# Darwin Initiative: Final Report

## Darwin Project Information

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| Project reference | 25-017 |
| Project title | Enhancing rural Caucasian community livelihoods through fruit and nut conservation |
| Country(ies) | Georgia and Armenia |
| Lead organisation | Royal Botanic Gardens, Kew (RBG Kew) |
| Partner institution(s) | Nature Heritage NGO of Armenia (NH), National Botanic Garden of Georgia (NBGG) and Institute of Botany, Georgia (IoB) |
| Darwin grant value | £310,171 |
| Start/end dates of project | 1st July 2018 – 30th April 2021 |
| Project leader's name | Aisyah Faruk (PI); Ian Willey (Co-PI)<br>Previously Elinor Breman (PI); Aisyah Faruk (Co-PI) |
| Project website/blog/social media | Website: https://www.kew.org/science/our-science/projects/enhancing-rural-caucasian-livelihoods-fruit-and-nut-conservation<br>Blog: https://www.kew.org/read-and-watch/adventures-in-armenia<br>Social media: On PI's personal Twitter @AisyahFaruk. All project lreated tweets are grouped under #fruitandnutproject |
| Report author(s) and date | Aisyah Faruk; Ian Willey; Anush Nersesyan; Astghik Papikyan; Tinatin Barblishvili; Tsira Mikatadze-Pantsulaia; David Kikodze. 30 July 2021 |

## 1 Project Summary

The Caucasus region is recognised as being one of the world's 34 Biodiversity "Hotspots" and 35 "priority places" according to Conservation International and the WWF[1]. It is home to over 6,500 plant species, of which, 25% are found nowhere else in the world, making the Caucasus the region with the highest level of endemism within the Temperate Zone of the Northern Hemisphere [2]. Around 2,000 plants species found within the region have a direct economic value and are used by local communities for various purposes from food and medicines to fuel and dyes[3]. Of these, over 15% are wild-growing fruit and nut species[4]. Communities in Georgia and Armenia are dependent on harvesting wild fruit and nut species to supplement their diet and

[1] Caucasus Nature Fund (CNF, 2014) *Supporting people conserving nature in the Caucasus,* Brochure, http://caucasus-naturefund.org/wp-content/uploads/2012/10/brochureCNF2014_reduced.pdf, viewed July 2021

[2] Batsatsashvili, K., Schatz, G. E. and Schulkina, T. (2013) *Caucasus Plant Initiative: A regional plant conservation strategy*, Missouri Botanical Garden, Missouri USA

[3] Rukhadze, A. (2015) *Georgia's fifth national report to the convention on biological diversity, "*United Nations Convention on Biological Diversity", viewed July 2017

[4] Food and Agriculture Organisation (FAO), 2006, *Better forestry, less poverty - A practitioner's guide; Food and Agriculture Organization of the United Nations.* Rome

livelihoods. In 1991, heavy economic recession and high unemployment rates in the South Caucasus (or Transcaucasus) forced rural families into poverty and a heavy dependence on ecosystem services [5]. In Georgia, approximately 1,200 plant species are used medicinally[6] and in Armenia, fruits and nuts make up 52% of frequently collected forest products [7].

Within the last century, more than 40 vascular plant species have disappeared from Armenia and Georgia, and over 250 are in danger of extinction [8]. Moreover, due to widespread illegal logging and mining activities, it is estimated that less than 12% of Caucasus vegetation remains unspoiled [9]. Other major threats to wild fruit and nut populations include overharvesting, overgrazing and pollution. Overharvesting using destructive techniques can speed up collecting, but can heavily damage re-growth, which can be detrimental to sensitive or rare populations of fruit and nut species [10]. Further threats come from locals facing economic pressure, a lack of education on the importance of wild genetic resources, and the expansion of monocultures[11] . These threats are exacerbated by the interaction of climate-change with habitat loss, plant population decline and the disruption of ecological processes.

The current project aims to safeguard the ecologically and economically important fruit and nut species in Georgia and Armenia, which would safeguard rural livelihoods and conserve these valuable genetic resources. In Georgia, we have engaged with the Mchadijvari community and in Armenia the Khachik community (Figure 1).

## 2 Project Partnerships

The lead institution is RBG Kew's Millennium Seed Bank (MSB), which manages a partnership network of 97 countries and overseas territories and has over 20 years' experience of plant conservation project design and delivery. Well-established partnerships exist with Nature Heritage (NH), National Botanic Gardens of Georgia (NBGG) and the Institute of Botany, Georgia (IoB) through previous work in plant conservation. A Memorandum of Collaboration (MoC) or Access and Benefit Sharing Agreement (ABSA) between Kew and each partner institute was in place prior to beginning the project to establish the terms and conditions of our collaboration.

All partners were closely involved in the initial development and overall delivery of the project. A brainstorming event held in Yerevan in September 2018 with in-country partners facilitated the creation of the work package that enabled effective community engagement, and discussions around monitoring and evaluation activities (Figure 2). Progress reports are submitted by project partners and reviewed on a quarterly basis. These reports serve to foster dialogue between Kew and in-country partners and identify problems early on (see partner reports). Planning of activities relating to community engagement are largely led by the partners, social scientists and Biodiversity Champions appointed during the first year of the project (see section 3.1). For visits and events requiring the attendance of Kew or overseas staff the project team work well together to coordinate mutually acceptable timings and actions.

A notable challenge for the final year of the project was the effects from the COVID-19 pandemic. Whilst overseas and national travel was not possible in 2020 and 2021, we managed to conduct all our meetings online. In April 2021, the end-of-project meeting between all project members was held virtually (Figure 3). All partners and Kew project staff gave presentations on their achievements, challenges and lessons learnt during the project and held focused break-out rooms to scope follow-on projects and discuss how each partnership should move forward.

[5] Bakkegaard, R. K. (2014) '*Executive Summary – Regional analysis of forest and environmental product use and dependence amongst rural households in South Caucasus, Eastern Europe and Russia*', in *Enpi East FLEG II*, http://www.enpi-fleg.org/site/assets/files/1532/forest_dependency_regional_executive_summary_publication_final.pdf, viewed July 2017

[6] Ministry of Environment and Natural Resources Protection of Georgia (MoE), *Georgia's Fifth National Report to the Convention on Biological Diversity*, 2014, https://www.cbd.int/doc/world/ge/ge-nr-05-en.pdf, viewed August 2017

[7] Mkrtchyan, A., Grigoryan, E. 2014. The World Bank (WB), European Neighborhood and Partnership Instrument East Countries Forest Law Enforcement and Governance II Program, *Forest Dependency in Rural Armenia*

[8] Food and Agriculture Organisation (FAO), 2010, *Gardens of Biodiversity, Conservation of genetic resources and their use in traditional food production systems by small farmers of the Southern Caucasus,* Rome

[9] Caucasus Nature Fund (CNF, 2012) '*Flora Fauna and Threats: Biodiversity under Threat, the Caucasus',* http://caucasus-naturefund.org/the-caucasus/flora-fauna-threats/, viewed August 2017

[10] Bakkegaard, R. K. (2014) *Enpi East FLEG II*, 4

[11] Food and Agriculture Organisation, *Gardens of Biodiversity*, 3

Generally, partners reflected positively on their relationship with Kew and fellow partner organisations. They highlighted in-country meetings, training courses and the opportunity to build strong working relationships with community members as great achievements from the project. Challenges include the need for taxonomic revisions in-country; difficulties getting projects off the ground initially with community members and COVID-19 restrictions imposed on project staff by their institutions restricting travel and access to buildings.

Partners all expressed their desire to continue their relationship with Kew, focusing on enhancing the link between ex situ conservation and in situ activity. Armenian partners expressed their desire to continue working with communities, particularly those who utilise the landscape around protected areas, as they feel this has largely been overlooked. The Georgian partners feel that there are more gaps in the traditional knowledge of wild plants, so involving communities in ethnobotanical studies to support income generation and preventing overharvesting of non-woody species via certification schemes (e.g., FairWild). The desire for partners to continue collaboration with Kew is demonstrated by the signing of new partnership agreements running into 2030.

In Year 2 of the project, the PI reached out to potentially interested third parties such as FairWild. We managed to create more awareness about their sustainability certification to small local businesses (e.g. Wildy Tisane Armenia) who have started employing the community members for their responsibly harvested range of teas (Figure 4). In Georgia there is interest from a current FairWild certified supplier to include local harvesters from the Mchadijvari community in their sustainable certification training programme.

Notably in the second year, the project included stronger links with additional partners, namely from the local universities as the MSc students started working on the research components of the project. The involvement of key Armenian and Georgian researchers alongside the partners has been a success for the project, enhancing project-learning and linking research into conservation action.

The project has endeavoured to strengthen ties between target and neighbouring communities. In March 2019, the Georgian project team visited five neighbouring communities (Aragvispiri, Tsitelisofeli, Dzalisi, Bulachauri, Bazaleti) to introduce the project and gauge the residents' interest. Of the 192 people surveyed 95% had not heard of the project at the time of questioning but after being introduced to the project, 97% found the project interesting with 92% wanting to know more (survey results, Annex 3.1.1.31). Unfortunately, because of COVID-19 we were not able build on this enthusiasm in Year 3 by inviting residents to join final project workshops. However, the in-country project team were able to distribute 290 end-of-project community booklets and links made with the BC and steering committee to continue engagement past project end.

Links with Embassies also featured in the project. In 2018 a representative from the Armenian Embassy met the project team in Yerevan during the Red List training course. She was introduced to the objectives of the project and the team members and has continued communication with the Armenian partners. In 2021, the Kew published final project booklet (see section 3.1, Output 4) was shared with the Armenian and Georgian Embassies in the UK and the UK Embassies in the target countries. In response to the booklet, the Georgian Ambassador visited Kew to hear more about the work being done between UK and Georgia (Figure 5). The PI and Georgian Ambassador explored avenues for strengthening ties between the UK and Georgia through conservation.

# 3 Project Achievements

## 3.1 Outputs

### Output 1. Two rural communities trained in sustainable harvesting practices and empowered to deliver in-situ conservation of fruit and nut ecosystem services to enhance rural livelihoods

Conserving wild fruit and nut species and enhancing livelihoods of two rural communities requires effective engagement with the target communities in Armenia and Georgia. The first indicator of success was to make 60% of the community members (497 women, 497 men and 108 children)

aware of the project by December 2018. An estimated 1,845 adult residents and 660 children were made aware of the project through the distribution of 615 project leaflets written in the local language (Figure 6 and see Annex 3.1.1.1 – 3.1.1.4 for final leaflet designs and distribution declaration forms by partner staff), conducting 238 interviews with residents by social scientists and project partners, and presentations given at two local schools (Figure 7) with a quiz at the end to see what the children learnt (Figure 8 and see Annex 3.1.1.33 – 3.1.1.36 for school quiz examples and results). The recipients of project leaflets were 42% women in Armenia and 52% women in Georgia. The total number of people reached is based on data collected as part of a community assessment by partners and social scientists and estimated average of three adults and one child per household. At the end of the project, in-country project partners conducted a survey of their target community and found that 49% of the people interviewed from the Khachik community in Armenia and 67% from Mchadijvari community in Georgia were aware of the project. Georgian partners also conducted a tour of the NBGG's Seed Conservation Department for the Mchadijvari school group (15 pupils, 3 teachers) (Figure 9) (Community Engagement Report & photos, Annex 3.1.1.27) to raise awareness over biodiversity conservation and seed banking. At the start of the project only 2% of under 18s knew about seed banking as a tool for conservation, but by the end of the project, the social scientist survey showed a 48% increase in their knowledge of seed banking (Annex 3.1.1.13).

Originally, we planned to hold workshops to disseminate project learning and engage more with neighbouring communities, but COVID-19 restrictions did not make this possible. In March 2019 (pre-COVID-19 restrictions), Georgian partners surveyed five neighbouring communities to ready end-of-project learning dissemination to neighbouring communities (survey results, Annex 3.1.1.31). They found majority (95%) were not aware of the project but were interested in learning more (92%). To mitigate the restrictions from the pandemic in the final year, we developed the end-of-project community booklets, which were distributed to both target communities and neighbouring communities (Output 1.7) (end-of-project community booklet, Annex 3.1.1.5 & 3.1.1.6). The Georgian partners managed to engage with 22% of their target community and distributed a further 290 booklets to neighbouring communities (Aragvispiri, Tsitelisofeli, Dzalisi, Bulachauri, Bazaleti & Dusheti) (booklet distribution declaration and register, Annex 3.1.1.7-3.1.1.9). By March 2021, the outcomes of shared learning had been disseminated to 1,107 community members in Armenia and Georgia, including 506 male, 461 female, and 140 children. In Armenia, partners exceeded their engagement targets by distributing community booklets to 75% of the Khachik community (booklet distribution declaration and register, Annex 3.1.1.10-3.1.1.12). Unfortunately, the Armenian partners were unable to reach out to neighbouring communities but have data to suggest that community members are confident in spreading project learning more widely (see final paragraph in this section below). The team also developed a display of the project at the EcoCenter based at the Yerevan Botanic Gardens to reach out to the wider public.

At the end-of-project surveys, 84% of those aware of the project in Armenia reported "The project has increased my knowledge about plants and nature, their value and importance of conserving them for the future" (community survey, Annex 3.1.1.12), and majority of the community felt that the project benefited their community in some way (average score of 8.4 on a scale of 1 – no benefit to 10 – significant benefits). Georgian project staff and social scientists surveyed 100 residents, 67% of those surveyed were both aware of the project and able to list project objectives (social scientist report, Annex 3.1.1.12). Part of the survey was to capture the local communities understanding of broader plant conservation action (both in situ and ex situ). In the Georgian community, the majority of those that were surveyed showed a good understanding of Red List Assessments at the start of the project (83%), however, project activities highlighted to them the relevance of assessments to their diversity and landscape:

> *"I've learnt about the Georgian almond for the first time. I've heared about a great number of plants, but did not know that they needed protection, for example the bludder nut. I've learnt that the Red List is being continuously updated"* – extract from participant survey form (social scientist report, Annex 3.1.1.13).

To empower the community to conserve fruit and nut ecosystems, we aimed to establish a community led steering-committee made up of four members of each community (three of whom

are women) and one Biodiversity Champion (Output 1.2). This was achieved in 2018. Nine people are engaged in the steering committee in Armenia (78% women) and 14 in Georgia (57% women), (community engagement reports & workshop minutes, Annex 3.1.1.14 & 3.1.1.15). Georgian partners invited the Mchadijvari steering committee to NBGG in Tbilisi to educate them on seed banking and the importance of floral diversity (Figure 10, community engagement report, pages 1-2, Annex 3.1.1.27). The steering committees have played a leading role in engaging and empowering their respective communities throughout the project lifetime. In early 2019, the Armenian Biodiversity Champion (BC) was appointed (contract, Annex 3.1.1.16) and in June 2019 the Georgian BC was appointed (contract, Annex 3.1.1.17). Both BC's are active members of the community and have proven to be essential mediators between project staff and the community, notably when co-ordinating community access during the COVID-19 pandemic (community engagement report, Annex 3.1.1.18). They have helped turn project objectives into community action and have pledged to continue leading community involvement in the demonstration plots beyond project end (community engagement report, Annex 3.1.1.19).

The third measurable indicator that we are using to identify progress and eventually success of Output 1 is the establishment of two demonstration plots in 2018 in local areas and cultivated with six priority species by December 2019. By 2019 both target communities had established demonstration plots planted with eight locally sourced fruit and nut species (target six). Georgian partners have planted *Staphylea colchica, Sambucus tigranii* and *Amygdalus georgica* (photographic evidence Annex 3.1.1.20; community engagement report, page 1, Annex 3.1.1.21) whilst the Armenian plot contains *Rosa hemisphaerica, Crataegus orientalis, Crataegus armena, Pyrus sosnovskyi* and *Berberis vulgaris* (photographic evidence Annex 3.1.1.22; community engagement report, page 1, Annex 3.1.1.23). The Armenians have chosen species that are of use to the community but rare in the wild having held a steering committee workshop in May 2019 to help select species (workshop register and data gathering, Annex 3.1.1.24). The Georgian team have similarly established a plot under the advice of their steering community, located within the school grounds (community engagement report, page 1, Annex 3.1.1.21). The plot has been endorsed by a teacher at the school (personal communication):

> *"We [teachers] really like this demonstration plot. The students have always learnt about important species in Georgia in the class room, and now they can come out here and see them"* – biology teacher from Mchadijvari school during training event.

The Mchadijvari community further decided to create an additional plot with project partners on the school grounds (community engagement report, Annex 3.1.1.19). Twenty-four species were selected, and an irrigation system established. The 'community garden' was officially opened in March 2021, when restrictions eased in Georgia, by the Governor of Mchadijvari and Director of NBGG. During the event various speakers talked about irrigation, plant care and sustainable harvesting techniques (Figure 11). The community garden will further enhance local livelihoods and alleviate overharvesting pressures on wild communities.

The plots established at the end of the project currently need little attention other than watering. Therefore, at the end of the 3-year project, these plots are being worked on by a small group of community members. We had, therefore, not reached the 20% of community cultivating and utilizing the plots as intended in the second part of the Output 1.3. However, evidence from community surveys in the second and early in the third year of the project demonstrates the readiness of the community to begin cultivation once plots are established. In Georgia, a survey of 100 community members at the end of the third year showed that 91% were aware of the school demonstration plots (Georgian social scientist report, page 9, Annex 3.1.1.13) and 55% of respondents expressed their desire to take part in the care and propagation of plants within the plot. A survey of 130 community members from the Armenian community pre-restrictions revealed 48% of the community members were aware of the plots and 68% of those wished to be involved in cultivating the plot (40% women and 28% men) (community engagement report, Annex 3.1.1.23, survey results Annex 3.1.1.25). Practical training events were conducted and care sheets in the local language were disseminated to both communities (care sheet, Annex 3.1.1.26, community report, Annex 3.1.1.27). Community members were especially appreciative to receive expertise on caring for the plants and training on how to sell their produce (community

engagement report, Annex 3.1.1.14; photographic evidence, Annex 3.1.1.28). These activities, we believe, will contribute towards alleviating overharvesting of wild populations.

The fourth measurable indicator is that 10% of community members (83 women and 83 men) are trained in harvesting techniques by 2020, and a total of 20% of community members, 166 women and 166 men, are trained in sustainable harvesting techniques and the long-term consequences for important F&N by March 2021. As of March 2020, 159 people (113 female, 46 male) had received practical training in sustainable harvesting techniques (attendance register for Years 1 and 2, Annex 3.1.1.29). By April 2021, a further 677 adults received the final project booklet which has been produced both by NH and NBGG (distribution declarations, Annex 3.1.1.7, 3.1.1.8, 3.1.1.10 & 3.1.1.11). The booklet contains specific advice on how to collect sustainably and the importance of doing so for F&N species (community booklets, Annex 3.1.1.5 & 3.1.1.6). The success of various training and dissemination efforts is demonstrated in the final community surveys held in 2021. In Armenia 85% of those surveyed for the final project survey who had heard about the project (70/143 respondents) stated “Through the project I understand the value of sustainable harvesting of produce from wild populations” (community survey, Annex 3.1.1.12). In Georgia, 100 respondents to the final project survey rated the project 7.8/10 when asked to rate the following statement “Through this project I’ve learned how significant is observing the methods of sustainable harvesting of wild plant species” (social scientist report, Annex 3.1.1.13).

Output indicator 1.5 involves the collection and utilisation of data from the community; threat data for 20 F&N species for IUCN red-list publications, and data for 12 research taxa which was to be collected from 20% of adult community members, 166 women and 166 men, during 2018 and 2019 and then used in red-list assessments and genetic research. We believe that this output has been met. 219 residents in Year 1 (190 in Georgia & 29 in Armenia; 94 women and 92 men) [community questionnaire responses Annex 3.1.1.25 & 3.1.1.30, community database screenshot, Annex 3.1.1.31) and 144 residents in Year 2 (86 women and 58 men) (workshop data, Annex 3.1.1.24; community survey data, Annex 3.1.1.25) contributed data towards red list assessments and research taxa at workshops in 2018 & 2019. Although only 148 men contributed, partners received a significant number of responses from both genders and exceeded the overall target for number of respondents. This data has fed into 22 red-list assessments uploaded to SIS (screenshot example Annex 3.1.3.8), one first class MSc thesis and one MSc thesis yet to be submitted (MSc thesis, Annex 3.1.4.11; research report, Annex 3.1.4.13). Contributions from the community have also been part of a research paper submitted to a peer-reviewed journal for Open Access, highlighting the importance of wild harvested plants to rural communities to conservation NGOs and conservation scientists (confirmation of submission email, Annex 3.1.4.17).

Community-led conservation action plans (one in Georgia, one in Armenia) were developed within the project (Output 1.6) in collaboration between the project partners and representatives of the SC and distributed to 677 adults across both target communities (community booklets, Annex 3.1.1.5, 3.1.1.6). The final conservation action plans were approved at the final steering committee meetings who had been involved throughout the process. In Armenia, specific actions to take forward are to conduct annual sustainable harvesting courses and restricting the use of cutting tools when collecting from wild species (community engagement report, Annex 3.1.1.23). In Georgia, the steering group agreed to utilise the community plot to further their own livelihoods and reduce wild harvesting for rare species. Care for the community garden has been pledged by the local school where it will also provide education benefits to children (community engagement report, page 3, Annex 3.1.1.21).

COVID-19 affected partners ability to develop plans with the community on how they were to disseminate project learning to neighboring communities, therefore, output 1.7 was not readily achievable. The pandemic also impacted the ability of partners to establish links with neighboring communities, but final community surveys reveal the readiness of target communities to share their knowledge with neighboring communities. 43% of Khachik community members interviewed at the end of the project said that they felt confident in sharing what they have learnt with neighboring communities (community survey, Annex 3.1.1.12). Members of the Mchadijvari community taking part in the final community survey (social scientist report, Annex 3.1.1.13) were asked to state the extent to which they agreed with the following statement “I think I am able to transfer the knowledge, acquired from the project to others beyond my village (community)”. The average score on the 10-point scale was 8.43. 290 final project booklets were also distributed to

the neighbouring community in Georgia when restrictions eased (booklet distribution registry, Annex 3.1.1.9, distribution declaration, Annex 3.1.1.7 & 3.1.1.8). Members from the neighbouring community are reported to have responded positively to the community orchard, stating the desire for similar in their villages (community engagement report, Annex 3.1.1.19).

**Output 2. Seeds of 122 wild fruit and nut species from the Caucasus are protected through *ex-situ* seed banking in-country and at the MSB**

190 seed collections, representing 127 wild fruit and nut species have been collected and conserved in their country of origin (Figure 12), with a proportion of the original collection sent and received by the Millennium Seed Bank (MSB collections list, Annex 3.1.2.1), thereby meeting the first measurable indicator for Output 2. Seed collections from Years 1 and 2 arrived whilst the MSB was closed during the pandemic, therefore a surrogate means of verification is provided in the form of email confirmation of receipt by processing teams at MSB (Annex 3.1.2.2, Annex 3.1.2.3) and photographic evidence of seed arriving at the MSB (Annex 3.1.2.4). Year 3 collections arrived in 2020 and were accompanied by Notifications of Transfers (NoT's, Annexes 3.1.2.5 & 3.1.2.6).

Full cleaning, counting and viability data has been generated for 190 seed collections held at the MSB (MSB data, Annex 3.1.2.1) (Figure 13). The process to upload this data onto the MSBP's Data Warehouse is underway (DW screenshot, Annex 3.1.2.1a), which will make the data and collections freely available to the other members of the global partnership. Cleaning, counting and viability testing data has also been generated for all 190 collections held in Armenia and Georgia (partner data, Annex 3.1.2.7; photographic evidence of processing in-country). Holding collections in-country and at the MSB affords extra protection for conserved species and full associated data can be used to support use of seed collections and ensure collections are not exhausted.

In Georgia experienced partner staff have trained 10 young staff members in seed collecting, field data collection and seed banking procedures (attendance list Annex 3.1.2.8, partner report, Annex 3.1.2.7). In Armenia, three partner staff from Armenia (66% women) were trained in seed collecting, processing, and banking in June 2019 (seed collecting report page 3, Annex 3.1.2.9; photographic evidence, Annex 3.1.2.10). During this training, staff were evaluated by making those trained take the lead on the second day and plan a seed collecting expedition. Increasing the level of training within the project teams in country has helped us to achieve **Output 2** and embed skills within respective institutions.

**Output 3. Global extinction risk assessments are completed and submitted to IUCN SIS for 20 of the target seed conservation species**

Within the first year of the project Kew staff conducted a red-list training event in Yerevan, Armenia (Agenda, Annex 3.1.3.1; photographic evidence, Annex 3.1.3.2). 15 participants, of which 67% were woman (attendance list Annex 3.1.3.3) from all partner institutes were trained to conduct red list assessments to IUCN standards, meeting the first measurable indicator for Output 3 (Figure 14). Prior to the training, participants were asked to fill out a Training Needs Assessment (TNA) to record their existing comprehension of the key elements of IUCN assessments. The TNAs indicated that only 23% of trainees felt they were confident in carrying out assessment activities independently. Around 35-36% of participants felt that they have no or some knowledge of assessing species prior to the training. At the end of the course participants were asked to complete a feedback form (feedback forms, Annex 3.1.3.3). 85% of trainees very much agreed that the objectives of the course were met, with 56% saying that the materials, content, and organisation of the course was Excellent. 62% of the participants felt confident that they could assess species independently and the same percentage say that they could train others in IUCN assessments. Original TNAs are available upon request. Certificates were provided on completion of the course (Annex, 3.1.3.4).

Following the IUCN red list training course, species were selected for assessment as part of the project. Data from herbaria (e.g. *Rosa hemisphaerica*, Annex 3.1.3.5) and through fieldwork (e.g. *Rosa galushkoi*, Annex 3.1.3.6, Annex 3.1.3.7) were gathered during the first and second years of the project. As a result, project partners have submitted 22 global red-list assessments to

IUCN's SIS portal and national red list assessments are also being compiled for submission to the relevant national authorities (Table 1Table 1: Provisional Red List assessments submitted to IUCN as part of this project). These global assessments highlight the threats faced by each species and recommend conservation action to prevent extinction of assessed species. The assessments are a crucial step towards implementing a conservation strategy for these species across their native range. The assessments are summarised in the table below, full assessments are available via SIS portal (screenshot example, Annex 3.1.3.8) or as MS Word documents downloaded from SIS (Annex 3.1.3.9 & 3.1.3.10). In Georgia, data and assessments made as part of this project have been written into the IUCN SSC report by the Caucasus Plant Red List Authority [RLA] (email correspondence, Annex 3.1.3.11). The IUCN report will include new assessments, including those made as part of this project, as well as reassessments of previously assessed flora. The report serves as a vital resource for conservationists, policymakers and various stakeholders invested in protecting the flora of the Caucasus.

Community workshops planned (Output 3.4) were not possible because of COVID-19 restrictions. As an alternative, in 2021 partners produced end-of-project community booklets to disseminate project learning, including relevant learning from global IUCN assessments. The booklets also included the community conservation action plans (community booklets, Annex 3.1.1.5 & 3.1.1.6; more detail on the booklets provided against Output 1). Booklets for both countries highlighted the red-listing process and key species assessed. Both booklets incorporate learning from red-list assessments to illustrate the various threats wild fruit and nut species face and how individuals can harvest wild fruit and nut sustainably.

Prior to the pandemic, partners in Georgia developed a demonstration plot within the local school ground that highlighted red-list species of Georgia (photographic evidence, Annex 3.1.1.20). The Headteacher at the local school is grateful this plot has been established, stating it will contribute to the ecological education of school children (community engagement report, Annex 3.1.1.19). Evidence of community learning is demonstrated through final survey responses. 91% of respondents (100 people interviewed) expressed their awareness of the school plots and when asked to select from a variety of answers "Informing the population, increasing their awareness of biodiversity issues" came out as the most positive outcome of the project (social scientist report, Annex 3.1.1.13).

**Output 4 Increased understanding of the genetic diversity and uses of 12 fruit and nut taxa, highlighting valuable traits for climate change resilience**

Two MSc students were engaged in their respective countries in Year 1, Razmik in Armenia (contract, Annex 3.1.4.1) and Ana in Georgia (confirmation email from supervisor, Annex 3.1.4.2). Both students visited the UK for a 2-week residential training course at RBG Kew's Jodrell Laboratory (Figure 15 & Figure 16). Razmik and Ana were able to use specific primers to study target species and received thorough training from Laszlo Csiba of RBG Kew's Molecular Systematics Team (Figure 17) (Annex 3.1.4.3; Annex 3.1.4.4). Both MSc students were extremely positive about the training they received, demonstrating their confidence in conducting genetic studies. Training at Kew together with in-country training in Year 1 for Razmik (presentation, Annex 3.1.4.7) and in Year 2 for Ana (research report page 2, Annex 3.1.4.8, 3.1.4.8a) equipped the students with the skills to successfully achieve the other measurable indicators under Output 4.

*"I had the opportunity to communicate with amazing specialists in this field and learn important laboratory skills. Also during this time I was able to significantly improve my understanding of the language"* - Razmik, Annex 3.1.4.5

*"I got familiar with commonly used laboratory methods in molecular-genetic study and also got impression on the structure on the molecular study of Prunus spinosa, which is one of the major parts of my master thesis. It was also interesting to meet local scientists and discus some of the molecular technics of laboratory."* - Ana, Annex 3.1.4.6

By the end of the second year of the project, Razmik and Ana were able to extract DNA and perform PCR analysis for all 12 target taxa (research report, page 1, Annex 3.1.4.9; research report, page 1, Annex 3.1.4.10 respectively), thus meeting the second measurable indicator for output 4. As a result, Razmik successfully completed and defended his MSc thesis in May 2020 with a high score of 19/20 (MSc thesis, Annex 3.1.4.11; research report, Annex 3.1.4.12). He is now working with MSB co-ordinators and in-country project supervisors to publish his findings in a peer reviewed journal (research report, Annex 3.1.4.19). Ana begun her MSc project in Year 2 and as a result COVID-19 has had a bigger impact on her work. Throughout 2020 Ana had limited access to her institution and had to take personal leave from university for several months. Despite this, Ana has made good progress in concluding her MSc thesis. She has written key chapters of her thesis and is now back in the lab finalising her genetic analysis. She is due to submit her thesis in Autumn 2021 (research report, Annex 3.1.4.13).

Despite activities being delayed or halted due to COVID-19 related restrictions (e.g., the cancellation of the Annual Biodiversity Conference in Georgia), we did manage to disseminate research outcomes from the project in other ways (Output 4.3). For example, by including research findings in Georgian and Armenian end-of-project community booklets (Annex 3.1.1.5 & 3.1.1.6), and in English in the final project booklet (Annex 3.1.4.14), and distributing these to a range of different stakeholders, including relevant embassies (Figure 18). Razmik has also presented his results to the scientific community at conferences in Tajikistan in July 2019 and the UK in September 2019 (Posters, Annex 3.1.4.15 & 3.1.4.16). The PI has kept the Armenian IPTGRFA's focal point updated about imminent publication of project progress (email, Annex 3.1.4.17). In June 2021, the PI submitted a joint research paper to the journal Conservation Biology titled "The use and long-term conservation of wild edible fruits and nuts of the South Caucasus" (confirmation of submission email, Annex 3.1.4.18). The paper is co-authored by project partners and Kew colleagues.

A part of Razmik's MSc was to understand the effectiveness of different native rose species found in Armenia. In the second and third year of the project, the Armenian project members shared these results to the community members and the Steering Committee. This was done through a discussion group in Year 2, steering committee meetings and the community booklet in Year 3 (research report, Annex 3.1.4.19). We found that the community members were very interested in which species held the most Vitamin C and readily engaged with the project members.

## 3.2 Outcome

Numbers of people engaged with the project and its various activities can be found in section 3.1 above. Due to the pandemic, the teams were not able to conduct the community surveys at the same scale as the first year, however, of those who were engaged (117 men, 126 women), majority stated the value of sustainable harvesting of wild populations (see section 3.1,Output 1, page 8). During community interviews in October 2019, the Mchadijvari community members shared their view on sustainable wild harvesting, seeing this as an avenue for increasing their income and something that they were keen on maintaining past the project end:

> *"…they regard the necessity of rising environmental awareness as very important. They said that in their opinion this is especially important for the future generation to grow with correct values and caring attitude the nature. That's why they welcome the involvement of school pupils in this project."* – Social Scientist report, page 2, Annex 3.2.1

Although the training and awareness campaign has equipped community members with the knowledge on how to sustainably manage resources and protect ecosystem resources (see section 3.1, Output 1 page 4-5 for more detail), the development of the community-led steering group and conservation action plans have played their part in empowering the community to make suitable decisions for the conservation of their landscape and their livelihoods (see Section 3.1, Output 1 page 6-7 for more detail) (**Outcome indicator 0.1**).

During final surveys of members of the Khachik community, 141 out of 143 respondents said they would talk to friends and family or others in neighbouring communities about what they have

learnt during the project (community survey, Annex 3.1.1.12). In Georgia we are seeing a similar level of confidence growing throughout the project's lifetime. Notably, Temur "Jambuli" Mighdiseli, a local collector was interviewed for National TV (Figure 19) where he was able to express the importance of sustainable harvesting for conservation and his own livelihood.

It is also evident that the target communities have learnt about sustainable harvesting proven by the development of their conservation action plans e.g. harvesting without cutting tools and community set limits on collection of ripe fruits (see Section 3.1, Output 1 pages 6-7 for more detail). In the final surveys, 84% of those interviewed in Armenia, who were aware of the project agreed with the following statement "The project has increased my knowledge about plants and nature, their value and importance of conserving them for the future" (community survey, Annex 3.1.1.12). Similarly in Georgia, when asked to rate the statement "This project increased my knowledge about the plants and the nature, the significance of their protection/conservation for the future and their value" from 1 (Strongly disagree) to 10 (Strongly agree), the average score was towards the "Strongly Agree" section (8.06).

At the end of Year 2, 159 community members had received practical training (attendance register for Years 1 and 2, Annex 3.1.1.29). By the end of the project, 1,102 community members had also received the end-of-project community booklets produced by each partner containing practical advice on cultivation (community booklets, Annex 3.1.1.5 & 3.1.1.6) (**Outcome indicator 0.2**). Establishment of the cultivation plots during the lifetime of the project will contribute towards alleviating harvesting pressures from wild populations. Evidence from community interviews show promising results where communities are readily able to maintain the plots and see their value to the overall community (see section 3.1, Output 1). Training on the propagation and care of the plots through workshops and care sheets have largely been welcomed by the local communities, reaching 159 people within the project's lifetime.

**Outcome indicator 0.3** has been achieved. Section 3.1 details how the community action plans were developed and disseminated via end-of-project community booklets. In Georgia, project partners have already distributed the booklets to 6 neighbouring communities who have expressed their desire to create a demonstration plot (community engagement report, Annex 3.1.1.19). In Armenia, project partners reported how prior to the project many community members often overlooked the negative impact of wild harvesting on nature. They highlight that through the process of designing the community action plan, the community have a clear understanding of sustainable harvesting and an opportunity to implement programs which will make it possible to sell sustainably harvested F&N in line with the community action plan (community engagement report, Annex 3.1.1.18). Unfortunately, the planned meeting between the Steering Committee of the Khachik community and neighbouring Areni community to disseminate project learning and exchange knowledge was cancelled due to the country restrictions.

**Outcome indicator 0.4** has been achieved through the conservation of 190 seed collections in long-term storage, representing 127 wild fruit and nut species (see section 3.1, Output 2). All the collections in-country have been duplicated to the Millennium Seed Bank for added security. Similarly, **Outcome indicator 0.5** has also been achieved with the submission of 22 global red-list assessments to IUCN's SIS portal, creating the first step on the path of increasing their conservation across the region (see section 3.1, Output 3).

**Output indicator 0.6** has only been partially achieved due to restrictions placed on students access to their universities, cancellation of Georgia's Annual Biodiversity Conference and the inability to identify, communicate with and meet policy makers and the wider scientific community. As explained in Section 3.1, the MSc students were unevenly affected by the pandemic and as a result, only partial information related to the research has been disseminated to the wider scientific community (see section 3.1. Output 4). A joint paper is in prep to publish the Armenian

students' results and a paper authored by the PI and co-authored by representatives from all partners institutes has been submitted to an open access journal. Ana, the Georgian MSc student unfortunately had to delay her studies, however, her thesis is currently in its final draft and will be submitted in September 2021 (pers comms with D. Kikodze from the Institute of Botany).

### 3.3 Monitoring of assumptions

All the Output and Outcome assumptions were monitored during the project's lifetime.

The onset of the pandemic in spring 2020 was unexpected, but generally the risk of inaccessibility of communities through political and/or natural disasters was identified at the start of the project. The inaccessibility of the target communities in the third year affected some of the project outputs, leading to changes needed in the project activities to still achieve the relevant outputs. In-person community activities were suspended, however, the establishment of the steering community ensured that project partners still had strong links to the target community and when restrictions eased, project members were able to disseminate project learning through written material, thereby allowing for the achievement of Output 1. We should also note that the sapling establishment assumption is only partially held, as in Armenia, one of the species placed in cultivation did not survive its first season. We mitigated this risk through ensuring more than one species was planted within the plot, and therefore ensures the achievement of Output 1. In Georgia, some of the species planted are yet to experience a full season, therefore, it is too early to say if this assumption holds true. For those that were planted in the second year, however, the saplings are established and going some way in raising awareness of threatened useful species of the region.

In the first year of the project, we added an additional assumption relating to Output 4:

*Assumption 1: Kew staff are available to train MSc student on genetic analysis techniques*

To manage this risk, we engaged with relevant members of staff at an early stage, and as a result, both Ana and Razmik received training at the Jodrell Laboratory.

We believe that majority of the assumptions for Output 4 (i.e., target populations, student engagement and conclusive results) still hold true. However, due to the pandemic hampering access to institutions and the need of the Georgian partner to take personal leave in the final year of the project, her research plan has been delayed past the project end. Therefore, in future, any research related outputs should come with an assumption around accessibility to institution collections and support.

Majority of the Outcome level assumptions still hold true, however, the pandemic hampering delivery of the project in the final year has affected the project's overall contribution towards the Impact statement.

### 3.4 Impact: achievement of positive impact on biodiversity and poverty alleviation

The original application highlighted that the project would contribute towards achieving sustainably utilised ecosystem services in the Caucasus by the national population thereby contributing to rural poverty reduction, increased food security and protection of plant biodiversity. The Caucasus region is considered a global biodiversity hotspot and a region of high diversity for wild relatives of domesticated crops (including fruit and nut crops)[12], therefore, conserving its diversity will have a high impact on global biodiversity conservation and food security.

[12] Pironon et al (2020) Toward unifying global hotspots of wild and domesticated biodiversity, *Plants,* **9**, pp1-18

Through Output 1, the project has contributed to biodiversity conservation and poverty alleviation through enhancing the knowledge of local fruit and nut collectors in plant conservation and sustainable harvesting techniques. Alongside sustainable harvesting techniques, workshops were run in the second year that focused on selling wild collected produce. The workshops were aimed at women within the Khachik community, empowering women to sell their produce, which is traditionally a male dominated activity (See section 4.3). The establishment of plots for the community to cultivate fruit and nut crops that are traditionally used in their own cooking and for sale will alleviate pressures on wild harvesting and establish a potential new income source for the community (). Training on propagation () and care of the cultivation plots in the second and third year () has given communities the tools to ensure the plots are maintained and secure their livelihoods.

Through the activities and outputs listed under Output 2 and Output 3, we believe that the project has directly contributed towards higher-level impact on biodiversity conservation and food security. The project successfully ensured 127 fruit and nut species are in long-term conservation both in their country of origin and duplicated for additional safety at the Millennium Seed Bank, effectively preventing the extinction of those species. As these are economically and culturally important, both in the Caucasus and globally, safeguarding these collections has also contributed towards increasing food security within a global setting.

Red Listing of 22 species (Output 3) contributes towards the overall biodiversity conservation and their associated ecosystems through the documentation of current knowledge on extinction risk and locality. By providing this information to the relevant stakeholders (i.e., to national government and publicly through the IUCN portal), the project has further increased the potential of this information being used to enhance biodiversity conservation in the region.

Training of additional staff in-country has also enhanced the capacity of both seed conservation (through Output 2) and extinction risk assessments (through Output 3) within this biodiversity rich ecoregion. The training of 23 local students, researchers, and conservation practitioners in these latest techniques and in the case of the red list assessments, recognised international qualification, also contributes towards poverty alleviation. Similarly, through Output 4, the project has demonstrated a contribution towards poverty alleviation through at least one local student receiving an MSc qualification during the lifetime of the project, with another pending at the end of this year. The skills learnt through the project has equipped these two students with the ability to enhance their wellbeing and career progression, as well as contribute towards a wider understanding of economically important species conservation.

# 4 Contribution to Darwin Initiative Programme Objectives

## 4.1 Contribution to Global Goals for Sustainable Development (SDGs)

This project addresses SDGs 1, 2, 12, 13 and 15.

Targets 1.4 and 1.5 focus on equal rights and control of economic resources and building the resilience of the poor. Targets 12.2 and 12.8 focus on sustainable natural resource use and raising awareness of such aims. The project has contributed towards these targets by increasing community knowledge of the importance of biodiversity, sustainable use, and ecosystem services (section 3.1,Output 1). The development of the cultivation plots of key wild species and a separate plot highlighting threatened species will further highlight to the community species that are useful and those that should be cared for in the wild. Locating the plots at readily accessible locations, for example, next to the local school in the Georgian community, ensured that this resource is shared throughout the community (23% increase in awareness of the plot since

development). The Conservation Action Plan developed by the Armenian community has also demonstrated an understanding of key biodiversity issues and actions to mitigate them.

The development of the cultivation plots also contributed towards Target 2.1, which aims for improved quality and quantity of food from ecosystems and 2.4, 13.1 and 13.4 highlight the need for strengthened resilience to climate-change. The cultivation plots ensure the sustainability of local livelihoods amidst potential instability/loss of wild populations, and the collection of wild relatives of the economically important species serves as a base to initiate research on species that may provide further resilience to climate change that could be used to enhance food security.

Original collections of seeds made during the project are kept in-country, and the duplicate collection is deposited at the MSB under an Access and Benefit Sharing Agreement between the donating country and RBG Kew. This contributes toward Targets 2.5 and 15.6, which specifically intends to maintain plant biodiversity and ensure the benefits of genetic resources are shared equitably.

Finally, Target 15.4 specifies the conservation of mountain ecosystems, within which the project is located, for sustainable development.

### 4.2 Project support to the Conventions or Treaties (e.g. CBD, Nagoya Protocol, ITPGRFA, CITES, Ramsar, CMS, UNFCCC)

The project furthers ITPGRFA's objectives for "conservation, documentation, sustainable use, and *ex-situ* collections of food and agriculture resources" through community collaboration for conservation of fruit and nut crop wild relatives (CWR). 190 collections of economically important species and their CWRs are now stored in ex-situ conservation, and the threats and use of 22 species are documented through IUCN red list assessments and communicated to a range of stakeholders. Finally, the sustainable use of wild harvested species, particularly threatened species are highlighted to collectors throughout the project, with a documented increase in awareness of these issues towards the project end.

CBD strategic goals A-E are supported. Aichi Targets (AT) 1 and 4 raise awareness of biodiversity value and conservation with stakeholders. Georgia's National Goals (NG) A1, A2 and E2, and Armenia's national CBD targets 25.1.b and 26.1.a to inform the public about biodiversity and threat mitigation, increasing local involvement in decision-making for sustainable biodiversity use by 2020. Towards the end of the project, 84% of those aware of the project in Armenia agreed with the following statement "The project has increased my knowledge about plants and nature, their value and importance of conserving them for the future" (community survey, Annex 3.1.1.12). Similarly in Georgia, when asked to rate "This project increased my knowledge about the plants and the nature, the significance of their protection/conservation for the future and their value" from 1 (Strongly disagree) to 10 (Strongly agree), the average score was towards the "Strongly Agree" section (8.06). The project also raised awareness of different types of conservation action, including ex situ conservation, particularly in Georgia where there was a 29% increase in participants acknowledging their familiarity to seed banking as a tool for conservation. Community engagements have also included a participatory approach to the development of Conservation Action Plan that outlines the community's commitment to sustaining biodiversity (see section 3.1, Output 1 page 9). Finally, the final project booklets (Annex 3.1.4.14) distributed more widely have engaged the interest of the Georgian and Armenian Ambassadors towards the projects activities and calls for enhancing conservation throughout the region.

Through IUCN Red List assessments, the project has contributed towards AT 5, which aims to reduce the rate of loss of natural habitats, including forests, by 50%. The project has highlighted 18 species that are of risk to extinction and their associated habitats or considered Near Threatened. These assessments will be made public on the IUCN Red List website, which is readily used in national reports and aid in recommendations for increased protection.

Seeds from 127 species of fruits and nuts are in long-term conservation in the country of origin and duplicates sent to the Millennium Seed Bank. This directly contributes towards halting the

extinction of these species, which is the aim of AT 12. Of those conserved, 7 are within the threatened category or considered Near Threatened according to the IUCN Global Red List (collections at MSB, Annex 3.1.2.1 Tab 2). As part of this project 18 species have been assessed as threatened or Near Threatened and are awaiting publication onto the IUCN Red List. Of these, seed collections have been conserved for 17 species. *Pyrus ketzhovelii* & *Pyrus sachokiana* have been provisionally assessed as Critically Endangered making the timely conservation of these species' ex situ an important part of future efforts to protect this species.

Throughout the project, a participatory approach was used with the target community. The involvement of local social scientists and integration of local community members as Biodiversity Champions ensured that all local knowledge relevant for the conservation and sustainable use of biodiversity and their rights are respected and acknowledged within the Conservation Action Plans, contributing towards AT 18.

Knowledge and technological sharing are a substantial aspect of this project. Red list assessment training events in the first year and laboratory placements of local MSc students in the second year highlights the project's contribution towards improving capacity biodiversity conservation in the region. Learning from the project has also been widely shared through a variety of ways, from peer reviewed articles, academic talks, social media, and popular literature (e.g., blogs and magazine articles).

## 4.3 Project support to poverty alleviation

The Mchadijvari community in Georgia and the Khachik community in Armenia are the intended beneficiaries of this project. The project aims to help them maintain (through sustainable harvesting) and enhance (through community demonstration plots) the F&N resources they utilise.

The project has contributed to poverty alleviation through employment of local Georgian and Armenian students/researchers/conservationists in various project activities (section 3.1). As well as direct employment, activities have supported income generation indirectly. Two local students were engaged at the beginning of the project to conduct MScs as part of project activities. The knowledge, skills, and academic qualifications that they gained will contribute towards an improved development and enhance their career prospects. In the Armenian community, social scientists held a workshop to teach selling techniques to increase sales by women within the community (Annex 3.1.1.14) (Figure 23). As a result of the project, a local retailer who focuses on selling organic and sustainable teas ("Wildly Tisane") has purchased raw materials (mostly thyme, but some rosehips) from members of the Armenian community. Through engagement, training, and employment (See section 3.1 for examples including steering committee visits to NBGG and demonstration plot training in Armenia) target communities in Armenia and Georgia have benefited from increased understanding of sustainable harvesting, uses of, and threats to wild fruit and nut populations. This will positively impact diet and income, contributing to poverty alleviation in the community. By engaging the next generation in the community through school visits (Annex 3.1.1.27) we are ensuring increased knowledge is intergenerational.

## 4.4 Gender equality

The project aims to increase the knowledge, and thereby confidence, of more disadvantaged community members to take decisions about the future of their natural resources. Rural Caucasus populations are dominated by women (52% in Armenia[13] and Georgia[14]). However, traditional gender norms prevail, preventing their equal participation[15]. These communities are almost homogenous in ethnicity and religion[16]. Project partners are committed to equal opportunities and employ staff without regard to gender; eight of 12 key project roles are held by women.

Evidence of female inclusion is evident in the red listing workshop in Year 1 of the project, where over 67% of the participants were female (See section 3.1, Output 3) In Year 2, the project saw

13 National Statistical Service of the Republic of Armenia. 2015. Population. The Demographic Handbook of Armenia
14 National Statistics Office of Georgia, 2015. Women and Men in Georgia. Statistical Publication, Tbilisi
15 http://www.fao.org/3/a-i5575e.pdf

the inclusion of two women Biodiversity Champions, who went on to become the main point of contact between project partners and the overall community (See section 3.1,Output 1, page 7) Their engagement and leadership led to the successful implementation of various project related events in the second year, including the planting of the wild harvested fruit plots in the Armenian community.

The project aims for gender equity and a "do-no-harm" policy; social scientists engaged are trained in Yerevan University's Guidance for Social Workers in Armenia, and Porta and Keating's Approaches in the Social Sciences in Georgia, to encourage equal participation (Figure 24). Workshops conducted with communities have allocated time to predominantly female activities, including fruit and nut collection and processing. As a result, in the first year we had a total of 18 out of 26 of participants of training activities were women in Armenia, and 29 out of 35 were women in Georgia. In year 2, some of the women from the community requested that we diversified the training to include techniques for selling their sustainably harvested produce. Selling is traditionally a male dominated activity, so the training we added in the second year ensured that women also had the skills in place to support the household further (see community engagement report page 7, Annex 3.1.1.14; photographic evidence).

Female members of staff were at hand to conduct interviews and give out leaflets, ensuring that these activities provide a safe space for any female community members to speak out. In minutes of meetings provided after each workshop, the partners transcribed questions and comments made by the participants, the majority of whom, were women.

## 4.5 Programme indicators

- **Did the project lead to greater representation of local poor people in management structures of biodiversity?**

The project engaged with two key members of the local community to lead a community-led Steering Group, overseeing activities related to the conservation of diversity within the Khachik and Mchadijvari community.

- **Were any management plans for biodiversity developed and were these formally accepted?**

Conservation Action Plans were developed jointly with the Steering Group of each target community. The action points from these have been adopted and agreed by the group during the last project meeting and disseminated throughout the communities.

- **Were they participatory in nature or were they 'top-down'? How well represented are the local poor including women, in any proposed management structures?**

All community activities were participatory in nature. Women made up the majority of the Steering Committee membership.

- **How did the project positively influence household (HH) income and how many HHs saw an increase?**

Due to the pandemic and restrictions in-country we were not able to conduct a full survey as per Year 1 to compare household income. Additionally, the loss of income from the pandemic, which affected communities globally, would have also skewed our comparative results. Anecdotal evidence does show that the cultivated plots developed do have the potential of increasing household income within the target community and the awareness of sustainable collectors to a local buyer/retailer specialising in organic teas has led to the latter purchasing community produce (email correspondence, Figure 20).

- **How much did their HH income increase (e.g. x% above baseline, x% above national average)? How was this measured?**

See above

### 4.6 Transfer of knowledge

Two MSc students, one male one female, have been trained at local universities complete with a two-week residency at Kew's Jodrell laboratory (see section 3.1,Output 4 ). One student has completed their MSc to a high standard and has presented their findings to practitioners and researchers at two international conferences. The second student is set to complete their MSc in Autumn 2021. 15 students and practitioners, of which 67% were woman, from all partner institutes received Red List accreditation after completing a Kew-led training course on how to conduct red list assessments to IUCN standards (see section 3.1, Output 3). They have used this knowledge to research, write and submit assessments for 22 species to the IUCN SIS portal and the regional Caucasus Red List Assessment report. All participants on this course and the two MSc students were from Armenia or Georgia which are classified as low- and middle-income countries according to the OECD.

### 4.7 Capacity building

Razmik (male), the MSc student is now in full time employment after finishing his studies as part of the project. The presentations that he gave in two international conferences has also enhanced his status within academia. Sona Galstyan (female), who is part of the Nature Heritage team and assisted in a variety of activities throughout the project has gained a position as a PhD student at the local university to further the work from the project in relation to taxonomy and genetic diversity of native Armenian flora. Ashken Danielyan (female), who attended the training on seed banking and DNA extraction was also selected for a PhD and will be researching legumes. The Project Coordinator based in Armenia (Astghik Papikyan) is up for a promotion within her institute (final decision will be announced end of August 2021). Konstantine Kereselidze (male), who attended the Red List training course has been promoted to research assistant at Institute Of Botany in Georgia and is now also involved in a project updating Georgia's national Red List of tree and shrub species. Elene Jadpridze (female), who led the propagation training with the target community have been given a full-time position as Head Gardener based at the US Embassy in Georgia.

## 5 Sustainability and Legacy

We believe that our planned exit strategy is still valid and will demonstrate this through the project achievements we think will endure after the project end:

Understanding of wider plant conservation issues and actions

As evident through the engagement surveys towards the end of the project, two things are clear 1) the project has increased awareness of the importance of biodiversity and ways of mitigating loss; and 2) community members feel confident and willing to disseminate project learning to their families, friends, and members of the neighbouring community. In Georgia, we were also able to demonstrate that 92% of the people surveyed from neighbouring communities are interested to hear more about the project. The involvement of school children in engagement activities in both target communities, as well as the development of the plots in the school grounds in Georgia also ensures that the legacy of project learning will continue into the next generation.

Maintenance of links with key stakeholders

Strong links with CBD and ITPGRFA was evident at the beginning of the project and have been maintained through updates of project progress throughout via email correspondences and through the dissemination of the end-of-project booklets. We have also made additional links with the Georgian Embassy in the UK, prompting a visit from the Georgian Ambassador to visit RBG Kew to hear more about this work. Similarly, a member from the UK Embassy in Armenia have also shown interest early in the project and visited a training event in Yerevan.

Cultivation plots & Biodiversity Champions

The cultivation plots are a substantial legacy for the project and will also serve as a hub for continued knowledge exchange both between members of the community and between the

community and in-country partners. The Biodiversity Champions will continue to be the main focal contact after the project end, ensuring continuity of knowledge and capacity for further engagement.

Red list assessments

The Red List training course, delivered by Kew staff in Yerevan in Year 1, was extremely well received (see section 3.1). Participants have utilised their training to research, write and submit draft assessments to IUCN, and when published, the assessments themselves will serve as a legacy of the project. As well as trainees benefitting from becoming accredited Red List assessors, their institutions will be able to draw on these skills to deliver future projects that include Red List assessments. One project has already been proposed to a funder that will employ a trained assessor to carry out assessment in-country.

Seed Collections

The collections that are banked in long-term storage as part of this project will be viable for several decades, representing a significant legacy of the project. Training in seed conservation conducted for a range of different partner staff has ensured that knowledge is not lost with staff turnover and institutions are able to continue their conservation activities for many years to come.

Kew is committed to continued work in Georgia and Armenia through the MSBP and is keen to maintain conservation, training, and research co-operation amongst regional partners. Partnership agreements (e.g., ABSAs and MoUs) for two project partners have been extended and we are in the process of extending the agreement with the third project partner. Most of the project staff have been employed to work on a new funded project with RBG Kew conserving rare and threatened flora. We have also developed a new project in Armenia that will incorporate community engagement, which is seeking funding.

## 6 Lessons learned

The training aspect of this project, both with formal accreditation and without, worked especially well within the project. By building a range of different training options into the project itself (e.g., Red List Accreditation; practical sustainable harvesting workshops; MScs) that target various backgrounds, interests, and educational levels, we were able to widen the impact of the project, diversify outputs for different stakeholders and increase the scope for future projects.

Although partners experienced initial difficulties engaging target communities on the impact of overharvesting on biodiversity, once engaged, the two-way relationship formed between each partner institution and their respective target community proved extremely valuable. The community questionnaires carried out during the project worked well and contributed a wealth of knowledge about local fruit and nut species, their uses, and perceived threats. The surveys were instrumental in facilitating dialogue between the community and partner institutions which has led the development of local community fruit and nut plots and community actions and a relationship that will continue beyond project end. Information on harvesting behaviour and the relative importance of fruit and nut species to the community has already been utilised to draft a paper and as explained in Section 3.1. community members value being empowered to use fruit and nut species sustainably. The community surveys would not have been possible without the establishment of a steering committee within each community and the appointment of a BC. The BC's act as a mediator between community members and project staff and without them being in place it would have been more difficult to build the trust needed to carry out questionnaires. This is especially true during the pandemic where partner staff did not have access to the community and both BC's worked to coordinate participation in final surveys and notify project partners which members of the community could not take part due to self-isolation.

Although the project timeframe was sufficient to deliver most objectives, more time is needed for the cultivated plots to bring tangible/monetary returns to the community. A longer time frame for delivery should have been reflected in the log frame and more appropriate measurable indicators set (e.g. proportion of community engaging with planting of the plots/proportion of community agreeing plants for cultivation etc). All three plots established by this project will require continued input from partners and steering committees, therefore a measure of willingness to participate and plans for gathering additional contributions towards future maintenance would be more appropriate as an end-of-project measure.

As this was the first Darwin Initiative project for the participating partners, the level of monitoring and evaluation required was unfamiliar, and as a result the partners severely underestimated the amount of time and resources required for gathering and evaluating this type of information. The flexibility to adapt/change through the Change Request Forms was a positive process, although time consuming.

Finally, although IUCN Red List is the global standard used to evaluate threats, at times the focus on targeting these overshadowed the significance of National Red List. National Red Lists highlights species of importance within a particular country, which at times can be locally threatened, but globally common. There is, therefore, the risk of local population extinctions for these species if not correctly prioritised for conservation. In terms of the assessment process itself, global assessments will typically involve gathering data from outside the country boarders, which proved problematic during the project. As National Red List assessments typically focus on the situation within country boarders, it reduces the challenges of information gathering from third parties. National Red Lists are readily adopted by in-country policy makers as they are also one of the main stakeholders within the assessment process. Therefore, for any future projects, we would aim to prioritise National Red List assessments as part of the objective within the lifetime of a project.

## 6.1 Monitoring and evaluation

During the first meeting in Yerevan, the original log frame was shared with all the project partners and there was a discussion regarding any changes that needed to be made now that they had engaged with their respected communities. The changes identified were immediately highlighted to LTS by the PI and Co-PI and the results of the change request were communicated back to the partners, generally on the same day it was received.

The partners in Georgia had initially planned to engage with a small village community within the Dusheti Municipality called Ebnisi. During their visit to the Ebnisi community in the first quarter of the project, several issues were highlighted, such as a lower number than thought of collectors and a lack of water access making establishing demonstration plots unfeasible. A new community, Mchadijvari, was identified that was interested in joining the project. This community has a much higher population than Ebnisi (943 adults, 463 male, 480 female and 131 children), increasing the number of people engaged with the project. A change request was approved by LTS, and percentage indicators relating to population size in the log frame (indicators 0.1, 0.2, 1.1, 1.2 etc) were updated.

In Armenia, during the partner and social scientist's first visit to the Khachik community, they identified a change in the size of its population compared to when an assessment was done prior to the project application. A change request was approved by LTS and the log frame was updated accordingly. In Armenia, there was also a change in their social scientist since the start of the project (CRF approved by LTS), the new social scientist is from World Vision International Charity Organisation.

For M&E, community questionnaires were conducted every year of the project to measure the impact the project has on the community. In the first year the questionnaire served as a baseline, aimed at gathering existing knowledge of residents prior to the project activities. We aimed to interview the same individuals in the second and third year but because of COVID-19 this was not always possible due to residents needing to self-isolate. Despite this, the questionnaire has proved a crucial M&E tool, providing the project with both qualitative and quantitative data that contributes to the overall outcome.

Training/meeting/workshop registers were taken as evidence of the number of people attending. Meeting minutes given by partners provided an overview of the progress towards the various outputs throughout the project. Partner's submission of progress reports to the Co-PI on a quarterly basis proved an effective method for M&E.

Feedback information from the MSc student training was gathered alongside research reports.

## 6.2 Actions taken in response to annual report reviews

Feedback from Years 1 and 2 have been reviewed and actioned where possible. Responding to feedback from Year 1, this report provides clarification that 67% of participants attending the Red List training course were female.

Responding to feedback from Year 2, this report details the development of post-project community conservation action plans in Section 3.1. Section 3.1 also provides evidence that seed collections from 127 species have been conserved in-country and duplicated to the MSB. We did not specify within the accepted log frame the proportion of threatened species that will be banked, and therefore were not expecting to report against this metric, but we will oblige by providing this information below:

| Concatenated | Red List cat | Red List criteria |
|---|---|---|
| *Pyrus salicifolia* | LR/NT | |
| *Rosa zangezura* | VU | B1ab(ii)+2ab(ii) |
| *Corylus colchica* | VU | B1ab(iii)+2ab(iii) |
| *Pyrus oxyprion* | LR/NT | |
| *Pyrus salicifolia* | LR/NT | |
| *Corylus colchica* | VU | B1ab(iii)+2ab(iii) |
| *Pistacia atlantica* | NT | |

Section 4.1 details which SDG the project has contributed towards and Section 4.5 highlights difficulties faced in assessing whether the community has benefited from additional income from local harvesting as a result of project learning

# 7 Darwin identity

In all targeted and wider communications, The Darwin Initiative (DI) funding was recognised as the main contributor and the distinction of the project was highlighted. Project partners have continued to explain the DI whenever they conducted presentations/workshops/interviews with the target communities and use the DI logo wherever possible, e.g. The DI logo used in project leaflets and booklets sent out to target and neighbouring communities (Annex 3.1.1.4, 3.1.1.5), conference posters (Annex 3.1.4.15, 3.1.4.16) and cultivation plots (Annex 3.1.1.22). The final project booklet (Annex 3.1.4.14) published by Kew with input from all project partners publicised the role of the DI and has been distributed to several stakeholders including the Armenian and Georgian Embassies in the UK and the UK Embassies in the target countries. In summary, the visibility of DI within the host countries has been increased within the community (see comments from the Governor of Mchadijvari who sends his gratitude to the donor organisation, Annex 3.1.1.19), with project partners, and with influential stakeholders.

The project, DI and UK Government's contribution was highlighted in two articles in the 34th issue of the Samara Newsletter (https://www.kew.org/sites/default/files/2019-03/Samara%2034%20Web_final.pdf). In Ed Ikin's article on page 12 and the news section on page 14. This issue of Samara reached at least 900 people (500 hard copies sent out to international subscribers, 300 distributed in the UK and 109 electronic copies sent out via email).

The PI, Aisyah Faruk, has written a blog (https://www.kew.org/read-and-watch/adventures-in-armenia) which raises the profile of the project and DI's role in supporting it. The PI and Co-PI, Ian Willey, have also wrote articles for the Darwin newsletter in 2019 (Darwin-Newsletter-December-2019-Traditional-Culture-Conservation-FINAL.pdf (darwininitiative.org.uk)) and 2020 (Darwin-Newsletter-December-2020-Hungry-for-Biodiversity-FINAL.pdf (darwininitiative.org.uk)). An article, written by journalist Carolyn Fry, was published in the Kew Magazine 2020 Spring edition. Carolyn joined Aisyah and the collecting team in October 2019 to follow an expedition and learn more about the project. The Kew magazine is free to members of Kew (119,770 in 2019) and can also be purchased in paperback or online form. The PI has

submitted a paper to an Open Access peer-reviewed journal acknowledging the role of DI (Annex 3.1.4.18).

On social media, project communication is made through the PI's personal account (@AisyahFaruk). Approximately 36 project related tweets (including retweets) have been shared during the project lifetime (top tweets, Figure 25).

# 8 Impact of COVID-19-19 on project delivery

COVID-19 has had a considerable impact on our ability to deliver objectives (see Section 3.1. for COVID-19 impact on individual outputs). In-country, COVID-19 has primarily impacted partners' ability to access target and neighbouring communities, their ability to hold workshops with community members and the MSc student's ability to access their institutions to carry out research. To ensure we engaged the target numbers of people we moved our activities away from face-to-face contact towards written materials (e.g., project leaflets). The community booklets created to disseminate project learning are extremely valuable and have been delivered across the community. Production of the community booklets was the only method available for dissemination that did not put project staff or community members at risk and we regularly caught up with project partners to understand the COVID-19 situation in-country. Only when it was safe to do so in March 2021 did partners return to the communities to deliver booklets and carry out final community questionnaires. It is appreciated that the booklets are not going to be as effective at delivering practical training but they will serve as useful resource for the community going forward and provide a platform for future work. In the absence of workshops, community surveys were used to gauge resident's ability and willingness to share project learning with family, friends and neighbouring communities. One student was not able to finish their MSc prior to project-end but partner reports highlight their progress now they have regained access to their institution and proposed completion date in Autumn 2021.

Cancellation of Georgia's Annual Biodiversity Conference 2021, which Kew and partner staff were due to attend, reduced our ability to communicate the project to the scientific community and key stakeholders. To mitigate this, Kew published a final project booklet with input from all partners which has been shared with key stakeholders and will continue to be used as a resource for future project dissemination and awareness raising. The final project meeting, scheduled in Tbilisi, was also cancelled due to travel restrictions. Instead, all partners and Kew project staff gave presentations on their achievements, challenges and lessons learnt during the project and held focused break-out rooms to scope follow-on projects and discuss how each partnership should move forward. This proved effective and the ability to hold such meeting virtually will benefit future projects. However, partners expressed the loss of face-to-face meetings as a negative, and communication from March 2020 being entirely online posed challenges during the final year of the project.

# 9 Finance and administration

## 9.1 Project expenditure

| Project spend (indicative) since last annual report | 2020/21 Grant (£) | 2020/21 Total actual Darwin Costs (£) | Variance % | Comments (please explain significant variances) |
|---|---|---|---|---|
| Staff costs (see below) | | | | |
| Consultancy costs | | | | |
| Overhead Costs | | | | |
| Travel and subsistence | | | | |
| Operating Costs | | | | |

| | | | | |
|---|---|---|---|---|
| Capital items (see below) | | | | |
| Others (see below) | | | | |
| **TOTAL** | | | | |

| **Project spend (indicative) since last annual report** | **2021/22 Grant (£)** | **2021/22 Total actual Darwin Costs (£)** | **Variance %** | **Comments (please explain significant variances)** |
|---|---|---|---|---|
| Staff costs (see below) | | | | |
| Consultancy costs | | | | |
| Overhead Costs | | | | |
| Travel and subsistence | | | | |
| Operating Costs | | | | |
| Capital items (see below) | | | | |
| Others (see below) | | | | |
| **TOTAL** | | | | |

| **Staff employed (Name and position)** | **Cost 2020/21 (£)** | **Cost 2021/22 (£)** |
|---|---|---|
| Aisyah Faruk (Project Leader) | | |
| Ian Willey (Project Officer) | | |
| Tamaz Darchidze (Project Coordinator) | | |
| Tsira Mikatadze-Pantsulaia (Project Manager) | | |
| Tinatin Barblishvili (Data Manager) | | |
| Giorgi Natsvaladze (Accountant NBGG) | | |
| Mariam Kikvidze (Red List Officer NBGG) | | |
| David Kikodze (Project Manager IoB) | | |
| Tamar Kurdadze (Project Coordinator IoB) | | |
| Tamar Jashi (Accountant IoB) | | |
| Ketevan Batsatsashvili (Red List Officer IoB) | | |
| Anush Nersesyan (Project Manager NH) | | |
| Astghik Papikyan (Project Coordinator NH) | | |
| Ivan Gabrielyan (Project Coordinator NH) | | |
| Sona Navasardyan (Accountant NH) | | |
| Araqsja-Inna Elbakyan (Red-List Officer/Herbarium Technician NH) | | |
| **TOTAL** | | |

**No Capital Items in the 2020/21 and 2021/22 years**

| **Other items – description** | **Other items – 2020/21 cost (£)** | **Other items – 2021/22 cost (£)** |
|---|---|---|

| | | |
|---|---|---|
| Consumables (petri dishes, cultivation plot consumables, herbarium paper, leaflet/booklets, stationary, agar powder, flipchart pens and paper, printer cartridges)<br><br>Student costs (not equipment) | | |
| **TOTAL** | | |

### 9.2 Additional funds or in-kind contributions secured

| Source of funding for project lifetime | Total (£) |
|---|---|
| RBG Kew | |
| National Botanic Gardens, Georgia | |
| Nature Heritage NGO, Armenia | |
| Institute of Botany, Georgia | |
| **TOTAL** | |

### 9.3 Value for Money

We believe that the project has provided value for money. The project input has supported a range of employments that contributed directly towards successful tangible outputs. For example, seed collections made during the lifetime of the project were of sufficient size and quality to be considered a long-term conservation collection by international standards. These collections will be viable for many decades and may hold the key to enhancing global food security (with proper Access and Benefit Sharing framework in place), providing a good case for value for money. All the capital items purchased during the project's lifetime will continue to contribute towards enhanced conservation of biodiversity and resilience of local communities to climate change. For example, the irrigation system will not only serve to sustain the cultivation plot, but the water tank system used to capture rainwater will also be beneficial for the entire community as drought events continue to increase in duration and severity due to climate change.

## 10 OPTIONAL: Outstanding achievements of your project during the (300-400 words maximum). This section may be used for publicity purposes

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

This project aimed at enhancing the livelihoods and sustaining the cultural identity of rural communities within the South Caucasus (Armenia and Georgia) through the conservation of economically important wild harvested fruit and nut species. Key achievements of the project includes:

- Raising awareness of biological diversity and importance of conservation to rural communities, from children to adults, ensuring learning is intergenerational. The project activities were varied to ensure engagement of different stakeholders and as a result exceeded its target to engage with 60% of the local communities.
- Seed conservation is a key tool in halting the extinction of species. The project ensured long-term protection of 127 species of fruits and nuts. Abiding by the spirit of the Convention of Biological Diversity (CBD), we recognise the sovereign rights of the donating country over their genetic material. As such, we ensured that original collections are kept in-country, with a proportion of each duplicated to the Millennium Seed Bank under appropriate Access and Benefit Sharing agreements with the donating country.
- Ensuring that livelihoods are not hampered through conservation, three cultivated plots of wild harvested species were successfully established within the project's lifetime. The location and species planted were led by the community, while the cultivation and training

around care were led by the in-country experts in propagation and horticulture. Species chosen were those that were threatened in the wild, but readily used by local communities, for example, *Staphylea colchica* (Bladdernut) in Georgia, and *Pyrus sosnovskyi* (wild pear) in Armenia.

- The project also contributed towards the successful MSc of an Armenian student, Razmik Papikyan. Through the project he was able to learn the skills required to conduct high quality research, as well as the English language. In less than 1-year, he was able to present his findings at an International Conference in the UK. He has since gone on to have full-time employment at the Institute of Botany in Armenia.

## Annex 1 Project's original (or most recently approved) logframe, including indicators, means of verification and assumptions.

Note: Insert your full logframe. If your logframe was changed since your Stage 2 application and was approved by a Change Request the newest approved version should be inserted here, otherwise insert the Stage 2 logframe.

| Project summary | Measurable Indicators | Means of verification | Important Assumptions |
|---|---|---|---|
| **Impact:** Ecosystem services of the Caucasus are utilised sustainably by national populations thereby contributing to rural poverty reduction, increased food security and protection of plant biodiversity.<br>(Max 30 words) | | | |
| **Outcome:**<br>(Max 30 words)<br><br>**F&N conservation enhanced in Georgia and Armenia, by community members working together to strengthen economically-important ecosystem-services for rural livelihoods, helping build ecological resilience through knowledge and protection of plant resources.** | 0.1 Best-practice harvesting techniques employed by 60% of adult community, 497 women and 497 men, by March 2021 to empower decision-making around sustainable resource management and protection of ecosystem services.<br><br>0.2 20% of adult community members, 166 men and 166 women, receive and apply practical training in the cultivation of six priority species across two demonstration plots by March 2021<br><br>0.3 Using learning from project research, two steering-committees agree in their final meeting in 2021 three community-led actions and identify six neighbouring communities for engagement to improve local collection and cultivation beyond project end | 0.1 Workshop attendance registers; community baseline and evaluation surveys<br><br>0.2 Training attendance registers; community baseline and evaluation survey sections on cultivation (demonstration plots); photographic evidence<br><br>0.3 Community action plan; steering-committee meeting minutes | Political climate continues to enable partners to access rural areas<br><br>Political climate continues to enable the shipping of plant material to the UK<br><br>Exchange rate variation (e.g. as Brexit progresses) remains within bounds that enable project work to be fulfilled<br><br>Natural disasters which would prevent project delivery do not occur in the project region<br><br>Target F&N produce sufficient mature seeds for project needs |

| | | | |
|---|---|---|---|
| | 0.4 100% of seed collections are duplicated to two seed banks by March 2021, conserving a total of 122 F&N<br><br>0.5 20 global risk assessments of economically-important F&N submitted to the IUCN by March 2021, putting in place the pathway for their threat and status information to be shared with policy-makers and the public<br><br>0.6 Genetic research results for 12 taxa delivered to the regional scientific community through two MSc theses and the presentation of a partner-led research paper at Georgia's Annual Biodiversity Conference in May 2020. Two research papers, submitted to regional journals by March 2021, will communicate project findings to the wider scientific community as well as policy-makers. | 0.4 Notification of Transfer documentation; DW data search<br><br>0.5 Field survey forms; IUCN red-list assessment submission receipt<br><br>0.6 Two partner research papers and 2 MSc theses in pdf format; receipts of submission to regional journals for former; receipt of submission of abstract to conference. | |
| **Outputs:**<br><br>**1. Two rural communities trained in sustainable harvesting practices and empowered to deliver in-situ conservation of fruit and nut ecosystem services to enhance rural livelihoods** | 1.1 60% of community members, 497 women, 497 men and 108 children under 18, are made aware by December 2018 of the project, and by March 2021 of the outcomes of shared learning on IUCN threat assessments, genetic research, and sustainable harvesting<br><br>1.2 Five members of each community (three of whom are | 1.1 Community survey section on household engagement at baseline then annual evaluations; leaflet distribution confirmed by signed declaration of delivery for each community by partner staff in 2018 and 2021; school quiz results baseline and end-of-project | All engaged community members remain in the region for the entire project period<br><br>Access to communities remains politically and physically possible |

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| | women) take on roles as ambassadors for change in the form of a steering-committee of four people in 2018 and one BC in 2019 | 1.2 Community engagement reports; community surveys; steering-committee minutes; letter accepting post as BC | Environmental conditions enable sapling establishment successful within the project timeframe |
| | 1.3 Two demonstration plots are established in 2018 in accessible, local areas with six priority F&N being cultivated by 20% of community members, 166 women and 166 men, by December 2019 | 1.3 Community engagement reports; community surveys; photographic evidence | |
| | 1.4 10% of adult community members, 83 women and 83 men, are trained in sustainable harvesting techniques by 2020, and a total of 20% of adult community members, 166 women and 166 men, are trained in sustainable harvesting techniques and the long-term consequences for important F&N by March 2021 | 1.4 Training attendance registers; community baseline and evaluation surveys; photographic evidence | |
| | 1.5 Utilisation and threat data for 20 F&N for IUCN red-list publications and 12 research taxa is collected from 20% of adult community members, 166 women and 166 men, during one workshop in 2018 and one workshop in 2019 and fed into red-list assessments and genetic research | 1.5 Workshop attendance registers; workshop data forms; community surveys; IUCN red-list assessments; research report | |
| | 1.6 Steering-committees develop draft ideas for community-led conservation action plans (one in | 1. 6 Two community conservation action plans | |

| | | | |
|---|---|---|---|
| | Georgia, one in Armenia) by March 2019, with at least three points to take forward by their last meeting in 2021<br><br>1.7 10% of adult community members, 83 women and 83 men, develop plans for continued conservation and dissemination to neighbouring communities of sustainable harvesting techniques by March 2020, and 20% of adult community members, 166 women and 166 men, agree by March 2021 to continued conservation and dissemination to neighbouring communities of sustainable harvesting techniques of local F&N, led by the steering-committee and BC. | 1.7 Two community conservation action plans; steering-committees meeting minutes; community engagement reports; Community feedback forms/questionnaires. | |
| **2. Seeds of 122 wild fruit and nut species from the Caucasus are protected through *ex-situ* seed banking in-country and at the MSB** | 2.1 65% of seed collections are duplicated to two seed banks by December 2020 and a further 35% by March 2021, conserving a total of 122 F&N (61 in Armenia, 90 in Georgia – an overlap of 29 species)<br><br>2.2 Data on cleaning, counting and viability testing of 65% of collected species is available by March 2020 and 35% by March 2021, to the Millennium Seed Bank Partnership<br><br>2.3 Six partner staff, of which 50% women (three in Georgia and three in Armenia) are trained in seed | 2.1 Field data sheets; cleaning/counting/testing data sheets; notification of transfer paperwork; photographic evidence<br><br>2.2 DW data search | Mature seeds are available for collection within the project timeframe.<br><br>Partners and Kew able to continue to work under the current terms of their ABSAs for exchange of seeds<br><br>Seed collection size is large enough to be divided and banked in 2 locations (i.e. contains >1,000 seeds, which can be a problem for rare/endangered plants) |

| | | | |
|---|---|---|---|
| | collecting, processing and banking by December 2019 | 2.3 Copies of training assessments and certificates; photographic evidence | |
| **3. Global extinction risk assessments are completed and submitted to IUCN SIS for 20 of the target seed conservation species** | 3.1 14 partner-affiliated individuals (of which 50% women) are capable of conducting global red-list assessments to the standard of the IUCN by September 2018<br><br>3.2 Full assessment data are available for seven species by December 2019 and a further 13 species by December 2020<br><br>3.3 IUCN global-scale assessments are made and submitted to the IUCN SIS, detailing the threats to, and status of, each of the 20 F&N; seven assessments made and submitted by March 2020 and a further 13 made and submitted by February 2021<br><br>3.4 Relevant learning from global IUCN assessments integrated into community workshops in 2020 and incorporated in community conservation plans by March 2021 | 3.1 Training register of attendance; scan of competence certificate signed by IUCN-accredited trainer<br><br>3.2 Audited species data forms<br><br>3.3 IUCN red-list assessment submission receipt; final assessments<br><br>3.4 Community action plan; steering-committee meeting minutes; community surveys | Sufficient data can be found on the target species to conduct meaningful assessments<br><br>Kew trainer is able to travel and deliver training in year one<br><br>IUCN accepts and publishes data within 12 months of project end |
| **4. Increased understanding of the genetic diversity and uses of 12 fruit and nut taxa, highlighting** | 4.1 Two MSc students (Georgia and Armenia) in post by March 2019, and capable of conducting genetic | 4.1 Signed MSc Student contract, training assessments; photographic evidence | Target species populations are of sufficient size to enable material collection |

| | | | |
|---|---|---|---|
| **valuable traits for climate change resilience** | analysis for 12 fruit and nut taxa (8 in Armenia, 4 in Georgia) by March 2020<br><br>4.2 DNA extraction completed on 12 taxa (8 in Armenia, 4 in Georgia) by March 2020 and laboratory analyses completed on 12 taxa by December 2020<br><br>4.3 MSc and partner research findings disseminated to the scientific community and available to policy makers by March 2021<br><br>4.4 Two communities include relevant learning from research on traits related to climate change resilience for 12 F&N in their conservation plans by March 2021 | 4.2 Annual research reports; data from research<br><br>4.3 Two MSc theses in pdf format; receipt of abstract submission to conference; copy of presentation for conference; two partner research papers in pdf format; receipts of submission to regional journals; email exchanges with ITPGRFA focal point in Armenia<br><br>4.4 Community action plan; steering-committee meeting minutes; community surveys | Two suitable local students are found within the project timeframe for completion of the Masters projects<br><br>Results are sufficiently conclusive to provide new information to the scientific community<br><br>Research proceeds according to plan and will be completed in time to feedback learning to communities before project end |

**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. Two rural communities trained in sustainable harvesting practices and empowered to deliver *in-situ* conservation of fruit and nut ecosystem services to enhance rural livelihoods**

1.1 Two social scientists are engaged, one in Georgia, one in Armenia

1.2 Partners and social scientists conduct community assessments and engage members

1.3 300 project leaflets are prepared and distributed to 200 households, the target school and the church in each community

1.4 Partners and social scientists recruit volunteers for the steering-committees (consisting of 1 partner staff and four community members) and plan future meetings during the first workshop

1.5 Steering-committees, partners and social scientists meet for training and activity planning, including planning of demonstration plots

1.6 Presentations and quizzes are delivered to school-children during the school term in Y1 and Y3

1.7 Workshops for information sharing are conducted with community members

1.8 Land secured for two demonstration plots and signs created

1.9 Baseline/evaluation surveys conducted

1.10 Plant material for demonstration plots (three important F&N) collected and provided to each community (six species in total)

1.11 Practical and theoretical training is delivered by partners and social scientists on planting, cultivation and harvesting

1.12 Two BCs are engaged and coached in knowledge dissemination by the social scientists

1.13 Steering-committees, BCs and communities meet at partner-led workshop to develop a post-project community conservation action plan

**2. Seeds of 122 wild fruit and nut species from the Caucasus are protected through *ex-situ* seed banking in-country and at the MSB**

2.1 Final target species list is completed, including distribution data

2.2 Pre-collection assessments are conducted on the target species

2.3 Training is delivered by partner staff in seed collecting, processing and banking

2.4 Seeds, herbarium vouchers and data are collected in the field for 122 F&N

2.5 Seeds are counted, cleaned and viability tested in-country

2.6 Seeds of 122 F&N are duplicated to the MSB via DHL courier

2.7 Duplicated seeds are counted, cleaned and viability tested at the MSB

2.8 Data is shared by partners and the MSB on cleaning/counting/viability testing of seed collections

2.9 Data is uploaded to the DW

**3. Global extinction risk assessments are completed and submitted to IUCN SIS for 20 of the target seed conservation species**

3.1 IUCN-accredited Kew staff travel to Armenia to deliver training to all project partners in IUCN assessments

3.2 Training is delivered to 14 participants
3.3 Fieldwork is conducted for data collection
3.4 Desk-based research on 20 target-species is delivered
3.5 Community data-collection surveys are delivered
3.6 Red-listing workshops are conducted to analyse and summarise the gathered data
3.7 Red-list assessments are submitted to the IUCN SIS for publication after project end
3.8 Results from the red-listing assessments of 20 species are shared with communities at workshops and through steering-committee meetings through 2019 – 2021

**4. Increased understanding of the genetic diversity and uses of 12 fruit and nut taxa, highlighting valuable traits for climate change resilience**
4.1 MSc students engaged and trained by partner staff in genetic analysis techniques
4.2 MSc students two-week residential training at RBG Kew, delivered by Conservation Science Department
4.3 DNA extraction and PCR techniques are used to conduct research on 8 taxa in Armenia and on 4 taxa in Georgia.
4.4 CBD focal point contact invited to Georgia's Annual Biodiversity Conference 2021
4.5 MSc students complete theses and submit
4.6 Attendance by Georgian partners at Georgia's Annual Biodiversity Conference 2021
4.7 Presentation of latest research findings, including red-listing and community engagement learning, at Georgia's Annual Biodiversity Conference 2021
4.8 Research results of 12 taxa are shared with communities at workshops and through steering-committee meetings in 2021
4.9 Research paper finalised and submitted to regional journals;
4.10 IPTGRFA focal point contacted and made aware of the imminent publication

## Annex 2 Report of progress and achievements against final project logframe for the life of the project

| Project summary | Measurable Indicators | Progress and Achievements |
|---|---|---|
| **Impact**:<br>Ecosystem services of the Caucasus are utilised sustainably by national populations thereby contributing to rural poverty reduction, increased food security and protection of plant biodiversity. | | The project has contributed towards a positive impact on biodiversity, directly through the conservation of endemic and economically important wild harvested species through seed banking, raising local and national level awareness of their importance and enhancing our understanding of their threats and use through scientific research and standardised assessment process. Additionally, by bringing in selected wild harvested species into cultivation, the project has contributed towards reducing wild harvesting pressures and a positive change in the conditions of human communities through additional source of income. By enhancing the knowledge and skills in-country, the project has contributed towards empowering local communities to conserve their unique diversity and livelihoods. |
| **Outcome** F&N conservation enhanced in Georgia and Armenia, by community members working together to strengthen economically-important ecosystem-services for rural livelihoods, helping build ecological resilience through knowledge and protection of plant resources. | 0.1 Best-practice harvesting techniques employed by 60% of adult community, 497 women and 497 men, by March 2021 to empower decision-making around sustainable resource management and protection of ecosystem services<br><br>0.2 20% of adult community members, 166 men and 166 women, receive and apply practical training in the cultivation of six priority species across two demonstration plots by March 2021<br><br>0.3 Using learning from project research, two steering-committees agree in their final meeting in 2021 three community-led actions and identify six neighbouring communities for engagement to improve local collection and cultivation beyond project end | The political climate throughout majority of the project's lifetime enabled continued access to the rural areas of target sites, enabling the project outputs to be achieved. Only in the final year that natural disaster (i.e. pandemic) hampered access and therefore had an impact on project delivery. Despite this, we believe that a significant proportion of the Outcomes have been achieved through the project:<br><br>For Outcome 0.1, the training and awareness campaign has equipped community members with the knowledge on how to sustainably manage resources and protect ecosystem resources (see section 3.1, Output 1). The development of the community-led steering group and conservation action plans have played their part in empowering the community to make suitable decisions for the conservation of their landscape and their livelihoods (see Section 3.1,Output 1 for more detail on conservation action plan/booklet/community report). Community surveys have demonstrated awareness within both target communities of the need to use resources sustainably.<br><br>For Outcome 0.2, through a combination of practical training and community booklets containing practical advice on cultivation, community members have been made aware of the demonstration plots and have the knowledge and skillset within the community to cultivate it effectively. Evidence from community interviews show promising results where |

| Project summary | Measurable Indicators | Progress and Achievements |
|---|---|---|
| | 0.4 100% of seed collections are duplicated to two seed banks by March 2021, conserving a total of 122 F&N<br><br>0.5 20 global risk assessments of economically-important F&N submitted to the IUCN by March 2021, putting in place the pathway for their threat and status information to be shared with policy-makers and the public<br><br>0.6 Genetic research results for 12 taxa delivered to the regional scientific community through two MSc theses and the presentation of a partner-led research paper at Georgia's Annual Biodiversity Conference in May 2020. Two research papers, submitted to regional journals by March 2021, will communicate project findings to the wider scientific community as well as policy-makers | communities are readily able to maintain the plots and see their value to the overall community (see section 3.1, Output 1).<br><br>For Outcome 0.3, steering committees have incorporated project learning into community-led action plans at their final meetings in 2021. The action plans have been shared with target communities in both countries, and neighbouring communities in Georgia, via end-of-project community booklets. The community action plans demonstrate an understanding of conservation issues and a commitment to continued sustainable harvesting.<br><br>Outcome 0.4 has been achieved through the conservation of 190 seed collections in long-term storage, representing 127 wild fruit and nut species (see section 3.1 Output 2) All the collections in-country have been duplicated to the Millennium Seed Bank for added security and all assumptions around material collection and transfers were held.<br><br>Outcome 0.5 has also been achieved with the submission of 22 global red-list assessments to IUCN's SIS portal, creating the first step on the path of increasing their conservation across the region (see section 3.1, Output 3)<br><br>For Outcome 0.6, one MSc student has completed their studies whilst the second has experienced significant delays due to COVID-19 but is set to submit their thesis in Autumn 2021. Dissemination of research results has been limited by student's inability to access their universities, cancellation of Georgia's Annual Biodiversity Conference and the inability to identify, communicate with and meet policy makers and the wider scientific community. However, A joint paper is in prep to publish the Armenian students' results and a paper authored by the PI and co-authored by representatives from all partners institutes has been submitted to an open access journal. Work to disseminate project research will continue beyond project end. |
| **Output 1**. Two rural communities trained in sustainable harvesting practices and empowered to deliver in-situ conservation of fruit and nut ecosystem services to enhance rural livelihoods | 1.1 60% of community members, 497 women, 497 men and 108 children under 18, are made aware by December 2018 of the project, and by March 2021 of the outcomes of shared learning | An estimated 1,845 adult residents and 660 children were made aware of the project through the distribution of 615 project leaflets written in the local language, conducting 238 interviews with residents by social scientists and project partners, and presentations given at two local schools (See section 3.1, Output 1, Annex 3.1.1.1 – 3.1.1.4 for final leaflet designs and distribution declaration forms by partner staff). By March 2021, the |

| Project summary | Measurable Indicators | Progress and Achievements |
|---|---|---|
| | on IUCN threat assessments, genetic research, and sustainable harvesting.<br>1.2 Five members of each community (three of whom are women) take on roles as ambassadors for change in the form of a steering-committee of four people in 2018 and one BC in 2019<br>1.3 Two demonstration plots are established in 2018 in accessible, local areas with six priority F&N being cultivated by 20% of community members, 166 women and 166 men, by December 2019<br>1.4 10% of adult community members, 83 women and 83 men, are trained in sustainable harvesting techniques by 2020, and a total of 20% of adult community members, 166 women and 166 men, are trained in sustainable harvesting techniques and the long-term consequences for important F&N by March 2021<br>1.5 Utilisation and threat data for 20 F&N for IUCN red-list publications and 12 research taxa is collected from 20% of adult community members, 166 women and 166 men, during one workshop in 2018 and one workshop in 2019 and fed into | outcomes of shared learning had been disseminated to 1,107 community members in Armenia and Georgia, including 506 male, 461 female, and 140 children. Output indicator 1.1 was appropriate but became difficult to fully achieve because of COVID-19.<br><br>Output 1.2. was achieved in 2018. Nine people are engaged in the steering committee in Armenia (78% women) and 14 in Georgia (57% women), (community engagement reports & workshop minutes, section 3.1, Output 1, Annex 3.1.1.14 & 3.1.1.15). In early 2019, the Armenian Biodiversity Champion (BC) was appointed (contract, Annex 3.1.1.16) and in June 2019 the Georgian BC was appointed (contract, Annex 3.1.1.17).<br><br>For output 1.3, both target communities had established demonstration plots planted with eight locally sourced fruit and nut species (target six) by 2019 (See section 3.1, Output 1 Annex 3.1.1.20; Annex 3.1.1.21, 3.1.1.22, 3.1.1.23). Georgian partners have additionally established a community garden planted with 24 species. Although the plots had been established by the end of the project, they are not currently being cultivated buy 20% due to more time needed for saplings to establish. We have demonstrated the community's readiness to cultivate the plots but more time is needed. This output indicator should have measured the community's willingness to participate in future cultivation.<br><br>For output 1.4, as of March 2020, 159 people (113 female, 46 male) had received practical training in sustainable harvesting techniques (see section 3.1, Output 1, attendance register for Years 1 and 2, Annex 3.1.1.29). By April 2021, a further 677 adults received the final project booklet which has been produced both by NH and NBGG (distribution declarations, Annex 3.1.1.7, 3.1.1.8, 3.1.1.10 & 3.1.1.11). The booklet contains specific advice on how to collect sustainably and the importance of doing so for F&N species (community booklets, Annex 3.1.1.5 & 3.1.1.6).<br><br>For Output 1.5, 219 residents in Year 1 (190 in Georgia & 29 in Armenia; 94 women and 92 men) [See section 3.1, Output 1, community questionnaire responses Annex 3.1.1.25 & 3.1.1.30, community database screenshot, Annex 3.1.1.31) and 144 residents in Y2 (86 women and 58 men) (workshop data, Annex 3.1.1.24; community survey data, Annex 3.1.1.25) contributed data towards red list assessments and research taxa at |

| Project summary | Measurable Indicators | Progress and Achievements |
|---|---|---|
| | red-list assessments and genetic research<br>1.6 Steering-committees develop community-led conservation action plans (one in Georgia, one in Armenia) with at least three points to take forward by their last meeting in 2021<br>1.7 10% of adult community members, 83 women and 83 men, develop plans for continued conservation and dissemination to neighbouring communities of sustainable harvesting techniques by March 2020, and 20% of adult community members, 166 women and 166 men, agree by March 2021 to continued conservation and dissemination to neighbouring communities of sustainable harvesting techniques of local F&N, led by the steering-committee and BC. | workshops in 2018 & 2019. This data has fed into 22 red-list assessments uploaded to SIS, one first class MSc thesis and one MSc thesis yet to be submitted.<br><br>For Output 1.6, Community-led conservation action plans (one in Georgia, one in Armenia) were developed within the project in collaboration between the project partners and representatives of the SC and distributed to 677 adults across both target communities (community booklets, Annex 3.1.1.5, 3.1.1.6). The final conservation action plans were approved at the final steering committee meetings who had been involved throughout the process.<br>Output 1.7 was only partially achievable. COVID-19-19 affected partners ability to develop plans with the community on how they were to disseminate project learning to neighboring communities. However, the community are willing to establish links with neighboring communities as evidenced in final community surveys (see section 3.1, Output 1, Annex 3.1.1.12, 3.1.1.13). This measurable indicator proved difficult to fully achieve because of COVID-19 but we feel it was appropriate. |
| Activity<br>1.1 Two social scientists are engaged, one in Georgia, one in Armenia | | Complete: social scientists have been engaged by project partners in both countries. |
| 1.2 Partners and social scientists conduct community assessments and engage members | | Complete: social scientists engaged target communities and carried out assessments (see section 3.1, for more detail) |
| 1.3 300 project leaflets are prepared and distributed to 200 households, the target school and the church in each community | | Complete: Year 1 leaflets were designed and printed by the partners. A total of 615 were distributed to households, target school and the local church (Annex 3.1.1.1-Annex 3.1.1.4). |
| 1.4 Partners and social scientists recruit volunteers for the steering-committees (consisting of 1 partner staff and four community members) and plan future meetings during the first workshop | | Complete: in Armenia, 9 members of the community were recruited to be part of the steering committee. In Georgia, 14 people have been recruited. This |

| Project summary | Measurable Indicators | Progress and Achievements |
|---|---|---|
| | | was done prior to the first workshop, during interviews conducted by the social scientist (see Annex 3.1.1.30). |
| 1.5 Steering-committees, partners and social scientists meet for training and activity planning, including planning of demonstration plots | | Complete: Steering committee, partners and social scientists continued to meet throughout the project. Examples of training can be seen in community engagement reports by each partner organisations (e.g., Annex 3.1.1.21, 3.1.1.14) |
| 1.6 Presentations and quizzes are delivered to school-children during the school term in Y1 and Y3 | | Partially Complete. Both partners gave a presentation and conducted school quizzes in Year 1. A series of questions were asked, designed to gauge their learning around the project and plant conservation in general. School visits were not possible in year 3 of the project due to COVID-19. Instead, we delivered end-of-project community booklets to households with children. |
| 1.7 Workshops for information sharing are conducted with community members | | Complete: In Year 1, NBGG staff members conducted information sharing workshops for the Mchadijvari community. NH staff conducted workshops and field-work activities with the Khachik community. In Year 2 partners continued to share relevant information through leaflets, workshops and invitations to view the demonstration plots. In Year 3 end-of-project community booklets were shared with community members and discussed with residents who took part in the final survey |
| 1.8 Land secured for two demonstration plots and signs created | | Complete. In Armenia, the plots were secured in in Y1 and have continued to establish (Section 3.1, Annex 3.1.22). In Georgia, partners established a demonstration plot of threatened species within the school grounds in Y2 (Annex 3.1.1.20) and in Y3 established a second plot, the community orchard. |
| 1.9 Baseline/evaluation surveys conducted | | Complete. Baseline surveys were conducted by partners and social scientist in Year 1 and questionnaires were scanned and sent to Aisyah (Co-PI in 2019), who incorporated them into a Community Engagement Database (See section 3.1, Annex 3.1.1.31). Partners returned to communities in Y2 and Y3 to carry out evaluation surveys. In the final year, Armenian partners were able to conduct surveys with 143 residents and Georgian partners acting through their social scientist surveyed 100 residents (Annex 3.1.1.12, 3.1.1.13) |

| Project summary | Measurable Indicators | Progress and Achievements |
|---|---|---|
| | | |
| 1.10 Plant material for demonstration plots (three important F&N) collected and provided to each community (six species in total) | | Complete: both target communities had established demonstration plots planted with eight locally sourced fruit and nut species (target six) by 2019 (See section 3.1, , Annex 3.1.1.20; Annex 3.1.1.21, 3.1.1.22, 3.1.1.23) |
| 1.11 Practical and theoretical training is delivered by partners and social scientists on planting, cultivation and harvesting | | Complete: In Year 1, NH staff members delivered practical and theoretical through a range of workshops including a practical training course on plant conservation and sustainable harvesting with the Khachik community. As part of this training, the partners taught local community members topics relating to health and safety in the field, how to collect herbarium vouchers and highlighted sustainable collection of fruit and nut species in the wild based on MSBP International Seed Conservation Standards. Further training was delivered on sustainable harvesting to the Khachik community (community engagement report, page 3, Annex 3.1.1.14) and practical training for the community on how to cultivate and care for their plot. They also developed and delivered care sheets for community members (Annex 3.1.1.26).<br><br>In Georgia, partners also delivered a variety of training including training on propagation/cultivation techniques and fieldwork techniques (Annex 3.1.1.27). |
| 1.12 Two BCs are engaged and coached in knowledge dissemination by the social scientists | | Complete: Both BC's received regular training at steering committee meetings and community workshops (e.g. training on "Establishing a collaborative relationship: buyer-seller" Annex 3.1.1.14) |
| 1.13 Steering-committees, BCs and communities meet at partner-led workshop to develop a post-project community conservation action plan | | Complete: Despite the challenges of COVID-19 and some attendees not able to be present, a final steering group meeting in Armenia was held in April 2021 (Annex 3.1.1.18). The partners published the final community action plan in the end-of-project booklet (see section 3.). A final steering group meeting in Georgia was held in March 2021 (Annex 3.1.1.19). Ideas for the conservation action plan evolved through discussion with collectors, the steering committee, and residents (Annex 3.1.1.27). The community action plan was published in the end-of-project leaflet and distributed to members of the community |

| Project summary | Measurable Indicators | Progress and Achievements |
|---|---|---|
| **Output 2.** Seeds of 122 wild fruit and nut species from the Caucasus are protected through *ex-situ* seed banking in-country and at the MSB | 2.1 65% of seed collections are duplicated to two seed banks by December 2020 and a further 35% by March 2021, conserving a total of 122 F&N (61 in Armenia, 90 in Georgia – an overlap of 29 species)<br>2.2 Data on cleaning, counting and viability testing of 65% of collected species is available by March 2020 and 35% by March 2021, to the Millennium Seed Bank Partnership<br>2.3 Six partner staff, of which 50% women (three in Georgia and three in Armenia) are trained in seed collecting, processing and banking by December 2019 | For output 2.1 & 2.2, 190 seed collections have been duplicated to two seeds banks, representing 127 wild fruit and nut species. Full processing data has been generated as in the process of being uploaded to DW (See section 3.1, for more detail).<br>For output 2.3, 10 young staff members have been trained in seed collecting, field data collection and seed banking procedures. In Armenia, three partner staff have been trained (See section 3.1, , Annex 3.1.2.7, 3.1.2.9 for more detail) |
| 2.1 Final target species list is completed, including distribution data | | Complete: Target lists were compiled by partners in Year 1. |
| 2.2 Pre-collection assessments are conducted on the target species | | Complete: Partners carried out pre-collection assessments for 60 species year 1, an additional 41 species in Year 2 and the remainder in Year 3. |
| 2.3 Training is delivered by partner staff in seed collecting, processing and banking | | Complete: 10 Georgian staff trained in Year 1 and 3 Armenian staff trained in Year 2 |
| 2.4 Seeds, herbarium vouchers and data are collected in the field for 122 F&N | | Complete: 190 seed collections have been duplicated to two seed banks, representing 127 wild fruit and nut species |
| 2.5 Seeds are counted, cleaned and viability tested in-country | | Complete: Partners counted, cleaned and viability tested (Annex 3.1.2.7) |
| 2.6 Seeds of 122 F&N are duplicated to the MSB via DHL courier | | Complete: See notification of transfers and confirmation emails in Section 3.1, Output 2. |
| 2.7 Duplicated seeds are counted, cleaned and viability tested at the MSB | | Complete: Full processing data generated for 190 collections at MSB (see section 3.1, Output 2, Annex 3.1.2.1) |
| 2.8 Data is shared by partners and the MSB on cleaning/counting/viability testing of seed collections | | Complete: Full data exchanged and uploaded onto Seed Bank Database (Annex 3.1.2.1) |
| 2.9 Data is uploaded to the DW | | Partially complete: Majority of seed collection data uploaded to DW (Annex 3.1.2.1a) |

| Project summary | Measurable Indicators | Progress and Achievements |
|---|---|---|
| **Output 3.** Global extinction risk assessments are completed and submitted to IUCN SIS for 20 of the target seed conservation species | 3.1 14 partner-affiliated individuals (of which 50% women) can conduct global red-list assessments to the standard of the IUCN by September 2018<br><br>3.2 Full assessment data are available for seven species by December 2019 and a further 13 species by December 2020<br><br>3.3 IUCN global-scale assessments are made and submitted to the IUCN SIS, detailing the threats to, and status of, each of the 20 F&N; seven assessments made and submitted by March 2020 and a further 13 made and submitted by February 2021<br><br>3.4 Relevant learning from global IUCN assessments integrated into community workshops in 2020 and incorporated in community conservation plans by March 2021 | For Output 3.1, 15 participants, of which 67% were woman (see section 3.1, Output 3, attendance list Annex 3.1.3.3) from all partner institutes were trained to conduct red list assessments to IUCN standards.<br><br>For Output 3.2, following the IUCN red list training course, species were selected for assessment as part of the project. Data from herbaria (e.g., Rosa hemisphaerica, Annex 3.1.3.5) and through fieldwork (e.g. Rosa galushkoi, Annex 3.1.3.6, Annex 3.1.3.7) were gathered during the first and second years of the project.<br><br>For Output 3.3, project partners have submitted 22 global red-list assessments to IUCN's SIS portal and national red list assessments are also being compiled for submission to the relevant national authorities. The assessments are summarised in the table in Section 3.1, Output 3, full assessments are available via SIS portal (screenshot example, Annex 3.1.3.8) or as MS Word documents downloaded from SIS (Annex 3.1.3.9 & 3.1.3.10).<br><br>For Output 3.4, community workshops were not possible because of COVID-19-19. Alternatively, partners produced end-of-project community booklets to disseminate project learning, including relevant learning from global IUCN assessments (See section 3.1, Output 3). The measurable indicator remains appropriate despite not being fully achieved because of COVID-19. |
| Activity<br><br>3.1 IUCN-accredited Kew staff travel to Armenia to deliver training to all project partners in IUCN assessments | | Complete: Training course delivered. |
| 3.2 Training is delivered to 14 participants | | Complete: 15 participants trained |
| 3.3 Fieldwork is conducted for data collection | | Complete |
| 3.4 Desk-based research on 20 target-species is delivered | | Complete: See section 3.1, |
| 3.5 Community data-collection surveys are delivered | | Complete: see evidence against Activity 3.6. |
| 3.6 Red-listing workshops are conducted to analyse and summarise the gathered data | | Complete: 219 residents in Year 1 (190 in Georgia & 29 in Armenia; 94 women and 92 men) [Annex 3.1.1.25 & 3.1.1.30, 3.1.1.31) and 144 |

| Project summary | Measurable Indicators | Progress and Achievements |
|---|---|---|
| | | residents in Y2 (86 women and 58 men) (Annex 3.1.1.24; Annex 3.1.1.25) contributed data towards red list assessments and research taxa at workshops in 2018 & 2019. See section 3.1, for more detail. |
| 3.7 Red-list assessments are submitted to the IUCN SIS for publication after project end | | Complete: 22 red-list assessments uploaded to SIS (screenshot example Annex 3.1.3.8) |
| 3.8 Results from the red-listing assessments of 20 species are shared with communities at workshops and through steering-committee meetings through 2019 – 2021 | | Partially complete: workshops were not possible due to COVID-19 but learning from red-list assessments was shared via end-of-project community booklets (Annex 3.1.1.5, 3.1.1.6). |
| **Output 4.** Increased understanding of the genetic diversity and uses of 12 fruit and nut taxa, highlighting valuable traits for climate change resilience | 4.1 Two MSc students (Georgia and Armenia) in post by March 2019, and capable of conducting genetic analysis for 12 fruit and nut taxa (8 in Armenia, 4 in Georgia) by March 2020<br><br>4.2 DNA extraction completed on 12 taxa (8 in Armenia, 4 in Georgia) by February 2020 and laboratory analyses completed on 12 taxa by December 2020<br><br>4.3 MSc and partner research findings disseminated to the scientific community and available to policy makers by March 2021<br><br>4.4 Two communities include relevant learning from research on traits related to climate change resilience for 12 F&N in their conservation plans by March 2021 | For output 4.1, two MSc students were in post by March 2019 and received training in-country and at Kew (see section 3.1, Annex 3.1.4.1, 3.1.4.2, 3.1.4.3, 3.1.4.4).<br><br>For output 4.2, by the end of the second year the two students were able to extract DNA and perform PCR analysis for all 12 target taxa (See section 3.1, Annex 3.1.4.9, 3.1.4.10).<br><br>For Output 4.3, Despite activities being delayed or halted due to COVID-19 related restrictions (e.g. the cancellation of the Annual Biodiversity Conference in Georgia), we did manage to disseminate research outcomes from the project in other ways (see section 3.1, , Including community booklets (Annex 3.1.1.5, 3.1.1.6) and a final project booklet published by Kew and distributed to key stakeholders (Annex 3.1.4.14). One MSc student also presented at two international conferences (Annex 3.1.4.15, 3.1.4.16) and the PI has submitted a joint research paper (Annex 3.1.4.18).<br><br>For Output 4.4, In the second and third year of the project, the Armenian project members shared results of the MSc students research to community members and the Steering Committee. This was done through a discussion group in Year 2, steering committee meetings and the community booklet in Year 3 (see section 3.1, . |
| 4.1 MSc students engaged and trained by partner staff in genetic analysis techniques | | Complete: training delivered in-country (Annex 3.1.4.7, 3.1.4.8) |
| 4.2 MSc students two-week residential training at RBG Kew, delivered by Conservation Science Department | | Complete: training delivered at Kew (Annex 3.1.4.5, 3.1.4.6) |
| 4.3 DNA extraction and PCR techniques are used to conduct research on 8 taxa in Armenia and on 4 taxa in Georgia. | | Complete: Annex 3.1.4.9, 3.1.4.10 |

| Project summary | Measurable Indicators | Progress and Achievements |
|---|---|---|
| 4.4 CBD focal point contact invited to Georgia's Annual Biodiversity Conference 2021 | | Incomplete: Georgia's Annual Biodiversity Conference 2021 cancelled. Kew published a final project booklet that was sent to partners in Armenia and Georgia to share with key stakeholders (Annex 3.1.4.14). |
| 4.5 MSc students complete theses and submit | | Partially complete: Armenian student has received first class grading for MSc thesis. Georgian student to submit thesis in Autumn 2021 after experiencing COVID-19 related delays. |
| 4.6 Attendance by partners at Georgia's Annual Biodiversity Conference 2021 | | Incomplete: Georgia's Annual Biodiversity Conference 2021 cancelled. |
| 4.7 Presentation of latest research findings, including red-listing and community engagement learning, at Georgia's Annual Biodiversity Conference 2021 | | Incomplete: Georgia's Annual Biodiversity Conference 2021 cancelled. PI authored paper that utilises community engagement data and has submitted to peer reviewed journal. Project learning incorporated into Kew published final project booklet (Annex 3.1.4.14) |
| 4.8 Research results of 12 taxa are shared with communities at workshops and through steering-committee meetings in 2021 | | Partially complete: community workshops not possible due to COVID-19 restrictions but learning from genetic research shared via end-of-project community booklets (see section 3.1, , Annex 3.1.1.5, 3.1.1.6). |
| 4.9 Research paper finalised and submitted to regional journals; | | Partially complete: Research paper authored by PI submitted to peer reviewed journal. The paper is co-authored by project partners and Kew colleagues. A research paper by Armenian student based on MSc research is in-prep and will be submitted to regional journal later in 2021 (see section 3.1, |
| 4.10 IPTGRFA focal point contacted and made aware of the imminent publication | | Complete: The PI has kept the Armenian IPTGRFA's focal point updated about imminent publication of project progress (email, Annex 3.1.4.17) |

# Annex 3 Standard Measures

We use these figures as part of our evaluation of the wider impact of the Darwin Initiative programme. Projects are not evaluated according to quantity. That is – projects that report few standard measures are not seen as being of poorer quality than those projects which can report against multiple standard measures.

Please quantify and briefly describe all project standard measures using the coding and format of the Darwin Initiative Standard Measures. Download the updated list explaining standard measures from http://darwin.defra.gov.uk/resources/reporting/. If any sections are not relevant, please leave blank.

| Code | Description | Total | Nationality | Gender | Title or Focus | Language | Comments |
|---|---|---|---|---|---|---|---|
| **Training Measures** | | | | | | | |
| 1a | Number of people to submit PhD thesis | 0 | | | | | |
| 1b | Number of PhD qualifications obtained | 0 | | | | | |
| 2 | Number of Masters qualifications obtained | 2 | Georgian & Armenian | 1 male; 1 female | Molecular and Phylogenetic studies of *Rosa spp.* and *Prunus spp.* x | Georgian & Armenian | Title of Armenian MSc thesis: “Phylogenetic characteristics and biotechnological potential of some representatives of the genus *Rosa* L. (Rosaceae)”<br>Georgian thesis title TBC |
| 3 | Number of other qualifications obtained | 0 | | | | | |
| 4a | Number of undergraduate students receiving training | 0 | | | | | |
| 4b | Number of training weeks provided to undergraduate students | 0 | | | | | |
| 4c | Number of postgraduate students receiving training (not 1-3 above) | 0 | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 4d | Number of training weeks for postgraduate students | 0 | | | | | |
| 5 | Number of people receiving other forms of long-term (>1yr) training not leading to formal qualification (e.g., not categories 1-4 above) | 0 | | | | | |
| 6a | Number of people receiving other forms of short-term education/training (e.g., not categories 1-5 above) | 174 | Georgian & Armenian | 123 female<br>51 male | Practical training in sustainable harvesting techniques and Kew-led Red List training course | Georgian, Armenian and English | |
| 6b | Number of training weeks not leading to formal qualification | | | | | | |
| 7 | Number of types of training materials produced for use by host country(s) (describe training materials)<br>- Care sheets for wild harvested plants brought into cultivation.<br>- Information signs for threatened plants.<br>- Leaflets for project introduction, sustainable harvesting and importance of | 3 | N/A | N/A | Overall project information; sustainable harvesting methods; biodiversity; propagation methods; care and maintenance of wild plants | Georgian, Armenian and English | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | biodiversity, end-of-project information. | | | | | | |
| **Research Measures** | | **Total** | **Nationality** | **Gender** | **Title** | **Language** | **Comments/ Weblink if available** |
| 9 | Number of species/habitat management plans (or action plans) produced for Governments, public authorities or other implementing agencies in the host country (ies) | 11 | Georgian | N/A | Red List Assessments | Georgian & English | 11 Red List assessments containing management plan for species written into IUCN SSC report by the Caucasus Plant Red List Authority [RLA]. Report currently being proofread before publication (email correspondence, Annex 3.1.3.11).<br>Participatory process? |
| 10 | Number of formal documents produced to assist work related to species identification, classification and recording. | | | | | | |
| 11a | Number of papers published or accepted for publication in peer reviewed journals | | | | | | |
| 11b | Number of papers published or accepted for publication elsewhere | 1 | | | | | Paper submission accepted in https://therai.org.uk/conferences/anthropology-and-conservation/panels#10279 |
| 12a | Number of computer-based databases established (containing species/generic information) and handed over to host country | | | | | | |
| 12b | Number of computer-based databases enhanced (containing species/genetic information) and handed over to host country | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 13a | Number of species reference collections established and handed over to host country(s) | | | | | | |
| 13b | Number of species reference collections enhanced and handed over to host country(s) | | | | | | |

| Dissemination Measures | | Total | Nationality | Gender | Theme | Language | Comments |
|---|---|---|---|---|---|---|---|
| 14a | Number of conferences/seminars/workshops organised to present/disseminate findings from Darwin project work | 3 | Armenian, Malaysian | 1 male, 2 female | | Russian, English | |
| 14b | Number of conferences/seminars/ workshops attended at which findings from Darwin project work will be presented/ disseminated. | | | | | | |

| Physical Measures | | Total | Comments |
|---|---|---|---|
| 20 | Estimated value (£s) of physical assets handed over to host country(s) | | |
| 21 | Number of permanent educational, training, research facilities or organisation established | 2 | |
| 22 | Number of permanent field plots established | 3 | Two demonstration plots planted with eight locally sourced fruit and nut species were established in the target communities in Armenia and Georgia. In Georgia partners created an additional community garden planted with 24 species. All plots are accessible to the local community and have permanent signs carrying the DI logo and project title, Annex 3.1.1.22) Please describe |

| Financial Measures | Total | Nationality | Gender | Theme | Language | Comments |
|---|---|---|---|---|---|---|

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 23 | Value of additional resources raised from other sources (e.g., in addition to Darwin funding) for project work *(please note that the figure provided here should align with financial information provided in section 9.2)* | | | | | | |

# Annex 4 Aichi Targets

| | Aichi Target | Tick if applicable to your project |
|---|---|---|
| 1 | People are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably. | X |
| 2 | Biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems. | |
| 3 | Incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio economic conditions. | |
| 4 | Governments, business and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits. | X |
| 5 | The rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced. | X |
| 6 | All fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits. | |
| 7 | Areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity. | |
| 8 | Pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity. | |
| 9 | Invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment. | |
| 10 | The multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning. | |
| 11 | At least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes. | |
| 12 | The extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained. | X |
| 13 | The genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity. | |

| | | |
|---|---|---|
| 14 | Ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable. | |
| 15 | Ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification. | |
| 16 | The Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in force and operational, consistent with national legislation. | |
| 17 | Each Party has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated national biodiversity strategy and action plan. | |
| 18 | The traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels. | X |
| 19 | Knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied. | X |
| 20 | The mobilization of financial resources for effectively implementing the Strategic Plan for Biodiversity 2011-2020 from all sources, and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilization should increase substantially from the current levels. This target will be subject to changes contingent to resource needs assessments to be developed and reported by Parties. | |

# Annex 5 Publications

Provide full details of all publications and material that can be publicly accessed, e.g. title, name of publisher, contact details. Mark (*) all publications and other material that you have included with this report

| Type * (e.g. journals, manual, CDs) | Detail (title, author, year) | Nationality of lead author | Nationality of institution of lead author | Gender of lead author | Publishers (name, city) | Available from (e.g. web link, contact address etc) |
|---|---|---|---|---|---|---|
| Booklet | "Enhancing rural Caucasian livelihoods through fruit and nut conservation", **Faruk, A., Willey, I.,** Neresyan, A., Papikyan, A., Kikodze, D., Barblishvilli, T. & Mikatadze-Pantsulaia, T. (2021) | Malaysian, British | British | Female & Male | RBG Kew, London | https://www.kew.org/sites/default/files/2021-04/Enhancing%20rural%20Caucasian%20livelihoods%20through%20fruit%20and%20nut%20conservation.pdf |
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# Annex 6 Darwin Contacts

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|---|---|
| **Ref No** | 25-017 |
| **Project Title** | Enhancing rural Caucasian livelihoods through fruit and nut conservation |
| | |
| **Project Leader Details** | |
| Name | Dr Aisyah Faruk |
| Role within Darwin Project | PI |
| Address | |
| Phone | |
| Fax/Skype | |
| Email | |
| **Project Officer** | |
| Name | Mr Ian Willey |
| Role within Darwin Project | Co-PI (as of April 2020) |
| Address | |
| Phone | |
| Email | |
| **Partner 1** | |
| Name | Mrs Astghik Papikyan |
| Organisation | Nature Heritage NGO |
| Role within Darwin Project | Project Co-ordinator in Armenia |
| Address | |
| Fax/Skype | |
| Email | |
| **Partner 2 etc.** | |
| Name | Mr David Kikodze |
| Organisation | Institute of Botany, Georgia |
| Role within Darwin Project | Project Co-ordinator in Georgia |
| Address | |
| Fax/Skype | |
| Email | |

## Checklist for submission

| | Check |
|---|---|
| **Is the report less than 10MB?** If so, please email to Darwin-Projects@ltsi.co.uk putting the project number in the Subject line. | No |
| **Is your report more than 10MB?** If so, please discuss with Darwin-Projects@ltsi.co.uk about the best way to deliver the report, putting the project number in the Subject line. | Yes |
| If you are submitting photos for publicity purposes, **do these meet the outlined requirements (see section 10)?** | Yes |
| **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 |
| 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. | |