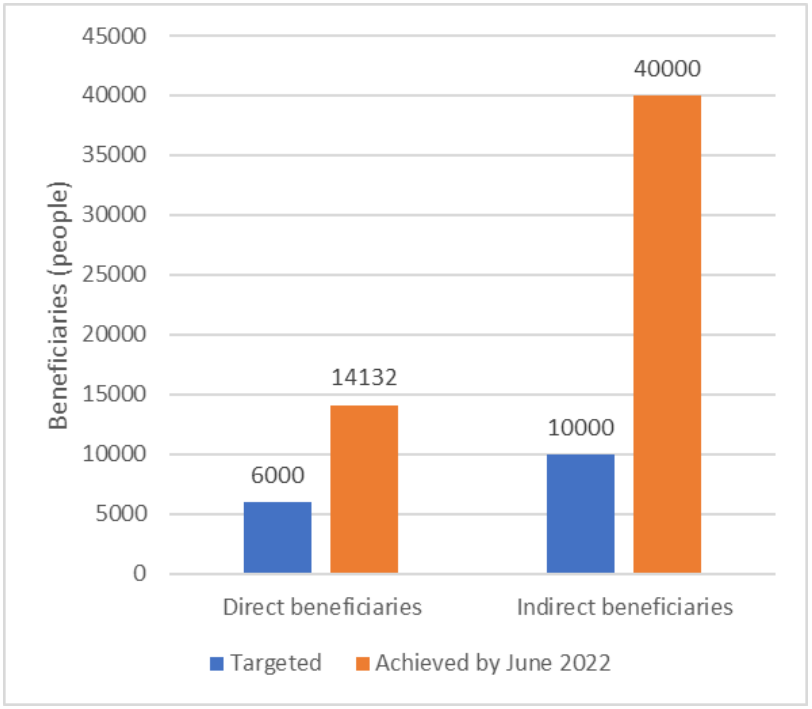


Figure 6. The Project targeted and achieved beneficiaries

Box 1. Project beneficiaries

- **Direct beneficiaries** were households who received benefits (e.g. technical training, in-kind support) from the Project and implemented EbA/CSA measures/interventions, as follows.
  - *Direct group 1: Core households:* Households who directly received in-kind support, technical training, technical material and ACIS from the Project and implemented EbA/CSA interventions in Huong Son and Can Loc districts.
  - *Direct group 2:* Households who participated in the FU Homegarden Improvement programme, received benefits from the Project (e.g. in-kind support, technical training, technical material, ACIS) and implemented EbA/CSA practices in Huong Son, Can Loc, Ky Anh and Huong Khe districts. 'Homegarden' here includes forest gardens, orchards and homegardens.
  - *Direct group 3:* Households with VSLA-ag members who received benefits from the Project (e.g. introduction on EbA/CSA, training in group/fund management, establishment of revolving microcredit schemes, technical material, ACIS) and implemented EbA/CSA practices.
  - *Direct group 4:* Households who implemented EbA/CSA because of joining technical training provided by the Project.
  - *Direct group 5:* Households who implemented EbA/CSA because of receiving material and technical knowledge shared by farmers in the other direct groups.
  - *Direct group 6:* Households who implemented EbA/CSA and were supported by the Project and FU in accessing markets to sell their CSA products.
- **Indirect beneficiaries** were people who received benefits from 1) The Project activities such as training, sharing events, TV and media; 2) knowledge and outputs generated from the Project, such as technical guidelines, manuals, posters, agro-advisories; and 3) project-influenced governmental policies/plans/programmes, where the status of actual implementation was not confirmed through the Project's M&E.
- *Indirect group 1*: Members of VSLA-ag groups (this excludes members who were already adopters and counted for in the number of direct beneficiaries).
- *Indirect group 2*: The number of people who participated in training (e.g. technical training, introductory orientation on EbA/CSA and photovoice) provided by the Project (this excludes farmers who were already counted in the number of direct beneficiaries and indirect group 1).
- *Indirect group 3*: Farmers who participated in the training and/or field implementation of the partners' programmes and/or projects (e.g. programmes of Ha Tinh Extension Center and Ha Tinh FU) that use knowledge or material (e.g. technical training material, EbA/CSA concept) from the Project.
- *Indirect group 4*: Farmers who received technical knowledge shared by core farmers (core farmers trained, talked with or guided by

other collaborative farmers on how to implement EbA/CSA practices).

- *Indirect group 5*: Zalo group members of FU and the Project who regularly received information from the Project, such as technical material, climate information services and technical advice on management of CSA interventions. This excludes members who were counted as direct beneficiaries.
- *Indirect group 6*: FU members who received technical information at their meetings at village to provincial levels.
- *Indirect group 7*: People in target communes in Can Loc, Huong Son, Huong Khe and Ky Anh districts who could access printed agro-advisory posters.
- *Indirect group 8*: Accumulated number of views/downloads/copies/clicks/page visits through the websites and social media of ICRAF and partners throughout the Project period.

Note

- Farmers in the indirect groups were counted as 'direct beneficiaries' when they reported that they adopted EbA/CSA after participating in and/or obtaining benefits (e.g. technical training and material, access to micro-credit from VSLA-ag group) from the Project. Therefore, the Project monitored the EbA/CSA adoption of indirect groups 1 and 2, at least.
- GIZ, ICRAF and the provincial Taskforce agreed at the Project coordination and Taskforce meetings on 22 and 23 March 2021 that 'indirect beneficiaries' would be counted as the total number of people/views/downloads/copies/clicks reached through different channels. By having lists of participants for some indirect groups, the intention is to minimize the risk of double counting the indirect beneficiaries' groups as much as possible.

Table 16. Overview of direct beneficiaries of the Project activities as of June 2022

Direct beneficiary category	Number of direct beneficiaries as of June 2022			Types of support provided directly by the Project			Types of support from farmers in direct groups 1 and 4		
	HH	Male	Female	In-kind from project (seedlings, beehives, fertilizers etc)	Received loan from VSLA-ag group	Training, technical guidance, technical material, ACIS	Market link support	Input material (seedlings, beehives, fertilizers	Technical knowledge sharing
1. Core HHs	234	468	468	Yes	No	Yes	Maybe	No	Yes
2. HHs in the Homegarden Improvement programme	2351	4702	4702	Yes	Maybe	Yes	Maybe	NA	NA
3. HHs in the VSLA-ag groups	92	42	50	No	Yes	Yes	Maybe	No	Yes
4. HHs trained by the Project	99	198	198	No	No	Yes	Maybe	No	No
5. HHs receiving inputs shared by other direct groups	67	134	134	No	No	Yes	Maybe	Yes	No
6. HHs receiving support for marketing CSA products*	759	1518	1518	No	Maybe	Maybe	Yes	Maybe	Maybe
Total	**3602**	**7062**	**7070**						

**: excluding 150 HHs counted in other direct groups. HH = household*

Table 17. Overview of indirect beneficiaries from project activities as of June 2022

Number of indirect beneficiaries	Total as of Jan 2022	Total as of June 2022
Total people	**35,416**	**40,522**
Indirect group 1: Members of VSLA-ag groups (this excludes members who were already adopters and counted in the number of direct beneficiaries)	534	723
Indirect group 2: The number of people who participated in training (e.g. technical training, introductory orientation on EbA/CSA and photovoice) provided by the Project (this excludes farmers who were already counted in the number of direct beneficiaries and indirect group 1).	1572	1784
Indirect group 3: Farmers who participated in training and/or field implementation activities of the partners' programmes and/or projects (e.g. programmes of Ha Tinh Extension Center and FU) which use knowledge or material (e.g. technical training material, EbA/CSA concept) from the Project	547	587
Indirect group 4: Farmers who received technical knowledge shared by core farmers (core farmers trained, talked with or guided by other collaborative farmers on how to implement EbA/CSA practices)	38	88
Indirect group 5: Zalo group members of FU and the Project who regularly receive information from the Project such as technical material, climate information services and technical advice on management of CSA interventions	345	500
Indirect group 6: FU members who received technical information at their meetings at village to provincial levels	13,000	15,000
Indirect group 7: People in target communes in Can Loc, Huong Son, Huong Khe, and Ky Anh districts who could access printed agro-advisory posters	19,380	21,840
Total views/downloads/copies/clicks/page visits on communication channels (link)		
Indirect group 8: Accumulated number of views/downloads/copies/clicks/page visits through websites and social media of ICRAF and its partners throughout the Project period	**65,000**	**90,000**

4. GENDER AND SOCIAL INCLUSION

Gender aspects were actively and continuously considered and integrated in all project activities. Notably, the Project strived for equal participation of both men and women (around 50% F, 50% M) in the household interviews, training, field implementation and groups. The team continually stressed the importance of gender awareness with extension staff.

For the VSLA-ag group and field implementation, the Project operated at the household level, which meant that both husband and wife joined the Project. If one of them was busy, the other could participate in the activities and share what they learned with their partner.

The Homegarden Improvement programme was promoted with application of agroforestry systems, organic-oriented production, and standard designs for improving diversity of farm components (trees, crops, grass and livestock). This provided more opportunities for involvement and knowledge exchange between men and women in implementation and management regarding the products with which they had more experience, respectively.

5. CHALLENGES

5.1 Challenges in implementation

Social lockdowns caused some challenges for implementation.

First, project staff could not travel frequently to sites to monitor the interventions. Therefore, strengthening relationships with local partners (commune and district) and farmers was important to mobilise local human resources for implementation, e.g. assess the progress of the implementing farmers and conduct household surveys for identifying the needs of farmers.

It was also essential to improve capacity in plot management and participatory action research for farmers and local partners from commune through to provincial levels, especially in the context of COVID-19 impact. As travel restrictions were enforced between provinces and between communes, the more knowledge and skills in field implementation held by local partners, the better they were able to support the work on the ground. Frequent updates, communication and sharing among project partners at both local and national levels was important so that project results could inform and be integrated into higher-level initiatives, programmes and policies. Moreover, social networks played an important role in the Project because they served as interactive online learning and sharing platforms for farmers, agricultural technical/extension staff, FUs, Met Center officers and others. The Project team developed training material in digital formats and pre-recorded technical videos to help to avoid further delays in implementation of training and to reach farmers and partners directly through social networks, e.g. Zalo groups and Facebook pages.

Second, less familiar technologies or generally more complex technologies may more slowly spread farmer-to-farmer as information sharing becomes more complex and farmers may not be sufficiently comfortable with the new technologies.

Third, lack of financial resources, labour and land limitations were the main issues for implementing EbA/CSA interventions. This could explain the lower rate of scaling of aquaculture rotation with giant freshwater prawn and fish even though the rate of return on investment was highest of the five implemented interventions.

Monitoring and evaluating impacts of EbA/CSA interventions requires more time than other kinds of interventions because changes occur over time as plants grow. It was challenging to capture all benefits of EbA/CSA interventions in a short-term project.

It was observed in the training courses under Work Package 2 that there were still considerable gaps in knowledge and skills of local stakeholders in developing comprehensive climate change plans. This was partly due to fact that most climate-change plans in the province were developed by consultants or consulting firms. Even at DONRE, the key agency in charge of climate-change planning, there was only one staff assigned to planning development and he did not have sufficient time to cover all aspects of climate-change planning. This was one of the key challenges in climate-change planning in Ha Tinh. Building the province's in-house capacity continues to be needed and, therefore, the core group of climate-change planners (created during the training) can play an important role.

5.2 Challenges in governance

The rotation of Government staff was a major challenge for the Project. It takes time for new staff to fully understand the Project and to coordinate activities.

The policy review noted that the One Commune, One Product (OCOP) policy provides an opportunity to diversify agricultural products around one commercial product. However, at district level, policy support was often terminated after 1–2 years of implementation or updated depending on the budget available for the agricultural sector. Such practices could counter the long-term commitment needed for establishing and maintaining diversified systems based on an OCOP crop.

5.3 Challenges in scaling

The lack of familiarity and the complexity of the interventions was one of the challenges for scaling. Less familiar technologies or generally more complex and high-cost technologies may more slowly spread farmer-to-farmer as information sharing becomes more complex and farmers may not be sufficiently comfortable with the new technologies.

For highly scalable EbA/CSA interventions, it is better to support farmers in improving their current farming practices because farmers are willing to adopt climate-smart farming practices but may need more time to change their whole farming system.

To be specific, the percentage of respondents in the endline survey who reported improving management or farming practices was higher than those who reported changing their farming practices. The easy to implement 'quick wins' that do not cost a lot or require detailed knowledge were highly popular while the others were adopted much slower.

Second, scaling out agro-advisory bulletins requires availability of seasonal weather forecasts at the district level in all districts.

6. INNOVATIONS OF THE PROJECT

The Project piloted highly scalable EbA/CSA interventions, which were carefully selected from recommended SESs in a previous study by GIZ, the results of scoping study, longlist of existing CSA interventions; shortlist of potential interventions based on scientific knowledge, local experience and review of enabling policy for EbA/CSA implementation.

The Project was able to successfully integrate its interventions into provincial partner's programmes. Key highlights were the Homegarden Improvement programme of Ha Tinh FU (No.01/BKKTĐ- HNDT) (which was part of the Provincial New Rural Development Programme), Digital Transformation Programme in Agriculture in Ha Tinh Province, Ha Tinh FU Resolution No.1-NQ/HNDT on agricultural and household waste treatment for composting, supporting farmers in marketing 'safe' agricultural products under COVID-19 impacts (Ha Tinh FU initiative) and the national programme, Planting One Billion Trees 2021–2025.

The dissemination of ACIS through various offline and online channels and platforms and the establishment of VSLA-ag supported adoption of EbA/CSA by more farmers. This resulted in a higher number of direct beneficiaries.

7. LESSONS LEARNED

The Project achieved its expected outcomes thanks to several key experiences. The lessons from the Project presented below can be useful for further scaling out of EbA/CSA interventions.

First, using sets of indicators to select suitable communes and EbA/CSA interventions was an important step to make sure that the selected sites fit with the design of the Project, providing more guarantee for the Project success.

Second, design of the EbA measures must not only take into account the biophysical features of the sites but also socio-economic and cultural conditions of the local people. This will ensure the buy-in of the farmers on the technologies from its start.

Third, support to local people must be context specific. The Project did not provide one-size-fit-all support to its beneficiaries. Instead, its support responded directly to the needs of the pilot households, based on participatory assessment and discussion with relevant actors. It is also because the Project responded to the needs of the farmers that the training provided by the Project was highly received by them.

Forth, regular technical backstopping is very important. After the first training, the Project continued to visit the pilot farmers on regular basis and provide on-site support to them.

Fifth, farmer-to-farmer learning is essential for spreading the new knowledge among farmers. The Project promoted farmers' groups, which boosted the sharing of information of pilot farmers among themselves and with other farmers.

Sixth, capacity building and strengthening relationships with project partners enabled the Project to achieve results despite travel restriction owing to COVID-19. During the travel restriction when ICRAF team was not able to go to the field, the Project would not have been able to

progress without Ha Tinh FU and Extension Center continuing to provide regular support to farmers, with prior and continued coaching from ICRAF through on-line platform.

Last but not least, the Project was very successful in scaling out interventions as it was able to integrate into provincial partner's on-going programmes. To be specific, EbA interventions from the Project were incorporated into Homegarden Improvement programme of Ha Tinh FU (No.01/BKKTĐ- HNDT), which contributed to Provincial New Rural Development Programme, Digital Transformation Programme in Agriculture in Ha Tinh Province, Ha Tinh FU Resolution No.1-NQ/HNDT on agricultural and household waste treatment for composting, supporting farmers in marketing 'safe' agricultural products under COVID-19 impact (Ha Tinh FU initiative) and the Governmental project, Planting One Billion Trees 2021–2025.

8. RECOMMENDATIONS

For successful replication and upscaling of the results of the Project, the following recommendations are made:

- It is recommended that not only the familiarities but also the complexities of the intervention need to be considered to scale out interventions. To encourage wider adoption, start with easy-to-implement measures, which do not cost a lot nor require detailed knowledge, to ensure 'quick wins' by early adopters. Farmers are more willing to adopt more complicated farming practices when and if they have already achieved initial success.
- Additionally, integrating viable financial options is a key for sustainability. The reasons for this recommendation were that financial constraints and uncertainty of the effectiveness of the promoted EbA/CSA interventions, particularly, for high investment interventions, were among the greatest constraining factors for farmers to adopt these technologies. To scale out better, it is important to attract the private sector. Therefore, it is recommended to highlight cost-effectiveness and direct, short-term benefits that are attractive to the private sector.
- The Project was very successful in increasing its coverage owing to integration of the interventions into provincial partners' programmes. For impact at wider scale, it is recommended that the results and lessons learned from the Project be used to contribute to development of provincial (and perhaps national) policy framework/s. The process of developing demonstration sites should be documented to be used for creating guidelines for implementation of climate change adaptation and mitigation actions in the field.
- The Project adjusted its plan to support farmers to sell EbA/CSA products to markets via Ha Tinh FU. However, it was not a priority of the Project. Hence, it is highly recommended for any follow-up project to conduct research on markets and value chains for EbA/CSA products and strengthen market links for consumption of EbA/CSA products.
- Regarding climate change adaptation and mitigation planning, there is an urgent need to assist stakeholders engage more actively and earlier in climate-change planning — not just in coordination but also in technical development — to ensure such plans match well with the needs of the province, sectors, businesses, and different social groups.

- The Project published a rich amount of guidelines and technical reports, which are very useful for the replication of project results in other location. It is recommended that government agencies (for example the Agricultural Extension system) take a step forward to institutionalize such knowledge and promote within their system. This will allow government staff at the grassroot level to officially apply in their work.
- The Project was successful with the farmer-to-farmer sharing of information, which is essential for spreading the knowledge gained from training and experience to promote wide-scale adoption of proven EbA/ CSA technologies. It is recommended that in designing the expansion of the Project interventions, farmer-to-farmer learning should be emphasized.
- There is also a need for a platform for data, information and knowledge sharing among farmers, local stakeholders and with external actors. This will help planning agencies to obtain comprehensive, up-to-date data and information to develop the various scenarios of climate change and development.
- Moreover, there is a need to strengthen the institutional capacity of the province in terms of climate-change planning wherein line agencies must have sufficient resources (finance, human and technical) for planning tasks.
- For a full impact attribution at landscape level to create ecological benefits, the integration of a rigorously designed impact study will be important when taking the Project's results to wider scale.
- Last but not least, for transformational change of the landscapes, proven EbA technologies should be implemented at wide scale. Priority should be given to the Project's sites where the intervention should be increased in scale to take in the whole village or commune to create 'engagement landscapes' of EbA/CSA practices.

9. CONCLUSION

Overall, the Project was completed successfully. Most activities were implemented as planned, as reflected by the number of direct and indirect beneficiaries that the Project reached as of June 2022, achieving both direct and indirect beneficiary targets. The EbA/CSA practices have been adopted by 3602 farming households (14,132 people) and integrated into provincial programmes. The Project contributed to diversification of sources of livelihoods as an adaptation strategy. The calculated change in number of livelihoods' sources from 2019 to 2021 shows that about 18% of the core and collaborative households — 9% each, were provided with at least two new livelihoods' sources through the Project. The corresponding change for the control group was only 2%.

The scaling activities were implemented, including integration with the local initiative, supporting farmers in marketing agricultural products to local food stores, field visits and sharing project outputs through multiple communication channels.

Capacity development needs for climate planning and implementation were analysed and training under Work Package 2 was conducted. Lessons learned summarized in a policy brief.

The synthesized L&D report of the VN-SIPA project has been compiled. In-depth analyses in certain communes were conducted, contributing to the provincial case study on L&D in the agricultural sector.

Work Package 4 on adaptation proposal development was fulfilled. The Project has generated USD 893,725 in international funds for expanding scale in Viet Nam.

The Project had four exit strategies (integrating into governmental programmes/policies/plans; fundraising through proposal development; ensuring capacity to maintain farmers' interest groups/VSLA-ag groups managed by Ha Tinh FU; and documentation of EbA/CSA interventions and preparation of relevant publications) to maintain and scale out EbA/CSA interventions and approaches in Ha Tinh and other provinces in Central Viet Nam.

10. FINANCIAL REPORT

Total funds received: **EUR 628,824**

Use of funds in the period: See details below

No	Expenditure line	Accumulative Expenditure of previous periods	Expenditure in current period	Total accumulative expenditure up-to-date	Budget lines as agreement	Budget balance	Burning rate (%)
1	Staff	241,955	69,716	311,671	341,288	29,617	91%
2	External Experts/Consultant	30,395	15,706	46,100	49,648	3,548	93%
3	Transportation/travel costs	6,020	16,327	22,347	24,000	1,653	93%
4	Training costs	53,951	33,346	87,297	74,552	(12,745)	117%
5	Procurement of Goods	7,295	-	7,295	7,400	105	99%
6	Other costs	142,649	24,804	167,452	145,545	(21,907)	115%
7	Indirect costs (16%)	76,907	25,866	102,773	102,789	16	100%
8	CGIAR Systems Fee (2%)	11,415	3,777	15,192	14,904	(288)	102%
	Total:	**570,586**	**189,542**	**760,128**	**760,128**	**0**	**100%**

Balance of funds: - EUR 77,704

Accumulative matching funds contributed by ICRAF up to the Project end at 30 June 2022: **EUR 163,655.**

Narrative of status and challenges

The COVID-19 pandemic had serious negative impact, delaying the implementation of field activities owing to social distancing and travel restrictions.

The Project team together with local partners adapted flexibly with adaptive solutions to overcome the challenging situation to ensure progress.

A quite large remaining fund was discussed and re-assigned from the personnel line to activities, including homegarden improvement (operated by FU) and sustainable EbA/CSA demonstration (operated by the Extension Center).

Thanks to the local partners and endless efforts of the Project team, almost all activities were carried out and the funding used as planned.

We would like to extend our sincere thanks to the Government of Germany and GIZ for the tremendous financial and other support to ICRAF and the Project over the three years. We believe that together we made good changes and impact for local people.

ANNEXES

Annex 1.1a. Policies enabling EbA/CSA implementation in Ha Tinh and nationally

Policy code	Issued by	CSA indicators[15]	Components and technologies if specify
National level			
173/TB-VPCP Announcement- building the model new-style rural area and homegarden demonstration models	Prime Minister (PM)	1, 3	Homegarden improvement, homegarden demonstration model, VietGAP.
QĐ 1600/2016/QĐ-TTg The National Target Programme on building new rural areas in the 2016–2020 period	PM	1,2,3	OCOP, market links.
QĐ 1980/2016/QĐ-TTg The national indicators for the new rural commune in the period 2016–2020	PM	1,2,3	Cooperative or farmers' groups with market links, environment, and food safety.
QĐ 899/2013/QĐ-TTg The project on agricultural restructuring towards raising added value and sustainable development	PM	1, 2,3	▪ Homegarden improvement, integrated systems (VAC, agroforestry, diversification), VietGAP/Global GAP, stress-tolerant crop varieties, mulching, crop residue management/recycling, reduced inputs, water-use efficiency (drip irrigation), water harvesting. ▪ Livestock: change feed formulae/fermented and high-quality feed, waste management/recycle (composting, biogas, EM products, biochar, etc), aquaculture (VietGAP, improved shrimp farming). ▪ Natural forest enrichment and regrowth: manage and use natural forests in a sustainable manner, replace inefficient areas with high-yield timber plantations, improve forest quality, regenerate natural forest, payment for environmental services. ▪ Increase forecasting capacity, regular update to improve provincial action plans, upgrade early warning and weather forecasts.

[15] CSA indicators: Food security=1, Adaptation=2, Mitigation=3

Policy code	Issued by	CSA indicators[15]	Components and technologies if specify
QĐ 819/2016/QĐ-BNN-KHCN Action plan on climate-change response of agriculture and rural development sector	MARD	1,2,3	▪ CSA, EbA, VietGAP, integrated homegarden (VAC, agroforestry, crop diversification), mulching, adjusting crop calendar, adjust farming practices, using tolerant crop/species, crop residue management/ recycling, water use efficiency (drip irrigation), water harvesting, ▪ Livestock: change feed formulae, fermented and high-quality feed, hardy livestock breeds, improved livestock cages, aquaculture (EbA, Integrated Food-Energy Systems, agroforestry, rice–fish, rice–shrimp, improved shrimp farming, etc). ▪ Restore mangrove forests and protect coastal forests and watersheds. ▪ Natural forest: manage and use natural forests in a sustainable manner, replace inefficient areas with high-yield timber plantations, improve forest quality, regenerate natural forest, PES. ▪ Plantation forest: conversion towards multi-purpose trees, fruit trees, NTFPs and animal husbandry in the areas that can be converted. ▪ Increase forecasting capacity, regular update to improve provincial action plans, upgrade early warning and weather forecasts.
QĐ 891/QĐ-BNN-KHCN The implementation plan of MARD for the Paris Agreement on climate change for the period 2021–2030	MARD	1,2,3	Low carbon emission and climate-smart agriculture: stress-tolerant varieties, convert to resilient crops/livestock adapted to climate change, pests and diseases prevention and control.
QĐ3969/QĐ-BNN-KN The list of central agricultural extension projects to be implemented in the period of 2021–2023	MARD	1,2	Homegarden demonstration model, organic rice with market links, VietGAP and diversified citrus varieties (orange, pomelo) to extend harvesting time, tea with market links, fruit trees linked with OCOP products.
Provincial level			
NQ 123/2018/NQ-HDND and NQ 255/2020/NQ-HDND Resolution to support (agriculture, forestry, aquaculture) production and	Provincial People's Council	1,2,3	Homegarden improvement, citrus seedlings, drip irrigation, VietGAP, OCOP, livestock waste management.

Policy code	Issued by	CSA indicators[15]	Components and technologies if specify
processing to encourage development of agriculture, new rural and urban commercial areas in Ha Tinh Province for period of 2019–2021			
QĐ 59/2015/QĐ-UBND Criteria for building new demonstration models for rural gardens	Provincial People's Committee (PPC)	1,2,3	Homegarden improvement, citrus seedlings, drip irrigation, water/energy use efficiency (drip irrigation), livestock waste management.
QĐ 05/2017/QĐ-UBND Promulgating norm that satisfies the criterion of new rural areas in the period 2017–2020	PPC	1,2,3	Homegarden improvement, water/energy use efficiency (drip irrigation), livestock waste management.
QĐ 786/2019/QĐ-UBND The plan for restructuring the agricultural sector of Ha Tinh Province in the period of 2019–2020 and the following years	PPC	1,2,3	Reduce chemical fertilizer and pesticides, produce safe, VietGAP or organic products, improved alert system for pests and diseases, water-saving irrigation technology, diversified harvesting time/extended harvesting period, convert low-production rice areas (5000 ha) in water-scarce places, mountainous areas and near coastal areas into other crops or feed crops for livestock.
QĐ 2914/QĐ- UBND The plan for implementing the Paris Agreement on climate change in Ha Tinh Province	PPC	1,2,3	Implement integrated ecosystem-based and community-based climate change adaptation through ecosystem services, biodiversity conservation, indigenous knowledge. Implement targeted programme on sustainable aquaculture development. Adjust crops/variety and farming calendars to adapt to climate variability and change.
District level			
NQ 40/2019/NQ-HDND Resolution to support (agriculture, forestry, aquaculture) production and processing	Can Loc District People's Council	1,2,3	Homegarden improvement, fruit trees (orange, pomelo, guava, dragonfruit), bio-fertilizer production, mushroom, conversion of low-production paddy and lowland areas into aquaculture (fish: chinh (Anguilla spp), loc (snakehead fish), leo (Wallago attu), dieu hong (red tilapia); and giant river prawn)

Policy code	Issued by	CSA indicators[15]	Components and technologies if specify
Document No.3579 /UBND-NN Agricultural planning for 2021 of Can Loc District	Can Loc District People's Committee	1,2,3	Increase 100 ha fruit-tree-based farming system in 2021. Aquaculture (rice–fish, giant river prawn, fish — chinh (Anguilla spp.), dieu hong (red tilapia), ro phi (tilapia) — increase from 379 ha in 2020 to around 570 ha in 2021.
NQ 167/2020/NQ-HDND Resolution to support agriculture, rural development, new rural and urban development and OCOP in Huong Son District, Ha Tinh Province in 2021	Huong Son District People's Council	1,2,3	Citrus-based farming practices (Bu, Chanh and Đường orange, Da Xanh pomelo), trials to improve fruit quality (to increase brix concentration) of orange, homegarden improvement, conversion of paddy rice into other plants for livestock raising or freshwater aquaculture, goat raising (Bach Thao and Boer goat varieties), commercial tea, geographical identification of Huong Son flagship products, support farmers to join market events to introduce OCOP agricultural products to other districts and provinces.

Annex 1.2a. VSLA-ag groups established under the Project as of June 2022

Group name	Date Established (m/y)	Location	Total members (people)			Group funds (VND million)	Group loans (VND million)	No. HHs obtaining loans for agriculture	Loans invested in CSA practices
			Total	Male	Female				
VSLA Lang Lau 1	Sep 2021	Vuong Loc Commune, Can Loc District	25	24	1	14.7	14	3	Yes
VSLA Hong Linh 1	Sep 2021	Vuong Loc Commune, Can Loc District	25	23	2	21.3	20	4	Yes
VSLA Hong Vuong 1	Sep 2021	Vuong Loc Commune, Can Loc District	25	17	8	15	15	3	Yes
VSLA Lang Moi 1	Sep 2021	Vuong Loc Commune, Can Loc District t	25	21	4	12	10	2	Yes
VSLA Bac My	Nov 2021	Dong Loc Town, Can Loc District	33	5	28	18.1	15	3	Yes
VSLA Tan Huong	Nov 2021	Dong Loc Town, Can Loc District	30	17	13	15.5	10	2	Yes
VSLA Khe Tho 1	Nov 2021	Dong Loc Town, Can Loc District	29	24	5	14.3	12	3	Yes
VSLA Khe Tho 2	Nov 2021	Dong Loc Town, Can Loc District	32	10	22	23	20	4	Yes
VSLA Nam Xuân 1	Sep 2021	Ky Tay Commune, Ky Anh District	25	20	5	17	15	3	Yes
VSLA Nam Xuan 2	Sep 2021	Ky Tay Commune, Ky Anh District	20	18	2	11	10	2	Yes
VSLA Dong Xuan 1-group 1	Sep 2021	Ky Tay Commune, Ky Anh District	28	10	18	17.4	15	3	Yes
VSLA Dong Xuan 1-group 2	Sep 2021	Ky Tay Commune, Ky Anh District	28	6	22	18.2	18	3	Yes
VSLA Phuc Dong 11	Jan 21	Phuc Dong Commune, Huong Khe District	20	10	10	16.3	15	3	Yes
VSLA Phuc Dong 7	Jan 21	Phuc Dong Commune, Huong Khe District	20	6	14	14.1	14	2	Yes
VSLA Phuc Dong 3	Jan 21	Phuc Dong Commune, Huong Khe District	26	10	16	19.5	18	3	Yes
VSLA Phuc Dong 1	Jan 21	Phuc Dong Commune, Huong Khe District	21	12	9	17	15	3	Yes
VSLA Binh Phuc 1	Jan 21	Loc Yen Commune, Huong Khe District	25	8	17	24	24	5	Yes
VSLA Binh Phuc 2	Jan 21	Loc Yen Commune, Huong Khe District	25	10	15	22.7	21	4	Yes

Group name	Date Established (m/y)	Location	Total members (people)			Group funds (VND	Group loans (VND	No. HHs obtaining loans for	Loans invested in CSA
VSLA Huong Giang 1	Jan 21	Loc Yen Commune, Huong Khe District	22	2	20	31.5	30	6	Yes
VSLA Huong Giang 2	Jan 21	Loc Yen Commune, Huong Khe District	20	2	18	22	20	4	Yes
VSLA Son Hong 5	Apr 21	Son Hong Commune, Huong Son District	20	5	15	9	5	1	Yes -
VSLA Son Hong 3 and 10	Apr 21	Son Hong Commune, Huong Son District	24	14	10	13.2	10	2	Yes
VSLA Son Hong 9	Apr 21	Son Hong Commune, Huong Son District	19	9	10	17.1	15	3	Yes
VSLA Son Hong 4	Apr 21	Son Hong Commune, Huong Son District	25	7	18	11	10	2	Yes
VSLA Phu Minh 1	Mar 22	Ky Phu Commune, Ky Anh District	25	12	13	14	10	2	Yes
VSLA Phu Minh 2	Mar 22	Ky Phu Commune, Ky Anh District	24	12	12	12.4	11	2	Yes
VSLA Phu Tan 1	Mar 22	Ky Phu Commune, Ky Anh District	29	15	14	18.3	15	3	Yes
VSLA Phu Tan 2	Mar 22	Ky Phu Commune, Ky Anh District	25	15	10	17	17	3	Yes -
VSLA Vuc Rong	Mar 22	Son Tien Commune, Huong Son District	28	18	10	12	10	2	Yes
VLSA Tan Tien	Mar 22	Son Tien Commune, Huong Son District	29	21	8	18.1	15	3	Yes
VSLA Ao Tron, Dong Eo, Ngoc Son	Mar 22	Son Tien Commune, Huong Son District	32	22	10	15	10	2	Yes
VSLA Con Son	Mar 22	Son Tien Commune, Huong Son District	31	27	4	12	12	2	Yes
Total			815	432	383	533	471	92	

Annex 1.2b. Commune information based on selection indicators

District and Commune	Indicator													
	Potential to implement scalable EbA/CSA interventions				**High risk of climate change exposure until 2040s**	**High impact of past disasters**		**High vulnerability (to extreme weather events)n**				**Strong partners**		**Willingness to participate**
	Hectare of designated forest and agriculture area (ha)	Share monoculture (ha)	Distance to natural resources (Yes/No)	Distance to "township sprawl" and industrial zones (km)	Area potentially at risk of increasing exposure to Climae change (Yes/No)	Area affected of each, per year over past 5-10 years (ha)	Infrastructure damages (road, dams, irrigation etc)	Poor household (%)	Near poor household ratio (%)	Other livelihoods (besides agriculture)	High dependency on agriculture for livelihoods (Yes/No)	Number of active extension and FU staff (Yes/No)	CSA/EbA-like demonstration models exist in the commune (Yes/No)	Commune and village leaders show active engagement and own ideas, Willingness to let meeting room for meetings/trainings Existing or potential to form farmer groups (Yes/No)
Huong Son district														
Son Hong	18395	298	Yes	26	Yes	297	High	7	NA	Low	Yes	Yes	Yes	Yes
Son Tien	3757	930	Yes	16	Yes	930	High	7	9	Low	Yes	Yes	Yes	Yes
Can Loc district														
Thien Loc	699	450	Yes	2,5	Yes	600	Moderate	2.6	3.6	Moderate	Yes	Yes	Yes	Yes
Vuong Loc	1132	655	Yes	1	Yes	200	Moderate	3.6	6.6	Low	Yes	Yes	Yes	Yes
Gia Hanh	939	825	1 km far	11	Yes	250	Moderate	3.4	NA	Low	Yes	Yes	Yes	Yes
My Loc	549	450	Yes	13	Yes	400	No	4.8	5.0	High	Yes	Yes	Yes	Yes
Phu Loc	1109	842	2km far	17	Yes	300	Moderate	3.6	5.4	Low	Yes	Yes	Yes	Yes
Dong Loc	697	300	Yes	10	Yes	697	Moderate	3.2	7.6	Low	Yes	Yes	Yes	Yes
Huyện Thạch Hà														
Tan Lam Huong	1267	1041	No	4	Yes	80	NA	4	6	Moderate	Yes	Yes	Yes	Yes
Thach Khe	563	259	Yes	7	Yes	70	NA	2,9	4,2	Moderate	Yes	Yes	Yes	Yes
Thach Lien	543	427	Yes	7	Yes	60	NA	2,9	2,8	Moderate	Yes	Yes	Yes	Yes

NA = No information

Source: district and commune government staff

Annex 1.2c. Summary of reviewed EbA/CSA practices in Ha Tinh

Adm. level	No. practices	Main components	Key improved EbA technology, management	Target ecosystem functions to improve
Province	150	▪ Native tree species ▪ Fruit trees, orange, pomelo ▪ Dragon fruit ▪ Medicinal plants, including ginger, turmeric, lemongrass ▪ Grass (guinea, mulato, Arachis pintoi) ▪ Pineapple ○ Annual crops (vegetables, leguminous crops etc) ○ Rice ○ Livestock (cow, goat) ○ Honeybee ○ Freshwater aquaculture (shrimp, fish) ○ Mushroom	▪ Natural forest enrichment ▪ Improved irrigation, drip irrigation ▪ Water harvesting (pond) ▪ Agroforestry, contour planting, shade trees, windbreak trees, grass strips, pineapple strips ▪ Integrated/diversified homegarden ▪ Waste management (composting, vermicompost, biogas, bio-bedding) ▪ Mulching ▪ VietGAP, organic production, organic-oriented production ▪ Improved livestock breed and cage ▪ Solar power ▪ Market smart	▪ Production ▪ Soil nutrients ▪ Water flow ▪ Soil moisture ▪ Soil erosion ▪ Slope stabilization ▪ Carbon sequestration ▪ Microclimate regulation ▪ Biological diversity (field) ▪ Soil biota ▪ Control or reduce pollutants/ contaminants ▪ Enhance landscape connectivity
Can Loc District	22	▪ Fruit trees, orange, pomelo ▪ Dragonfruit ▪ Medicinal plants: gấc (*Momordica cochinchinensis)*, cà gai leo (*Solanum trilobatum)*, lemongrass, turmeric) ▪ Grass ▪ Local onion	▪ Improved irrigation, drip irrigation ▪ Agroforestry ▪ Integrated/ diversified homegarden ▪ Waste management (composting) ▪ VietGAP/safe production ▪ Mulching	▪ Production ▪ Soil nutrients ▪ Water flow ▪ Soil moisture ▪ Soil erosion ▪ Slope stabilization ▪ Carbon sequestration

Adm. level	No. practices	Main components	Key improved EbA technology, management	Target ecosystem functions to improve
		▪ Vegetables for seedlings and consumption ▪ Rice ▪ Rice-duck/fish ▪ Livestock (cow, goat) ▪ Honeybee ▪ Giant river prawn ▪ Mushroom		▪ Microclimate regulation ▪ Biological diversity (field) ▪ Soil biota
Huong Son District	22	▪ Fruit trees, e.g. orange, pomelo, guava, canarium ▪ Annual food crops ▪ Medicinal plants (ginger, turmeric) ▪ Grass (guinea, mulato) ▪ Livestock (cow, goat) ▪ Honeybee ▪ Mushroom	▪ Drip irrigation ▪ Agroforestry ▪ Integrated/ diversified homegarden ▪ Waste management (composting) ▪ VietGAP/safe production ▪ Mulching ▪ Improved livestock breed and cage	▪ Production ▪ Soil nutrients ▪ Water flow ▪ Soil moisture ▪ Soil erosion ▪ Slope stabilization ▪ Carbon sequestration ▪ Microclimate regulation ▪ Biological diversity (field) ▪ Soil biota

Annex 1.3a. Number of delivered seedlings supported by the Project under Homegarden Improvement programme 2021–2022

Order	District/commune	No. of households	No. of seedlings by fruit types and location (seedlings)													
			Pomelo (Da Xanh, Phuc Trach)	Thai jackfruit (red, yellow)	Guava (Dai Loan, Rubi, Nu Hoang)	Litchi	Orange (V2, Gion, Bu)	Mango (Dai Loan, Thai)	Longan	Sapote	Thai custard apple	Tu Thoi Lime	Jujube	Persimmon	Coconut	Total
A	Can Loc district	264	1542	2881	2227	60	567	20	40	0	529	240	0	20	60	8186
1	Dong Loc commune		570	1950	1670	60	310	20	40			240		20	60	4940
2	Thuong Nga commune		120	120	120		120				120					600
3	Phu Loc commune		45	200	146		0				223					614
4	Vuong Loc commune		100	115	0		120				0					335
5	Xuan Loc commune		212	42	106		0				0					360
6	Son Loc commune		150	95	0		17				166					428
7	Gia Hanh commune		135	190	0		0				20					345
8	Trung Loc commune		210	169	185		0				0					564
B	Ky Anh district	400	3654	0	1825	3289	330	60	345	430	0	0	70	0	0	10003
9	Ky Lac commune		1225	0	1750	455	0						70			3500
10	Ky Tay commune		2429	0	75	2834	330	60	345	430						6503
C	Huong Son district	720	6440	6425	3717	0	560	0	0	0	0	0	0	0	0	17142
11	Son Tien commune		1523	2354	1517		0									5394
12	Son Hong commune		2849	0	1191		0									4040
13	Son Linh commune		933	1218	266		329									2746
14	Son Giang commune		371	1430	280		231									2312
15	Son Chau commune		764	1423	463		0									2650
D	Huong Khe district	927	8279	5724	2569	126	75	1140	156	100	0	0	0	0	0	18169
16	Loc Yen commune		945	0	0		0									945
17	Phuc Dong commune		1800	1740	985	126	0		156							4807
18	Huong Lien commune		390	0	310		0									700
19	Huong Lam commune		1440	720	0		0									2160
20	Ha Linh commune		939	837	428		75									2279
21	Huong Binh commune		221	815	348		0	416								1800
22	Huong Thuy commune		1206	385	0		0	215								1806
23	Hoa Hai commune		938	977	498		0	509								2922
24	Dien My commune		400	250	0		0			100						750
	Total	2311	19915	15030	10338	3475	1532	1220	541	530	529	240	70	20	60	53500

Annex 1.3b. Indicators for EbA/CSA intervention selection

Intervention	Meet CSA indicators	Has been tested in the selected SES	High interest among farmers to implement and co-invest	Scalability, feasibility with plans and policies
Integrated homegarden improvement	✓	✓	(1)	(2)
Apiculture	▫	▫	(3)	(4)
Drought-tolerant grass for livestock raising	(1)	(2)	(3)	(4)
Local onion and mung bean rotation, associated with OCOP product chain	(5)	(6)	(7)	(8)
Giant river prawn and freshwater fish with tree crops	(9)	(10)	(11)	(12)

✓ = Meets the requirement

Annex 1.3c. Summary of shortlisted EbA/CSA practices at project sites

Name of practice	Main components	Key improved technology, management	Target ecosystem function benefits EbA/CSA indicator	Policy support
Can Loc District				
Integrated homegarden improvement	▪ Grafted fruit trees: orange (Chanh, Bu, V2), pomelo, guava ▪ Pineapple and/or guinea grass ▪ Cover crops: *Arachis pintoi* or seasonal crops for the first 2–3 years: vegetables, local onion, beans or pest-repellent plants	▪ Contour planting of trees, spaced 4x5 m ▪ 'Taungya' cropping (food crops while tree canopy develops ▪ Pineapple and/or grass double strips along contour lines, spaced 40x50 cm ▪ Mulching, composting ▪ Drip irrigation as necessary	**Food security** ▪ Diversified products and incomes ▪ Increased product quality ▪ Increased resource-use efficiency ▪ Increased income by Year 4 **Adaptation** ▪ Increased microclimate regulation: shade trees ▪ Reduced direct soil evaporation: trees, mulching, composting ▪ Increased water-use efficiency ▪ Risk diversification: spread harvesting time of products and apply technical skills to the management of trees and crops **Mitigation and ecosystem services** ▪ Reduced soil erosion ▪ Increased recycled crop	**Can Loc District** ▪ Resolution 40/NQ-HĐND **Ha Tinh Province** ▪ Resolution 123/NQ/HĐND, ▪ Decision 59/2015/QĐ-UBND ▪ Decision 05/2017/QĐ-UBND ▪ QĐ 786/2019/QĐ-UBND ▪ QĐ 2914/QĐ-UBND **National** ▪ 173/TB-VPCP ▪ QĐ 1600/QĐ-TTg ▪ QĐ 899/QĐ-TTg ▪ QĐ 819/QĐ-BNN-KHCN ▪ QĐ 891/QĐ-BNN-KHCN QĐ3969/QĐ-BNN-KN

Name of practice	Main components	Key improved technology, management	Target ecosystem function benefits EbA/CSA indicator	Policy support
			residue ▪ Reduced chemical fertilizer and pesticides ▪ Increased tree cover, aboveground biomass, field biota ▪ Improved soil-nutrient level ▪ Connects diverse landscapes with trees and agroforestry	
Honeybee raising based on existing homegarden and forest ecosystem	▪ Honeybees: native to the area ▪ Existing trees and crops (for example, fruit, timber and native tree species in homegardens, orchards, forest gardens)	▪ Agroforestry ▪ Apiculture Improved quality of farmed beehives to reduce wild-honey and bee extraction from forests	**Food security** ▪ Diversified products, opportunity for further product development ▪ Increased and diversified incomes ▪ Increased resource-use efficiency (tree-crop ecosystems for bees) ▪ Improved product quality) **Adaptation** ▪ Climate-suitable honeybee: species native to the area ▪ Increased microclimate-regulation: trees provide shade for bees ▪ Risk diversification: spread harvesting time of products and apply technical skills to the management of bees	**Can Loc District** ▪ Resolution 40/NQ-HĐND, Document No.3579 /UBND-NN **Ha Tinh Province** ▪ Resolution 123/NQ/HĐND, ▪ Decision 59/2015/QĐ-UBND ▪ Decision 05/2017/QĐ-UBND ▪ QĐ 786/2019/QĐ-UBND ▪ QĐ 2914/QĐ-UBND **National** ▪ 173/TB-VPCP ▪ QĐ 899/QĐ-TTg ▪ QĐ 819/QĐ-BNN-KHCN ▪ QĐ 891/QĐ-BNN-KHCN QĐ3969/QĐ-BNN-KN

Name of practice	Main components	Key improved technology, management	Target ecosystem function benefits EbA/CSA indicator	Policy support
			Mitigation and ecosystem services ▪ Maintained biodiversity of forest ecosystem (reduced wild bee extraction from forests) ▪ Reduced chemical fertilizer and pesticides ▪ Increased field biota	
Local onion and mung bean rotation	▪ 'Tăm' onion (*Allium schoenoprasum* L.) ▪ Sesame, beans or leguminous crops, for example, mung bean, black bean and peanut	▪ Organic-oriented input: biofertilizers, biopesticides, compost, green manure ▪ Temporal rotation ▪ Raised bed, 20–25 cm deep, 100–120 cm wide ▪ Rice-straw mulch (cover) ▪ Drought-tolerant species for rotation ▪ Pest-repellent crop (onion)	**Food security** ▪ Increased income/change to higher value crop ▪ Increased land-use efficiency (rotation) ▪ Improved product quality (safe production) ▪ Evenly distributed labour (onion can be harvested/stored in the field for several months) **Adaptation** ▪ Risk diversification: enables extending harvest time of products ▪ Drought tolerant: mulch reduces direct soil evaporation and retains soil moisture for the subsequent crop ▪ Flood adaptation: raised beds reduce risks associated with	**Can Loc District** ▪ Resolution 40/NQ-HĐND, Document No.3579 /UBND-NN **Ha Tinh Province** ▪ NQ 123/2018/NQ-HDND, ▪ QĐ 786/2019/QĐ-UBND ▪ QĐ 2914/QĐ-UBND **National** ▪ QĐ 1600/QĐ-TTg ▪ QĐ 899/QĐ-TTg ▪ QĐ 819/QĐ-BNN-KHCN ▪ QĐ 891/QĐ-BNN-KHCN

Name of practice	Main components	Key improved technology, management	Target ecosystem function benefits EbA/CSA indicator	Policy support
			saturated soils after heavy rain and flooding ▪ Windproof: short/low-lying crops are resistant to strong winds ▪ Onion repels pests: reduced pest and disease problems during abrupt weather changes **Mitigation and ecosystem services** ▪ Using crop residues: straw mulch reduces burning and makes plastic mulch redundant ▪ Soil improvement: organic mulch and compost build up soil organic matter, soil nutrients and biota ▪ Reduced use of chemical fertilizer and pesticides	
Giant river prawn and freshwater fish with agroforestrys	• Giant river prawn (*Macrobrachium rosenbergii*) male juveniles • Various fish: Common carp (*Cyprinus carpio* var. communis), grass carp (*Ctenopharynogodon idella*), silver carp (*Hypophthalmichthys molitrix*), mrigal carp (*Cirrhinus mrigala*) or other	▪ Rotation of fish and prawn ▪ Windbreak, dust and air-pollutant protection, shade trees ▪ Pond-bank stabilizing trees and grasses ▪ Phytoremediation plants for inlet and outlet water	Food security ▪ Diversification of products and income ▪ Increased income in years 2–3 Adaptation ▪ Risk diversification: spread harvesting time of products ▪ Increased microclimate regulation: shade trees,	**District:** ▪ NQ 40/2019/NQ-HDND, Document No.3579 /UBND-NN **Ha Tinh Province:** ▪ QĐ 786/2019/QĐ-UBND, QĐ 2914/QĐ-UBND ▪ Provincial aquaculture plans

Name of practice	Main components	Key improved technology, management	Target ecosystem function benefits EbA/CSA indicator	Policy support
	fish, such as *Anguilla* spp, red tilapia, tilapia. ▪ Trees, e.g. jackfruit, citrus, timber species ▪ Grasses, e.g. guinea or napier as feed for fish ▪ Phytoremediation plants, e.g. common water hyacinth, *Cyperus* spp, *Cyperus alternifolius*, *Phragmites australis*		windbreaks, dust, and air-pollutant protection ▪ Reduced direct soil and water evaporation ▪ Can function as water-harvesting pond, if needed **Mitigation and ecosystem services** ▪ Increased tree cover and aboveground biomass ▪ Water-pollution control (phytoremediation) ▪ Hedgerows, green fencing	**National** ▪ QĐ 899/QĐ-TTg ▪ QĐ 819/QĐ-BNN-KHCN ▪ QĐ 891/QĐ-BNN-KHCN
Huong Son District				
Integrated homegarden improvement	▪ Grafted fruit trees: orange (Chanh, Bu, V2), pomelo, guava ▪ Pineapple and/or guinea grass ▪ Cover crops: *Arachis pintoi* or seasonal crops for the first 2–3 years: vegetables, local onion, beans or pest-repellent plants	▪ Contour planting of trees, spaced 4x5 m ▪ 'Taungya' cropping (food crops while tree canopy develops ▪ Pineapple and/or grass double strips along contour lines, spaced 40x50 cm ▪ Mulching, composting ▪ Drip irrigation as necessary	**Food security** ▪ Diversified products and incomes ▪ Increased product quality ▪ Increased resource-use efficiency ▪ Increased income in Year 4 **Adaptation** ▪ Increased microclimate regulation: shade trees ▪ Reduced direct soil evaporation: trees, mulching, composting	**Ha Tinh Province** ▪ Resolution 123/NQ/HĐND, ▪ Decision 59/2015/QĐ-UBND ▪ Decision 05/2017/QĐ-UBND ▪ QĐ 786/2019/QĐ-UBND ▪ QĐ 2914/QĐ-UBND **National** ▪ 173/TB-VPCP ▪ QĐ 1600/QĐ-TTg ▪ QĐ 899/QĐ-TTg

Name of practice	Main components	Key improved technology, management	Target ecosystem function benefits EbA/CSA indicator	Policy support
			▪ Increased water-use efficiency ▪ Risk diversification: spread harvesting time of products and apply technical skills to the management of trees and crops **Mitigation and ecosystem services** ▪ Reduced soil erosion ▪ Increased recycled crop residue ▪ Reduced chemical fertilizer and pesticides ▪ Increased tree cover, aboveground biomass, field biota ▪ Improved soil-nutrient level ▪ Connects diverse landscapes with trees and agroforestry	▪ QĐ 819/QĐ-BNN-KHCN ▪ QĐ 891/QĐ-BNN-KHCN QĐ3969/QĐ-BNN-KN
Honeybee raising based on existing homegarden and forest ecosystem	▪ Honeybees: native to the area ▪ Existing trees and crops (e.g. fruit, timber and native tree species in homegardens, orchards, forest gardens)	▪ Agroforestry ▪ Apiculture Improved quality of farmed beehives to reduce wild-honey and bee extraction from forests	**Food security** ▪ Diversified products, opportunity for further product development ▪ Increased and diversified incomes ▪ Increased resource-use efficiency (tree-crop ecosystems for bees) ▪ Improved product quality)	**Ha Tinh Province** ▪ Resolution 123/NQ/HĐND, ▪ Decision 59/2015/QĐ-UBND ▪ Decision 05/2017/QĐ-UBND ▪ QĐ 786/2019/QĐ-UBND ▪ QĐ 2914/QĐ-UBND **National**

Name of practice	Main components	Key improved technology, management	Target ecosystem function benefits EbA/CSA indicator	Policy support
			Adaptation ▪ Climate-suitable honeybee: species native to the area ▪ Increased microclimate-regulation: trees provide shade for bees ▪ Risk diversification: spread harvesting time of products and apply technical skills to the management of bees **Mitigation and ecosystem services** ▪ Maintained biodiversity of forest ecosystem (reduced wild bee extraction from forests) ▪ Reduced chemical fertilizer and pesticides ▪ Increased field biota	▪ 173/TB-VPCP ▪ QĐ 899/QĐ-TTg ▪ QĐ 819/QĐ-BNN-KHCN ▪ QĐ 891/QĐ-BNN-KHCN • QĐ3969/QĐ-BNN-KN
Drought-tolerant grass	▪ Guinea grass	▪ Drought-tolerant grass crop	**Food security** ▪ Increased quality feed for livestock ▪ Reduced inputs of buying feed for livestock ▪ Increased circular agriculture/resource use efficiency **Adaptation** ▪ Drought-, shade- and fire-	**Ha Tinh Province** ▪ QĐ 786/2019/QĐ-UBND ▪ QĐ 2914/QĐ-UBND **National** ▪ QĐ 899/QĐ-TTg ▪ QĐ 819/QĐ-BNN-KHCN ▪ QĐ 891/QĐ-BNN-KHCN

Name of practice	Main components	Key improved technology, management	Target ecosystem function benefits EbA/CSA indicator	Policy support
			tolerant grass ▪ Grass recovers fast after droughts, whirlwinds and storms compared to crops like rice, maize or cassava ▪ Regulates soil moisture content (grass cover for 5–6 years continuously) **Mitigation and ecosystem services** ▪ Deep roots that bind soils and reduce surface runoff and erosion on sloping land ▪ Reduced use of chemical fertilizers and pesticides compared to other crops, for example, maize, rice	

Annex 2. List of submitted proposals by the Project partners and ICRAF

No.	Title	Submitter	Receiver	Key information/expected results	Submission date	Total fund (USD)	Time period	Site
1	Demonstrating and transferring techniques on the implementation of agroforestry models and	Ha Tinh Extension Center	Ha Tinh DARD	Implement agroforestry models with different components: fruit trees, timber trees, crops, grass, honeybees, livestock. ▪ Manage 16 ha of fruit trees towards organic	February 2021	116,000	2022	Vu Quang District, Ha Tinh Province

No.	Title	Submitter	Receiver	Key information/expected results	Submission date	Total fund (USD)	Time period	Site
	forest garden's ecosystem improvements to adapt to climate change			production. ▪ Plant 1 ha of pineapple along contour lines for soil erosion prevention and income improvement. ▪ Plant 1 ha *Arachis pintoi* to prevent soil erosion, provide feed for livestock and make green manure. ▪ Raise 160 honey beehives. ▪ Plant 1 ha of grass for fodder. ▪ Recycle crop residues from agroforestry systems to produce 100 tonnes of compost/year. ▪ Forest: protect 100 ha of natural forest, plant an additional 10,000 local trees, plant medicinal trees under a forest canopy for diversification and income generation. ▪ Raise awareness of climate-change adaptation through field visits, training, and workshops for 1000 people.				

No.	Title	Submitter	Receiver	Key information/expected results	Submission date	Total fund (USD)	Time period	Site
2	Developing community which promotes forest gardens' ecosystems for climate change adaptation and experiential eco-tourism	Ha Tinh Extension Center	Initiative for community development which was co-organized by the editorial department of *Communist Magazin*e, the Ministry of Science and Technology, the Vietnam General Confederation of Labor and Vietnam Electricity	Same as the proposal "Demonstrating and transferring techniques on the implementation of agroforestry models and forest gardens' ecosystem improvements to adapt to climate change" but with a focus on the landscape level to establish homogenous agroforestry implementation in certain areas for eco-tourism services.	25 May 2021	200–2500 (depends on the price)	2022	Tho Dien Commune, Vu Quang District, Ha Tinh Province
3	Develop organic-oriented citrus production areas in a production chain, linked with product branding	Ha Tinh Extension Center	Ha Tinh DARD	Demonstrate 10 ha of organic-oriented citrus production areas. Products will be certified with the OCOP brand. Improve chances for marketing organic-oriented products: ▪ Organise events for farmer groups to meet buyers and private sector ▪ Develop websites/online forums for advertising organic-oriented products	24 May 2021	24,000	2022	Dong Loc Commune, Can Loc District, Ha Tinh Province

No.	Title	Submitter	Receiver	Key information/expected results	Submission date	Total fund (USD)	Time period	Site
4	Applying advanced science and technology to the implementation of agricultural interventions associated with eco-tourism for household economic improvement and climate change adaptation	Ha Tinh Farmers' Union	Ha Tinh Department of Science and Technology	○ Improve farmers' livelihoods through implementation of integrated interventions (e.g. agroforestry) towards eco-tourism services and adaptation to climate change. Expecting to establish 20–50 agricultural interventions with: ▪ Components of trees, crops, ornamental plants, pest- and disease-repellent plants, and livestock (fishpond, poultry etc.) or the garden-pond-livestock model. ▪ Technologies: diversified farming systems, contour planting on sloping land, composting, using plants to repel pests and diseases, drip irrigation, applying a climate information service during planning and implementation. ○ Improve knowledge of soil management and market development. ○ Improve the responsibility of farmers towards sustainable agricultural production and natural	20 April 2021	65,000	2022	Son Hong Commune, Huong Son District, Ha Tinh Province

No.	Title	Submitter	Receiver	Key information/expected results	Submission date	Total fund (USD)	Time period	Site
				resource management, especially in the context of COVID-19. o Document and disseminate local knowledge of natural resource management. o Organise events and disseminate project information through multiple communication channels to promote eco-tourism.				
5	Improving livelihoods associated with natural resource conservation for farmers in Vu Quang District in the context of climate change and COVID-19 impacts	Ha Tinh Farmers' Union	UNDP Small Grant Program in Vietnam	▪ Improve farmers' livelihoods through adoption of agroforestry interventions, associated with soil erosion and degradation, biodiversity conservation and protection of ecosystems surrounding Vu Quang national park. Expecting to establish 40–70 agroforestry models. ▪ Improve capacity of farmers to adapt to climate variability and change. ▪ Raise awareness of farmers of forest fire protection and natural resource management, especially in the context of COVID-19. ▪ Document and share local knowledge of natural	26 March 2021	50,000	2022	Vu Quang District, Ha Tinh Province

No.	Title	Submitter	Receiver	Key information/expected results	Submission date	Total fund (USD)	Time period	Site
				resource management.				
6	Agroforestry with biocontrol to move towards healthier agro-environments	ICRAF	Ekhagastiftelsen	Agroforestry utilises biological pest control, such as repellent and attractor plants, to guide pests to or from a location to reduce pesticide use. This practice has potential within EbA landscapes to promote agrobiodiversity and biological pest control instead of the business-as-usual practice of chemical applications.	20 May 2021	140,000	2022	Ha Tinh Province
7	Marketing networks for EbA products in Ha Tinh	ICRAF	IUCN/global EbA fund ([link](#) to the call)	The Project will add value to all ongoing EbA/CSA projects in Ha Tinh Province, including those that are locally funded, which focus on developing EbA models (practices) and bridging through agro-climatic information interventions. However, none of the projects have a component to connect farmers with markets or build their capacity to do so. This proposed project fits exceptionally well with the Support to Implement the Paris Agreement, which will explicitly scale five EbA models from 250 direct beneficiaries to 10,000 households.	30 April 2021	250,000	2022	Ha Tinh Province

No.	Title	Submitter	Receiver	Key information/expected results	Submission date	Total fund (USD)	Time period	Site
8	Resilience capacity and Climate-Smart Agriculture for the ethnic minority communities in A Luoi District, Hue province	Centre for Rural Development under Hue University of Agriculture and Forestry	IKI Small Grants	The overall outcome aims to support impoverished ethnic communities in central Vietnam with livelihoods that can adapt to adverse climate impacts and, in the long term, contribute to restoring degraded landscapes. To kick-start activities, the Project will seek to interact with EbA/CSA sites in Ha Tinh Province. Lessons will be learned from the climate-smart village and the the Project project. It is argued that peer exchange can provide motivation and mentorship to build a community of good practices in both locations, through “roving workshops” and exchange visits. Through the roving workshop, farmers will see and analyse different landscapes and solutions, and establish farmer-to-farmer mentoring networks.	February 2021	122,000	2022	Hue Province
9	Integrated approaches to climate resilience in the uplands of Southeast Asia	ICRAF, Swedish University of Agriculture, and Hue University Agriculture and Forestry	Swedish Research Link	This network will specifically collect scalable evidence on resilient land use models from and with applications for Central Vietnam by establishing a research network in the region.	2021	83,598	2022–2023	Central Viet Nam
10	People, Primates, Plants: Co-	ICRAF, Botanic Gardens	Darwin Initiative	Key focus: Tuyen Hoa’s forest biodiversity, including the rare Ha Tinh langur and ebony and	Stage 1: September 2021	696,702	2022–2025	Quang Binh Province

No.	Title	Submitter	Receiver	Key information/expected results	Submission date	Total fund (USD)	Time period	Site
	managing Biodiversity and Improving Livelihoods in Vietnam	Conservation International and Center for Highland Natural Resource Governance Research		legume trees, which are threatened by habitat conversion and over-exploitation. This project will build capacity of local people to draw on alternative livelihood options through agroforestry and participation in forest restoration, provide practical examples of community co-management of Special-use Forest in the short-term, whilst serving as models for replication in national policy frameworks in the long-term. The Project will draw on experience in livelihood improvement and biodiversity conservation from Ha Tinh Province, where agroforestry and ecological restoration as alternatives to tree plantations and crop monocultures have been tested.	Stage 2: January 2022			

Annex 3. Guidelines and instruments for integrating EbA/CSA in land-use and development planning

Land-use planning procedure at national level (Reference: link)

I: First phase

- To collect data and documents and conduct field survey about land-use planning
- To analyse and evaluate results of recent land use
- To develop national land-use plan
- Overview orientation, socio-economic development targets related to national land-use plan
- Determine areas of land use in national planned land use for each 5 years
- Plan land use in 5 years for each socio-economic zone and administrative unit of province
- Allocate land-use criteria in the approved system (session 3, MONRE guideline)
- Determine area of land needing to change purpose of land use in land law
- Determine unused land area
- Determine scale, location, land-use projects in land law
- Estimate revenue and costs
- Develop solutions to implement national land-use plan (solutions for soil protection and improvement, environment protection, resources, implementing and monitoring, and others)
- Create national land-use map, and land-use maps for rice, protection forest, special use forest, production forest, industrial zone, high-tech zone, economic zone, transportation
- Create systematic tables, figures of analysed data, diagrams, and graphs
- Develop reports on land use for rice, protection forest, special use forest, production forest, industrial zone, high-tech zone, economic zone, transportation
- Organize workshops, revise reports and maps
- Evaluate and approve
- To report including evidence

II: Last phase

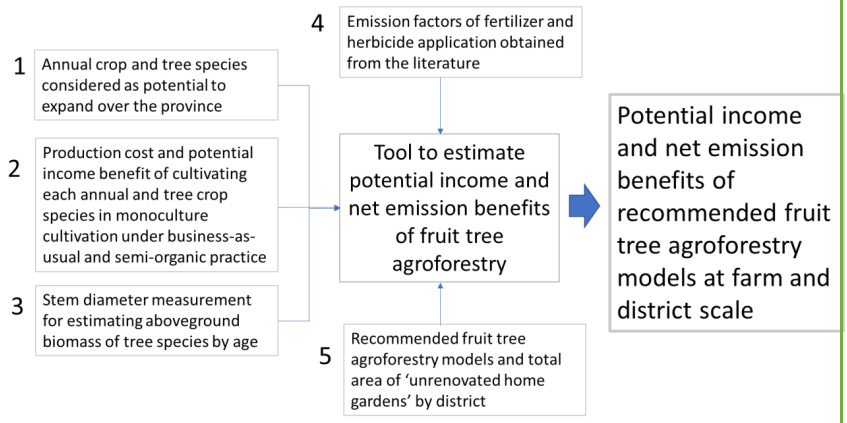
- To collect data and documents and conduct field survey about land-use planning
- To analyse and evaluate natural, socio-economic and environmental conditions impacting on land use
    - To analyse and evaluate of natural conditions, resources, environmental conditions
    - To analyze and evaluate conditions of socio-economic development
    - To analyze and evaluate impacts of climate change on land use: sea-level rise, salinization, desertification, soil erosion, landslides
    - Create land-use maps

- Develop land-use reports
- Organize workshops, revise reports and maps
- Evaluate and approve

- To analyse and evaluate results of recent land use
- To develop national land-use plan
- To report including evidence

Table A2.1. Recommendations to integrate EbA/CSA in the third step of first phase and the second step in the last phase

3rd step: developing land-use plan in the first phase	Guidelines to integrate EbA/CSA in land-use and development planning developed	Instruments
Overview orientation, socio-economic development targets related to national land use plan Determine area of land use in national planned land use for each 5 years for agricultural land: rice, other annual crops, perennial trees, protection forest, special use forest, production forest (including natural forest), aquaculture, salt farming, other agricultural), unused land- functional area: agriculture, forestry Plan land use in 5 years for each socio-economic zone and administrative unit of province Allocate land-use criteria in the approved system (session 3, MONRE guideline) Determine area of land need to change purpose of land use in land law Determine unused land area Determine scale, location, land-use	Justify benefits of integrating EbA/CSA in enabling socio-economic development plan, such as achieving criteria of new rural programme. One of its indicators is the improvement of homegardens Determine suitable EbA/CSA practice Monitor and evaluate effectiveness of interventions	1. The 'talking toolkit' to identify extreme weather events, suitable EbA/CSA interventions 2. Decision analysis in estimating costs and benefits of EbA/CSA interventions The cost–benefit analysis calculation was based on distribution outcomes generated from 10,000 system runs with randomly selected input variables in a Monte Carlo simulation using the decisionSupport R package developed by Luedeling et al (2021) Important uncertainties that affect farm profits were identified using the Variable Importance in Projection score of a Partial Least Squares regression system (Luedeling et al 2021). *Advantages of using the instrument:* Important uncertainties that affect farm profits were identified Benefit indicators of EbA/CSA

3rd step: developing land-use plan in the first phase	Guidelines to integrate EbA/CSA in land-use and development planning developed	Instruments
projects in land law Estimate revenue and costs Develop solutions to implement national land-use plan (solutions for soil protection and improvement, environment protection, resources, implementing and monitoring, and others) Create national land-use map, and land-use maps for rice, protection forest, special use forest, production forest, industrial zone, high-tech zone, economic zone, transportation		 **Figure A2.1**. Five different inputs for estimating income and net emission benefits of fruit tree agroforestry models using the tool To include emission factors from IPCC e.g. IPCC (2006). Guidance for agriculture, forestry and other land use, chapter 11. https://www.ipcc-nggip.iges.or.jp/public/2006gl/vol4.html

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This is the final report of the VN-SIPA's component in Ha Tinh province.

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