Darwin Initiative Innovation Annual Report

To be completed with reference to the "Project Reporting Information Note": (https://www.darwininitiative.org.uk/resources-for-projects/information-notes-learning-notes-briefing-papers-and-reviews/).

It is expected that this report will be a maximum of 20 pages in length, excluding annexes)

Submission Deadline: 30th April 2023

Submit to: BCF-Reports@niras.com including your project ref in the subject line

Darwin Initiative Project Information

Project reference	DARNV005
Project title	Understanding Ugandan native plant species' role in innovative sustainable landscapes
Country/ies	Uganda
Lead Partner	Botanic Gardens Conservation International
Project partner(s)	Tooro Botanical Gardens (TBG), GrassRoots Ltd (GR), Makerere University, National Agirculture Research Organisation (NARO) - Entebbe Botanical Garden (EBG)
Darwin Initiative grant value	£199,995
Start/end dates of project	1st April 2022 to 31st March 2024
Reporting period (e.g. Apr 2022 – Mar 2023) and number (e.g. Annual Report 1, 2, 3)	Apr 2022 – Mar 2023 Annual Report 1
Project Leader name	Alex Hudson
Project website/blog/social media	https://www.bgci.org/our-work/projects-and-case-studies/agroforestry-with-native-edible-plants-in-uganda/
Report author(s) and date	Harriet Kokuganza (TBG) and Alex Hudson (BGCI)

1. Project summary

Natural resource degradation in Uganda has increased over the past 30 years, causing biodiversity loss and livelihoods challenges from reduced nutritional diversity and reduced food yields caused by soil erosion and flooding. Agriculture is a driver of this, having expanded from 84,695 km2 (1990) to 105,317 km2 (2015) as the country's largest employment sector, often aiming for high calorie production rather than nutrient diversity.

Population increases, market pressures and policies contribute to degradation with land use systems converted to monoculture cash crops. A lack of awareness of the benefits of more diverse food systems to people's health and the environment also contributes to this.

These challenges are well-documented in scientific and development literature and were identified in a previous Darwin Initiative project (25-020), which established nurseries that propagate native species for Forest Landscape Restoration (FLR). This project builds upon this initiative by developing agroforestry practices that incorporate propagated native species,

including food sources. The project aims to create the evidence needed to stimulate new markets for native plant products and reduce the risk for investment in them.

We will investigate how native food plant species in diverse agroforestry systems could help address plant conservation challenges in Uganda. A target list of useful species will be tested in agroforestry trials, analysed nutritionally, and developed into new food products. The goal will be to product novel food products from native species that address nutritional gaps in Ugandan diets, improving their value and marketability. The inclusion of smallholder farmers at every stage of this development will ensure they are the future beneficiaries of developments. As demand increases, there will be increased farmer uptake of agroforestry compared to less diverse systems increasing national biodiversity and health impacts.

The results will then be promoted to rural and urban communities.

2. Project stakeholders/ partners

Steering committee meetings have been run 4 times in the year with all partners present, with terms of reference produced for the group in first quarter and a final meeting held in Uganda in February 2023 (See Annexes 4 and 5). In these partners have presented progress, discussed challenges and made plans for the time to the next meeting.

Partners have communicated and collaborated regularly in the project at steering committee meetings and through established management WhatsApp groups. They have also collaborated on activities, for example GrassRoots Ltd and Entebbe Botanical Garden (EBG) staff took part in the early project community workshops that were run by TBG.

TBG has also supported EBG with the provision of plants needed for the agroforestry plots that EBG were unable to source. BGCI, TBG and GrassRoots Ltd have also collaborated to develop some information leaflets on the target species, that can be used to engage different stakeholders in markets to discuss their uses (See examples in Annex 6). These compiled pictures, vernacular names and other information about the species, since fruits or actual products were not available for use in the field.

A delay to the project initiation for budget confirmations and administrative challenges in getting the funds available for use internally at Makerere University caused delays to the training of community collectors for raw food material and consequent delays to final nutritional analysis. A Change Request to move £2,500 of the nutrition analysis budget to the second year was requested and accepted to continue this work.

3. Project progress

3.1 Progress in carrying out project Activities

Activity 1.1: Run 5 workshops in project areas to engage local communities to discuss food consumption, and barriers to accessing nutritional food year-round, and to gather traditional knowledge on the target plant species

Five (5) consultation workshops were organized and conducted in 5 project site areas of Kagadi, Mbale, Lwamunda, Entebbe and Tooro Botanical Gardens in Fort Portal.

The workshops had the dual goals of gathering traditional knowledge about the targeted plant species and involving local communities in discussions about food intake barriers to year-round access to nutrient-dense food. Three hundred (300) project stakeholders (170 males and 130 females) participated, including famers, sub-country and district level leaders, youth, school representatives, religious leaders, cultural institutions, and political and business representatives.

TBG staff gave a detailed power point project presentation with a focus on the project objectives, expectations from different stakeholders, and the diverse tree species the agroforestry trial intends to promote. Grassroots also did a questionnaire to understand food consumption barriers to accessing nutritional food, and the growing habits year-round, and to gather traditional knowledge on the target plant species.

Activity 1.2: Select community members for inclusion in agroforestry activities from workshop attendees

During the community workshops, TBG together with the participants identified community representatives that would oversee the day-to-day operations of the different agroforestry trials (See Annex 7). The key consideration was given to individuals who had an interest in conservation, are opinion leaders, and special interest groups like women and youth, among others.

32 (15 Females and 17 males) community members were identified and trained on their roles and responsibilities. And since then, they have been executing their duties in different agroforestry trial sites.

Activity 1.3: Analyse data and report on community perception

Participants in community workshops were asked to share their opinions on native food consumption barriers, and understanding of traditional species growing, eating, and cooking practice. These included groups of a maximum of 10 people at a time and their responses were coded for analysis (See Annex 8)

Exotic and native species, including the target species, were discussed with the following natives receiving most mentions as important food sources:

- *Syzygium* spp.
- *Symphonia globulifera* (not one of the target species)
- *Vangueria apiculata*
- *Annona senegalensis*
- *Canarium schweinfurthii*
- *Warburgia ugandensis*
- *Ficus natalensis*
- *Elaeis guineensis*

TBG and BGCI are still compiling the analytical report.

Activity 1.4: Market research to investigate market gaps for food products and nutrition content

Surveys were completed in markets in over 20 markets in Kampala and 5 markets outside of Kampala (Mbale central market; Mpanga market, Fort Portal; Kagadi market; Kitooro Market, Entebbe; and Bivamuntuyo Group Market, Lwamunda). The study was conducted using questionnaires and interviews to understand which of the target species are already sold in markets and what people's perceptions and interest in them and thoughts on potential markets at gaps. These markets all showed some level of interest in the potential options. The main interest remains in Kampala where most of the wealthier people live with more discretionary income (An initial report is found in Annex 9). Knowledgeable people have been identified in this work that can and will be engaged with further in the future in relation to the project (GrassRoots Ltd have recorded names and telephone numbers).

9 species have been recommended for further consideration from this analysis:

1. *Pseudospondia macrocarpa*
2. *Canarium schweinfurthii*
3. *Annona* spp. (potentially conflict focus on exotic *Annona muricata* rather than native *A. senegalensis*)
4. *Tamarindus indica*
5. *Artocarpus heterophyllus* (Exotic)
6. *Spondias lutea*
7. *Aframomum angustofolium*
8. *Vitellaria paradoxa*
9. *Garcinia buchananii*

Activity 2.1: Complete training for food raw materials monitoring and collection.

Collectors were trained (31 people) by Makerere University to collect fruits of the target species and deliver them to Makerere University to carry out nutritional analysis research. Cool boxes were purchased to transport raw food materials in to keep they fresher for analysis. The collectors have monitored the target plant species within their provenance to produce / update their phenology calendars for different agroecological zones of the 5 project areas. Since various species had already been mapped out (for example in Darwin Initiative project 25-020), this provided direction for some species.

Activity 2.2: Trained community members collect food raw materials from target species for nutritional analysis

Target plant species lists, classified by their ecological zones, were given to collectors from the five project areas. Individual voucher specimens and raw, ripe fruits of each species of 17 of the target species were gathered from the local populations and sent to the Makerere lab for nutrient analysis.

Activity 2.3: Makerere University is profiling the nutritional analysis of the 34 target species to help in the selection of at least 6 species for the creation of food products that will be carried out in year 2 of the project

Nutrition analysis is looking at ash content, crude protein, dietary fibre, carbohydrates, fat & oil content and Vitamins A and C. Amount of the minerals Iron, Zinc, sodium, potassium and magnesium is also being investigated. Fourteen (14) plant species have been tested for Vitamin A, Vitamin C & Carbohydrates with tests on-going for dietary fibre and fat & oil contents at Makerere University so far (results in Annex 10). Project initial delays and internal administrative difficulties (See section 2) and some species proving difficult to find, either whole plants or the target parts (e.g., fruits – see section 8) have meant analysis of all target plants is ongoing.

Activity 3.1: Establishment of a steering committee

A steering committee made up of 16 relevant experts from the areas of Uganda's biodiversity, agriculture, forestry, and human-wildlife conflict was formed. The committee's objective was to supervise every step of the project's execution (See terms of reference in Annex 4). It was decided at the first meeting that the group would meet every three months rather than every six, to review the status of the project (see more info in section 7 below).

Activity 3.2: Decide agroforestry trial design and monitoring framework that incorporates target native food species, alongside other useful and beneficial species to the system (e.g. nitrogen fixers)

Five (5) Agroforestry designs were decided and developed to match individually identified farmlands from the project site, in collaboration with National Agricultural Research Organization (NARO) and National Forestry Research Institute (NaFORI). These designs were developed in consideration of the 34-project target food tree species. Species were categorized based on the known provenance from the 3 agroecological zones namely:

1. Western mid-altitude landscapes for the Fort portal and Kagadi agroforestry design,
2. Lake Victoria crescent for Mpigi-Lwamunda and Entebbe EBG design, and;
3. Afromontane landscapes for Mbale design.

The designs were made for 1 hectare of land. They were planned to be integrated with food crops that do not interfere with the species' growth demands. Around 13-14 fruit tree species are targeted for use in each plot.

A Random Complete Block Design (RCBD) for planting was also included, 3 plants of each species planted in each plot. The agroforestry trials were divided into strata or known, uniform blocks, and seedlings were randomly distributed inside the blocks. Stratification considered distance-dependent gradient change (See Annex 11 for designs).

A monitoring framework outlines how to keep track of the native plant species growth and survival as well as productivity of crops planted between them. The framework covers a period that is longer than the project and will require more budget. Monitoring of wider biodiversity beyond plants has been difficult to include within project budgets, so connections with the conservation biology department at Makerere University are being considered, using students to support the data collection. Monitoring is set to be carried out every 6 months.

A robust yearly intercrop and tree management operational plan has also been developed for each site. This includes silvicultural management practices in the demos - i.e., stacking, spot weeding, climber cutting, and pruning measures. The plan also deals with risk to trees, such as pests and diseases, and anthropogenic threats, - e.g., epicomicity and fire protection, and site security.

Activity 3.3: Seed collection networks collect the seed of the target species in their area for propagation

TBG identified and trained seed collectors from each agroforestry trial site who have benefited from a series of training and support in seed collection, nursery bed establishment and management, and seed banking. 15 out of the 40 seed collectors (15 female, 25 male) have also benefited from the Terraformation (https://www.terraformation.com/) training on seed collection and management and have since been issued with a certificate of completion.

Activity 3.4: Community nurseries propagate the target species provided by the seed collection networks for use in trials

TBG's previously established satellite nursery beds (from project 23-026) spread across the different agroecological zones provided a source for the majority of the targeted 22 native tree species and 12 herbs / lianas. Tree species have been planted already and the herbs / lianas will be propagated and incorporated into planting in year 2. Important to note that, the species that were not found on these nursery beds had to be outsourced to meet the project target.

Activity 3.5: Complete monitoring training for community member site managers

The training of individual site managers for the trials planned to be completed during the second year of the project.

Activity 3.6: Plant 5 trial plots at TBG and public land (e.g., church groups) or willing community members' land

It was decided at early steering committee meetings that this needed to be done in year 1 instead of year 2, to allow or more monitoring and replacement of plants that die, and because the project budget was actually allocated to year 1.

A benchmarking and assessment process was undertaken on degraded farmlands to identify the sites for the trial plots. TBG conducted 5 Field assessments using field agroforestry farmland assessment criterion to decide suitability, these being:

- Communally owned land or individual farmlands.
- Farmlands that were poorly managed and degraded.
- Landowners that would voluntarily offer at least 1 hectare of their farmlands to act as model farms within their community.
- Farmers who are enthusiastic about tree growing and agricultural systems, and willing to shift their mind-sets to adopt the proposed agroforestry model.
- Farmlands within at least 5 kilometres from the existing nurseries.
- Availability of a water source nearby, not more than 500m from the proposed plot.
- Accessibility to transport.
- Accessibility for labour to work on the agroforestry plots.

To ensure the project's agroforestry trial's establishment and continuation both during and after the project, a Memorandum of Understanding (MOU) was signed by TBG and the property owners. In accordance with the project guidelines, MOUs emphasized the roles and responsibilities of each party.

Bush clearance was done initially at the 5 sites. Primary and secondary tillage was done to soften the surface and make a good seedbed for crops. This was followed by lining, pitting, and planting to the required standards for the establishment of agroforestry demonstrations in Uganda. A total of 183 tree species have been planted across the plots of 23 species. One hundred community members (20 from each site) were hired as laborers receiving income for this - 40% women and 60% were men.

TBG is also carrying out demarcation and mapping exercises to mark the boundaries of the trials. GPS coordinates and area calculations are being recorded. This was to help in the trial design development and production of spatial maps.

At some community workshops, it was noted that security of some of the agroforestry demos especially Mbale garden was not good as cattle grazing had become a problem. Following an accepted change request, some funds were used to build fencing around the sites to protect them from intruders and livestock.

For those involved in plot management to get some short-term benefits from the land still, cash crops - like green gram or mung beans (*Vigna radiata*) - were planted in the trials at the four sites since they would resist the upcoming dry season despite the date of the season and the unpredicted weather. The production from these crops will also be monitored, with production versus proximity to the trees planted also assessed to understand the impact of the trees over time.

Activity 3.7: Carry out baseline monitoring of plots and surround areas.

This surveillance was carried out two times to check on the seedlings after planting and after removal of the crop. This made it easier to monitor the seedlings. In Mbale due to short rain season 13 trees did not survive immediately after planting, while in Lwamunda, Fort portal and Kagadi all tree species planted survived. All the dead plants have been replaced.

An after-intercrop harvest surveillance found that some seedlings were being attacked by garden crickets *Gryllus assimilis* (Fabricius) causing defoliation of the *Canarium schweinfurthii* and *Cordia africana*. The farmers were advised to weed the gardens to avoid pests but also in preparation for March intercrop planting.

In the survey work, it has been noted that the conditions in Mbale are different from those in western and central Uganda with pests more prevalent. We anticipate engaging a plant entomologist and pathologist to support pest identification and disease diagnosis and prescription of the management solutions for such pests and diseases.

Initial yield measurements from intercrops were difficult to measure since harvest was early to properly measure growth.

The project team are developing data collection forms for every parameter to be assessed i.e., plant development record form, pest, and disease surveillance forms. We are also working with experts on what to include as regards canopy interaction.

Activity 3.8: Monitor plots quarterly after the establishment

Monitoring and data collection of the agroforestry trials will be done by TBG in support of trained site managers at the beginning of year 2 of the project. Data is to be gathered every three months into a specially designed data form for improved analysis. This data will be used to demonstrate,

in comparison to other land use systems, the advantages of agroforestry that incorporates native food plant species.

We are working on how to do tree growth assessment to determine Current Annual Increment (CAI) and Mean Annual Increment (MAI), species diversity annual changes as a result of farmer Managed Natural Regeneration (FMNR) using Integrated Stock Survey and Management Inventory (ISSMI). TBG plan to organise to receive training on how to do ISSMI.

Difficulties for monitoring biodiversity outside of plants has been discussed by the team and they are going to consider using connections with Makerere University for students of similar to undertake this.

Activity 4.1: Botanic Garden co-creation, education awareness and interpretation development training delivered to staff from TBG and EBG

An education and awareness raising group was established in August 2022 and has met 5 times online and in person in February 2023, when Ane Zabaleta, education & awareness officer from BGCI, and Alex Hudson, project leader, travelled to Uganda. A plan for the co-creation sessions to take place in year 2 has also been created (See Annex 12).

Activity 4.3: Radio programmes created and delivered monthly to promote agroforestry and native food plant species, including using co-creation workshop knowledge towards the project end

Through matched funding, 3 radio programmes have been made and aired on plant biodiversity in year 1, with the main budget and planned radio campaign for year 2, building on the results from the co-creation workshops.

3.2 Progress towards project Outputs

Output 1: Current use and markets of 34 targets indigenous food species understood

Through community engagement workshops - carried out by TBG, and with GrassRoots Ltd - information on food consumption barriers to access nutritional food all year round (traditional methods for growing, eating, and recipes) was collected on the target species from 5 project areas. 26 markets in Kampala and 5 markets in the project areas were also visited by the GrassRoots Ltd team for discussions with sellers and consumers on their knowledge, trade and opinions of the target species, and other products traded.

The information from these, with the nutritional data from Output 2, will guide and contribute to the decisions to select 12 species to develop food products from. Eight (8) species are recommended from the community workshops (see activity 1.3 in section 3.1 above) and 9 species from the market analysis (see activity 1.4 in section 3.1 above). *Canarium schweinfurthii* is the only species to feature in both lists, although Annona senegalensis was mentioned as important in community workshops, and soursop more generally were highlighted in market analysis, which could include *A. senegalensis*, but perhaps also the exotic *A. muricata*.

Output 2: Nutritional profiles of 34 target native food species known showing levels of important micro- and macronutrients with 12 new food products produced from at least 6 that are beneficial

Trained collectors from the five project areas have collected raw food samples from known sources of the target food plants of 17 species. Nutritional analysis is underway, with Vitamin A and C and other parameters (see activity 2.3 in section 3.1) completed for 14 species at Makerere's food science and technology lab. With the results from Output 1, the steering committee team will select the species to develop 12 food products, with the aim of improving shelf life.

Output 3: Five agroforestry trials, with at least 6 of the target native food plant species, established to investigate the benefits to people and nature compared to fewer diverse alternatives, with baseline data collected

Five (5) Agroforestry trial plots of about 1-hectare each have been prepared and planted with a total of 23 species (13-14 in each trial based on agroecological zone matching) in the five project areas: Fort portal, Kagadi, Lwamunda, Entebbe, and Mbale. Agroforestry trial designs were decided with inclusion of the steering committee expertise and local smallholder farmers' input. One Botanical Gardens staff and individual field trial managers are to be being trained to monitor the agroforestry trials by assessing the food production returns and some biodiversity indicators.

Output 4: 200 farmers and 400 urban community members help design promotion options to reach wider audiences about the benefits of native food species and agroforestry via radio shows and Botanical Gardens.

BGCI delivered training to 5 TBG and 3 EBG staff on approaches to co-creation workshops, education awareness, and development of interpretation materials. These trainees will then run co-creation workshops with groups of community members from the 5 project areas, to co design agroforestry interpretation materials, such as leaflets, flyers, magazines, information boards and a radio campaign, in the project's second year. The materials are to be used for information purposes in the agroforestry trial plots – 2 in botanic gardens and 3 in Kagadi, Lwamunda and Mbale. These materials will be created in English and at least two local languages.

3.3 Progress towards the project Outcome

Outcome: New innovative development opportunities using native food plant species are available with the baseline biodiversity information of their use in agroforestry systems collected and ready for future impact monitoring

Despite delays to the nutrition analysis and some difficulties with species confirmation in market assessment fieldwork, the project should still be able to achieve the outcome. It may be that decisions on product development have to be made before analysis has been completed on the full list of 34 target species for this, incorporating available published data where already available.

- Indicator 0.1: Through community engagement workshops and market assessments in over 30 markets across 5 districts (Mpigi, Fort Portal, Kagadi, Kampala and Mbale), the uses and importance of 34 native food plant species is better understood. 300 local stakeholders have contributed to this (see community engagement results in Annex 8). Engagement will further be expanded through more co-creation meetings with communities and radio programs during the second year of the project.
- Indicator 0.2: Nutrition analysis for the target species has been delayed (see activity 2.3 in section 3.1 above) slowing the final selection of species for product development, but this will continue into the second year following an accepted change request to move funds for analysis to the second year.
- Indicator 0.3: Crop production returns are going to be recorded with key biodiversity indicators monitored in the second year of the project. This will be used as a baseline to monitor changes across the plots and data used for future developments.
- Indicator 0.4: For the promotion of nutrition and biodiversity benefit, co-creation training has been undertaken in February 2022 (see section 8) with workshops due to take place by the end of September to create promotional materials by the project end.

3.4 Monitoring of assumptions

Assumption 1: From the target species some benefits can be shown (e.g., nutritional, seasonal production outside of main crops to provide year-round food security, market use, and potential) to select 12 for new product development.

Comments: There has been a delay to the nutritional analysis (see activity 2.3 in section 3.1 above). The lesson regarding storage in cool boxes for transport of raw foods contributed to

this (see section 8). A Change Request was submitted and accepted at the end of 2022 to move some funds to the second year to complete this analysis, however the total number of food products that will be able to be made in the project needs to be confirmed.

Assumption 2: Biodiversity indicators are selected that can be monitored easily by the plot managers with support from TBG.

Comments: So far, the decision has been made to monitor plants only due to resource constraints. Following the travels of Project leader, Alex Hudson, to Uganda in February 2023, it has been noted that Makerere University may be able to support wider biodiversity measurements in the future – further engagement is needed to consider this in year 2.

Assumption 3: Markets can be assessed multiple times in the year to include seasonal changes in the availability of food plant resources, with research teams based in suitable locations to provide locality-specific data.

Comments: GrassRoots Ltd has been regularly attending markets so far in the project throughout the year to capture seasonal changes. This work will continue into the second year.

Assumption 4: The collectors can collect sufficient raw materials from the known sites in a year to be used by Makerere University for analysis.

Comments: As in assumption 2 this is to continue in the second year. For some of the target species, it has been noted that due to seed size versus edible flesh of the fruits an exceptionally large number of fruits is needed for analysis. This would follow through for any product developments, so it was recommended that this factor impacts species selection.

Assumption 5: Community members engaged lose interest due to lack of support or miscommunications

Comments: Communities engaged by TBG and GrassRoots Ltd (in markets) have shown interest in the project. TBG has also run radio campaigns, and dissemination of promotional materials at their gardens to reach a wider audience and increase interest in native edible plants for sustainable development.

Assumption 6: The partner organizations can deal with any issues community members have within their roles and support them to overcome them

Comments: Expertise from the steering committee and project technical team have helped to deal with issues as they have arisen. For example, when it was realised some of the fruits collected would spoil before analysis could be undertaken a new system (Use of cool boxes) was discussed and put in place under the budgets available for the project. The same is true of decisions regarding constructing fencing around agroforestry plots.

Assumption 7: Urban and rural communities engage with the co-creation workshops to understand their diverse perspectives for promotion activities.

Comments: TBG have used their experience to start engagements well with community and BGCI, through Ane Zabaleta, has further trained EBG & TBG staff to implement co-creation activities in greater detail. This guidance is to continue with follow up online sessions and travel to Uganda as needed in the second year.

3.5 Impact: achievement of positive impact on biodiversity and poverty reduction

The stated project impact on biodiversity and poverty alleviation was “FLR in Uganda includes a substantial amount of Agroforestry on degraded land using native food plant species to improve significantly rural and urban populations' health outcomes and local biodiversity.”

The project is building evidence for this and has so far established 5 agroforestry trial plots around Uganda, each with native edible plant species natural to the local agro-ecological conditions. Due to due to native plants relationships with other wildlife (pollinators, seed dispersers etc.), incorporating them in land use systems should have positive biodiversity impacts relative to exotic farmlands or landscapes that have lost these plants. The inclusion of trees can support soil improvement and protect against leeching and erosion, allowing farmers to grow other crops better. The plots will act as demonstration sites in the future.

So far, the project has incorporated beneficiaries in the full process, in workshops and market research. The health benefits of native plant species options are also being understood, through nutrition research. These will allow development decisions (regarding new product developments) to include a wide range of opinions and species that can fill dietary nutrition gaps. This will mean selection decisions are more likely to lead to successful outcomes following the project period. The development of new markets, from the products that will be developed in year 2, could help to diversify smallholders' income opportunities helping to eradicate poverty in rural areas, as well as improving nutrition availability from produce that reaches towns and cities.

Within the project, temporary employment opportunities for casual labourers to work within the established agroforestry trails have raised individual incomes already. For example, 40 seed collectors have gained skills in the harvest and storage of longevity native fruit species. Community members will also be trained in the methods to monitor plant growth and plot biodiversity.

With promises to restore 100 million hectares of land in Africa by 2030 under the Bonn Challenge and the Africa Forest Landscape Restoration Initiative (AFR100), the project will also provide a replicable model for local farmers and will in other nations.

4. Project support to the Conventions, Treaties or Agreements

The project supports targets from 3 of the strategic objectives of the countries National Biodiversity Strategy and Action Plan 2 (2015-2025):

Objective 2: To facilitate and build capacity for research, monitoring and information management on biodiversity through engagement and training with partners and local communities in the agroforestry trial establishment and monitoring processes.

National Target 6: By 2019, traditional knowledge and practices of indigenous and local communities integrated into biodiversity conservation and sustainable use at all levels – Aichi 18. This is being achieved by discussions with community groups of the project areas to understand how they use the target species, how they value them and incorporating this into the decisions made.

Objective 4: To promote the sustainable use and equitable sharing of costs and benefits of biodiversity by building evidence for more biodiversity friendly farming practices and promotion that is more effective because the target audience is involved in its creation.

National Target 17: By 2020, appropriate incentives for biodiversity conservation and sustainable use are in place and applied – Aichi 3 – through the development of income opportunities from native plants that can be used in sustainable land use systems, ready to be applied more broadly beyond the project.

Objective 5:

National target 21: By 2020, people are aware of the meaning and values of biodiversity and the steps they can take to use it sustainably – Aichi 1.

Objective 7: promote innovative sustainable funding mechanisms.

National Target 31: By 2018, new financing mechanisms are operational and new funding mobilized for biodiversity conservation. - Aichi 20. Thew new funding mechanisms will be new markets for products from native plants, that will need to be expanded further beyond the project.

5. Project support to poverty reduction

Rural small-scale farmers in the Kagadi, Lwamunda, Mbale, and Fort Portal districts, whose primary economic activity is farming and whose poverty rates are high as land becomes increasingly scarce, are among the project's target beneficiaries.

Some direct income benefits have been increased locally through project employment opportunities (see section 3.5 above). Beyond the project, indirect more sustainable and diverse income opportunities from the sale of the 12 new products (indicators 0.2) from native plant species may also be stimulated but may not be at the point of producing a lot of sales by the project end. The creation of new products will offer project beneficiaries a direct way to access nutritional benefits outside of those species' seasonal availability once (indicator 2.6).

Public awareness work will also contribute to promoting the produce of native plant species, with more targeted messaging produced in the second year (indicator 0.4).

6. Gender equality and social inclusion

Project engagement activities with local communities at knowledge-generation workshops, as well as market analysis, have been broken down by gender, age, culture, level of affluence, and employment. This has made sure that the project's public awareness-raising efforts and marketing development consider the needs of various groups, including women. At least 50% of trained and contracted individuals are women (seed and raw food material collectors, casual labourers, and managers).

Knowledge sharing workshops with communities have been undertaken to create a level playing field between scientists/experts and local communities. This helped to foster communication and build trust among participants, who would not typically have access to such platforms for expressing their opinions. 50% of attendees were women to ensure (a) women's roles in family health provision and their food challenges and desires, and (b) women's From these, Traditional Knowledge and values associated with the target native plant species, are better understood, and integrated into the project.

Please quantify the proportion of women on the Project Board[1].	41%
Please quantify the proportion of project partners that are led by women, or which have a senior leadership team consisting of at least 50% women[2].	50% of the 4 main project partners: BGCI has a senior leadership team with over 50% women and GrassRoots Ltd is being led by Rehema Walugembe

7. Monitoring and evaluation

A steering committee has been established to support the M&E of the project. Terms of Reference for this group were agreed and it met 4 times in the year (thrice online and once in person in Uganda in February 2023 – see Annexex 4 and 5). One in person meeting in Uganda had to be postponed due to the Ebola outbreak from October 2022 to January 2023 (see section 11). In meetings, the team presented progress and challenges and discussed the risk register to make sure activities are on track.

[1] A Project Board has overall authority for the project, is accountable for its success or failure, and supports the senior project manager to successfully deliver the project.

[2] Partners that have formal governance role in the project, and a formal relationship with the project that may involve staff costs and/or budget management responsibilities.

TBG has made sure that all actions are carried out according to the plan in its capacity as the lead in-country partner. In addition, TBG will aid the community agroforestry plot managers who will be trained in the first quarter of year two of the project to gather data on productivity and biodiversity. TBG will help to resolve any problems that may arise to guarantee that the data is gathered consistently and a coordinated manner for accurate analysis. In comparison to other land use systems, this will demonstrate the advantages of agroforestry land use systems integrating native food plant species.

Because open participation has been a top priority community engagement workshops have made sure the necessary information is recorded and that communities are satisfied with the project and now feel like their opinions are taken into consideration.

GrassRoots Ltd has gathered marketing data in engagement workshops and market surveys to assist in deciding which species to create new products from.

Together with TBG, Makerere University trained and assisted raw food materials collectors in locating new collection locations. Target native food tree species were gathered as the raw materials for nutrition research at Makerere University. Partners have been sharing data and reports on these activities so that informed decisions can be made in the project steering committee meetings, making changes, if necessary.

8. Lessons learnt

A bottom-up approach has worked well - engaging the beneficiaries in all the project activities. This has created a sense of ownership for the project. The preliminary research pre-project enabled a long-list to be created of potential species for use in sustainable development with some local consultations and a review of scientific publications and databases. Building on this and working with the communities more is allowing us to refine choices in the project based on those that are most acceptable and marketable to people in Uganda.

For the collection of raw food materials for analysis, following training of community members, it was realised that cool boxes were needed to ensure that the collected materials do not go off before analysis could be completed, so some collections were ruined. Further support was also needed by some community members to improve the timing of fruit collections. Improving this post-harvest handling when working with communities to carry out collections in rural areas to bring to research institutes would be advisable in other similar projects.

Insufficient quantities of some plant species for proper analysis was also noted. For some species - e.g., *Bridelia micrantha, Harungana madagascari*ensis & *Phoenix reclinate* - the fruits are small with large seeds and very little or fibrous pulp for analysis. For these, larger collections are needed to get quantities to carry out all the tests. Other target species, e.g., *Citropsis articulata*, are rare, have restricted distributions and are targets for other wildlife, like primates, so have been difficult to find. Other target species are being considered instead.

To improve communications with market analysis experts, without the option of providing raw materials for them to use in discussions at markets, it was also useful to compile basic useful information sheets to identify the species - images, local names, simple descriptions, and local known ethnobotanical information. This should have been done at an earlier stage since initial work undertaken by GrassRoots Ltd highlighted exotic species, including those from the same target taxonomic group, in part because of common name uses (e.g. Soursop - *Annona muricata* from latin Americas - instead of *Annona senegalensis*). Having fruits available for the market research would be most useful but is a challenge when they are only available for a part of the year from specific areas and their perishability before getting them to market assessment teams is not always possible. More time is required to achieve this for all.

9. Actions taken in response to previous reviews (if applicable)

None available, project is in the first year.

10. Risk Management

A risk register is being submitted with the report, that has been discussed and updated at steering committee meetings.

11. Other comments on progress not covered elsewhere

Seed of some of the target species have been hard to come by, especially in the more urban areas of EBG. This reflects a lack of updated knowledge on where these species can be found in combination with increased impacts on the populations of these species as Uganda becomes more degraded. This has identified a need to create some genetically diverse *ex situ* collections (e.g., seed orchards) for some of these species within botanical institutes like TBG and EBG for these species long term conservation and use in longer-term domestication programmes.

There was a breakdown of some equipment for analyzing the mineral content of the plant species at Makerere University, with difficulties getting the manufacturers to support repairs in African countries where they do not have bases. Fortunately, it has been possible to outsource to other labs within the university, particularly the Geology laboratory. Arrangements for this have already been made.

From 20 September 2022 to 10th January 2023 (see https://www.ecdc.europa.eu/en/ebola-virus-disease-outbreak-uganda), there was an Ebola outbreak in Uganda that impacted Mubende district, with cases (more than 10) reaching the capital Kampala. In total over 55 people died from more than 140 infected. This meant that a planned visit to Uganda from the BGCI team and some internal travels had to be cancelled in that period. BGCI held meetings online to try to accommodate for this unforeseen impact on travel.

12. Sustainability and legacy

The cost-benefit analysis of agroforestry versus other land use systems will still be possible to produce in the project. New food products will also be produced in the second year if a bit later than initially planned due to project delays in nutrition analysis. With these produced, further market testing and a marketing strategy will be able to be undertaken by GrassRoots Ltd.

The project in the first year has also helped to build the partnerships between BGCI, TBG, EBG, Makerere University, GrassRoots Ltd and local communities around Uganda. This will help beyond the project as complimentary opportunities are discussed and understood. For example, on the travels of BGCI staff to Uganda, members of partner organisations were able to visit the Makerere University incubation centre to see its facilities to support students to develop products to test in the market, that can be used within and beyond the project. NARO also has a similar incubation facility. All institutes will still be able to use this joint experience to develop new training programmes for extension offices that can support agroforestry in the country.

The creation of champions within rural communities has also begun through the selection of individuals to play important roles within the project, such as managing and monitoring the agroforestry plots.

For beyond the project, the team are considering options for extending the project and funding options, such as the EU Horizon 2020 call “Fair, healthy and environmentally-friendly food systems from primary production to consumption” (Opening 17th October 2023). This will help to build on the project results ensuring the legacy of this project is the beginning of the developments of new agroforestry options in Uganda that incorporate native plant species.

The project profile has been promoted at various levels this year – with local rural and urban communities at workshops about the project and through radio announcements; through the inclusion of experts from different government organisations in the steering committee (e.g., National Agricultural Research Institute, National Forestry Research Institute, Uganda National Council for Science and Technology and the Uganda Wildlife Authority)

13. Darwin Initiative identity

A project page on the BGCI website has been created (https://www.bgci.org/our-work/projects-and-case-studies/agroforestry-with-native-edible-plants-in-uganda/) that explains the Darwin Initiative funding support with the logo displayed.

During steering committee meetings and training, the Darwin Initiative and the UK Government is always promoted as the funding body that is supporting this project, reaching from local community members to government officials.

14. Safeguarding

Has your Safeguarding Policy been updated in the past 12 months?		No
Have any concerns been investigated in the past 12 months		No
Does your project have a Safeguarding focal point?	No	
Has the focal point attended any formal training in the last 12 months?	No	
What proportion (and number) of project staff have received formal training on Safeguarding?		Past: % [and number] Planned: % [and number]
Has there been any lessons learnt or challenges on Safeguarding in the past 12 months? Please ensure no sensitive data is included within responses. None have been recorded		
Does the project have any developments or activities planned around Safeguarding in the coming 12 months? If so please specify. Co-creation workshops are to be run with communities in the second year of the project and safeguarding of those involved will be important. This will build on past relationships and engagements already competed by TBG so is not expected to cause any particular issues.		

15. Project expenditure

Some finances and receipts need to be confirmed and checked, which will be done before the actual claim form is submitted to Darwin.

Table 1: Project expenditure during the reporting period (1 April 2022 – 31 March 2023)

Project spend (indicative) since last Annual Report	2022/23 Grant (£)	2022/23 Total Darwin Initiative Costs (£)	Variance %	Comments (please explain significant variances)
Staff costs (see below)				
Consultancy costs				
Overhead Costs				
Travel and subsistence				
Operating Costs				
Capital items (see below)				
Monitoring & Evaluation (M&E)				
Others (see below)				
TOTAL	**120911.**	**112608.6**		

16. OPTIONAL: Outstanding achievements or progress of your project so far (300-400 words maximum). This section may be used for publicity purposes

I agree for the Biodiversity Challenge Funds Secretariat to publish the content of this section (please leave this line in to indicate your agreement to use any material you provide here).

File Type (Image / Video / Graphic)	File Name or File Location	Caption, country and credit	Online accounts to be tagged (leave blank if none)	Consent of subjects received (delete as necessary)
				Yes / No
				Yes / No
				Yes / No
				Yes / No
				Yes / No

Annex 1: Report of progress and achievements against logframe for Financial Year 2022-2023

Project summary	SMART Indicators	Progress and Achievements April 2022 - March 2023	Actions required/planned for next period
Impact FLR in Uganda includes a substantial amount of Agroforestry on degraded land using native food plant species to improve significantly rural and urban populations' health outcomes and local biodiversity.		5 agroforestry trial plots with native plant species have been established to understand biodiversity and livelihoods impacts. Assessments of value of the native plants have also been started, with community workshops and market analysis producing recommendations with nutritional analysis ongoing.	[redacted]
Outcome New innovative development opportunities using native food plant species are available with the baseline biodiversity information of their use in agroforestry systems collected ready for future impact monitoring	0.1 34 native food plant species to 100 smallholder farmers and 10 local markets in 5 districts are understood with a top 12 for each of the 5 project districts July 2023 0.2 12 new food products created from native food plant species that provide valuable nutrition content and have value chain development potential by January 2024 0.3 Baseline biodiversity indicators are recorded by agroforestry plot managers within 4 1ha agroforestry plots, 4 1ha farmland plots and 4 1ha degraded unmanaged plots by March 2024 to be used to monitor change across the plots in the future. 0.4 Nutrition and biodiversity benefits of producing and consuming native plant food species in diverse land use systems promoted to over 200 smallholder farmers and 400	0.1 From 5 workshops with over 300 community members 8 native plant species and from analysis of 31 markets 9 species have been recommended for development 0.2 Not planned for year 1 0.3 Agroforestry trial plants established in 5 districts of Uganda with plot managers identified. 0.4 BGCI led co-creation training course in Uganda with 8 staff from TBG and EBG	0.1 Nutrition research concluded and recommendations from nutritional analysis confirmed, and project team analyse all results to decide which species to consider for new food development options. 0.2 Makerere University team to produce new products that can be taken to market and re-assess nutritional profiles of products made. 0.3 Biodiversity indicators finalised and plots monitored on a quarterly basis including parameters for: native plant productivity; intercrop productivity; and biodiversity. 0.4 Five (5) Co-creation sessions held at each project site and promotional materials produced and displayed at trial plots.
Output 1. Current use and markets of 34 target indigenous food species understood	1.1 4 consultation workshops held with local farmers, producers and marketers to discuss food consumption barriers to access nutritional food all year round, and to gather knowledge on species that we are analysing (traditional	All indicators are appropriate and sticking to timeline for Output 1 1.1 Five (5) consultation workshops were completed with communities recording information on food consumption barriers and traditional uses of native plant species (See section 3.1)	

	methods for growing, eating, recipes, etc.) by October 2022. 1.2 Data analysed from workshops to contribute to the decision of which 12 species to develop food products by October 2022 1.3 Market research undertaken to understand current markets for the target species and assess national market gaps and consumer food opinions and decisions published by July 2023.	1.2 Data from workshops analysed with a list of 8 native plant species recommended for food product development (See section 3.1 and Annex 8) 1.3 26 markets in Kampala and 5 markets in the project areas (Mbale, Kagadi, Lwamunda, Fort Portal and Entebbe) visited by the GrassRoots Ltd team for discussions with sellers and consumers on their knowledge, trade and opinions of the target species, and other products traded. 9 plant species recommended (not all native) (See section 3.1 and Annex 9)	
Activity 1.1: Run 4 workshops in project areas to engage local communities to discuss food consumption, barriers to accessing nutritional food year-round, and to gather traditional knowledge on the target plant species		5 workshops run in Entebbe, Fort Portal, Lwamunda, Kagadi and Mbale	Activity completed
Activity 1.2: Select community members for inclusion in agroforestry activities from workshop attendees		From workshop attendees, community members to be further involved in agroforestry activities selected (see section 3.1 and Annex 7)	Activity completed
Activity 1.3: Analyse data and report on community perception		Data analysed and recommendation of 8 species to develop products from	Data to be used to make final decision on which species to develop new food products from
Activity 1.4: Market research to investigate market gaps for food products and nutrition content		31 markets investigated with 9 recommendations of species from which new products could be developed (See section 3.1)	Activity completed, but GrassRoots Ltd to continue to engage with individuals from markets that showed particular interest in the project
Activity 1.5: Publish market research report		Market research report drafted (See Annex 9)	Report to be finalised and published
Output 2. Nutritional profiles of 34 target native food species known showing levels of important micro- and macronutrients with 12 new food products produced from at least 6 that are beneficial	2.1 50 community members (seed collectors) trained to collect raw food materials from known sources of the target food plants for nutritional analysis by October 2022 2.2 Monitors collect samples for analysis from the relevant species to each of the 4 project areas (between 13 and 28 species) by July 2023	2.1 31 local community members were trained to collect raw food materials and deliver them to Makerere University for analysis 2.2 The trained collectors have collected samples of 17 species and delivered them. Poor collections and degradation before reaching Makerere University meant support and cool boxes were needed to improve supplies. 2.3 Research underway into 14 species (See Annex 10), but project delays have held up results, as well as malfunctioning equipment. Activities to be extended further into year 2.	

	2.3 Research into the nutritional profiles of the 34 target species completed by July 2023 2.4 Steering committee uses consultation workshop, market research and nutrition profile results to select at least 6 species for food product development by October 2023 2.5 At least 6 New food products developed using Makerere University's food technology methods from the 12 species selected that have improved shelf life 2.6 Nutritional profiles of 12 newly developed food products produced by March 2024	2.4 Steering committee established with terms of reference (see Annex 4) and 5 meetings held in the year (See example minutes in Annex 5) 2.5. To be completed in year 2 2.6 To be completed in year 2	
Activity 2.1: Complete training for food raw materials monitoring and collection		Completed	Further support as needed provided to collectors by Makerere University
Activity 2.2: Trained community members collect food raw materials from target species for nutritional analysis		17 species collected	Remaining 17 species collected, with repeat collections made of 3 that were not analysable
Activity 2.3: Carry out nutritional analysis on samples collected from all target species		Nutritional analysis underway for 14 collected species, but not completed for all parameters	Analysis to be completed for the 14 species underway, as well as the remaining species that get collected
Activity 2.4: Report on nutritional content of all target species produced		Initial data from analysis that has been completed made available (See Annex 10)	When analysis is completed a report to be shared with the project team
Activity 2.5: Agree 12 species to take forward for new food product development		Nutritional analysis needs to be completed for this to be carried out	Management team to meet to assess recommendations from community workshops, market analysis and nutritional analysis once all data is available to make this decision
Activity 2.6: Development of products from selected food species - including organoleptic testing		Not planned for year 1	Once decisions made on species selection, Makerere University team to develop new food products
Activity 2.7: Carry out nutritional analysis carried out on newly developed food product		Not planned for year 1	Once new products developed, Makerere University team to analysis

			the nutritional content of the new products.
Output 3. Five agroforestry plots, with at least 6 of the target native food plant species, established to investigate the benefits to people and nature compared to less diverse alternatives, with baseline data collected	3.1 Steering committee established of project partners and relevant experts from the fields of Ugandan biodiversity, human wildlife conflict, agriculture and forestry by July 2022 to meet bi-annually 3.2 Agroforestry trial design developed with steering committee, and local smallholder farmer input, by October 2022 3.3 24 smallholder agroforestry champion farmers (50% women) and 1 botanic garden staff trained to establish, manage and monitor the agroforestry trials, by June 2023 3.4 4 x 1ha agroforestry trials established on community land and 1 at TBG by November 2022 3.5 Baseline productivity of 5 x 1ha agroforestry and 5 x 1ha local smallholder farmer 5 collected by the main harvest season in June/July 2023 3.5 Baseline data on biodiversity indicator species between 5 agroforestry, 5 local smallholder farmer and 5 degraded forest plots collected by March 2024	3.1 Steering committee established and met 5 times in the year with terms of reference agreed (See Annexes 4 and 5) 3.2 Agroforestry trial designs developed with input from the Uganda National Forestry Research Institute (see section 3.1 and Annex 11) 3.3 20 champions from each project area to be involved in future project activities (e.g. co-creation workshops) and 1 agroforestry trial manager selected (See section 3.1 and Annex 7) 3.4 5 agroforestry trial plots have been established and fenced in the project areas with 183 trees planted in total and intercrops for short-term benefits (See section 3.1) 3.5 Baseline data to be collected in year 2	
Activity 3.1: Establish steering committee and meet every 6 months		Committee established and TORs agreed. Group agreed to meet every 3 months	To continue to meet quarterly
Activity 3.2: Decide agroforestry trial design and monitoring framework that incorporates target native food species, alongside other useful and beneficial species to the system (e.g. nitrogen fixers)		Trial designs confirmed	Activity completed
Activity 3.3: Seed collection networks collect the seed of the target species in their area for propagation		40 seed collectors supported to collect seeds of the target species	Groups to continue to be supported

Activity 3.4: Community nurseries propagate the target species provided by the seed collection networks for use in trials		Nurseries have continued to propagate collected plant species	To continue to propagate the target species
Activity 3.5: Plant 5 trial plots at TBG and public land (e.g. church groups) or willing community members' land		Sites assess and 5 plots established with target species relevant to the local agro-ecological zone	Activity completed
Activity 3.6: Complete monitoring training for community member site managers		Site managers selected at each site	Training for monitoring to be completed early in year 2
Activity 3.7: Carry out baseline monitoring of plots		Not planned for year 1	Monitors to carry out baseline monitoring
Activity 3.8: Monitor plots quarterly after establishment		Not planned for year 1	Monitors to continue monitoring throughout the year
Output 4. 200 farmers and 400 urban community members help design promotion options to reach wider audiences about the benefits of native food species and agroforestry via radio shows and botanic gardens	4.1 Co-creation, education awareness and interpretation development training delivered to staff at TBG and EBG by April 2023 4.2 24 co-creation workshop held with 600 community members around TBG and EBG by October 2023 4.3 24 promotional radio shows run on local radio in the 5 project areas by March 2024 4.4 Agroforestry interpretation materials created including 2000 leaflets in English, 2000 flyers in two local languages, 2 magazine promotions and at least 1 information board at the agroforestry plot at TBG, by March 2024	4.1 BGCI staff travelled to Uganda in February 2023 to deliver the training to 8 staff members from TBG and EBG 4.2 Co-creation workshops to be run with community groups at all 5 project areas in year 2 (See plans for workshops in Annex 12) 4.3 Matched funding used to run small radio campaign in year 1 with the majority of the campaign to take place in year two following co-creation workshops. 4.4 All other interpretation materials to be created in year 2 following the co-creation workshops.	
Activity 4.1: Botanic Garden co-creation, education awareness and interpretation development training delivered to staff at TBG		BGCI staff delivered training in February 2023.	Activity completed. BGCI staff to continue to support the team as needed in year 2
Activity 4.2: Co-creation workshops held with groups of 25 community members		Not planned for year 1	Workshops to be held in the first half of year 2
Activity 4.3: Radio programmes created and delivered monthly to promote agroforestry and native food plant species, including using co-creation workshop knowledge towards the project end		Not planned for year 1	Radio campaign to be launched in year 2 following co-creation workshops

Activity 4.4: Interpretation materials designed, printed and installed at TBG using knowledge from co-creation workshops	Not planned for year 1	Interpretation materials to be created in year 2 following co-creation workshops and made available at 5 agroforestry sites

Annex 2: Project's full current logframe as presented in the application form (unless changes have been agreed)

Project summary	SMART Indicators	Means of verification	Important Assumptions
Impact: FLR in Uganda includes a substantial amount of Agroforestry on degraded land using native food plant species to improve significantly rural and urban populations' health outcomes and local biodiversity. .			
Outcome: New innovative development opportunities using native food plant species are available with the baseline biodiversity information of their use in agroforestry systems collected ready for future impact monitoring	0.1 34 native food plant species to 100 smallholder farmers and 10 local markets in 5 districts are understood with a top 12 for each of the 5 project districts July 2023 0.2 12 new food products created from native food plant species that provide valuable nutrition content and have value chain development potential by January 2024 0.3 Baseline biodiversity indicators are recorded by agroforestry plot managers within 4 1ha agroforestry plots, 4 1ha farmland plots and 4 1ha degraded unmanaged plots by March 2024 to be used to monitor change across the plots in the future. 0.4 Nutrition and biodiversity benefits of producing and consuming native plant food species in diverse land use systems promoted to over 200 smallholder farmers and 400	0.1 Database records, workshop reports that highlight communities' use of species including disaggregation by gender, market research report including disaggregation by gender, species target lists 0.2 Scientific publications, information on the World Agroforestry Centre "Priority Food Tree and Crop Food Composition" database 0.3 Site biodiversity records, biodiversity baseline report 0.4 workshop attendees lists, radio recordings, promotional materials (e.g. signs and posters for use at TBG agroforestry plot)	From the target species some benefits can be shown (e.g. nutritional, seasonal production outside of main crops to provide year round food security, market use and potential) to select 12 for new product development Biodiversity indicators are selected that can be monitored easily by the plot managers with support from TBG
Output 1 Current use and markets of 34 target indigenous food species understood	1.1 4 consultation workshops held with local farmers, producers and marketers to discuss food consumption barriers to access nutritional food all year round, and to gather knowledge on species that we are analysing (traditional methods for growing, eating, recipes, etc.) by October 2022. 1.2 Data analysed from workshops to contribute to the decision of which 12	1.1 Workshop records outlining opinions of attendees from the 4 project districts 1.2. Report of consultation workshops with suggestions for product development 1.3 Market research report, species target list	Markets can be assessed multiple times in the year to include seasonal changes in availability of food plant resources, with research teams based in suitable locations to provide locality specific data

	species to develop food products by October 2022 1.3 Market research undertaken to understand current markets for the target species, and assess national market gaps and consumer food opinions and decisions published by July 2023.		
Output 2 Nutritional profiles of 34 target native food species known showing levels of important micro- and macronutrients with 12 new food products produced from at least 6 that are beneficial	2.1 50 community members (seed collectors) trained to collect raw food materials from known sources of the target food plants for nutritional analysis by October 2022 2.2 Monitors collect samples for analysis from the relevant species to each of the 4 project areas (between 13 and 28 species) by July 2023 2.3 Research into the nutritional profiles of the 34 target species completed by July 2023 2.4 Steering committee uses consultation workshop, market research and nutrition profile results to select at least 6 species for food product development by October 2023 2.5 At least 6 New food products developed using Makerere University's food technology methods from the 12 species selected that have improved shelf life 2.6 Nutritional profiles of 12 newly developed food products produced by March 2024	2.1 Training reports with trainee names and details, pre and posttraining surveys to understand knowledge gained 2.2 Quality collections suitable for analysis provided to Makerere University 2.3 & 2.6 Report on analysis of nutrition, scientific publication, community engagement reports and market research 2.4 Steering committee meeting minutes describing rationale and the decision made by the committee 2.5 New food products, low-cost methods of production documented	The collectors are able to collect sufficient raw materials from the known sites in a year to be used by Makerere University for analysis Community members engaged lose interest due to lack of support or miscommunications
Output 3 Five agroforestry plots, with at least 6 of the target native food plant species, established to investigate the benefits to people and nature compared to less	3.1 Steering committee established of project partners and relevant experts from the fields of Ugandan biodiversity, human wildlife conflict, agriculture and	3.1 Steering committee minutes outlining data and presentations given and decisions made on any changes required	The partner organisations are able to deal with any issues community members have within their roles and support them to overcome them

diverse alternatives, with baseline data collected	forestry by July 2022 to meet bi-annually 3.2 Agroforestry trial design developed with steering committee, and local smallholder farmer input, by October 2022 3.3 24 smallholder agroforestry champion farmers (50% women) and 1 botanic garden staff trained to establish, manage and monitor the agroforestry trials, by June 2023 3.4 4 x 1ha agroforestry trials established on community land and 1 at TBG by November 2022 3.5 Baseline productivity of 5 x 1ha agroforestry and 5 x 1ha local smallholder farmer 5 collected by the main harvest season in June/July 2023 3.6 Baseline data on biodiversity indicator species between 5 agroforestry, 5 local smallholder farmer and 5 degraded forest plots collected by March 2024	3.2 Trial design report outlining how trials will be planted and monitored 3.3 Training attendees lists, training reports, payslips, plot data, socio-economic survey data 3.4 Plot establishment report with photos and GPS data, baseline monitoring data 3.5 & 3.6 Plot monitor reports, impact analysis report, Socioeconomic and biodiversity data from agroforestry trials, nursery sales records and receipts	
Output 4 200 farmers and 400 urban community members help design promotion options to reach wider audiences about the benefits of native food species and agroforestry via radio shows and botanic gardens	4.1 Co-creation, education awareness and interpretation development training delivered to staff at TBG and EBG by April 2023 4.2 24 co-creation workshop held with 600 community members around TBG and EBG by October 2023 4.3 24 promotional radio shows run on local radio in the 5 project areas by March 2024 4.4 Agroforestry interpretation materials created including 2000 leaflets in English, 2000 flyers in two local languages, 2 magazine promotions and at least 1 information board at the	4.1 Co-creation training report 4.2 Awareness raising strategy for engagement with urban populations 4.3 Radio programme recordings available online 4.4 Number of leaflets produced, number of signs produced	Urban and rural communities engage with the co-creation workshops to understand their diverse perspectives for promotion activities.

	agroforestry plot at TBG, by March 2024		

Activities (each activity is numbered according to the output that it will contribute towards, for example 1.1, 1.2 and 1.3 are contributing to Output 1)

1.1 Run 4 workshops in project areas to engage local communities to discuss food consumption, barriers to accessing nutritional food year-round, and to gather traditional knowledge on the target plant species
1.2 Select community members for inclusion in agroforestry activities from workshop attendees
1.3 Analyse data and report on community perception
1.4 Market research to investigate market gaps for food products and nutrition content
1.5 Publish market research report

2.1 Complete training for food raw materials monitoring and collection
2.2 Trained community members collect food raw materials from target species for nutritional analysis
2.3 Carry out nutritional analysis on samples collected from all target species
2.4 Report on nutritional content of all target species produced
2.5 Agree 12 species to take forward for new food product development
2.6 Development of products from selected food species - including organoleptic testing
2.7 Carry out nutritional analysis carried out on newly developed food product

3.1 Establish steering committee and meet every 6 months
3.2 Decide agroforestry trial design and monitoring framework that incorporates target native food species, alongside other useful and beneficial species to the system (e.g. nitrogen fixers)
3.3 Seed collection networks collect the seed of the target species in their area for propagation
3.4 Community nurseries propagate the target species provided by the seed collection networks for use in trials
3.5 Plant 5 trial plots at TBG and public land (e.g. church groups) or willing community members' land
3.6 Complete monitoring training for community member site managers
3.7 Carry out baseline monitoring of plots
3.8 Monitor plots quarterly after establishment

4.1 Botanic Garden co-creation, education awareness and interpretation development training delivered to staff at TBG
4.2 Co-creation workshops held with groups of 25 community members
4.3 Radio programmes created and delivered monthly to promote agroforestry and native food plant species, including using co-creation workshop knowledge towards the project end
4.4 Interpretation materials designed, printed and installed at TBG using knowledge from co-creation workshops

Annex 3: Standard Indicators

Table 1 Project Standard Indicators

DI Indicator number	Name of indicator using original wording	Name of Indicator after adjusting wording to align with DI Standard Indicators	Units	Disaggregation	Year 1 Total	Year 2 Total	Year 3 Total	Total to date	Total planned during the project
E.g. DI-A01	Co-creation, education awareness and interpretation development training delivered to staff at TBG and EBG by April 2023	Number of people from key national and local stakeholders completing structured and relevant training	People	Gender	8			8	-
DI-D01	Baseline biodiversity indicators are recorded by agroforestry plot managers within 4 1ha agroforestry plots, 4 1ha farmland plots and 4 1ha degraded unmanaged plots by March 2024 to be used to monitor change across the plots in the future.	Hectares of habitat under sustainable management practices	Hectares	None	5			5	4
DI-B05	24 co-creation workshop held with 600 community members around TBG and EBG by October 2023	Number of people with increased participation in local communities / local management organisations (i.e., participation in Governance/citizen engagement).	People	Gender	100			100	600

Table 2 Publications

Title	Type (e.g. journals, manual, CDs)	Detail (authors, year)	Gender of Lead Author	Nationality of Lead Author	Publishers (name, city)	Available from (e.g. weblink or publisher if not available online)

Checklist for submission

	Check
Different reporting templates have different questions, and it is important you use the correct one. Have you checked you have used the **correct template** (checking fund, type of report (i.e. Annual or Final), and year) and **deleted the blue guidance text** before submission?	Yes
Is the report less than 10MB? If so, please email to BCF-Reports@niras.com putting the project number in the Subject line.	Yes
Is your report more than 10MB? If so, please discuss with BCF-Reports@niras.com about the best way to deliver the report, putting the project number in the Subject line.	No
Have you included means of verification? You should not submit every project document, but the main outputs and a selection of the others would strengthen the report.	Yes
Do you have hard copies of material you need to submit with the report? If so, please make this clear in the covering email and ensure all material is marked with the project number. However, we would expect that most material will now be electronic.	No
If you are submitting photos for publicity purposes, do these meet the outlined requirements (see section 16)?	No
Have you involved your partners in preparation of the report and named the main contributors	Yes
Have you completed the Project Expenditure table fully?	Yes
Do not include claim forms or other communications with this report.	