Darwin Initiative Main Project Annual Report

Important note: *To be completed with reference to the Reporting Guidance Notes for Project Leaders:*

it is expected that this report will be about 10 pages in length, excluding annexes

Submission Deadline: 30 April

Darwin Project Information

Project Reference	22-001
Project Title	Rescuing and restoring the native flora of Robinson Crusoe Island
Host Country/ies	Chile
Contract Holder Institution	CABI
Partner institutions	CONAF, INIA, MMA, Oikonos
Darwin Grant Value	£227427
Funder (DFID/Defra)	Defra
Start/end dates of project	1st April 2015 - 31st March 2018
Reporting period (e.g., Apr 2015 – Mar 2016) and number (e.g., Annual Report 1, 2, 3)	April 2015 - March 2016 Annual Report 1
Project Leader name	Steve Edgington
Project website/blog/Twitter	www.cabi.org/projects/project/46827
Report author(s) and date	S. Edgington, V. Lagos, A. France, P. Hodum. 29 April 2016

1. Project Rationale

Invasive plant species have colonised around 90% of Robinson Crusoe Island's* (RCI) native forest and exert tremendous pressure on the remaining tracts of forest and the fauna that depends on it. The invasive species must be controlled and replaced by native plants to prevent the complete loss of all viable RCI native forest and many rare plant species. RCI is part of the Juan Fernández Archipelago (JFA), a UNESCO International Biosphere Reserve with one of the highest densities of endemic plant species in the world, many of which are endangered. This Darwin project is part of a larger invasive species management programme for JFA. Chilean Government is coordinating the systematic removal of invasive species from the archipelago, the Darwin Initiative project will enable the conservation, propagation and replanting of native species in their place. The project will conserve many of RCI's native plants and restore five key native species to 1 ha. The project will improve seed conservation and nursery propagation on RCI, protecting plants threatened with extinction and ensuring sufficient numbers are available for replanting. At the programme level it will support the restoration of some 30 sq km of JFA by 2033. The Chilean Ministry of the Environment approached CABI to provide technical and scientific assistance for improving the conservation, propagation and re-establishment of RCI's native plants, with the aim of safely storing many of RCI's native species and piloting the re-introduction of ecologically important species, including two plants on the IUCN Red-List.

*where the original 'Robinson Crusoe' (Alexander Selkirk) was marooned for over 4 years in the 18th Century

Figure 1. Robinson Crusoe Island is within the Juan Fernandez Archipelago, about 360 miles off the coast of Chile. The project's HQ is at the CONAF administration centre (above right), where the nursery and new seed bank will be located. Photo: S. Edgington CABI; Maps: https://commons.wikimedia.org

2. Project Partnerships

The project has four official partners (excl. the UK lead):

- Chilean National Forestry Commission (CONAF): Host-country lead. CONAF is the government body responsible for all of Chile's National Parks (of which RCI is one) and is key to project implementation. CONAF chaired the original stakeholder meeting in 2013 and has since led all in-country activities, through Victor Lagos – CONAF Biodiversity Officer; this has included facilitating the 6-month and year-end project meetings, a project kick-off day on RCI, publicity outputs and collation of partner reporting. CONAF has been punctual with reporting and suitably pro-active with publicity outputs (see Table 2).
- Chilean Ministry of the Environment (MMA): MMA was the first to approach CABI regarding habitat protection on RCI. Their mandate includes the development of environmental policy and regulatory standards. At the project kick-off meeting a change was proposed that would re-direct MMA's staff budget to CONAF to enable CONAF to put a full-time Darwin project officer on RCI. An official change request was accepted by the Darwin Initiative, with MMA assuring the project that their loss of budget would not compromise their project responsibilities.
- Instituto de Investigaciones Agropecuarias (INIA): INIA attended the original stakeholder meeting on RCI and has jointly led the broader (programme level) proposal for habitat restoration on JFA. CABI has considerable experience working with INIA, including a previous Darwin project in Chile (Ref: 15/004). INIA's primary project activity is researching soil microbes associated with native RCI plants to aid successful replanting. Their laboratory records show some 250+ growth promoting and/or pest defence microorganisms were obtained in Year 1 from RCI soils.
- Oikonos: Oikonos is an international NGO focused on studying and protecting threatened ecosystems. They have been working on RCI for many years implementing ecological methods of protecting and boosting populations of critically endangered birds. Their work on RCI includes physical removal of invasive plant species to encourage recolonization by native flora and fauna. Over the last 12 months they have helped to clear invasive plants from 600 m^2 which is now available for project replanting.

3. Project Progress

3.1 Progress in carrying out project activities

Output 1. Seed-bank established to conserve native RCI plant species

Activity 1.1 Adaptations to botanical garden to establish seed-bank facility

Project staff assessed potential seed-bank facilities at the botanical garden and, prepared an inventory of equipment needed. The botanical garden on RCI needed a complete overhaul to be suitable as a seed-bank. There was a small laboratory but it was beyond repair. CONAF has obtained a shipping container in Year 1 which will be the physical structure of the seed-bank. The container was delivered to RCI in Q4 Year 1 and will be moved to its permanent position, and equipped, by Q2 Year 2.

Activity 1.2 Seeds and spores obtained from native forest and conserved in seed-bank (duplicate collection in separated facility/store)

Accession records show that the project collected 41 seed samples representing 30 native species in Year 1 (approximately 15% of the total RCI species). The seeds are presently stored at a temporary seed bank at the RCI botanical garden, as an interim measure until the full facility is put in place.

Activity 1.5 Monitoring and evaluation, recording and dissemination of above

A project kick-off meeting was held on RCI in September 2015 (Figures 2a & b). About 40 people attended, including the CONAF Regional Director (in charge of all national parks in the region – mainland and islands), local citizens, the RCI Mayor and journalists. The project's 6- and 12-month reports were both submitted on time. Internal 6- and 12-month partner reports were submitted on time. A project homepage was established on the CABI website and three publicity articles were produced in Chile (for additional details see Table 2 and Annex 4):

http://www.lignum.cl/2015/08/18/conaf-liderara-ejecucion-de-proyecto-de-restauracion-ecologica-en-juan-fernandez/; http://www.lignum.cl/2015/08/20/el-parque-nacional-robinson-crusoe-se-somete-a-una-restauracion-ecologica/; http://www.conaf.cl/conaf-liderara-ejecucion-de-proyecto-de-restauracion-ecologica-en-juan-fernandez/.

Figures 2a & b. Project kick-off meeting on RCI, September 2015. Facilitated by in-country lead Victor Lagos of CONAF (above left)

Output 2. Improved nursery facility to ensure sufficient plant material available for 1 ha habitat restoration

Activity 2.1 Alterations to expand nursery ground space

INIA's principal plant pathologist (Dr Andrés France) visited the RCI nursery for consultation with nursery staff on best practice and to assess present planting stock. Key points from the visit: almost 3000 plant specimens representing some 36 species were being grown in the nursery, a surprisingly high number for the limited floor space; plants were in bad health primarily due to pests, diseases and overcrowding; the nursery is relying heavily on chemical pesticides as interventions with little consideration to ecotoxicology and resistance management; the nursery irrigation system is unsuitable. Dr France wrote a protocol for quality control of material coming into the nursery and, together with CONAF, has completed plans for

a new nursery layout (Figure 3). The plans include a double-doored entrance, improved ventilation and collection points for rainwater. Work to commence Year 2.

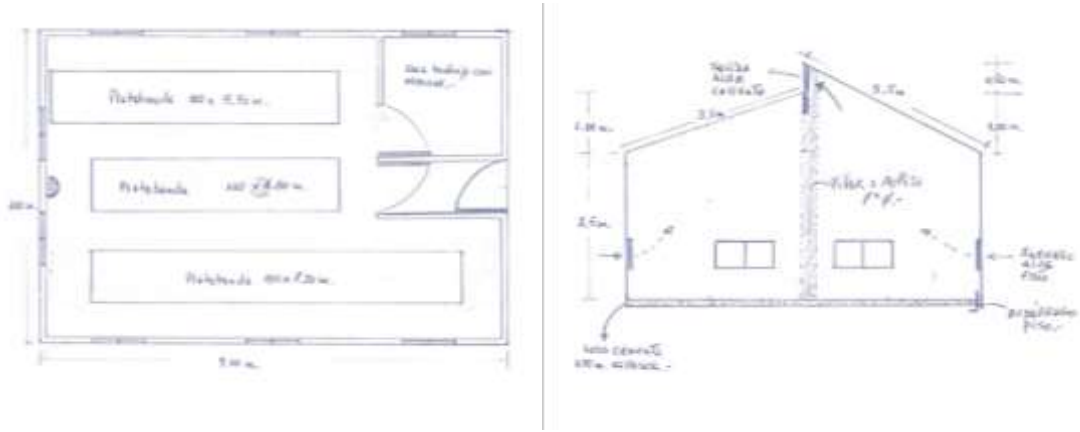

Figure 3. Plans for the nursery improvements on RCI

Activity 2.2 Internal fittings and fixtures upgraded and improved

Partners have prepared an inventory including costings for improvements to the nursery (see Internal Year 1 Report for details – provided as an attachment).

Activity 2.4 Monitoring and evaluation, recording and dissemination of above

Dr France prepared a report on best practice at the RCI nursery (see Report on RCI nursery for details – provided as an attachment).

Output 3. Enhanced technical capacity of local staff for propagation, storage and quality control of native plant species

Activity 3.1 Training in plant propagation, seed/spore preservation and quality control given to local staff and local citizens

Two training courses were completed on RCI in Year 1:1) **Collection and *ex-situ* conservation of seeds** (September 2015). Led by INIA (INIA curate the national seed collection on mainland Chile and are the project's culture collection specialists) and attended by 16 people, primarily park officers but also one local lady who will be in charge of nursery production. Training content included seed collection, storage, quality control and record keeping. Each participant received an INIA manual on seed collection and conservation (see Figure 4 – and a full copy is available on request). 2) **Record keeping for seed banks** (March 2016). Led by CONAF, attended by fifteen people (same group as above with two absentees), to complement the earlier training on seed conservation.

Activity 3.2 Trialling of propagation techniques in nursery

We have failed to meet this objective for Year 1. Trials of propagation techniques will take place once improvements to the nursery are complete (anticipated Q3-4 Year 2)

Activity 3.3 Production of propagation and quality control guidelines

The project distributed an INIA-Kew Millenium Seed Bank manual 'Collecting seeds from wild plants' to accompany a training course (Figure 4 – copy available on request). Project staff will require a manual on plant propagation: action CONAF/INIA by Q2 Year 2.

Figure 4. The course manual accompanying the training course on **Collection and *ex-situ* conservation of seeds**

Output 4. One ha of land cleared and five native plant species re-established

Activity 4.1. One hectare of land manually cleared of invasive species, in total by Year 3

Oikonos manually cleared invasive plants in Year 1, supported by a number of non-project partners from a GEF project on RCI invasive species management (Figure 5). All cleared areas will be available for project replanting. In total there are 26 across a number of different ecozones, which, when combined, cover >1 ha. Not all areas will be appropriate for the project's priority species and this is to be assessed Q1-Q2 of Year 2.

Figure 5. Clearance activities in Year 1 on RCI

Output 5. Beneficial plant-microbe complexes understood, and microbes produced for re-establishment activities; species conserved at INIA's Genetic Resources facility

Activity 5.1 Determination of microbial complexes associated with native plant species and conserved at INIA's Genetic Resources facility

The project did two soil surveys on RCI in Year 1, collecting and analysing 216 samples (176 soil and 40 from insect and/or plant material within soil). Analysis focused on obtaining microbes associated with plant defence, namely insect- disease- and nematode-killing fungi, and also plant growth promoting bacteria. To date they have obtained 279 isolates of interest which have been cryopreserved at Chile's National Microbial Bank (at INIA) and will be screened at the INIA laboratories.

Activity 5.2 Production of selected microbes

INIA has produced small quantities of microbes (collected during Activity 5.1) to assess upscaling potential and, to provide inoculum for laboratory studies. Larger-scale production will be done in Year 2.

3.2 Progress towards project outputs

Staff training is running to schedule with two key training courses completed in Year 1. Over 1 ha of land has already been cleared of invasive species (split over 26 sites) and is ready for replanting. Approximately 15% of RCI's native flora has been collected and stored as seed and over 279 (potentially) beneficial microbes have been isolated from RCI soils. There have been some delays to the nursery improvements which have led to delays in propagation trials, however this should not significantly impact on the overall propagation and replanting schedule, as increased throughput of high quality planting stock should be relatively quick once the nursery is ready. Establishing the seed bank will require installing and fitting of a shipping container which is also taking a little longer than anticipated, but again should not significantly impact on delivery (of note, the project has established a short-term seed bank to enable seed collecting to progress as per schedule, and the physical structure of the new seed-bank (a shipping container) was delivered to RCI). Overall, the project is on track to achieve the outputs by project close.

The project's specific indicators remain a valid means of measuring progress. The combination of team visits to RCI (three in Year 1) and the decision to have a dedicated project officer on RCI is proving a useful means of monitoring outputs and measuring progress. Contact between the project field officer and his line management (CONAF), as well as the project lead (CABI) has been good, with regular correspondence. CABI project staff ensured that every RCI visit included a meeting with all project partners, either on RCI or on Chilean mainland. The Chilean partners organised 6-monthly review meetings, attended by INIA, CONAF, MMA and CABI.

Prior to being stationed on RCI the new project officer spent a week at the Chilean National Microbial Collection at INIA to familiarise themself with aspects of culture collections and of plant and soil health.

3.3 Progress towards the project Outcome

Project outcome: Improved seed-bank and nursery facilities, with conserved soil microbiota, enable the protection of RCI native plants and restoration of five important species to 1 ha (N.B. Darwin project level)

Indicator 1. 50% (minimum) of RCI's native flowering species and 50% (minimum) of known non-flowering vascular species stored as seed or in culture in the new seed-bank, by Year 3

Accession records show that the project collected approximately 15% of RCI's native species in Year 1. The seeds are presently stored in a temporary bank on RCI (until the new facility is in place). A shipping container has been obtained by CONAF which will form the physical seed-bank structure.

Indicator 2. 100% increase in production capacity at the RCI nursery by Year 2, by enlarged facilities by Year 1 and more efficient throughput by Year 2

Based on what we now know this indicator should read "100% increase in production capacity of healthy planting stock…". This is because production numbers are high enough but many of the plants are too weak for replanting (due to pests, diseases, lack of nutrition and general inadequate nursery practice). The size of the nursery has not been increased by year-end, so we are behind schedule in this respect, however the review of facilities and practices and subsequent report will ensure appropriate modifications and practices can be implemented.

Indicator 3. Native plant species: *Dendroseris litoralis* (20*), *Rhaphihamnus venustus* (30), *Gunnera tinctoria* (20), *Haloragis masatierrana* (20) and *Fagara mayu* (10) re-established in 1 ha of RCI by Year 3. *minimum number re-established

Three of the five key species have been collected and are now in temporary storage (one more already exists in the nursery but will be assessed for quality).

Indicator 4. Three project staff and 10 citizen scientists trained in production and maintenance activities at the nursery and seed-bank by Year 1

Sixteen resident national park officers and one local citizen trained in the collection and ex-situ conservation of seeds. Fifteen also received training on record keeping for seed banks. The project team has met with the RCI Mayor on three occasions to pursue greater involvement of local citizens; the team is aware that the project needs greater community involvement. The project held a publicity event on RCI to showcase the work, the RCI Mayor was in attendance and gave a speech and around 70 people attended. The new project officer spent a week at Chile's National Microbial Resource Collection prior to taking up his post on RCI, to learn primarily about culture collections.

Indicator 5. Microbial complexes associated with five RCI species (as above) deposited in genetic resources collection by Year 2; complexes of 50% (minimum) of RCI native flora deposited by Year 3

Accession records show 279 potential beneficial microbes were obtained from RCI soils, including insect- fungi- and nematode-killing fungi as well as growth promoting bacteria. Culture collection records show all are now under long-term preservation.

3.4 Monitoring of assumptions

Outcome and output level assumptions still hold true. Points to note: the new seed bank will be at a height above the 2010 tsunami level, which killed a number of RCI citizens. The have been indications that two ministers from the Chilean Government will visit the project site in 2016 (CONAF to confirm), which could be extremely important at both the project and programme level for levering additional funding, and it is still too early to know if biological control agents will work against the invasive plants (outcome risk at the programme level).

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

Impact: Native biodiversity on the Juan Fernandez Archipelago is substantially conserved through a programme of invasive species control and habitat restoration (N.B. programme level)

The Darwin project is part of an invasive species management programme in JFA. Chilean Government is coordinating the systematic removal of invasive species, the Darwin Initiative project is enabling the conservation, propagation and replanting of native species in their place. The Darwin project has already conserved 15% of RCI's native flora (as seed) and will continue to conserve more in Years 2 and 3. The project will restore five of these species to 1 ha of RCI. The upgrading of facilities on RCI combined with training for local staff, involvement of the local RCI community and a greater understanding of soil microbiology will ensure successful conservation, propagation and replanting of native RCI species. It will also significantly support the restoration of approximately 30 sq km of JFA by 2033, at the programme level. To note, poverty alleviation is not the primary objective of this project, however there will be direct employment benefits for a small number of residents on RCI, for example the nursery and seed bank will be employing technical support and also the project has created a project officer role for the duration of the project. The wider programme's success, in restoring native plants and associated biodiversity to JFA may help increase tourism to the islands.

4. Project support to the Conventions (CBD, CMS and/or CITES)

The project is presently contributing to CBD Article 9 (ex-situ conservation of biodiversity) through its collection and conservation of native RCI plants, Article 10 (sustainable use of native biodiversity) through its support of improved nursery facilities and best practices for producing planting stock, and Article 12 (research and training) through its complementary scientific and technical training for park officers and local RCI citizens. In Years 2 and 3 the project will also contribute to CBD Article 8 (in-situ conservation of biodiversity) through its replanting of native species. Of additional note, although Chile has yet to ratify the Nagoya Protocol, the project is establishing and enhancing genetic resources and compliance to the Protocol's obligations is of upmost importance. INIA is housing the project's microbial resources and take all possible measures to comply with Nagoya's obligations. CABI operates in full compliance with the Nagoya Protocol.

The project partner MMA is the focal point for the CBD in Chile (MMA also sits on the CITES and CMS National Committees, in Chile). MMA have been present on all field visits to RCI and at all planning/implementation meetings. They have reviewed this report prior to submission.

5. Project support to poverty alleviation

As above (3.5) poverty alleviation is not the primary objective of this project however there will be direct employment benefits for a small number of residents on RCI, for example at the nursery and seed bank, the project has also created a project officer on RCI. The saving of RCI unique biodiversity will have a positive effect on the practical environment in which the RCI community live. There may be minor employment benefits from the project and the wider programme's success, as restoring native plants and associated biodiversity to JFA may help increase tourism. Birdwatching tourism on RCI is limited but with a population of around 700 people, even the addition of a few tours per year would have a positive effect.

6. Project support to Gender equity issues

At present addressing gender equality is not a feature of this project. All the project team can do is assure the review committee that any opportunities for local citizens to participate in project activities, including training and field work, will not discriminate against age or gender.

7. Monitoring and evaluation

Dr Steve Edgington (project manager) has been responsible for M&E in Year 1. The process has been one of continuous, systematic monitoring of activities, both self-assessment and internal monitoring. CONAF have been the primary in-country support for M&E even though MMA were originally assigned this role. This came about quite naturally due to CONAF's greater participation in direct project activities and, whilst any self-assessment must be treated

with an element of caution, Dr Edgington is satisfied with their M&E activities. CONAF has coordinated all internal 6- and 12-monthly reporting from partners and facilitated all three of the project planning and implementation meetings in Chile. CABI has appointed a project board, which includes CABI's Regional Representative for South America, CABI's liaison officer for Chile and the Centre Director of CABI-UK. The board has monitored the project via reports and direct contact with the project manager. CABI's Regional Representative for South America met with the project lead via Skype in March 2016 for a lengthy review of Year 1 activities. If Chilean ministers visit RCI in 2016, as has been suggested, the CABI Regional Representative will also be present (their staff costs covered by CABI). The project is being monitored as work packages, each being a collection of outputs with the respective activities. The work packages reflect the project outputs, namely facilities (seed bank and nursery structures), capacity building/training, project publicity, plant collections (at the RCI seed bank), plant propagation (at the RCI nursery), soil microbiology and habitat replanting. The delivery of each work package is managed, monitored and evaluated as a unit, enabling any changes to the work plan, for example the delays to nursery improvements, to be suitably controlled. Work packages are reviewed every six months with a short report produced and circulated internally. Where relevant each project partner has assisted in compiling/producing information to support work package reviews, with Chilean inputs coordinated by CONAF for all but the soil microbiology work package. The information gathered and reports produced have been shared amongst all project partners as well as a number of stakeholders within the wider invasive species management programme, for example the Regional Director of CONAF.

8. Lessons learnt

At an early project meeting in Chile it was unanimously agreed by the project partners that having a project officer stationed on RCI for the duration of the project would strengthen delivery. As far as the project lead is aware this hadn't been thought of during the planning stage (no idea why) but it is proving to be an excellent move. The in-situ project officer has enabled continuity of activities in what is unquestionably an isolated locality. On a somewhat negative side, the hiring, familiarisation and physical relocation of the officer took several months which led to a delay in achieving several key objectives for Year 1 (primarily the nursery improvements). The hiring of the officer also required transference of MMA's project staff budget to CONAF (the officer is a CONAF employee) and whilst MMA have assured the project lead this will not impact on their project input this is a situation that must be monitored.

The expertise, enthusiasm and general project coordination of the host-country lead (Victor Lagos of CONAF) has so far proved invaluable. Furthermore, as a senior biodiversity officer for CONAF it is hoped he will be a means of ensuring sustainability of conservation activities on RCI following project end. Although it is not always easy to achieve, a key lesson for future proposals is to liaise fully with all stakeholders to identify the key partners for delivery and sustainability of project activities. CABI is now engaged with CONAF and the Mayor of RCI to focus on levering further funding for habitat restoration on RCI (two target donors are USDA and Chilean Regional Government).

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

NA

10. Other comments on progress not covered elsewhere

The design of the project has not been enhanced over the last year with the exception of stationing a project officer out on RCI for project duration. Project risks are as per the original proposal and there have been no significant difficulties during this first year.

11. Sustainability and legacy

CONAF, MMA and Oikonos have and will continue to communicate with the RCI community on project activities and, the large scale removal, via classical biological control, of invasive species (at the programme level). Raising awareness has been done through public meetings, meetings with the RCI Mayor, information boards and news media. There is a project webpage (http://www.cabi.org/projects/project/46827). Close cooperation with MMA, itself part of the Chilean Government decision making process, will allow the possibility of influencing government policy on the classical biological control of invasive species on island ecosystems

including RCI (at the programme level). There is a potential visit by two government ministers to RCI early in Year 2, to meet project partners. The project's planned exit strategy is still valid; by the end of the project there will be sufficient capacity and infrastructure on RCI to enable propagation and replanting activities to continue for the duration of a large restoration programme. CONAF has responsibility for the RCI National Park and is committed to continue and expand the replanting work, as well as regularly monitoring progress and disseminating relevant information. INIA will maintain rigorous scientific scrutiny of microbial diversity and Oikonos will continue to monitor fauna that depend on the island's native flora. The RCI Mayor is a key ally and the project must ensure they maximise his not inconsiderable power in levering funding from government and other sources for habitat restoration activities. CABI's role will not continue after the Darwin Initiative project, unless other funding is obtained, instead the work will be done by the Chilean partners. CONAF have permanent park officers on RCI, many of whom have received training in Year 1 for project activities, hence continuing the work will be largely experience-based after the Darwin project.

12. Darwin Identity

The project lead gave a presentation at the project kick-off meeting on RCI. This included general details of the Darwin Initiative and some examples of past CABI-Darwin Initiative projects (this presentation is available on request). The Darwin logo was featured on the presentation and on information boards that accompanied the kick-off meeting. No partner or donor logos appeared on the media articles produced (Table 2), only their names within the script. The Darwin Initiative project is always presented as supporting a clear project, however it must (and is) also presented as a key component of a larger programme of habitat restoration in JFA. All of the Chilean project partners, which include two Chilean ministries, were familiar with the Darwin Initiative as a previous CABI-Chile Darwin project was a considerable in-country success and received wide national coverage. Local citizens on RCI were not familiar with the Darwin Initiative prior to the start of this particular project

13. Project Expenditure

Table 1 Project expenditure <u>during the reporting period</u> (1 April 2015 – 31 March 2016)

Project spend (indicative) since last annual report	2015/16 Grant (£)	2015/16 Total Darwin Costs (£)	Variance %	Comments (please explain significant variances)
Staff costs (see below)			+2.17%	Additional CABI staff time for Liaison with CONAF
Consultancy costs	0	0	0	
Overhead Costs			+7.72%	As a result of additiona staff time
Travel and subsistence			-9.54%	CONAF provided accommodation on RC at a reduced rate (in staff quarters). We would like to use the underspend for an additional visit to RCI in Year 2
Operating Costs			-8.59%	INIA did not use their full conference budget. They would like to use the underspend to present project work at the Chilean Congress of Biological Control in August 2016.

Capital items (see below)	0	0	0	
Others (see below)			0.00%	
TOTAL			**0.2**	

*Our finance officer (Alice Muiruri) can explain the differences in reporting

14. OPTIONAL: Outstanding achievements of your project during the reporting period (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)

Annex 1: Report of progress and achievements against Logical Framework for Financial Year 2015-2016

Project summary	Measurable Indicators	Progress and Achievements April 2015 - March 2016	Actions required/planned for next period
Impact Native biodiversity on JFA is substantially conserved through a programme of invasive species control and habitat restoration (N.B. programme level)		The project has conserved 15% of RCI's native flora (as seed) and will continue to conserve more in Years 2 and 3.	[redacted]
Outcome Improved seed-bank and nursery facilities, with conserved soil microbiota, enable the protection of RCI native plants and restoration of five important species to 1 ha (N.B. Darwin project level)	1. 50% (minimum) of RCI's native flowering species and 50% (minimum) of known non-flowering vascular species stored as seed or in culture in the new seed-bank, by year 3 2. 100% increase in production capacity at the RCI nursery by year 2, by enlarged facilities by year 1 and more efficient throughput by year 2 3. Native plant species: *Dendroseris litoralis* (20*), *Rhaphihamnus venustus* (30), *Gunnera tinctoria* (20), *Haloragis masatierrana* (20) and *Fagara mayu* (10) re-established in 1 ha of RCI by year 3. *minimum number re-established 4. Three project staff and 10 citizen scientists trained in production and maintenance activities at the nursery and seed-bank by year 1	1. Approximately 15% of RCI native plants collected and conserved. New seed-bank structure obtained. 2. Mechanisms identified to increase throughput of healthy planting stock in nursery 3. Three of the five species now in a (temporary) seed bank 4. 16 project staff and one local citizen trained in seed collection and conservation. 15 project staff and one local citizen trained in record keeping	1. Seed collecting in Year 2, with a minimum of 35% of RCI plants obtained and stored as seed by year end. All project priority species (5 in total) sourced from the wild and put into seed bank. Seed bank facility in place and equipped by Q2 Year 2 2. Physical improvement to nursery completed by Q2 Year 2 3. Two priority species in propagation by Q3 Year 2. 4. Minimum of three project staff and two local citizens trained in plant propagation
Output 1. Seed-bank established to conserve native RCI plant species	1. Physical presence of functioning seed-bank facility 2. Seed-bank and nursery records record show minimum of 50% native species conserved by year 3 3. Seeds are used for nursery	Shipping container obtained and will form the new seed bank, to be in place and equipped Q2 Year 2. For now there is a temporary short-term bank. Seed bank accession records show approximately 15% of RCI's native species conserved by Year 1; all presently stored in the temporary seed bank. Seeds will be used for nursery production in Year 2. Indicators appropriate.	

	production and, where appropriate, for direct re-establishment activities	
Activity 1.1 Adaptations to botanical garden to establish seed bank facility		Present facility assessed and inventory (+costings) prepared. Shipping container obtained and will be the physical basis of the seed-bank. Container put in permanent location and equipped by Q2 Year 2.
Activity 1.2, Seeds and spores obtained from native forest and conserved in seed bank (duplicate collection in separated facility/store)		Accession records show 41 seed samples of 30 native species collected in Year 1 (approximately 15% of the total RCI species). Presently stored at a temporary seed bank facility on RCI.
Activity 1.5 Monitoring and evaluation, recording and dissemination of above		Project kick-off meeting on RCI. About 40 people attended, including the CONAF Regional Director, local citizens, the RCI Mayor and journalists. Six-month and 12-month Darwin reports submitted on time. Internal reporting from partners as per agreed schedule. Project homepage established on CABI website.
Output 2. Improved nursery facility to ensure sufficient plant material available for 1 ha habitat restoration (assuming growth from re-established species as well)	1. Productive, protected floor space increased by 50 sq m, open nursery field production to be doubled 2. Internal fittings and fixtures are modern and suitable for effective plant propagation 3. Nursery records demonstrate improved production efficacy of native plants	Floor space not increased by year-end, so we are behind schedule in this respect. INIA review of facilities and practices and subsequent report will ensure the most appropriate modifications and practices can be implemented. Based on what we now know this indicator should read “100% increase in production capacity of healthy planting stock…”. At present a considerable proportion of material being produced is too weak for replanting outside, due to pests, diseases, lack of nutrition and general inadequete nursery practice. Indicators appropriate.
Activity 2.1. Adaptations to expand nursery ground space		Consultation by INIA specialist on best nursery practice; report produced. Census of present nursery production: ~3000 plant specimens of 36 species being grown; many in very bad health. Heavy reliance on chemical pesticides as interventions. Plans completed for the new nursery layout, work to commence Year 2.
Activity 2.2. Internal fittings and fixtures upgraded and improved		Inventory including costings produced for nursery improvements.
Activity 2.4 Monitoring and evaluation, recording and dissemination of above		Report on best nursery practice produced and distributed to project and nursery staff
Output 3. Enhanced technical capacity of local staff for propagation, storage and quality control of native plant species	1. Local working group on plant propagation established by year 1 2. Manual of plant propagation and quality control distributed to local staff by year 2 3. Training notes demonstrate technical capacity building of local staff	Three of the five key species have been collected and are now in temporary storage (one more already exists in the nursery but will require quality control). Indicators appropriate.

Activity 3.1 Training in plant propagation, seed/spore preservation and quality control given to local staff and local citizens		Two training courses completed:1) Collection and *ex-situ* conservation of seeds and 2) Record keeping for seed banks. 16 and 15 people trained, respectively. Each participant received an INIA manual on seed conservation
Activity 3.2 Trialling of propagation techniques in nursery		Delayed. Trials to commence once nursery improvements are complete.
Activity 3.3 Production of propagation and quality control guidelines		Manual on seed collection (produced by INIA-Kew Millenium Seed Bank) distributed to training course attendees
Output 4. 1 ha of land cleared and five native plant species re-established	1. Field visits confirm 1 ha of land cleared by year 1 2. Botanical records show successful re-establishment of 1 ha with *Dendroseris litoralis* (20*), *Rhaphihamnus venustus* (30), *Gunnera tinctoria* (20), *Haloragis masatierrana* (20) and *Fagara mayu* (10) produced by the nursery, by year 3. *minimum number re-established	Sixteen resident national park officers and one local citizen trained in the collection and ex-situ conservation of seeds, with 15 going on to receive training on record keeping for seed banks. The project team has met with the RCI Mayor on three occasions to pursue greater involvement of local citizens. The project held an RCI publicity event to showcase the work; the RCI Mayor was in attendance and gave a speech. Around 70 people attended (10% of RCI population). The new in-situ project officer received culture collection training for a week at INIA, prior to taking up his post on RCI. Indicators appropriate.
Activity 4.1 1 ha of land manually cleared of invasive species		Oikonos and the University of Chile (non-project partner) have cleared a total of 26 areas covering over 1 ha.
Output 5. Beneficial plant-microbe complexes understood, and microbes produced for re-establishment activities; species conserved at INIA's Genetic Resources facility	1. Records of microbial complexes for key native plants 2. Records of conserved and characterised microbial diversity 3. Improved plant propagation through the use of microbial amendments	Accession records show insect- fungi- and nematode-killing fungi as well as growth promoting bacteria, have been obtained from RCI soils. Culture collection records show all are now under long-term preservation. Indicators appropriate.
Activity 5.1 Determination of microbial constituents from native forest soils and associations with plant species		Two soil surveys done on RCI, collecting 216 soil samples; 279 microbes with potential plant health benefits obtained; all cryopreserved at Chile's National Microbial Bank (at INIA)
Activity 5.2 Production of selected microbes		Small quantities being produced, primarily to assess upscale potential and to provide inoculum for screening studies.

Annex 2 Project's full current logframe

Project summary	Measurable Indicators	Means of verification	Important Assumptions
Goal: Effective contribution in support of the implementation of the objectives of the Convention on Biological Diversity (CBD), the Convention on Trade in Endangered Species (CITES), and the Convention on the Conservation of Migratory Species (CMS), as well as related targets set by countries rich in biodiversity but constrained in resources.			
Outcome: Improved seed-bank and nursery facilities, with conserved soil microbiota, enable the protection of RCI native plants and restoration of five important species to 1 ha (N.B. Darwin project level)	1. 50% (minimum) of RCI's native flowering species and 50% (minimum) of known non-flowering vascular species stored as seed or in culture in the new seed-bank, by year 3 2. 100% increase in production capacity at the RCI nursery by year 2, by enlarged facilities by year 1 and more efficient throughput by year 2 3. Native plant species: *Dendroseris litoralis* (20*), *Rhaphihamnus venustus* (30), *Gunnera tinctoria* (20), *Haloragis masatierrana* (20) and *Fagara mayu* (10) re-established in 1 ha of RCI by year 3. *minimum number re-established 4. Three project staff and 10 citizen scientists trained in production and maintenance activities at the nursery and seed-bank by year 1 5. Microbial complexes associated with five RCI species (as above) deposited in genetic resources collection by year 2; complexes of 50% (minimum) of RCI native flora deposited by year 3	1. Seed-bank log book; botanical survey records for RCI 2. Nursery production records 3. Botanical survey records for RCI 4. Staff training records 5. Resource collection records; INIA research records	Natural disasters, such as earthquakes and tsunamis do not disrupt nursery and seed bank facilities. These facilities to be situated above the height of the areas affected by the 2010 tsunami. Local communities and MJFA remain open and committed to working on the project; representatives from both will be on a project steering committee, to ensure (and gauge) their engagement Chilean Government maintains support for the project after 2018 Biological control agents work as expected from relevant experience (N.B. programme level)
Outputs: **1**. Seed-bank established to conserve native RCI plant species	1a. Physical presence of functioning seed-bank facility 1b. Seed-bank and nursery records record show minimum of 50% native species conserved by year 3 1c. Seeds are used for nursery production and, where appropriate, for	1a. Photo records: of facilities 1b. Project records: accessions to seed-bank 1c. Project records: nursery; photo records: of re-planting	Low proportion of plant species recalcitrant regarding seed storage CONAF remit of conserving biodiversity in JFA National Park remains 'Turnover' of local staff remains manageable

	direct re-establishment activities		
2. Improved nursery facility to ensure sufficient plant material available for 1 ha habitat restoration (assuming growth from re-established species as well)	2a. Productive, protected floor space increased by 50 sq m, open nursery field production to be doubled 2b. Internal fittings and fixtures are modern and suitable for effective plant propagation 2c. Nursery records demonstrate improved production efficacy of native plants	2a. Project records: nursery; Photo records: of facilities 2b. Photo records: of facilities 2c. Project records: nursery and training and education; project video of breeding successes	Low proportion of plant species recalcitrant regarding seed storage CONAF remit of conserving biodiversity in JFA National Park remains 'Turnover' of local staff remains manageable
3. Enhanced technical capacity of local staff for propagation, storage and quality control of native plant species	3a. Local working group on plant propagation established by year 1 3b. Manual of plant propagation and quality control distributed to local staff by year 2 3c. Training notes demonstrate technical capacity building of local staff	3a. Project records: training and education 3b. Project notes 3c. Project notes	CONAF remit of conserving biodiversity in JFA National Park remains 'Turnover' of local staff remains manageable
4. 1 ha of land cleared and five native plant species re-established	4a. Field visits confirm 1 ha of land cleared by year 1 4b. Botanical records show successful re-establishment of 1 ha with *Dendroseris litoralis* (20*), *Rhaphihamnus venustus* (30), *Gunnera tinctoria* (20), *Haloragis masatierrana* (20) and *Fagara mayu* (10) produced by the nursery, by year 3. *minimum number re-established	4a. Project notes: field notes; photo records 4b. Project notes: field notes on native species' presence; photo records	Low proportion of plant species recalcitrant regarding seed storage CONAF remit of conserving biodiversity in JFA National Park remains 'Turnover' of local staff remains manageable
5. Beneficial plant-microbe complexes understood, and microbes produced for re-establishment activities; species conserved at INIA's Genetic Resources facility	5a. Records of microbial complexes for key native plants 5b. Records of conserved and characterised microbial diversity 5c. Improved plant propagation through the use of microbial amendments	5a. Project notes: laboratory notes on microbial associations 5b. Project records: accessions to microbial collection 5c. Project notes: laboratory and nursery notes on microbial associations	'Turnover' of local staff remains manageable

Activities:
Activity 1.1 Adaptations to botanical garden to establish seed bank facility
Activity 1.2, Seeds and spores obtained from native forest and conserved in seed bank (duplicate collection in separated facility/store)
Activity 1.3 Testing of seeds/spores at yearly interval to demonstrate efficacy of procedures
Activity 1.4 Release of seeds and spores for nursery production and/or direct seeding into cleared areas
Activity 1.5 Monitoring and evaluation, recording and dissemination of above
Activity 2.1. Adaptations to expand nursery ground space
Activity 2.2. Internal fittings and fixtures upgraded and improved
Activity 2.3 Key native species prioritised and propagated
Activity 2.4 Monitoring and evaluation, recording and dissemination of above
Activity 3.1 Training in plant propagation, seed/spore preservation and quality control given to local staff and local citizens
Activity 3.2 Trialling of propagation techniques in nursery
Activity 3.3 Production of propagation and quality control guidelines
Activity 3.4 Monitoring and evaluation, recording and dissemination of above
Activity 4.1 1 ha of land manually cleared of invasive species
Activity 4.2 Seedlings of five native plant species replanted in 1 ha of cleared land
Activity 4.3 Testing of plant health and growth at intervals, to demonstrate successful re-establishment
Activity 4.4 Monitoring and evaluation, recording and dissemination of above
Activity 5.1 Determination of microbial constituents from native forest soils and associations with plant species
Activity 5.2 Production of selected microbes
Activity 5.3 Trialling of propagation techniques and interactions with microbial complexes in nursery
Activity 5.4 In-field trialling of microbial complexes with native plants, in 1 ha replanted area
Activity 5.5 Monitoring and evaluation, recording and dissemination of above

Annex 3 Standard Measures

Table 1 Project Standard Output Measures

Code No.	Description	Gender of people (if relevant)	Nationality of people (if relevant)	Year 1 Total	Year 2 Total	Year 3 Total	Total to date	Total planned during the project
6A	New project officer received >30h training in microbial resources at Chile's national microbial resource collection (INIA)	male	Chile	1			1	0
7	Plant propagation guidelines			0				1
7	Quality control guidelines			1				1
13A	Inventory of seed-bank accessions			1			1	1
13A	Inventory of microbial accessions			1			1	1
13A	Inventory of nursery accessions			1			1	1
14A	Workshop: Collection and *ex-situ* conservation of seeds		Chile	1			1	1
14A	Workshop: Record keeping for seed banks		Chile	1			1	1
22	Field plots for habitat restoration			1ha			1ha	1ha

Table 2 Publications

Title	Type (e.g. journals, manual, CDs)	Detail (authors, year)	Gender of Lead Author	Nationality of Lead Author	Publishers (name, city)	Available from (e.g.website link or publisher)
Rescuing	webpage	CABI	F	UK	CABI,	http://www.cabi.org/pr

and restoring the native flora of Robinson Crusoe Island		2016			Wallingford	ojects/project/46827
Conaf liderará ejecución de proyecto de restauración ecológica en Juan Fernández	website	V.Lagos 2015	M	Chile	www.lignum.cl Santiago	http://www.lignum.cl/2015/08/18/conaf-liderara-ejecucion-de-proyecto-de-restauracion-ecologica-en-juan-fernandez/
CONAF liderará ejecución de proyecto de restauración ecológica en Juan Fernández	website	V. Lagos 2015	M	Chile	www.conaf.cl	http://www.conaf.cl/conaf-liderara-ejecucion-de-proyecto-de-restauracion-ecologica-en-juan-fernandez/
El Parque Nacional Robinson Crusoe se somete a una restauración ecológica	website	V.Lagos 2015	M	Chile	www.lignum.cl Santiago	http://www.lignum.cl/2015/08/20/el-parque-nacional-robinson-crusoe-se-somete-a-una-restauracion-ecologica/