Darwin Initiative Main & Extra Annual Report

To be completed with reference to the "Project Reporting Information Note":
(https://www.darwininitiative.org.uk/resources/information-notes/)

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

Submission Deadline: 30th April 2025

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

Darwin Initiative Project Information

Scheme (Main or Extra)	Main
Project reference	31-001
Project title	Quinoa-associated fungi and bacteria in Bolivia: conservation and sustainable use
Country/ies	Bolivia
Lead Organisation	CABI
Project partner(s)	CABI [international, based in UK] Permaculture Association [UK] PROINPA [Bolivia] Universidad Autónoma del Estado de Morelos [Mexico] Universidad Mayor de San Simón [Bolivia]
Darwin Initiative grant value	£584,880
Start/end dates of project	1 July 2024 – 31 March 2027
Reporting period (e.g. Apr 2024 – Mar 2025) and number (e.g. Annual Report 1, 2, 3)	1 July 2024 – 31 March 2025
Project Leader name	D.W. Minter
Project website/blog/social media	
Report author(s) and date	D.W. Minter

1. Project summary

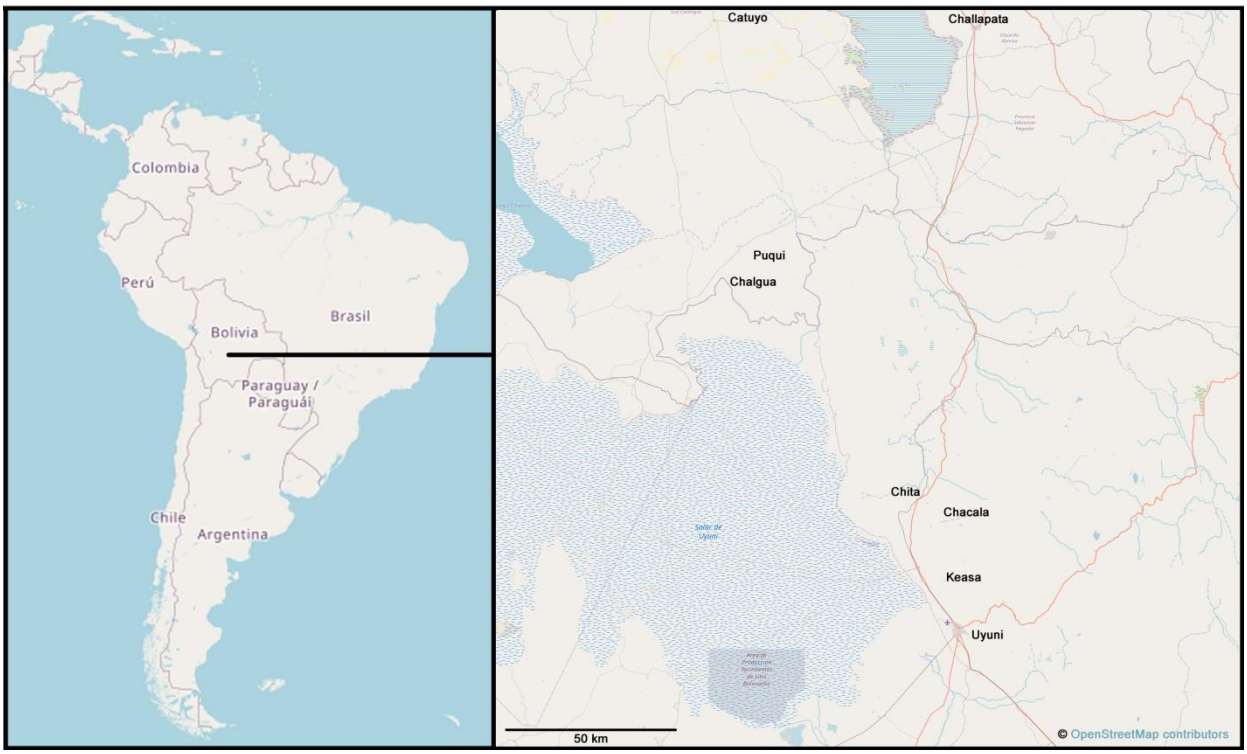
Quinoa, Bolivia's signature grain, is grown organically by altiplano smallholder households, many headed by women. In such extreme environments, climate change and other threats make harvests unpredictable. Research shows beneficial fungi and bacteria could help. Jointly with village collectives, this project explores that largely unknown diversity, developing new bioproducts from promising strains to improve crop resilience for these communities. The diversity found will also contribute to an initiative to include fungi and bacteria, currently totally overlooked, in Bolivia's conservation policies.

Nine months into this project, that summary, unchanged from the original application, remains valid. It identifies the biodiversity and wellbeing challenges addressed and why they are relevant. Biodiversity challenges and their evidence base were identified by the project's core team. Poverty reduction challenges were identified by the Bolivian partners, with the evidence base provided by their outreach services. The project uses scalable approaches (see the response to question 19b in the original application, and section 11 below), but implementing them beyond horizons defined in the original application was never part of the proposal.

The attached map shows approximate locations of project community outreach and fieldwork mentioned in this text.

Darwin Initiative project 31-001
Quinoa-associated fungi and bacteria in Bolivia: conservation and sustainable use

Maps showing approximate locations of community outreach and fieldwork



2. Project stakeholders/partners

Partners and their representatives. The project's five partners are represented as follows: Dr David Minter (Project Leader) for **CABI** (the lead partner), Ms Gihan Soliman for the **Permaculture Association** (UK), Dr Rolando Oros for **PROINPA** (Bolivia), Prof. Ramón Batista for **UAEM** (Universidad Autónoma del Estado de Morelos, Mexico), and Prof. Daniel Guzmán for **UMSS** (Universidad Mayor de San Simón, Bolivia). This line-up, which makes up the project's core team, is unchanged from the original application.

The representatives first met as a group in February 2022 during the Darwin Initiative round 27 partnership project which was the precursor of our current work. Relations between all members of the group have been cordial and co-operative throughout, and a high degree of trust has developed. Frequent e-mail and social media contact is maintained. The partnership was initially based on demand stemming from the host country and Mexico, and all partners were fully involved in preparing the proposal. All are now similarly actively involved in project management and, under the lead of Ms Soliman, in monitoring & evaluation [**M&E**]. Decision-making is by collective consent.

Smallholder quinoa growers as stakeholders. These key stakeholders live in and around the Altiplano town of Uyuni. Their links to the project originated through the community outreach services of **PROINPA** and, to a lesser extent, **UMSS**. Their full involvement only began after the project proposal was approved. That involvement has therefore grown within the project's first nine months from virtually nothing to its present level. Key players in this development have been **PROINPA**'s native Aymara- and Quechua-speaking liaison officers based in Challapata and Uyuni respectively. Their existing contacts in the region's villages have facilitated growth in local awareness of the importance of natural capital management for the quinoa crop. This has been achieved through a series of village meetings, workshops and other events. By March 2025, individual stakeholders were in active contact with the project, and particularly with the **Permaculture Association**'s representative, and growth in that communication traffic is expected in the coming months. As the project Steering Group gathers

momentum, villagers will be encouraged and expected to become increasingly involved in project management, **M&E**, and decision making.

Bolivian and UK partner representatives attended an open day for the school in Chita, the village chosen by **PROINPA** as the location for its planned Permaculture Centre on the Altiplano (see also section 3.2 Output 2). The school is fortunate to be led by Sra Zuazo, a dynamic and forward-looking teacher. We were very agreeably pleased to see how much of relevance to this project was already being taught, and how strongly and positively the children were influencing their parents. As an important person in her community, and as a member of the project's Steering Group (see below), Sra Zuazo has been invited to visit the UK. She hopes to stimulate and inspire her pupils with what she sees, and to make this school a model for others on the Altiplano in its teaching about poverty alleviation through biodiversity conservation and sustainable resource management.

Bolivia's CBD National Focus Point as a stakeholder. Because of his position within Bolivia's civil service, the remaining stakeholder is a special case. He provided a letter in support of this project's original application, and so can be considered sympathetic to its aims. The core team, however, recognizes that people in such positions are often inundated with communications, and that adding unnecessarily to that flood could be counter-productive. Project policy has therefore been to maintain contact, but only when essential and, ideally, when reasons for contact are wholly positive. In that respect, frequency of contact is expected to rise in the project's final year.

3. Project progress

3.1 Progress in carrying out project Activities

Project activities are referenced by their logframe number in bold within square brackets.

Output 1 activities [strains and consortia of fungi and bacteria with potential for enhancing quinoa crops] (see photos 01-09 and 21 in evidence attachment)

Since the project's start, the Altiplano has been visited several times by Bolivian team members for sampling. Partner representatives from Mexico and the UK participated in November/December 2024 and March 2025 fieldwork. Advised by the project's local native Aymara- and Quechua-speaking liaison officers, and with prior agreement from farmers involved, long-term quinoa cultivation sampling plots have been selected. The principal sites are near Chalgua, Chita and Keasa. These make it possible to collect specimens from fields where quinoa is actively grown and from adjacent fallow land. They include sites where the crop is grown organically, and sites where chemical treatments have been used. They also include sites assessed by local farmers as favourable for quinoa or extremely harsh. Replicated labeled collections of soil, roots and rhizosphere, and stems and leaves of quinoa plants have been made at each site. Exact locations, dates of collection, and names of collectors have all been recorded [**1.1(1)**].

On return to the laboratory after each trip, collections have been processed promptly. Quinoa-associated fungi and bacteria have been isolated into pure culture using a range of techniques and growth media. Where possible, preliminary identifications of the fungi have been made to genus level using classic morphology and developmental characters. Isolates from samples collected in March 2025 are being grown additionally on specialized media favouring selective isolation of extremophile organisms [**1.1 (2)**]. Samples have also been used for physicochemical assessments [**1.1 (3)**].

Work has begun on nucleic acid extraction from cultures, in preparation for identifications using molecular techniques and subsequent metagenomic analysis [**1.1 (5)**]. Kits and equipment for this work have been delivered from the UK to Bolivian partners, with the aspiration of developing in-country capacity for molecular work [**1.1 (4)**]. In vitro work has begun to determine which fungal strains have potential to enhance crop resilience [**1.1 (5)**]. All of these activities are scheduled to continue in the coming months, while the remaining activities for **Output 1** are planned to begin in the second year of the project.

Output 2 activities [outreach and support programme for natural capital management by traditional altiplano quinoa-growers] (see photos 10-18 in evidence attachment)

In late 2024, meetings were organized and held in Chalgua, Chita and Puqui, three quinoa-growing villages on Bolivia's altiplano (see map). Where possible, particular attention was given to womens' groups within those villages (e.g. the 'Club de Madres' in Chita). Workshops and other events related to this project were also held in various villages, including Catuyo, Chacala, Chita, Puqui and Keasa. Further meetings were held with local groups linked to cultivation practices (Abono Puqui, Agricultura y Tradición, Communidad Chita, Preparado Abono Orgánico, and PROINPA-AVSA), to local agricultural businesses (AVSA), and at local schools (Franz Tamayo School, and Eduardo Abaroa School). Significantly, an 'ayllu' meeting was also held ('ayllu' is a special Bolivian word denoting traditional tribes, perhaps best thought of as similar to Scottish clans). Ayllu meetings are highly influential particularly at a local level, so this involvement was a very positive step. Attendants at all of these events were informed about the project, and a discussion was initiated about local priorities and needs [**2.1 (1)**].

Village meetings were also used to elicit representatives for the project's Steering Group, which was duly established [**2.2 (1)**]. All Steering Group members have mobile 'phones and are familiar with the technology, so this has been the medium for initial activities, with the project supporting usage costs. A formal meeting in Cochabamba has not yet been possible because extreme weather conditions in March 2025 blocked the main and only direct road between the altiplano and Cochabamba, resulting in some slippage in timing of these activities. That meeting is now planned to be held at **PROINPA** (Cochabamba) in May 2025 [**2.2 (2)**].

In consultation with villagers in general and the Steering Group in particular, the project has begun reviewing specific collective facilities needed at village level to enhance quinoa production [**2.3 (1)**] and to support village school education in biodiversity. In March 2025, a digital microscope for use with a laptop and 20 magnifying glasses were delivered to the local school in Chita, and (to the delight of pupils) the microscope was successfully installed and has gone into use [**2.4 (1)**]. In our workplan, activity **2.3 (1)** is listed as continuing well into the project's second year, and activity **2.4 (1)** is listed as continuing to the end of the project.

In respect of natural capital management, fieldwork has also included searches for additional candidate companion plants and potential cover crop species to reduce current fallow land practice, and pilot studies have been carried out combining associated organisms and permaculture methods to enhance quinoa crop resilience.

Output 3 activities [capacity development for national CBD focus point] (see photo 19 in evidence attachment)

Three Bolivian graduates have received initial training in identifying information sources, and digitizing and editing the records they contain [**3.1 (1)**]. All are now actively carrying out this work, and two have been selected to visit the UK for further training. Prioritizing two very old but pioneering checklists of Bolivia's fungi published in the 1940s and 1960s, over 1500 new records have already been keyboarded and edited through this work, which is actively supervised by the project leader [**3.1 (2)**]. Preliminary lists of publications about Bolivia's fungi and bacteria have also been compiled, and these will inform selection of future information sources for keyboarding.

GBIF's Bolivian fungi records have been downloaded, and the downloaded copies have been restructured to make their ecological association data usable (see comments about GBIF's database design in section **3.2 (Output 3)** below). Locality information within both newly keyboarded and GBIF records has been checked and edited. This will enable reliable automatic generation of latitude and longitude data through look-ups to linked databases of place names. The in-house programs which will produce project distribution maps have been updated (see *.jpg* in evidence attachments): commercial mapping systems provided by Google and Microsoft have been abandoned in favour of OpenStreetMap which operates under creative-commons copyrights.

The past nine months have also seen intensive work to ensure compatibility between project-generated data and the world's principal on-line nomenclators for fungi, and for animals and plants (their most frequent associated organisms). The value of data lies less in individual pieces of information, and far more in the links between them. The literally millions of links established thanks to this compatibility editing are adding enormous value to project databases.

There has also been similar work on nomenclatural and taxonomic data for chromists and protists, prioritizing those traditionally studied by mycologists, and for archaea and bacteria.

In addition, the project leader has contributed to the *Global Strategy for Fungal Conservation* and *Contribution of Fungi to the Global Biodiversity Framework*, two documents currently in preparation through the IUCN Species Survival Commission's fungal specialist groups. The *Global Strategy for Fungal Conservation* will provide a fungal equivalent for the existing *Global Strategy for Plant Conservation* already in use by the CBD. The *Contribution of Fungi* document explains in language accessible to an educated lay-person why the internationally agreed targets of the Kunming-Montreal Global Biodiversity Framework can only be achieved if fungi are taken into account.

All other activities linked to this output are scheduled to start, at the earliest, in the last quarter of year two of this project. Those aimed at producing a new on-line presence for Bolivia's fungi and bacteria will use existing expertise. Production of advice for the country's CBD National Focus Point about conserving its fungi and bacteria will be pioneering. The necessary thought and planning to realize that has begun and will continue in the coming year. Experience gained from similar activities in the sister Darwin project in Sub-Saharan Africa [30-020] will help guide that work.

General activities

M&E and gender equality. Core project staff (i.e. representatives of each project partner) have been alerted to the gender-equal character of the project, and its **M&E** procedures. This has included drawing attention to relevant policy guidance, and training both in person and on-line. Each representative has explicitly confirmed they understand the issues and agree with this aspect of project policy [**General (1)**]. Where appropriate, disaggregated measurables are being gathered, and an on-line resource has been set up to encourage all core staff to carry out active monitoring and evaluation [**General (2)**]. Four of the five graduates employed in the past nine months under the project's gender-neutral recruitment policies are women [**General (4)**]. See also section 6 below.

Liaison in biodiversity conservation. In September 2024, Bolivia's CBD National Focus Point was invited to support the pioneering pledge about fungi launched at COP16 (Colombia, October 2024) by the Chilean and UK governments [**General (3)**]. See section 16 below for more information on how this project responded to that unique opportunity, and what is happening as a result.

3.2 Progress towards project Outputs

Output 1

This output focuses on collecting strains and consortia of fungi and bacteria from the traditional heartlands of quinoa cultivation on Bolivia's Altiplano, and assessing their potential for enhancing quinoa crops.

Baseline condition. At the start of the project, the laboratories of the two Bolivian partners (**PROINPA** and **UMSS**) had: facilities for processing samples, for preparation of culture media, for isolating fungi and bacteria into pure culture, and for storing those cultures; staff with the expertise necessary to carry out this work; living collections of these organisms growing in pure culture. They did not, however, have a collection of cultures of fungi and bacteria explicitly and specifically associated with quinoa and its crop environment, nor did they have resources to collect samples necessary to produce such a collection, nor consumables needed for carrying out the new work. One **PROINPA** and three **UMSS** team members had experience in molecular biology techniques, but both laboratories lacked equipment essential for actually carrying out the work. The laboratory at **UAEM**, the Mexican partner, was in general better equipped, particularly for cultural work, but lacked some molecular equipment. Collectively, all three laboratories lacked a computer with the processing power to carry our the project's molecular analyses.

Change recorded to date. Funds to pay for fieldwork and laboratory consumables have been delivered to the Bolivian and Mexican partners. As a result, sampling work has been possible. By the end of March 2025, a collection of several hundred strains had been accumulated, and a

culture collection of quinoa-related fungi and bacteria had been established with active addition of new strains. It has also been possible to begin shortlisting individual isolates for properties which might be beneficial for quinoa cultivation. Some molecular equipment has been delivered to **PROINPA**, and some funding for molecular equipment has been delivered to **UMSS** and **UAEM**. Following agreement between all partners, **UAEM** has also received the funding necessary for buying the molecular analysis computer, which will be a shared asset.

Comment. To date, for Output 1, only SMART Indicator 1.1 is relevant. It promises at least 500 samples/specimens of fungi and bacteria with a subset of 200 selected for cultural/molecular work by the end of December 2025. By the end of March 2025, over 250 samples/specimens of fungi and bacteria had been accumulated, and work to select the subset had begun. Collectively, the core team is confident Output 1 will be achieved by the end of the project.

Output 2

This output aims to deliver an outreach and support programme for natural capital management by traditional Altiplano quinoa-growers.

Baseline condition. At inception of this project, **PROINPA** and **UMSS** already had an infrastructure for outreach and support to rural farming, but in both cases it was general and not specific for quinoa-growers. The project was therefore able to benefit from, for example, local liaison officers who were natives to the Altiplano, and who were native speakers of Aymara and Quechua. They brought to the project an informal network of contacts among Altiplano farming communities.

For quinoa growers themselves, there were already various collectives, but these tended and still tend to be focused on marketing the crop rather than on managing its natural capital, a nuanced but important difference. There were no activities aimed at developing bioproducts of any sort, and no concept that local people could be involved in management of any such development. Additionally, there was very low local awareness of possible benefits from organized sustainable resource management including composting and water harvesting.

Change recorded to date. To avoid confusions and duplication of effort, an early decision was made to work principally through the **PROINPA** infrastructure for outreach and support. Collectively, more than 800 local people (over 40% women) representing more than 750 households in quinoa-growing villages have been informed about the project. There is now a Steering Group with most members appointed by local people for managing this project's bioproduct development work. It currently contains ten members (three are women). Composition is as follows: two are the project's native Aymara- and Quechua-speaking liaison officers; another is the local schoolteacher in Chita; the remainder are villagers from Chacala, Chita, Puqui and Keasa. In negotiations with local government and representatives in Chita, and involving the representative of the project's **Permaculture Association** partner, **PROINPA** has obtained agreement to establish a pilot centre for organized sustainable resource management in that village, under the agreed banner of permaculture, and plans to realize this are currently in preparation. Significantly, the local authority has agreed to set aside land for this purpose. The project's native Quechua-speaking liaison officer and the local schoolteacher in Chita have been invited to visit the UK to see permaculture-based and other relevant sustainable resource management.

Comment. For Output 2, SMART Indicators 2.1, 2.2, 2.3 and 2.4 are relevant to date, all with December 2024 deadlines. The project has generally fallen slightly short of these targets, but not by much. Indicator 2.1 promised 1,000 people (about 50% female) / 350 households made aware of the natural capital value of fungi and bacteria associated with quinoa, and involved in their development. The project actually reached over 800 people (over 40% women) but they represented more than 750 households. Indicator 2.2 promised at least 10 community-selected representatives (at least 5 women) participating in the project's Steering Group. So far, the project has actually achieved a Steering Group with only three women representatives. Indicator 2.3 promised enhancement of 5 grower collective facilities. Although work on those facilities has started, it remains incomplete at the time of writing. Indicator 2.4 promised 100 resource items for five local schools. To date, just over 20 items have been delivered, and these only to one school. In all cases, the shortfalls are expected to be rectified in the coming months. We will organize additional village meetings and, in particular, we intend to increase

the proportion of women involved in the Steering Group. The local authority's generous gesture to set aside land for the new Permaculture Centre has been a great boost to morale. Supplying resources to schools is a delight and is, for those with the privilege of being present when they are delivered, emotionally satisfying. Collectively, the core team remains confident Output 2 will be achieved by the end of the project.

Output 3

This output aims to deliver capacity for Bolivia's CBD National Focus Point, by providing information and advice about Bolivia's fungi and bacteria suitable for use in the country's CBD national biodiversity strategies, action plans and reports. That means digitizing relevant information in a structured and usable form, and combining it with best-practice advice linked to CBD targets.

Baseline condition. The starting point was very low. Fungi are mentioned only twice in Bolivia's revised 2019–2030 NBSAP. Both are just isolated words in a diagram. Bacteria are not mentioned at all. Several thousand records of Bolivian fungi are available on-line from the GBIF website, but fundamental flaws in the design of its database limit their usefulness. Specifically, information about associations (for example between mycorrhizal fungi and the trees they support) cannot easily be uploaded, so most contributors simply do not bother. As a result, only a small proportion of GBIF records contain information about ecological associations. Furthermore, the way that information is stored within GBIF makes it inaccessible and difficult to use. This is a serious defect, because information about associations is essential not just for fungi, but for all ecological work. The USA's Mycoportal and Lichen Consortium databases have similar limitations. For bacteria, the situation is worse, with far fewer records in GBIF and no obvious alternative digitized sources.

Change recorded to date. The past nine months' work to ensure compatibility between project-generated data and the world's principal on-line nomenclators is providing a strong foundation for products expected in the project's final year. It is also enhancing many desirable mid- to long-term uses of this information, including computer-generated draft red-list assessments, lists of potential quarantine threats, monitoring of invasives, and similar outputs. These can only be produced by systems which adequately handle associations between species, a design strength of the Cybertruffle databases used in this project. The properly structured information gathered by this project will enable the enormous range of fungi and bacteria in this megadiverse country to be presented meaningfully.

In addition, the policy advice contained in the *Global Strategy for Fungal Conservation* and *Contribution of Fungi to the Global Biodiversity Framework* documents, combined with the infrastructural improvements described above, will become critically important during the later months of this project, particularly during output of the resources promised by this project for Bolivia's CBD National Focus Point. In sum, all change to date has been infrastructural and, so to speak, behind the scenes.

Comment. To date, for Output 3, only SMART Indicator 3.1 is relevant. It promises at least 10,000 previously undigitized records of fungi and bacteria uploaded to GBIF by the end of December 2026. By the end of March 2025, over 1500 previously undigitized records of fungi and bacteria had been keyboarded. The infrastructural changes described above are evidence of proactive preparations to satisfy SMART Indicators 3.2 and 3.3 when they come into effect at a later stage of the project. Collectively, the core team is confident Output 3 will be achieved by the end of the project.

3.3 Progress towards the project Outcome

Outcome. Conserving Bolivia's fungi and bacteria made realistic through new in-depth assessments and recommendations, with evidence of their crop resilience / poverty alleviation potential through a case-study in altiplano quinoa-farming communities.

Achieving this Outcome, first and foremost, means producing national assessments on the status of Bolivia's fungi and bacteria, together with conservation plans for each biological kingdom, and delivering them to the country's CBD National Focus Point. The assessments will need to be accessible, i.e. clear, concise, and understandable by an educated non-scientist. They will also need to be balanced and authoritative, i.e. backed by good quality information

and with clear indication of what is and is not known (much of this will inevitably be in annexes to the main text). Finally, they will also have to be accompanied by reasoned and convincing advice, particularly in respect of conservation. The foundation for these assessments will be the accumulated and digitized individual occurrence records, together with functioning links to biological nomenclators, links to locality databases, software to produce distribution maps and other diagrams, and access (ideally automated) to information about conservation threats and the red-list status of key associated organisms. Although a good start has been made, much remains to be done. The project's core team collectively believe SMART Indicator 0.1, which covers this part of the Outcome, will be achieved.

There are already promising signs that several of the fungal and bacterial strains isolated so far have potential to enhance quinoa crop resilience, and hence to help alleviate poverty. Although it is still early days, it seems likely that that part of SMART Indicator 0.2 will be met. Much more work remains to be done, however,to satisfy the second part of that Indicator. But the team can confidently affirm that all of this part of the work is on schedule.

SMART Indicator 0.3 requires active management of at least 10 community representatives (at least 50% women) to be involved in managing quinoa-associated natural capital. So far, a Steering Group with 10 community representatives (3 women) has been set up, but it has yet to start its activities. This part of the work is also on schedule, and information on how well this group is functioning will become available during the project's second year.

3.4 Monitoring of assumptions

Assumption 0.1. The Bolivian CBD national focus point will support this work (a formal letter of support has been requested and an oral reply suggests it will be forthcoming). **Comments**. The formal letter of support was supplied prior to this project's proposal submission.

Assumption 0.2. Fungi and bacteria suitable as bioproduct sources can be found, collected, cultured and used for development. **Comments**. Fungi and bacteria associated with quinoa have now been collected and cultured. They are currently being assessed to determine whether they are suitable bioproduce sources. Supposing at least some are suitable, it remains an assumption that they can be used for development.

Assumption 0.3. Meetings can be organized at times, in locations and at a frequency convenient for crop producer participation [quinoa farming communities are remote and sometimes inaccessible; liaison between meetings may also be difficult]. **Comments**. This is still relevant. The blocked road caused by floods and landslide between Cochabamba and Oruro in March 2025 showed that accessibility even over main highways can be an issue. Efforts to organize Steering Group meetings in person in the project's second year will doubtless provide useful experience. The use of mobile 'phones and social media is helping promote contact between Steering Group members.

Assumption 1.1. The long-term future of reference collections is secure. **Comments**. This is also still relevant; the issue will be reviewed during the forthcoming project year, including the possibility of submitting specimens and isolates to internationally recognized reference and culture collections.

Assumption 1.3. Where not already existing, suitable techniques for bioproduct development and manufacture can be established by participating scientists using their considerable pool of shared expertise. **Comments**. This assumption remains untested. Based on their experience with other products in the past, **PROINPA** staff believe bioproduct development and manufacture within their institution should be possible.

Assumption 2.1. Quinoa-growers are receptive to interaction with this project (existing close links with Bolivian partners make this a plausible assumption). **Comments**. In contacts and meetings so far in this project, receptive interaction from quinoa growers has occurred; the core team believes this is likely to continue.

Assumption 3.1, **3.2**, **3.3**. Procedures used over many years make work on this outpur low risk. Through previous Darwin Initiative and other projects, fungal and (to a lesser extent) bacterial records from many other countries have already been digitized. **Comments**. No change.

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

Impact, as in original application. Fungi and bacteria recognised in Bolivia's environmental laws and CBD strategies as organisms which merit conservation and are valued for the key ecosystem services they provide and their livelihoods-enhancing potential.

Project contribution to higher-level impact on biodiversity conservation. This project, and its sister project in Sub-Saharan Africa [30-020], are truly pioneering, with a profound and positive impact on biodiversity conservation: almost uniquely, they focus on fungi and prokaryotes. The CBD recognises the right of all species to live on this planet, but its achievements have fallen far short of that promise. National CBD conservation strategies and reports invariably deal overwhelmingly with animals and plants. CBD coverage of fungi [monitored on-line *www.fungal-conservation.org/micheli.htm*] remains virtually non-existent. The situation for the rest of biodiversity - archaea, bacteria, chromists, protists etc. - is even worse. This deficiency is serious: without checks and balances, the clock won't work; you cannot protect producers (plants) and consumers (animals) unless recyclers are also conserved.

Our work helps CBD member countries to rectify that failing. For Bolivia, the beneficiary country of the present project, help means providing the country's CBD National Focus Point with the means of including these neglected organisms. It will take the form of a concise but comprehensive document [see 3.3 above].

At this stage in the project, progress towards the impact has consisted of assembling a framework for that document, so that the team understands exactly what is needed. It has also involved accumulating the necessary data. All of this is infrastructure development, something which is not externally visible. Additionally, the project has accumulated a specialist collection of living cultures of bacteria and fungi, which adds an ex situ conservation element to the impact. Furthermore, both projects have provided very active support for the fungal pledge mentioned earlier. The pledge has antecedents in earlier Darwin projects about fungi, and is a ground-breaking advance at a political level towards delivering the same impact that inspires this project. For further comment, see also section 16 below.

Project contribution to higher-level impact on human development and wellbeing (poverty reduction). The impact described in the original application form of this project addresses human development and wellbeing indirectly, in the context of an aspiration for fungi and bacteria to be valued for the ecosystem services they deliver, and for their livelihoods-enhancing potential.

For animals and plants, links between poverty and biodiversity decline are often obvious, direct and easily observed. For fungi and bacteria, that is rarely the case. Links certainly exist, and in many cases they are at least as significant, but because fungi and bacteria lack the cuteness of flowers, fur and feathers, and because they are often inconspicuous, indirect and not easily observed, public and political awareness of their importance is very low.

Many of the benefits provided by fungi and bacteria relate to recycling. Privileged humans take urban waste collection for granted. It is something which goes on unnoticed in the background. Its importance is only recognized when refuse collectors go on strike. Fungi and bacteria are nature's refuse collectors. Sustainable life on this planet depends on them. But they too are vulnerable to climate change, and that vulnerability is likely to show itself first in places most affected by global warming. That's where the world's poor live. Bolivia is one of the countries most affected by climate change. This project contribution to the impact is to ask the question, "why, when they are so important for human wellbeing, are so few resources directed to biodiversity conservation of fungi and bacteria?"

4. Project support to the Conventions, Treaties or Agreements

In the past nine months, project support to the Conventions has focused principally on the CBD, and in particular in respect of the COP16 pledge on fungi issued by the Chilean and UK governments. For further information, see section 3.1 General activities, last paragraph, above, and section 16 below.

5. Project support for multidimensional poverty reduction

This project works principally in Bolivia, which is a Lower Middle Income country.

Expected beneficiaries are Altiplano communities of quinoa growers. The project aims to help them by surveying quinoa-associated bacteria and fungi, evaluating them for potential use and, if a suitable strain is found, using them to develop a crop-enhancing bioproduct. Most members of the project's Steering Group are from these Altiplano communities. This encourages and enables those communities to maintain an interest in and ownership of this resource. Additional broader help is being provided by **PROINPA** and the **Permaculture Association** through education and introduction of sustainable techniques for local agriculture, particularly for composting and water management.

Active engagement with these local communities (see section 3.1 Output 2 activities above) has led to meetings in different villages and with different sectors within and between those communities. Those sectors have included women, businesses, NGOs, schools (parents, pupils, teachers), and ayllu ('tribal') groups. Care has been taken, particularly when interacting with women's groups, to provide an environment and audience where they are likely to feel able to express their views. Listening to them has enabled the project team to learn about and understand their needs and the wider needs of their communities [**SMART Indicator 2.1**].

No major direct poverty impacts have yet emerged from this project, but new and upgraded greenhouses and delivery of new equipment from the project will start to deliver change in the coming year [**SMART Indicator 2.3**]. Adaptation to sustainable agricultural practices and delivery of greater crop resilience/yield by the anticipated bioproduct will take longer. No measurable poverty impact from this has yet occurred. Local schools are being supported to deliver greater awareness of wildlife in their pupils [**SMART Indicator 2.4**]. Participation in the Steering Group is providing village representatives with increased experience in community governance [**SMART Indicator 2.2**].

6. Gender Equality and Social Inclusion (GESI)

GESI Scale	Description	Put X where you think your project is on the scale
Not yet sensitive	The GESI context may have been considered but the project isn't quite meeting the requirements of a 'sensitive' approach	
Sensitive	The GESI context has been considered and project activities take this into account in their design and implementation. The project addresses basic needs and vulnerabilities of women and marginalised groups and the project will not contribute to or create further inequalities.	
Empowering	The project has all the characteristics of a 'sensitive' approach whilst also increasing equal access to assets, resources and capabilities for women and marginalised groups	**X**
Transformative	The project has all the characteristics of an 'empowering' approach whilst also addressing unequal power relationships and seeking institutional and societal change	

See also section 3.1 above, and the response to question 16 in our original application. For **GESI** matters, in addition to Darwin Initiative guidance, this project is also informed by the *UN Women Strategic Note Brochure for Bolivia, 2022–2026* [www.unwomen.org/sites/default/files/2023-10/un-women-strategic-note-brochure-bolivia-2022-2026-en.pdf]. The project's Leader and Safeguarding Focal Point have both read this document and the World Bank report "*Gender Dynamics and Climate Change in Rural Bolivia*" cited in the original application, and we accept and subscribe to the principles and policies described. All core project staff (i.e. the representatives of each partner) are aware of the Darwin Initiative aspiration for **GESI**-sensitivity, and have explicitly indicated support for that aspiration. Within the present project, realizing **GESI** involves considering two separate groups of people. One group (employed team members) is small in number, works largely in laboratory / institutional environments, and is easily contactable; the other (rural quinoa-growers) is legion, highly dispersed, and contact is infrequent.

Employed team members. These include two Aymara people (one is a partner representative), and two Quechua people (one a senior scientist); one of the five partner representatives is a woman; both financial administrators (based in **PROINPA**) are women; of the 12 project scientists (graduate level and above) based in Bolivia and Mexico, seven are women. For this group, **GESI** policies are routinely applied, particularly for employment conditions and career prospects.

Rural quinoa-growers. Applying **GESI** policies to this group is more difficult. Project management tries to take into account core **GESI** principles (rights, practice, environment, roles and responsibilities, representation, and resources). In practice, this has translated into ensuring women have the opportunity to speak in an environment where their views can be expressed without fear, listening to those views, ensuring project activities take account of those views, and seeking to include women in decision-making groups. A fuller list of actions we intend to carry out can be seen in our response to question 16 in the original application. Experience over the past 12 months has reinforced our supportive attitude towards those actions.

7. Monitoring and evaluation

Overall responsibility for **M&E** lies with the Project Leader. Administration and day-to-day oversight is carried out by Ms Soliman, representative of the **Permaculture Association**.

Every core team member (i.e. the representatives of every partner) has a shared responsibility to ensure those parts of project work for which they are responsible are subject to adequate **M&E**. Ms Soliman has designed a system enabling core team members to review and update progress in their areas, and has made it available on-line. She has also organized training to ensure that users know how to use it. Project progress is reviewed in person, informally but on at least a weekly basis, by the Project Leader and Ms Soliman. It is also reviewed in person more formally, but less frequently, when Bolivian and overseas partners meet. Up to now, this approach has seemed suitable and adequate for the needs of this project, and no change has been made to our **M&E** plan since the project was approved.

The project's logframe and workplan were scrutinized during the application process, so Activities and Outputs listed there are already agreed as likely to contribute to the Outcome. Our job is therefore to look out for signs of failure, and to be particularly vigilant when unlisted activities are taken on which have not benefited from that peer review.

Outputs 1 and 3 both have quantitative indicators of achievement (numbers of samples, isolates, species, digitized records etc.). Qualitative indicators for Outputs 1 and 3 are less straightforward. Examining petri dishes with growing cultures revealed little and often no contamination, providing evidence that sterile technique is probably satisfactory. Animated discussion between partners, for example about which nutrient media to use, and for what purposes, suggests a lively and intellectually rigourous approach is being maintained. Quality of keyboarded data has been satisfactory. Factors like these indicate that work on these two Outputs is currently on track.

Output 2 has quantiative indicators, and they too are on track. In general, though, work for this Output is more qualitative. The atmosphere of village collective meetings attended by partners from the UK has been very friendly and positive. The women who participate seem unabashed and perfectly willing to make their views heard, though care is needed to be sure the women who participate and speak are representative of those who don't. This Output also feels like it is currently on track, but that evaluation is more subjective.

Up to now, no stakeholders have been involved in the project's **M&E**. If the screening work of Output 1 actually finds potentially useful bacterial and fungal strains, this will have to change. The Steering Group will rapidly move to centre-stage, and will be expected to play an important and influential role in **M&E** for bioproduct development. Partly with that in mind, two members of that group have been invited to visit the UK in the coming months, and the Project Leader and Ms Soliman intend to use that visit as an opportunity to prepare them for the **M&E** work the Steering Group will be expected to deliver.

8. Lessons learnt

At present there are no plans to submit a Change Request for this project. Our core team accepts and subscribes to continuous improvement and adaptive management as important tools for delivering results. Like any such ventures, this project has experienced 'ups' and 'downs' - queuing hours for petrol in some small remote Altiplano town, for example, isn't much fun - and doubtless, more will come along before the work is over. In its first nine months, the 'downs' were infrequent and generally mild, and experience from earlier projects (and from life in general) was enough to deal with most of them.

Only one was bad enough to evoke a sense that lessons needed to be learned: financial conditions inside Bolivia are more parlous than anyone in the team realized, local partners included. The lesson learned from this was, for the remainder of this project, where possible, to give financial transactions involving Bolivia a greater lead-in time. This one problem had two principal impacts. They are described below. Workarounds were found for both. Though far from ideal, they have been effective and sufficient to keep the project going.

First, it has so far been impossible to deliver project funds directly to **UMSS**, one of the project partners. Apparently, a regulation imposed by the Bolivian government forbids the university from accepting foreign money into its regular accounts. Even the partner's representative, Prof. Guzmán, who holds a senior position at the university, was unaware of it. The result was that funds sent by bank transfer to the university's account were rejected. They went all the way to Bolivia, and came all the way back. Apart from charges levied by intermediary banks for the

privilege of not delivering this money, nothing was actually lost. Prof. Guzmán believes there is a way round this obstacle, but up to now it has not been found. To deal with the fallout from failed fund delivery, a Change Request to delay payment for a major item of equipment had to be submitted to Darwin, and was duly approved. Ameliorative measures were also needed simply to get money for fieldwork and related resources into the country. That involved the Project Leader carrying US dollar bills and passing them in person to Prof. Guzmán. The Darwin Initiative was informed about this, the amounts moved in this way were well below import/export limits set by Bolivian customs regulations, and no money was lost through this procedure.

The second impact was that both Bolivian partners (**PROINPA** and **UMSS**) found it impossible to pay the charges (which must be paid in US dollars on-line) for UK visa applications and their concomitant interviews. A digital blockage occurs at the point where bank card details need to be entered. This seems to happen only with Bolivian bank cards. It is impossible for the applicant to progress further. The cause of the blockage is unclear, but doesn't seem to be a software fault. The problem has meant severe and continuing delays in getting visas, and considerable disruption of plans. No Bolivian participant has yet visited the UK. A workaround has now been found. The Bolivian applicant enters the system, gets a password, keyboards responses to all the questions relating to the visa itself then, at the point of payment, exits and sends the password to one of the UK partner representatives. They then go into the system with the same password, and make the payments using their own private plastic card. It's hardly ideal, but at least it works.

Other prompts about lessons learned. 'Doing things differently with hindsight'. More attention will be given to publicity and prominence of the Darwin logo. Development of specific project indicators, a better understanding of Darwin standard indicators and their use, and greater familiarization with the risk register and its workings will also be priorities. 'Recommendations to others doing similar projects or working in the same geographical area' is a good question. Work similar to Output 1, needs careful experimental design, with meticulous attention to controls, replicates, and the requirements of those statistical tests necessary to demonstrate significant results. For work similar to Output 3, robust and effective database design is essential, particularly in respect of handling associations between organisms. Output 2, with the fluidity so typical of work with people rather than things, is still at too early a stage for confident recommendations.

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

Section 6 of the half-year report submitted in October 2024 responded to all feedback points provided when this project was confirmed. In making that response, all project partners were consulted, and their views were taken into account. No subsequent issues have been raised.

10. Risk Management

No new fiduciary, operational, reputational or safeguarding risks have arisen in this project over the past 12 months, and no already-listed risks have materialized. The principal changes to this project's risk register have been in two areas: fieldwork safety, and (because the project involves visits to schools) interactions between project staff and children. Those changes were the result of greater understanding of how risk registers should function, and dealt with risks inherent in the project itself. They were not a response to the emergence of new risks. A copy of the most recent version of the project's risk register is attached.

11. Scalability and durability

For the present project's general scalability, see response to question 19b in the original application.

Many aspects of the present project and its sister project in Sub-Saharan Africa [30-020] are different from those of other Darwin projects. There is a focus on fungi and bacteria. The links between these organisms and poverty alleviation are simultaneously more complex and less immediately evident than those for animals and plants. For fungi and bacteria, extending successful practice to other nature reserves, and using arguments about benefits and costs to encourage buy-in by potential adopters feel less pressing than the urgent need to put in place

basic infrastructure taken for granted in animal and plant conservation. In short, the factors surrounding scalability and durability are different, and so therefore is this report's response to the present question.

Previous Darwin projects focusing on fungi and involving the present Project Leader (3-054 [round 1], 6-056 [round 5], 8-011 [round 7], 10-001 [round 9], 11-026 [round 10] and 16-008 [round 15]) have a good track-record in durability. The information they accumulated is still available on-line through the Cybertruffle databases (with simplified subsets in GBIF), and remains in daily use by conservationists and mycologists. The 2007 Darwin project 16-008 [round 15] marked a key moment in development of the fungal conservation movement, and its long-term impact has grown. The present project and its African sister project are similar in character to their predecessors.

Output 1. This is additionally scalable through increased capability and capacity of Bolivian partners to search for and develop sustainable crop-enhancing bioproducts, particularly in terms of molecular know-how and equipment. **Output 2**. It is too early to comment on any changes in respect of this Output. **Output 3**. For fungi, publication of the COP16 pledge has significantly altered scalability and durability perspectives for Output 3. This project, and its sister project in Sub-Saharan Africa [30-020], are already planning to help CBD National Focus Points in Bolivia and several Sub-Saharan countries. Other countries which have endorsed the pledge can be expected to show similar interest in national fungal conservation advisory documents and their ancillary information. During preparation of this report, there was an on-line meeting of key conservation-focused mycologists, including the Project Leader, the CEO of *Fundación Fungi*, the Chair of IUCN's Species Survival Commission *Fungal Conservation Committee*, and representatives of the *International Society for Fungal Conservation* and *International Mycological Association*. At that meeting, plans were initiated to extend fungal conservation outreach to other new CBD National Focus Points, and the draft advisory document structure in use by this project and its African sister project were adopted as a template.

12. Darwin Initiative identity (see photo 20 in evidence attachment)

The two papers published from thie project (listed below) both acknowledge Darwin Initiative support. The on-line Cybertruffle database pages have acknowledged Darwin Initiative support and have displayed the Darwin Initiative logo for over 15 years.

On 28 March, an on-line seminar entirely dedicated to this Darwin Initiative project, and lasting a little over two hours, was held at **PROINPA**'s headquarters. Darwin funding was clearly and prominently acknowledged. All partner representatives were present, and each delivered a presentation about their part of the work. There was also a guest speaker who provided an additional presentation on Bolivia's extremophile micro-organisms. **PROINPA** staff and visitors attended in person, but far more people attended on-line. The event attracted nearly 12000 views from more than 6000 different participants, and 55% of those were people who did not normally follow **PROINPA**'s social media page. The seminar has now been removed from the web, but **PROINPA** has a full copy as an archive. The high number of views and the extensive reach took the whole core team by surprise. Given that success, there are plans for other similar but larger and more widely publicised events during this project's second year.

All partners recognize that this project is distinct and has a clear Darwin Initiative identity separate from all other work they are involved with. It does not form part of a larger programme. Bolivian partners knew about the Darwin Initiative even before the initial partnership project which led to the present work. They are aware that it is funded by the UK government, and understand very clearly its character and the type of projects it supports. They have a very high opinion of the Initiative, and are simultaneously grateful and proud to have been entrusted with this project. The Initiative is also undoubtedly known more broadly among conservationists and in the biosciences. The interest evoked by the on-line seminar mentioned above suggests that a much wider audience extending beyond Bolivia is also aware of the Initiative's impacts, and participates when an opportunity is presented.

The project website has been prepared but has not yet gone live. As the outreach work of Output 2 gets under way, social media is expected to play a much more prominent role in this project. **PROINPA** in particular has an impressive track-record using social media to get its

message across, including on-line videos targeted at young people and where appropriate delivered in Quechua. The project has reached an informal agreement with **PROINPA** that one of its more savvy social media operators will devote time in the coming months to promoting this project on-line, with prominent acknowledgement of the Darwin Initiative.

13. Safeguarding

14. Project expenditure

All but one of the changes highlighted in the table below are less than 10% of their budget line; the exception (Operating Costs) is an amount small enough to be reasonably considered as covered by virement; accordingly, Darwin approval was not sought.

Table 1: Project expenditure during the reporting period (1 April 2024 – 31 March 2025)

Project spend (indicative) since last Annual Report	**2024/25 Grant (£)**	**2024/25 Total 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	202204			

Table 2: Project mobilised or matched funding during the reporting period (1 April 2024 – 31 March 2025)

	Secured to date	Expected by end of project	Sources
Matched funding leveraged by the partners to deliver the project (£)			staff costs, overhead costs and operating costs promised in the original proposal by **PROINPA**,**UAEM** and **UMSS**
Total additional finance mobilised for new activities occurring outside of the project, building on evidence, best practices and the project (£)			

15. Other comments on progress not covered elsewhere

No comments.

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

I agree for the Biodiversity Challenge Funds to edit and use the following for various promotional purposes (please leave this line in to indicate your agreement to use any material you provide here).

For fungal conservation, the CBD's COP16 meeting in Colombia last October was remarkable. The governments of Chile and the UK, jointly with the Chilean NGO *Fundación Fungi*, issued a special document called a pledge []. This drew attention to past neglect of fungi, and called on the CBD to increase greatly recognition and coverage of this key biological kingdom. The weeks before its publication saw intense activity from this project and its sister project in Sub-Saharan Africa [30-020]. The aim was to maximize international support for that groundbreaking initiative. Two courses of action were deployed.

The first was to ensure a confident and informed voice of support for fungi from inside the COP apparatus. That meant getting at least one mycologist onto a national delegation. In addition to alerting the Bolivian CBD National Focus Point about the pledge (see section 3.1 above), this project offered to cover costs for a Bolivian mycologist to attend COP as part of the country's delegation. Although that offer could not be taken up for reasons beyond the control of the Bolivian National Focus Point, a similar offer to Benin through our sister project resulted in project leader, Prof Nourou Yorou, joining that country's delegation. The result was that fungi had formal representation within a CBD event for the first time and, through Prof. Yorou, mycologists were heard speaking in favour of the pledge.

The second course was to encourage countries to add their names to the document. National focus points in every CBD signatory country received a personal e-mail from this project's leader, alerting them to the initiative, and encouraging them to support it. Personal e-mails were also sent to members of the *International Society for Fungal Conservation*, to mycological societies worldwide, and to many other individual mycologists, encouraging them to contact their CBD national focus points. At the time of writing, six months since COP16, twelve countries (Benin, Cambodia, Colombia, Costa Rica, Ecuador, Germany, Guinea, Mexico, Peru and Spain) have added their names. For sure, there were other considerations and factors at work, but every one of those countries had been contacted, and for at least two of them, this targeted lobbying was a deciding factor. Persuading two countries to endorse a CBD pledge at the cost of two or three hundred e-mails was a very successful example of citizen science in action.

Publication of the pledge was a key victory in the long and continuing campaign to bring fungi into conservations mainstream. That campaign had its origins in an earlier Darwin Initiative project, *Conservation of Microfungi: a voice for unprotected and vulnerable organisms* [16-008], which ran from 2007–2011. Until then, fungal conservation was no more than a few scattered voices of far-sighted individual scientists reporting population declines. Through an international meeting organized by that project in 2009, infrastructure was added, together with a new recognition that education and co-ordinated political action was necessary. Since then, the IUCN has recognized that conserving fungi is just as important as protecting animals and plants, the number of IUCN Species Survival Commission fungal specialist groups has quadrupled, the number of fungi on its red list has increased from just 2 to over 1300, and new specialist fungal conservation NGOs, including Chile's *Fundación Fungi*, have appeared. The Darwin Initiative has played a key role in taking fungi from obscurity to a central position in biodiversity conservation. That is something worth celebrating. [**no images, videos or graphics attached - visuals of the project are not appropriate - this is an achievement of the Darwin Initiative as a whole**]

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

Annex 1: Report of progress and achievements against logframe for Financial Year 2024-2025

Project summary	Progress and Achievements April 2024 - March 2025	Actions required/planned for next period
Impact Fungi and bacteria recognised in Bolivia's environmental laws and CBD strategies as organisms which merit conservation and are valued for the key ecosystem services they provide and their livelihoods-enhancing potential.	The pioneering work of this project on fungi and bacteria provides timely scientific support for the wider aims expressed for fungi in the pledge of the Chilean and UK governments to recognise the importance these organisms in biodiversity, and their key but undervalued role in poverty alleviation.	
Outcome Conserving Bolivia's fungi and bacteria made realistic through new in-depth assessments and recommendations, with evidence of their crop resilience / poverty alleviation potential through a case-study in altiplano quinoa-farming communities.		
Outcome indicator 0.1. CBD National Focus Point for Bolivia has first national assessments and conservation plans for fungi and bacteria (by end of March 2027) [**DI-C01**].	A huge amount of background infrastructural work has been carried out over the past nine months: tens of thousands and very probably hundreds of thousands of individual data elements have been reviewed, edited, checked and restructured in preparation for their anticipated use to deliver this indicator.	This background work needs to be continued. Additionally, work needs to start updating in-house output softward and drafting new programs needed for produging the promised documents and websites.
Outcome indicator 0.2. At least one fungal / bacterial strain with crop resilience / poverty alleviation potential identified, documented and under development as bioproduct (by end of March 2027) [**DI-C04**].	Hundreds of fungal and bacterial cultures have been acquired through sampling work. They are now being evaluated to shortlist strains for cultural/molecular work.	Evaluating strains using cultural and molecular techniques will form the key activity for this indicator in the coming year.
Outcome indicator 0.3. At least 10 community representatives (at least 50% women) involved in managing quinoa-associated natural capital [**DI-B05**].	A Steering Group has been established. Gender proportions need further attention.	Achieve the target gender balance; ensure the Steering Group functions effectively, particularly in respect of **M&E**.
Output 1. A collection of living strains and consortia of fungi and bacteria with potential for enhancing quinoa crops.		
Output indicator 1.1. At least 500 samples/specimens of fungi and bacteria directly associated with quinoa or collected from quinoa-growing environments, with a subset of 200 selected for cultural/molecular work (by end of December 2025) [**DI-C09**].	Hundreds of fungal and bacterial cultures have been acquired through sampling work. They are now being evaluated to shortlist the 200 strain subset to be used for cultural/molecular work.	Evaluating strains using cultural and molecular techniques will form the key activity for this indicator in the coming year.
Output indicator 1.2. 10 strains / consortia selected and tested in vitro for crop resilience / poverty alleviation capabilities (by end of December 2025) [**no DI metric**].	This work will only begin when the subset (see Output indicator 1.1 above) has been selected.	Start crop resilience / poverty alleviation tests on selected strains.

Output indicator 1.3. At least one experimental field test for each strain / consortium, including techniques, replicates, controls and results (by end of December 2026) [**no DI metric**].	This work will only begin when testing of the 10 strains (Output indicator 1.2) has been carried out.	If in vitro evaluations can be completed, start field tests.
Output indicator 1.4. At least one bioproduct under development (by end of March 2027) [**no DI metric**].	At the earliest, this work can only begin when (**and if**) a potentially useful strain emerges from the evaluations mentioned above.	This work is not expected to begin in the coming year.
Output 2. Enhanced capability and capacity for natural capital management by traditional altiplano quinoa-growers.		
Output indicator 2.1.1000 people (about 50% female) / 350 households made aware of the natural capital value of fungi and bacteria associated with quinoa, and involved in managing their development (by end of December 2024) [**DI-B05**, **DI-B07**].	More than 800 people (about 40% women) representing over 750 households have been made aware of fungi and bacteria as a natural resource, and, through their representatives, are in a position to manage development of crop-enhancing resources from them.	Further meetings to disseminate information and to obtain grower feedback on project progress.
Output indicator 2.2. At least 10 community-selected representatives (at least 5 women) participating in project's Steering Group (by end of December 2024) [**DI-B05**, **DI-B07**].	Ten community-selected representatives (three of them women) are participating in the project's Steering Group.	Further appointments to complete the gender balance are anticipated in the coming months.
Output indicator 2.3. Five grower collective facilities enhanced by quinoa shelterbelt and companion plant nurseries and other equipment (by end of December 2024) [**DI-A03**].	Fiver grower collective facilities linked to the project, including shelterbelt and companion plant nurseries, are now functioning.	Develop the new grower collective facilities, and check that they are delivering the desired young plants.
Output indicator 2.4. 100 resource items (books, hand-lenses, identification guides, microscopes, paper & pencils, posters etc.) for five local schools (by end of December 2024) [**DI-A03**].	25 resource items delivered so far.	Deliver more school resources.
Output indicator 2.5. 100 villagers trained in bioproduct use (by end of March 2027) [**DI-A01**].	Scheduled for later in the project.	Scheduled for later in the project.
Output indicator 2.6. 1000 people (about 50% female) / 350 households benefitting from improved sustainable agricultural practices [**DI-D11**], and reporting improved livelihoods (by end of March 2027) [**DI-D16**].	Scheduled for later in the project.	Scheduled for later in the project.
Output 3. CBD national focus point capability and capacity enhanced through new resources enabling coverage of fungi and bacteria in CBD strategies and reports.		
Output indicator 3.1. Estimated 10,000 previously undigitized records of Bolivian fungi and (as a pilot scheme only) certain bacteria, from reference collections, published sources and the case-study, digitized, edited, and their Darwin Core fields added to GBIF (by end of December 2026) [**DI-C16**].	Over 1500 previously undigitized records keyboarded so far.	More records will be digitized.

Output indicator 3.2. Two websites established (one for Bolivian fungi and the other, as a pilot scheme only, for Bolivian bacteria) based on those records (by end of March 2027) [**no DI metric**].	Scheduled for later in the project.	Scheduled for later in the project.
Output indicator 3.3. At least two (Fungi, Bacteria) and possibly up to five (Archaea, Chromista, Protists) biological kingdoms covered for Bolivia by detailed national-level assessments and, for the first time, considered for conservation, with breakdown by division, class, order, family, and by associated organisms (by end of December 2026) [**no DI metric**].	Scheduled for later in the project.	Scheduled for later in the project.

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

This logframe is unchanged

Project Summary	SMART Indicators	Means of Verification	Important Assumptions
Impact: Fungi and bacteria recognised in Bolivia's environmental laws and CBD strategies as organisms which merit conservation and are valued for the key ecosystem services they provide and their livelihoods-enhancing potential.			
Outcome: Conserving Bolivia's fungi and bacteria made realistic through new in-depth assessments and recommendations, with evidence of their crop resilience / poverty alleviation potential through a case-study in altiplano quinoa-farming communities.	0.1. CBD National Focus Point for Bolivia has first national assessments and conservation plans for fungi and bacteria (by end of March 2027) **[DI-C01]**. 0.2. At least one fungal / bacterial strain with crop resilience / poverty alleviation potential identified, documented and under development as bioproduct (by end of March 2027) **[DI-C04]**. 0.3. At least 10 community representatives (at least 50% women) involved in managing quinoa-associated natural capital **[DI-B05]**.	0.1. Copies of e-mails to National Focus Points with assessments attached; copies of assessments supplied by Project Leader. 0.2. Samples of potential new bioproduct(s); documentation of test results; photographic and video evidence of use. 0.3. Lists of equipment purchased through project; photographs and videos of their use. Agenda and minutes of project management meetings, including meeting attendance lists.	0.1. The Bolivian CBD national focus point will support this work (a formal letter of support has been requested and an oral reply suggests it will be forthcoming). 0.2. Fungi and bacteria suitable as bioproduct sources can be found, collected, cultured and used for development. 0.3. Meetings can be organized at times, in locations and at a frequency convenient for crop producer participation [quinoa-farming communities are remote and sometimes inaccessible; liaison between meetings may also be difficult].
Outputs: 1. A collection of living strains and consortia of fungi and bacteria with potential for enhancing quinoa crops.	1.1. At least 500 samples/specimens of fungi and bacteria directly associated with quinoa or collected from quinoa-growing environments, with a subset of 200 selected for cultural/molecular work (by end of December 2025) **[DI-C09]**. 1.2. 10 strains / consortia selected and tested in vitro for crop resilience / poverty alleviation capabilities (by end of December 2025) **[no DI metric]**. 1.3. At least one experimental field test for each strain / consortium, including techniques,	1.1. Reference collection records of accessions and their subsequent curation, with (as appropriate) images, identifications, preliminary suitability assessments and (for short-listed specimens only) cultures and sequences. 1.2. Documentation of strain/consortium assessment and selection processes. 1.3. Records of tests, including documentation of experimental design and results.	1.1. The long-term future of reference collections is secure. 1.3. Where not already existing, suitable techniques for bioproduct development and manufacture can be established by participating scientists using their considerable pool of shared expertise.

	replicates, controls and results (by end of December 2026) **[no DI metric]**. 1.4. At least one bioproduct under development (by end of March 2027) **[no DI metric]**.		
2. Enhanced capability and capacity for natural capital management by traditional altiplano quinoa-growers.	2.1. 1000 people (about 50% female) / 350 households made aware of the natural capital value of fungi and bacteria associated with quinoa, and involved in managing their development (by end of December 2024) **[DI-B05, DI-B07]**. 2.2. At least 10 community-selected representatives (at least 5 women) participating in project's Steering Group (by end of December 2024) **[DI-B05, DI-B07]**. 2.3. Five grower collective facilities enhanced by quinoa shelterbelt and companion plant nurseries and other equipment (by end of December 2024) **[DI-A03]**. 2.4. 100 resource items (books, hand-lenses, identification guides, microscopes, paper & pencils, posters etc.) for five local schools (by end of December 2024) **[DI-A03]**. 2.5. 100 villagers trained in bioproduct use (by end of March 2027) **[DI-A01]**. 2.6. 1000 people (about 50% female) / 350 households benefitting from improved sustainable agricultural practices	2.1, 2.2. Written reports and photographs of community meetings; agenda and minutes of committee meetings. 2.3, 2.4, 2.5, 2.6. Written reports and photographic evidence of courses, enhanced facilities and other resources; lists of participants; lists of delivered materials.	2.1. Quinoa-growers are receptive to interaction with this project (existing close links with Bolivian partners make this a plausible assumption).

	[DI-D11], and reporting improved livelihoods (by end of March 2027) **[DI-D16]**.		
3. CBD national focus point capability and capacity enhanced through new resources enabling coverage of fungi and bacteria in CBD strategies and reports.	3.1. Estimated 10,000 previously undigitized records of Bolivian fungi and (as a pilot scheme only) certain bacteria, from reference collections, published sources and the case-study, digitized, edited, and their Darwin Core fields added to GBIF (by end of December 2026) **[DI-C16]**. 3.2. Two websites established (one for Bolivian fungi and the other, as a pilot scheme only, for Bolivian bacteria) based on those records (by end of March 2027) **[no DI metric]**. 3.3. At least two (Fungi, Bacteria) and possibly up to five (Archaea, Chromista, Protists) biological kingdoms covered for Bolivia by detailed national-level assessments and, for the first time, considered for conservation, with breakdown by division, class, order, family, and by associated organisms (by end of December 2026) **[no DI metric]**.	3.1. GBIF website. 3.2. New websites; backed by Google Analytics use statistics. 3.3. Downloadable assessments.	3.1, 3.2, 3.3. Procedures used over many years make this work low risk. Through previous Darwin Initiative and other projects, fungal and (to a lesser extent) bacterial records from many other countries have already been digitized.

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. Each activity should start on a new line and be no more than approximately 25 words.)

General

General (1). At the outset, ensure core project staff understand gender-equal character of project and procedures for M&E, training where necessary.

General (2). Throughout project, monitor and evaluate work, disaggregating measurables by gender and, where appropriate, by household income level.

General (3). Maintain already established contact and dialogue with CBD National Focus Point.

General (4). Recruit graduate project staff on a gender-neutral basis, and train them (this may involve travel to UK).

Output 1 [strains and consortia of fungi and bacteria with potential for enhancing quinoa crops]

1.1 (1). Collect representative samples of all parts of quinoa plants, and from adjacent soils, companion plants etc., establishing and maintaining accessions information for all specimens collected.
1.1 (2). Examine samples microscopically, where possible identifying fungi present using classic morphology and developmental characters, and isolating fungi and bacteria using a range of culture media.
1.1 (3). Assess the physicochemical characteristics of the plant and soil samples.
1.1 (4). Identify isolated fungi and bacteria using molecular techniques.
1.1 (5). Carry out metagenomic analysis of the samples, shortlisting suitable strains / consortia.
1.2 (1). Using in vitro techniques, evaluate shortlisted strains / consortia for potential to enhance resilience (as biofertilizers, plant-growth promoters, protection against drought and salinity, etc.).
1.3 (1). Establish field test baseline parameters, including local quinoa crop yields (kg/ha).
1.3 (2). Carry out field tests of the ten most promising strains / consortia.
1.3 (3). Assess results for strains / consortia against established parameters.
1.3 (4). Select most suitable strain(s) / consortia for bioproduct development.
1.4 (1). Develop bioproduct.

Output 2 [outreach and support programme for natural capital management by traditional altiplano quinoa-growers]

2.1 (1). Through village meetings, explain project, and establish priorities for collective infrastructure, local school biodiversity-teaching needs, and a commitment to due care for project-donated equipment.
2.2 (1). Through village meetings, elicit Steering Group representatives.
2.2 (2). Hold inaugural meeting of Steering Group; establish its objectives, mode of operating (chair, secretary etc.) and meetings timetable.
2.2 (3). Ensure effective management of bioproduct development through subsequent meetings.
2.3 (1). In addition to already known infrastructural priorities, locate, obtain and deliver as many further collective facilities as possible for quinoa production.
2.4 (1). Locate, obtain and deliver biodiversity-teaching resources for local schools and, where invited and compatible with routine visits, contribute to classes on this theme.
2.5 (1). Visit each participating village several times to explain bioproduct(s) and train villagers in their use, and reinforce that training.

Output 3 [capacity development for national CBD focus point]

3.1 (1). Train researcher in Bolivia to identify sources of information about Bolivian fungi and bacteria, gather records from those sources, then digitize and edit them.
3.1 (2). Supervise work of the trained researcher in Bolivia, ensuring quality and compatibility.
3.1 (3). Avoiding duplicates, upload Darwin Core data of accumulated records to GBIF with copy to CABI.
3.2 (1). Design websites for Bolivia's fungi and bacteria, modelled on existing Cybertruffle websites for other countries and similar to those planned for Darwin Initiative project DIR29S2\1032.
3.2 (2) Make digitized records available on-line through the new websites, clearly acknowledging sources.
3.3 (1). Finalize specifications for national assessments of Bolivia's fungi and bacteria (currently in draft).
3.3 (2). Incorporate the digitized records in the fungal and bacterial assessments.

3.3 (3).	Incorporate information about ecosystems, and associated organisms, particularly those which are endemic or threatened, presenting the data from the perspective of fungi and bacteria.
3.3 (4).	Accumulate information about national awareness of fungi and bacteria among administrators and politicians, in education, and in the general public.
3.3 (5).	Accumulate information about how diversity of these organisms promotes wealth and well-being, and how its loss impacts poverty and gender issues.
3.3 (6).	Using accumulated information, prepare detailed draft assessments of Bolivia's fungi and bacteria, including proposed plans for their conservation.
3.3 (7).	Circulate those drafts to suitable colleagues for review and feedback and, based on comments received, prepare final versions.
3.3 (8).	Present finalized assessments to CBD National Focus Point, and make them available on-line.

Checklist for submission

	Check
Different reporting templates have different questions, and it is important you use the correct one. Have you checked you have used the **correct template** (checking fund, scheme, type of report (i.e. Annual or Final), and year) and **deleted the blue guidance text** before submission?	**Tick**
Is the report less than 10MB? If so, please email to BCF-Reports@niras.com putting the project number in the Subject line.	**Tick**
Is your report more than 10MB? If so, please consider the best way to submit. One zipped file, or a download option, is recommended. We can work with most online options and will be in touch if we have a problem accessing material. If unsure, please discuss with BCF-Reports@niras.com about the best way to deliver the report, putting the project number in the Subject line.	**N/A**
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.	**Tick**
Have you provided an updated risk register? If you have an existing risk register you should provide an updated version alongside your report. If your project was funded prior to this being a requirement, you are encouraged to develop a risk register.	**Tick**
If you are submitting photos for publicity purposes, do these meet the outlined requirements (see Section 16)?	**N/A**
Have you involved your partners in preparation of the report and named the main contributors	**Tick**
Have you completed the Project Expenditure table fully?	**Tick**
Do not include claim forms or other communications with this report.	