Darwin Initiative Main Project Annual Report

To be completed with reference to the "Writing a Darwin Report" guidance: (http://www.darwininitiative.org.uk/resources-for-projects/reporting-forms). It is expected that this report will be a **maximum** of 20 pages in length, excluding annexes)

Submission Deadline: 30th April 2018

Darwin Project Information

Project reference	3082
Project title	Sustaining biodiversity, livelihoods and culture in PNG's montane forests
Host country/ies	Papua New Guinea
Contract holder institution	Wildlife Conservation Society (WCS)
Partner institution(s)	Oxfam International, Individual Reform & Restoration Movement, KGWan Eco-Habitat, Miruma community
Darwin grant value	£299,959
Start/end dates of project	Apr 2016 – Mar 2019
Reporting period (e.g., Apr 2017 – Mar 2018) and number (e.g., Annual Report 1, 2, 3)	Apr 2017 – Mar 2018
Project Leader name	Ambroise Brenier
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1. Project rationale

To significantly and demonstrably reduce deforestation in the Bismarck Mountains of Papua New Guinea (PNG), strengthen local livelihoods, and conserve biological and cultural diversity, this project will improve agricultural practices, implement sustainable forestry and silviculture, reduce hunting pressure on threatened species, and retain and pass on traditional ecological knowledge to the next generation. Maps are provided in the attached Annex 4: Compendium Report (page 5).

2. Project partnerships

Memoranda of understanding (MoU) were signed in Year 1 with three community-based organisations (CBOs): IRRM and KGWan Eco-habitat in Gembogl District, Chimbu Province, and the Miruma (Namta) community in Daulo District, Eastern Highlands Province. The established CBOs of IRRM and KGWan Eco-habitat were supported since Year 1 through sub-grant awards to contribute to their organisational overheads and participation in Darwin initiative activities. Part way through Year 2, the Miruma community also received a sub-award from WCS. Prior to this the Miruma community was supported via direct funding of community activities through the Operating Cost budget line in WCS's overall budget. Miruma was initially excluded due to concerns about their ability to manage funds. In March 2018, the Miruma community formed a CBO named 1 U 5 and appointed a leadership team. WCS is currently assisting 1 U 5 to formally register their CBO with the PNG Investment Promotion Authority.

In Year 1, additional MoU were signed with Oxfam International (for agricultural support) and Man on Earth Ltd (to utilise a nearby nursery to trial native timber propagation methods). Also in Year 1, WCS signed and awarded sub-grants both to: the National Agricultural Research Institute (NARI), to undertake agricultural training and drought resistant plant propagation with the participating communities; and Oxfam International, to evaluate agricultural resilience in Gembogl in response to the 2015-2016 drought to inform our agricultural initiatives.

3. Project progress

3.1 Progress in carrying out project Activities

Objective 1: The introduction and uptake of improved gardening practices in three communities and an increase in the duration and life of garden areas

Activity 1.1: Increase the number of new gardening techniques that are taken up by communities in the project area

Underway. NARI submitted a finalised report to WCS in March 2018 which assessed food security in the three project communities with recommendations for the introduction of improved gardening practices (Annex 4: Compendium Report, Appendix 1). This report found a lack of knowledge of agronomic practices for commercial vegetable production, methods to guard against pest and disease and management of soil fertility, water resources and fertilizer application at Miruma. The Gembogl communities have a greater knowledge of these methods but identified a need for training on the management of soil fertility, water resources and fertilizer application. NARI is scheduled to undertake training on all gardening practices listed above between April and September 2018. Their training will include: improved management and production technologies for sweet potato, carrot and E2 potatoes; improved soil moisture conservation and soil fertility management practices for staple crops; training on how to grow a greater diversity of drought tolerant crops species and varieties (cassava, yam, rice, mung/soy beans); improved food processing technologies for livestock feed and domestic consumption; greater financial literacy skills for farmers; and pest and disease management. WCS's agricultural officer will attend these trainings and assist the local farmers and CBO agricultural officers in helping community members implement the training in their gardening practices.

Additionally, as part of the WCS commitment to building local (CBO) agricultural capacity, WCS sponsored Steven Yandime (KGWan) and Toppy Sundu (IRRM) and two WCS staff to attend an agricultural extension officer conference held in Goroka (10-12 September 2017). The purpose of such training was to familiarise the two CBO leaders and WCS staff with regional issues, local approaches, and agricultural techniques to facilitate the roll out of the NARI

training. Additionally, the conference provided an opportunity for the attendees to network with key government agencies (especially NARI), other community groups and NGO partners.

WCS has propagated the multi-use tree species *Causarina oligodon* for use as a nitrifying legume for fallow areas (1,400+ seedlings are currently growing in the WCS nursery). WCS has so far distributed 366 *C. oligodon* seedlings to Namnta community and will distribute the remaining in the next 12 months (see Agriculture initiatives, and Silviculture initiatives sections in the attached Annex 4: Compendium Report, for more detail).

Activity 1.2: Ensure activities are established in >300 households using new gardening techniques by March 2018

Underway. We have experienced delays in the implementation of this activity, however NARI has a variety of trainings planned in the three communities which will kickstart this activity over the next 6 months. WCS agricultural and community engagement officers, in collaboration with CBO agricultural officers and local famers, will attend these training sessions and ensure that full scale roll out of these techniques occurs over the next 6 months (see NARI's work plan in Annex 4: Compendium Report, Appendix 1). In addition, we have distributed E2 potatoes in the Gembogl District and *C. oligodon* seedlings in Miruma. Training has been provided to the communities for these crops.

Activity 1.3: Promote new techniques to ensure the duration of active garden areas is increased by 30% by March 2019 in comparison to baseline information from past practise

Underway. In their agricultural assessment, NARI determined that active garden duration in the study sites is 2-5 years. Garden lifespan therefore often exceeds the project length. We will consequently not be able to show a change over the length of the project. We therefore request that Activity 1.3 be changed to '*Promote new techniques such that a minimum of 150 gardens are maintained with improved practices by March 2019.*' The gardening techniques NARI will introduce in the next 6 months, which include improved soil moisture and management protocols should ensure the lifespan of gardens is increased substantially. WCS completed a baseline perception survey which will be used to monitor changes in farmer food security at the end of the project.

Objective 2. Introduction of new market crops for income generation, and introduction of pest and drought resistant varieties for subsistence use within all three communities

Activity 2.1: Work with Oxfam and local partners to promote a 50% increase in the number of marketable crops in gardens

Underway. WCS received a report from NARI in March 2018 identifying the current marketable crops in, Danbagl, Miruma and Womkama and assessing appropriate drought resistant crops for introduction. This supported the results of WCS' initial agricultural assessment at the start of the project. At Danbagl and Womkama bulb onion is the main marketable crop and appears to be grown by nearly all households. Miruma does not currently have a cash crop which attracts similar market prices. Before 2015 potato was the main market crop at Danbagl and Womkama, however it was destroyed by potato blight that year and has not been re-established. Both communities identified the establishment of blight resistant potatoes as a priority. NARI is therefore scheduled to establish E2 blight resistant potatoes in all three communities. Based on feedback from their survey and their own assessment, NARI also plans to establish blight resistant, early maturing sweet potato and cassava at each community. NARI is scheduled to complete this work over the next 6 months (see Annex 4: Compendium Report, section on Agriculture initiatives).

In addition, in April 2018, in partnership with Oxfam, WCS distributed fourteen 25 kg bags of E2 blight resistant potatoes to Danbagl and Womkama, and we provided training and assisted local farmers (11 at Danbagl, 8 at Womkama) in planting the E2 potatoes. WCS's agricultural officer also attended training by the Fresh Produce Development Authority (FPDA) on growing blight resistant potatoes. WCS has sourced blight resistant E2 potatoes from FPDA and is currently sourcing garlic and peas from FPDA to begin propagating at our office multiplication plot for distribution to Danbagl, Miruma and Womkama. Our expectation is that this work will supplement the activities NARI will undertake over the next 6 months and form part of WCS' long-term commitment to improve livelihoods in the Bismarck Range.

Activity 2.2: With the support of NARI introduce least 2 new pest and/or drought tolerant crop varieties

Underway. As mentioned in Activity 2.1, WCS has received a report from NARI and advice from Oxfam International identifying suitable drought and pest tolerant crops. NARI is scheduled to introduce blight resistant potatoes and blight resistant, early maturing sweet potato and cassava into the communities in the next six months. We introduced E2 blight resistant potatoes to Danbagl and Womkama in April 2018 and will introduce this crop to Miruma later in the year. WCS has established a multiplication plot at our office and will soon begin propagating E2 potatoes and drought resistant garlic and peas for introduction at the three communities. Additionally, WCS is currently propagating apples at our Goroka nursery.

Objective 3. Nursery practices for native tree species tested and established in two communities and active planting of areas with native species by the project end

Activity 3.1: Develop propagation methods for at least four native tree species in nurseries

Achieved. WCS has successfully devised and implemented propagation methods for 7 timber trees species which are now in the seedling stage at the WCS nursery: *Fragraea beteriana* (1,700 seedlings), *Fagraea salticola* (45 seedlings), *Dacrycarpus cinctus* (45 seedlings), *Casuarina oligodon* (685 seedlings), *Araucaria cunninghami*, (231 seedlings), *A. hunsteinii (25 seedlings)* and *Castanopsis acuminatissima* (9 seedlings). Three tree crop species have also been successfully propagated: *Ficus damaropsis* (209 seedlings), *F. copiosa* (1,333 seedlings), and *Pandanus jiulianetti* (252 seedlings). An additional two timber trees species are also undergoing germination trials (*Nothofagus sp. and Cryptocarya sp.*; see Annex 4: Compendium Report, Silviculture section).

Activity 3.2: Planting of native tree species in place of exotic species incorporated into land use plans by March 2018 with community nursery output exceeding 3,000 weather hardened native seedlings per community per year by project end.

Underway. WCS and our partner communities have developed seven reforestation and silviculture initiatives: two community woodlots at Miruma which at present cover 0.18 ha and 0.62 ha; and five riparian replanting sites, two at Miruma which will cover 1.47 ha and 2.82 ha by project end (planting has not yet begun for these), one at Danbagl which currently covers 0.4 ha and is scheduled to cover 6.62 ha by project end, and two proposed at Womkama which will cover 1.54 ha and 9.15 ha. These projects were developed with the community CBOs and have been incorporated into village land use plans. As nearly all land is owned by individuals in each community it has been difficult to establish community woodlots at Womkama and Danbagl. We will work with these communities to develop community woodlots during the upcoming sustainable land use planning and mapping activities which will be undertaken with the United States Forestry Service. This will begin when the US Forestry service hold a two day workshop with our partner CBOs and WCS in May 2018.

In total across the project nurseries, approximately 11,119 seedlings have been or are currently being raised. WCS worked with the Miruma community to build two permanent community nurseries, each with the capacity to produce more than 6,000 seedlings per rotation. Two smaller nurseries were built at Miruma rather than one larger one as WCS and the Miruma community determined that two smaller nurseries would allow for greater community participation in the silviculture program. These nurseries are currently in operation. So far 1223 seedling have been reared at Miruma, of which 197 have been weather hardened and planted. At the Danbagl (Miruma) nursery, 1600 native seedlings have been reared, weather hardened and distributed to community members and planted as part of the community water catchment reforestation program. At the Womkama (IRRM) nursery, 3,762 native plants have been reared, weather hardened and planted into the community to date. At the WCS Goroka nursery, over 4,500 seedlings are currently being reared. From this nursery weather hardened seedlings have been distributed and planted at the three communities: 273 weather hardened seedling at Danbagl (160 *Fagraea berteriana*, 70 *Ficus damaropsis*, 40 *F. copiosa* and 3 *Castanopsis acuminatissima*), 766 at Miruma (366 *Causarina oligodon*, *110 F. damaropsis* and 290 *F. copiosa*) and 360 at Womkama (260 *Araucaria cuninghamii* and 100 *Pandanus jiulianetti*).

Objective 4. Sustainable use of existing forest stands within remaining areas of native forests and planted areas of exotic trees

Activity 4.1: Work with local CBOs to reduce the number of native trees harvested compared to number of exotic trees harvested from already existing forest stands (Note: the aim is to shift stand diversity towards native trees by removing exotics.)

Underway. 50 individuals were surveyed in February 2018 at each community on the sale of five common timber species over the last year. Unfortunately, the timber sale section of the survey was incorrectly filled out by the community facilitators (CFs) who administered the survey at Danbagl and the data were not usable. At Miruma the sale of three native species (*Casuarina papuana, Casuarina oligodon* and *Nothofagus spp*.) averaged 54 PNG kina (PGK) per person per year (pppy), much higher than the sale of the two introduced species (non-native pine and *Eucalyptus*) at 18 PGK pppy. At Womkama a much larger amount of timber was sold: on average 326 PGK pppy of the three native species and 802 PGK pppy of the two introduced species. WCS will work with the CBOs during the land use planning workshops to encourage a greater rate of harvesting of introduced species and a replanting of native species where introduced have been harvested from. This is currently occurring through the reforestation initiatives outlined in Activity 3.2.

Activity 4.2 Secure more than 500 hectares under sustainable forestry practices as compared to baseline by March 2019

Staff from the United States Forestry Service will be visiting our project sites in May 2018. They will assist WCS and our partner communities in establishing sustainable forestry land use plans and practices. In total the communities have approximately 7000 hectares of intact forest. The communities have shown an interest in safeguarding these areas for future generations, so we believe this goal is achievable.

Objective 5. Capturing and passing on traditional ecological knowledge on forests and threatened species

Activity 5.1: Produce school curricula capturing local ecological knowledge in 3 primary schools in the project area by September 2017

Achieved. WCS collected local ecological knowledge based on interviews with regard to natural resource management and perceptions of the importance of forest and traditional ornamentation

at Danbagl, Miruma and Womkama. Supplementary curriculum support materials including a syllabus entitled “Making a living” with 7 supporting posters and a teacher’s guide, which included lesson plans that were distributed to the upper primary schools in the project area (see Annex 4: Compendium Report, Traditional ecological knowledge section).

Activity 5.2: Measure an increase in the number of school children that learn about their local culture and traditional ecological knowledge by March 2019

Ongoing. Baseline monitoring of student knowledge has been completed at Dangal and Womkama and will be completed in May 2018 at Miruma. Upper primary school teachers in the project will be teaching the syllabus over the next 12 months. We will resurvey students at the end of the school year at each school to determine if the curricula have led to an increase in child learning about their local culture and traditional ecological knowledge.

Objective 6. Minimizing impacts on hunted species by preserving local costumes and reviving traditional *tambu* (no hunting) areas.

Activity 6.1: Promote the uptake of improved preservation methods for fur and feathers in traditional costumes (termed bilas *in tok pisin)*

Achieved. A total of 785 bilas protection kits, consisting of heavy duty plastic, butcher papers, camphor mothballs, and Tok Pisin instructions, were distributed to the project communities. A further 810 kits were distributed during the 2016 Mt. Hagen show and the 2016 and 2017 Goroka shows (see Annex 4: Compendium Report, Natural resource management section).

Activity 6.2: Work to increase the area or number of tambu sites created or re-established in the project area by March 2019, or other compatible traditional management methods

Underway. Surveying has revealed that *tambu* areas in the project communities are not used as a land use management mechanism. WCS will use the land use planning activities (see Activity 4.2) scheduled for the next 12 months to explore the establishment of *tambu* areas or equivalent management methods. Given the absence of traditional land management practices in this region of PNG, this activity will likely focus around protection of water catchment areas.

Activity 6.3: Conduct baseline and end threshold surveys for key biodiversity indicator species, and establish monitoring procedures for birds of paradise.

Underway. Monitoring at each site (Danbagl, Womkama and Miruma) occurred from September to October 2017. The monitoring protocol took two weeks to implement in each location and included:1) 5 minute dawn bird counts incorporating a distance variable detection methodology; 2) camera trapping transects; 3) mist netting for birds; 4) village threshold surveys which record the species and weight of hunted animals consumed in households; and 5) hunter interceptions (recoding hunter captures when hunters are incidentally met while conducting the other field activities). This monitoring was repeated at Womkama in April 2018 and repeat monitoring will be undertaken at the other two sites in May 2018. A geographic information system (GIS) database was set up to store information on wildlife sightings. In total, over the two years and across methods, there were 1860 fauna sightings. In total 72 bird species, including two species of birds of paradise (Princess Stephanie's astrapia (*Astrapia stephaniae*) and the brown sicklebill (*Epimachus meyeri*)), the Endangered Papuan eagle (*Harpyposis novaeguinea*), 20 mammal species including the Endangered Goodfellow’s tree kangaroo (*Dendrolagus goodfellowi)*, Vulnerable New Guinea pademelon (*Thylogale stigmatica*), the Near Threatened plush-coated ringtail possum (*Pseudochirops corinna),* pygmy ringtail possum (*Pseudochirulus mayeri*) and lesser forest wallaby (*Dorcopsulus vanheurni*) were observed. The

5 minute bird count proved to be an effective monitoring procedure, with 103 recordings of the 2 bird of paradise species recorded in 2017.

Threshold surveys in which hunter caught animals are intercepted at households occurred at the three communities over a two week period. These surveys revealed wild hunted animals to be an important source of protein for villages, with 21 wild caught animals consumed. The majority of animals caught were small birds caught near the villages. Evidence of hunting of the Endangered Goodfellow's tree kangaroo (*D. goodfellowi* was recorded at each site: at Danbagl two individuals of the species were caught by intercepted hunters; at Miruma two Goodfellow's tree kangaroos were recorded in household threshold surveys; and at Womkama one hunter reported killing seven Goodfellow's tree kangaroos between January and March 2017. Tree kangaroos are long-lived species with a low fertility rate and are listed on the IUCN Red-List as Endangered due to overhunting. Overexploitation of this species is therefore likely occurring at the 3 sites. A number of cuscus were also hunted. it is possible that these species are also being overexploited, as they appear to be overhunted in other areas of New Guinea(see Annex 4: Compendium Report, Natural resource management section).

3.2 Progress towards project Outputs

Report on how overall progress has been made towards the project Outputs and how likely the project is to achieve them by its close. Address each Output in turn, identifying the baseline condition, change recorded to date, and the source of evidence for this change. Please comment on how you are measuring the Output indicators and whether these are still the best indicators. Please substantiate comments with evidence and use indicators to support progress towards Outputs.

Output 1. The introduction and uptake of improved gardening practices in three communities and an increase in the duration and life of garden areas

1.1 Number of new gardening techniques that are taken up by male and female community members in the project area by March 2018 and by March 2019

WCS has taught new gardening techniques in association with the propagating of E2 potatoes in Gembogl district and *Causarina oligodon* in Miruma. NARI has completed a full agricultural assessment and developed a set of training interventions for the next 6 months which includes: improved management and production technologies for sweet potato, carrot and E2 potatoes; improved soil moisture conservation and soil fertility management practices for staple crops; training on how to grow a greater diversity of drought tolerant crops species and varieties (cassava, yam, rice, mung/soy beans); improved food processing technologies for livestock feed and domestic consumption; greater financial literacy skills for farmers; and pest and disease management.

1.2 At least 300 households using new gardening techniques by March 2018

As detailed above in section 3.1, achievement of this outcome has been delayed. NARI's training program will be undertaken over the next 6 months and WCS will work with the communities of Danbagl, Miruma and Womkama to ensure new gardening techniques are being used by at least 300 households by project end. As mentioned in Activity 2.1 under section 3.1, WCS and Oxfam International have begun introducing new gardening techniques for E2 potatoes and *Causarina oligodon*. Training to cultivate E2 potatoes has so far been provided to 19 households. These members will work with WCS agricultural officer and the CBOs to distribute and train others in the community over the next 12 months. WCS is also working towards training the communities in the production of drought resistant varieties of garlic and peas. WCS has also introduced a number of new propagation methods to the community, CBO foresters have been trained in these methods and are sharing these methodologies with interested

community members (see Annex 4: Compendium Repot, sections on Agriculture and Silviculture initiatives).

1.3 Duration of active garden areas increased by 30% by March 2019 in comparison to baseline information from past practise

As mentioned in Activity 1.3 under section 3.1, the baseline duration of active garden areas is longer than the project lifespan. We therefore request that Outcome 1.3 be changed to '*Introduction of new techniques to a minimum of 150 households to ensure the duration of active garden areas will increase by project end'.* NARI's training and the subsequent support that WCS and the village CBOs will provide should ensure improved gardening practices lead to an increase in active garden duration that can be measured under this revised indicator (see Annex 4: Compendium Report, Appendix 1 for NARI's work plan).

Output 2. Introduction of new market crops for income generation, and introduction of pest and drought resistant varieties for subsistence use within all three communities

2.1. A 50% increase in the number of marketable crops in gardens in project areas by March 2019.

Through WCS's survey and NARI's report it has been determined that Miruma does not have a commercial crop and Danbagl and Womkama have one (bulb onions). In partnership with Oxfam we have introduced blight resistant potatoes to the Gembogl sites. The establishment of this crop will represent a 50% increase in the number of marketable crops at these sites. We will introduce this crop to Miruma in the next 6 months. In addition, NARI have identified pathogen tested clean sweet potatoes and blight resistant potatoes as having commercial potential and will introduce these to our partner communities in the next 6 months (see Annex 4: Compendium Report, Appendix 1 for NARI's work plan).

2.2 At least 2 new pest and/or drought resistant crop varieties introduced by March 2018

This output has been delayed. However, as mentioned, NARI is scheduled to introduce multiple new pest and/or drought resistant crops within the next 6 months (see Annex 4: Compendium Report, Appendix 1 for NARI's work plan). WCS and Oxfam have introduced blight resistant E2 potatoes to the Gembogl sites and will be distributing this crop and others to all communities over the next year. WCS will submit a change request to switch the introduction date for indicator 2.2 to September 2018.

Output 3. Nursery practices for native tree species tested and established in two communities and active planting of areas with native species by the project end

3.1 Successful propagation of at least four native tree species in nurseries by March 2018

WCS has successfully propagated 7 timber and 3 tree crop species. No change to indicators.

3.2 Planting of native tree species in place of exotic species incorporated into land use plans by March 2018 with community nursery output exceeding 3,000 weather hardened native seedlings per community per year by project end

WCS is on track to meet this output with approximately 9428 seedlings planted so far. Community nusery output is on track to exceed 3,000 weather hardened seedlings per community per year by project end. Planting of native trees have been incorporated into community land use plans through the reforestation and silviculture initiatives outlined in

Activity 3.2. Land use plans will be mapped and developed further over the next 12 months. No change to indicator.

Output 4. Sustainable use of existing forest stands within remaining areas of native forests and planted areas of exotic trees

4.1 Reduced area and number of native trees harvested compared to number of exotic trees harvested from already existing forest stands by March 2019 (Note: the aim is to shift stand diversity towards native trees by removing exotics.)

Baseline total forest loss between 2001 and 2014 in the project area was 40.6 ha (where forest loss is defined as canopy cover over 5 meters in height and of at least 80% cover at a 30 x 30 m resolution). This has revealed that comparatively little closed canopy forest has been lost from Womkama and Danbagl but by comparison forest loss is increasing year-on-year at Miruma. Overall 32.6 ha has been lost at Miruma over the 13 year period. Given that enumerating trees felled on a daily basis is not feasible (given the extensive area and large number of subsistence households) we suggest that indicator 4.1 is changed to: "Fewer native species used for timber and more households report gathering timber from areas dominated by non-native trees by project end based on a random sub-sample of households"

4.2 More than 500 hectares under sustainable forestry practices as compared to baseline by March 2019

Given that the Global Forest Cover dataset is experiencing a two-year lag we cannot rely on it to measure project effectiveness. Consequently, we recommend the indicator 4.2 be changed to: "The area under new woodlot plantation at project end equals or exceeds the area affected by 3 years of annual forest loss (averaged across 2001-2014) within the project footprint." We will submit a change request for this recommendation.

Output 5. Capturing and passing on traditional ecological knowledge on forests and threatened species

5.1 Quantitative survey on knowledge and attitudes of men, women and children in project and control areas at the project start and end

A baseline survey covering traditional ecological knowledge and perception of environmental values has been completed at Miruma (64 people: 38 male, 26 female), Danbagl (49 people: 36 male, 13 female) and Womkama (43 people: 28 male,15 female). In total 18 children (14-18 years old) were surveyed.The majority of respondents reported high or very high levels of concern about the effects of deforestation and reported that they used the forest occasionally (see Annex 4: Compendium Report, Traditional ecological knowledge section). No change to indicators.

5.2 Copies of supplementary education materials capturing local ecological knowledge delivered to 3 primary schools in the project area by September 2017 with teacher guides

Supplementary education materials (school syllabus, teacher's guide and 7 different posters which related to the syllabus) have been developed and delivered to the 3 upper primary schools in the project area. A baseline survey of the knowledge to be covered in the syllabus was carried out at 1 class in each of the schools in Danbagl and Womkama and will soon be carried out in Miruma. These classes will be re-surveyed at the end of the project to ascertain if the students have an increased understanding of traditional ecological knowledge (see Annex 4: Compendium Report, Traditional ecological knowledge section). No change to indicators.

5.3 Increase in number of school children that learn about their local culture and traditional ecological knowledge by March 2019

This activity is ongoing, see Output 5.2 and Traditional Ecological Knowledge section in the Compendium Report, Annex 4, for more detail. No change to indicator.

5.4 Documentation of tok ples names and traditional knowledge of culturally and ecologically important fauna and flora gathered from female and male community members by March 2018

WCS has documented 103 fauna and flora *tok ples* names so far. Will we continue gathering names through to the end of the project. No change to indicators.

Output 6. Minimizing impacts on hunted species by preserving local costumes and reviving traditional *tambu* (no hunting) areas.

6.1 Uptake of improved preservation methods for fur and feathers in traditional costumes (termed bilas in tok pisin) by 3 active cultural troupes (at least 75 dancers) by March 2019

To date 1595 bilas protection kits have been given out, including 785 kits to bilas owners in the project areas and 810 kits distributed during the Mt. Hagen and Goroka shows in 2016 and 2017.

6.2 Increase in area or number of tambu sites created or re-established in the project area by March 2019

WCS has surveyed communities with regard to traditional practices including *tambu* areas. There has been no indication that *tambu* prohibitions are being used as a resource management technique in this region of PNG. However, there is some indication IRRM are interested in developing a protected area along their tourist path to Mt Wilhelm at Womkama. WCS will be working with the United States Forestry Service to undertake land use planning in the next 12 months. The prospect of developing a formal protected area near Womkama and examination of the possibility of a new *tambu* area in the other sites will be investigated.

6.3 Participatory threshold surveys for key biodiversity indicator species (tree kangaroos, forest wallabies, echidna and cassowaries) by September 2016 and end surveys by March 2019, and established monitoring procedures for birds of paradise by November 2016

Baseline monitoring and threshold surveyed have been completed at Danbagl, Womkama and Miruma. The final wildlife monitoring and threshold surveys of the project will occur in the next 6 months as we have identified the dry season (April-November) as being more conducive to identifying fauna. The baseline monitoring surveys recorded a total of 92 unique species including a number of threatened species such as the Goodfellow's tree kangaroo (see Annex 4: Compendium Report, Wildlife monitoring and Natural resource management sections).

3.3 Progress towards the project Outcome

Outcome 1: Area under new replanting at project end equals or exceeds the area affected by 3 years of annual forest loss (averaged across 2001-2014) within the project footprint indicators of mammal and bird abundance show stability or improvement.

Progress: Baseline rates of forest loss have been carried out from 2001-2014. Community replanting is underway with a total of 6958 native seedlings reared, distributed to community members and planted as part of the community water catchment reforestation and woodlot

programs. Over 11,000 seedlings have been planted or are in production. Baseline indices of occupancy have been completed for major animal groups.

Adequacy of indicators and achievability: currently considered measureable and achievable.

Outcome 2: Increased food security and climate resilience through doubling in variety of crops in gardens (in comparison to baseline) for 1000 households in the project area by March 2019.

Progress: Baseline indices of crop diversity have been established for all communities. One of the deliverables in the sub-grant awarded to NARI is to increase crop diversity and they have submitted field work plans to do so within the next 6 months. As insurance, WCS is now working with Oxfam International to develop 3 crops for distribution. One of these crops, E2 potatoes, has been distributed to the Gembogl sites already.

Adequacy of indicators and achievability: currently considered measureable and achievable.

Outcome 3: Diversified livelihood opportunities for households in 3 communities, disaggregated by gender, by March 2019

Progress: WCS has developed and taught propagation methods for highland timber and tree crop species in the 3 communities. A new commercial crop has been introduced and more will be introduced in the next 6 months. Drought resistant crops and training to improve harvest, garden lifespan, pest and drought resistance will be introduced over the next 12 months.

Adequacy of indicators and achievability: currently considered measureable and achievable.

Outcome 4: Increased awareness, including among youth, of importance of forests and local biodiversity to local people and cultures, measured through quantitative surveys at the project start and end in communities within the project

Progress: Traditional ecological knowledge has been quantified at three villages for adults and children. This information was used to develop the supplementary school curricula which WCS is now assisting schools in the local area in teaching. WCS's community engagement team is working to repatriate this information to the local communities.

Adequacy of indicators and achievability: currently considered measureable and achievable

3.4 Monitoring of assumptions

Assumption (Outcome): Large scale changes outside the control of the project (such as major droughts and forest fires or political and social unrest) do not impact the project area

Comments:

Drought: No drought recorded over the last 12 months.

Political unrest - 2017 Election: The 5 yearly PNG elections took place between 24th June – 7th July, 2017. Progress on field activities around the election period were significantly slowed and/or suspended as communities were otherwise occupied and to maintain safety of our staff. After a fatal vehicle accident involving campaigners, our partner communities in Gembogl communities advised WCS to suspended activities on 2 June 2017. This issue was communicated to the Darwin Initiative. The return of writs on 28 July 2017 should have heralded the end of the election period. However, politically motivated killings in Chimbu Province (see http://tinyurl.com/ycmbreaf) led to violent reprisals against the communities in Gembogl District. In a defensive response, the Gembogl communities removed the flooring of the vehicle bridges which prevented all

vehicle access into the District. The bridges were restored on 18 Sept 2017. WCS, having followed the events closely, was able to prepare a field team in advance which accessed the District on the date the bridges first reopened. Both Gembogl community-based organisations were able to continue working on their sub-granted activities over this period despite the lack of access from outsiders. Activities in Miruma (Eastern Highlands) were only suspended over the core election period and were not substantially affected. During the election period, WCS focused efforts on developing and finalising curriculum materials, building two nurseries in Miruma and completing the distribution of ornament protection kits in Miruma. Normal activities resumed in September. Legal challenges to the election of the Chimbu governor are currently in court. WCS is following this process closely. If a recall election is called this could disrupt WCS's activities.

Assumption (Output 1-2): Extreme weather events do not occur during the project period.
Comments:

Drought: No drought recorded over the last 12 months.

Assumption (Output 3): No major forest fires in the area during the project period
Comments:

Forest Fire: During the 12 month project period no forest fires have been recorded from project site locations (based on data from http://fire.pngsdf.com/)

Assumption (Output 4): Market opportunities continue for using native tree species
Comments:

Native timber: Native timber, especially *Nothofagus* spp., remains sought after. Indeed, in Miruma one clan opted out of signing an MOU (in 2016) with WCS in order to engage a logging company to log their *Nothofagus* forest.

Assumption (Output 5): Approval from provincial education divisions for use of developed curriculum materials and willingness from community members to participate in surveys
Comments:

Curriculum: WCS received approval from the relevant provincial education divisions to have the supplementary school syllabus taught at 3 upper primary schools. Teachers were very receptive to the material and WCS community engagement officers will work with the teachers to teach the syllabus over the next year.

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

Biodiversity conservation is being addressed through reforestation initiatives focusing on reducing forest degradation through the development of native timber woodlots, introduction of continuous cover forestry practices, reducing demand for wildlife through preservation initiatives for existing ornamentation (over 1500 have already been distributed), and the establishment of land management practices to better manage wildlife. Poverty alleviation is being directly addressed through a minimum 50% increase in marketable crops, the introduction of a minimum of 2 new drought/pest resistant crops and training in permaculture methods including water preservation and soil fertility.

4. Contribution to the Global Goals for Sustainable Development (SDGs)

Goal 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture

The project has worked towards achieving food security through the propagation and distribution of food bearing tree crops (*Castonopsis acuminatissima, Pandanus julianetti* and *Ficus copiosa*) which we have identified as important reserve food crops during times of drought. Drought and blight resistant potatoes have been introduced. Training to improved soil

moisture conservation and soil fertility management practices for staple crops; training on how to grow a greater diversity of drought tolerant crops species and varieties (cassava, yam, rice, mung/soy beans); and pest and disease management will be undertaken with NARI in the next 6 months,

Goal 12: Ensure sustainable consumption and production patterns
The project has propagated and distribution of native timber species which will form the foundation of the development of sustainable forestry to meet the immediate timber needs of villagers, and ultimately lessen the impact of degradation on the surrounding primary forest. WCS has surveyed household consumption of wildlife included the Endangered Goodfellow's tree kangaroo. Further surveys in the next 12 months will allow WCS to determine which species are likely currently overhunted and work with our partner CBOs to ensure sustainable consumption practices are introduced.

Goal 13: Take urgent action to combat climate change and its impacts
The project has pioneered the propagation and husbandry of native montane tropical timber species. By promoting the husbandry edible tree crops, which we have identified as one of the most important food reserve in times of drought, we have strengthened the resilience and adaptive capacity of the community to climate-related hazards especially drought. The growth of the seedlings distributed so far into mature trees will sequester carbon thereby begin to offset the communities carbon footprint. Furthermore a drought in 2015 resulted in widespread starvation, we have introduced one drought tolerant crop and will introduce at least 2 more in the next 6 months. This will combat the effects of increased droughts caused by climate change.

Goal 15: Sustainably manage forests, combat desertification, halt and reverse land degradation, halt biodiversity loss
The development of community nurseries and the timber species husbandry methods by WCS over the last 12 months should form the foundation for reducing the rate of forest degradation, deforestation and biodiversity loss. The planting of tree species on cleared, mountainous riverine areas has diminished the risk of catastrophic landslides and water pollution at the partnering villages.

5. Project support to the Conventions, Treaties or Agreements

The objectives of the project are directly relevant to the Convention on Biological Diversity (CBD)'s 2011-2020 Strategic Plan, most notably Goal A (Address the underlying causes of biodiversity loss); Goal B (Reduce the direct pressure on biodiversity and promote sustainable use); and Goal C (To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity). The project also supports three of the CBD's seven thematic programmes of work for Agricultural Biodiversity; Forest Biodiversity and Mountain Biodiversity. Within PNG the project supports many of the key goals identified within PNG's Medium Term Development Plan (2) and the National Strategy for Responsible Sustainable Development. This includes supporting the national government's aim to support the sustainable development of PNG's natural resources (strategic assets) and activities to promote the conservation and sustainable use of forests and biodiversity, protect the area's rich cultural authenticity and promote high organic agriculture practises. Priority areas of the Medium Term Development Plan (2) include: maintaining areas under forest cover through afforestation / reforestation; development of coping and mitigation strategies for pests and diseases including climate change; and promoting research on culture, biodiversity and medicinal plants.

6. Project support to poverty alleviation

Poverty alleviation is being directly addressed through the introduction of drought resistant crops, permaculture methods, and diversification of marketable crops. We expect to alleviate poverty indirectly through strengthening pre-existing community-based organisations (IRRM &

KGWan Eco-habitat), and helping establish the community based organisation in Miruma (1 U 5). The CBOs in Gembogl have significantly alleviated poverty through working with NGOs (CARE, Oxfam) and with government departments. The establishment of 1 U 5 should lead to higher incomes and more secure livelihoods in Miruma. There is clear evidence that gender inequality undermines economic growth, human development and poverty reduction. Therefore, through promoting, advocating for, and delivering gender inclusive training and activities WCS is helping to alleviate poverty in our partner communities. WCS and NARI's introduction of new pest and drought resistant crops and cash crops will significantly increase household incomes and provide food security. This has begun with the distribution of the cash crop E2 blight resistant potatoes. Training, particularly to increase soil fertility and water conservation (which has been identified as currently lacking in our partner communities) will also alleviate poverty as will the continue distribution of the nitrogen fixing *Casaurina oligodon* trees as a fallow crop. The reforestation and community woodlot projects will provide a sustainable resource of important timber and tree crop species and also decrease the high landslide risk which could cause the loss of life and the destruction of important garden areas. The beneficiaries of the projects are the communities of Womkama, Danbagl, and Miruma and their community-based organisations (IRRM, KGWan Eco-Habitat and 1 U 5).

7. Project support to gender equality issues

WCS is working to achieve gender parity within the communities with respect to all training and participatory activities. While WCS has stipulated to the communities that parity representation is mandatory for community facilitators, attrition resulted in only 3 women completing training at Miruma compared to 10 men. We delayed undertaking new CFs training at Miruma until the CBO was established, as the CBO will have input in and facilitate the CF program. As Miruma's CBO was recently established (April 2018), we will commence a new CF training session in the next 6 months. Even achieving such low numbers of women in a representative role is an achievement given that typically in Highland's culture there is no female representation at all. While this project does not have any gender specific activities, gender inclusiveness is a cross-cutting principle within all our project activities. Each WCS activity is expected to integrate the perspectives of women and include female representation.

8. Monitoring and evaluation

Outcome indicators 0.1-0.4: Baseline rates of forest loss have been determined and replanting is on track to equal or exceed the 3 years of forest loss. Baseline identification of the crops currently grown in the 3 communities has been determined. NARI, WCS and Oxfam's planned work should insure at least a doubling in the variety of crops by the end of the project. Traditional ecological knowledge has been quantified at three villages for adults and school children and is being taught to primary school children at 3 primary schools. **No change to indicators.**

Output indicators 1.1-1.3. Number of men, women and households attending trainings in improved techniques will be captured and uptake of these methods will be recorded from annual surveys of gardens. Assessment of gardening techniques suggests the average duration of garden areas exceeds the project length. **Change to indicator 1.3** Given active garden duration exceeds the life of the project we request the indicator is change to '*Introduction of new techniques to a minimum of 150 households to ensure the duration of active garden areas will increase by project end'*

Output indicators 2.1-2.2. The number of market crops in each village has been determined from farmer surveys and data collected by Oxfam and NARI. WCS staff will record changes in the number of subsistence crops in gardens at the end of the project. **No change to indicators**

Output indicators 3.1-3.2. WCS's forestry Officer has developed methods for propagation of ten local tree species and output from community nurseries is on track to exceed 3,000 weather hardened seedlings per year by project end. Numbers of native and introduced tree species planted and maps and photo-plots of planted areas will be produced to monitor the success of this activity. **No change to indicators.**

Output indicators 4.1-4.2. Publically available forest change satellite imagery (Global forest change) has allowed us to ascertain baseline deforestation rates, sustainable forestry areas to be mapped by GPS, end threshold surveys will record changes in household use of timber species.
Change to indicator 4.1 Given that enumerating trees felled on a daily basis is not feasible (given the extensive area and large number of subsistence households) we suggest that the indicator is changed to: Fewer native species used for timber and more households report gathering timber from areas dominated by non-native trees by project end based on a random sub-sample of households.
Change to indicator 4.2 Given that the Global Forest Cover dataset is experiencing a two-year lag we cannot rely on it to measure project effectiveness. Consequently, we recommend the indicator 4.2 be changed to: "The area under new woodlot plantation at project end equals or exceeds the area affected by 3 years of annual forest loss (averaged across 2001-2014) within the project footprint.

Output indicators 5.1-5.3. Baseline surveys of traditional ecological knowledge and the local of local language name for fauna and flora have been collected and used to develop a supplementary school curriculum. This curriculum has been distributed to the local schools in the project area and WCS will support the schools in teaching this material over the next 12 months. Community surveys have been undertaken at the start of the project and will be repeated at the end of the project to assess awareness of traditional ecological knowledge and changes in this measure over the course of the project. Numbers of children taught with the new education materials will also be captured. **No change to indicators.**

Output indicators 6.1-6.3. Numbers of *bilas* protection kits distributed will continue to be recorded. We have determined that there are no pre-existing *tambu* sites in our project area. However, IRRM have expressed interest in establishing a *tambu* area and the Gembogl District villages have expressed interest in sustainable land use planning. WCS will work with the United States Forestry Service to undertake land use planning and the establishment of protected areas over the next 12 months. Baseline threshold and forest bird surveys have been conducted and end surveys will be completed over the next 6 months. This work, combined with forest loss measurements, will monitor the long-term effectiveness of this project for key biodiversity indicators and be used to advise the upcoming land use planning activities. Local management interventions in response to participatory monitoring and data repatriation will also be recorded. **No change to indicators**.

9. Lessons learnt

During recent wildlife monitoring (October 2017) it was revealed that the Danbagl community have been hand cutting a road through the northern portion of the forest in order to develop a vehicle transport route through to Eastern Highlands Province. The road appears to have been ill planned and undertaken: 1) without liaison support from the provincial government; 2) without any engineering input; 3) without consideration of recurrent costs; and with 4) little consideration of the viability of descent into Eastern Highlands province given the extreme gradients. The road will likely: result in loss of forest; accelerate road-side forest degradation; severely damage a 500 ha alpine grassland; and result in over-hunting of the wallaby population

which presently inhabits the grassland. WCS will work with the United States Forestry Service, Oxfam, the provincial government, KGWan and the wider community to promote better decision making through the integrated land use planning training planned over the next 12 months as part of Activity 4.2.

Despite large quantities of seed both WCS and our partner CBOs have failed to attain germination for the *Nothofagus* genus. This is possibly due to the seed being sterile (as all were collected from only a limited number of smaller trees at the end of the fruiting season) or as yet an unknown set of environmental circumstances being required to initiate germination. As *Nothofagus* spp. are the most valuable and widespread timber of the region, the propagation of this species continues to be an ongoing priority for WCS. WCS's forestry officer has recently collected *Nothofagus* spp. seeds from Gembogl during an early period in the fruiting season andwe're hopeful that these will successfully germinate.

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

Comment 1
It would be interesting to learn about the management and functioning of partnerships. What happened to Ward 3 Upper Asaro Local Level Government (LLG) which was included in the original application? Why did the NARI agreement take so long to put in place? More details of Man on Earth Ltd.

WCS is very happy with the relationship we have developed with the CBOs at Danbgal (KGWan), Miruma (1 U 5) and Womkama (IRRM). Each CBO has strongly developed their silviculture program and displayed a keenness to continue working with WCS to improve conservation and livelihood outcomes. They have each also acquitted sub-grants with receipts in an appropriate manner. Staff from the WCS community engagement team meet regularly with the communities to ensure clear understanding between each CBO, community members and WCS.

Ward 3 Upper Asaro Local Level Government is also known at the Miruma / Namta community. WCS signed a subgrant with 6 Miruma clans and these clans recently formed the CBO 1 U 5. The subcontract between the WCS and the clans was amended to recognise 1 U 5 as the representative of the clans.

NARI have an unparalleled wealth of experience at undertaking agricultural work and training in PNG. The NARI agreement took so long to put in place because NARI staff were busy with other projects and did not prioritize its finalization. This also explains why we have experienced delays in the activities in which NARI is involved. However, we are satisfied with the report and activity plan that NARI recently submitted to WCS. Moreover, they have recently been in contact to schedule field work with WCS. (WCS's agricultural officer will accompany NARI during their field work), so we are confident that they will complete their activity plan as outlined.

Man on Earth Ltd. is the nursery of a local business owner in Goroka who has a keen interest in botany and horticulture. He is supportive of the Darwin Initiative work and is allowing us to use his nursery. He benefits from the expert advice WCS's botanist/forester provides to him, we also share seeds and seedlings with him for personal propagation.

Comment 2
Ensure that proposed changes to Indicators are submitted on a Change Request for approval.

This has been done.

Comment 3
Clarify what is meant by the project footprint? (45,000 ha or only the areas being replanted (100 ha) (linked with proposed revision of Indicator 0.1)

Following this comment, we submitted a change request which was approved. Indicator 0.1 has been changed to the following: Area under new replanting at project end equals or exceeds the area affected by 3 years of annual forest loss (averaged across 2001-2014) within the project footprint indicators of mammal and bird abundance show stability or improvement. As outlined in the report we are on track to achieve this.

Additional comments
Work on 4.1, also scheduled for PY1 is reported as 'not yet targeted': no reason is given; and work on 5.3 (Documentation of tok piles [local language] names and traditional knowledge) (which was also scheduled for Q1-4 of PY1) is not reported at all – although Table 2 of Annex 4 does provide a list of names gathered to date.

As outlined it is not possible to enumerate trees felled on a daily basis. We have therefore suggested indicator 4.1 be changed to: "Fewer native species used for timber and more households report gathering timber from areas dominated by non-native trees by project end based on a random sub-sample of households" and that the related indicator 4.2 be changed to: the area under new woodlot production at project end equals or exceeds the area affected by 3 years of annual forest loss (averaged across 2001-2014) within the project footprint. We will submit a change request for these proposed amendments. We are on track to achieve this goal by the end of the project.

It was an oversight in the previous report not to mention the documentation of tok ples names. We detail progress on this activity in the current report. As outlined in Appendix 4 we are on track to achieve all activates detailed in Outcome 5. In total 102 local language names for native plant and animal species have been collected to date.

11. Other comments on progress not covered elsewhere

The project has been enhanced by the involvement of the United States Forestry Service, which has extensive experience in developing nurseries and facilitating land use planning in developing nations. There is a chance that a current legal challenge to the election of the governor of the province where our Gembogl field sites are located will result in a recall election. Should this occur, WCS would follow the security situation closely and we may be forced to suspend our field activities for 1-2 months. If this occurs, WCS would notify the Darwin Initiative and attempt to continue field activities in situ via the CBOs and community facilitators. However, we note there is a risk that the level of distraction may derail the progress of some activities for a few months.

12. Sustainability and legacy

We have raised the profile of the project through the production and distribution of posters to government, partner organisations and local schools. We additionally profiled the project at our stall at the Port Moresby Nature Park on World Wildlife Day (4 March 2017), at the Mt. Hagen show (17-17 August 2017) and at the past two Goroka shows. An interview about the project was also broadcast on Tribe FM. We also presented the project at the Endemic and Flagship Species workshop held in Port Moresby between 2-3 March 2017, which was attended by conservation and governmental organisations. WCS's conservation technician and botanist will present results from their work on this project at the upcoming Society of Conservation Biology

Oceania conference in Wellington in July 2018. Finally, WCS PNG's Twitter (https://tinyurl.com/yc4r72a5) account has been actively promoting the project.

Our exit strategy remains to enshrine the current projects within the work of the CBOs, and we believe we are making strong progress at this. The CBOs and community members have shown an ongoing commitment and interest in the Darwin Initiative projects in their community and, we believe, can see the clear benefit to their community of continue this work into the future. We are particularly happy at the progress the Miruma community are making in establishing a CBO. We are optimistic that this CBO will help the Miruma community achieve higher livelihood and conservation standards, as the CBOs at Danbagl and Womkama have achieved.

We have successfully received funding from the European Union (EU) administered through the Food and Agricultural Organisation of the United Nations (FAO) through their Sustainable Wildlife Management Program. This will allow us to continue and build-up the activities supported by the Darwin Initiative for an additional five years. We will continue to support the work in our current partner communities but will also seek to engage additional communities in the Bismarck Range. Through the EU FAO project, we will work with these communities to determine which species are currently overhunted and work with the communities to reduce hunting to sustainable levels while providing alternative protein sources. The wildlife monitoring and threshold reports occurring in the current project will provide essential information in determining sustainable harvest rates. It is hoped that the success of this EU project will provide a model to be rolled out across Melanesia.

13. Darwin identity

The Darwin Initiative logo has been used on all documents related to this project. It is on the 7 school posters and the school syllabus WCS designed and distributed (we have sent the school syllabus to our website manager to publish on the WCS PNG website). The Darwin Initiative funding is recognised as the major funder of our Bismarck Forest Corridor programme, along with the co-funder The Christensen Fund. Our social media account (Twitter: @WCSMelanesiaSci) has been posting actively (in the last 12 months: approximately 20 posts which directly mention the Darwin Initiative). We have presented and discussed the project with government official at all levels, including many members and the Managing Director of the Conservation and Protection Authority (the national government environment department) and high placed government officials in the two provinces we work in. Additionally, WCS's botanist and conservation technician will be presenting their work on the Darwin project at the premier conservation conference in Oceania in July 2018.

14. Project expenditure

Table 1: Project expenditure during the reporting period (1 April 2017 – 31 March 2018)

Project spend (indicative) since last annual report	2017/18 Grant (£)	2017/18 Total Darwin Costs (£)	Variance %	Comments (please explain significant variances)
Staff costs			-7%	
Consultancy costs			-1%	
Overhead Costs			4%	
Travel and subsistence			9%	
Operating Costs			8%	

Capital items	-	-		
Monitoring & Evaluation (M&E)			3%	
Others			7%	
TOTAL			**0**	

Annex 1: Report of progress and achievements against Logical Framework for Financial Year 2017-2018

Project summary	Measurable Indicators	Progress and Achievements April 2017 - March 2018	Actions required/planned for next period
Impact The restoration and sustainable management of montane forests within the Bismarck Mountains to strengthen livelihoods, protect biological and cultural diversity, and act as a model for forest conservation in PNG.			[redacted]
Outcome Reduced rates of deforestation in the Bismarck Range through improved agricultural and forestry practices that diversify and strengthen livelihoods and conserve PNG's cultural and biological diversity.	0.1 Area under new replanting at project end equals or exceeds the area affected by 3 years of annual forest loss (averaged across 2001-2014) within the project footprint indicators of mammal and bird abundance show stability or improvement 0.2 Increased food security and climate resilience through doubling in variety of crops in gardens (in comparison to baseline) for 1000 households in the project area by March 2019 0.3. Diversified livelihood opportunities for households in 3 communities, disaggregated by gender, by March 2019 0.4 Increased awareness, including among youth, of importance of forests and local biodiversity to	0.1 Baseline rates of forest loss have been carried out from 2001-2014. Community replanting under way with a total of 6958 seedlings (include WCS and CBO plantings both timber and tree crops) planted out at the 3 participating communities. Baseline indices of occupancy have been completed for major animal groups. 0.2 Baseline identification of crops currently grown in the 3 communities has been carried out. A formal assessment has been completed by NARI 0.3 WCS is coordinating with Oxfam International to develop three marketable crop varieties: late blight resistant potatoes, garlic, and peas. NARI plans to introduce a number of crops to the communities in the next 6 months. 0.4 The traditional ecological knowledge has been quantified at three villages for adults and school children.	Introduce drought tolerant crops and train community members in their husbandry. Train community members in techniques for increasing garden duration such as composting and mulching. Develop multiple additional crops for household income generation. Assist local school teachers in teaching supplementary school syllabus. Survey school students to show evidence of learning. Repatriate traditional ecological knowledge to communities

	local people and cultures, measured through quantitative surveys at the project start and end in communities within the project		
Output 1. The introduction and uptake of improved gardening practices in three communities and an increase in the duration and life of garden areas	1.1 Number of new gardening techniques that are taken up by male and female community members in the project area by March 2018 and by March 2019 1.2 At least 300 households using new gardening techniques by March 2018 1.3 Duration of active garden areas increased by 30% by March 2019 in comparison to baseline information from past practise)	NARI has been slow to undertake the contracted activities due to other commitments and security issues around the time of the PNG national election in July 2017. NARI has however completed a full agricultural assessment and developed a set of interventions (see NARI's work plan in Annex 4: Compendium Report, Appendix 1). WCS has developed a baseline level of garden use but, as garden duration generally exceeds the project lifespan, we will submit a change request for Activity and Indicator 1.3. WCS has introduced new gardening techniques for E2 blight resistant potatoes and the nitrogen fixing species *Causarina oligodon.* As duration of active gardens is greater than the project length we will submit a change request for Indicator 3.1: *Introduction of new techniques to a minimum of 150 households to ensure the duration of active garden areas will increase by project end.*	
Activity 1.1 Increase the number of new gardening techniques that are taken up by communities in the project area		WCS has identified current agricultural systems in use and crops currently cultivated from an initial survey of the three communities and NARI's agricultural report. WCS is propagating the multi-use tree species *Causarina oligodon* for use as a nitrifying legume for fallow areas (1,400+ seedlings are currently growing in the WCS nursery, 366 have been distributed to date). WCS has engaged NARI via sub-grant to undertake community agricultural training. Their training will include: improved management and production technologies for sweet potato, carrot and E2 potatoes; improved soil moisture conservation and soil fertility management practices for staple crops; training on how to grow a greater diversity of drought tolerant crops species and varieties (cassava, yam, rice, mung/soy beans); improved food processing technologies for livestock feed and domestic consumption; greater financial literacy skills for farmers; and pest and disease management.	
Activity 1.2 Ensure activities are established in >300 households using new gardening techniques by March 2018		WCS has engaged NARI via a sub-grant to undertake training which will then be disbursed to the wider community by village extension workers of IRRM in Womkama, KGWan Eco-habitat in Danbagl, and community facilitators in Miruma. WCS has provided training for a commercial potato crop and *Causarina*	

		oligodon.
Activity 1.3 Promote new techniques to ensure the duration of active garden areas is increased by 30% by March 2019 in comparison to baseline information from past practise		WCS has engaged NARI via a sub-grant to undertake training which they are scheduled to complete in the next 6 months (as above). A change request will be submitted as active garden duration is often greater than the project length. Proposed new activity 1.3: *Promote new techniques such that a minimum of 150 gardens are maintained with improved practices by March 2019.*
Output 2. Introduction of new market crops for income generation, and introduction of pest and drought resistant varieties for subsistence use within all three communities	2.1. A 50% increase in the number of marketable crops in gardens in project areas by March 2019 2.2 At least 2 new pest and/or drought resistant crop varieties introduced by March 2018)	WCS awarded a sub-grant to NARI in March 2017 for the introduction of new crop species (and related training). WCS also awarded a small sub-grant to Oxfam International in March 2017 to undertake an evaluation of the resilience of Gembogl agricultural practices with regard to improving the effectiveness of Darwin initiative interventions based on the experiences of the 2015-2016 drought. Three crops were recommended by Oxfam and are currently being sourced by WCS for production. Indicators remain appropriate.
Activity 2.1 Work with Oxfam and local partners to promote a 50% increase in the number of marketable crops in gardens		WCS and Oxfam have identified 3 crops with the potential for scaling and have begun production of them (blight resistant E2 potatoes, drought resistant peas and garlic). WCS and Oxfam have distributed E2 potatoes to Dangabl and Womkama. WCS is also currently propagating apples. Crops were screened on the basis of community familiarity, perishability, low competition and marketability. NARI is scheduled to introduce blight resistant, early maturing sweet potato and cassava, as well as E2 potatoes to the three partner communities in the next 6 month.
Activity 2.2. With the support of NARI introduce least 2 new pest and/or drought tolerant crop varieties		As mentioned above, NARI is introducing 3 new pest and/or drought tolerant species in the next 6 months. WCS and Oxfam are also working to distribute 3 crops and have so far distributed one (E2 potatoes) to Danbagl and Womkama. These crops were chosen on the basis of Oxfam's evaluation of drought resistant / climate change compatible crops appropriate for the Gembogl district, as they have been working with these communities since the 2015-2016 drought.
Output 3. Nursery practices for native tree species tested and established in two communities and	3.1 Successful propagation of at least four native tree species in nurseries by March 2018	Four community nurseries (one each at KGWan Eco-habitat and IRRM and two at Miruma) are actively producing seedlings and growing wildlings. Ten native species are currently being propagated (published

active planting of areas with native species by the project end	3.2 Planting of native tree species in place of exotic species incorporated into land use plans by March 2018 with community nursery output exceeding 3,000 weather hardened native seedlings per community per year by project end.	propagation methods currently only exist for two of these species). So far 1223 seedling have been reared at Miruma, of which 197 have been weather hardened and planted. At the KGWan nursery (Danbagl), 1600 native seedlings have been reared, weather hardened and distributed to community members and planted as part of the community water catchment reforestation program. At the Womkama (IRRM) nursery, 3,762 native plants have been reared, weather hardened and planted into the community to date. At the WCS demonstration nursery over 4,500 seedlings have been developed and 1033 have been planted at the three sites (766 at Namta, 360 at Womkama and 272 at Danbagl). Woodlots and community reforestation planting projects progressing at each site. Land use planning occurring with the United States Forestry Service over the next 12 months. In total, 9,896 weather hardened seedlings have been or are currently being raised across the 5 nurseries.
3.1 Develop propagation methods for at least four native tree species in nurseries		WCS has developed novel propagation methods for 5 timber and 3 tree crop species: • *Causarina oligodon* (fuel wood, nitrogen fixer, to be used as nurse crop for hardwoods species in woodlots, it is also locally an important timber tree for local construction purposes). • *Fragrea beteriana* (durable hardwood timber tree) • *Fragraea salticola* (durable hardwood timber tree) • *Castanopsis acuminatissima* (general purpose timber, food source (seeds), has commensal edible fungi) • *Pandanus julianetti* (reserve food crop for under story planting) • *Ficus copiosa* (reserve food crop for under story planting) - • *Ficus damaropsis* (reserve food crop for under story planting) • *Dacrycarpus cinctus* (montane pine, softwood timber tree species)
3.2 Planting of native tree species in place of exotic species incorporated into land use plans by March 2018 with community nursery output exceeding 3,000 weather hardened native seedlings per community per		Community woodlots and riparian replanting areas have been developed at Danbagl, Namta and Womkama. These will be mapped over the next 12 months with community meetings organised to go over the existing land

year by project end		use plans and incorporate the expert advice of the United States Forestry Service into new plans. To date 1600 native seedlings have been reared, distributed to community members and planted as part of the community water catchment reforestation program at Danbagl. At the Womkama (IRRM) nursery, 3,762 native plants have been reared, weather hardened and planted into the community to date. 1223 seedling have been reared at Miruma, of which 197 have been weather hardened and planted. An additional 1033 have been developed at the WCS (Man on Earth) nursery and planted at the three sites (766 at Miruma, 360 at Womkama and 272 at Danbagl).
Output 4. Sustainable use of existing forest stands within remaining areas of native forests and planted areas of exotic trees	4.1 Reduced area and number of native trees harvested compared to number of exotic trees harvested from already existing forest stands by March 2019 (Note: the aim is to shift stand diversity towards native trees by removing exotics.) 4.2 More than 500 hectares under sustainable forestry practices as compared to baseline by March 2019	Baseline total forest loss between 2001 and 2014 in the project area was 40.6 ha (where forest loss is defined as canopy cover over 5 meters in height and of at least 80% cover at a 30 x 30 m resolution). This has revealed that comparatively little closed canopy forest has been lost from Womkama and Danbagl, but by comparison forest loss is increasing year-on-year at Miruma. Overall 32.6 ha has been lost at Miruma over the 13 year period.] Given that enumerating trees felled on a daily basis is not feasible (given the extensive area and large number of subsistence households) we suggest that indicator 4.1 is changed to: “Fewer native species used for timber and more households report gathering timber from areas dominated by non-native trees by project end based on a random sub-sample of households” We will ask for a change request. Given that the Global Forest Cover dataset is experiencing a two-year lag we cannot rely on it to measure project effectiveness. Consequently we recommend the indicator 4.2 be changed to: “The area under new woodlot production at project end equals or exceeds the area affected by 3 years of annual forest loss (averaged across 2001-2014) within the project footprint.” We will ask for change request.
4.1 Work with local CBOs to reduce the number of native trees harvested compared to number of exotic trees harvested from already existing forest stands		Sale of timber was recorded as part of the perception survey; 50 individuals were surveyed at each community. Unfortunately, the timber sale section of the survey was incorrectly filled out by the CFs who administered the survey at Danbagl and the data was not usable. At

		Miruma the sale of three native species (*Casuarina papuana, Casuarina oligodon* and *Nothofagus spp*.) averaged 54 Papua New Guinea Kina (PGK) per person per year (pppy), much higher than the sale of the two introduced species (non-native pine and *Eucalyptus*) 18 PGK pppy. At Womkama a much larger amount of timber was sold: 326 PGK pppy of the three native species and 802 PGK pppy of the two introduced species. WCS will work with the CBOs during the land use planning workshops to encourage a greater rate of harvesting of introduced species and a replanting of native species where introduced have been harvested from. WCS has begun this process with its reforestation and riverine planting projects.
4.2 Ensure more than 500 hectares under sustainable forestry practices as compared to baseline by March 2019		WCS has calculated the rate of forest cover loss from the closed canopy cover within the project footprint from an analysis of deforestation and afforestation rates within the project area of interest via the Global Forest Change database. As a result we have established baseline rates for annual losses and gains between 2001 and 2014. Total forest loss between 2001 and 2014 in the project area was 40.6 ha (where forest loss is defined as canopy cover over 5 meters in height and of at least 80% cover at a 30 x 30 m resolution). This has revealed that comparatively little closed canopy forest has been lost from Womkama and Danbagl but by comparison forest loss is increasing year-on-year at Miruma. Overall 32.6 ha has been lost at Miruma over the 13-year period. As a consequence Miruma has been prioritised in terms of greatest need for intervention. WCS will be collaboration with experts from the United States Forestry Service to develop land use plans and sustainable forestry practices with our partner CBOs and their communities.
Output 5. Capturing and passing on traditional ecological knowledge on forests and threatened species	5.1 Quantitative survey on knowledge and attitudes of men, women and children in project and control areas at the project start and end 5.2 Copies of supplementary education materials capturing local	Surveys of baseline traditional ecological knowledge have been undertaken at Danbagl, Miruma and Womkama. 103 T*ok ples* names for important species have been collected from the 3 sites. Baseline wildlife monitoring using 5 separate methods has been undertaken at the project site and to date 72 unique species including a number of species such as the Goodfellow's tree kangaroo have been recorded. The baseline ecological knowledge and *tok ples* names were used to develop supplementary education materials including a syllabus, lesson plans, a teacher's guide

	ecological knowledge delivered to 3 primary schools in the project area by September 2017 with teacher guides 5.3 Increase in number of school children that learn about their local culture and traditional ecological knowledge by March 2019 5.4 Documentation of *tok ples* names and traditional knowledge of culturally and ecologically important fauna and flora gathered from female and male community members by March 2019	and 7 related posters which have been distributed to three upper primary schools in the project area. Bassline surveys of students at Danbagl and Womkama have been undertaken (March 2018). Students at Miruma primary will be surveyed in May. These students will be resurveyed at the end of the school year, after being taught the supplementary education syllabus to show evidence of learning about local culture and traditional ecological knowledge. 103 *tok ples* names have been collected, traditional ecological knowledhe has been gathered from male and female adults and children to create the supplementary education syllabus. Baseline wildlife monitoring using 5 separate methods has been undertaken at the project site, to date 72 unique species including a number of species such as the Goodfellow's tree kangaroo have been recorded.
5.1 Produce school curricula capturing local ecological knowledge in 3 primary schools in the project area by September 2017		WCS collected local ecological knowledge from Danbagl, Miruma and Womkama. Community facilitators were trained at each community to collect local ecological knowledge with regard to natural resource management and perceptions of the importance of forest and traditional ornamentation. This knowledge, together with the *tok ples* names recorded through our wildlife monitoring and silviculture activities, formed the basis of educational materials produced (as above).
5.2 Measure an increase in the number of school children that learn about their local culture and traditional ecological knowledge by March 2019		Women, men and children were surveyed in April-May 2017 at Danbagl, Miruma and Womkama on traditional ecological knowledge. This showed the youngest age class (10-25 years) had a much less reliable knowledge of local fauna and flora names. The traditional ecological knowledge gathered from these surveys was used to make a supplementary school syllabus for primary school students in the project area. Baseline knowledge of 50 students (25 Danbagl and 25 Womkama) have been surveyed at two primary schools. Students will be surveyed at Miruma in the next month. These students (and others at the schools) will

		be taught the supplementary education syllabus and resurveyed at the end of the school year to measure if an increase in knowledge of their knowledge of local culture and traditional ecological knowledge has occurred.
Output 6. Minimizing impacts on hunted species by preserving local costumes and reviving traditional *tambu* (no hunting) areas.	6.1 Uptake of improved preservation methods for fur and feathers in traditional costumes (termed *bilas* in *tok pisin*) by 3 active cultural troupes (at least 75 dancers) by March 2019 6.2 Increase in area or number of *tambu* sites created or re-established in the project area by March 2019 6.3 Participatory threshold surveys for key biodiversity indicator species (tree kangaroos, forest wallabies, echidna and cassowaries) by September 2016 and end surveys by March 2019, and established monitoring procedures for birds of paradise by November 2016	1595 bilas protection kits have been given out including 785 kits to bilas owners in the project areas and 810 kits distributed during the 2016 Mt. Hagen and Goroka (2016, 2017) shows. The WCS stall at these cultural shows had the theme "Strongim Kastom. Lukautim Bilas bilong Yu!" (Translation: strengthen your culture, look after your ornamentation) and specifically targeted Highland costume owners. WCS surveys indicate that *tambu* prohibitions are not being used as a resource management technique at Danbagl, Miruma and Womkama. However, there is some indication IRRM are interested in developing a protected area along their tourist path to Mt. Wilhelm at Womkama. WCS will be working with the United States Forestry Service to undertake land use planning in the next 12 months. The prospect of developing a formal protected area near Womkama and examination of the possibility of a new protected area in the other sites will be investigated. Baseline monitoring and threshold surveyed have been completed at Danbagl, Womkama and Miruma. End of project wildlife monitoring and threshold surveys will occur in the next 6 months, as we have identified the dry season (April-November) as being more conducive to identifying fauna. The baseline monitoring surveys recorded a total of 92 unique species, including a number of threatened species such as the Goodfellow's tree kangaroo and two species of bird of paradise. 5 minute bird call monitoring was established as very effective at identifying birds of paradise (>100 recordings of the 2 species).
6.1 Promote the uptake of improved preservation methods for fur and feathers in traditional costumes (termed *bilas* in *tok pisin*)		1595 bilas protection kits have been given out including 785 kits to bilas owners in the project areas and 810 kits distributed to performers during the 2016 Mt. Hagen and Goroka (2016, 2017) shows.

6.2 Work to increase the area or number of *tambu* sites created or re-established in the project area by March 2019, or other compatible traditional management methods	There is no indication that Danbagl, Miruma or Womkama use *tambu* areas as a management method. However, there is some indication IRRM are interested in developing a protected area along their tourist path to Mt. Wilhelm at Womkama. The prospect of developing a formal protected areas will be investigated over the next 12 months with the assistance of the United States Forestry Service.
6.3 Conduct baseline and end threshold surveys for key biodiversity indicator species, and establish monitoring procedures for birds of paradise	We carried out a survey on the use and importance of wild caught meat. A total of 59 community members (33 male, 26 female) were interviewed across Womkama, Danbagl, and Miruma. The top three most common sources of wild caught meat were cuscus, birds, and tree kangaroo. Two weeks of monitoring at each site (Danbagl, Womkama and Miruma) occurred from September to October 2017. This two week monitoring protocol incorporated: 1) 5 minute dawn bird counts incorporating a distance variable detection methodology, 2) camera trapping transects, 3) mist netting for birds, 4) village threshold surveys, and 5) hunter interceptions. This monitoring was repeated at Womkama in April 2018 and will be undertaken at the other two sites in May 2018. A GIS database was set up to store sightings. In total over the two years across methods there were 1860 fauna sightings. In total, 72 bird species including two species of birds of paradise (Princess Stephanie's astrapia (*Astrapia stephaniae*) and the brown sicklebill (*Epimachus meyeri*)), the Endangered Papuan eagle (*Harpyposis novaeguinea*), 20 mammal species including the Endangered Goodfellow's tree kangaroo (*Dendrolagus goodfellowi)*, Vulnerable New Guinea pademelon (*Thylogale stigmatica*), the Near Threatened plush-coated ringtail possum (*Pseudochirops corinna)*, pygmy ringtail possum (*Pseudochirulus mayeri*) and lesser forest wallaby (*Dorcopsulus vanheurni*) were observed. The 5 minute bird count proved to be an effective monitoring procedure, with 103 recordings of the 2 bird of paradise species recorded in 2017. Threshold surveys in which hunter caught animals are intercepted at households occurred at the three communities over a two week period. These surveys revealed wild hunted animals to be an important source of protein for villages, with 21 wild caught animals consumed. The majority

	of animals caught were small birds caught near the villages. Evidence of hunting of the Endangered Goodfellow's tree kangaroo (*D. goodfellowi)* was recorded at each site: at Danbagl two individuals of the species were caught by intercepted hunters; at Miruma two were recorded in household the threshold survey; and at Womkama one hunter reported killing sevenbetween January and March 2017. Overexploitation of this species is therefore likely occurring at the 3 sites. A number of cuscus were also hunted, it is possible that these species are also being overexploited (see Annex 4: Compendium Report, Wildlife monitoring and Natural resource management sections).

Annex 2: Project's full current logframe as presented in the application form (unless changes have been agreed) [note agreed changes have been modified using track change]

Project summary	Measurable Indicators	Means of verification	Important Assumptions
Impact: (Max 30 words) The restoration and sustainable management of montane forests within the Bismarck Mountains to strengthen livelihoods, protect biological and cultural diversity, and act as a model for forest conservation in PNG.			
Outcome: (Max 30 words) Reduced rates of deforestation in the Bismarck Range through improved agricultural and forestry practices that diversify and strengthen livelihoods and conserve PNG's cultural and biological diversity.	0.1 Area under new replanting at project end equals or exceeds the area affected by 3 years of annual forest loss (averaged across 2001-2014) within the project footprint indicators of mammal and bird abundance show stability or improvement 0.2 Increased food security and climate resilience through doubling in variety of crops in gardens (in comparison to baseline) for 1000 households in the project area by March 2019 0.3. Diversified livelihood opportunities for households in 3 communities, disaggregated by gender, by March 2019	0.1 Area under replanting. Indices of mammal and bird abundance 0.2 WCS and community reports on agriculture and forestry work, showing diversified crops, drought and pest tolerant crops, and native species in use in gardens 0.3 Socio-economic studies at the project start and end, including sales/income records, indicate increased use and importance of diversified crops and timber products for households 0.4 Records of number of school children who have been taught with the project's curricula (disaggregated by gender), and published report on results of quantitative survey	Large scale changes outside the control of the project (such as major droughts and forest fires or political and social unrest) do not impact the project area

	0.4 Increased awareness including among youth, of importance of forests and local biodiversity to local people and cultures, measured through quantitative surveys at the project start and end in communities within the project area and control areas		
Outputs: 1. The introduction and uptake of improved gardening practices in three communities and an increase in the duration and life of garden areas	1.1 Number of new gardening techniques that are taken up by male and female community members in the project area by March 2018 and by March 2019 1.2 At least 300 households using new gardening techniques by March 2018 1.3 Duration of active garden areas increased by 30% by March 2019 in comparison to baseline information from past practise	1.1 WCS and community reports detailing successful introduction of new techniques 1.2 Community reports on garden numbers and gardeners, disaggregated by gender 1.3 Baseline report on current garden life and reports on duration following establishment of new techniques	Extreme weather events do not occur during the project period
2. Introduction of new market crops for income generation, and introduction of pest and drought resistant varieties for subsistence use	2.1. A 50% increase in the number of marketable crops in gardens in project areas by March 2019	2.1 WCS and community reports detailing the number of new crops against baseline information	Extreme weather events do not occur during the project period

within all three communities	2.2 At least 2 new pest and/or drought resistant crop varieties introduced by March 2018	2.2 WCS and NARI reports on the planting and use of new pest/drought resistant varieties	
3. Nursery practices for native tree species tested and established in two communities and active planting of areas with native species by the project end	3.1 Successful propagation of at least four native tree species in nurseries by March 2018 3.2 Planting of native tree species in place of exotic species incorporated into land use plans by March 2018 with community nursery output exceeding 3,000 weather hardened native seedlings per community per year by project end	3.1 Propagation records from nursery programme 3.2 (a) Land use plans incorporate planting areas for native species 3.2 (b) Maps/photos of areas planted with native species	No major forest fires in the area during the project period
4. Sustainable use of existing forest stands within remaining areas of native forests and planted areas of exotic trees	4.1 Reduced area and number of native trees harvested compared to number of exotic trees harvested from already existing forest stands by March 2019 (Note: the aim is to shift stand diversity towards native trees by removing exotics.) 4.2 More than 500 hectares under sustainable forestry practices as compared to baseline by March 2019	4.1 (a) Records of tree species felled 4.1 (b) Community land use plans and forestry plans 4.1 (c) Area of forest clearance from satellite imagery 4.2 Community land use plans and forestry plans; WCS and community reports on forestry work	Market opportunities continue for using native tree species

5. Capturing and passing on traditional ecological knowledge on forests and threatened species	5.1 Quantitative survey on knowledge and attitudes of men, women and children in project and control areas at the project start and end 5.2 Copies of supplementary education materials capturing local ecological knowledge delivered to 3 primary schools in the project area by September 2017 with teacher guides 5.3 Increase in number of school children that learn about their local culture and traditional ecological knowledge by March 2019 5.4 Documentation of *tok peles* names and traditional knowledge of culturally and ecologically important fauna and flora gathered from female and male community members by March 2018	5.1 Published results of quantitative survey 5.2 Copies of supplementary education materials 5.3 Records of number of children taught (disaggregated by gender) at three primary schools in the project area 5.4 Reports detailing *tok peles* and scientific names for >100 species and reporting traditional uses for fauna and flora including gender specific uses	Approval from provincial education divisions for use of developed curriculum materials and willingness from community members to participate in surveys
6. Minimizing impacts on hunted species by preserving local costumes	6.1 Uptake of improved preservation methods for fur and feathers in	6.1 Reports on number of *bilas* protection kits distributed to male	Changing use of *bilas* products (e.g. development of markets for these

and reviving traditional *tambu* (no hunting) areas.	traditional costumes (termed *bilas* in *tok pisin*) by 3 active cultural troupes (at least 75 dancers) by March 2019 6.2 Increase in area or number of *tambu* sites created or re-established in the project area by March 2019 6.3 Participatory threshold surveys for key biodiversity indicator species (tree kangaroos, forest wallabies, echidna and cassowaries) by September 2016 and end surveys by March 2019, and established monitoring procedures for birds of paradise by November 2016	and female performers and in use by cultural groups 6.2 Copies of resource management plans and maps of *tambu* sites 6.3 Project reports on hunted species that are brought in by community members ("threshold surveys") and reports and results from forest bird surveys	materials) do not impact the project area Community members are willing to participate in threshold surveys

Activities

1.1 Increase the number of new gardening techniques that are taken up by communities in the project area

1.2 Ensure activities are established in >300 households using new gardening techniques by March 2018

1.3 Promote new techniques to ensure the duration of active garden areas is increased by 30% by March 2019 in comparison to baseline information from past practise

2.1 Work with Oxfam and local partners to promote a 50% increase in the number of marketable crops in gardens

2.2 With the support of NARI introduce least 2 new pest and/or drought tolerant crop varieties

3.1 Develop propagation methods for at least four native tree species in nurseries

3.2 Planting of native tree species in place of exotic species incorporated into land use plans by March 2018 with community nursery output exceeding 3,000 weather hardened native seedlings per community per year by project end

4.1 Work with local CBOs to reduce the number of native trees harvested compared to number of exotic trees harvested from already existing forest stands

4.2 Ensure more than 500 hectares under sustainable forestry practices as compared to baseline by March 2019

5.1 Produce school curricula capturing local ecological knowledge in 3 primary schools in the project area by September 2017

5.2 Copies of supplementary education materials capturing local ecological knowledge delivered to 3 primary schools in the project area by September 2017 with teacher guides

6.1 Promote the uptake of improved preservation methods for fur and feathers in traditional costumes (termed *bilas* in *tok pisin*)

6.2 Work to increase the area or number of *tambu* sites created or re-established in the project area by March 2019, or other compatible traditional management methods
6.3 Conduct baseline and end threshold surveys for key biodiversity indicator species, and establish monitoring procedures for birds of paradise

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
23	The Christensen Fund for activities on traditional ecological knowledge	NA	NA	75,000 USD				75,000 USD (initially 100,000 USD requested but only 75,000 forth coming)
23	Pacific Development Conservation Trust) for development of bilas protection kits	NA	NA	10,092 NZD				10,092 NZD
23	European Union / Food and Agricultural Organization of the United Nations (5 year project)	NA	NA			USD 251,613 (Planned to start in September 2019)		USD 251,613
23	European Union / Food and Agricultural Organization of the United Nations (inception phase)	NA	NA		USD 281,004			USD 281,004

Table 2 Publications

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

None to date (conference abstracts will soon be available online)						

Checklist for submission

	Check
Is the report less than 10MB? If so, please email to Darwin-Projects@ltsi.co.uk putting the project number in the Subject line.	
Is your report more than 10MB? If so, please discuss with Darwin-Projects@ltsi.co.uk about the best way to deliver the report, putting the project number in the Subject line.	x
Have you included means of verification? You need not submit every project document, but the main outputs and a selection of the others would strengthen the report.	x
Do you have hard copies of material you want to submit with the report? If so, please make this clear in the covering email and ensure all material is marked with the project number.	
Have you involved your partners in preparation of the report and named the main contributors	x
Have you completed the Project Expenditure table fully?	x
Do not include claim forms or other communications with this report.	