

Biodiversity Challenge Funds Projects Darwin Initiative, Illegal Wildlife Trade Challenge Fund, and Darwin Plus Half Year Report

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Submission Deadline: 31st October 2022

Project reference	27-015
Project title	Farms and Forests: Boosting biodiversity and livelihoods in Northern Cambodia
Country(ies)/territory(ies)	Cambodia
Lead partner	Botanic Gardens Conservation International (BGCI)
Partner(s)	Cambodia: National Authority of Preah Vihear (NAPV); Sra-aem Commune Council (Choam Ksant District) Viet Nam: International Center for Research in Agroforestry (ICRAF) (World Agroforestry)
Project leader	<i>Joachim Gratzfeld</i>
Report date and number (e.g. HYR1)	31 Oct 2022 HYR3 (1 Apr – 30 Sep 2022)
Project website/blog/social media	BGCI website: https://www.bgci.org/our-work/projects-and-case-studies/farms-and-forests/ NAPV Facebook and website: https://hi.in.facebook.com/watch/100080583857206/ គម្រោងកសិកម្ម និងព្រៃឈើ Facebook https://napv.gov.kh/ ICRAF website: https://worldagroforestry.org/project/farms-and-forests-boosting-biodiversity-and-livelihoods-northern-cambodia

1. Outline progress over the last 6 months (April – Sept) against the agreed project implementation timetable (if your project has started less than 6 months ago, please report on the period since start up to end September).

Comments on Year 2 annual review report

- Clarify how the project defines ‘employment’ (e.g., in terms of FTE) under Output 3, *Survival of threatened tree species through species recovery plantings, forest restoration activities and related forest management employment opportunities for local people are increased within the PVHS*, Indicators 3.3-3.4.

Employment is defined as hiring for work at either the nursery or in the forest restoration activities. This comprises two categories, permanent employment for the two workers employed at the nursery, and workers hired on a daily basis for forest restoration and nursery management.

Prior to the start of the project, reforestation work was implemented at modest scale. This relied on only 3 labour forces hired by NAPV. With few labourers and a limited budget, reforestation

areas were often affected by forest fires during the dry season. This project has contributed to hiring 6 more workers on a daily basis for reforestation work and efforts to combat fires (e.g. grass clearing and removal of climbers before the dry season), resulting in a smaller area affected by forest fires, and providing evidence of the link between employment and effective reforestation as a result of the project.

Indicator 3.3: Ten community members employed in leadership positions in nurseries by end of project (2023)

2 workers are hired permanently for nursery management. Their roles at the nursery include seed collection, treatment and propagation, potting, weeding, producing fertilizer, etc. Additional 8 workers have been employed on a daily basis, based on budget availability from other sources, in particular from NAPV (US\$ 50 per month) and income from the sale of seedlings. As with the permanent employees, these workers are trained in all aspects of nursery maintenance during their employment at the nursery.

Indicator 3.4: At least 20 community members are employed in tree planting and maintenance activities (500% increase compared to pre-project) by end of year 3 (2023)

The 20 community members engaged in forest restoration and maintenance work are employed on a daily basis when they are not busy with their farming work. Activities include tree planting, tending seedlings and the establishment of firebreaks.

- There seems to be a missing assumption around adequate monitoring/enforcement of PVHS conservation zones and project restoration areas to minimise forest degradation (namely illegal logging, NTFP collection, and burning) by individuals external to the target communities. Review Assumptions and clarify how this has been mitigated through project design or the capacities of NAPV and local authorities.

NAPV employ 6 ranger posts within conservation/buffer zone to monitor entry by members of the local community into the heritage site. In addition, NAPV also have a mobile team of 5 to 7 staff to patrol the forest and monitor any illegal activities such as land clearance and logging. The mobile team patrol the forest 4 times per month, with additional days when needed. All the budget for patrol activities is provided by NAPV. Monitoring of forest fire at the restoration area is carried out in the dry season from December to April.

- Clarify the reasons for lower women's participation in Year 2 Activities and actions to remedy this.

Year 2 activities were mainly related to provision of capacity building to Training of Trainers (ToTs). At present there are a total 22 ToT members from the community and commune council including 7 women, which presents a reduction from the 27 ToT members at the initial project stage. The reason for this is that during the agroforestry characterization assessment, more male-owned farms matched the criteria for selection for further improvement. For agroforestry farms owned by the couple, wives were encouraged to participate in the project as ToT members. In addition, except for nursery workers, project staff include 6 people, of whom only one member is female. Hence, this has generated an imbalance in gender in year 2. Moreover, the project workshop to promote agroforestry systems to the 8 communes of Choam Ksant district was attended by more male members as each commune council nominated their commune representative to participate in the workshop. A barrier for women to participate in the workshops is that they cannot travel to different location as easily as men due to their responsibility for their children. As a result, it is easier to find men willing to live for employment in the remoter areas of the NAPV project site, as well as for joining meetings outside of their villages. To counteract this gender challenge in year 3, the project has encouraged more females to participate in activities and events organised by the project, for example by implementing dissemination activities in the villages, such as village cinemas, which were attended on average by a larger proportion of women (men – women: 40 – 60). Thereby, a higher participation by women can be achieved, and the project will continue to promote this approach.

Progress over the last 6 months (Apr – Sep)

0.1 Establish a project steering committee to guide project activities, monitor progress, and adaptively manage project

The project partners met online on 4 August 2022 to discuss the review report on the project's Year 2 report. The project team highly values the comments and suggestions made by the reviewer/s whilst providing answers to their questions in this half-year report.

1.1 Design and conduct surveys in year 1 and year 3 to characterize and measure the impacts of project on socio-economic systems and wild plant use

Baseline data collection on socio-economy in the four villages was undertaken in year 1, and end line survey on socio-economic to measure the change in their livelihood will be carried out between November and December 2022. The time plan of the Year 3 survey has considered (i) farm households' activities (i.e., the period when they are not largely occupied by field activities), (ii) weather conditions (i.e., not during the rainy season), and (iii) time needed to possibly witness impacts of agricultural interventions, especially crop diversification and income changes (i.e., since March 2022, the project has gradually distributed seedlings of various cash crops such as ginger, egg plants, and chillies, for integration into tree plantations or home gardens of farm households in the four villages). Therefore, the Year 3 survey will be conducted about 6-8 months following the seedlings' distribution. The project also distributed seedlings of perennial cash crops such as coconut and guava, however perennial crops take time to bear fruits and generate income.

1.2 Characterize successful local agroforestry practices in the four sample villages with relatively similar biophysical and climatic conditions, as options for agroforestry models for interventions

Characterization of agroforestry in the four villages was conducted in year 1. Well-designed agroforestry farms were used as a showcase for other ToT members and leaders of the 8 commune council members, as well as other interested community members. Fruit tree farms which have not fully met agreed agroforestry criteria have been supported by the ToT farmers to diversify their farming systems with biennial, annual, and seasonal crops.

1.3 Conduct land suitability analysis for selected tree species combined with the participatory maps of vulnerability level, to identify suitable area for agroforestry development

The land suitability study was conducted in year 1. Based on lab-based study, soil quality has shown to be mainly moderate to poor with pH between 5-6. Based these findings, general observation in the field, compatibility fruit trees ecological needs and climate, consultative discussions with ToT members and recommendations by ICRAF staff and Vietnamese experts, six fruit tree species were selected namely Guava, Jujube, Jackfruit, Pomelo, Coconut, Longan (two varieties – thin and fragrant aril and thick aril) for cultivation in the four villages. The project team is documenting the conceptual and methodological approaches of the land suitability assessment, and key results, in a technical report expected to be available by mid of December 2022.

1.4 Design and conduct study on market opportunities and value chain for key agroforestry and NTFP products from the region in year 1

The study of the market for agricultural products and NTFP was conducted in year 1; further studies of other potential crops to be integrated into agroforestry under this project are undertaken during the third year. This will also include studies of short-lived, short-season crops jointly carried out by the project team and a selected trader.

1.5 Develop recommended agroforestry models for trials, including benefit-cost analysis

Using the collected information from the agroforestry characterisation survey (Activity 1.2), the team identified 10 agroforestry models that could generate relatively high net annual incomes (i.e., that range from USD [REDACTED] per hectare in 2020). Thanks to the survey, the team could also identify economically promising cash crops, either annuals such as chili and eggplant or perennial crops such as climbing wattle, custard apple, and coconut. The team provided and distributed the seedlings of these cash crops to integrate into tree plantations or home gardens of selected farm households in the four villages.

In addition, based on inputs from local farm households and other stakeholders such as traders and village or commune councils as local authorities, the team has developed additional

agroforestry models for trials, and the benefit-cost analysis of these models is ongoing. For example, several herbaceous crop species such as pea eggplant, chili, ginger, pineapple, galangal, and turmeric that are considered potentially commercially viable as well as beneficial for mixed planting into fruit tree agroforestry systems, have also been recommended to farmers for integration into their existing orchards or new farms. Other common short-lived crops such as spring squash, sponge gourd, and long beans are further promoted for cultivation in the four villages during the late rainy season. Additional companion plants such as *Moringa oleifera* and *Acacia (Senegalia) pennata* are also promoted given various advantages such as for soil improvement, health benefits, and marketability. What's more, legume ground cover such as with mung beans has also been encouraged to improve soil quality and to provide additional income.

The agroforestry expert from ICRAF has provided NAPV a suitable template for the benefit-cost analysis. The draft proforma has been discussed among project staff and a consultant and will be reviewed by the project team in November 2022.

2.1 Develop training materials and programs (on agroforestry system development, rural market system development, and small-scale business development) for the training of trainers and pilot farmers

Training materials such as booklets, leaflets and posters developed in year 2, were thoroughly used in first semester of year 3 for dissemination to and capacity building of farmers in the four villages. The leaflet on agroforestry will be reprinted for dissemination to further farmers during the village exchange visits. 13 videos have been produced about agroforestry best practices in cooperation with a PhD student of ICRAF and were disseminated via village cinemas to farmers.

2.2 Design market-based conservation farming and agroforestry on-farm trials/ demonstration plots for training

Agroforestry trial plots have been developed at each ToT's farmer houses, involving the improvement of existing agroforestry farms, and the development of new ones. The trial farms include fruit trees as the main component with key crops provided and distributed by the project as follows:

- Coconut as the main component combined with pineapple or annual crops;
- Jujube as the main component combined with pineapple;
- Longan as the main component combined with pea eggplant;
- Mango as the main component combined with pineapple;
- Custard apple combined with rice;
- Diverse fruit trees combined with sweet potato.

2.3 Provide TOT trainings for villages leaders/ local officials (40 participants) and on-site trainings for 200 community members on market, small-scale business development, conservation farming and agroforestry

- Meetings with farmers were held separately by village - 26 April in Bos Sbov village, 28 April in Sen Chey village, 29 April and 3 May in Sra-aem Khang Cheun village, and 4 May Eco-village. A total of 116 (78 women) village members participated in the gatherings. The meetings aimed to provide community members with knowledge of agroforestry and promote the cultivation of pea eggplant and chili. Posters and leaflets on agroforestry systems were used for illustration. Discussion topics included aspects such as land form, soil type and water availability on the respective farms. A trader who is also a ToT member was invited to share market information on the two crops. Seeds of pea eggplant and chili were distributed to interested farmers.
- Practical training to 68 (44 women) farmers from the four villages, was provided by ICRAF's technical staff and Prof. Tran Thi Thu Ha, a fruit tree expert from Thai Nguyen University of Agriculture and Forestry University of Vietnam on 22-24 May, 2022. The training included an interactive questions and answers session between the experts and the farmers on issues of the farms, technical capacity in cultivation, etc. along with practical exercises on fruit tree planting, grafting techniques, and nursery bed preparation. The experts also highlighted the need of developing semi-organic practices by increasing for instance manure inputs and the use of bio-pesticides, and explained the methods to produce these.

- A training workshop (23 May 2022) on constraints for adoption of fruit tree-based agroforestry was delivered to 24 ToT members and commune council members, of whom 9 participants were women. The training included video display of agroforestry systems, and a group discussion on constraints concerning agroforestry, followed by individual discussions pertaining to wishes to gain more knowledge on techniques of fruit tree planting, pest management, natural pesticide and fertiliser production, processing and packaging, etc.
- On July 19-21, 2022, 88 farmers (56 women) in the four villages of Techo Bos Sbov, Sen Chey, Sra-aem Khang Cheung and the Eco-Village were trained on how to protect their crops and fruit trees from mealybug and fruit fly infestation, which are the major pests in ToT farmers' agroforestry operations. The training was conducted by Lilian Beck, PhD student in extension, and 9 videos were produced for this purpose. The training included displaying the video, discussions about the agroforestry best practices presented, and hands-on practice. Thereby, the videos highlighted agroforestry impact mechanisms and organic, integrated pest management strategies.

2.4 Provide on-going support for establishment and maintenance of on-farm trials for sustainable agroforestry in pilot households through year 2 and 3

Apart from the virtual support, the ICRAF team and one fruit tree expert from Thai Nguyen University of Agriculture and Forestry in Vietnam, visited the four villages in May 2022 and provided pilot households onsite guidance on establishment such as soil preparation and seedling cultivation, and maintenance of fruit tree-based agroforestry such as manure and biopesticide application and pruning techniques. The team also demonstrated different grafting techniques that can allow fruit trees to bear fruits more rapidly. Following the visit, the team provided a list of recommendations to NAPV, that are feasible to implement during the year 3 of the project, to help pilot households improve plot management practices that in turn can expectedly increase crop productivity. In total, 22 ToT farmers were visited on their farms individually to consult with them about their agroforestry systems and the issues they are facing.

2.5 Provide on-going support for market linkages and small business development for pilot households throughout year 1 and 3

The market network has been prepared. ToT members of the four villages and one farmer who is not a ToT member have been selected based on their interest in market development, their potential as entrepreneurs, following agreement among the team. The structure of the market network is simple as presented below:

- Trader to link agri-products from consolidators at each village for sale to local and regional markets: Mr. Sok Pov is selected to be a trader to collect agri-products from collectors in each village and transport them to wholesale shops at local and regional markets. The trader also has a role to identify the potential market of crops, and disseminate related information to village collectors.
- Village collectors/consolidators of agri-products in each village have a role to buy agri-products from farmers/producers in each village and sell to the trader: The village collectors in each village include Mr. Sok Pov in Pos Spov village; Mrs. Ny Sok Heang in Sen Chey village; Mrs. Samrith Vanny, Mrs. Sok San, Mr. Kong Mao and Mr. Eou Sopheap in Eco-village, and Mr. Lun Savoeurn and Hourt Kimheng in Sra-aem Khang Cheung village. Village collectors have additional roles to disseminate potential crops to farmers at each village for cultivation on their agroforestry farms, and to provide technical guidance on cultivation techniques.

This approach will be further finetuned following project team meetings in November 2022.

2.6 Policy recommendations on agroforestry and small-scale business developed and published by end of year 3

An assessment of the trial farms will be conducted in the second semester as a basis to prepare policy recommendations.

3.1 Two nurseries built with 20,000 seedling capacity with required supplies by end of year 2

The project provided contracts to 2 permanent workers for seedling propagation and management of the nursery. Activities relating to the nursery include producing charcoal from rice husk, potting, seedling collection, propagation, and daily management of the nursery. From April to September 2022, project staff and workers collected 23 kg of seeds belonging to 7 native species, 10 kg of *Leucaena leucocephala* and 12 kg of *Delonix regia*. In total, some 6,150 seedlings of 7 native species and 130 saplings of ornamental plants were propagated. By September 2022, a total of 1,488 seedlings had been distributed to schools, pagodas, and individuals, and some 5,600 seedlings of 12 species had been used for forest restoration.

3.2 Employees recruited and contracts signed with NAPV for managers and staff of nurseries by end of year 1

Currently, two workers are contracted at the nursery, and additional community members are hired for labour-intensive tasks such as potting, transporting potted soil to the row, and transplanting seedlings.

3.3 Contract for restoration consultant developed and signed in year 1

Completed in year 1.

3.4 Workshops to develop and implement restoration plan for NAPV with guidance of consultant and BGCI in years 1, 2 and 3

The restoration plan for NAPV has been completed. It is notable that both local authority and communities are not empowered to manage forest resources within the buffer zone of about 25,000 hectares, but they are encouraged to participate in forest restoration work and allowed to harvest NTFPs. The restoration plan also encourages local authorities and communities to plant fruit and native forest trees along streets within their villages and their farmland, besides integrating them into agroforestry systems.

3.5 Restoration surveys designed and carried out in year 1 and species survival plots established in year 1 and monitored in years 2 and 3

A total of 6 monitoring plots were developed in year 1 for monitoring growth and mortality in years 2 and 3. The monitoring of growth rate and mortality was conducted in year 2 and will be reassessed in year 3.

3.6 Plant 15,000 trees over years 1, 2, and 3, and implement aftercare

- The location of 90 mother trees relating to over 23 project target species was identified for seed collection and nursery propagation.
- A total of 5,395 seedlings of 12 species were planted alongside encouraging natural re-growth (assisted natural regeneration, ANR) on a total area of 2.5 hectares of degraded land. Besides tree planting, the project also conducted a trial with seedlings of *Leucaena leucocephala* along the firebreak. This species is light demanding, acts as a pioneer species, provides shade to the ground during 2-3 years after planting, is able to minimize the growth of grasses, and is briefly deciduous whilst remaining green in the dry season. Leaves and fruits are edible both for humans and wild animals.
- A tree planting event was held with the participation of NAPV's Director General, staff and community members to celebrate the inscription of Preah Vihear on the World Heritage List and Arbor Day. 32 (22 female) community members and staff of the National Authority for Preah Vihear participated in the event. A total of 1,400 trees (of a total of 5,395 trees) belonging to 9 species were planted along the national road no. 62. At the event, the Director General thanked the Darwin Initiative, and the partner NGOs - BGCI and ICRAF for contributing to forest and threatened species restoration as well as promoting agroforestry systems, which contributes to sustainable agriculture, as well as livelihood and ecosystem improvement.
- Tree planting events were also held at two schools - 1) Khemerak Techo high school on 22 July 2022, in which 93 students and teachers participated, planting 200 trees of 5 species, and 2) Sra-aem high school in which 500 students and teachers participated on 4 August 2022, planting 300 seedlings belonging to 7 species.

- A further tree planting event was held at Kirisavoan Khemarak Techo pagoda on 27 August, in which the head of the pagoda, monks, the village chief, villagers, and students participated (120 people).

4.1 Run a public outreach campaign to strengthen links between forest conservation and livelihood opportunities in years 1, 2 and 3

Public awareness raising events were organized at villages, schools, and pagodas supported by articles posted on social media from April to September 2022.

- 10 short articles on project activities were posted on the NAPV, MoCFA, and project outreach channels, relating to forest restoration, the value of forest ecosystems and agroforestry;
- A group of 6 guests from the Ministry of Environment and Department of Environment was facilitated to visit agroforestry farms in Sra-aem Khang Cheung and Eco-village;
- 44 students from 3 local schools were involved in awareness raising activities using 5 themes displayed on posters (the value of forest ecosystem, the impact of forest fire on biodiversity, sustainable harvest of NTFPs, tree planting in the village, agroforestry system) and leaflets on agroforestry;
- A series of lectures was delivered relating to the value of trees and forest ecosystems at tree-planting events at schools and pagodas.
- Technical information on soil improvement through agroforestry was provided to the four villages.

4.2 Hold forest management plan meetings between NAPV and community members held and plan developed by end of year 3

The forest management plan has been finalized and will be submitted to community members and local authorities in December 2022 to confirm the number of seedlings required for planting along roads in villages and on agroforestry farms.

4.3 Monitor fire events and forest use practices over years 1, 2 and 3

The monitoring of forest fires at restoration sites is regularly conducted in March. None of the restoration areas supported by the project was affected by forest fire due to a number of key factors – project interventions (fire break construction, thinning of grass ground cover, installation of signboards on the restoration area), as well as early, occasional rain in the dry season.

2. Give details of any notable problems or unexpected developments/lessons learnt that the project has encountered over the last 6 months. Explain what impact these could have on the project and whether the changes will affect the budget and timetable of project activities.

- The rainy season in 2022 year has been extreme, causing severe floods at the farms in the target villages. In addition, consecutive rain resulted in water stagnation in the farms affecting crops (except pine apple) and fruit trees. However, this is not expected to affect the delivery of the project outputs, in particular as a result of the training work (such as preparedness for and mitigation approaches following severe weather events) and ongoing commitment by the farmers to the agroforestry work.
- The increase of fruit flies in the rainy season has also affected the fruits of crops and fruit trees. Mitigation measures have been identified and related information disseminated to farmers, for example through insect traps made of holy basil (*Ocimum tenuiflorum*).

3. Have any of these issues been discussed with NIRAS-LTS International and if so, have changes been made to the original agreement?

Not applicable.

Discussed with NIRAS-LTS:

Yes/No

Formal Change Request submitted: Q3.	Yes/No Will be submitted before the end of
Received confirmation of change acceptance	Yes/No
Change request reference if known:	

4a. Do you currently expect to have any significant (e.g. more than £5,000) underspend in your budget for this year?

Yes No Estimated underspend: £

4b. If yes, then you need to consider your project budget needs carefully. Please remember that any funds agreed for this financial year are only available to the project in this financial year.

If you anticipate a significant underspend because of justifiable changes within the project, please submit a re-budget Change Request as soon as possible. There is no guarantee that Defra will agree a re-budget so please ensure you have enough time to make appropriate changes if necessary. Please DO NOT send these in the same email as your report.

5. Are there any other issues you wish to raise relating to the project or to BCF management, monitoring, or financial procedures?

The two commune council members who attended the training on agroforestry and related subjects have been appointed to be trainers of agroforestry to provide dissemination and training on agroforestry system to farmers in the seven villages. The project wishes to provide financial support to them for this dissemination programme (██████ per month, ██████ in total) as this will reinforce the overall delivery of the project. This will be covered from the 'Training agribusiness skill' budget line without affecting delivery of scheduled activities.

The project will submit a change request for reallocation of the budget line for the restoration ecologist (██████): 1) ██████ of this budget is requested for practical forest restoration as there is need of additional budget to hire local labour to establish firebreaks and care for both, planted and naturally growing seedlings at the restoration sites and along road sides; and 2) 30% of this budget is used for project staff to facilitate the completion of the forest restoration action plan with the commune council, village chiefs and community members, as well as to carry out monitoring growth status of the planted and natural seedlings.

If you are a new project and you received feedback comments that requested a response (including the submission of your risk register), or if your Annual Report Review asked you to provide a response with your next half year report, please attach your response to this document.

Please note: Any planned modifications to your project schedule/workplan can be discussed in this report but should also be raised with NIRAS-LTS International through a Change Request. Please DO NOT send these in the same email.

Please send your **completed report by email to BCF-Reports@niras.com**. The report should be between 2-3 pages maximum. **Please state your project reference number, followed by the specific fund in the header of your email message e.g. Subject: 29-001 Darwin Initiative Half Year Report**