Darwin Initiative/Darwin Plus Projects
Half Year Report
(due 31st October 2021)

Project reference	27-015
Project title	Farms and Forests: Boosting biodiversity and livelihoods in Northern Cambodia
Country(ies)/territory(ies)	Cambodia
Lead organisation	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	Joachim Gratzfeld
Report date and number (e.g. HYR1)	29 October 2021 HYR1
Project website/blog/social media	https://www.bgci.org/our-work/projects-and-case-studies/farms-and-forests/ https://www.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).

0.1 Establish project steering committee to guide project activities, monitor progress and adaptively manage the project
Preparations were under way at the end of the second quarter for the 3rd meeting of the steering committee scheduled for October 2021.

1.1 Design and conduct surveys in year 1 (baseline) and in year 3 to characterize and measure the impacts of project on socio-economic and livelihood systems, farming systems, forest and wild plant use of local households
The baseline survey and associated report were completed in year 1 of the project and were provided with the first annual report. The end-line survey will be conducted in year 3.

1.2 Characterize successful local agroforestry practices in the four sample villages or surrounding areas with relatively similar biophysical and climatic condition, as options for agroforestry models for interventions.
The survey was conducted in year 1 and a report has been drafted and will be submitted by end of year 2.

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 participatory mapping activities were conducted in year 1. The maps are being used for the land suitability assessment of six fruit trees namely pomelo, longan, guava, jujube, jackfruit and

custard apple. The results of the assessment will be presented in a workshop planned to be held in March 2022 with local stakeholders and authorities, for further promoting agroforestry as a more sustainable farming practice in the Sra-Aem commune and Choam Ksant district.

1.4 Design and conduct study on market opportunities and value chain for key agroforestry and NTFP products from the region
Market appraisals and value chain analysis of commodity crops cultivated by farmers in the targeted communes have been conducted. These identified market players, supporting functions, and the enabling business environment for important commodity crops in the area, such as cashew, mango, and cassava. The appraisals also identified potential small to medium scale processors that can add value to the commodities. Information collected from the assessment has identified the need to establish collective marketing units at village level to facilitate sales and add bargaining power. Aligned with Activities 1.1, 1.2, 1.3 and 1.5, training on marketing and small-scale business development will be delivered and business models will be recommended subsequently.

1.5 Develop recommended agroforestry models for trials, including benefit-cost analysis
The project recommends three agroforestry-based home garden models: 1) simple alley cropping with border trees, 2) species-diverse intercropping with natural fence that integrates several fruit tree species, nut tree species such as cashew, multi-purpose tree species such as drumstick tree (*Moringa oleifera*) as well as native tree species such as neem (*Azadirachta indica*), *Pterocarpus macrocarpus* or *Dipterocarpus intricatus*, and 3) planting mimicking traditional, multi-strata home garden systems, yet with varied annual crop and tree species arranged in different zones to optimize ecological and economic benefits. Selected farmers from the four villages of the Sra-Aem commune have been trained (see Activity 2.1 and 2.3) in the techniques to implement the three agroforestry types to enable informed decision as to their preferred model. With assistance provided by NAPV, the farmers are now establishing trials of these agroforestry models.

2.1 Develop training materials and training programmes for training of trainers (ToT) and pilot farmers
The selection of ToT members was based on findings from the agroforestry characterisation survey (Output 1) and further consultations with village chiefs. Field visits to the four villages were conducted to identify farmers interested in participating in the ToT, and to select crops and fruit tree species for the agroforestry trials at each village. As a result, a total of 12 farms were selected for agroforestry demonstration (farms with existing agroforestry practices) (see also Activity 2.2), and 17 farms were chosen for agroforestry trials (farms with no or inadequate agroforestry practices). 29 community members across the four villages owning farms and keen to volunteer for the agroforestry trials were selected as ToT members. Of 31 species preferred for agroforestry trials as identified during the surveys with farmers in year 1 (Output 1), seven taxa were selected for training in horticultural and harvesting techniques including the six fruit trees (see Activity 1.3) and papaya. These are fruit trees for which farmers particularly lack knowledge and skills for cultivation. To support the training, the project developed a training manual. This resource describes cultivation techniques of the target taxa in detail and highlights low-emission farming practices namely, the use of organic or semi-organic fertiliser and bio-pesticides to control pests and diseases. It also promotes agroforestry-based home garden models in the four villages. The manual was distributed to the ToT members and is available in Vietnamese, English and Khmer language.

In addition, the Agroforestry module (Curriculum on Agroforestry) produced by the Ministry of Agriculture, Forestry and Fisheries (MAFF) with technical support of Food and Agriculture Organization of the United State (FAO), was made available to the ToT members. This resource, in Khmer language, describes different agroforestry-based home garden models, recommended crops, and potential economic and ecological benefits that can be generated by the models presented in the module.

The project circulated a further manual on general use practices of organic fertilisers and bio-pesticides which was developed based on the local expertise of a farmer and ToT member. This manual is also in Khmer language and was made available to all ToT members.

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

Using the results of the agroforestry characterization survey conducted in year 1, ICRAF and NAPV identified local home garden systems considered to implement good agroforestry practices. This was based on four criteria including maturity and net annual income generated by the systems, level of crop diversification within the systems as well as resilience to climate variability and extreme weather events. The systems are eventually selected as agroforestry demonstration models as concrete examples of good agroforestry practices and to motivate farmers in the Sra-Aem commune to practice agroforestry. The NAPV has facilitated farmers to visit the demonstration plots. Using the knowledge and inspiration obtained from the visits and training on home garden models and low-emission cultivation techniques of fruit tree species described earlier, as well as farmers' preferences of annual crop and tree species that are also adversely affected as regards market access, the project is working with 17 farmers to design agroforestry-based home garden trials (see also Activity 2.1).

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

The first online training delivered by the project partners on agroforestry-based home garden models was delivered to 24 ToT members and 2 commune council members on 2 August 2021 attending in-person. The training, led by ICRAF, and facilitated and translated by NAPV, introduced agroforestry as a sustainable farming practice that can reconcile economic and ecological benefits, and different types of agroforestry and agroforestry-based home garden models (see Activity 1.5). It also explained participatory development approaches and home garden models using a 3D mock-up.

Training in agroforestry-based home garden models using a 3D mock-up.

The second, three-day training (16-18 August 2021) also delivered online, remotely by ICRAF, focused on cultivation techniques of the seven fruit tree species (see Activity 2.1). Due to the social restrictions imposed by the COVID-19 pandemic, the number of participants attending in-person had to be limited to ten ToT members and two commune council members. Delivered by experts in fruit tree horticulture from the Fruit and Vegetable Research Institute (FAVRI) and Thai Nguyen University of Agriculture and Forestry (TUAF) of Vietnam, and interpreted from Vietnamese into Khmer language by NAPV, the training expounded appropriate planting, maintenance and harvesting techniques for the seven species and highlighted the use of organic

and semi-organic fertilizers and bio-pesticides to guide the development of low-emission fruit tree cultivation. During the training, the 3D mock-up presented in the first course was further developed by breaking into groups each representing the four project villages, to refine and present their preferred 3D mock-ups, in light of the three agroforestry-based home garden options.

In addition, further knowledge exchange opportunities for farmers on fruit tree cultivation and agroforestry design were organised on 9 September for eight ToT members from Techo Bos Sbov and Sen Chey villages, and 11 September for 14 ToT members from Sra-Aem Khang Cheung village and Eco-village. The training was held at a farm predominantly cultivating guava, jujube and longan. Key aspects illustrated through practical demonstrations included size of planting holes, installation of irrigation systems, managing waterlogging during the rainy season (Sep.-Oct.), suitability of fruit trees in accordance with soil type and geographical conditions, selection of planting materials, planting interval between fruit trees, pest management, pruning season and techniques. All participants were also invited to visit another agroforestry farm of a ToT member in Sra-aem Khang Cheung village. This farm is cultivating orange trees and wattle (*Acacia megaladena* var. *indo-chinensis*) as main crops, in addition to smaller areas with custard apple, coconut, pomelo, banana, and galangal. The objective of these exchanges was to provide ToT members with practical knowledge on the intercropping system, and the value of agroforestry for enhancing livelihoods, with this 0.3 hectare farm able to generate an income of over USD per annum, compared to farms with mono cropping practices such as cashew plantations that generate an average annual income of USD per hectare.

A further knowledge exchange gathering on organic fertilizer and pesticide production, organised at a ToT member's farm in Eco-village, was organized on 20 September for 20 ToT members and 2 commune council members. This ToT member has extensive experience in Indigenous Micro Organism (IMO)-based fertiliser production and its application to cashew plantations. In addition to IMO, this practical training also covered other fertilizer-pesticide methods, including Fermented Fresh Milk Bra (FMB) and organic pesticides to control insect infestations, as well as application of hormones to promote flowering, fruiting and shoot growth. A further exchange visit was organised to the farm of another ToT member in Eco-village, one of the 12 agroforestry demonstration farms. This farm benefits from good drainage canals preventing soggy soil on crops and fruit trees in the rainy season whilst they are used for irrigation during the dry season. A number of project fruit tree species are grown on the farm including orange, custard apple and guava alongside annual crops such as yam, melon and chili.

2.4 Provide on-going support for establishment and maintenance of on-farm trials for sustainable agroforestry in pilot households
On-farm agroforestry trials at the selected farms have not yet started due to heavy rainfall in July and August and waterlogging. However, the project has provided 17 ToT farmers crop seeds and seedlings of fruit trees, and planting activities are scheduled to begin by the end of October/early November.

2.5 Provide on-going support for market linkages and small business development for pilot households
The initial linkages established with private sector actors, including local processors and exporters, will be further explored and consolidated in quarters 3 and 4 of the project.

3.1 Two nurseries built with 20,000 seedling capacity with required supplies
A new nursery of 20m x 20m has been constructed, using wooden poles, a metal structure, and plastic net. The water system has been installed, and 40 brick-made rows (each 4m x 0.8m with holding capacity of around 800 seedlings) were established on a total area of 600 m^2.

Seed preparation at the project nursery.

3.2 Employees recruited and contracts signed for managers and staff of nurseries
Two nursery workers have been contracted to propagate seedlings. A total of 8,340 seedlings representing 11 tree species (eight native tree species and three fruit tree species) have been propagated.

3.4 Workshops to develop and implement restoration plan for NAPV with guidance of consultant and BGCI in years 1, 2 and 3
Further development of the restoration plan will be undertaken in quarter 3 and 4 of the project.

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
Monitoring of the seven restoration plots established in year 1 in zone 2 will be carried out in quarter 3 and 4 of the project.

3.6 Plant 15,000 trees in years 1, 2 and 3 and implement aftercare including weeding
To date, some 18,325 seedlings of 20 tree species have been planted at 6 areas (8,430 seedlings for year 1, and 9,895 seedlings for semester 1 of year 2), including 4 restoration areas, along road sides of the eco-village and opposite the new nursery over an area of around 8 hectares. Some 32 villagers including 17 women have been involved in the propagation and planting work.

4.1 Run a public outreach campaign to strengthen links between forest conservation and livelihood opportunities in years 1, 2 and 3
A total of 6 posters have been produced by an artist; they convey various aspects of agroforestry, forest degradation and restoration, sustainable use and livelihoods improvement:
- Agroforestry with an intercropping system and natural fences. This agroforestry system demonstrates the intercropping of orange trees with ginger, fenced by native trees, banana and coconut.
- Agroforestry with species-diverse intercropping and natural fences. This agroforestry system displays a cropping system in blocks, and a natural fence using native tree species and bananas. Fruit trees include jackfruit, pomelo, guava, and other crops including eggplant, gourd, chili and dragon fruit.

- The negative effect of forest fire on forest ecosystems, wildlife and the environment at large as a result of smoke and dust.
- Sustainable collection of forest resources aims to display the two practices - sustainable NTFP collection practice with many trees providing fruit yield, and unsustainable practice with fewer trees remaining.
- The value of the forest ecosystem to socio-economic and environment shows a diversity of benefits the forest ecosystem provides to local communities including goods and services such as mushrooms, honey, resin, bamboo, as well as natural features attracting nature-based tourism such as water falls.
- Village tree planting aims to show participation of community members including monks, school children in tree planting along roadsides within the village.

Sustainable collection and overexploitation of NTFP.

4.2 Hold forest management plan meetings between NAPV and community members and forest management plan developed by end of year 3
The draft Forest Restoration Action Plan will be reviewed in quarters 3 and 4.

4.3 Monitor fire events and forest use practices over years 1, 2, and 3
The map of forest fires will be updated in the second semester.

2a. Give details of any notable problems or unexpected developments/lessons learnt that the project has encountered over the last 6 months (for COVID-19 specific delays/problems, please use 2b). Explain what impact these could have on the project and whether the changes will affect the budget and timetable of project activities.

As noted in Activity 2.4, on-farm agroforestry trials at the selected farms have not yet started due to heavy rainfall in the second quarter of the project. Excess in water would have caused the fruit tree planting to fail. On the other hand, many of the farms selected for the agroforestry trials lack irrigation facilities and ground preparation (levelling and drainage), whilst others were used in the meantime for cultivating cassava. However, following consultation with the selected farmers, fruit tree planting has been agreed to be rescheduled to December. This should allow to make up on the delay, and enable progress towards achieving Output 2.

2b. Please outline any specific issues which your project has encountered as a result of COVID-19. Where you have adapted your project activities in response to the pandemic, please briefly outline how you have done so here. Explain what residual impact there may be on your project and whether the changes will affect the budget and timetable of project activities.

A key issue of the COVID-19 pandemic is its impact on the project's capacity building activities, that were planned in the original project as classroom, face-to-face training courses. However, the project quickly adapted to this new reality with the trainers from ICRAF based in Viet Nam and Indonesia delivering the training remotely, online. The training was held in two main parts (see Activity 2.3) to reduce the number of farmers attending in-person, in line with social distancing requisites. Three village chiefs from Bos Sbov, Sen Chey and Sra-aem Khang Cheung village could not attend a series of events as they were engaged in facilitating the vaccination of their community members as well as in organising transport of sick members to health centres for treatment. Three ToT members from Eco-village had to withdraw either due to ill health or for personal reasons, whilst three originally selected ToT members were replaced by other community members. Discussions with further farmers of Sen Chey village who have indicated interest in joining the ToT, will be held in quarter 3 and 4.

Although COVID-19 continues to pose challenges for travel, ICRAF and BGCI are still hoping to use their international travel budgets as allocated in the original project for year 2. However, we will continue to monitor the situation until the end of 2021, before making a decision regarding another Change Request. Any other COVID-19 related impacts would also be reflected in the Change Request at that stage.

2c. Have any of these issues been discussed with LTS International and if so, have changes been made to the original agreement?

Discussed with LTS:	Yes/No (not approached LTS yet as we continue to monitor the situation as mentioned above)
Formal change request submitted:	Yes/No
Received confirmation of change acceptance	Yes/No

3a. Do you currently expect to have any significant (e.g. more than £5,000) underspend in your budget for this year?

Yes ☐   **No** x   Estimated underspend: £

3b. 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 rebudget Change Request as soon as possible. There is no guarantee that Defra will agree a rebudget 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.

4. Are there any other issues you wish to raise relating to the project or to Darwin's management, monitoring, or financial procedures?

Despite further significant progress made in the project, COVID-19 continues to present challenges for the project implementation as highlighted in Question 2b above. The project team will therefore carry out a further review across all the Outputs and associated Indicators in December 2021, following the completion of nearly 15 months into the project. Any changes deemed necessary by the project team will then be submitted to the Darwin Initiative as part of a

formal Change Request. We highly value the assistance and guidance provided by the team at the Darwin Initiative in support of achieving the objectives of our project.

If you were asked to provide a response to this year's annual report review with your next half year report, please attach your response to this document.

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

Please send your **completed report by email** to Darwin-Projects@ltsi.co.uk. The report should be between 2-3 pages maximum. **<u>Please state your project reference number in the header of your email message e.g. Subject: 25-001 Darwin Half Year Report</u>**