

## Darwin Initiative Main: 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: 30<sup>th</sup> April 2023**

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### Darwin Initiative Project Information

Project reference	29-025
Project title	Sweetpotato, a model for food-security and long-term conservation of biodiversity
Country/ies	Kenya, Madagascar, Peru, and Zambia
Lead Partner	Global Crop Diversity Trust (Crop Trust)
Project partner(s)	Fiompiana Fambolena Malagasy Norvéziana (FIFAMANOR) International Potato Center (CIP) Lima and Nairobi The Zambia Agriculture Research Institute (ZARI)
Darwin Initiative grant value	GBP 600,000
Start/end dates of project	1 June 2022 – 31 March 2025
Reporting period	Apr 2022 – Mar 2023, Annual Report 1
Project Leader name	Sarada Krishnan
Project website/blog/social media	<a href="https://www.croptrust.org/work/projects/darwin-initiative-funded-sweetpotato-project/">https://www.croptrust.org/work/projects/darwin-initiative-funded-sweetpotato-project/</a> <a href="https://www.croptrust.org/news-events/news/chill-solution-for-meeting-future-demand-of-sweetpotato/">https://www.croptrust.org/news-events/news/chill-solution-for-meeting-future-demand-of-sweetpotato/</a>
Report author(s) and date	Sarada Krishnan, April 2023

### 1. Project summary

Sweetpotato is a vital subsistence crop in Africa with high micronutrient content and adaptive qualities for many farming systems and is a globally critical component of food security. However, the unique diversity of sweetpotato landraces in low-income countries is poorly conserved and vanishing. This project introduces a robust methodology to conserve and use sweetpotato genetic diversity as a model for the long-term, secure conservation of clonal crops, many of which are essential to smallholder farmers for increased sustainability and livelihoods.

The project name, *Sweetpotato Clean and Share*, clearly states the project objectives, which are to collect sweetpotato landraces from Madagascar and Zambia, clean the sweetpotato landraces of all diseases, repatriate the phytosanitary cleaned material to smallholder farmers in Madagascar and Zambia for enhanced productivity and securely conserve this material long-term under the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) for use by future generations. The project is working in collaboration with the Seeds for Resilience Project (S4R) in Zambia and a USAID-funded BHA-project in Madagascar, both of which also supported the collection of sweetpotato landraces.

The project involves collection of farmer sweetpotato landraces in both Madagascar and Zambia (maps of collection sites are included in Annex 4) and the shipment of these landraces to the International Potato Center (CIP) in Nairobi. The landraces are then put into *in vitro* culture and phytosanitary cleaned using thermotherapy and meristem culture by CIP-Nairobi. The *in vitro* material was multiplied, and the phytosanitary cleaned material will be repatriated to the countries of origin, where mass vine multiplication will occur prior to distribution of the cleaned vines to farmers for planting. At harvest, surveys will be conducted using small farmer focus groups to assess farmer impressions and

satisfaction with the planting of the phytosanitary clean material. In parallel with these activities in Madagascar and Zambia, CIP-Nairobi will ship *in vitro* material to CIP-Lima for long-term secure conservation of the material in the global sweetpotato collection held there in trust for humanity under the ITPGRFA. The landraces from this project will be available under the ITPGRFA from CIP-Lima and will be conserved for future generations in cryopreservation as part of the Global Plant Cryopreservation Initiative.

## 2. Project stakeholders/ partners

The project team includes:

- The Zambia Agriculture Research Institute (ZARI), a department of the Ministry of Agriculture and Livestock, which houses the Zambian National Plant Genetic Resources Center, is the lead partner from Zambia. In conjunction with ZARI, the project also includes the Zambian Department of Agriculture (DoA), the National Agriculture Information Services (NAIS), commercial vine multipliers, community leaders and farmers.
- Fiompiana Fambolena Malagasy Norvéziana (FIFAMANOR), which is a Malagasy institution working in Rural Development and Applied Research, is the lead partner from Madagascar. In conjunction with FIFAMANOR, the project also includes CIP-Madagascar, commercial vine multipliers, community leaders and farmers.
- CIP-Peru, working closely in harmony with CIP-Kenya, is the lead partner from CIP. CIP works closely with ZARI (Zambia) and FIFAMANOR (Madagascar) for the collection of sweetpotato landraces in each country, the shipment of the landraces to CIP-Nairobi for placement into *in vitro* tissue culture and disease cleaning, the repatriation of the landraces back to the country of origin and the shipment of the landraces to CIP-Lima for long-term conservation. CIP-Lima also is coordinating the generation and analysis of DNA fingerprints for the material.
- The Global Crop Diversity Trust (Crop Trust) is the overall lead administrative organization for the project.

Main lessons learned include:

- The need for a facilitated transport system for plant genetic resources to a central hub in Africa where material can be placed into *in vitro* both for repatriation to farmers and for shipment to CIP-Lima for long-term conservation.
- The involvement of local communities during the collection of local varieties is very important, and it is necessary to have a key contact person in each area and even in each locality.
- There is a certain sensitivity for farmers in sharing their landraces, which they have nurtured and protected for generations. Often, long-term conservation in a distant land is not a concept they have considered. Therefore, careful explanation and understanding is needed to ensure prior informed (PIC) consent is obtained.
- The involvement of the Regional Bureau of Agriculture in Madagascar was critical for the identification of collecting areas and resource persons.
- There are several landraces with different names that are not genetically different.
- Collecting landraces from an area far from the station needs special handling.
- Shipping materials within Africa is problematic. For example, no courier could be found that ships plant materials out of Zambia, which necessitated all Zambian landraces to be hand-carried to Kenya. Thus, transfer of material was delayed due to waiting until someone was travelling and could hand carry the material.
- Regular partner meetings enhanced communication and project coordination.

Challenges include:

- Delays in collecting of materials and issues with timely shipping of materials to Kenya have put pressure on the project as there is a short window during which planting can be done.
- The identification of areas with a maximum number of local varieties is important because collecting time is limited. To deal with this, prior identification of the farmers actually growing sweetpotato is necessary.
- The distribution of food or cash is common among the project areas and when sharing landraces, farmers expect to receive something in return. This is particularly true in communities outside a partner's common intervention zones and is sensitive as until farmers are asked for their landraces, the communities have never considered them of value.

- Finding the right contact to introduce the lead partners to the communities or farmers is key, as is an explanation by a trusted individual that the landraces will be returned to their source areas.
- Ensuring partners in Madagascar are provided communications materials in French to assure complete understanding and reporting.

### 3. Project progress

#### 3.1 Progress in carrying out project Activities

##### **Output 1. Landraces collected in partner countries and processed for long-term conservation**

- YR1 milestones from Output 1 have been successfully accomplished by FIFAMANOR and ZARI and partially accomplished by CIP.
- Target areas for collecting in Madagascar were identified, farmers were contacted, over 30 sweetpotato landraces were collected and vines from these landraces were shipped to CIP-Nairobi where the landraces were placed into *in vitro* culture and phytosanitary cleaning (thermotherapy and meristem culture) was initiated.
- The second shipment of sweetpotato landraces from Madagascar to CIP-Nairobi was interrupted unexpectedly by a 2-week closure of the KEPHIS research station due to the Kenyan elections. Unfortunately, this closure came at the same time material was shipped to CIP-Nairobi, resulting in a high level of death of the plant material. This necessitated a reshipment of the material, which has resulted in a delay in placing the material into *in vitro*, phytosanitary cleaning and subsequent multiplication of the material in CIP-Nairobi.
- Sweetpotato landraces from Zambia (collected under the S4R project) were shipped to CIP-Nairobi with an SMTA, successfully isolated into *in vitro* and phytosanitary cleaning (thermotherapy and meristem culture) has been done for over 30 landraces.
- The shipment of the sweetpotato landraces from Zambia to CIP-Nairobi was problematic due to the unforeseen policy by DHL and other courier services not to allow shipment of live plant material out of Zambia. The partners have never encountered this policy before and therefore the issue was unexpected. However, material was transferred from ZARI to CIP-Nairobi via hand-carrying of sweetpotato vines by individuals flying from Zambia to Kenya. While this caused logistical challenges and some delays, all sweetpotato landraces from Zambia were ultimately successfully transferred to CIP-Nairobi.
- Disease screening to confirm the efficacy of the phytosanitary cleaning protocols at CIP-Nairobi were delayed due to both the decision by the company providing the existing disease screening system in Kenya to stop supporting the screening and delays in CIP signing the project agreement with the Crop Trust. The partner agreement has been signed but the move toward a new provider of PCR-based disease screening capacity in Kenya was delayed. The PCR-based disease screening system is now in the final testing phase, but this necessitated the shift to another disease diagnostic method, high-throughput sequencing of small-RNAs, to confirm disease-free status of the propagules prior to repatriation. All the systems are now in place and disease screening is ongoing.
- The multiplication of repatriated phytosanitary clean planting stock has been initiated in Madagascar (five landraces). Repatriation of the full complement of 25 landraces to each country is still pending with an expected full completion of repatriation of the 25 clean landraces to each country by May 2023.
- In-country multiplication of the repatriated landraces has been initiated in Madagascar.
- Shipment of the collected landraces from CIP-Nairobi to CIP-Lima has been initiated with the shipment of 60 sweetpotato landraces originating from Zambia to CIP-Lima. As expected after a trans-Atlantic flight of over a week, a few of the landraces arrived in CIP-Lima in sub-par condition (weakened/yellowing material and seven landraces with signs of bacterial contamination); however, as per past experience, over 90% will be successfully established in CIP-Lima. Those that do not survive will be reshipped with a subsequent shipment.

##### **Output 2. 40,000 cleaned vines of 25 sweetpotato landraces available per country to smallholder farmers.**

- FIFAMANOR and ZARI are ready to initiate the multiplication of the repatriated landraces and it is anticipated that all project sweetpotato landraces will be repatriated by May 2023.
- Passport data from all landraces included in the project from both FIFAMANOR and ZARI has been shared with all partners.

### **Output 3. Capacity of national genebanks strengthened.**

- The initial tender for greenhouse and lab supplies/materials was delayed by logistical challenges. A change request to make these Year 1 funds available in Year 2 instead was approved. With this approval, equipment will be purchased as soon as possible.
- Four technicians from FIFAMANOR were trained on the use of the ODK tool for data collection.

### **3.2 Progress towards project Outputs**

Progress toward the achievement of *Output 1. Landraces collected in partner countries and processed for long-term conservation*, is substantially on schedule with most milestones being successfully accomplished. At the beginning of the project (June 2022), eight landraces had already been shipped from Madagascar to CIP-Nairobi under the USAID-BHA project. With the initiation of the Darwin project, the first sweetpotato landraces from Zambia were shipped to CIP-Nairobi in July 2022. The material shipped from both Madagascar and Zambia to CIP-Nairobi were fresh sweetpotato vine cuttings, which on arrival at CIP-Nairobi were placed in water to recover, then planted in pots to initiate growth prior to taking actively growing shoots for isolation into *in vitro* culture. Once established into *in vitro*, the cultures were subjected to thermotherapy treatment, after which meristems (~0.5mm) were excised for phytosanitary cleaning and the meristems were cultured individually to elongate into putatively disease-free shoots. The original project design called for confirmation of disease-clean status prior to multiplication and repatriation, however due to the challenge that the existing disease-diagnostic system at CIP-Nairobi is no longer being supported by the diagnostic company and delays in getting a new disease screening method up and running, multiplication was initially delayed. Other delays were also experienced in shipping material from the project countries to CIP-Nairobi. However, despite these delays the processing of the materials for long-term conservation in CIP-Lima is ongoing, with the first successful shipment of 60 landraces from CIP-Nairobi to the genebank at CIP-Lima for inclusion into the global sweetpotato collection under the ITPGRFA. Overall, the project will meet the goals of Output 1 with only a few months' delay.

Although most of the activities for *Output 2. 30,000 cleaned vines of 25 sweetpotato landraces available per country to smallholder farmers* are beyond YR1, those that were due in YR1 have been substantially accomplished. Output 2 relies on the successful phytosanitary cleaning of 25 landraces from both partner countries, the initial multiplication of the cleaned landraces at CIP-Nairobi and the repatriation of the initially multiplied material to the countries of origin. At the start of the project, none of these processes had been initiated. Currently, the phytosanitary cleaning of all landraces has been done or is near completion and preliminary multiplication of the material for repatriation is ongoing. Initial repatriation has been initiated for the initial testing of the within-country mass multiplication systems. DNA fingerprinting of the landraces from Zambia has been done and analysis is ongoing.

Only limited activities for *Output 3. Capacity of national genebanks strengthened* were planned for YR1, and those that were planned have been completed. At the beginning of the project, neither partner had good capacity for handling, much less multiplying, phytosanitary clean material. Tissue culture capacity was strengthened, as were greenhouse/screenhouse capacity. Capacity training for entry of data for an online data collection system (ODK) was provided to FIFAMANOR in Madagascar and this has been tested in YR1 of the project.

### **3.3 Progress towards the project Outcome**

There is no reason at this point to modify the two-fold outcome for the project which is 1) the secure long-term conservation of at-risk sweetpotato landraces from Madagascar and Zambia and 2) the increase in sweetpotato yields for smallholder farmers. Prior to the initiation of this project there were no projects aimed at the long-term conservation of sweetpotato landraces from Madagascar nor the repatriation of phytosanitary clean sweetpotato landraces aimed at increased yield to farmers in either country. This project has overseen the successful collection and placement into *in vitro* culture for long-term conservation over 40 sweetpotato landraces from Madagascar and ~250 sweetpotato landraces from Zambia. This in itself is a huge accomplishment. The process of shipping this material to be included in the global sweetpotato collection at CIP-Lima for secure long-term conservation has been initiated and a second shipment of these landraces to CIP-Lima should be completed by the end of the first year of the project (April 30, 2023). A large capacity-building effort is underway in each country supported by 1.5-hour monthly partner conference calls where not only challenges facing the project

are discussed, but also logistical, philosophical, and practical issues in handling of plant genetic resources are deliberated.

The indicators for measuring the outcomes of the project are still very appropriate: 1) a minimum of 25 landraces securely conserved long-term from each of Madagascar and Zambia under the terms of the ITPGRFA and 2) the redistribution of phytosanitary 30,000 clean propagules to at least 60 households per country by the end of the project. Farmer surveys in YR3 of the project will be conducted which will determine the success achieved with increasing yields by providing the farmers with phytosanitary clean materials.

### **3.4 Monitoring of assumptions**

Based on progress in YR1, current assumptions for monitoring project progress still apply. There is no need at this time to modify baseline assumptions made in the development or design of the project to date.

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

The major outcomes of the project, conservation of at-risk genetic diversity and increased farmer yield with the use of phytosanitary clean planting material, are good indicators of the positive impact this project will have both on biodiversity and poverty alleviation. This project has already demonstrated a positive impact on biodiversity by the collection and secure *ex situ* conservation of genetic materials for future generations. During the collecting, farmers expressed surprise that the landraces they were planting had a value that someone wanted to conserve. Thus, the project has already elevated the consciousness and awareness for smallholder farmers of the need to protect their valuable resources. Further, the placement of the collected landraces into the global in-trust sweetpotato collection managed by CIP-Lima, ensures the safeguarding for use under the ITPGRFA virtually into perpetuity of the material collected by this project. Future generations will always have access to this rich and valuable diversity. One unexpected element of these collecting efforts has been knowledge of the existence of such a large number of local varieties.

The repatriation of phytosanitary clean material back to farmers for their planting will provide first-hand evidence to farmers of the benefits of managing diseases in their fields. The project will provide training in the identification of diseases to the farmers and suggest some practical and easy ways to lessen disease pressures in their fields. One example of the lessons which will be taught are the use of positive and negative selection in saving planting material for subsequent years, i.e., saving good healthy plants (positive selection) and not diseased, weak material (negative selection). Further, badly diseased plants should be removed early (negative selection) prior to them providing inoculum for spreading the disease to healthy plants. Such lessons will not cure all problems and disease will always be present, but the lessons will provide farmers tools to lessen the impact of disease-causing decreased production on their fields. Such lessons we hope will have a lasting impact on farm productivity. And, in the end, when the farmers see that the use of phytosanitary clean material enhances their crop productivity, this project will also provide the knowledge on how they can obtain this disease-free material in the future as it will be conserved in a clean state for use.

## **4. Project support to the Conventions, Treaties or Agreements**

The activities undertaken in this project conform and support the framework of the national action plans in both countries where collections have taken place (Madagascar's *National Strategy and action plan on plant genetic resources for food and agriculture 2018-2025* and *Zambia's second national biodiversity strategy and action plan 2015-2025*).

Sweetpotato is listed in Annex 1 of the ITPGRFA, and all material transferred to CIP under this project was transferred with the Standard Material Transfer Agreement (SMTA) of the ITPGRFA. Long-term conservation of all collected material in this project will be done in the global sweetpotato collection which is held in-trust for humanity under the ITPGRFA. Further, the principal partner for the project from Zambia, Graybill Munkombwe from ZARI, is the country focal point for the ITPGRFA and has been in contact with his counterparts from CBD and the Nagoya Protocol, making all relevant parties aware of the project and its goals. In Madagascar, the principal partner for the project, Noroseheno Ralisoa from FIFAMANOR, has been in contact with the ITPGRFA country focal point, who approved the issuance of the SMTA for the shipment of the sweetpotato landraces.

CIP-Lima manages the global sweetpotato and potato collections held in-trust under the ITPGRFA and therefore is a key component of the ITPGRFA (covered by Article 15 of the ITPGRFA). The Crop Trust, the primary lead partner for the Darwin project is also a key partner to the ITPGRFA.

In summary, all genetic resources used in this project are under the auspices of the ITPGRFA with full knowledge and approval of both Madagascar and Zambia. To date, there has been no need for contact or interaction with the UK embassies, consulates, or diplomatic representatives in the partner countries.

## 5. Project support to poverty reduction

The project has already had a major impact on biodiversity by the collecting of important farmer sweetpotato landraces, placement of these landraces under the auspices of the ITPGRFA for use by humanity for crop improvement, training, and conservation into perpetuity for sustained and continued availability to future generations. The repatriation of disease-free planting materials to farmers, in conjunction with training in disease management, should provide immediate increases in smallholder farm productivity, leading to improved income and food security. Since YR1 of the project concentrated on collection of materials, cleaning the material of diseases, and increasing the clean material for distribution to farmers, farmer impact is not yet documented. This will happen in YR2 and YR3 of the project.

## 6. Gender equality and social inclusion

The project prioritizes the enhancement of gender sensitivity and awareness. Gender balancing by the project will impact positively on participation of both women and men. Fieldwork already done by the project has been conscious of ensuring gender balance in collecting teams. In Madagascar, women are part of the project team: 2 women executives are directly involved, the technical manager of the project and the person in charge of the evaluation with the farmers. In addition, one of the field technicians is a woman as well as two staff in administration. On the ground, the farmers contacted, and those who donated sweetpotato accessions are gender balanced. Similarly, in Zambia also the officers implementing the project have almost 50% representation of women and gender balance is ensured in the identification of farmers as well. In Madagascar, the sweetpotato is considered a woman's crop. Hence, as this project aims to improve crop production, women will benefit, helping them get more food and cash. Vine distribution and farmer surveys are designed to ensure gender balance.

Please quantify the proportion of women on the Project Board <sup>1</sup> .	Such quantification is not easily applicable as the project has no official project board. Of the people who regularly participate in the monthly project team virtual meetings, 67% (8/12 using the January 2023 meeting as an example) are women.
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 <sup>2</sup> .	With the exception of ZARI, all other lead partners in the project (Crop Trust, FIFAMANOR, CIP-Lima and CIP-Nairobi) are women (80%).

## 7. Monitoring and evaluation

All project Outputs and Activities are on schedule and monitored on an ongoing basis via regular emails and monthly virtual project team meetings. In YR1, collecting, shipment to CIP-Nairobi, placement into *in vitro* and disease-cleaning has been done and a shipment of landraces collected in the project to CIP-Lima has been initiated. All material was transferred with an SMTA (Annex 4) under the auspices of the ITPGRFA. To justify that the products and activities contribute to the results of the project, all local varieties collected, sent, and redistributed, with their characteristics, are directly registered in the project database. Documents such as the signed SMTA also document the transfer of plant materials. The list of producers who will receive the cleaned plant materials will also be directly entered in the database. Achievement indicators include number of local varieties collected, cleaned, repatriated, put into long-term storage (CIP-Lima), number of producers multiplying virus-free local varieties, and number and gender of smallholder farmers who receive and plant the repatriated landraces.

<sup>1</sup> 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.

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

Additionally, a database (ODK tool) was used for collected plant characteristics during the collection of landraces.

The M&E plan has not changed over this reporting period. All partners share the M&E work. Information among partners via email exchanges as well as during monthly meetings of all stakeholders.

## 8. Lessons learnt

- Regular and constant communication between the project partners has been critical to ensure timely delivery of activities. This has been done through monthly 1.5-hour teleconferences with all partners participating as well as constant, sometimes daily, correspondence via email.
  - Internet connectivity in partner countries has at times been problematic but this occurs less than 10% of the time and detailed minutes of the meeting are circulated, with ACTION items assigned to partners, which ensures critical points are conveyed.
  - Time difference between partners (project coordinator on Pacific Standard Time and Madagascar/Nairobi on Eastern Africa Time) requires flexibility in the timing of the meetings, however, to date all partners have provided this flexibility, making the project and communication function well.
- The 3-year project duration and very rapid ramp-up time from project approval to project initiation is sub-optimal and allows little time for adjustments in delays of deliverables. Because the project is dealing with living biological materials, seasonality for collecting, multiplication of planting materials, planting and data collection are all very time sensitive. Despite this, the project is only slightly delayed at the end of YR1 and provided the project can continue without further delays, all goals should be met by the end of the project.
  - Constant communication has been crucial in monitoring all critical points with partners and to date all partners are ready and willing to meet deliverables.
  - Weather is important for planting and the project timing is based on “normal” weather (seasonal rains and dry period), thus any deviation from this could cause delays. If needed, changes in planting sites to meet the deliverables will be made based on the actual weather.
- The fall of the UK£ relative to the US\$ during this first year of the project caused a significant (12%) reduction in project funds. This was particularly hard on partners in Madagascar and Zambia, who were relying 100% on funds from this project to meet deliverables.
  - Flexibility in budgets and deliverables is critical in any project design or planning and in the case of this project, the change in the exchange rate was handled by a decrease in the quantity of vines produced and households receiving vines, with no impact to date on capacity building for partners in Madagascar or Zambia.
  - The ability to maintain the projected level of capacity building in partner countries is critical for long-term impact within Madagascar and Zambia to allow infrastructure for continued awareness and ability for genetic resources conservation.
- Remote training for the preparation of material for DNA fingerprinting is difficult and direct hands-on training is a preferred method.
  - Although drying plant material on silica gel for DNA extraction is common practice for those skilled in the technique, the need for capacity building and training for the preparation of plant material for DNA extraction was not adequately appreciated.
  - In the future, capacity building for drying leaf material for molecular analysis needs to begin earlier in the project period and it should not be taken for granted that the partners have the necessary knowledge or capacity.
- Direct transport (hand-carrying) of collected plant genetic resources is preferred within the African continent to use of a courier service such as DHL or FedEx.
  - For one partner country (Zambia), a direct courier could not be found to transport the living plant material. If this was known prior to the initiation of the project, this would have avoided delays in trying to work with the courier companies and also in facilitating and planning better for opportunistic hand-carrying of the plant materials to Kenya.
- Coordination with other projects such as S4R and USAID-BHA was critical and greatly benefitted the collecting of the local varieties.
  - Prior knowledge of such programs operating in partner countries is a must for future projects to ensure timely success in achieving deliverables.
- In future projects such as this, a longer ramp-up time and longer project time period should be considered.

- This would allow better pre-scouting of collection sites to both identify partner institutions with which the farmers are familiar and the education of the farmers for the project goals and need for long-term conservation of their native varieties.

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

N/A

## **10. Risk Management**

N/A

## **11. Other comments on progress not covered elsewhere**

- Changes in the exchange rate resulted in ~12% decrease in project funds, which necessitated flexibility by partners and slight changes made mid-stream.
- Project goals were reduced from 80,000 clean vines distributed to 150 farmer households to the distribution of 60,000 clean vines to 120 farmer households.
- Despite this, open communication has been critical, and all partners are trying hard to ensure project goals are met.

## **12. Sustainability and legacy**

As the project is only in its first year and is operating on schedule, there is no reason to change any long-term or exit strategies. The best evidence of interest and support of the project is that both country partners have collected more than the required sweetpotato landraces. This clearly demonstrates their understanding that long-term conservation of their genetic resources is critical. This project will help improve the productivity of sweetpotato in different regions of Madagascar with harsh climate. This is very important for the Malagasy Government and potential donors. To ensure a sustained legacy of this project outcome, it is necessary to make producers aware of the importance of protecting crops from viruses in order to ensure sustained high yields and incomes. The project will provide proof for encouraging adoption of plants clean of diseases by farmers in both countries. Sustained legacy will also be ensured through the documentation and dissemination of project outputs through print, radio, and television media to create awareness of the importance of sweetpotato virus cleaned vines in other communities outside project sites.

## **13. Darwin Initiative identity**

The Crop Trust website has a dedicated [webpage](#) for this project, recognizing the UK Government's Darwin Initiative as a supporter of this project. A [blog post](#) was also published in late March about this project.

To publicize the Darwin Initiative project, FIFAMANOR uses the Darwin Initiative and Crop Trust logos in every publication. Whenever the team is going to the field, they ensure promoting the input of Darwin Initiative in the development of the region. The Darwin Initiative funding is recognized as a distinct project. Mostly, scientists and the communities where some projects have been conducted are familiar with the Darwin Initiative. The Ministry of Agriculture in Madagascar is aware of the Darwin Initiative actions.

CIP has not initiated any official communications at this early stage of the project. However, the project has been constantly mentioned to visitors to the CIP genebank in Lima, which has been a very efficient strategy to promote the long-term conservation of sweetpotato diversity. This has also served to reinforce the importance of collaborating with NARS, promoting capacity building and repatriation of clean materials back to farmers.

## **14. Safeguarding**

N/A



## 15. Project expenditure

**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 Costs (£)	Variance %	Comments (please explain significant variances)
Staff costs (see below)				FYI - CIP: Veronica Valencia was given a permanent contract and moved from Consultant to Personnel, as this is within the 10% no change request was sent.
Consultancy costs				
Overhead Costs				Reduced due to overall underspending within the project
Travel and subsistence				Less travel was carried out, due to delays with the project start date. Many of the farmer meetings will take place in Year 2.
Operating Costs				Shipping costs were minimized as CIP was able to arrange this directly. A training workshop did not take place.
Capital items (see below)				Due to delays in the procurement, equipment could not be purchased within Year 1 by FIFAMANOR. A change request to make the funds are available in Year 2 was approved
Monitoring & Evaluation (M&E)				
Others (see below)				
<b>TOTAL</b>	<b>197,420</b>	<b>167,902</b>	<b>15</b>	

**Table 2: Project mobilising of matched funding during the reporting period (1 April 2022 – 31 March 2023)**

	Matched funding secured to date	Total matched funding expected by end of project
Matched funding leveraged by the partners to deliver the project.		
Total additional finance mobilised by new activities building on evidence, best practices, and project (£)		

## 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.

The Darwin Initiative project, *Sweetpotato, a model for food-security and long-term conservation of biodiversity*, has had a large impact already in the first year of the project. Piggybacking onto the Seeds for Resilience (SFR) project in Zambia and a USAID Bureau for Humanitarian Assistance (BHA) project in Madagascar, the Zambian Agricultural Research Institute coordinated the collection of over 250 sweetpotato landraces in Zambia, while Fiompiana Fambolena Malagasy Norvéziana (FIFAMANOR) collected over 60 sweetpotato landraces from six regions in Madagascar. After collection, vines from the collected landraces were shipped to the International Potato Center (CIP) facilities situated at the Kenya Plant Health Inspectorate Service (KEPHIS) station in Nairobi, where the landraces were isolated into *in vitro* culture and underwent phytosanitary cleaning (thermotherapy and meristem isolation). Disease-free *in vitro* cultures are currently undergoing multiplication at the CIP-Nairobi facilities before being repatriated back to Madagascar and Zambia, where they will undergo mass multiplication prior to distribution of disease-free planting materials to local farmers. All landraces were transferred under the Standard Material Transfer Agreement (SMTA) of the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) and shipped to CIP-Lima for incorporation into the global sweetpotato collection, where they will be held in-trust for use by humanity

under the auspices of the ITPGRFA. Long-term conservation of the landraces in cryopreservation will be done at CIP-Lima under the Global Plant Cryopreservation Initiative.

#### Image, Video or Graphic Information:

File Type (Image / Video / Graphic)	File Name or File Location	Caption, country, and credit	Online accounts to be tagged	Consent of subjects received
Image		Sweetpotato vines from Zambia shipped in brown bags to CIP-Nairobi. <i>Credit: Alfred Waweru (CIP)</i>		Yes
Image		Unwrapped bundle of sweetpotato vines from Zambia after arrival at KEPHIS. <i>Credit: Alfred Waweru (CIP)</i>		Yes
Image		Rejuvenation of sweetpotato vines shipped from Zambia in water before planting. <i>Credit: Alfred Waweru (CIP)</i>		Yes
Image		Invitro Sweetpotato plantlet in CIP Nairobi Tissue Culture Lab. <i>Credit: Alfred Waweru (CIP)</i>		Yes
Image		In vitro sweetpotato plantlet from Zambia shipped in CIP-Lima. <i>Credit: Maria Roman (CIP)</i>		Yes
Image		A family from Tsianofana Centre in Vangaindrano District of the South East Region, Madagascar, eager to take a local variety of sweetpotato tuber to show and give to Rakotomahandry Jules (FIFAMANOR Technician). <i>Credit: Holiarison William Rakotomalala (FIFAMANOR)</i>		Yes
Image		With Ernest's family, a farmer from Vohimasy Farafangana in the South East of Madagascar, the FIFAMANOR team, led by the Director himself, are collecting local landraces. <i>Credit: Holiarison William Rakotomalala (FIFAMANOR)</i>		Yes
Image		Manitra's wife, from Isoanala (Betroka, Madagascar) is proud to show the Maroanaka, a local landrace of sweetpotato. <i>Credit: Noroseheno Ralisoa (FIFAMANOR)</i>		Yes
Image		Farmers during engagement meetings with Dr Mulenga Rabson in Kapiri-mposhi, Zambia. <i>Credit: Dorcas Kabuya (National Agriculture Information Service)</i>		Yes
Image		Dr Mulenga Rabson during farmers engagement meetings in Kapiri-mposhi (2022), Zambia. <i>Credit: Dorcas Kabuya (National Agriculture Information Service)</i>		Yes
Image		Camp Officer Betty Mwiindwe has a discussion with farmers in Monze (2022), Zambia. <i>Credit: Munkombwe Graybill (ZARI)</i>		Yes

## 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
<p><b>Impact:</b> Smallholder farmers in Sub-Saharan Africa have long-term access to phytosanitary clean sweetpotato diversity and other clonal crop diversity as a means to address future climate change and other challenges</p>		<p>The first phase of the project - collection and phytosanitary cleaning of landraces - has been successfully accomplished. This is a significant positive impact on biodiversity as it ensures the long-term conservation of this genetic diversity for future generations. Although the most significant positive impacts on small holder farmers in Madagascar and Zambia is yet to be realized, the collection of these landraces raised awareness in the farming communities of the value of the genetic diversity in their fields as well the value of maintaining their landraces to ensure sustainable farm productivity.</p>	<p>With the first successful shipment of the landraces collected to CIP-Lima, this starts the 4-month Peruvian quarantine period before the material can be transferred into the In Trust global sweetpotato collection and put into long-term secure conservation for humanity. Thus, over the next year the remaining landraces will be transferred to CIP-Lima and over the next 2 years a minimum of 20 of the landraces will be cryopreserved. Confirmation of disease cleaning will be completed in Q1 or YR2 and repatriation of phytosanitary clean material will be completed in Q1 of YR2 with vine multiplication and distribution to farmers occurring prior to the end of 2023.</p>
<p><b>Outcome:</b> Increased sweetpotato yields for smallholder farmers in Zambia and Madagascar as part of a “Clean &amp; Share” approach to conserve, and provide clean planting material, of RTB diversity.</p>	<p>0.1 By the end of the project, sweetpotato yields have increased 20% for farmers that received clean planting material for 50 high-value sweetpotato landraces</p> <p>0.2 The “Clean &amp; Share” conservation approach and its potential application to other countries or clonal crops documented and broadcast</p>	<p>This is in process and expected to be confirmed prior to the end of the project.</p> <p>This is in process and expected to be documented prior to the end of the project.</p>	<p>YR2 will focus on vine multiplication and dissemination of vines to farmers for planting. YR3 will focus on the assessment of impact on crop field and livelihood of smallholder farmers in addition to the secure long-term cryopreservation of the collected germplasm.</p> <p>YR2 will continue web-based progress reports for the dissemination of this approach and to build awareness for the application to other clonally propagated crops. A final report and peer-reviewed journal article will scientifically document the approach.</p>
<p><b>Outputs:</b> 1. 50 sweetpotato landraces from partner countries are processed for long-term conservation in the global sweetpotato collection at CIP in Lima, Peru</p>	<p>By the end of the project phytosanitary clean planting material from 50 landraces will be planted by small holder farmers and 20 of these landraces will be in long-term secure conservation in the CIP-Lima cryobank.</p>	<p>All indicators remain relevant and achieving the indicators on a project basis is on schedule.</p>	
<p>1.1 By the end of year 1, 60 sweetpotato landraces are selected and collected in Zambia and Madagascar</p> <p>1.2 By the end of year 2, 60 sweetpotato landraces are genetically characterised</p> <p>1.3 By the end of year 1, 50 sweetpotato landraces are cleaned of yield-limiting viruses and other pathogens at KEPHIS, Kenya</p> <p>1.4 By the end of year 1, 50 sweetpotato landraces are shipped to CIP-Lima for processing into the collection and ultimately for cryopreservation in the global collection at CIP-Lima.</p>		<p>1.1 Successfully and fully accomplished.</p> <p>1.2 Initiated, ongoing and on schedule.</p> <p>1.3 Substantially accomplished, awaiting confirmation of phytosanitary cleaning</p> <p>1.4 Shipment of 50 sweetpotato landraces successfully and fully accomplished.</p>	<p>1.1 N/A</p> <p>1.2 By the end of YR2 all landraces used in the project will be genetically characterized.</p> <p>1.3 Confirmation of the efficacy of phytosanitary cleaning will be confirmed Q1YR2.</p> <p>1.4 N/A</p>

<b>Project Summary</b>	<b>Smart Indicators</b>	<b>Progress and Achievements April 2022 - March 2023</b>	<b>Actions required/planned for next period</b>
<b>2.</b> 60,000 cleaned vines (planting materials) of 50 sweetpotato landraces are made available to smallholder households in Zambia and Madagascar	By the end of the project 60,000 phytosanitary clean vines will be distributed to and planted by small holder farmers in Zambia and Madagascar.	All indicators remain relevant and achieving the indicators on a project basis is on schedule. In vitro cultures of a limited number of landraces have been successfully repatriated to Madagascar and a shipment is pending for repatriation of material to Zambia. Vine multiplication and distribution to farmers will occur in YR2.	
2.1 By July 2023, Vine multipliers in Zambia and Madagascar receive 10+ clean cuttings/in vitro plants of 25 landraces from CIP-Kenya for multiplication and multiply them to 1200 samples per landrace 2.2 By December 2023, 60,000 sweetpotato disease-free vines distributed to a minimum of 120 farmer households 2.3 By the end of the project, yield data and focus group data are collected and summarized		2.1 Distribution of in vitro material has started, and everything remains on schedule. 2.2 As for 2.1, distribution of in vitro material has started, farmers are being identified and everything remains on schedule. 2.3 Partners are identifying communities to work with, everything remains on schedule.	2.1 YR2 Q1 10+/- phytosanitary propagules from 25 landraces will be repatriated to partners. 2.2 By the end of Y2 Q3 vine distribution of farmers will be successfully completed 2.3 By the end of YR3 Q3, all data will be collected, and analysis completed.
<b>3.</b> Capacity of national genebanks in Zambia and Madagascar strengthened to conserve diversity and support its use by farmers	Where applicable, tissue culture facilities for each partner will be operational and multiplication of disease-free vines will be operational.	Equipment has been purchased by Zambia and the process is ongoing and on schedule for the capacity strengthening. Madagascar was delayed in the purchase of equipment due to unforeseen circumstances. A change order was submitted, which was approved on 27 April 2023. With this approval, equipment will be purchased as soon as possible.	
3.1 By the end of the project, National genebanks in Zambia and Madagascar are strengthened through bi-monthly project meetings and three workshops on 1) conservation techniques, 2) analysis of molecular data and assessment of benefits at the farmer level 3.2 By December 2023, Vine multipliers, NARS and farmers in Zambia and Madagascar receive training on disease recognition, disease management, and multiplication of clean planting material		3.1 Monthly project meetings have been ongoing since the project inception. Workshops are planned and on schedule. 3.2 Report completed on progress of activities that contribute toward achieving this Output	3.1 By the end of Y2 workshop on conservation of genetic resources and analysis of molecular data will be completed. 3.2 By the end of 2023, a workshop on clean planting practices will be completed.
<b>4.</b> Cryopreservation protocol refined and optimized specifically for sweetpotato diversity	Robust cryopreservation system for sweetpotato developed as evidenced by the cryopreservation of 20 sweetpotato landraces from the project.	Methodology development for sweetpotato cryopreservation is ongoing and making excellent progress. Everything is on schedule.	
4.1 By the end of the project, experiments to improve cryopreservation protocol for sweetpotato undertaken 4.2 By the end of the project, protocol pilot tested on 20 sweetpotato accessions		4.1 Experiments in sweetpotato cryopreservation are ongoing. 4.2 Ongoing and on schedule	4.1 Refinement of sweetpotato cryopreservation methodology will continue through YR3 of the project. 4.2 Pilot will be initiated in YR2 after material is released from Peruvian quarantine and continue through YR3.

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

Project Summary	Measurable Indicators	Means of Verification	Important Assumptions
<b>Impact:</b> Smallholder farmers in Sub-Saharan Africa have long-term access to phytosanitary clean sweetpotato diversity and other clonal crop diversity as a means to address future climate change and other challenges.			
<b>Outcome:</b> Increased sweetpotato yields for smallholder farmers in Zambia and Madagascar as part of a "Clean & Share" approach to conserve, and provide clean planting material, of RTB diversity.	0.1 By the end of the project, sweetpotato yields have increased 20% for farmers that received clean planting material for 50 high-value sweetpotato landraces  0.2 The "Clean & Share" conservation approach and its potential application to other countries or clonal crops documented and broadcast	0.1 Yield data gathered from farmers' groups and NARS experimental plots  0.2 Publications, presentations and workshops on the reciprocal conservation approach  Plant Treaty's Global Information System lists new sweetpotato landrace accessions available worldwide for research, breeding, and training	Long-term conservation (cryopreservation) protocols are sufficiently effective  Working conditions and travel remain sufficiently flexible for project implementation in project countries
<b>Outputs:</b> 1. 50 sweetpotato landraces from partner countries are processed for long-term conservation in the global sweetpotato collection at CIP in Lima, Peru	1.1 By the end of year 1, 60 sweetpotato landraces are selected and collected in Zambia and Madagascar  1.2 By the end of year 2, 60 sweetpotato landraces are genetically characterised  1.3 By the end of year 1, 50 sweetpotato landraces are cleaned of yield-limiting viruses and other pathogens at KEPHIS, Kenya  1.4 By the end of year 1, 50 sweetpotato landraces are shipped to CIP-Lima for processing into the collection and	1.1 Images, reports, delivery of accessions in Kenya  1.2 Data provided as part of reports and/or science papers  1.3 Phytosanitary and import permits, confirmation of disease-free status at CIP  1.4 New accessions are reported via the online portal, Genesys ( <a href="http://www.genesys-pgr.org">www.genesys-pgr.org</a> ), and through assignment of digital	All collected landraces have minimum passport data associated with them required for assigning DOIs. <i>To this end, we will ensure that partners assume accountability for obtaining this information</i>  Countries transfer the landraces with a standard material transfer agreement. <i>In discussions with partners, we have been assured that this will not be an issue.</i>  Not all landraces adapt quickly to in vitro culture, and some are problematic for phytosanitary cleaning (need 2 or more rounds of cleaning). Thus, the number collected is 5 landraces more than the target of 25 landraces repatriation to ensure success with deliverables.  Sweetpotato materials are successfully imported to Peru without losses. <i>Advances in successful shipments from Kenya to Peru have progressed over the past couple</i>

Project Summary	Measurable Indicators	Means of Verification	Important Assumptions
	ultimately for cryopreservation in the global collection at CIP-Lima.	object identifiers to each accession in the Plant Treaty's Global Information System	<i>of years and most recently we have developed a system that ensures success by improved packaging and communication with Peru's phytosanitary authority.</i>
<p><b>2.</b> 80,000 cleaned vines (planting materials) of 50 sweetpotato landraces are made available to smallholder households in Zambia and Madagascar</p>	<p>2.1 By July 2023, Vine multipliers in Zambia and Madagascar receive 10+ clean cuttings/in vitro plants of 25 landraces from CIP-Kenya for multiplication and multiply them to 1600 samples per landrace</p> <p>2.2 By December 2023, 80,000 sweetpotato disease-free vines distributed to a minimum of 150 farmer households</p> <p>2.3 By the end of the project, yield data and focus group data are collected and summarized</p>	<p>2.1 Import permits, images, reports</p> <p>2.2 Data and images gathered on cleaned vines at multiplication sites</p> <p>2.3 Data collected from small focus groups to assess satisfaction, opinions and suggestions of farmers</p>	<p>Experienced vine multipliers are identified and willing to collaborate. <i>Several vine multipliers have already been identified in each country so that we have several options.</i></p> <p>Small-holder households are organized to receive and plant disease-free materials. <i>We will start the organization of farmers with advance printed announcements of the availability of clean planting materials</i></p> <p>Field conditions are conducive for growing material and there are no major abnormal climatic occurrences.</p>
<p><b>3.</b> Capacity of national genebanks in Zambia and Madagascar strengthened to conserve diversity and support its use by farmers</p>	<p>3.1 By the end of the project, National genebanks in Zambia and Madagascar are strengthened through bi-monthly project meetings and three workshops on 1) conservation techniques, 2) analysis of molecular data and assessment of benefits at the farmer level</p> <p>3.2 By December 2023, Vine multipliers, NARS and farmers in Zambia and Madagascar receive training on disease recognition, disease management, and multiplication of clean planting material</p>	<p>3.1 Workshop reports and photos</p> <p>Training materials made available online</p> <p>3.2 Screenhouses, equipment installed, training reports</p>	<p>NARS or NGOs in target countries organize appropriate, gender-balanced participation for capacity building events and knowledge is put to use</p>
<p><b>4.</b> Cryopreservation protocol refined and optimized specifically for sweetpotato diversity</p>	<p>4.1 By the end of the project, Experiments to improve cryopreservation protocol for sweetpotato undertaken</p> <p>4.2 By the end of the project, Protocol pilot tested on 20 sweetpotato accessions</p>	<p>4.1 Workplans, reports with raw data</p> <p>4.2 Improved sweetpotato cryopreservation success rates documented and reported</p>	<p>Complementary research on cryopreservation at CIP and other CGIAR Centres is supported and under way.</p>

**Activities**

- 1.1 Collection and selection of 60 sweetpotato landraces in Zambia and Madagascar (targeted collecting from diverse habitats and of valuable landraces in Zambia and Madagascar, preparation of vines for shipment to Kenya, shipment of vines to Kenya) (Q1 Year 1)
- 1.2 Data collected and analyzed from DArTseq genetic characterization of 60 sweetpotato landraces (Q2 Year 2)
- 1.3 50 sweetpotato landraces phytosanitary cleaned of yield-limiting viruses and other pathogens via thermotherapy and meristem isolation at CIP-Kenya (Q4 Year 1)
- 1.4 50 sweetpotato landraces packaged and shipped to CIP-Peru with all necessary paperwork including an SMTA for processing into the in trust collection and ultimately for cryopreservation in the global collection at CIP-Peru (Q4 Year 1). SMTA generated by Q1 Year 2.
  
- 2.1 Disbursement of 10+ clean cuttings/in vitro plants from CIP-Kenya of 25 landraces each to vine multipliers in Zambia and Madagascar for multiplication to 1600 samples per landrace (Q1 Year 2)
- 2.2 80,000 disease-free vines sweetpotato distributed to a minimum of 150 farmer households (Q3 Year 3)
- 2.3 Yield data and focus group data collected and summarized (Q1-Q4 Year 3)
  
- 3.1 Carry out bi-monthly meetings to discuss progress, challenges, needs and logistics with project leads from the national partners in Zambia and Madagascar and coordinate and hold three workshops on 1) conservation techniques (disease-free maintenance of plant materials in the field, in vitro culture, transfer in vitro material into greenhouses), 2) analysis of molecular data (virtual workshop to use data from the project demonstrating how to interpret the data using R-Script to identify unique and similar material) and 3) assessment of benefits at the farmer level (virtual + hands on workshop on techniques collect data and conduct surveys assess benefits and farmer feed-back) (Q4 Year 3)
- 3.2 Carry out training on disease recognition, disease management, and multiplication of clean planting material for vine multipliers, NARS and farmers in Zambia and Madagascar (virtual training workshop on recognition of sweetpotato diseases, how the diseases are spread, how to limit the spread of the diseases and principals of positive and negative selection for disease management) (Q2 Year 2)
  
- 4.1 Undertake experiments to improve cryopreservation protocol for sweetpotato (lab-based experiments in mother plant treatments, genotype screening, composition, and exposure time to loading solutions and PVS2, recovery of plants from cryo) (Q4 Year 3)
- 4.2 Test protocol pilot on 20 sweetpotato accessions (develop and test a 'best-bet' method based on the experiments from activity 4.1) (Q4 Year 3)

## 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
	People who attended the farmer training in Zambia on sweetpotato production and practices. <i>Country included: Zambia</i>	Number of farmers from Zambia who attended training on sweetpotato production and practices	People	Men Women	25 35			60	100
	People who attended the monthly virtual project team meetings. The meetings cover activities actively ongoing + preparation for future activities to ensure the project is on schedule. Each meeting contains discussions to build understanding and awareness of all partners in technologies used and needed. <i>Countries included: Kenya, Peru, Germany, Madagascar, and Zambia</i>	Number of project staff who attended the monthly virtual project team meetings since the project started (total of 10 meetings)	People	Men Women	48 78			126	300
	People trained in the methodology for in vitro rapid multiplication of sweetpotato in liquid. <i>Countries included: Kenya, Peru</i>	Number of project staff who received capacity building in in vitro sweetpotato multiplication in liquid	People	Men Women	1 1			2	2
	FIFAMANOR staff trained on the use of ODK tool for sweetpotato landrace collection on 8 August 2022. <i>Country included: Madagascar.</i>	Number of FIFAMANOR staff trained on the use of ODK tool for sweetpotato landrace collection	People	Men Women	4 2			6	6
	Photography workshop participants trained in documenting their work and project efforts visually.	Number of project staff who attended the photography workshop	People	Men Women	2 4			6	6

**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)
Contribution à la valorisation de la production de la patate douce locale pour lutter contre la malnutrition à Madagascar	Master thesis*	Rahoelimananjara Erno, 2022-2023	Male	Malagasy	Antsirabe	In process

\* The abstract of the Master's thesis can be found in Annex 4



● **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 <b>correct template</b> (checking fund, type of report (i.e., Annual or Final), and year) and <b>deleted the blue guidance text</b> before submission?	
<b>Is the report less than 10MB?</b> If so, please email to <a href="mailto:BCF-Reports@niras.com">BCF-Reports@niras.com</a> putting the project number in the Subject line.	
<b>Is your report more than 10MB?</b> If so, please discuss with <a href="mailto:BCF-Reports@niras.com">BCF-Reports@niras.com</a> about the best way to deliver the report, putting the project number in the Subject line.	
<b>Have you included means of verification?</b> You should not submit every project document, but the main outputs and a selection of the others would strengthen the report.	
<b>Do you have hard copies of material you need to submit with the report?</b> 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.	
If you are submitting photos for publicity purposes, do these meet the outlined requirements (see section 16)?	
Have you involved your partners in preparation of the report and named the main contributors	
Have you completed the Project Expenditure table fully?	
Do not include claim forms or other communications with this report.	