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# **DIR25S2\100048**

## **Integrating conservation and health in Papua New Guinea's vulnerable rainforests**

Conservation intervention, research, and capacity building will (i) enable expansion of indigenous rainforest conservation through community health provision, (ii) spread awareness of the benefits of intact forests, (iii) research both the relationships between forest integrity and health in PNG, and the efficacy of integration of health services into forest conservation across the tropics, and (iv) train students and staff in research and conservation. The long-term impact will protect highly diverse forests in PNG and improve their inhabitants' quality of life.

## PRIMARY APPLICANT DETAILS

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<b>Title</b>	Dr
<b>Name</b>	Alan
<b>Surname</b>	Stewart
<b>Tel (Work)</b>	
<b>Email (Work)</b>	
<b>Address</b>	

## Section 1 - Contact Details

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### PRIMARY APPLICANT DETAILS

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Title	Dr
Name	Alan
Surname	Stewart
Tel (Work)	
Email (Work)	
Address	

### GMS ORGANISATION

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Type	Organisation
Name	UNIVERSITY OF SUSSEX
Phone	
Email	
Address	

## Section 2 - Title, Dates & Budget Summary

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### Q3. Project title:

Integrating conservation and health in Papua New Guinea's vulnerable rainforests

### What was your Stage 1 reference number? e.g. DIR25S1\100123

DIR25S1\100123

### Q4. Country(ies)

**Which eligible country(ies) will your project be working in? Where there are more than 4 countries that your project will be working in, please add more boxes using the selection option below.**

Country 1	Papua New Guinea	Country 2	No Response
Country 3	No Response	Country 4	No Response

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Do you require more fields?

No

## Q5. Project dates

**Start date:**

01 April 2019

**End date:**

31 March 2022

**Duration (e.g. 2 years, 3 months):**

3 years

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## Q6. Budget summary

Year:	2019/20	2020/21	2021/22	Total request
<b>Amount:</b>	£122,042.00	£116,930.00	£116,381.00	<b>£</b> 355,353.00

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Q6a. Do you have proposed matched funding arrangements?

Yes

**What matched funding arrangements are proposed?**

The University of Sussex, the Brighton & Sussex Medical School, the New Guinea Binatang Research Center, and the Academy of Sciences of the Czech Republic will match 9.8%, 7.6%, 3.5% and 16.4% respectively of total project costs, which will include additional staff and trainer time, overheads, lab and office use, equipment use, accommodation, etc., amounting to a total of £X.

**Q6b. Proposed (confirmed and unconfirmed) co-financing as % of total project cost** 37%

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## Section 3 - Project Summary

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### Q7. Summary of project

**Please provide a brief summary of your project, its aims, and the key activities you plan on undertaking. Please note that if you are successful, this wording may be used by Defra in communications e.g. as a short description of the project on [GOV.UK](https://www.gov.uk). Please write this summary for a non-technical audience.**

Conservation intervention, research, and capacity building will (i) enable expansion of indigenous rainforest conservation through community health provision, (ii) spread awareness of the benefits of intact forests, (iii) research both the relationships between forest integrity and health in PNG, and the efficacy of integration of health services into forest conservation across the tropics, and (iv) train students and staff in research and conservation. The long-term impact will protect highly diverse forests in PNG and improve their

inhabitants' quality of life.

## Section 4 - Lead Organisation Summary

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### Q8. Lead organisation summary

Has your organisation been awarded a Darwin Initiative award before (for the purposes of this question, being a partner does not count)?

Yes

If yes, please provide details of the most recent awards (up to 6 examples).

Reference No	Project Leader	Title
22-002	A.J.A. Stewart	Complete Altitudinal Rainforest Transect for research and conservation in PNG
19-008	A.J.A. Stewart	Building biodiversity research capacity to protect PNG rainforest from logging
15-007	A.J.A. Stewart	Focus for Fiji: Insect inventories for biodiversity assessment
14-054	A.J.A. Stewart	Training the next generation of Papua New Guinean conservation biologists.
EIDPO009	A.J.A. Stewart	Consolidating Local Capacity for Biodiversity Surveys in Papua New Guinea.
10-030	A.J.A. Stewart	Developing local capacity for biodiversity surveys in Papua New Guinea

Have you provided the requested signed audited/independently examined accounts? If you select "yes" you will be able to upload these. Note that this is not required from Government Agencies.

Yes

## Section 5 - Project Partners

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### Q9. Project partners

Please list all the partners involved (including the Lead Organisation) and explain their roles and responsibilities in the project. Describe the extent of their involvement at all stages, including project development.

This section should illustrate the capacity of partners to be involved in the project. Please provide Letters of Support for each partner or explain why this has not been included.

N.B. There is a file upload button at the bottom of this page for the upload of a cover letter (if applicable) and all letters of support.

Lead Organisation name: University of Sussex

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Website address: <http://www.sussex.ac.uk>

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Details (including roles and responsibilities and capacity to engage with the project):

Project Leader Alan Stewart (Reader in Ecology; <http://www.sussex.ac.uk/lifesci/Stewartlab.html>) will be responsible for overall co-ordination, liaison with overseas and UK partners, financial management and report writing. He will co-ordinate PNG trainee visits to the UK, including training them, participate in fieldwork and assist in planning training visits to PNG by UK experts. He has led six Darwin Initiative (DI) projects previously and has considerable experience of the issues and challenges involved.

Mika Peck (Senior Lecturer in Biology; <http://www.sussex.ac.uk/lifesci/Pecklab.html>) led a DI project in Ecuador to establish protected areas for critically endangered species and has experience developing indigenous livelihoods in PNG. He will train PNG partners in biodiversity survey and GIS mapping/remote sensing to define and establish protected area boundaries.

Jackie Cassell (<https://www.bsms.ac.uk/about/contact-us/staff/professor-jackie-cassell.aspx>) is a public health doctor and academic with broad experience in the prevention of infectious and chronic diseases. She will support the health and epidemiology related work, provide UK clinical oversight, and contribute to training.

Jo Middleton (Research Fellow; <https://www.bsms.ac.uk/about/contact-us/staff/jo-middleton.aspx>) will co-design and participate in fieldwork and training. He has a background in research (qualitative, quantitative), emergency care (ambulance service) and teaching (trauma care, including in wilderness areas; health-biodiversity interactions) and carried out the medical needs assessment in Wanang.

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Have you included a Letter of Support from this organisation?  Yes

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Have you provided a cover letter to address your Stage 1 feedback?  Yes

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**Do you have partners involved in the Project?**

Yes

**1. Partner Name:** New Guinea Binatang Research Center (BRC)

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**Website address:** <http://www.entu.cas.cz/png>

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**Details (including roles and responsibilities and capacity to engage with the project):** Principal counterpart in five DI projects, principal partner in project management, training and research. BRC has established a collaborative network including PNG's main universities, research institutes and conservation NGOs.

BRC is a leading biological research and training institution in PNG with 40 researchers, para-ecologists and students in residence. BRC has published >100 biodiversity papers at international level and its Center for Postgraduate Biology trains, in collaboration with all major PNG universities, the largest group of postgraduate biology students in PNG.

BRC is the principal partner of WCA, working with indigenous Wanang landowners on conservation, development and research. It assists and develops other conservation areas, including the Mt. Wilhelm DI project.

The project team, its key members DI-trained, has >10 years of experience at WCA. It is led by the Deputy Director Dr. Dem and includes team leaders (Mogia, Molem), senior para-ecologists (Labun, Jimbudo, Wagia, Pomoh, Koane), junior para-ecologists recruited from WCA (Filip, Paul, Siki, Umari, Kimbeng), resident students (Kik, Luke, ), senior scientists specialized in biodiversity (Novotny) and social science (Konecna), and 2 newly recruited postgraduate students.

BRC is equipped to meet the project's logistical demands (expertise, lab facilities, vehicles, access to field sites, liaison with government).

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Have you included a Letter of Support from this organisation?  Yes

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**2. Partner Name:** Wanang Conservation Area (WCA)

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**Website address:** [www.entu.cas.cz/png/wanang/](http://www.entu.cas.cz/png/wanang/)

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**Details (including roles and responsibilities and capacity to engage with the project):**

WCA is a village-owned and run 10,000 ha conservation area in a CBD priority area, one of only two large conservation areas in PNG surviving in direct contact with logging. WCA is directed by the Conservation Board with nine members, who are also leaders of the nine clans that combined their lands to create WCA. The Board is chaired by J. Rop. Another clan leader, F. Damen, acts as Project Manager. WCA has partnered with BRC to provide an alternative avenue to logging for community development. It is hosting research and partnering with local businesses and NGOs interested in supporting conservation. This capacity was developed during the 19-008 DI project. WCA will host the proposed project, using it to expand and improve conservation of highly biodiverse lowland rainforest. The WCA community will support and participate in biodiversity and medical research. It will be the beneficiary of medical aid, including a newly established Aid Post, and biodiversity training provided by the project.

WCA was awarded the UNDP 2015 Equator Prize for “innovative approaches to conservation” and has potential to become one of the two best developed and secured conservation areas in PNG, a role model for such projects in PNG.

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**Have you included a Letter of Support from this organisation?**  Yes

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**3. Partner Name:** PNG Institute of Medical Research (IMR)

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**Website address:** [www.pngimr.org.pg/](http://www.pngimr.org.pg/)

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**Details (including roles and responsibilities and capacity to engage with the project):**

IMR is the leader of medical research in PNG and scientifically the most productive PNG institution overall. The Institute has an in-house postgraduate training programme, community outreach for health awareness, and research programmes focused on major medical problems in PNG, including malaria, filariasis, TB and HIV. With 550 staff, it represents the largest concentration of medical research expertise in the country. It is also the regulatory body permitting medical research, including the project proposed here.

The Institute will actively collaborate in the proposed medical research and intervention in WCA and its staff will be trained, in PNG and UK, during the project. Dr Moses Laman will be lead IMR contact, and clinical lead in PNG. He is a medical doctor (paediatrician) and scientist with extensive experience running multi-site rural studies in PNG. Based in the regional centre closest to the WCA (Madang, where BRC is also located), he is ideally placed to oversee IMR project staffing (Research Nurse, social scientist, laboratory scientist, scientist- entomology) and collaboration with project partners. Dr William Pomat (IMR Director) has wide practical experience of field and laboratory research which will inform his oversight and advice on the project, including of IMR contribution to M&E.

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**Have you included a Letter of Support from this organisation?**

Yes

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**4. Partner Name:**

International Institute of Environment and Development

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**Website address:**

<https://www.iied.org/users/emilie-beauchamp>

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**Details (including roles and responsibilities and capacity to engage with the project):**

The proposed partnership understands the central importance of monitoring and evaluation (M&E) in successful project implementation, output delivery, and reporting. IIED have thus been brought into the partnership to provide expert M&E advice and oversight.

IIED is a policy and action research organisation with 114 staff working to promote sustainable development in projects across the world. Dr Emilie Beauchamp has extensive experience doing M&E of conservation, development, and climate adaptation interventions. She has worked on such projects in Cambodia, Laos, Myanmar, Cameroon, Senegal, Mali, and India. She has also done fieldwork in PNG and this practical experience combined with her M&E expertise will enable her to (i) maintain an effective oversight of the overall project M&E, (ii) provide training to PNG staff in M&E techniques and application of the project M&E strategy, and (iii) synthesize M&E for whole project reporting.

In addition, IIED is partnering with Conservation Through Public Health (Uganda) on another DI project seeking to integrate health and conservation. Dr Dilys Roe (Principal researcher and team leader [biodiversity], Natural Resources) will ensure links are made between these two projects and any learning from the Uganda project that might support this proposed project is transferred – and vice versa.

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**Have you included a Letter of Support from this organisation?**  Yes

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**5. Partner Name:** *No Response*

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**Website address:** *No Response*

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**Details (including roles and responsibilities and capacity to engage with the project):** *No Response*

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**Have you included a Letter of Support from this organisation?**  Yes  No

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**6. Partner Name:** *No Response*

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**Website address:** *No Response*

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Details (including roles and responsibilities and capacity to engage with the project):

No Response


Have you included a Letter of Support from this organisation?  Yes  No


If you require more space to enter details regarding Partners involved in the Project, please use the text field below.

No Response

Please provide a cover letter responding to feedback received at Stage 1 if applicable and a combined PDF of all letters of support.


 **Letter responding to Stage 1 reviewers comments**


 03/12/2018

 22:16:16

 doc 941 KB

 **Combined letters of support**

 03/12/2018

 14:45:14

 pdf 1.32 MB

## Section 6 - Project Staff

### Q10. Key project personnel

Please identify the core staff on this project, their role and what % of their time they will be working on the project.

Please provide 1 page CVs for these staff, or a 1 page job description or Terms of Reference for roles yet to be filled. Please include more rows where necessary. These should match the names and roles in the budget spreadsheet.

Name (First name, Surname)	Role	% time on project	CV attached below?
Dr Alan Stewart (AS)	Project Leader	10	Checked

Jo Middleton (JM)	BSMS & School of Life Sciences, UoS: Research Fellow [Medical Research/ Health care] WS-1: (i) co-plan medical provision and assessment of health outcomes, incl. fieldwork. (ii) co-design protocol for attitudinal survey. WS-2: (i) co-design protocol, participate in fieldwork and analysis. WS-3: train PNG staff/community members in (i) immediate trauma care and evacuation procedures (ii) research methods (Rapid anthropological Assessment Procedures, focus groups, structured interviews, qualitative analysis, disease/vector ecology, systematic reviews). WS-4: WS lead, write systematic review protocol, and co-supervise MSc student at BRC.	20	Checked
Prof. Jackie Cassell (JC)	BSMS, UoS: Project Clinical Lead at UoS WS-1,2,4: (i) co-design health related protocols, (ii) alongside ML in PNG, clinical oversight of implementation, (iii) public health and epidemiology related supervision of work by JM.	2	Checked
Dr Moses Laman (ML)	Lead IMR contact, and clinical lead in PNG Provide oversight of daily activities of research collaboration including staffing, research outcomes and collaborative discussions and publication (WS-1,2,4). Provide clinical support (WS-1,2) and training (WS-3).	10	Checked

**Do you require more fields?**


Yes


Name (First name, Surname)	Role	% time on project	CV attached below?
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Dr Emilie Beauchamp (EB)	IIED: M&E Oversight WS-1,2,3,4: Expert advice and oversight on the M&E strategy. Training of PNG staff in M&E techniques and application of the project M&E strategy. Oversight of M&E delivery, and synthesis of M&E for whole project reporting. WS-1: co-design protocol for attitudinal survey.	2	Checked
Dr Francesca Dem (FD)	BRC: Overall leadership of the project and coordination of PNG participating organizations, interaction with PNG Government and universities, supervision of PNG students, training of BRC staff, WS-1,2,3,4	50	Checked
Prof. Vojtech Novotny (VN)	BRC: Coordinator/Trainer, M&E Leadership in biodiversity survey methods and training (WS-2), student and staff training in biodiversity methods and data analysis (WS-4, 2, 3), project evaluation (WS-1-4).	25	Checked
Alfred Kik (AK)	BRC: Social Research, M&E Leadership in surveys of community attitudes and logging impacts (WS-1, 2), systematic review of health-conservation interactions (WS-4)	25	Checked

**Please provide 1 page CVs (or job description if yet to be recruited) for the Project staff listed above. Ensure the file is named clearly, consistent with the named individual and role above.**

 **Combined CVs**

 03/12/2018

 23:12:38

 pdf 2.12 MB

**Have you attached all Project staff CVs?**

Yes

## Section 7 - Problem Statement & Conventions

### Q11. Problem the project is trying to address

**Please describe the problem your project is trying to address in terms of biodiversity and its relationship with poverty. For example, what are the drivers of loss of biodiversity that the project will attempt to address? Why are they relevant, for whom? How did you identify these problems?**

Papua New Guinea (PNG) includes the world's third largest rainforest(1), supporting 5% of global

biodiversity. However, 24% of PNG forests have been cleared or degraded in 30 years(1), nearly half caused by commercial logging(2). Only 4.5% of land is officially protected, and this is largely ineffectual. In PNG, 97% of land is owned by clans as communal property, offering a potential counterweight against logging(3). However, without alternative development options, many communities are attracted by inducements from extractive industries and opt for logging(4).

Much of PNG is remote and lacks development resources. It is notably low on health service provision, being ranked 155 of 188 countries by Sustainable Development Goal (SDG) 3's health indicator scores(5). Medical neglect has left the top causes of health problems unchanged for fifteen years(6). Life expectancy is low(7); maternal(8) and infant(9) mortality rates are high.

Sustainable development requires protecting life on land (SDG 15), and supporting good health (SDG 3), but these goals can seem in conflict to PNG forest communities. Logging companies' offers of roads and income can decrease remoteness from health services, making desire for health a driver for forest destruction and erosion of health related ecosystem services. Conservation success in PNG thus requires synergies be developed with delivery of other SDGs, particularly those pertaining to health. Our proposed integrated health and conservation project includes (i) a community health intervention tied to conservation, (ii) community and school-based education in the health-related ecosystem services of intact forests, (iii) creation of two new conservation areas, expansion of an existing one, creation of a no-impact zone within it and two new buffer zones on its borders, (iv) an evidence synthesis of related projects across the tropics, and a multi-site assessment of the effect on biodiversity and public health of conserving compared to logging forests in PNG.

**If necessary, please provide supporting documentation e.g. maps, diagrams etc., using the File Upload below:**

*No Response*

## **Q12. Biodiversity Conventions, Treaties and Agreements**

**Q12a. Your project must support the objectives of one or more of the agreements listed below. Please indicate which agreement(s) will be supported and describe which objectives your project will address and how. Note: projects supporting more than one will not achieve a higher score.**

- Convention on Biological Diversity (CBD)
- Nagoya Protocol on Access and Benefit Sharing (ABS)

### **Q12b. Biodiversity Conventions**

**Please detail how your project will contribute to the objectives of the agreement(s) your project is targeting. You should refer to Articles or Programmes of work here. Note: No additional significance will be ascribed for projects that report contributions to more than one agreement.**

According to its (latest available, 2017) Fifth Report on the CBD, PNG had planned to increase protected areas from 4.5% to 10% of the country by 2010 and improve their management. Although not fully achieved, the Conservation and Environment Protection Agency (CEPA - the government contact point for the CBD) of the PNG Government is working towards this goal. WCA is included in their strategy and is considered a thriving role model to other conservation areas for securing finances and community benefits in direct competition with logging options. In this context, our project is relevant to CBD Aichi Biodiversity Targets 5 and 11. WCA has become the leading field research site in PNG for biodiversity studies, equipped with a research station, trained teams of assistants and an extensive knowledge base (Target 19).

Our project will enable BRC and WCA to support the Nagoya protocol through research and documentation of the country's biodiversity, and training of biodiversity professionals in local communities to postgraduate researchers, including collecting and making public genetic information on the country's species.

### **Q12c. Is any liaison proposed with the CBS/ABS/ITPGRFA/CITES/CMS/Ramsar focal point in the host country?**

Yes

#### **Please give details:**

The Conservation and Environment Protection Agency of the PNG Government (CEPA), which is the focal point for the CBD and CITES treaties in PNG, is a close collaborator of BRC and has been working with BRC on the conservation of the WCA for the past 7 years (see CEPA support letter).

### **Q12d. Global Goals for Sustainable Development (SDGs)**

#### **Please detail how your project will contribute to the Global Goals for Sustainable Development (SDGs)**

The project goals are perfectly aligned with: SGD15 by protecting 10,000 ha of high value lowland rainforest which is under the most intense pressure from logging in PNG; SDG03 by providing access to health care for indigenous community members who presently lack it; and SDG04 by providing training opportunities from grassroots to postgraduate levels for PNG citizens. Conservation already supports the local elementary and primary schools. Additionally, the project will have indirect positive effects on goals 1 (no poverty), 2 (zero hunger), 5 (gender equality), 8 (decent work and economic growth), 10 (reduced inequalities), and 17 (partnerships for the goals) through bringing employment opportunities (as para-ecologists and other staff supporting biodiversity research) to remote, highly disadvantaged and economically poor communities, improving their quality of life, redressing the existing gender imbalance in access to medical care and economic opportunities and promoting local and international collaboration.

## **Section 8 - Method, Change Expected, Gender & Exit Strategy**

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### **Q13. Methodology**

**Describe the methods and approach you will use to achieve your intended Outcome and Impact. Provide information on how you will undertake the work (materials and methods) and how you will manage the work (roles and responsibilities, project management tools etc.).**

**This may be a repeat from Stage 1, but you should update or refine as necessary.**

We propose four work streams.

WS-1. Supporting and expanding indigenous led forest conservation by providing health services and improving community health

DI 19-008 supported clans (c.200 people) who rejected financial incentives from loggers (contrary to surrounding communities) and established Wanang Conservation Area (WCA), preserving 10,000ha of forest, legacy benefits being schooling, income from hosting scientists, travel, and para-ecologist training. The clans now identify health as their remaining top priority. The project will set up a nurse-staffed aid post in Y1 (ultimately to be funded by PNG government), which will improve health service provision and community health, and enable expansion and creation of conservation areas. As part of this project the clans propose to declare in Y1 a new no-impact zone (no hunting, no gardening) of 1000ha within WCA, and

two new conservation areas of primary forest beyond it (500ha and 400ha respectively). In addition, by providing access to the aid post to 9 villages surrounding WCA (c.1800 people) who own previously selectively logged forests which retain biodiversity value, a 3000ha buffer zone (no logging, no agriculture) for WCA's intact forests will be declared by Y1 end (map in appendix). Improved attitudes to conservation in the communities previously outside the conservation collaboration will be assessed by household surveys before and after the health intervention.

#### WS-2. Educational programmes on health and well-being benefits of intact forests

Intact forests provide direct and indirect services supporting the well-being of communities, especially marginalised groups such as women and elderly. We will develop and implement educational programmes for different social groups on these benefits, in (i) BRC partner communities across PNG (c.5000 people), and (ii) schools: in Y1 at Wanang (c.260 pupils, 35% female), and Y2 through BRC's established network (c.750 pupils). In Y3, the package will be made available nationally to Department of Education, and internationally to educational partners in the Planetary Health Alliance.

WS-3. Providing evidence on the interlinkages between logging, forest conservation, health, well-being, and livelihoods in PNG, and reviewing integrated health and tropical forest conservation projects worldwide.

To encourage government and communities to support conservation pathways to development, we will collect evidence of the ecosystem services and biodiversity intact forests maintain in PNG, and assess integrated health and rainforest conservation projects across the tropics. Multi-disciplinary teams will collect data to compare health and access to health provision (including governance and development infrastructure); perceptions of well-being, livelihoods, and biodiversity indicators between villages in forests which are (i) intact, (ii) undergoing logging, or (iii) logged. In parallel, PNG nationals (trained by Sussex) will produce an evidence synthesis (following Collaboration for Environmental Evidence guidelines (10)) into the efficacy of health service incorporation in tropical forest conservation worldwide.

#### WS-4. Training of PNG nationals

We will train in-country, and bring PNG nationals to the UK for 1-month of intensive courses in: health, ecology, microbiology, biodiversity surveying, and project evaluation. This will increase skills and knowledge and enable them to teach on return. We will train 1 MSc and 1 BSc Hons student enrolled at University of PNG.

## Q14. Change expected

**Detail the expected changes this work will deliver. You should identify what will change and who will benefit a) in the short-term (i.e. during the life of the project) and b) in the long-term (after the project has ended).**

**Please describe the changes for biodiversity and for people in developing countries, and how they are linked. When talking about people, please remember to give details of who will benefit and the number of beneficiaries expected. The number of communities is insufficient detail – number of households should be the largest unit used. If possible, indicate the number of women who will be impacted.**

Short-term:

Workstream 1 (outputs 1 and 2): As a contribution to poverty reduction, significantly improved health for c.2,000 people (10 villages, c.333 households) within c.500 km<sup>2</sup> currently lacking any medical services, especially women and elderly, with health data supporting design of long term health plan. Community defined priorities include: increased availability of malaria testing and treatment, child vaccination,



proportion of births attended by health professionals, proportion of women of reproductive age who have their need for family planning satisfied with modern methods; reduced incidence of neglected tropical diseases (indicators for all in logframe).

Strengthened support for conservation as a result of health intervention will result in increased conservation of biodiversity, specifically (i) increased no-impact zones (1,000 to 2,000ha, map in appendix) within WCA, with 25% increase in abundance of previously hunted mammal and bird species by project end, and (ii) adding two new conservation areas beyond WCA (900ha), which will provide protection for an additional average of: (i) 34 individual birds/ha (across all species), (ii) 11.5 individuals of each of the ten rarest bird species in the area; (iii) 15 tree species recorded across the combined protected areas. The WCA comprises a highly diverse forest type that is under the most intense pressure from logging in PNG.

Attitudes to conservation amongst communities receiving health care surrounding the WCA will improve and facilitate declaration of a 3,000ha buffer zone protected from further logging or conversion to agriculture (map in appendix). These forests, previously selectively logged, will show a significant shift towards the community composition of primary forest.

Workstream 2 (Output 3): Greater awareness in BRC partner communities (c5000 people) and school pupils (c1010 in 6 village schools) of health and well-being benefits of intact forests.

Workstream 3 (output 4): Novel socially disaggregated data and analysis on well-being, health, livelihood, and biodiversity impacts of forest status (intact/logged/undergoing logging) in PNG. Meta-analysis of integrated health and forest conservation projects across the tropics.

Workstream 4 (output 5): PNG nationals, including women, acquire key skills in health, biodiversity, and project evaluation (two postgraduate students; on-site courses for 25 BRC staff and 14 villagers; UK training visits for five personnel from BRC and IMR).

Long-term:

Foundations laid for long-term health care for Wanang and neighbouring communities, ensuring sustainable support for expanded WCA, as DI funding is leveraged into government support for aid post. Better health care (especially for women and elderly). Traditional land rights, biodiversity, and ecosystem services secured through rainforest conservation.

Materials developed for Department of Education will support education of PNG school pupils in the benefits of sustainable development pathways which preserve forests.

Quantification of conservation and logging impacts on community health, and effects of integrated conservation interventions on attitudes and well-being, sought by PNG government (CEPA) for their conservation policies.

Better-informed debate on incentivizing tropical forest conservation through medical interventions, and synergies between biodiversity conservation and human health, as a contribution to Planetary Health agenda.

PNG conservation and health institutions will be increasingly staffed and led by skilled PNG nationals.

## Q15. Gender

**All applicants must consider whether and how their project will contribute to reducing inequality**

**between persons of different gender. Explain how your project will collect gender disaggregated data and what impact your project will have in promoting gender equality.**

The patrilineal customary land ownership and tribal traditions in PNG make for a politically strongly male-dominated society (e.g. 2017 general elections produced an all-male Parliament). On the local level, this bias translates to poorer access for women to education and health care. Our project, while it has to respect to a degree the realities of village politics and therefore cannot strive for complete gender equality, will focus on redressing the gender imbalance. Bringing health care directly to the community represents a major step towards equalizing access to it as women are no longer dependent on decisions, often made by husbands, whether to seek treatment in town. Further, community health outreach empowers women as they are the primary audience, caring also for children. Based on experience from previous DI projects when 100% of applicants for training and other desirable positions were male, we will reserve 25% of positions for female trainees in our village-based programmes. The project will also establish the Aid Post Board with equal representation of women and men from Wanang, the first such balanced committee in WCA, ensuring that the women's concerns and priorities are addressed.

In contrast to the village situation, the applications for postgraduate student positions tend to have approximately 1:1 gender balance and will be therefore awarded on merit. At BRC, the project is led by a female researcher (one of the few in the country in such a position) and also includes four other female staff.

Our surveys of the health situation in village communities, and the health impacts of logging, conservation and our medical intervention will be monitored with respect to gender, identifying particular needs of female and male patients.

## **Q16. Exit Strategy**

**State whether or not the project will reach a stable and sustainable end point. If the project is not discrete, but is part of a progressive approach, give details of the exit strategy and show how relevant activities will be continued to secure the benefits from the project. Where individuals receive advanced training, for example, what will happen should that individual leave?**

WCA can be sustainable only if addressing the developmental needs of the communities, with health care and education being the key concerns.

The DI-funded Wanang Aid Post will represent a strong incentive for the PNG government Health Department to recognize it and continue funding afterwards. This strategy follows the precedent of the Wanang school, funded initially from grants, but after demonstrated success recognized and funded by the Department of Education.

The introduction of medical research to WCA brings a new income stream for the community from its logistical support. As illustrated by two other research fields established at WCA, biodiversity and anthropology, successful research attracts new teams and projects as there are few alternative field sites in PNG that can support such research. The WCA is well prepared to take advantage of this new research opportunity.

Training of students and staff creates a lasting legacy as long as the trainees continue using their skills and expertise. BRC's past record is excellent: 31 of 44 para-ecologists continue in research and 6 study university biology; of 17 Hons and MSc students, 12 remain in research and 5 continue PhD studies. We expect similar success from the present project.

**Please provide supporting documentation e.g. maps, diagrams etc., using the File Upload below:**

## Section 9 - Existing works, Ethics & Safeguarding

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### Q17a. Harmonisation

**Is this a new initiative or a development of existing work (funded through any source)?**

- Development of existing work

**Please give details:**

This is a new, distinct stage in a longer joint effort by BRC, WCA and UoS to develop a rainforest conservation area in PNG that is financially sustainable and contributes to biodiversity research and training, thereby becoming a model for other conservation areas. The management capacity for conservation and support of research projects at WCA was developed during DI project 19-008. The present project will introduce health care to WCA and also expand the research, hitherto focused on biodiversity, to examining the relationship between forest conservation and human health. These activities will be co-funded from ongoing BRC-based projects supporting research and student training, but the health focused elements of the project will not happen without the targeted input from DI funding. The long-term impact of our past DI projects is evidenced by those taking part in the proposed project: the two BRC team leaders, K. Molem and M. Mogia, who were initially trained by the 10-030 and EIDPO009 projects (starting in 2001), and by the project leader F. Dem who was a student trainee in the 14-054 project.

**Q17b. Are you aware of any other individuals/organisations/projects carrying out or applying for funding for similar work?**

- No

### Q18. Ethics

**Outline your approach to meeting the Darwin Initiative's key principles for research ethics as outlined in the Guidance.**

Our long-standing UoS-BRC collaboration complies with PNG laws, including approval for research and research visas by the PNG National Research Institute. Our PNG employees enjoy high working standards, medical and pension insurance, holidays, and financial assistance for accommodation and education. Work safety and security is taken very seriously (safe driving, security guards as needed, emergency medical assistance etc.). We have had no work-related serious accidents in past DI projects, despite >150 person-years of activity over 17 years, including field work in difficult conditions.

Our use of PNG biodiversity is guided by six principles: (i) sampling approved by communities and financially compensated, (ii) exports of specimens approved by PNG government (animals: CEPA, plants: Forestry Research Institute), (iii) duplicate specimens deposited in PNG collections (Forestry Research Institute, National Museum, National Agriculture Research Institute), (iv) molecular and taxonomic information made public, (v) local biodiversity experts trained, (vi) local informants and communities retain control over any future use of traditional ethnobiology information.

Our work with communities is based on application of their traditional knowledge to modern science. BRC is recognised as a global leader in this field. The indigenous communities in the WCA have been working with BRC for 10-20 years, in a stable and mutually beneficial partnership.

The standards of research data are rigorously maintained, as illustrated by BRC taking part in >100 research papers, often in highly regarded research journals.

Work-streams 1 and 2 (involving health service provision and human participation) will be reviewed by (i) the Research, Governance and Ethics Committee at BSMS, UoS, (ii) the IMR Institutional Review Board, and (iii) the PNG Government Medical Research Advisory Committee. All medical provision will follow PNG national guidelines, with clinical oversight of the project by Dr Laman and Prof Cassell. Personal data will only be collected with Prior Informed Consent.

## Q19. Safeguarding

(see Guidance Note 3.8)

**Projects funded through the Darwin Initiative must fully protect vulnerable people all of the time, wherever they work. In order to provide assurance of this, we would like projects to ensure they have the appropriate safeguarding policies in place. Please tick the box to confirm you have relevant policies in place and that these can be available on request.**

Checked

## Section 10 - Biodiversity & Project Information

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### Q20. Raising awareness of the potential worth of biodiversity

**If your project contains an element of communications, knowledge sharing and/or dissemination please provide a description of your intended audience, how you intend to engage them, what the expected products/materials will be and what you expect to achieve as a result. For example, are you expecting to directly influence policy in your host country or is your project a community advocacy project to support better management of biodiversity?**

The project will be communicating several important messages, each to a specific audience, using the appropriate approach:

(i) health care and biodiversity conservation awareness for grassroots communities in Wanang (c.260 pupils), 5 partner village schools (c.750 pupils) and c.5000 people in BRC partner communities (education level 0 – 8 years of schooling): message delivered in Neomelanesian Pidgin by BRC staff, experienced in community outreach and themselves trained by the UK experts in PNG and UK (examples from previous projects: <http://baloun.entu.cas.cz/png/ptcleaflets.htm>)

(ii) biodiversity and medical research results for academic community in PNG and overseas: seminars and lectures at PNG universities by BRC and UK project members, including students; research papers (examples from previous projects: [https://scholar.google.cz/scholar?hl=en&as\\_sdt=0%2C5&q=%22New+Guinea+Binatang+Research+Center%22&btnG=](https://scholar.google.cz/scholar?hl=en&as_sdt=0%2C5&q=%22New+Guinea+Binatang+Research+Center%22&btnG=))

(iii) the project's results and lessons on (1) forest conservation management and incentivisation strategies, (2) impact of forest logging on biodiversity, and (3) training and education strategies for research in PNG will be communicated by policy papers, to the PNG Government (CEPA and the PNG Secretariat for Science and Technology, PNG Forestry Authority), research institutes (IMR, PNG Forest Research Institute), and universities (University of PNG, PNG University of Technology, Goroka University). We have established contacts and communication channels at these institutions and have ascertained interest in the expected outputs of the project. We will also disseminate a version of these results more broadly, to the general and professional public (examples from previous projects: [http://baloun.entu.cas.cz/png/NovotnyToko\\_InBryanShearman\\_2015\\_full.pdf](http://baloun.entu.cas.cz/png/NovotnyToko_InBryanShearman_2015_full.pdf); <http://baloun.entu.cas.cz/png/NovotnyBIOTROPICA2010.pdf>)

(iv) various updates on social media including the WCA website(<http://baloun.entu.cas.cz/png/wanang/>), BRC

website(<http://baloun.entu.cas.cz/png/>), Facebook(<https://www.facebook.com/New-Guinea-Binatang-Research-Centre-107820965941582/>), and YouTube(<https://www.youtube.com/channel/UCSjQaQg4FSHZcZKviiE75Lw>)

## Q21. Capacity building

**If your project will support capacity building at institutional or individual levels, please provide details of what form this will take and how this capacity will be secured for the future.**

The project will build professional capacity (i) at BRC and IMR by training para-ecologists and researchers, and (ii) in PNG at large by training postgraduate students. Such training brings benefits beyond the duration of the project as long as the trainees use their newly developed skills. The record of BRC from our past DI projects is excellent: 31 of 44 para-ecologists trained in past projects continue in research, plus six proceeded to study biology at a university, whilst only seven are no longer working in their field. Likewise, BRC trained 17 Hons and MSc students: 12 have careers in research and five are studying for PhD degrees. We are confident of similar success from the proposed project. Better trained staff and students will allow BRC and WCA to secure more biodiversity projects in research, environmental impact assessment and conservation. BRC has been active since 1997, and WCA since 2000, demonstrating the sustainability of their modus operandi.

The project will build an Aid Post in Wanang village as part of the capacity development for WCA. The sustainability plan (continued funding by the Department of Health beyond DI project) is outlined in our Exit Strategy (Q16).

IMR staff will benefit from training in the UK and PNG, as outlined in Work-stream 4 (Q13). Those participating in research will have PNG based training prior to data collection, certificated by Brighton and Sussex Medical School. Fieldwork will develop these skills and knowledge in practice. Training will increase skills and knowledge of PNG nationals, with materials provided to enable future course delivery by IMR. An intensive 1-month of UK training for six PNG nationals, primarily at Brighton and Sussex Medical School, will be individually targeted in line with IMR strategic personnel development plans to maximise transfer of UK expertise to IMR for lasting impact.

## Q22. Access to project information

**Please describe the project's open access plan and detail any specific funds you are seeking from the Darwin to fund this.**

BRC makes all its research publications available for the PNG professional audience on its web site (<http://baloun.entu.cas.cz/png/parataxoweb.htm?ptcpubl.htm>). Further, research papers are published wherever possible as open access. BRC has staff trained in producing Neomelanesian Pidgin publications aimed at sharing the project results with the village communities (<http://baloun.entu.cas.cz/png/ptcleaflets.htm>). BRC has established contacts with PNG Government (CEPA) to share project information relevant to national conservation strategy and policy. All academic papers will be placed on the open access repository of University of Sussex (<http://sro.sussex.ac.uk/>).

## Section 11 - Logical Framework

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### Q23. Logical Framework

Darwin projects will be required to report against their progress towards their expected Outputs and Outcome

if funded. This section sets out the expected Outputs and Outcome of your project, how you expect to measure progress against these and how we can verify this.

**Impact:**

Improved health status and support for rainforest protection in Wanang, and improved evidence and debate on the interaction between health and conservation in the tropics, reflected in PNG government policy.

<b>Project summary</b>	<b>Measurable Indicators</b>	<b>Means of verification</b>	<b>Important Assumptions</b>
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**Outcome:**

Enhanced human health resulting from health service provision promotes improved knowledge, awareness and positive attitudes towards rainforest conservation and facilitates enhanced biodiversity protection in PNG's remote and vulnerable village communities.

0.1 Improved community and individual health status by Y3 end measured against SDG and other health targets, and improved ability to provide first aid and emergency evacuation, in the ten communities (Wanang + 9 others) that have accessed the health post.

0.2 Protected areas expanded and enhanced for biodiversity by end of year 3, through: (i) increase of 1,000 ha to the core no-impact zone of the Wanang Conservation Area (WCA); (ii) buffer zones of 3,000 ha bordering WCA of selectively logged forests created by neighbouring communities; (iii) declaration of two new conservation areas, totalling 900ha, thus increasing total protected area by 10%. People in protected area communities show more positive attitudes towards forest conservation by the Y3 end, compared to baseline, as a result of health intervention.

0.3 School pupils and village residents have improved understanding and attitudes towards the health and wellbeing benefits of forest conservation in: (i) Wanang school (250 pupils, by Y1 end), (ii) 5 villages in BRC's schools network (750 pupils, by Y2 end), and (iii) BRC's partner communities (5,000 pupils, by Y3 end).

0.4 Improved understanding by project end of the interlinkages between biodiversity and human health, well-being, and livelihoods in PNG rainforests, and the efficacy of combined tropical forest conservation and health projects worldwide (through evidence synthesis).

0.5 Enhanced national capacity for biodiversity and anthropological survey and research, first aid and health research, by Y3 end, through training of BRC and IMR staff, paraecologists, and students.

0.1 Data detailing health services provided compared to previously accessible services; clinical data from returning individuals; focus groups and interviews before and after health service provision (clinical individual primary care assessments, interviews with key respondents)

0.2 Written approval by the WCA Conservation Board of enhanced no-impact zone. Conservation agreements with landowners in the villages neighbouring WCA regarding buffer zones and new conservation areas. Results of biodiversity surveys. Household survey data, before and after health service provision, on attitudes towards conservation, disaggregated by social group.

0.3 Results of attitudinal surveys and knowledge tests.

0.4 Database of case studies on interactions between rainforest integrity and human health. Evidence synthesis.

0.5 Records and certificates from skills and knowledge tests and

0.1-0.4 The Wanang community continues to cooperate with our approach and remains committed to forest conservation; Health service provision is accepted and used by the community; A sufficient number of survey participants can be recruited; Community expectations of health service provision and health benefits can be managed; Formal approval is obtained from ethics review committees of University of Sussex and PNG Institute of Medical Research.

assessments.

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**Output 1:**

Community health and health service provision for Wanang and surrounding communities has been improved, managed by a new community committee with equal gender representation (workstream 1).

1.1 By 6 months from project start, 12 WCA community members (25% female) are able to carry out immediate trauma care and evacuation procedures.

1.2 By Y1 end, Aid Post built, suitably equipped, staffed, and operational.

1.3 By Y1 end, new community health committee is able to manage the aid post, and has equal gender representation.

1.4 Setting-adapted SDG health and health service indicators (<https://sustainabledevelopment.un.org/sdg3>) at in-community level have improved compared to baseline data collected in new WCA buffer zones at project start, or in the 2018 Wanang community health needs assessment (carried out in preparation for this application, in part to determine community health service priorities). Specifically: SDG 3.D.1 health worker density, by beginning of last quarter of Y1 an increase from baseline of 0:2000 to 1:2000 in the target population; SDG 3.B.1 proportion of the [paediatric] target population covered by all vaccines included in their national programme [measles and three doses of DTP-HepB-Hib pentavalent vaccine], has improved from <10% at baseline [Wanang] to 60% of those children across the target population 1-years old in Y3; SDG 3.1.2 proportion of births attended [in-community] by skilled health personnel has improved from 0% at baseline to 60% in Wanang, and at least 20% in buffer zone communities by Y3 end; SDG 3.8.1 proportion of women of reproductive age (aged 15-49) who have their need for family planning satisfied with modern methods has increased from 0% at baseline to 50% in Wanang, and at least 20% in buffer zone communities by Y3 end; SDG 3.3.5 number of people requiring interventions against neglected tropical diseases [specifically in this setting mycoses, scabies, yaws] has decreased

1.1 Post-training skill assessments; audit of records of trauma/evacuation incidents throughout project

1.2 Building plans, builders invoice, completion certificate, photo; equipment inventories at opening and at 3-month intervals; equipment inventories and staff and aid post activity logs reviewed every two months until project end.

1.3 Minutes and membership list (disaggregated by sex) of community health committee.

1.4 Analysed individual level clinical data from primary care assessments and interviews before and after health intervention: 120 participants at Wanang July 2018 (63% of population of 189 [all ages]), and expected minimum 360 participants (all ages) across buffer zone communities (20% of population, all ages); patient treatment records; aid post staffing records and inventories.

1.1-1.4. Manuscript #1 for submission to peer reviewed journal ('The Lancet

1.1 A sufficient number of trained community members remain resident in the community.

1.2 Suitably qualified nurse can be recruited and retained for aid post; suitable equipment can be sourced and maintained; access to medical supplies can be maintained.

1.4 Wanang community continue to support the principle of the Aid Post and resident nurse.

50% by Y3 end. By Y3 end, average self-reported current health status has improved at least 1 point along a 5-point scale. Re SDG 3.3.3 malaria, in-community availability of malaria Rapid Diagnostic Test and treatment has improved from 0% baseline availability to 70% availability to all who seek aid.

1.5 Long-term health care plan supported by clinical data, targeting vulnerable groups (women, elderly) for WCA and surrounding communities produced by Y3 end.

Planetary Health').  
"Clinical and conservation attitudinal changes following introduction of health services into an expanding community-led conservation project in Papua New Guinea" [note this publication also will report findings as given below in 2.4].  
1.5 Long-term health care plan for Wanang and buffer zone communities

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**Output 2:**

Wanang conservation Area has been upgraded and expanded, with a resultant increase in biodiversity and improved attitudes to conservation in new partner communities (workstream 1)

2.1 By Y1 end, core no-impact conservation area (no hunting, no gardening) in WCA is 2,000 ha (an expansion in area of 100% from 1,000 ha), as a response to the health intervention. New 1,000ha no-impact zone within WCA shows 25% increase in abundance of previously hunted mammal and bird species by project end.

2.2 By Y1 end, WCA has two additional primary forest fragments (totalling 900ha, ~10% increase) protected from logging, as a response to the health intervention. By project end, the extra 900ha in two forest fragments will provide protection for an additional average of: (i) 34 individual birds/ha (across all species), based on previous WCA surveys showing a density of 1697 birds/50ha; (ii) 11.5 individuals of each of the ten rarest bird species (those with population densities of 1 individual or less per 50ha, based on surveys of the WCA 50ha plot); (iii) 15 tree species recorded across the combined protected areas, based on established plant species accumulation curves for the WCA.

2.3 By Y1 end, an additional 3,000 ha of previously selectively logged forests have been protected from further logging or conversion to agriculture, and form a buffer zone around WCA, as a response to the health intervention. Buffer zones show post-selective-logging recovery of vegetation community by project end, measured as a statistically significant shift along a successional trajectory towards the community composition of primary forest.

2.4 At Y3 end, buffer zone communities (9 villages: c1800 people, c300 households) outside pre-existing WCA boundary show improved positive community attitudes to conservation compared to baseline, as a response to the health intervention. Specifically, by Y3 end scored household attitudes to conservation show improvement in at

2.1 WCA Conservation Board conservation agreement including map with GPS verified boundaries; reports from forest inspections carried out by BRC staff every six-months during project; mammal and bird data from surveys in new no-impact zone.

2.2 Conservation agreement with village landowners of two extra forest fragments, including map with GPS verified boundaries; reports from forest inspections carried out by BRC staff every six-months during project; results of bird and plant surveys.

2.3 Conservation agreement with landowners in the villages neighbouring WCA, including map with GPS verified boundaries; reports from forest inspections carried out by BRC staff every six-months during project; results from multivariate analysis of changes in plant community composition in buffer zones since conservation agreement.

2.4 Database, with analysis, of data from household

2.1 No hunting / no gardening instruction for new no-impact zone is respected by Wanang community.

2.2 Protection of isolated forest fragments can be maintained effectively.

2.3 Selectively logged forest can be protected effectively from further adverse impact or disturbance.

2.4 Village communities in the new buffer zones are prepared to maintain participation in attitudinal surveys.

least 144 of the 300 total households. (Based on expectation that 60% of total households will have sought medical support from the conservation collaboration by Y3 end, and in 80% of such households this results in improved attitudes to conservation).

surveys on attitudes to conservation (disaggregated by sex and age) in each community, prior to health service provision in Y1, and after in Y3 (all c300 households targeted for recruitment).  
2.4 Manuscript #1 as detailed in means of verification for 1.1-1.3 above.

<p><b>Output 3:</b> Knowledge and understanding of the health and well-being benefits of forest conservation amongst school pupils and partner villagers has improved (workstream 2).</p>	<p>3.1 By Y1 end, c260 pupils (35% female) at Wanang school will have improved knowledge and understanding on the health and well-being benefits of forest conservation, compared to baseline pre- educational programme. 3.2 By Y2 end, c750 pupils in BRC's established network of 5 village schools will have improved knowledge and understanding on the health and well-being benefits of forest conservation, compared to baseline pre- educational programme. 3.3. By Y3 end, c5000 people in BRC partner communities across PNG have improved knowledge and understanding of the health and well-being benefits of forest conservation, compared to baseline pre-educational programme. 3.4 In Y3, the Department of Education has a pre-trialled educational package on the health and well-being benefits of forest conservation, which can be rolled out to other communities and incorporated into nationally' set school curricula.</p>	<p>3.1 &amp; 3.2 School records of tests before and after educational programme (disaggregated by sex, age and social group). 3.3 Records of assessments before and after educational programme (disaggregated by sex, age and social group). 3.4 Copy of pre-trialled educational package; minutes of meetings with education stakeholders, including Department of Education.</p>	<p>3.1-3.3 BRC partner communities, and schools beyond Wanang, are prepared to participate in educational programme. 3.4 Department of Education remains receptive to idea of national educational package on the health and well-being benefits of forest conservation.</p>
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**Output 4:**

New evidence has been produced on the interlinkages between logging, forest conservation, health, well-being, and livelihoods in PNG, and tropical rainforests globally (work stream 3)

4.1 By Y2 end, data collection is complete on the effects of forest status (intact, undergoing logging, or logged) on community health well-being, and livelihoods in 10 villages (3-4 villages in each land use category) in 100,000 hectare logging concession located near WCA. Data will include: (i) individual level data including demographics, social and occupational history, current health status and interventions, past medical history (including reproductive and child survival), present clinical observations (including Gross Development Index [children]), qualitative and quantitative data on subjective wellbeing, monetary income, (ii) community level data, including top-five (community ascribed) health problems, and livelihood benefits of differing forest status, including food sources and security (such as forest-use for swidden agriculture, hunting and harvesting plants), income, use of non-timber forest products; access to health provision (including the politics of access, transport etc.)

4.2 By Y3 end, data collection complete on the biodiversity status of the 10 sites (as 4.1). Data will include: abundance and species diversity of plants, birds, and butterflies recorded along fixed 300m transects.

4.3 By Y2 end, an evidence synthesis (in line with Collaboration for Environmental Evidence guidelines; reference #10) has been completed on the impacts of integrating health services into tropical forest conservation projects worldwide (based on our current evidence mapping, expected to be c60 projects).

4.1 Database on community health and well-being effects of forest status.

4.2 Database on biodiversity effects of forest status.

4.1-4.2 Manuscript #2 for submission to peer reviewed journal ('The Lancet Planetary Health'): What is the impact of logging on health and biodiversity in Papua New Guinea?

4.3 Database of evidence synthesis of published and grey literature.

4.3 Manuscripts #3 and #4 for submission to peer reviewed journal (both 'Environmental Evidence'). "Efficacy of integrating health services into tropical forest conservation projects worldwide: evidence synthesis protocol. An evidence synthesis of the efficacy of integrating health services into tropical forest conservation projects worldwide."

4.1-4.2 Sufficient communities are prepared to, (i) participate in health assessments (clinical examinations, focus groups, key informant's interviews, ethnography), and (ii) allow biodiversity transect counts on their lands.

4.3 Sufficient conservation organisations and other repositories of conservation case studies will co-operate by making internal evaluation documentation available for evidence synthesis.

**Output 5:**

Capacity has been expanded, and gender balance improved, in PNG environmental and health research (workstream 4).

5.1 By Y3 end, 14 PNG nationals (25% female) are able to carry out biodiversity surveys across multiple taxa and environments, to a scientifically sound standard.

5.2 By six-months into Y1, 25 BRC staff and students are able to do first aid techniques which may be required in remote fieldwork settings.

5.3 By end of first quarter of Y3, 5 BRC & 1 IMR research staff (all PNG nationals, at least one female) have gained knowledge and skills to acceptable standards in biodiversity survey; conservation project evaluation; ecology; microbiology; evidence synthesis and meta-analysis; rapid anthropological assessments; health research.

5.4 By end of first quarter of Y3, 2 PNG nationals (recruited on merit, from an expected 1:1 gender balance of application – see section 15 Gender) will be able to do health/environmental research projects at, respectively, masters and undergraduate level.

5.1 Participant training logs, periodic learning assessments/tests, and certifications.

5.2; 5.3 Training records; skill and knowledge assessments; certification for participants

5.4 MSc and BSc Hons theses; graduation certificates

5.1-5.4 A sufficient number of para-ecologists and BRC/IMR staff are interested in developing and broadening their skills base; suitable MSc and BSc Hons candidates can be recruited.

**Do you require more Output fields?**

**It is advised to have less than 6 Outputs since this level of detail can be provided at the Activity level.**

No

**Activities (each Activity is numbered according to the Output that it will contribute towards, for example 1.1, 1.2 and 1.3 are contributing to Output 1)**

**The word count for each individual activity should be no more than 25 words.**

## Activity details

### Activity Number

1.1

### Activity Details

Collect and analyse qualitative and quantitative health and wellbeing data before and after the health intervention. Baseline data for the community at Wanang has already been collected through a combined clinical and Rapid anthropological Assessment Procedure (RAP) carried out by team members in July 2018 in preparation for stage 2 of this application. Following the same protocol (available on request and due to be submitted in Jan 2019 to 'BMJ Open' for publication), data will be collected in the buffer zone communities at baseline, and towards project end (alongside Wanang). Multidisciplinary teams will do individual clinical assessments (available to all, expectation based on field experience is over 50% will request), structured interviews with key informants (4-6 per community: clan leaders, ward

councillors, traditional healers), ethnography, and focus groups (8-12 people in each focus group, 4 groups in each community carried out separately with young females, older females, young males, older males).

## Activity details

### Activity Number

1.2

### Activity Details

Train Wanang community members in immediate trauma care and evacuation procedures. WCA community members (25% female) receive training over 5 days in immediate trauma care and evacuation procedure (total 60 person-days of training). Training will largely follow standard Wilderness First Aid-Advanced syllabus (as developed by American Academy of Orthopaedic Surgeons and Wilderness Medical Society), tailored to fit learner requirements and specific needs of community as identified in 2018 health needs assessment (see 1.1 above).

## Activity details

### Activity Number

1.3

### Activity Details

Trained Wanang community members respond to trauma and evacuation incidents as required. Reports of incidents audited throughout, with appropriate add-on/refresher training provided as required.

## Activity details

### Activity Number

1.4

### Activity Details

Construct Aid Post, equip it, stock it with medicine, and recruit a nurse. Stock in line with PNG Health Extension Officer base supplies, with the addition of specific medicines and equipment required as identified in the 2018 community health needs assessment (for example: treatments for neglected tropical skin diseases, a bed for supervised births [if expected to be uncomplicated], malaria rapid tests and treatments, sexual and reproductive health supplies).

## Activity details

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### Activity Number

1.5

### Activity Details

Establish and train community health committee. Carry out training adapted from the good practice guide developed by colleagues at London of School of Hygiene and Tropical Medicine who have advised on this aspect, specifically re their projects on community mobilisation to improve the health of mothers and babies.

## Activity details

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### Activity Number

1.6

### Activity Details

Nurse staffed Aid Post receives and treats patients, maintains patient records. Provides range of services including emergency treatment to all who seek it at aid post (irrelevant of community background), and diagnosis, treatment, and referrals for routine and chronic clinical presentations for the target population (2000 people).

## Activity details

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### Activity Number

1.7

### Activity Details

Produce long-term healthcare plan. Developed jointly by community health committee and medical partners, report will provide planning basis of long term care when aid post support is transferred from funded project to local health authority at Y3 end (as already discussed with them).

## Activity details

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### Activity Number

2.1

### Activity Details



Establish new 1,000ha no-impact core conservation area (no hunting, no gardening), map with GPS verified boundaries, and declare in operation by WCA.

## Activity details

### Activity Number

2.2

### Activity Details

Carry out mammal and bird surveys of new no-impact zone.

## Activity details

### Activity Number

2.3

### Activity Details

Establish two additional primary forest fragments (c900ha total), map with GPS verified boundaries, and declare in operation by WCA.

## Activity details

### Activity Number

2.4

### Activity Details

Carry out plant and bird surveys of the two additional primary forest fragments. Our previous comprehensive bird survey of WCA recorded a density of 1,697 individuals per 50ha across 93 species, ten species of which have densities of one individual/50ha or less (amounting to <200 individuals across the entire 10,000ha area of WCA). The proposed extra 900ha of primary forest would be expected to protect an extra c.30,500 individual birds (across all species) and an average of 11.5 individuals of each of the ten rarest species: Cinnamon Ground dove (*Gallicolumba rufigula*), Long-tailed Honey buzzard (*Henicopernis longicauda*), Streak-headed Mannikin (*Lonchura tristissima*), Rainbow Bee-eater (*Merops ornatus*), Little Pied Cormorant (*Microcarbo melanoleucos*), Papuan Boobook (*Ninox theomacha*), Marbled Frogmouth (*Podargus ocellatus*), Channel-billed Cuckoo (*Scythrops novaehollandiae*), Grey Crow (*Corvus tristis*) and Rufous Monarch (*Symphysichrus rubiensis*). Plant species accumulation curves for the WCA indicate that an extra 900ha would be expected to generate an additional 15 tree species recorded within the combined protected areas.

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## Activity details

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### Activity Number

2.5

### Activity Details

Establish buffer zones of 3,000ha of selectively logged forests with indigenous landowners, map with GPS verified boundaries, and declare in operation by WCA.

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## Activity details

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### Activity Number

2.6

### Activity Details

Record and analyse vegetation community composition yearly in the two buffer zones (based on species composition of all trees >5cm DBH in ten randomly-located permanent 20x20m plots in each buffer zone, repeat sampled in each of 3 years), followed by multivariate analysis of community composition change over the 3 years.

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## Activity details

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### Activity Number

2.7

### Activity Details

BRC staff carry out forest inspections every six months of new no-impact conservation area, two additional primary forest fragments, and 3,000ha buffer zone forests.

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## Activity details

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### Activity Number

2.8

### Activity Details

Collect and analyse household survey data on attitudes to conservation in buffer zone communities outside pre-existing WCA boundary and agreements, before and after health intervention.

## Activity details

### Activity Number

3.1

### Activity Details

Produce curriculum and materials for school and community level educational programmes on health and well-being benefits of forest conservation.

## Activity details

### Activity Number

3.2

### Activity Details

Provide educational programme in Wanang School (c250 pupils, 35% female), making any necessary improvements to programme following delivery.

## Activity details

### Activity Number

3.3

### Activity Details

Provide educational programme in BRC network of 5 village schools (c750 pupils, not in the new buffer zone), making any final necessary improvements to programme following delivery.

## Activity details

### Activity Number

3.4

**Activity Details**

Provide educational programme in BRC partner communities across PNG (c5000 pupils), making any necessary improvements to programme following delivery.

**Activity details**

**Activity Number**

3.5

**Activity Details**

Hold meetings with educational stakeholders, including Department of Education, to arrange incorporation of educational package into educational plans nationally.

**Activity details**

**Activity Number**

3.6

**Activity Details**

Provide pre-trialled educational packages to PNG Department of Education for further roll-out beyond project, and distribute editable version of package throughout international partners in the Planetary Health Alliance primary/secondary education working group.

**Activity details**

**Activity Number**

4.1

**Activity Details**

Collect and analyse health, well-being, and livelihood data from 10 villages with forests that are either (i) intact, (ii) logged, or (iii) with ongoing logging. Collect health related data by carrying out combined clinical and Rapid anthropological Assessments Procedures (RAP, further methodological detail in 1.1 above). Use focus groups, structured interviews, and ethnography to collect qualitative and quantitative data on subjective wellbeing, and livelihood benefits of differing forest status, including food sources and security (such as forest-use for swidden agriculture, hunting and harvesting plants), income, use of non-timber forest products, etc.

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## Activity details

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### Activity Number

4.2

### Activity Details

Collect and analyse biodiversity data from 10 sites also visited for 4.1. Abundance and species diversity of plants, birds, and butterflies recorded from fixed 300m transects visited at each site four times (twice in wet season, twice in dry).

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## Activity details

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### Activity Number

4.3

### Activity Details

Carry out systematic review of efficacy of integrating health services into tropical forest conservation projects worldwide. Based on our current evidence mapping exercise, expected to be c60 projects.

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## Activity details

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### Activity Number

5.1

### Activity Details

Train 14 para-ecologists over 3 years in biodiversity survey methods. Total 280 person-days of training. The training includes instruction by PhD level researchers on study design, sampling methods, specimens processing, identification and ecological data analysis and report/manuscript writing for focal plant, insect and vertebrate taxa focused on rainforest ecosystems.

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## Activity details

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### Activity Number

5.2

**Activity Details**

Train 25 BRC staff and students in 'Wilderness First Aid - Advanced'. Two courses at BRC HQ and field sites for a total of 25 BRC staff and students (all PNG nationals, 25% female). These courses will give BRC staff and students working in remote settings the skills and knowledge to help each other in many potential fieldwork emergencies, and evacuate colleagues to outside care. Total 125 person-days of training.

**Activity details****Activity Number**

5.3

**Activity Details**

Train 5 BRC & 1 IMR research staff in UK. 1-month intensive training in: biodiversity survey; conservation project evaluation; ecology; microbiology; evidence synthesis and meta-analysis; rapid anthropological assessments; health research. Visits to partner institutions.

**Activity details****Activity Number**

5.4

**Activity Details**

Supervise research projects by 1 MSc student for 2 years and 1 BSc Hons student for 1 year based at the University of PNG. The student positions will be advertised nationwide and students selected on merit. They will be resident at BRC to conduct their dissertation research under joint supervision of DI project team and university-based supervisors. The dissertation research will be defined based on the students' strengths and professional interests to contribute to Outputs 2, 3 or 4.

## Section 12 - Implementation Timetable

### Q24. Provide a project implementation timetable that shows the key milestones in project activities

Please complete the Excel spreadsheet linked below to describe the intended workplan for your project.

#### Implementation Timetable Template

Please add columns to reflect the length of your project.

For each activity (add/remove rows as appropriate) indicate the number of months it will last, and fill/shade only the quarters in which an activity will be carried out. The workplan can span multiple pages if necessary.

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↓ Darwin\_R25\_Stage2-Implementation\_Timeta

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## Section 13 - Monitoring and Evaluation

### Q25. Monitoring and evaluation (M&E) plan

Describe, referring to the Indicators above, how the progress of the project will be monitored and evaluated, making reference to who is responsible for the project's M&E.

**Darwin Initiative projects are expected to be adaptive and you should detail how the monitoring and evaluation will feed into the delivery of the project including its management. M&E is expected to be built into the project and not an 'add' on. It is as important to measure for negative impacts as it is for positive impact. Additionally, please indicate an approximate budget and level of effort (person days) to be spent on M&E (see "[Finance for Darwin and IWT Guidance](#)").**

Recognising the vital importance of monitoring and evaluation (M&E) for a project of this magnitude, we have decided to contract in proven expertise in the relevant techniques. Training, design and oversight of the implementation of M&E across the project will be done by Dr Emilie Beauchamp who has extensive experience in monitoring and evaluating social impacts of conservation and climate interventions with the Wildlife Conservation Society and IIED in several countries in Africa, India and Southeast Asia. Additionally, specific duties will be fulfilled by the Project Leader (Stewart, supported by Middleton), BRC Director (Dem), BRC team leaders (Mogia, Molem), IMR Acting Director (Pomat) and the WCA conservation leader (Damen). Senior researchers Novotny (biodiversity) and Konecna (social science and anthropology) will also allocate part of their time on the project to M&E, supported by the BRC team leaders on biodiversity and social impact.

All BRC staff members in management positions have previous experience from 1 – 5 Darwin projects. BRC staff are empowered to report any problems or concerns directly to team leaders.

Project progress will be assessed quarterly, but informal monitoring will be continuous. Annual reporting will feed into the following year's project implementation for maximised adaptive management, carried out as required by meetings of all key staff.

Progress towards attainment of outputs will be monitored as detailed in the logframe, including with reference to the project generated: knowledge and skills assessment records (including periodic tests), audits of records of trauma and evacuation incidents, construction documentation, committee minutes,

individual level clinical data, interviews and focus groups before and after health intervention, conservation agreements, forest inspection reports, biodiversity field surveys, household surveys on attitudinal changes to conservation, multiple databases of collected research data; and the pre-existing scoring and exam system for university students.

Changes will be assessed from before and after intervention with quantitative and qualitative data. This mixed methods approach allows the development of a strong narrative that identifies net effects of the intervention, pathways of change through which the effects have taken place and potential unintended consequences of the intervention. We expect to detect changes in health status and attitudes in the local population, alongside biodiversity changes, within the lifetime of the project, but we recognize that social and ecological changes take years to unfold and long-term impacts will not be apparent within 3 years.

Please note that the budget for the UK-based IIED appears under 'project partners', and should not be confused with funds going to the host country.

**Total project budget for M&E (this may include Staff and Travel and Subsistence Costs)**

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Number of days planned for M&E	180
Percentage of total project budget set aside for M&E	8

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## Section 14 - Funding and Budget

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### Q26. Budget

**Please complete the Excel spreadsheet linked below, which provides the Budget for this application. Some of the questions earlier and below refer to the information in this spreadsheet.**

**[Darwin and IWT Budget Template](#)**


**Please refer to the [Finance for Darwin/IWT Guidance](#) for more information.**

**NB: Please state all costs by financial year (1 April to 31 March) and in GBP. The Darwin Initiative cannot agree any increase in grants once awarded.**


**Please upload your completed Darwin Budget Form Excel spreadsheet using the field below.**

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 **[Budget St2 - Darwin R25 IWT R5 Stewart](#)**

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### Q27. Value for Money



**Please explain how you worked out your budget and how you will provide value for money through managing a cost effective and efficient project. You should also discuss any significant assumptions you have made when working out your budget.**

The distribution of the budget maximizes the share for PNG partners (75% of total DI support; please note that this excludes the budget for IIED, who are non-PNG partners) while making sure that significant input, in terms of expertise and training, will be provided by the UK organizations. This will be achieved using the multiplier effect of UK and PNG-based training by UK experts, combined with a hierarchical training structure in PNG whereby researchers train para-ecologists and students, who in turn train village recruited assistants. This will ensure that the maximum number of PNG personnel receive training for the funds invested.

The project entirely depends on DI funds, but we successfully negotiated significant match funding (37% of the total budget) from the host institutions (UoS and BRC) as well as from existing grants to BRC from the Czech Academy of Science, particularly for salaries, field work costs and the use of existing facilities. We have allocated a significant part of the budget to salaries for PNG personnel and stipends for PNG students, in order to maximise participation in the project and reach the largest possible group of trainees. The operation of BRC facilities, including accommodation, laboratories, and field stations, is charged at cost, making it highly cost-efficient.

The Aid Post costs are based on experience in establishing a similar aid post in another village in 2017. The initial investment is justified as the first step towards permanent funding from the PNG Government. We decided to contract in expertise in monitoring and evaluation techniques to ensure that this vital part of the project was done to the highest possible standard. Although 8.4% of total budget, this will be a good investment for keeping the project on target, early signalling of potential problems and ultimately ensuring that outputs are successfully delivered.

## **Q28. Capital items**

**If you plan to purchase capital items with Darwin funding, please indicate what you anticipate will happen to the items following project end.**

No capital items are planned except the Aid Post which will be constructed during the project in Wanang Village. This will remain operational beyond the duration of the project with funding from the PNG Government (Health Department). We consulted with Eilidh Young (Darwin Applications) and have been advised (email 26/1/18) that, although the guidance states that building construction cannot be included as a capital cost, it is acceptable to Darwin to include this as a capital cost given that the Aid Post will be a wooden building (rather than constructed of concrete or other materials which would create a future legacy-cost for demolition)

## **Q29. Match funding (co-financing)**

**Are you proposing co-financing?**

Yes

**Secured**

**Provide details of all funding successfully levered (and identified in the Budget) towards the costs of the project, including any income from other public bodies, private sponsorship, donations, trusts, fees or trading activity, as well as any your own organisation(s) will be committing.**

<b>Donor Organisation</b>	<b>Amount</b>	<b>Currency code</b>	<b>Comments</b>
---------------------------	---------------	----------------------	-----------------

Czech Academy of Sciences	GBP	No Response
Binatang Research Center	GBP	No Response
University of Sussex	GBP	No Response
Brighton & Sussex Medical School	GBP	No Response

### Unsecured

**Provide details of any co-financing where an application has been submitted, or that you intend applying for during the course of the project. This could include co-financing from the private sector, charitable organisations or other public sector schemes.**

Date applied for	Donor Organisation	Amount	Currency code	Comments
No Response	No Response	No Response	No Response	No Response
No Response	No Response	No Response	No Response	No Response
No Response	No Response	No Response	No Response	No Response
No Response	No Response	No Response	No Response	No Response

**Do you require more fields?**

No

### Q30. Financial Risk Management

**Explain how you have considered the risks and threats that may be relevant to the success of this project, including the risks of fraud or bribery.**

The financial risks are well controlled due to management experience with DI and other projects requiring high standards of financial control at BRC. BRC has financial controls in place with bank accounts reconciled by the Chief Accountant (J. Kavagu), audited by the senior project partners and R. Wong & Associates, an external accounting firm. The selection of more important suppliers is transparent, based on competing offers from several vendors. Financial management in the partner WCA is also in place. BRC has not suffered a financial fraud case during its 21 years of operation and has been successfully managing similar projects from the European Union, NERC, science foundations from various countries (USA, Czech Republic, Japan) as well as private foundations. BRC has also a staff policy of ethical conduct and prevention of bribery. Bribery is not a serious problem for the proposed activities and the social environment in which they take place in the proposed project.

The exchange rate between UK sterling and the PNG Kina tends to fluctuate but our budget is robust

enough to absorb this level of uncertainty. PNG is politically stable and our procedures for research visas and permits have been tested.

## Section 15 - FCO Notifications

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### Q31. FCO Notifications

**Please put an X in the box if you think that there are sensitivities that the Foreign and Commonwealth Office will need to be aware of should they want to publicise the project's success in the Darwin competition in the host country.**

Unchecked

**Please indicate whether you have contacted your Foreign Ministry or the local embassy or High Commission (or equivalent) directly to discuss security issues (see Guidance Notes) and attach details of any advice you have received from them.**

Yes (no written advice)

## Section 16 - Certification

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### Q32. Certification

**On behalf of the**

Trustees

**of**

University of Sussex

**I apply for a grant of**

£355,353.00

**I certify that, to the best of our knowledge and belief, the statements made by us in this application are true and the information provided is correct. I am aware that this application form will form the basis of the project schedule should this application be successful.**

**(This form should be signed by an individual authorised by the applicant institution to submit applications and sign contracts on their behalf.)**

- **I have uploaded CVs for project principals and letters of support.**
- **I have uploaded our most recent signed audited/independently verified accounts and annual report.**





Checked

**Name**

Mark Raven

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Position in the organisation Head of Research Finance

Signature (please upload e-signature)  **Sussex certification 28 Nov 2018 (signed)**  
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Date 28 November 2018

## Section 17 - Submission Checklist

### Stage 2 Application - Checklist for submission

	Check
Have you read the Guidance (including <b>Guidance for Applicants and Finance for Darwin and IWT Guidance</b> )	Checked
Have you read, and can you meet, the current Terms and Conditions for this fund?	Checked
Have you provided actual start and end dates for your project?	Checked
Have you provided your budget based on UK government financial years i.e. 1 April – 31 March and in GBP?	Checked
Have you checked that your budget is complete and correctly adds up?	Checked
Has your application been signed by a suitably authorised individual?	Checked
Have you uploaded a 1 page CV for all the Project Staff on this project, including the Project Leader?	Checked
Have you uploaded a letter of support from the main partner(s) organisations?	Checked
Have you included a cover letter from the lead organisation, outlining how any feedback received at Stage 1 has been addressed?	Checked
Have you been in contact with the FCO in the project country/ies and have you included any evidence of this?	Checked
Have you uploaded a signed copy of the last 2 years annual report and accounts for the lead organisation?	Checked
Have you checked the Darwin website to ensure there are no late updates?	Checked
Have you read and understood the Privacy Notice on GOV.UK?	Checked

**We would like to keep in touch! Please check this box if you would be happy for the lead applicant (Flexi-Grant Account Holder) and project leader (if different) to be added to our mailing list. Through our**

**mailing list we share updates on upcoming and current application rounds under the Darwin Initiative and our sister grant scheme, the IWT Challenge Fund. We also provide occasional updates on other UK Government activities related to biodiversity conservation and share our quarterly project newsletter. You are free to unsubscribe at any time.**

Checked

## **Data protection and use of personal data**

Information supplied in this application form, including personal data, will be used by Defra as set out in the latest copy of the Privacy Notice for Darwin, Darwin Plus and the Illegal Wildlife Trade Challenge Fund available **here**. This Privacy Notice must be provided to all individuals whose personal data is supplied in the application form. Some information, but not personal data, may be used when publicising the Darwin Initiative including project details (usually title, lead organization, location, and total grant value) on the GOV.UK and other websites.

Information relating to the project or its results may also be released on request, including under the 2004 Environmental Information Regulations and the Freedom of Information Act 2000. However, Defra will not permit any unwarranted breach of confidentiality nor will we act in contravention of our obligations under the General Data Protection Regulation (Regulation (EU) 2016/679).