

## Darwin Plus: Overseas Territories Environment and Climate Fund Annual Report

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

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

**Submission Deadline: 30<sup>th</sup> April 2023**

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### Darwin Plus Project Information

Project reference	DPLUS160:
Project title	Multi-Purpose Soil Survey: informing environmental management and climate change mitigation
Territory	British Virgin Islands (BVI)
Lead Partner	University of Portsmouth, UK
Project partners	BVI: Department of Disaster Management (BVI lead); Ministry of Natural Resources; Agriculture and Fisheries Department; Environmental Health Division; Town and Country Planning Department; H. Lavity Stoutt Community College; National Parks Trust.
Darwin Plus grant value	£ 160,900
Start/end dates of project	20 June 2022 to 31 March 2024
Reporting period and number	Annual Report 1: April 2022 – March 2023
Project Leader name	Prof. Richard Teeuw
Project website/blog/social media sites	BVI Soils Facebook page: <a href="https://www.facebook.com/profile.php?id=100087320503724">www.facebook.com/profile.php?id=100087320503724</a> Department of Disaster Management Facebook page: <a href="https://www.facebook.com/bvi.ddm">www.facebook.com/bvi.ddm</a> Department of Disaster Management website: <a href="https://www.bviddm.com/publications/">https://www.bviddm.com/publications/</a>
Report author(s) and date	Richard Teeuw (UoP) & Melanie Daway (BVI DDM), April 2023

### 1. Project summary

#### **Why does the BVI need a multi-purpose soil survey? - environmental and climate change issues is the project addressing**

The lack of digital soil maps for the British Virgin Islands (BVI) is a critical gap in datasets needed for the Territory's environmental management. This project will inform environmental managers about locations of degraded, erosive, hazardous, polluted or vulnerable soils. Mapping soils and their biodiversity will improve knowledge of geo-ecological processes, providing a baseline dataset from which climate change impacts can be assessed.

BVI climate change challenges include increased frequency and magnitude of hurricanes, storm surges, coastal erosion, flooding, extreme rainfall, soil erosion, landslides and debris flows; also, less-predictable growing seasons. Another major challenge is from population pressures from increasing resident population and tourists: issues with water supplies,

wastewater management and sites for construction (ie, areas not exposed to geohazards, with suitable soils).

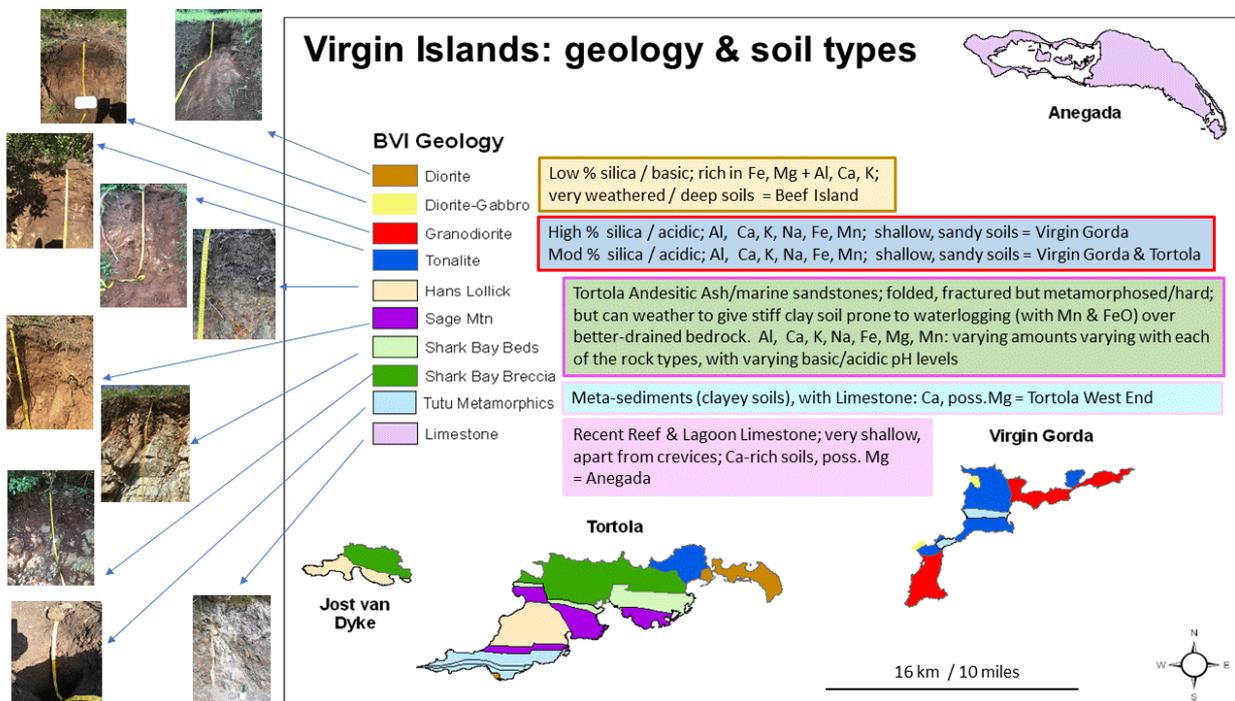
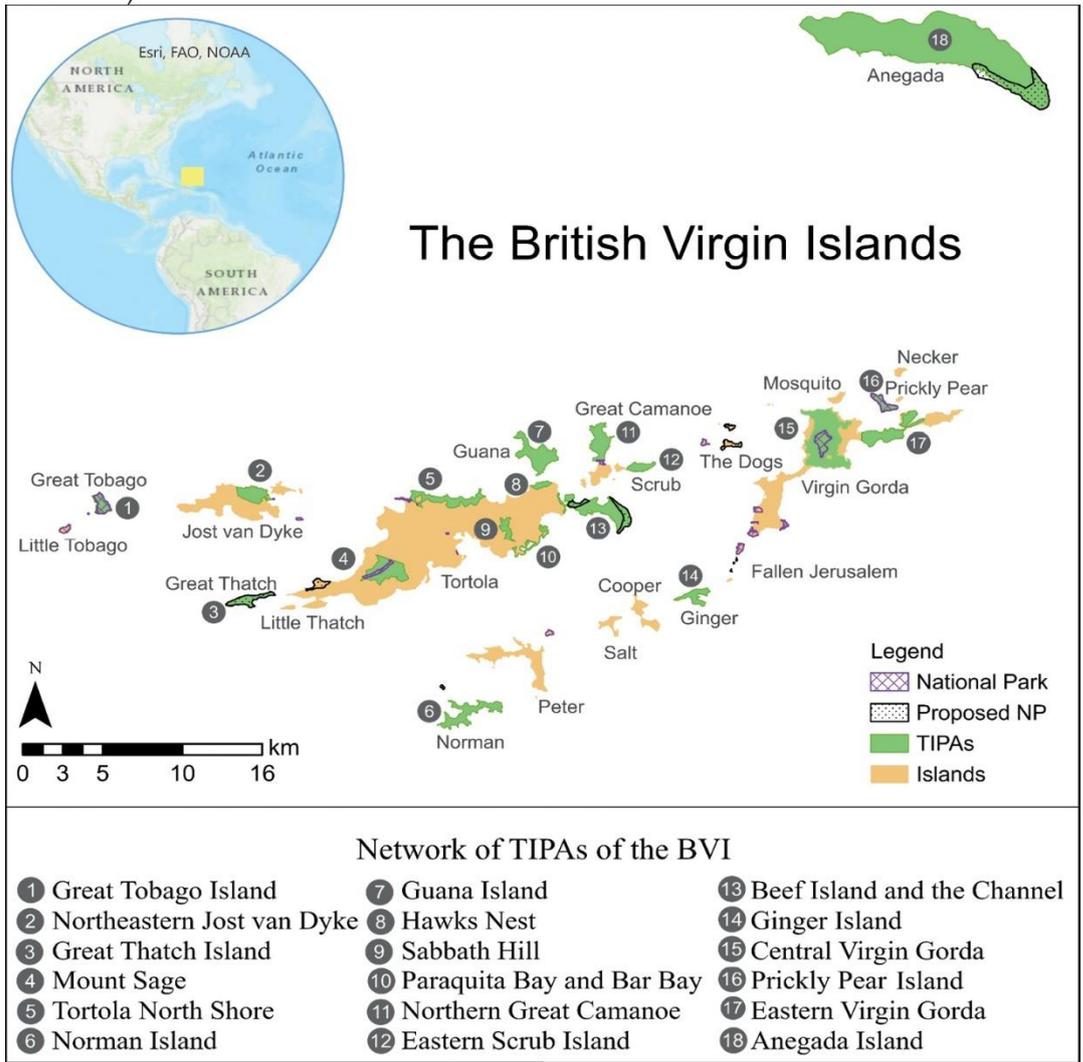


Figure 1. Top: BVI location map, showing National Parks and TIPA sites (source: BVI NPT); Bottom: Geology and representative Soil Types of the BVI (source: this project).

BVI environmental problems include soil degradation and loss of fertility, with increased erosion because of deforestation and land clearance for farming or construction. A problem highlighted by our partners in the BVI Environmental Health Division is sewage pollution from waste management systems that overflow in the rainy season. Information about BVI high-risk soil locations is needed for more effective environmental management or remediation of waste disposal sites.

The impacts of climate change and population pressures vary within the BVI because of its diverse range of bedrock and soil types (ie, its geodiversity), as well as local variations in terrain and vegetation cover. Little is known about links between the BVI's biodiversity with its relatively unknown underlying geodiversity and soil biodiversity. This project will inform that research, as well as contributing to an international problem: a global need for more soil biodiversity data and more trained soil survey staff (Guerra et al., 2020). Information is needed about BVI geodiversity, soil types and soil biodiversity; to inform research into soil-plant linkages and ecosystem functions, as well as potential impacts from climate change.

The inclusion of soil biodiversity within soil surveys is often overlooked, despite its importance in ensuring soil function. Plants protect the topsoil from erosive forces, such as rainfall, and bind soil with their roots. Soil micro-organisms provide structure to soil, providing conditions for successful plant growth and reduce erosion or landslide hazards by binding soil particles. Some soil communities rapidly adapt to changing conditions, improving resilience to changing climatic conditions. The relationship between plants and soil is also crucial in conserving above-ground species, such as plants and the fauna that plants support. There is increasing evidence that many plants form symbiotic associations with the range of soil fauna and fungi, but that those associations are vulnerable to disturbance and can also be perturbed by invasive species. It is therefore of critical importance to examine the organisms present in soils and their function within their specific habitat. There is a lack of understanding of those relationships and a dearth of data from developing countries: this study will help to fill that knowledge gap.

The project has seven BVI stakeholders, reflecting the need for a multi-purpose soil survey, with the project objectives co-developed by all of its partner organisations:

## 2. Project stakeholders/partners

The request for a soil survey of the islands came from BVI government agencies, led by the Department for Disaster Management (DDM). The project has been co-developed by its partner organisations, building on discussions that started in December 2019 during the annual conference of the Caribbean Disaster & Emergency Management Agency (CDEMA), when the project lead (Richard Teeuw, University of Portsmouth) met with a representative of the DDM.

The project partners consist of five BVI Government agencies: the Department for Disaster Management (lead BVI organisation); the Ministry of Natural Resources and the departments of Agriculture, Environmental Health, and Town & Country Planning. Other partners are the BVI National Parks Trust (a para-governmental organisation) and the H. Laverty Stoutt Community College. All 7 stakeholders have been involved in the project design and planning; they are also all involved in the project monitoring, evaluation and decision making, with a representative of each partner organisation on the project Steering Committee, which meets quarterly.

The lead BVI stakeholder is the **Department of Disaster Management (DDM)**, which has collaborated with UoP since 2011 via research projects supervised by Prof Teeuw. DDM regards a BVI soil inventory and GIS-based map as essential for geohazard management and climate change risk reduction. DDM will provide organisational, logistical and operational support, with a technician allocated to analysing soil samples.

The BVI **National Parks Trust (NPT)**, recognises the need for soil data when managing critical habitats such as TIPAs. NPT has 20 years experience with Darwin projects and highlighted ways in which soil data could support the ongoing DarwinPlus BVI project led by RBG Kew. NPT will provide operational support for accessing remote islands.

The **H.Lavety Stoutt Community College** will provide laboratory space for the soil analysis equipment and host the project training workshops. Training of trainers will be carrying out with college teachers, with Soil Science added to the curriculum – helping to raise public awareness about the importance of soil management.

The other BVI stakeholders mainly have an advisory role: the priority of the **Agriculture** Department is soil suitability for farming; the Ministry of **Natural Resources, Environmental Health** Division and **Town & Country Planning** Department are particularly concerned about waste management and pollution.

We also have an MOU with the BVI **Land Survey** Department, for accessing geospatial datasets in their archive and for the project's Soil GIS being hosted on their website.

Local communities and technical specialists who are not formally partners in the project fall into two main groups: BVI farmers and BVI school students. (i) To represent to viewpoints of BVI farmers, Mr William Georges Sr, a retired agricultural scientist, has been invited to attend the project's Steering Committee meetings; (ii) School students: the project has initiated an outreach programme for local schools, raising awareness about the importance of soils within that key part of the BVI population (see section 11 for details).

### **3. Project progress**

#### **3.1 Progress in carrying out project Activities**

The first year of the project have gone quite well, with many activities implemented as per schedule. Despite a delayed start, the schedule of training will be completed on time. The first phase of training (soil survey and sampling methods), led by Prof Teeuw, was during October/November 2022; with the second phase of training (soil laboratory analyses) during January/February 2023. The third phase of fieldwork and training will be in June 2023 (soil geotechnical properties soil biodiversity). A fourth phase of training for the Soil GIS will take place during December 2023 via online sessions.

Unfortunately, the official project notification was not received until June 2022, with final details of the log frame only agreed in August 2022. With estimated 6-week equipment purchase and delivery times (from the UK to the BVI) for our soil analysis equipment, the project start in the BVI has had to be postponed until the end of the Caribbean hurricane season (July-November), following FCDO risk guidelines for travellers. Consequently the project start date in the BVI, had to be postponed from June/July to October/November 2022. A Change Request Form was submitted about this issue on June 26<sup>th</sup> 2022 – and accepted. That decision to postpone the first BVI visit was well-founded, given that Hurricane Fiona came close to severely impacting the BVI in September 2022.

#### **Output 1. BVI self-sufficiency in soil survey and soil laboratory analysis, with an associated BVI Soil GIS inventory, mapping and analysis system.**

##### **Activity 1.1. Soil laboratory established** - for completion by Nov 2022

Completed: the main equipment for the soil physical analysis arrived in the BVI during October 2022, with delayed equipment for the soil chemical analysis arriving in January 2023. The BVI Soil Laboratory has been established within the Marine Research Centre of the H.Lavety Stoutt Community College (HLSCC), Tortola. The BVI Soil Laboratory has been equipped with particle size analysis equipment (sieve shaker, sieve set, with pipette and hydrometer equipment for clay analysis) and a soil chemistry analyser (Palintest S500). Evidenced by the photos and Facebook posts of Sections 11 & 15.

##### **Activity 1.2. Soil survey, sampling and soil lab analyses** – for completion by Nov 2023

On track: The 10 main soil types of the BVI have all been sampled and logged, with particle size analysis carried out for each soil horizon and chemical analysis of the topsoil: ca.150 soil samples have been processed. The soil survey and sampling of Anegada and some of the

unpopulated islands will be carried out during June 2023, in conjunction with the BVI National Parks Trust. Clay analysis of each horizon and topsoil chemical analyses will be carried out between July and November 2023

**Activity 1.3. Soil inventory, GIS database and maps** – for completion by Dec 2023

On track: A preliminary version of the soil inventory and BVI Soil GIS database is currently being developed. The 0.5m-pixel Lidar Digital Elevation Model (DEM), provided by the BVI Land Survey Department, has been converted to a more manageable 5m-pixel DEM (and shared with the Land Survey Department, as well as our BVI project partners). Using ArcGIS and QGIS with DEM and the BVI digital Geology map data, along with rainfall and temperature data, a BVI Geodiversity map has been produced, which has guided the soil survey and generated some useful discussions with our National Parks Trust partners, on possible links between BVI geodiversity and biodiversity See Annex 4. For a summary of those new map sets.

**Activities 1.4, 1.5 & 1.6** - are due in 2023-2024

**Activity 1.7. Workshop on ways of commercialising BVI Soil Laboratory analyses** – for completion by Feb 2023 – Completed - Prof John Williams (UoP, civil engineering & waste management) discussed ways of commercialising BVI Soil Laboratory analyses in a workshop with the project Steering Committee, on February 7<sup>th</sup> 2023. There is potential to commercialise aspects of the BVI Soil Laboratory, in conjunction with some forthcoming EU-funded BVI waste management and water quality projects. Furthermore, the BVI Soil Laboratory could expand its capabilities by making use of currently un-used analytical equipment in the Marine Centre of the HL Stout Community College (albeit with new training of HLSCC technical staff and purchase of necessary chemicals). See the DDM webpage for slides summarising the workshop findings: <https://www.bviddm.com/publications/>

**Output 2. Training provided to BVI Government staff and to the BVI's main higher education institution.**

**Activity 2.1. Training in soil survey and soil analysis** - due Feb 2023

Completed: via workshop on Soil Science & Soil Description (Oct 2022) and a Soil Chemistry workshop (Jan 2023). Evidenced by the training materials and attendee statistics provided in Annex 3, Tables 1 and 2.

**Activities 2.2, 2.3 & 2.4** - are due in 2023-2024

**Output 3. BVI soil survey results inform government departments, and raise public awareness, regarding soil applications, associated risks and climate change preparedness.**

**Activities 3.1, 3.2, 3.3 & 3.4** - are due in 2023-2024

**Activity 3.5. Press releases on project findings** – 4 are due during the 2 years of the project.

On track: a Press Briefing, in which Prof Teeuw introduced the BVI multi-purpose soil survey, was run by the BVI Department of Disaster Management (DDM) on October 27<sup>th</sup> 2022. A DDM press release followed that event, with a further DDM press release, about the soil chemistry aspects of the project and the workshop run by Dr Fay Couceiro, in January 2023. The HL Stout Community College also produced a press release, about their involvement in the project and their hosting of the BVI Soil Laboratory, in February 2023. In addition to the press releases, 12 Facebook posts about the project have been made during 2022-2023. These are all evidenced in Section 11.

## 3.2 Progress towards project Outputs

### **Output 1. BVI self-sufficiency in soil survey and soil laboratory analysis, with an associated BVI Soil GIS inventory, mapping and analysis system.**

The baseline condition for Output 1 is that the BVI had zero soil survey maps or documentation, only geological maps; zero soil laboratory analysis capabilities; zero soil inventory and Soil GIS mapping or analysis capabilities. For 2022-2023, relevant indicator measures for Output 1 are:

1.1 BVI Soil Lab equipment installed and operational (by Nov 2022).

1.2 Field data and soil lab analysis data available to partners, with fieldwork reports available on ResearchGate (by Nov 2023).

1.3 Soil inventory, GIS database and maps (by Dec 2023).

1.7a. Workshop attendee list provides gender disaggregated data (by Feb 2023).

1.7b. Questionnaire to project partner organisations at the end of the workshop, to gain ideas on possible BVI Soil Laboratory commercial activities, with recommendations on a business development strategy (by Feb 2023).

Change record to date:

Output 1.1 is complete, as evidenced by the photos and Facebook posts of Sections 11 & 15. Output 1.2. is partially complete, as evidenced by the near-complete spreadsheet of sampled BVI Soil Types and soil sub-types in Annex 4. The final phase of fieldwork and soil sampling is due in June 2023, with all the soil analysis due to be completed and shared with our BVI partner organisations by Nov 2023.

Output 1.3. is partially complete, with GIS analysis and mapping of BVI elevation, terrain, geology and geodiversity – evidenced in Annex 4.

Output 1.7. a workshop on ways of commercialising the BVI Soil Laboratory, was completed on February 7<sup>th</sup> 2023: see the DDM webpage for slides summarising the workshop findings: <https://www.bviddm.com/publications/> The results of the post-workshop questionnaire to attendees, to guide a business development strategy for the Soil Lab, have not yet been processed.

Progress towards successful completion of Output 1 is indicated by: the completion of Output 1.1 and the partial completion of Outputs 1.2, 1.3 and 1.7, with no significant problems expected before their completion. Of the Outputs that are being produced during 2023-2024, 1.4 and 1.5 relate to the BVI Soil GIS and associated guidelines on soil suitability: they build on Output 1.3 which has had a good start, so no problems are envisaged. Regarding Output 1.6, the HL Stoutt Community College has already started to incorporate soil science into its teaching curriculum, so no problems are envisaged with that Output.

### **Output 2. Training provided to BVI Government staff and to the BVI's main higher education institution.**

Baseline condition for Output 2 is that BVI Government staff and to the BVI's main higher education institution have had zero training in soil science, soil survey methods and soil laboratory analysis.

For 2022-2023, the only relevant indicator measure for Output 2 is:

2.1: Training in soil survey, soil sampling and soil analysis: two 'hands-on'; workshops, with supporting online training materials, by February 2023.

Output 2.1 is now completed, as evidenced by the training materials and attendee statistics provided in Annex 3, Tables 1 and 2.

Progress towards successful completion of Output 2 is indicated by the successful completion of Output 2.1. Of the Outputs that are being produced during 2023-2024, 2.2 and 2.3 relate to GIS training and are thus dependant on successful production of the BVI Soil GIS (Outputs 1.3, 1.4 and 1.5 – which are all on track); Output 2.4 is the uptake and use of the BVI Soil GIS by government departments, for which no problems are currently envisaged (the Department of

Disaster Management, the Land Survey Department and the National Parks Trust are already using outputs from GIS analysis carried out by this project)

### **Output 3. BVI soil survey results inform government departments, and raise public awareness, regarding soil applications, associated risks and climate change preparedness.**

The baseline condition for Output 3 is that BVI government departments – and the BVI general public - have minimal BVI-specific knowledge to inform them about soil applications, associated risks and climate change preparedness – the only major exception is the BVI Department for Disaster Management, which is tasked with climate change preparedness and associated risk reduction.

For 2022-2023, the only relevant indicator measure for Output 3 is: 3.5. Press releases about the soil survey findings: (i) Sept 2022; (ii) March 2023; (iii) Sept 2023; (iv) March 2024. Change record to date: Output 3.5. is partially complete, with the targeted number of press releases for 2022-2023 achieved, as evidenced by the details in section 11. Progress towards successful completion of Output 3.5 is indicated by 2023-2024 having a similar number of press releases to achieve – we are likely to exceed that target.

Progress towards successful completion of Output 3 is indicated by the successful completion of the 2022-2023 component of Output 3.5. Of the Outputs that are being produced during 2023-2024, 3.1, 3.2, 3.3 and 3.4 depend on the completion of the BVI GIS, 3.4 builds on the completion of the BVI soil survey, soil inventory and Soil GIS, all of which are progressing well.

### **3.3 Progress towards the project Outcome**

The project Outcome is: *BVI soil maps and information on soil suitability for Farming, Waste Management and Construction, leads to better-informed land management, with increased risk awareness, and climate change preparedness.* That will be achieved via the following indicators:

*1. Soil survey and soil analysis for the 4 main islands, with baseline BVI geospatial datasets produced for: BVI Soil Types & Biodiversity; and Soil Suitability for: Farming, Construction, and Waste Management, by Dec 2023.*

- As planned, 3 of the 4 main islands of the BVI have now had representative soil samples collected from them (see soil sample Excel spreadsheet in Annex 4. The bulk of the samples are from Tortola because that island is the largest and has 8 of the 10 major rock types – with associated soil types – found in the BVI. The 4<sup>th</sup> main island, Anegada, is due to be sampled in June, when the sea conditions are optimal for boat travel. Soil suitability for construction and soil biodiversity will be the focus of the June sampling, with further soil samples collected from Tortola, Vigin Gorda and Jost van Dyke islands, along with soil biodiversity sampling of smaller islands in conjunction with the National Parks Trust. Final laboratory analyses of soil horizon texture (% gravel, sand, silt and clay), mineralogy and topsoil chemistry will be carried out during June/July 2023. Between September and December 2023, that baseline soil inventory will be used to populate a BVI Soil GIS, subdivided into two parts: Soil Types & Biodiversity; and Soil Suitability for Farming, Construction, and Waste Management.

*2. For the BVI partner organisations: technical training on soil survey and sampling, soil laboratory analyses, Soil GIS mapping and soil map interpretation, by Jan 2024.*

- A one-day 'hands-on' workshop on soil survey and sampling was provided in and around the Marine Research Centre of the HL Stoutt Community College, in November 2022. Trainees logged and sampled soil horizons, tested the topsoil for permeability and then carried out basic physical analysis of the soil samples (ie, sieving of gravel, sand and silt/clay components), with microscope examination of peds and soil minerals. Soil chemistry and nutrients were the focus of training and topsoil analysis during training in January 2023. The focus of the training during June 2023 will be (i) soil strength and civil engineering applications, via field sampling and

laboratory analyses such as shear strength; them (ii) soil microbiota and biodiversity. Use of the BVI Soil GIS will be the focus of online training provided in December 2023.

*3. Partner organisations use soil suitability maps and guidelines in their activities (ie, for farming, construction, waste management and biodiversity conservation), as well as for soil-related risk management and preparedness for climate change, by March 2024.*

– Year-2 tasks, to be covered in the final report.

*4. Partner organisations' documentation and guidelines for the public, include land use soil suitability information, soil risk management for new developments and soil-related preparedness for climate change, by March 2024.*

- Year-2 tasks, to be covered in the final report.

All of the indicators are considered adequate for measuring the intended Outcome and the project is likely to achieve the Outcome by end of funding (end-March 2024).

### **3.4 Monitoring of assumptions**

The project has not encountered any significant issues with the Outcome and Output level assumptions – they still hold true.

## **4. Project support to environmental and climate outcomes in the UKOTs**

The project is providing baseline data on BVI soils and geomorphology. Those datasets are needed for the BVI to achieve greater hazard mitigation and environmental protection (BVI Multi-Hazard Mitigation Resilience Framework, 2020, p.26). The Virgin Islands Climate Change Policy (2012: p.9 & 23) and National Physical Development Plan (2019: p.85 & 104) also recognise the need for soil mapping in forestry and water conservation, biodiversity and restoration, food security and disaster planning.

## **5. Gender equality and social inclusion**

The project is aiming for gender equality in its operational tasks. We will be following University of Portsmouth guidelines on workplace gender equality and the Athena Swan Equality Charter: <https://www.port.ac.uk/about-us/structure-and-governance/corporate-governance/equality-and-diversity/gender-equality>.

There have been equal opportunities on the project for all genders and social backgrounds. One of the Outputs of the BVI Multi-purpose Soil Survey is to provide training in soil collecting and analyses, with the establishing of an operational soil laboratory. Each stakeholder member has designated two to four technical officers for training. A total of 23 persons including technical officers, students, and farmers have been trained in Introductory Soil Science; Soil Survey & Soil Description; Soil Chemistry/Nutrients and Soil Chemical Analysis - see weblinks to training material publications in Table 2 of the Annex (p.26).

Two workshops have been conducted: in November 2022 and January 2023. Seventeen (17) individuals participated in the Introductory Soil Science, Soil Survey & Soil Description workshop in November which trained ten (10) females and seven (7) males. There were twenty-one (21) participants in the Soil Chemistry workshop conducted in January 2023, which included fourteen (14) women and nine (9) men. Both soil study workshops have recorded more women in attendance.

The BVI Soil Study Steering Committee is composed of 15 members from the seven stakeholders. Of the 15 members, there are 8 women and 7 men.

Please quantify the proportion of women on the Project Board <sup>1</sup> .	Ratio: 8 women to 7 men
Please quantify the proportion of project partners that are led by women, or which have a senior leadership team consisting of at least 50% women <sup>2</sup> .	100% All project partners involve women that secure senior leadership or positions within their organisations.

## 6. Monitoring and evaluation

The M&E work is shared: the University of Portsmouth is the lead organisation, with the BVI Government (via the Department for Disaster Management) leading the M&E for our partner organisations in the BVI. This approach is working well, with representation of all relevant Government agencies, as well as inputs from the BVI National Parks Trust and the BVI education sector (via the HL Stout Community College). The views of BVI farming community are also informally represented via an *ex officio* member of the project Steering Committee, Mr William Georges, a retired agricultural scientist.

The Steering Committee also has inputs from two external experts who each have experience of managing previous Darwin Projects: Prof Simon Cragg of the University of Portsmouth's School of Biosciences (a mangrove expert) and Dr Premachandra Wattage of the Economics Department of Sarabaguwu, Sri Lanka (an expert on tropical ecosystem services). Prof Cragg has been able to attend all of this year's Steering Committee meetings and his feedback on the project's progress has been entirely positive. Unfortunately, Dr Wattage has only been able to attend one of the project's Steering Committee meetings because of the economic crisis and telecoms disruption in Sri Lanka since last year – and that was cut short because of a power cut – however, he is optimistic that he will be able to contribute to all of the Steering Committee meetings during year-2 of the project.

The M&E mechanisms that we have utilised for the project seem to be working well for tracking the Outputs and Activities, all of which are on track for meeting the project Outcome by the end of March 2024. Consequently, no changes made to the M&E plan during the reporting period.

The main achievements of the project's first year are:

- (i) Completion of the main part of the BVI soil survey and sampling, with all 3 of the targeted main islands comprehensively sampled – this is evidenced by the 60 soil sample pits logged and 150 soil samples collected; all of the BVI's 10 Soil Types have been sampled, along with their associated Soil Sub-types (e.g. wet terrain versus dry terrain; ridge/plateau, hillslope and valley-floor sub-types)
- (ii) Establishment of the BVI Soil Laboratory, which has been hosted by one of our partners, the HL Stoutt Community College – this is evidenced by the recently-established soil lab being used for the physical and chemical analysis of the collected soil samples, as well as the lab's use for the analytical aspects of the project's technical training courses.
- (iii) The successful running of the two technical training workshops, on Soil Survey & Soil Description (November 2022) and Soil Chemistry & Lab Analysis (January 2023) – this is evidenced by the pre- and post-training questionnaires and the trainee responses, which indicate improved soil science awareness and knowledge within the participating government agencies, NGOs and educational establishments. Another indication of success with the technical training is the fact that the bulk of the soil analyses carried out in the BVI Soil Lab have been carried out by 4 of our trainees - 2 from the Government (DDM) and 2 from the Community College); three females and one male. Those 4 soil technicians now have a trainer role, providing soil analysis training to a female student who was unable to attend the project's 2022-2023 training courses.

<sup>1</sup> A Project Board has overall authority for the project, is accountable for its success or failure, and supports the senior project manager to successfully deliver the project.

<sup>2</sup> Partners that have formal governance role in the project, and a formal relationship with the project that may involve staff costs and/or budget management responsibilities.

The Activities and Outputs associated with these achievements have contributed to the project Outcome: *BVI soil types and soil biodiversity surveyed and mapped, with self-sufficiency in soil survey and analysis capabilities, enabling improved management of land and waste, with better risk management and climate change preparedness.*

## 7. Lessons learnt

**What worked well, and what didn't work well, this past year?** - The BVI soil survey and sampling has gone well; the BVI Soil Laboratory has been established and is operational, enabling the physical and chemical analysis of the collected soil samples. The training in introductory soil science, soil survey and soil laboratory analyses has also gone well, with 4 of the newly-trained BVI technical staff now training others. The project publicity has been effective, particularly the Facebook posts, creating a widespread interest across the BVI, from the farming community through to school teachers and their students – with both sectors requesting outreach activities.

**Project items that did not go well this year** – those were primarily the budgeting and logistical aspects, driven by the Russia/Ukraine war, associated global inflation and disruption of supply chains – things that were not anticipated when drafting the project budget in 2022.

**If you had to do it again, what would you do differently?** - The project budget should have been designed with the costs of all travel, hotel and subsistence costs having a 10% contingency fund. Should that contingency fund not be needed, then it would be returned to the funder at the end of the project. I would make this recommendation to others doing similar projects and I aim to build this learning into my future projects.

## 8. Actions taken in response to previous reviews ( - not applicable)

## 9. Risk Management

Financial risks will be mitigated via the project partners' fiscal control mechanisms, in conjunction with strictly implemented financial reporting standards implemented by the lead organisation, the University of Portsmouth. Given the reputations of the partner organisations and the relative simplicity of the budget for this 2-year project, we consider the risk of fraud or corruption to be low.

**Risks that have arisen in the last 12 months, which were not anticipated** - The main items that did not go well this year are the budgeting and logistical aspects of the project, driven by the Russia/Ukraine war, associated global inflation and disruption of supply chains – things that were not anticipated when drafting the project budget in 2022. Although the original budget was designed with a 5-10% buffer within it, to cover contingencies (e.g. GB£ / US\$ exchange rate fluctuations and inflation) that was not enough to cover the very large increases in international travel costs and hotel costs during 2023. Supply chain disruption also led to significant delays - the delivery of some laboratory items has been delayed by months, rather than days or weeks – which has led to some items not being delivered and paid for within the 2022-2023 financial year, resulting in Change Requests to cover such items being paid for in the 2023-2024 financial year.

**Adaptations to the project design to address changes to risk** - Two actions have been taken to fit the increased costs of the BVI-based work within the project budget: (i) to reduce the impact of unexpectedly high hotel and subsistence costs in the BVI, the total number of days spent in the BVI by the UK team members has been reduced, typically from 3 weeks to 2 weeks; (ii) to reduce the impact of greatly increased international travel costs (as well as the BVI hotel & subsistence costs) the GIS training that Dr Argyriou will be providing during 2023-2024, has been changed from face-to-face training in the BVI, to online training and distance learning.

The project's risk register has been updated and can be found in Annex 4.

**10. Other comments on progress not covered elsewhere** – n/a: all covered

## **11. Sustainability and legacy**

The intended sustainable benefits post-project are still valid and the project is likely to deliver an Outcome with sustained legacy (social, technical, economic and ecological).

The major direct beneficiaries are the Virgin Islands government departments that are partners in the project: Environmental Health, Agriculture, Town & Country Planning and Disaster Management, as well as the the Ministry of Natural Resources and the National Parks Trust. Those six BVI stakeholder organisations – and the BVI inhabitants that they serve - will benefit from provision of soil maps and data. Those soil datasets will provide the BVI with previously unavailable information for environmental management: from land suitability for agriculture, mitigation of pollution, stabilisation of erosion or landslides, to biodiversity conservation and modelling impacts of climate change.

Those BVI Government partner organisations, as well as the Lavity Stoutt Community College, will also directly benefit from Capacity building. We have established a soil laboratory within the College, with training of at least 2 staff from each of the 7 BVI partner organisations. The College will be adding soil science to its teaching curriculum, so BVI students will be benefiting. Central to the BVI having a long-term capability for soil survey and analysis, is: (i) the availability of soil technicians, which should be secure because the project will be training-up two staff from each of the 7 stakeholder organisations; (ii) commitment of Lavity Stoutt Community College to host and maintain the soil analysis equipment provided by this project.

The commitment from the College is strong because it will be adding soil science to its curriculum, making use of training materials provided by UoP staff. The soil laboratory will add a practical dimension to teaching of applied soil science. The College is also aiming to develop soil laboratory usage for summer school field-based research, with visiting students paying a user-fee to use the lab. Beyond soil science per se, there is topical research potential in biodiversity studies and micro-plastic pollution (via mangrove soils). UoP will be advertising to its students these BVI field-study opportunities.

The College is considering further developing the lab's analytical capabilities, by offering soil analyses on a commercial basis. Prof John Williams, who runs a commercialised analytical laboratory at the University of Portsmouth discussed ways of commercialising BVI Soil Laboratory analyses in a workshop with the project Steering Committee, on February 7<sup>th</sup> 2023. From his review of the current BVI waste management situation, Prof Williams concluded that there is potential to commercialise aspects of the BVI Soil Laboratory, in conjunction with some forthcoming EU-funded BVI waste management and water quality projects. See the DDM webpage for slides summarising the workshop findings: <https://www.bviddm.com/publications/> Prof Teeuw has also been liaising with local farmers, notably Mr Dick-Read (manager of Good Moon Organic Farm Ltd: <http://www.goodmoonfarm.com/>) and Mr George (re. cultivation of major new banana plantations), regarding optimal pricing for soil nutrient analyses, should the BVI Soil Laboratory offer that as a service to BVI farmers.

BVI public interest in the project Facebook posts (see below) has led to the initiation of an outreach programme involving local schools, raising awareness about the importance of soils within a key age group . Two outreach sessions were run in January and February 2023, based on the HL Stoutt Community College campus, with students given introductory fieldwork sessions on soil survey and sampling, followed by an introduction to laboratory analysis of soils (evidenced in Annex 3: Table 1)

## **Promotion of the project in the BVI and internationally**

### **Project Press Releases**

From University of Portsmouth <https://www.port.ac.uk/news-events-and-blogs/news/helping-to-make-the-british-virgin-islands-more-resilient-to-the-impacts-of-climate-change>

From BVI DDM <https://bvi.gov.vg/media-centre/bvi-launches-comprehensive-soil-study>

From HL Stoutt Community College: <https://hlsc.org/news-press/>

#### **From our project Facebook page:**

Post about the project launch

<https://www.facebook.com/bvi.ddm/posts/pfbid028WTA6Vo8UiJzXtH5ngFQ5vew47H3CYEhZhbaWrLoP5jYj6epz8Ly25VumzANviJqI>

A post about the magazine coverage

[https://www.facebook.com/story.php?story\\_fbid=1968687446669893&id=147213335483989&m\\_entstream\\_source=permalink](https://www.facebook.com/story.php?story_fbid=1968687446669893&id=147213335483989&m_entstream_source=permalink)

A post about soil survey training with NPT staff in the Sage Mountain National Park

[https://www.facebook.com/story.php?story\\_fbid=1971114969760474&id=147213335483989&m\\_entstream\\_source=permalink](https://www.facebook.com/story.php?story_fbid=1971114969760474&id=147213335483989&m_entstream_source=permalink)

A post about Dr Fay' Couciero's arrival

<https://www.facebook.com/bvi.ddm/posts/pfbid0XFidHbXtTKtvoWtjNF84aFCTb2JbjyFHUW55ZnwvxolCa9NymzmxW9JG2zzwsPHLI>

About the school visit and introduction to soil survey and soil laboratory analysis

<https://www.facebook.com/bvi.ddm/posts/pfbid02qSnhehVJA9tn4Ptc3FpD3PkRnPyMtRJsDDdCjDuYiPwJGSvt2hdkeJTnkGW5gWMMI>

A short update about Prof John William review of BVI waste management

<https://www.facebook.com/bvi.ddm/posts/pfbid038EwfHjN54HHA6RhgYtr9JDKuYVvFZSdLuGNF4guWkuwejKec6mRFpZodEtEwDvBI>

And a post about the soil chemistry and nutrients training workshop

<https://www.facebook.com/bvi.ddm/posts/pfbid02arX7jTqp4hBb9kG74d8mPakBidfgi4EforLSRb ddZncX7u6WL8GDJ8WTo8a7mw7EI>

From our website, a short update <https://www.bviddm.com/virgin-islands-soils-study-continues/>

Beacon newspaper coverage <https://www.bvibeacon.com/soil-study-to-inform-planning-choices/>

Coverage on Caribbean regional news site Loop <https://caribbean.loopnews.com/content/ddm-begins-soil-study-bvi>

Coverage in UK Science Magazine online <https://scienmag.com/helping-to-make-the-british-virgin-islands-more-resilient-to-the-impacts-of-climate-change/>

## **12. Darwin Plus identity**

The Darwin Plus scheme and its logo have been promoted through the BVI soil survey project on several media platforms, through the Department of Disaster Management's Facebook page, Government of the Virgin Islands media page, a soil survey initiative press release on November 8<sup>th</sup> 2022, the H. Lavity Stoutt Community College webpage, and National Park Trust of the Virgin Islands webpage. The Darwin Plus scheme has also been promoted during the project's technical training workshops, in November 2022 and January 2023.

### **Recognition of the UK Government's contribution to the project's work:**

All Darwin Plus, DEFRA and UK Aid logos on title slide for all of the training courses, press briefings and Steering Committee meetings. For this multi-purpose soil survey of the British Virgin Islands, the Darwin Plus funding was recognised as enabling a distinct project with a clear BVI-focused identity. Via the BVI multi-purpose soil survey initiative, many BVI organisations – particularly the 7 that are partners in the project - have can become more familiar with the Darwin Plus funding programme. The project is thus adding to a growing awareness in the BVI that there are more potential projects for which Darwin Plus funding could be requested.

The Darwin Plus programme can be linked back through the BVI soil survey project media sources. Facebook has been our most effective way of publicising the project and its Darwin Plus funding, e.g. via the BVI Soils Facebook posts, DDM Facebook posts and HLSCC Facebook posts (see list provided above).

### 13. Safeguarding

Has your Safeguarding Policy been updated in the past 12 months?	No
Have any concerns been investigated in the past 12 months	No
Does your project have a Safeguarding focal point?	Yes, for the soil science training hosted by the H. Lavety Stoutt Community College (HLSCC) we are following their safeguarding policy (see: <a href="https://hlsc.org/policies/">https://hlsc.org/policies/</a> ). Our BVI focal point is Dr Susan Zaluski of the HLSCC: [REDACTED] Our focal point for the UK team is Prof Richard Teeuw: [REDACTED]
Has the focal point attended any formal training in the last 12 months?	No
What proportion (and number) of project staff have received formal training on Safeguarding?	Past: 20% [2/10] Planned: 50% [5/10]
Has there been any lessons learnt or challenges on Safeguarding in the past 12 months? Please ensure no sensitive data is included within responses.	No
Does the project have any developments or activities planned around Safeguarding in the coming 12 months? If so please specify.	No

None of our BVI Government partner organisations currently has a specific safeguarding policy. However, the Lavety Stoutt Community College, has an extensive set of relevant policies, such as on ethics, health and safety or sexual harassment (see: <https://hlsc.org/policies/>), and the project staff will abide by those policies while working within that college, which will be hosting the soil laboratory and hosting the training workshops.

Outside of the Lavety Stoutt Community College, for all other activities within the BVI territory, all of the project members will be expected to adhere to the University of Portsmouth (UoP) safeguarding policies, following a briefing at the start of the project. The UoP guidelines on health & safety, particularly fieldwork risk management are particularly important for the soil survey component of the project, which will involve boat travel between islands and fieldwork in often difficult terrain, under hot tropical conditions. UoP Fieldwork Risk Assessment forms (which include identifying the risks associated with each task, then mitigating and managing those risks) will be completed before the start of all the soil survey activities, as well as the laboratory soil analysis sessions and workshop training sessions.

## 14. Project expenditure

Table 1: Project expenditure during the reporting period (1 April 2022 – 31 March 2023)

Project spend (indicative) in this financial year	2022/23 D+ Grant (£)	2022/23 Total actual D+ Costs (£)	Variance %	Comments (please explain significant variances)
Staff costs				
Consultancy costs				
Overhead Costs				
Travel and subsistence				
Operating Costs				
Capital items				
Others (Please specify)				
<b>TOTAL</b>				

Changes have been discussed with and approved by Darwin Plus, following Change Requests of 8/3/2023 and 24/3/2023

## 15 Outstanding achievements or progress of the project so far

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

### Image, Video or Graphic Information:

1. Establishing the BVI Soil Laboratory: The establishment of the BVI Soil Laboratory, within the Marine Centre of the HL Stoutt Community College, Tortola. All the training in soil survey methods, soil chemistry and soil physical analysis have been conducted at this community college.
2. Training provided to BVI Government staff (target audience of 20 trainees): Two workshops have been conducted in soil survey and soil analysis. Twenty-three (23) local individuals have been trained in soil sampling and analysis, including technical officers, students and farmers.
3. Outreach programme: Students visiting from the Seventh-day Adventist School are trained by the BVI Soil Survey team, in the BVI Soil Laboratory and at sites within the campus of the HL Stoutt Community College, Tortola.

File Type - Images	File Name or File Location	Caption, country and credit	Online accounts to be tagged (leave blank if none)	Consent of subjects received (delete as necessary)
		BVI Soil Lab. Outreach programme to schools, Jan 2023, Tortola, BVI. Students with Dr Fay Couceiro of Portsmouth University.  Credit: DDM		No
		Training in soil sampling, on the campus of the HL Stoutt Community College, Tortola, BVI.  Credit: DDM		Yes
		BVI Soil Lab: air drying of samples, Nov 2022. Tortola, BVI.  Credit: DDM		Yes
		Training BVI National Parks Trust staff in sample pit digging and soil horizon sampling. Sage Mountain National Park, Tortola, BVI.  Credit: NPT		Yes
<a href="https://fb.watch/kaC9_hKU8a/">https://fb.watch/kaC9_hKU8a/</a> 	Training in water filtration	Video: Topsoil water percolation test, on the campus of the HL Stoutt Community College, Tortola, BVI.  Credit: DDM		Yes

		<p>Soil sampling in a road cut near Handsome Bay, Virgin Gorda, BVI. Credit: DDM</p>		<p><b>Yes</b></p>
		<p>Soil sampling at Hawk's Nest, Tortola. BVI. Finding the location and bedrock type on a local geology map. Credit: DDM</p>		<p>Yes</p>
<p><a href="https://fb.watch/kbWQjfpAWH/">https://fb.watch/kbWQjfpAWH/</a></p> 		<p>Video: Soil Chemical Analysis workshop in the BVI Soil Laboratory at the HLSCC Marine Centre. Tortola, BVI. Credit: DDM</p>		<p>Yes</p>

## Annex 1: Report of progress and achievements against logframe for Financial Year 2022-2023

Project summary	SMART Indicators	Progress and Achievements April 2022 - March 2023	Actions required/planned for next period
<p><b>Impact</b></p> <p>BVI soil types and soil biodiversity surveyed and mapped, with self-sufficiency in soil survey and analysis capabilities, enabling improved management of land and waste, with better risk management and climate change preparedness .</p>		<p>BVI moving towards self-sufficiency in soil survey and soil analysis: BVI Soil Laboratory now established and operating, with 4 of the technical staff trained by the project able to train other BVI technical staff. Most of the BVI soil types and sub-types have now been sampled and analysed.</p>	
<p><b>Outcome</b></p> <p>BVI soil maps and information on soil suitability for Farming, Waste Management and Construction, leads to better-informed land management, with increased risk awareness, and climate change preparedness.</p>	<p>0.1. Soil survey and soil analysis for the 4 main islands, with baseline BVI geospatial datasets produced for: BVI Soil Types &amp; Biodiversity; and Soil Suitability for: Farming, Construction, and Waste Management, by Dec 2023;</p> <p>0.2. For the BVI partner organisations: technical training on soil survey and sampling, soil laboratory analyses, Soil GIS mapping and soil map interpretation, by Jan 2024.</p> <p>0.3. Partner organisations use soil suitability maps and guidelines in their activities (ie, for farming, construction, waste management and biodiversity conservation), as well as for soil-related risk management and preparedness for climate change, by March 2024.</p> <p>0.4. Partner organisations' documentation and guidelines for the public, include land use soil suitability information, soil risk management for new developments and soil-related preparedness for climate change, by March 2024.</p>	<p>0.1. Partially completed: Soil survey and soil analysis carried out for 3 of the 4 main islands, with baseline BVI geospatial datasets produced for BVI Soil Types.</p> <p>0.2. Partially completed: technical training provided during Oct/Nov 2022 and Jan/Feb 2023 for soil survey and sampling, soil laboratory analyses.</p> <p>0.3. Pending: due in Q1 of 2024.</p> <p>0.4. Pending: due in Q1 of 2024.</p>	<p>0.1. Soil survey and soil analysis to be carried out for the 4<sup>th</sup> main islands during June 2023. Baseline geospatial datasets to be produced for Biodiversity and Soil Suitability for: Farming, Construction, and Waste Management during Q4 of 2023.</p> <p>0.2. Technical training to be provided on Soil GIS mapping and soil map interpretation, during January 2024</p>
<p><b>Output 1.</b> BVI self-sufficiency in soil survey and soil laboratory analysis,</p>	<p>1.1 BVI Soil Lab established, by November 2022. 1.2. Survey and sampling of BVI soils, focusing on the 4 largest islands, with analysis of collected soils, by Nov 2023</p>	<p>Output 1.1 – for completion by Nov 2022 - A Soil Laboratory for the BVI has been established within the Marine Research Centre of the H.Lavety Stoult Community College, Tortola. The BVI Soil Laboratory has been equipped with soil particle size</p>	

Project summary	SMART Indicators	Progress and Achievements April 2022 - March 2023	Actions required/planned for next period
with an associated BVI Soil GIS inventory, mapping and analysis system.	<p>1.3 Soil inventory, GIS database and maps of the estimated 10 main Soil Types, by Dec 2023.</p> <p>1.4 Review of predictive accuracy: relative variance of each mapped soil type, by Jan 2024.</p> <p>1.5. Four soil-based thematic maps, with explanatory documents: BVI Soil Types, and Soil Suitability for: (i) Farming, (ii) Construction, and (iii) Waste Management, by January 2024.</p> <p>1.6. Soil Laboratory and Soil Sampling equipment used by the Lavity Stoutt Community College for teaching of Soil science and its applications, by Jan 2024.</p> <p>1.7. Workshop on ways of commercialising BVI Soil Laboratory analyses, involving UoP project staff who manage soil, geotechnics and waste treatment labs, Lavity Stoutt Community College managers &amp; other BVI partners, by Feb 2023.</p>	<p>analysis equipment (sieve shaker, sieve set, with pipette and hydrometer equipment for clay analysis) and a soil chemistry analyser (Palintest S500).</p> <p>Output 1.2. – for completion by Nov 2023 - The 10 main soil types of the BVI have all been sampled and logged, with particle size analysis carried out for each soil horizon and chemical analysis of the topsoil: ca.150 soil samples have been processed. The soil survey and sampling of Anegada and some of the unpopulated islands will be carried out during June 2023, in conjunction with the BVI National Parks Trust. Particle size analysis of each horizon and topsoil analysis will be carried out between July and November 2023</p> <p>Output 1.3.– for completion by Dec 2023 – a preliminary version of the soil inventory and BVI Soil GIS database is currently being developed, with the results of the June/July 2023 soil survey and lab analyses added between August and Dec 2023.</p> <p>Output 1.4. – for completion by Jan 2024 – this will be done during the development of the BVI Soil GIS, between Sept 2023 and January 2024.</p> <p>Output 1.5. – for completion by Jan 2024 – the thematic maps and user documents will be produced alongside development of the BVI Soil GIS.</p> <p>Output 1.6. – for completion by Jan 2024 – the BVI Soil Laboratory has already been used for Soil science teaching, which will be further developed into a regular part of the curriculum of the Lavity Stoutt Community College.</p> <p>Output 1.7. – for completion by Feb 2023 – a workshop was run in February 2023, led by Prof John Williams of UoP (Civil Engineering &amp; Waste Management) and involving staff from the Lavity Stoutt Community College laboratories and other BVI partner organisations, to consider ways of commercialising the BVI Soil Laboratory.</p>	
Activity 1.1. Soil laboratory established.		Scheduled tasks completed: BVI Soil Laboratory established in the Marine Centre of the HL Stoutt Community College, Tortola, with equipment installed for soil physical analysis and soil chemical analysis.	Additional equipment for analysis of soil microbiota and biodiversity to be added to the laboratory in June 2023.
Activity 1.2. Soil survey, sampling and soil lab analyses.		Scheduled tasks mostly completed: all 10 major soil types of the BVI sampled,	Remaining 40 of the 60 topsoil samples to be analysed for soil chemistry during May/June 2023

Project summary	SMART Indicators	Progress and Achievements April 2022 - March 2023	Actions required/planned for next period
		<p>along with their sub-types, on 3 of the 4 main islands.</p> <p>150 soil samples collected from 60 soil sample sites. Particle size distribution analysis carried out on all samples, with chemical analysis carried out on 20 of the 60 the topsoil samples.</p>	<p>Samples to be collected for soil microbiota and biodiversity analysis during June 2023.</p> <p>Samples collected from the 4<sup>th</sup> main island (Anegada) and from some of the small National Park islands, during June 2023.</p> <p>Civil engineering properties of the main BVI soil Types and sub-types to be surveyed during June 2023.</p> <p>The % clay to be determined via automated laser diffraction and the clay mineralogy to be determined by spectroscopy, at the University of Portsmouth, during July 2023.</p>
Activity 1.3. Soil inventory, Soil GIS database and maps		BVI Soil Inventory being compiled – see Annex 5 - Excel spreadsheet	Further compilation of BVI Soil Inventory during July-August 2023. Geospatial database, Soil GIS and derived maps to be produced during July-December 2023
Activity 1.4. Review of predictive accuracy for each soil type.		n/a (year-2 activity)	Predictive accuracy for each mapped soil type to be evaluated during October-December 2023.
Activity 1.5. Thematic soil suitability maps and soil management guidelines.		n/a (year-2 activity)	
Activity 1.6. Soil Laboratory and Soil Sampling equipment used by the Lavity Stoutt Community College for teaching of Soil science		n/a (year-2 activity)	Preliminary teaching of HLSCC students, via a guided tours of the Soil Lab facilities. Use of the Soil Lab facilities by students carrying our research projects.
Activity 1.7. Workshop on ways of commercialising BVI Soil Laboratory analyses.		Completed: workshop led by Prof John Williams in Feb 2023	Ongoing discussions with BVI farming community, regarding appropriate fees for analysis of soil nutrients.
2. Training provided to BVI Government staff and to the BVI's main higher education institution.	<p>Target audience of 20 trainees (14 from project partners; 6 from BVI businesses or NGOs) will benefit from:</p> <p>2.1. Training in soil survey, soil sampling and soil analysis: two 'hands-on'; workshops, with</p>	<p>Output 2.1. – due Feb 2023 - Achieved, via workshop on Soil Science &amp; Soil Description (Oct 2022) and Soil Chemistry training in Jan 2023). Evidenced by the training materials and attendee statistics provided in Annex 3, Tables 1 and 2.</p> <p>Output 2.2. - n/a (year-2 activity)</p>	

Project summary	SMART Indicators	Progress and Achievements April 2022 - March 2023	Actions required/planned for next period
	<p>supporting online training materials, by February 2023.</p> <p>2.2 Training in soil database management and GIS usage for mapping and climate change impact assessment: an online 'hands-on'; workshop, augmented by online training materials, by December 2023.</p> <p>2.3 Training on analysis-ready soil maps &amp; briefing documents, for environmental managers and policy makers: two online workshops, by January 2024.</p> <p>2.4. <i>Learning outcomes from each technical training workshop applied within the participating organisations, by March 2024.</i></p>	<p>Output 2.3. - n/a (year-2 activity)</p> <p>Output 2.4. - n/a (year-2 activity)</p>	
Activity 2.1. Training in soil survey and soil analysis.		Completed as scheduled	Further training, on soil biodiversity, to be provided in June 2023
Activity 2.2. Training in GIS-based soil mapping.		n/a (year-2 activity)	Training materials to be developed, for online delivery
Activity 2.3. Training on soil maps and briefing documents, for environmental managers and policy makers.		n/a (year-2 activity)	Training materials to be developed.
Activity 2.4. Learning outcomes from each technical training workshop applied within the participating organisations.		n/a (year-2 activity)	Post-training questionnaires to be sent to training workshop participants, to determine take-up of learning outcomes within participating organisations.
<p><b>Output 3.</b> BVI soil survey results inform government departments, and raise public awareness, regarding soil applications, associated risks and climate change preparedness.</p>	<p>3.1 Key soil survey findings used to inform policy: for each of the project partners, the project will produce a briefing document, by January 2024.</p> <p>3.2 Report on BVI Soils, their land use suitability, the risks associated with each soil type and recommendations for climate change adaptation, by Feb 2024</p> <p>3.3. The BVI procedures for risk assessment of new developments will be adjusted to include</p>	<p>The activities for Output 3 are all to be carried out during the 2<sup>nd</sup> year of the project. The only exception is activity 3.3: Press releases, to raise public awareness about the importance of soils: (i) Sept 2022; (ii) March 2023; (iii) Sept 2023; (iv) March 2024.</p> <p>The number of expected press releases during 2022-2023 has been exceeded, with 3 of them, rather than 2, as evidenced in Section 12.</p>	

Project summary	SMART Indicators	Progress and Achievements April 2022 - March 2023	Actions required/planned for next period
	<p>inputs from the soil survey guidelines on land use suitability and the Soil GIS maps, by March 2024.</p> <p>3.4. Public-access version of the Soil GIS and user guides, hosted by the BVI Government NGIS website and the Lavetty Stoutt Community College, by March 2024.</p> <p>3.5. Press releases, to raise public awareness about the importance of soils: (i) Sept 2022; (ii) March 2023; (iii) Sept 2023; (iv) March 2024.</p> <p>3.6 Scientific articles, about: (i) BVI soil types; (ii) multi-purpose thematic soil maps; (iii) links between geodiversity, soil types &amp; biodiversity, submitted to Open Access, peer-reviewed journals by March 2024</p>		
Activity 3.1. Report on BVI Soils, highlighting the value of soil data.		n/a (year-2 activity)	Drafting of report on the BVI's soils.
Activity 3.2. Briefing documents on soil applications and soil sensitivity.		n/a (year-2 activity)	Drafting of briefing documents
Activity 3.3. BVI Hazard Vulnerability Assessment (HVA) form modified to include Soil GIS inputs and soil-based land use suitability guidance.		n/a (year-2 activity)	Adjustment of the HVA methodology currently used by the DDM and Town & Country Planning Dept, to utilise the soil maps in the BVI planning system.
Activity 3.4. Public-access version, BVI Soil GIS and documentation.		n/a (year-2 activity)	Preparing of GIS maps and documentation suitable for public access.
Activity 3.5. Press releases on project findings.		Three press releases have been made during Year-1, along with 12 postings on Facebook.	There will be 3 further press releases during 2023-2024, with a similar number of Facebook posts.
Activity 3.6. Scientific articles published.		n/a (year-2 activity)	Abstract accepted for presentation of project findings at conference of the UK remote sensing society (RSPSoc) in Sept 2023.

## Annex 2: Project’s full current logframe as presented in the application form

Project Summary	SMART Indicators	Means of Verification	Important Assumptions
<p><b>Impact:</b> BVI soil types and soil biodiversity surveyed and mapped, with self-sufficiency in soil survey and analysis capabilities, enabling improved management of land and waste, with better risk management and climate change preparedness .</p>			
<p><b>Outcome:</b> BVI soil maps and information on soil suitability for Farming, Waste Management and Construction, leads to better-informed land management, with increased risk awareness, and climate change preparedness</p>	<p>0.1 Soil survey and soil analysis for the 4 main islands, with baseline BVI geospatial datasets produced for: BVI Soil Types &amp; Biodiversity; and Soil Suitability for: Farming, Construction, and Waste Management, by Dec 2023            0.2 For the BVI partner organisations: technical training on soil survey and sampling, soil laboratory analyses, Soil GIS mapping and soil map interpretation, by Jan 2024.            0.3 Partner organisations use soil suitability maps and guidelines in their activities (ie, for farming, construction, waste management and biodiversity conservation), as well as for soil-related risk management and preparedness for climate change, by March 2024.            0.4. Partner organisations’ documentation and guidelines for the public, include land use soil suitability information, soil risk management for new developments and soil-related preparedness for climate change, by March 2024.</p>	<p>0.1 Report on BVI Soil Survey, with geospatial datasets, augmented by maps and explanatory documents on: BVI Soil Types &amp; Biodiversity; Soil Suitability for: Farming, Construction, and Waste Management.            0.2. Questionnaire survey results of the BVI partner organisations, show increased awareness of soil types, their land use suitability and risk management issues, as well as soil-focused recommendations for climate change preparedness.            0.3 User data from the partner organisations on their activities involving soil maps and guidelines on soil suitability (e.g., number of times per month that BVI Soil Survey webpages are accessed).            0.4a. BVI Hazard Vulnerability Assessment application form for new developments is modified to include inputs from soil survey guidelines on land use suitability and Soil GIS maps            0.4b..Guidance documents prepared by BVI partners on land use suitability of soils, soil-related risk management, or soil-focused preparedness for climate change.</p>	<p>New BVI soil maps and associated reports will be easily accessible to government agencies, NGOs and the public.</p> <p>Training and access to the soil map sets will lead to changes in behaviour and better land/soil management.</p> <p>Project partner organisations have the ability to intervene on environmental issues.</p>

<p><b>Outputs:</b></p> <p>1. BVI self-sufficiency in soil survey and soil laboratory analysis, with an associated BVI Soil GIS inventory, mapping and analysis system.</p>	<p>1.1 BVI Soil Lab established, by Nov 2022.  1.2. Survey and sampling of BVI soils, focusing on the 4 largest islands, with analysis of collected soils, by Nov 2023  1.3 Soil inventory, GIS database and maps of the 10 main Soil Types, by Dec 2023.  1.4 Review of predictive accuracy: relative variance of each mapped soil type, by Jan 2024.  1.5. Four soil-based thematic maps, with explanatory documents: BVI Soil Types, and Soil Suitability for: Farming, Construction, and Waste Management, by January 2024.  1.6. Soil Laboratory and Soil Sampling equipment used by the Lavity Stoutt Community College for teaching of Soil science and its applications, by Jan 2024.  1.7. Workshop on ways of commercialising BVI Soil Laboratory analyses, involving UoP project staff who manage soil, geotechnics and waste treatment labs, Lavity Stoutt Community College managers &amp; other BVI partners, by Feb 2023.</p>	<p>1.1 BVI Soil Lab equipment installed and operational;  1.2 Field data and soil lab analysis data available to partners, with fieldwork reports available on ResearchGate.  1.3 Soil inventory, GIS database and maps uploaded to the BVI Government NGIS website.  1.4 Results of predictive accuracy review for each mapped soil type uploaded to the BVI Government NGIS website.  1.5 Four soil-based thematic maps, with explanatory documents uploaded to the BVI Government NGIS website.  1.6. Soil Science included in the teaching curriculum of the Lavity Stoutt Community College.  1.7a. Workshop attendee list provides gender disaggregated data  1.7b. Questionnaire to project partner organisations at the end of the workshop, to gain ideas on possible BVI Soil Laboratory commercial activities, with recommendations on a business development strategy.</p>	<p>The Lavity Stoutt Community College maintains its agreement to host the BVI Soil Laboratory.</p> <p>Representative samples collected and analysed for all main soil types.</p> <p>BVI Government NGIS website operates effectively.</p>
<p>2. Training provided to BVI Government staff and to the BVI's main higher education institution (Lavity Stoutt Community College, which will host the laboratory and the workshop training). Aiming for 20 trainees.</p>	<p>Target audience of 20 trainees (14 from project partners; 6 from BVI businesses or NGOs) will benefit from:</p> <p>2.1. Training in soil survey, soil sampling and soil analysis: two 'hands-on'; workshops, with supporting online training materials, by February 2023.  2.2 Training in soil database management and GIS usage for mapping and climate change impact assessment: an online 'hands-on'; workshop, augmented by online training materials, by December 2023.  2.3 Training on analysis-ready soil maps &amp; briefing documents, for environmental managers</p>	<p>2.1, 2.2 and 2.3. Evidenced via training materials, attendance records and participant contact details, disaggregated by gender.  2.4. <i>Uptake and application of learning outcomes for each technical training workshop (Outputs 2.1, 2.2.3), assessed via a set of questionnaire surveys:</i>  (i) <i>pre-workshop, to determine initial levels of knowledge and understanding;</i>  (ii) <i>at the end of each workshop, to determine take-away lessons learnt;</i>  (iii) <i>two months after each workshop, to see how the learning outcomes have been used by the partner organisations.</i></p>	<p>Staff of our BVI partner organisations will be available for the training sessions</p> <p>Facilities will be available for the soil analysis training and GIS training, at our Community College partner.</p> <p>Should a pandemic curtail travel between the UK &amp; BVI, then alternative</p>

	<p>and policy makers: two online workshops, by January 2024.</p> <p><i>2.4. Learning outcomes from each technical training workshop applied within the participating organisations, by March 2024.</i></p>		<p>online training materials will be provided, paid for by reallocation of the unused travel funding.</p>
<p><b>3.</b> BVI soil survey results inform government departments, and raise public awareness, regarding soil applications, associated risks and climate change preparedness.</p>	<p>3.1 Key soil survey findings used to inform policy: for each of the project partners, the project will produce a briefing document, by January 2024.</p> <p>3.2 Report on BVI Soils, their land use suitability, the risks associated with each soil type and recommendations for climate change adaptation, by Feb 2024.</p> <p>3.3. The BVI procedures for risk assessment of new developments will be adjusted to include inputs from the soil survey guidelines on land use suitability and the Soil GIS maps, by March 2024.</p> <p>3.4. Public-access version of the Soil GIS and user guides, hosted by the BVI Government NGIS website and the Lavetty Stoutt Community College, by March 2024.</p> <p>3.5. Press releases, to raise public awareness about the importance of soils: (i) Sept 2022; (ii) March 2023; (iii) Sept 2023; (iv) March 2024.</p> <p>3.6 Scientific articles, about: (i) BVI soil types; (ii) multi-purpose thematic soil maps; (iii) links between geodiversity, soil types &amp; biodiversity, submitted to Open Access, peer-reviewed journals by March 2024</p>	<p>3.1. Briefing documents, informed by the BVI soil survey, for the government project partners, on soil applications, soil risks and climate change preparedness, published and available online, via by BVI Government NGIS website.</p> <p>3.2a. BVI soil survey report shared publicly via the Virgin Islands Government website and via ResearchGate, by March 2024.</p> <p>3.2b. Monitor the number of people accessing the BVI Soil Report via the Virgin Islands Government website and via ResearchGate.</p> <p>3.3. BVI Hazard Vulnerability Assessment application form (<a href="https://bvi.gov.vg/sites/default/files/forms/2016_revisd_hva_form_fillable.pdf">https://bvi.gov.vg/sites/default/files/forms/2016_revisd_hva_form_fillable.pdf</a>) modified to include inputs from the Soil GIS maps and soil survey guidelines on land use suitability.</p> <p>3.4a.. Public Soil GIS data, analysis-ready maps and user guides posted on the BVI Department for Disaster Management website and the Lavetty Stoutt Community College website.</p> <p>3.4b. Monitor access to the BVI Public Soils webpages by members of the public, NGOs, businesses and the education sector.</p> <p>3.4c. Questionnaire surveys of BVI NGO and education sector partner organisations show increased awareness of soil types, their land use suitability and risk management issues, as well as soil-focused recommendations for climate change preparedness.</p> <p>3.5. Press releases about the soil survey findings: (i) Sept 2022; (ii) March 2023; (iii) Sept 2023; (iv) March 2024.</p> <p>3.6. Articles for Open Access, peer-reviewed journals (3), submitted by March 2024.</p>	<p>BVI Government NGIS website operates effectively and allows public access, as well as monitoring the number of people accessing the website.</p> <p>ResearchGate continues to be freely accessible to public use.</p>

## **Activities**

- 1.1 Soil laboratory established.
  - 1.2. Soil survey, sampling and soil lab analyses.
  - 1.3 Soil inventory, Soil GIS database and maps.
  - 1.4 Review of predictive accuracy for each soil type.
  - 1.5 Thematic soil suitability maps and soil management guidelines.
  - 1.6. Soil Laboratory and Soil Sampling equipment used by the Lavity Stoutt Community College for teaching of Soil science
  - 1.7. Workshop on ways of commercialising BVI Soil Laboratory analyses.
- 
- 2.1. Training in soil survey and soil analysis.
  - 2.2 Training in GIS-based soil mapping.
  - 2.3 Training on soil maps and briefing documents, for environmental managers and policy makers.
  - 2.4. Learning outcomes from each technical training workshop applied within the participating organisations.
- 
- 3.1 Report on BVI Soils, highlighting the value of soil data.
  - 3.2. Briefing documents on soil applications and soil sensitivity.
  - 3.3. BVI Hazard Vulnerability Assessment form modified to include Soil GIS inputs and soil-based land use suitability guidance.
  - 3.4. Public-access version, BVI Soil GIS and documentation.
  - 3.5. Press releases on project findings.
  - 3.6 Open Access journal articles on key project findings.

**Annex 3: Table 1 Project Standard Indicators**

DPLUS Indicator number	Name of indicator using original wording	Name of Indicator after adjusting wording to align with DPLUS Standard Indicators	Units	Disaggregation	Year 1 Total	Year 2 Total	Year 3 Total	Total to date	Total planned during the project
DPLUS-A01	2.1. Training in soil survey, soil sampling and soil analysis: two 'hands-on'; workshops, with supporting online training materials, by February 2023.	Number of people from key national stakeholders completing soil survey & physical soil analysis training (Nov 2022).	No. of People	Gender: 10 females, 7 males Age group: 20 to 65 Stakeholder group: 7	17				20
DPLUS-A01	2.1. Training in soil survey, soil sampling and soil analysis: two 'hands-on'; workshops, with supporting online training materials, by February 2023.	Number of people from key national stakeholders completing chemical soil analysis training (Jan 2023).	No. of People	Gender: 14 females, 9 males Age group:18 to 65 Stakeholder group:7	23				20
DPLUS-A03	2.4. Uptake and application of learning outcomes for each technical training workshop (Outputs 2.1, 2.2, 2.3), assessed via a set of questionnaire surveys	Number of local/national organisations with improved capability and capacity as a result of project.	No. of organisations	Government department: 5 NGO/para-government: 1 College/school: 1	7				8
DPLUS-A04	2.4. Learning outcomes from each technical training workshop applied within the participating organisations, by March 2024.	Number of people reporting that they are applying new capabilities 6 months after training.	No. of People	Gender: 3 Females Age group:30 to 50 Stakeholder group: 3	3				20
DPLUS-A05 (y1)	2.4. Learning outcomes from each technical training workshop applied within the participating organisations, by March 2024.	Number of trainers trained reporting to have delivered further training by the end of Year-1 of the project	No. of Trainers	Gender: Female (3); Male (1) Age group:18-30 Stakeholder group: Community College (2); Government Dept (2)	4				8
DPLUS-A07	2.4. Uptake and application of learning outcomes for each technical training workshop (Outputs 2.1, 2.2, 2.3), assessed via a set of questionnaire surveys	Number of government departments with enhanced awareness and understanding of soils and associated biodiversity and climate change issues	No. of depts.	No. of government departments: 6	6				6

DPLUS Indicator number	Name of indicator using original wording	Name of Indicator after adjusting wording to align with DPLUS Standard Indicators	Units	Disaggregation	Year 1 Total	Year 2 Total	Year 3 Total	Total to date	Total planned during the project
Extra A07 for Schools	This is within <i>Output 3: BVI soil survey results inform government departments, and raise public awareness, regarding soil applications, associated risks and climate change preparedness.</i> This is an unexpected extra indicator, following requests from BVI schools for awareness training.	Number of school/college students with enhanced awareness and understanding of soils and associated biodiversity and climate change issues	No.of students	Age group: 15-20 Female: 9 Male: 28 No. of schools: 2 Seventh Day Adventist School and the H. Lavity Stoutt Community College, Tortola.	37				80
DPLUS-C12	3.5. Press releases, to raise public awareness about the importance of soils: (i) Sept 2022; (ii) March 2023; (iii) Sept 2023; (iv) March 2024.	Social Media presence	Number (by a relevant metric)	By month/year: February 2023 Platform: Facebook, DDM website, newspaper, news site, government webpage Metric: 5	12				24
DPLUS-C14	This is not directly covered, but relates to 3.1: <i>Key soil survey findings used to inform policy: for each of the project partners, the project will produce a briefing document, by January 2024.</i>	Number of decision-makers attending briefing events (via press conferences and project steering committee meetings).	Number	Attendee gender balance: 8 women to 7 men Types of decision-makers: Govt (73), NGO (6%), farmers (21%) Number of events: 6	15				15
DPLUS-C15	3.5. Press releases, to raise public awareness about the importance of soils: (i) Sept 2022; (ii) March 2023; (iii) Sept 2023; (iv) March 2024.	Number of Media related activities.	Number	Internet/ Print/ and sub-national / national / international	2				4
DPLUS-C19	2.1. Training in soil survey, soil sampling and soil analysis: two 'hands-on'; workshops, with supporting online training materials, by February 2023.	Number of other publications produced.	Number	Training manuals (3) Review of BVI waste management (1)	4				9

**Annex 3: Table 2 Publications**

Title	Type	Detail	Gender of Lead Author	Nationality of Lead Author	Publisher	Available from BVI Department of Disaster Management website
Soil Survey Methods for the BVI *	Training Manual	Richard Teeuw (2022)	M	UK	Department of Disaster Management, BVI	<a href="https://www.bviddm.com/download/soil-types-and-soil-survey-workshop/">https://www.bviddm.com/download/soil-types-and-soil-survey-workshop/</a>
Introduction to BVI soil geochemistry and the Soil Chemistry workshop *	Introductory slides	Richard Teeuw (2022)	M	UK	Department of Disaster Management, BVI	<a href="https://www.bviddm.com/download/introduction-to-bvi-soil-chemistry">https://www.bviddm.com/download/introduction-to-bvi-soil-chemistry</a>
Soil Chemistry in the BVI*	Training Manual	Fay Couciero (2023)	F	UK	Department of Disaster Management, BVI	<a href="https://www.bviddm.com/publications/">https://www.bviddm.com/publications/</a>
BVI Waste Management – island problems, with island solutions? *	Field Survey Report with workshop recommendations	John Williams (2023)	M	UK	Department of Disaster Management, BVI	<a href="https://www.bviddm.com/publications/">https://www.bviddm.com/publications/</a>

## Checklist for submission

	Check
Different reporting templates have different questions, and it is important you use the correct one. Have you checked you have used the <b>correct template</b> (checking fund, type of report (i.e. Annual or Final), and year) and <b>deleted the blue guidance text</b> before submission?	
<b>Is the report less than 10MB?</b> If so, please email to <a href="mailto:BCF-Reports@niras.com">BCF-Reports@niras.com</a> putting the project number in the Subject line.	x
<b>Is your report more than 10MB?</b> If so, please discuss with <a href="mailto:BCF-Reports@niras.com">BCF-Reports@niras.com</a> about the best way to deliver the report, putting the project number in the Subject line.	
<b>Have you included means of verification?</b> You should not submit every project document, but the main outputs and a selection of the others would strengthen the report.	x
<b>Do you have hard copies of material you need to submit with the report?</b> If so, please make this clear in the covering email and ensure all material is marked with the project number. However, we would expect that most material will now be electronic.	
If you are submitting photos for publicity purposes, do these meet the outlined requirements (see section 15)?	x
Have you involved your partners in preparation of the report and named the main contributors	x
Have you completed the Project Expenditure table fully?	x
Do not include claim forms or other communications with this report.	