

Ocean Country Partnership Programme

DEPC Data Management System Development: User Requirements Report



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This document is a deliverable of the [Ocean Country Partnership Programme](#) (OCPP). The OCPP is a UK-led programme funded through the UK's Blue Planet Fund, which provides demand-led technical assistance in marine science to partner countries, supporting them to overcome challenges that threaten marine environments and the livelihoods that depend on them.

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Acronyms

| | |
|--------|---|
| BSAP | Biodiversity Strategy and Action plan |
| CBD | Convention on Biological Diversity |
| CCA | Community Conserved Area |
| CITES | Convention on International Trade in Endangered Species |
| DEPC | Department of Environmental Protection & Conservation |
| EIA | Environmental Impact Assessment |
| MACBIO | Marine and Coastal Biodiversity Management in Pacific Islands |
| NSDP | National Sustainable Development Plan |
| OCP | Ocean Country Partnership Program |
| ODS | Ozone Depleting Substances |
| OGCIO | Office of the Government Chief Information Officer |
| POIC | Provincial Outreach, Information and Communication |
| SoE | State of Environment |
| SPC | The Pacific Community |
| SPREP | Secretariat of the Pacific Regional Environment Programme |
| SUMA | Special and Unique Marine Areas |
| UNCCD | United Nations Convention to Combat Desertification |
| VBoS | Vanuatu Bureau of Statistics |

Purpose of this document

The purpose of this document is to provide a detailed list of requirements to inform the development of a data management system, as requested by Vanuatu's Department for Environmental Protection and Conservation (DEPC). This document synthesises the results of user research interviews conducted with members of DEPC and additional conversations with relevant stakeholders including Office of the Government Chief Information Officer (OGCIO) and Vanuatu Bureau of Statistics.

The intended audience of this document includes, but is not limited to, members of DEPC, other relevant departments of the Government of Vanuatu, and future contracted developers.

Aims and objectives

The aim of this project is to assist the DEPC in developing a data management system for use across all divisions within the department. The objectives to achieve this are:

1. Develop a user friendly, easily manageable, data management system for use across DEPC divisions.
2. Support transfer of data into the data management system
3. Define and provide guidance material on data management protocols, including collection, input, cataloguing, storage, and use.
4. Support establishment of data sharing agreements within and between departments and relevant stakeholders.

Figure 1 details the process of achieving these objectives.

UPDATED: DEPC Data Management System Work Plan Diagram

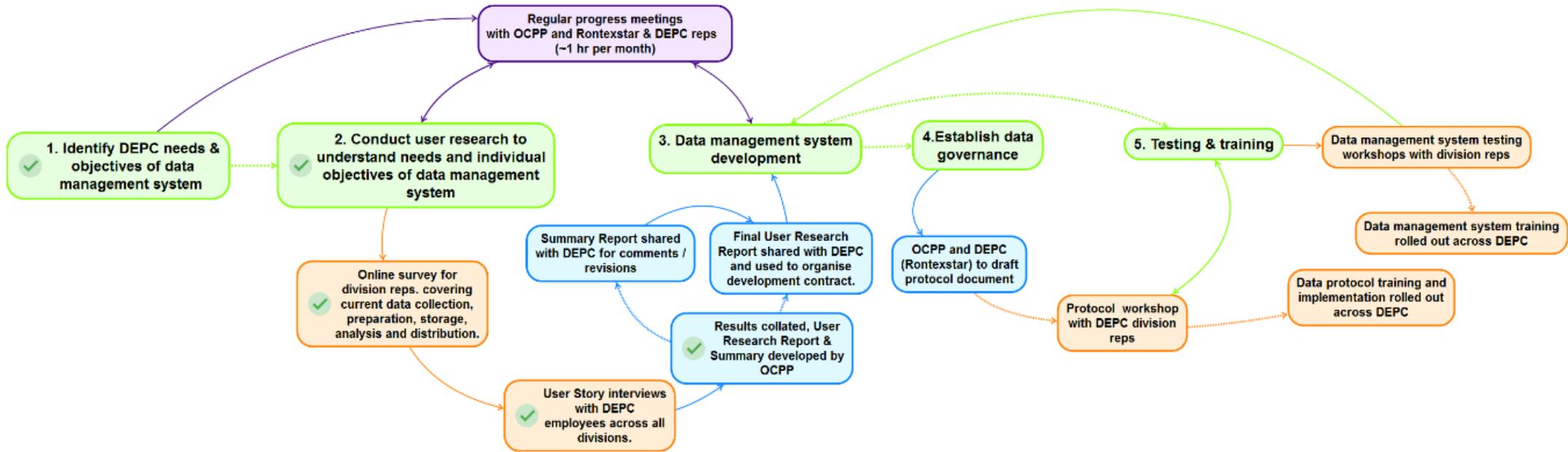


Figure 1. Work plan diagram showing the different steps involved for the development of the data management system. Items marked with a green tick, indicate these steps have been completed.

User research

To fully understand the user requirements for staff across DEPC the OCPP team have undertaken a comprehensive user research process to define requirements and outline system functionality to inform the development.

Objectives of user research

1. To understand current situation of data collection, management, and storage.
2. To understand how data are used within DEPC and how data are accessed across Vanuatu Government departments.
3. To understand the roles and responsibilities of division staff within DEPC.
4. To identify gaps in data and challenges to the use of data.
5. To outline interactions with other data systems, including other Vanuatu Government department systems and regional databases.
6. To understand future aspirations for data collection, access, and use across DEPC and collate a list of user requirements for the system.

Approach

During a two-week technical visit to Port Vila, Vanuatu, the OCPP team met with staff of the DEPC to understand requirements across divisions. Interviews were conducted one-to-one or in small groups and followed the questions outlined in [Appendix 4](#). DEPC staff who were not available during this time had the opportunity to contribute via an online questionnaire (see [Appendix 3](#)). The OCPP team also held discussions with other Vanuatu Government departments, including OGCI and the Vanuatu Bureau of Statistics, to understand data system interactions across Government, and met with regional organisations, including SPREP and SPC, to understand which regional data systems the DEPC development would need to connect with. For full user stories see [Appendix 1](#) and for a full list of participants, please refer to [Appendix 2](#).

Headline findings

- There is significant appetite across DEPC to enhance the department's data management processes to ensure data are available and accessible across divisions.
- Data and resources to manage them are limited. DEPC staff felt the limited data availability and accessibility is restricting their ability to make evidence-based decisions/justify decisions with evidence.
- To ensure a new data management system is used effectively; the system needs clear protocols and user-friendly training resources.
- There is currently a pilot system being developed by the Biodiversity and Conservation division and OGCI. This has the base functionality that would be required for a larger system so would be a strong foundation from which to develop a department-wide system.
- Data sharing is a big challenge, both within and across Government departments. Further clarity is required to provide details on what information is available, who owns or is responsible for it and a defined process to access. The National Geospatial Data Policy exists, but policies are required for other data types.
- Reluctance or challenges to share data within and between departments creates bottlenecks in work and reduces the ability of staff to use evidence to inform decision making.
- Current data processes are all manual, leading to backlog in applications / work being processed.

- Data are not stored or catalogued efficiently. Data are used for an immediate task but may be lost or not accessible to others, leading to duplication of effort and limited historical data records.
- DEPC is required to contribute to a number of Government initiatives/targets and share data between departments, however the current data management system means this is often challenging to accomplish.
- The new system needs to tie in with other systems being used, especially those relating to data collection (Live & Learn Vanuatu ranger toolkit and KoboToolbox forms used by provincial officers in reporting). The system also needs to link to other departments' reporting systems such the indicator generation process in VBoS.
- DEPC are keen to include an interactive geospatial element to display data used across multiple divisions.
- The system must include user-friendly indexing and search functions to assist in cataloguing all available data and ensuring they are easily accessible to anyone needing them.

Summary of current data management

Data collection

Data are collected to meet a number of requirements across DEPC divisions, for example to inform EIAs, and assess biodiversity in Community Conserved Areas (CCAs). DEPC staff with expertise in certain areas complete surveys and assessments alongside other work commitments. No regular monitoring programmes exist to collect data over time, and data are instead collected to meet a specific ask. For example, data are collected to validate submitted EIA reports through site assessments. Data collected in the field are written on paper forms and transferred to laptops (normally using Excel spreadsheets) when staff return to the office. The Excel files are usually stored on individuals' laptops or memory sticks. There is a trial underway using KoboToolbox to collect information in the field to contribute directly to regular reporting. DEPC work closely with communities to obtain permission to undertake field assessments and gather evidence through conversations with members of the community.

There are currently no internal frameworks or shared standardised protocols to define data collection methods, which can limit confidence in datasets, particularly those obtained from other Government departments to inform EIAs. Monitoring data are currently focused on observations, but there is ambition in the department to collect information on other parameters to expand the applications of collected data. More survey equipment and training for data collectors would be required to achieve this.

Data availability

Examples of data types used across DEPC's divisions include:

- Biodiversity assessments, including species monitoring data for CCA registration.
- METT-4 assessments for CCAs
- National baseline data, for example coastline mapping, are currently limited, but global layers are supplemented with project-specific data, such as dugong survey data and Special and Unique Marine Areas (SUMA) assessments from the Marine and Coastal Biodiversity Management in Pacific Islands (MACBIO) project.
- Chemical/waste disposal site locations.
- EIAs and associated surveys.
- Conversations/anecdotal evidence from community consultations.

Currently, data are mostly stored as Excel spreadsheets and paper data sheets or reports, including maps and raw survey data. Emails with expert advice and notes from conversations with colleagues or community members feed into the EIA process. Spatial data are visualised using shapefiles, but GIS capacity across the department is limited.

In general, DEPC staff feel the data required to complete their work are limited or not available. National baseline data are not available for key ecosystems, particularly seagrass and mangrove habitats, and decisions are made based on global layers. National datasets such as coastline mapping and village placement data are outdated, but efforts are underway to update this information. Biodiversity assessments are not complete in all target locations due to limited resource and there is a need for enhanced species distribution data to help enforce protection. Regular monitoring is a significant gap for invasive species management and biodiversity assessments over time. There is potential for the continued development of a ranger toolkit and app to fill some of these gaps. There is little information on pollution monitoring, for example water quality and waste disposal incidents, which limits DEPC's ability to enforce restrictions to manage pollution.

Enhanced biodiversity, invasive species, and pollution monitoring data availability would support DEPC staff in justifying decisions with evidence and raising awareness in communities to promote species/ecosystem protection, sustainable resource use, and waste management.

Data accessibility

Accessing data within DEPC and across other Government departments can be challenging. There is currently no formal catalogue system in place within the department, meaning datasets and reports are difficult to find and are often only used for a specific project instead of being accessible for future use, leading to duplication of effort. Within DEPC, accessing data across divisions is challenging, as data often exist only on a staff member's laptop or desktop. Datasets can be lost, particularly if a PC breaks, and data are held in paper reports or data sheets, many of which have no digital copies. The SALMON cross-Government file sharing system is accessible to all in DEPC but is not effectively managed and information is difficult to find. There is ambition across DEPC to enhance data accessibility through improved cataloguing to ensure data are findable and to maximise the use of data, following the "collect once, use many times" principle.

DEPC's work involves collaboration with several other Government departments, but sharing information across departments is currently not formalised. Data sharing between Government departments is currently facilitated through email requests and sending datasets online or delivering in-person on a USB stick. Department directors are responsible for submitting formal requests for data to other directors, or staff are reliant on personal relationships with staff in other departments to gain access to datasets. Variations in data sharing procedures across Government departments mean that requests are often challenging to accommodate and can be ignored or rejected. There is also a lack of clarity on timescales for sharing data, as staff are not required to provide information within given timeframes, causing delays. A National Geospatial Data Policy is in place to outline protocols to standardise, manage, and disseminate spatial data. Similar data policies would be welcomed for other data types to formalise the processes around sharing datasets.

Accessing data from communities requires authorisation of community chiefs. Use of this wealth of community knowledge needs to adhere to any conditions as agreed with community members, for example restricting access related to sensitive species or ecosystems. Following a protocol, for example the CBD Nagoya Protocol, could help to formalise community data sharing, ensuring community knowledge is treated with respect.

Some of the datasets used across DEPC are sensitive and cannot be widely shared, for example EIA information about proposed developments. Sharing of sensitive datasets needs to be carefully considered and formalised, ensuring these data are accessed by relevant staff members.

Current infrastructure

DEPC staff largely use laptops to access and use division data, as many desktop PCs are no longer in use. DEPC data are stored in laptops and PCs, which currently limits data sharing across the department. The SALMON cross-Government file sharing system exists to enable data sharing within DEPC and across departments, but storage space is limited, and the system is not widely used because the filing structure is not clear, and documents/datasets are difficult to find.

OGCIO currently have server capacity available for DEPC, but this will need to be reviewed as the development progresses. Government departments can access files stored on a cross-Government network through a wired connection in Government offices. Outside these offices staff access the network via Citrix, which requires a strong Internet connection. Cross-Government WiFi is available in Government offices, but this can be very slow and the DEPC staff use an office modem instead in both the Port Vila and provincial offices.

When working in the field, DEPC staff use paper forms and tablets (where available) to collect data, for example using the KoboToolbox survey forms. Trialling the KoboToolbox forms has been successful so far, with provincial officers submitting data to contribute directly to reports. Feedback shows the form needs more functionality to further enhance the information gathered, for example being able to upload multiple images as evidence, the option to explain missing data points, and the ability to attach documents to a submission. DEPC are currently partnering with Live & Learn Vanuatu to develop an app for CCA rangers to submit monitoring data. The app has been trialled in communities to gather feedback, and there is potential to further expand this tool to collect more information and ensure the interface is accessible to community members, for example by translating text to Bislama and simplifying protocols for wider use.

Data use

Data use spans divisions and departments. Within DEPC data are used in the following ways:

1. Reporting and legislation
2. Assessments and monitoring
3. Informing management decisions, compliance, and enforcement
4. Developing awareness / outreach materials
5. Preparing environmental policies, plans, guidelines, and protocols

Reporting and Legislation

DEPC's reporting requirements span a wide range from internal reporting on individual work plans, up to reporting on international commitments such as the Convention on Biological Diversity (CBD). Below is a broad overview of the different levels of reporting required from DEPC and the relevant commitments / initiatives covered at each level (Table 1).



Data are required for all levels of reporting by DEPC however obligations are not always met. A key example of this was set out by both DEPC and OGCIO regarding reporting on the environmental pillar of the NSDP. The indicators used were too broad, and data were not available which prevented DEPC as well as other departments from being able to inform the reporting. Additionally reduced resources and data gaps often lead to lapses in reporting for international commitments such as the CBD.

Table 1: Non-exhaustive list of DEPC reporting requirements and legislation commitments at each level, with details on relevant divisions, whether reporting/commitment spans multiple departments and reporting period.

| Reporting Level | Commitment / initiative | DEPC division | Cross Department | Reporting Period |
|-----------------|---|--------------------------|------------------|------------------|
| International | CBD | Biodiv & Conservation | ✓ | |
| | Nagoya Protocol | Biodiv & Conservation | | |
| | CITES | Biodiv & Conservation | ? | |
| | UNCCD | Biodiv & Conservation | | |
| | Stockholm Convention | Env. protection | | |
| | Marpol Convention | Env. protection | ? | |
| | Montreal Convention | Env. protection | ? | |
| | Waigani Convention | Env. protection | ? | |
| | Vienna Convention | Env. protection | | |
| | International Plant Protection Convention | Biodiv & Conservation | ✓ | |
| Regional | | | | |
| | SPREP / INFORM | | ✓ | |
| National | NSDP | All | ✓ | Annual? |
| | Chemical Management Act | Env. protection | ? | |
| | State of the Environment Report | All? | ✓ | |
| | Environmental Protection & Conservation Act | All | ✓ | |
| | Environmental Impact Assessment Regulation | | ✓ | |
| | National Parks Act | | ✓ | |
| | International Trade (Flora and Fauna) Act & Regulations | | ✓ | |
| | Waste Management Act | | ✓ | |
| | Pollution Control Act | | ✓ | |
| | Ozone layer protection Act and regulations | Env. protection | | |
| | National Invasive Species Strategy and Action plan | Biodiv & Conservation | ✓ | |
| Departmental | DEPC business plan | All | ✗ | |
| | Provincial business plan | All | ✗ | |
| | Individual work plans | All | ✗ | 6 monthly |
| | Financial report (Min Finance) | Finance & Administration | ✓ | Annual |

| | | | | |
|--|---|--------------------------|---|-----------|
| | Financial report (Min Climate Change Monitoring & Evaluation) | Finance & Administration | ? | 6 monthly |
|--|---|--------------------------|---|-----------|

Assessments and Monitoring

There are a number of assessments that DEPC carries out (independently or in collaboration with other Government departments) all of which need to be informed by robust data. These include, but are not limited to:

- Mapping habitats and protected/endemic species.
- Assessing threats from invasive species under the National Invasive Species Strategy and Action plan.
- Environmental and socioeconomic impact assessments for development projects in both marine and terrestrial environments.
- Water quality (although not linked to Bureau of Standards).
- Waste production and pollution control
- Disposal of chemicals and hazardous waste.
- Importation of refrigerants and Ozone Depleting Substances (ODS).

Both the assessments and monitoring would be improved with easier access to data. The ability to refer back to historic data would also be an advantage, something that is not possible currently as data are not catalogued or stored in a standardised way.

Informing Management Decisions, Compliance and Enforcement

A key responsibility of the DEPC is to use data to inform management decisions and ensure compliance with a number of Vanuatu's environmental protection laws. Examples of management decisions, and areas relating to enforcement and compliance that fall under the remit of the DEPC include, but are not limited to:

- Approving development applications and enforcing requirements/rules in relation to development permits (Environmental Planning and Impact Assessment division).
- Designating Community Conservation Areas (Biodiversity and Conservation).
- Approving and enforcing bioprospecting permits (Biodiversity and Conservation).
- Enforcing Vanuatu's obligations under CITES (Biodiversity and Conservation in conjunction with other relevant Government departments).
- Implementing the National Invasive Species Strategy and Action plan (Biodiversity and Conservation).
- Issuing permits and licenses for ODS (Environmental Protection).
- Issuing permits and enforcing compliance with pollution standards under the Pollution (Control) Act No. 10 of 2013 (Environmental Protection).
- Assisting compliance with Vanuatu's single use plastic ban issued under the Waste Management Regulations Order No. 15 of 2018 and the Waste Management (Penalty Notice) Regulation Order No. 17 of 2018 (Environmental Protection).
- Approving department-relevant research applications (DEPC in conjunction with Vanuatu's Cultural Centre).

Despite this wide remit and range of responsibilities DEPC members often do not have the data they need to fully inform decisions. Compliance and enforcement measures such as fines are often issued without enough data to fully justify them, leaving DEPC open to complaints and potential litigation should a business, community, or individual challenge the decision.

Developing Outreach / Awareness Materials

Within DEPC the Provincial Outreach, Information and Communication (POIC) division are responsible for managing the department's environment extension programmes and services. As part of this the division's obligations include:

- Providing environmental information and awareness to the general public.
- Developing and disseminating information and educational materials to schools, communities, and general public.
- Working with media, schools, provinces, and the general public to promote the sustainable use and management of Vanuatu's natural resources and environment.

To fulfil these obligations, POIC needs to utilise available data from across DEPC to develop relevant, up to date materials including posters, leaflets, teaching materials, booklets, and videos. The division also participates in national events, such as arts festivals, national agriculture week, ozone day, environment day etc., so having access to the relevant up to date data is key to ensuring materials are focussed, factual, and have as much impact as possible.

Preparing environmental policies, plans, guidelines, and protocols

One of the roles of the DEPC is the preparation of national environmental policies, plans, guidelines, and protocols, however access to data has hampered efforts to fulfil this role.

Environmental policies that DEPC are tasked with preparing include, but are not limited to:

- Vanuatu State of Environment Report 2022
- Vanuatu 2030 The People's Plan: National Sustainable Development Plan 2016 to 2030
- Vanuatu National Environment Policy and Implementation Plan 2016 to 2030
- Vanuatu National Waste Management, Pollution Control Strategy, and Implementation Plan 2016 to 2020
- National Invasive Species Strategy and Action Plan 2014 to 2020
- Vanuatu National Biodiversity Strategy and Action Plan (BSAP) 2018 to 2030

Guidelines and protocols also need to be developed to ensure data collection, monitoring, and assessments are all standardised within DEPC and across all Government departments. For example, the EIA division are responsible for processing and approving development applications, however often the data used to inform these applications is collected by other departments such as Fisheries or Lands. The protocols used are not always shared, so the reliability and comparability of data cannot be determined. Additionally, a lack of guidelines for roles such as chemical management has led to storage sites not having safety protocols, resulting in a lack of emergency response equipment and/or staff trained to use it.

Data flow

Understanding data sharing within the DEPC, between Government departments, and across regional databases helps to clarify which other systems the DEPC data management system needs to interact with.

Data flows within DEPC:

- Data need to be shared across divisions within DEPC to improve the evidence base available to inform decision making. For example, species distribution data can inform EIA decisions.
- Summary reports and statistics need to be accessible to the administrative DEPC staff to feed into department financial reporting.

Cross-Government links:

- Vanuatu Fisheries department collects information on marine resources, including fish stocks, while DEPC's remit includes marine ecosystems. Within conservation areas, DEPC have responsibility for data collection, but outside these areas DEPC work closely with the Fisheries Department to conduct joint surveys. For example, the Fisheries Department collects information on Crown of Thorns starfish to contribute to DEPC invasive species management.
- Data and expert advice is sought from Government departments to inform EIAs and issuing permits. Information is sought from the following departments:
 - Within the Ministry of Lands and Natural Resources: Department of Geology and Mines, Department of Water Resources, and Department of Lands.
 - Ministry of Internal Affairs
 - Within the Ministry of Agriculture Livestock Forestry Fisheries & Biosecurity: Department of Agriculture and Department of Forestry

Staff from these departments (and others as required by the development) collect data to inform the EIA, but these data are not necessarily shared with DEPC, only the summary report is shared.

- The Department of Biosecurity works with DEPC on invasive species management and monitoring.
- The Department of Forestry holds all vegetation data that can inform EIAs and biodiversity and conservation work.

Examples of key national and regional databases relevant to DEPC:

- [Vanuatu national herbarium database](#). This database includes information on vegetation species, including target species of interest to the DEPC.
- [The Vanuatu Environment Portal INFORM database](#), which feeds into the SPC regional data hub. DEPC interact with this database to share relevant data as needed.
- [GBIF invasive species database](#). Accessed through an online portal.
- [Single Window system](#). This public facing portal collects information on CITES and permits for regulating imported ODS.
- The Vanuatu Fisheries Department TAILS database, which collects catch information to form fish stock assessments.

Key challenges

- There is a general lack of baseline data, especially in marine habitats, and limited monitoring data, including invasive species, target species for biodiversity assessments, and pollution monitoring. Scarce data availability limits DEPC's ability to evidence decisions, enforce regulations, and raise awareness in communities.
- There is no indexing system currently in place and data are not formally catalogued or archived/retained. Data are usually only used for the immediate task and are not stored/filed to facilitate future use. This restricts staff knowledge of what data are available, leading to duplication of effort and limiting the ability to monitor changes over time.

- A significant amount of data are stored in paper forms, or on individuals' laptops. Digitising or transferring information and performing associated data manipulation/cleaning is very time-consuming.
- Limited data sharing due to a lack of formal agreements restricts effective use of data within and across Government departments.
- A lack of standard data collection and management protocols leads to inconsistencies and limits the ability to catalogue data to ensure it is easily accessible.
- Currently processes are largely manual, leading to a drain on time and resource. Resources across the department are stretched and support is required to undertake digitising and filing datasets.
- Limited transparency of workflows. Staff need clarity on roles and responsibilities to understand the full process of a task and ensure information is used effectively.

Suggested improvements

General suggestions from DEPC staff for improvements to data management culture are summarised here.

- Implement standardised sharing agreements between and within departments to formalise data sharing processes and ensure proper use.
- Provide training to promote need for data sharing and increase buy in across departments, creating an enabling environment to share information.
- Clarify within and across department workflows to visualise links between tasks and who is responsible for actioning tasks, highlighting any bottlenecks or delays.
- Enhance regular monitoring capacity, including biodiversity assessments, invasive species monitoring, and pollution monitoring.
- Define data collection protocols and methodologies, providing associated training, to ensure relevant information is collected for multiple uses (along the "collect once, use many times" principle) and enhance confidence in datasets.
- Ensure data are retained for future use, including EIA data from developers and other Government departments. If the full dataset cannot be shared openly, ensure the data are findable by making the metadata accessible so staff are aware relevant information exists. Staff can then request access to data as needed, adhering to data sharing agreements.

System requirements

Functional Requirements

Through the user research discussions, the following functional requirements (specific functions) of the data management system development have been identified. An exercise to prioritise these functions may be required to inform the development process.

Interactive map interface

A key requirement for the system is to enable DEPC staff to visualise spatial data from across divisions. Through an interactive map, users will be able to visualise biodiversity data monitoring points (particularly species distributions), CCA boundaries, baseline data, etc. Users need to be able to toggle layers on and off and filter layers to display attributes of interest. This will enable data sharing across divisions to inform decisions.

Search function and data catalogue

User-friendly indexing and search functions to assist in cataloguing all available data across DEPC and ensuring they are easily accessible to anyone. This catalogue includes the function to add scanned paper agreements/reports/contracts to the system to ensure these resources are retained and findable.

Integration of ranger toolkit data

The ongoing development of a ranger toolkit and app to collect data from communities needs to be integrated into the system, allowing data submitted to be ingested via a streamlined data flow. Similarly, the system needs to consider the data flow for data submitted by provincial officers via KoboToolbox forms.

Indication of data confidence

The ability to rate and highlight data confidence, for example showing non-validated points in a different colour on a map.

Data analytics and results export

To be further defined through discussions with DEPC and VBoS. Basic analysis within the platform to auto-generate graphs/maps and an export figure function to feed into reports and VBoS indicator generation. Statistics generated could include number of CCAs and percentage of Vanuatu protected, to highlight progress towards national and international commitments.

User accounts

The system will require user accounts to define different user types, access controls, and workflows for certain components, for example upload/approve/edit/view/download controls.

Landing page

All DEPC staff access this page and navigate to division-specific page from here.

Controlled access to certain datasets or records

Ability to categorise data based on their sensitivity, for example using a traffic light system, and have access to sensitive data enforced by user logins at different clearance levels (edit, use, view etc). Potential options could include ensuring metadata are available but not the full dataset as appropriate or blurring the resolution of sensitive data.

Standardised data entry

Data fields will be standardised by drop-down menus, using standardised names, and ensuring metadata are included.

Ability to attach additional information to records

The system will include the functionality to attach reports or anecdotal evidence gathered through community discussions.

Ability to interact with other key data systems

The DEPC system should have the functionality to link to other Government departments' reporting systems, such those in Vanuatu Bureau of Statistics, and regional databases wherever possible.

Public facing information centre

A public-facing element of the data management system to provide information regarding developments, CCA boundaries and regulations, pollutant/waste information/guidance, species distribution map (at an appropriate resolution), and outreach materials. The public-facing page will include an FAQ section to direct users to information and a contact form for users to submit queries or report incidents to the relevant division within DEPC.

Public facing application system

The system will provide an online portal for development application completion and submission. This will include a workflow system to ensure applications are fully complete prior to submission and ideally will include a task tracking element to assign next steps to the responsible member of staff. Similarly, the system will include an application process to register new CCAs, aligned with IUCN categories, to allow community members to submit information required to classify areas as a CCA. The functionality for CCA rangers to submit annual reports and associated data will also need to be incorporated.

Non-functional requirements

Through the user research discussions, the following non-functional requirements (system qualities) of the data management system development have been identified.

Accessibility

The system will adhere to accessibility guidance and legislation in Vanuatu. For example, the system needs to be simple to use and understand and may need to have the option to view in Bislama.

Usability

The system will be user-friendly and clearly documented, with all information required to use all aspects of the system provided. The interfaces will follow a clear layout and be described clearly.

Backups/recovery

Working closely with OGCIO, a sustainable process of regular backups of data stored needs to be established.

Future proofing

The system will be developed using maintained “off-the-shelf” software that is easily updated. Continued support will be secured for maintenance of the system.

Hosting

An appropriate hosting system will be agreed with OGCIO. Discussions with DEPC indicate a preference for hosting the system on local servers, managed by OGCIO.

Training and guidance

To ensure the effective use of the system by DEPC, there will be a comprehensive testing and training phase, integrating user feedback into the development, and providing training sessions for all staff. Clear user guidance, including documents and training videos, will be accessible through the system.

Compliance

The system will comply with all legislation and governance procedures employed by the Vanuatu Government, including managing sensitive data and considering the associated risks and legal responsibilities.

Standardised protocols

Alongside user guidance, additional resources will be accessible through the system including data collection methodology protocols and metadata templates, templates for maps and application forms, data sharing agreements, and data management best practice principles.

Complementary support

In addition to the system-specific requirements, the following aspects of support have been identified to complement the data management system development.

Additional resources:

- The user research has identified evidence gaps and clarified DEPC priorities for support to fill these gaps. OCPP will explore opportunities to support DEPC in generating evidence according to these priorities.
- Support for DEPC internships to transfer data from existing storage, scan and upload historic data and documents. Dedicated ongoing support within OGCI and DEPC will also be explored.

Data sharing agreements and standardised protocols:

- Support to establish formal data sharing agreements across DEPC divisions and between Government departments, for example through user groups similar to the geospatial group, can be provided as required. Data sharing agreements will ensure appropriate acknowledgement, for example citations and accreditation, are a condition of using datasets.
- Support to enhance the data sharing culture within DEPC and between Government departments, by demonstrating value and helping to establish a mechanism to share data, for example a data request form that triggers a workflow. Support to define workflows, for example through a clear flowchart, to clarify roles and responsibilities of staff and show how data and information flow through the department (show interactions between divisions and departments).
- Support as required to formalise community data sharing, for example following a similar protocol to the Convention on Biological Diversity (CBD) Nagoya Protocol.
- Support to define standardised protocols for collecting, managing, and communicating data, to enhance the confidence in datasets and ensure efficient data use.

Conclusions and recommendations

Based on the findings of the user research process, the following recommendations will be progressed under OCPP:

- Work with DEPC to generate a prioritised list of system requirements to inform the development process.
- Work with DEPC and VBoS to define analytical functions that would be most useful for reporting and indicator generation purposes.
- Develop and expand the pilot established by the Biodiversity and Conservation division, currently being built on a voluntary basis by OGCI developers, as this prototype meets interface requirements and has potential to include components for other divisions.
- Contract developers to build and expand this system, ensuring continued inclusion of OGCI developers.
- Continue to involve DEPC in the build of this system through user testing and feedback sessions and by providing training in data management best practice, while being mindful of DEPC staff time constraints.
- Work with DEPC to identify sustained staff support within the department to ensure the system is used and updated beyond the involvement of OCPP.
- Provide support to Live & Learn Vanuatu to continue developing and expanding the CCA ranger toolkit app, including ensuring the app links with the developed data management system, can be used offline during fieldwork, and can be used in Bislama to make it accessible to community members. Expansion of this toolkit will include the ability to monitor additional species and the inclusion of ID guides for target species to support data collectors.
- Support definition of data collection and monitoring protocols to ensure surveys are collecting the data required for reporting obligations and decision-making.

Appendices

Appendix 1: User stories

1. As a:

Department director, I am responsible for final approval of division work, including applications (EIA, waste management, registering PAs etc.).

I would like:

- Protocols for data use and accreditation
- Data request forms
- Requests to be automated within a workflow system.
- Baseline data for Efate, Tanna, and Santo in the first instance
- Access to data from external partners (e.g., NGOs and academia)
- Expand Live & Learn Vanuatu platform into coastal and marine environments.
- Controls on data access for sensitive data
- Intra/inter department sharing agreements.
- Automated mapping functionality
- Public facing map.

So that I am able to:

- Facilitate easier discussion/requests/sharing between divisions.
- Have oversight of where a piece of work is up to and who it is sitting with for actioning.
- Understand how one role impacts another within and across divisions and departments through the workflow.
- Reduce bottlenecks and delays in obtaining required data across departments.
- Enable input of data from all environments (marine, terrestrial and coastal) to build up baseline data sets.
- Better inform national and international reporting.

2. As a:

Principal biodiversity officer

I would like:

- Build on pilot system that the Biodiversity and Conservation division have developed with OGCIO.
- Incorporate standardised methodologies as they are developed.
- Enable traffic light protocol (as used by OGCIO) to set levels of access to various data sets/ information.
- Functionality for all information to be viewable, but not necessarily downloadable.
- Intern(s) dedicated to inputting data.
- To be able to digitise historical data and documents.
- Link the rangers' Live & Learn Vanuatu app to the system.
- Map function to have varying levels of clearance depending on the data being viewed.

So that I am able to:

- Speed up delivery of the new system (current pilot has taken years to get off the ground)
- Enable people to understand how the data were collected and ensure data are reliable and accurate.

- Be able to have everything in one system while also adhering to Vanuatu's Rights To Information (RTI) Act and ensure only people with the correct authority/clearance can access sensitive information (e.g., locations of endangered/endemic species).

3. As a:

Senior conservation officer, I manage and assess applications through the registry process for communities to register land for conservation measures. As only formally recognised areas can be reported against international targets, I work to encourage communities to apply and register their land as a PA to assist with Vanuatu's 30 x 30 commitment. I undertake biodiversity assessments and undertake GIS mapping of spatial datasets for the department.

I would like:

- Document scanning function.
- Cross department GIS training.
- Search and cataloguing functionality.
- Public-facing information centre including:
 - Regional and area updates
 - Trip reports / results
 - Activity updates for communities
 - Q & A section
 - Contact form

So that I am able to:

- Easily digitise historic data / information currently on paper.
- Reduce reliance on one person to generate maps and increase capabilities / give contingency across DEPC.
- Reduce time wasted on looking for documents / data.
- Prevent documents / data being lost, and thus duplication of effort.
- Enable public to answer standard and common queries online and reduce bottleneck caused by DEPC individuals having to respond directly to public queries.
- Inform public and communities of updates and news regarding applications or other relevant news.
- Provide educational resources to promote community uptake of formally registering their OECM's and thus, contributing to Vanuatu's 30 x 30 commitment.

4. As a:

Invasive species officer., I undertake implementation of national invasive species strategy and action plan, liaising with stakeholders and other government departments to assess appropriate management action.

I would like:

- To have baseline data for invasive species.
- Cross-departmental access to data sets.
- Workflow to understand who the data sits with, or who might be using the data.
- Integrated mapping functions to plot the data as they are entered into the system.
- Offline availability of species distributions etc. as internet connections are not good, especially in the field.
- A monitoring system and place for data to be uploaded. (Some people might have data for one species but need the data to be collated and easily accessible for all species.)

So that I am able to:

- Look at trends so that they can make better decisions and justify funding.
- Be more informed on decision making. (Data are currently limited.)

5. As an:

EIA officer, I assess requests and provide recommendations to issue permits to developers across Vanuatu. Assessment involves understanding the environmental and socioeconomic impacts of proposed developments, liaising with other relevant departments to assess available data and conduct field work.

I would like:

- Map function to be able to visualise developments and changes over time.
- Basic template that allows key data to be added and gives the meta data (including how it was collected and what instruments were used.)
- Access to data collected by other departments via the database.
- Historical catalogue of available data with search function.
- Clarification on sharing agreements in place, might need refining to agree timescales for sharing.

So that I am able to:

- Streamline development application process.
- Automated thematic GIS map will help with land rights. Systems vary between islands, so having everything on one map will make it easier to identify location specific issues.
- Fast track assessment of data to speed up approvals.
- Automate each step of the application process and develop workflow to understand how the application is progressing and who it is currently sitting with (developer, EIA division, Director Touasi), other departments). Remove need for manual assessment at each step of the application.
- Enable automatic visualisations to display results in a meaningful way.
- Refer to historic data to understand changes over time.

6. As a:

Principal waste management & pollution control office, I lead all aspects of the division, including waste permits, management, and enforcement.

I would like:

- Baseline data for habitats, similar to the Blue Prosperity work
- Easier communication / automated communication between divisions
- Protocols and training
- SOPs that link work of various divisions
- Workflow function to understand links in data, processes, and reporting between divisions.
- Citing and accreditation function for data use.
- Formal system for data requests between departments. Automate so that that requests trigger workflows.
- Link Live & Learn Vanuatu system to this new system and expand into coastal and marine environments (currently on terrestrial).
- Ability to link new system with others used across other departments.

So that I am able to:

- Reduce time spent reviewing applications.

- Facilitate easier discussion/requests/sharing between divisions.
- Have oversight of where a piece of work is up to and who it is sitting with for actioning.
- Reduce bottlenecks and delays in obtaining required data across departments.
- Enable input of data from all environments (marine, terrestrial and coastal) to build up baseline data sets.
- Better inform national and international reporting.

7. **As a :**

Senior chemical and ozone officer, I am responsible for monitoring and reporting against protocols as stipulated under various international agreements e.g., BASO Rotterdam, Stockholm convention, MINIMATA (most chemical conventions relate to hazardous waste).

I would like:

- Data cataloguing and search functionality
- Report generation functionality
- Well defined protocols
- Rating functionality
- Links to online MSDSs and other relevant literature (protocols?)

So that I am able to:

- Automatically generate reports.
- Ensure collection of robust data to inform reporting.
- Use protocols to ensure safe and effective disposal of hazardous chemicals and materials.
- Provide easy hazard rating for each chemical / material.
- Provide resources for applicants.

8. **As a:**

Senior outreach officer, my primary responsibility is to supervise, and support the provincial officers, and coordinate their work. Facilitate ways that provincial officers can report back to main office.

I would like:

- System that connects all departments in the main office with the provincial offices.
- Ability for provincial officers to upload their data from the field and for it to be available to all members of DEPC.
- Automatic report generation.
- QA functionality for data from within and between departments.
- Digitised, standardised, and simplified data sheets to be used across departments. Remove need for paper data sheets.
- Link system to field officers' tablets and mobile phones.

So that I am able to:

- Remove himself as focal point for all data dissemination.
- Ensure data are accurate and reliable.
- Collate data for various reporting needs.
- Automate report generation.
- Automate data visualisation.
- Ensure data entry is digitised from the beginning to assist with QA process.

9. **As a:**

Provincial officer, I cover responsibilities for all DEPC divisions within the province. This includes:

- Community Conservation Area assessments and applications with the biodiversity and conservation division.
- Writing letters of interest and assisting with the application process for potential developers.
- Replanting endemic species.
- EIA- gathering information and notifying radio station to disseminate information to communities.
- Work to set up public consultations.

I would like:

- Easier access for provincial officers to main office information.
- Offline access to data.
- Ability to generate regular reports.
- Protocol to have to report on all field trips.
- Simplify the development application and CPA process.
- Need simple output in relation to EIA application assessments.
- Need more consultation between developers and businesses. Increase guidance for applications. Online guide.
- Education and outreach materials e.g., for pollution
 - Need more information materials to educate communities.
 - Schools - posters, videos etc.

So that I am able to:

- Cut down time wasted on using government network.
- Reduce time wasted on contacting people for information.
- Reduce time spent creating reports for main office (e.g., Ron's monthly reports).
- Enable EIA team to review information quickly.
- Have all information automatically digitised so they don't have to input from paper, and everything is collated and not lost.
- Allow developers to easily understand the review of their applications.
- Pollution – currently has no access to info, so can't communicate changes and information to the communities. Need to be able to answer questions etc.

Appendix 2: List of DEPC interviewees

| Department | Division | Role |
|------------|-----------------------------|--|
| DEPC | - | DEPC director |
| DEPC | Biodiversity & Conservation | Principal biodiversity officer |
| DEPC | Biodiversity & Conservation | Senior conservation officer |
| DEPC | Biodiversity & Conservation | Invasive species officer |
| DEPC | Env. Planning & EIA | Principal EIA officer |
| DEPC | Env. Planning & EIA | Environmental engineer |
| DEPC | Env. Planning & EIA | EIA assessment officer |
| DEPC | Environmental Protection | Principal waste management & pollution control officer |
| DEPC | Environmental Protection | Senior chemical and ozone officer |
| DEPC | Provincial Outreach | Senior outreach officer |
| DEPC | Provincial Outreach | Provincial officer |

Appendix 3: Online user research questionnaire

As part of the UK Blue Planet Fund [Ocean Country Partnership Programme](#) we are aiming to develop a data management system for use across DEPC. To ensure a new data management system meets your requirements, we are asking staff from across the DEPC divisions to tell us how they currently use data and how they want to use data in future. As a first step, we would really appreciate it if you could complete this short questionnaire to give us an idea of how you access and use data as part of your work at DEPC.

We will be travelling to Vanuatu to meet in-person to discuss your requirements in more detail in September. It would be fantastic to speak with you if you are available. Please indicate a suitable date/time to meet at the end of this questionnaire and we will be in touch to arrange a meeting.

Background questions:

This section helps us to understand your role and how you currently use data.

Could you give a brief description of your role within the organisation?

We have broadly identified the following audiences that use data. Which one best describes you, if any (select all that apply)?

- a. Data collector (e.g. conducting surveys)
- b. Data processor (e.g. inputting data into DEPC systems)
- c. Data manager (e.g. managing access to data, checking accuracy of data)
- d. Data analyst (e.g. using data to produce evidence/reports)
- e. Decision-maker (uses data products e.g. reports)
- f. Other (please specify)

Within this role, how do you interact with data?

How would you rate your computer knowledge? Are you comfortable with online tools?

Data Quality Assurance

It would be good to understand if DEPC currently has any Quality Assurance processes in place (e.g. data checks)

Are there currently any processes in place to check the quality/accuracy of data? (e.g. checking for human errors)

Is there any information available on confidence of datasets?

Data availability

Do you have access to the data you need to complete your work?

Are there any gaps in data/evidence?

Data access

What format is the data you use currently in? (e.g. paper forms, Excel spreadsheet, GIS map layer)

How do you currently access data?

Who owns the data that DEPC use?

How does DEPC currently obtain data from communities?

Data use

How do you currently use data in your role? (e.g. reporting, analysis, responding to queries, providing advice, informing management plans)

Are there sensitivities about the data that means you would not be happy for it to be publicly

accessible – e.g. locations on a map or sensitive species?

Barriers/Challenges

Is there anything limiting how you use data currently?

What are the problem areas with data?

Future development/vision

Thinking about what would make your life easier in terms of getting the information you need.

How would you like to improve your current access to data?

What impact will these improvements have on your work?

Are there any features you would like to see in a new data management system?

Final Questions:

Is there anyone you suggest we include in this questionnaire/interview user research process?

Please provide names and contact details.

Are you available for a follow-up discussion in September?

Are you on the computer that you normally work on? Can you run speedtest.net test – type in upload and download speeds (give screenshot as example) or give URL of results .

Appendix 4: In-person user interview questions / script

Thank you for taking the time to talk to me today.

Just to introduce myself, my name's [XXXXX], I work for the Joint Nature Conservation Committee as an International MPA Specialist, and we are conducting some user research to inform the development of a DEPC data management system under the UK Ocean Country Partnership Programme.

Please be aware, I might be new to some of the topics we'll be discussing today so I might need to ask some clarifying questions. Thanks in advance for your patience with this.

The user research we're undertaking today is to help us identify your requirements for a data management system that provides you with access to the data you require to carry out your work. We completely understand that in your role you may interact with data directly or indirectly, and we want to clarify that we're interested in gathering everyone's requirements from across DEPC, whether you are a data analyst or not.

We anticipate the session lasting for about 45 minutes today, any time you can spare is much appreciated. We'll cover a range of topics, and we want to understand more about you and your role, and how you might use a data management system.

There are no right or wrong answers, and if there is anything I ask that is not clear, or you need me to repeat, please do ask. Also, if you have any questions at any point, please let us know.

If there are any questions you do not want to answer or you want to end the meeting at any point that's absolutely fine.

If you need to take a break at any point, that's also completely fine, just let me know.

Finally - if it's ok, I'd also like to record the session today. The recordings will only be used for our reference when writing up our findings and will not be shared outside of the team. The recordings are held for a maximum of 12 months. Our findings will be anonymised, and the original recordings will

not be shared.

Are you happy for me to begin recording?

[Start recording]

For the sake of the recording, please can you re-confirm that you're happy to be recorded?

Your role and background:

We're going to ask you a few questions to help us to understand your role and how much you interact with data.

Could you give a brief description of your role within the organisation?

We have broadly identified the following audiences that use data. Which one best describes you, if any (select all that apply)?

- a. Data collector (e.g. conducting surveys)
- b. Data processor/inputter (e.g. inputting data into DEPC systems)
- c. Data manager (e.g. managing access to data, checking accuracy of data)
- d. Data analyst/outputter (e.g. using data to produce evidence/reports)
- e. Decision-maker (uses data products e.g. reports)
- f. Other (please specify)

How you currently use data

We'll now talk about how you currently interact with data within your role at DEPC.

Can you talk us through the standard way you use data? What does data help you to achieve?

How does this data feed into wider work you do?

How often do you use data?

Data availability

Do you currently have access to the data you need to complete your work?

Are there any gaps in data/evidence?

What needs to happen to fill these gaps?

Data Quality Assurance

It would be good to understand if DEPC currently has any Quality Assurance processes in place (e.g. data checks)

Are there currently any processes in place to check the quality/accuracy of data? (e.g. checking for human errors)

Is there any information available on confidence of datasets?

Data access

What format is the data you use currently in? (e.g. paper forms, Excel spreadsheet, GIS map layer)

How do you currently access data?

Who owns the data that DEPC use?

How does DEPC currently obtain data from communities? (and in what format?)

Data use

How do you currently use data in your role? (e.g. reporting, analysis, responding to queries, providing advice, informing management plans)

Are there sensitivities about the data that mean you would not be happy for it to be publicly accessible – e.g. locations on a map or sensitive species?

Technical infrastructure

What device do you normally work on?

Are you on/can you access the device you normally work on? Can we run a Wifi speed test – speedtest.net test on that device?

How would you rate your computer knowledge? How confident are you using online tools?

Barriers/Challenges

When currently accessing the data do you experience any challenges?

Is there anything limiting how you use data currently? (ie anything you can't do?)

What are the problem areas with data?

Future development/vision

Thinking about what would make your life easier in terms of getting the information you need.

How would you like to improve your current access to data?

What impact will these improvements have on your work? (How much would they help?)

Are there any features you would like to see in a new data management system?

What would be the most ideal things added or changed to make the system better for you to use? Why?

Final Questions:

Is there anyone you suggest we include in this user research process? Please provide names and contact details.

Many thanks for your time and support with this process, we really appreciate your input to the user research. Your suggestions and feedback will help us to ensure that the new system meets your needs effectively. We are staying in Port Vila for the next week or so, so if you do have anything to add that you think of later please do not hesitate to get in touch. My email is XXXXX so please do reach out to me with any suggestions as they come to you and we will incorporate these into the final user research report, which will be shared with you.

