UNESCO-FLANDERS COOPERATION IN THE FIELD OF SCIENCE (FUST)

EXTERNAL EVALUATION OF THE FLANDERS/UNESCO TRUST FUND FOR THE SUPPORT OF UNESCO's ACTIVITIES IN THE FIELD OF SCIENCE"

Terms of reference 15 February 2023

1. UNESCO/Flanders Trust Fund

A. Background

The cooperation between Flanders and UNESCO started in 1998 when both parties signed a first framework agreement during the official visit of the Minister President of the Flemish Government. This was soon followed by an agreement on a first Trust Fund for the Support of Science, signed in September 1999 and subsequently extended for a second, third, fourth and fifth period of 5 years each as follow periods: 2004-2008, 2009-2013, 2014-2018 and recently 2019-2023. Through this Science Trust Fund, also known as FUST, the Flemish Government has supported UNESCO's activities in the field of oceanography, water management, geosciences and the Man and the Biosphere (MAB) programme. A selection of information and materials about the previous phases and the ongoing projects is available through https://fust.iode.org.

According to Article 2(2) of the Agreement on the UNESCO Trust Fund for the support of UNESCO's activities in the field of Science (FUST), a thorough evaluation is to be performed before the end of 2023 on the cooperation implemented during the past 5 years and reported to the Government of Flanders with a view to deciding whether to extend the agreement for a further period of five years.

Thus, the present terms of reference (ToRs) shall address the evaluation of the Flanders/UNESCO Science Trust Fund (FUST), including the coordination and the strategic implementation of the trust fund, in relation to the focus of the cooperation as stated in Article 3 of the Agreement to support:

- the programme of the Intergovernmental Oceanographic Commission (IOC);
- the International Hydrological Programme (IHP);
- the Man and the Biosphere Programme (MAB)
- The International Geoscience and Geoparks Programme (IGGP)

B. Supported programmes

As indicated above, through FUST, the Flemish Government has supported UNESCO's activities in the field of oceanography, water management, MAB programme and Geoscience and Geoparks. Below is a brief description of the purpose of UNESCO's programmes in these areas.

IHP

The International Hydrological Programme (IHP) is the only intergovernmental programme of the UN system devoted to water research, water resources management, and education and capacity building. The programme, tailored to Member States' needs, is implemented in multi-year phases, the new IHP IX programme will run 2022-2029 and focuses on water in a rapidly changing world.

International and regional co-operation in water resources issues is actively pursued in IHP activities. Particular attention is paid to reflecting the needs of developing countries in the IHP plans. Belgium (with an active role for Flanders) has become a member of the IHP Council in 2021, chairs the IHP working group on Scientific Research and Innovation and has a lead role regarding the topic of 'hydrology and citizen science', linking with an ongoing FUST project.

MAB

The Man and the Biosphere (MAB) Programme is an intergovernmental scientific programme aiming to set a scientific basis for the improvement of the relationships between people and their environment globally. The MAB Programme proposes an interdisciplinary research agenda and capacity building that target the ecological, social and economic dimensions of biodiversity loss and the reduction of this loss. It's World Network of Biosphere Reserves currently counts more than 700 biosphere reserves in 130+countries. Concerned with problems at the interface of scientific, environmental, societal and development issues, MAB combines natural and social sciences, economics and education to improve human livelihoods and safeguard natural ecosystems, thus promoting innovative approaches to economic development that is socially and culturally appropriate and environmentally sustainable. FUST currently supports a project on mangrove restauration in biosphere reserves in the LAC region. Another example is the Be-Resilient Project, which is about climate observations in biosphere reserves and a bridge between the IHP and the MAB.

IOC

The Intergovernmental Oceanographic Commission (IOC) was established to provide the Member States of the United Nations (UN) with an essential mechanism for global co-operation in the study of the oceans. In order to perform its vital cross- sectoral and cross-agency responsibilities and provide an efficient and effective mechanism for drawing on the expertise of the non-governmental scientific community, the Twenty-fourth Session of the General Conference in 1987 provided the IOC with functional autonomy within UNESCO. The basic mission of the IOC is defined in Article 2 of its statutes which states that 'The purpose of the Commission is to promote international co-operation and to co-ordinate programmes in research, services and capacity building, in order to learn more about the nature and resources of the ocean and coastal areas and to apply that knowledge for the improvement of management, sustainable development, the protection of the marine environment, and the decision making processes of its Member States.' Flanders hosts the IOC's project office for the IODE programme on oceanographic data and information. That office is also the global hub for IOC's capacity development activities. FUST has been a major funder for IOC projects.

Geosciences and Geoparks

The scope of FUST was enlarged in the renewal to its fifth phase 2019-2023, and a small-scale activity focusing on (potential) African geoparks was granted. So far, no large-scale project has been funded by FUST in this field of science.

2. Purpose and scope of the Evaluation

A. General

The primary purpose for this evaluation is to provide advice to the Flemish Government and UNESCO concerning the future directions of cooperation under the Trust fund. More specifically, the evaluation will:

- Examine the governance, management and coordination mechanism developed by the two sides within the trust fund during the period 2019 to end of 2022;

- examine at a general level how UNESCO science programme management, in responding to a FUST call, have positioned the role of proposed FUST projects in relation to UNESCO general and programmatic priorities, and what significance effectively selected FUST projects attained in relation to those general and programmatic priorities; determine 'lessons learnt' in this aspect of FUST management with regard to call preparation;

- Assess the implementation of the following five Large Scale Projects supported under FUST during the period 2019 to 2023, including their impact and sustainability:
    - The Ocean Teacher Global Academy project (OTGA)
    - The Ocean InfoHub project (OIH)
    - The Pacific Islands Martine Bioinvasions Alert Network (PacMAN)
    - Enhancing Climate Services for Improved Water Management (CliMWaR)
    - The Be-Resilient project

- A brief description of the selected projects is attached to the present ToRs;

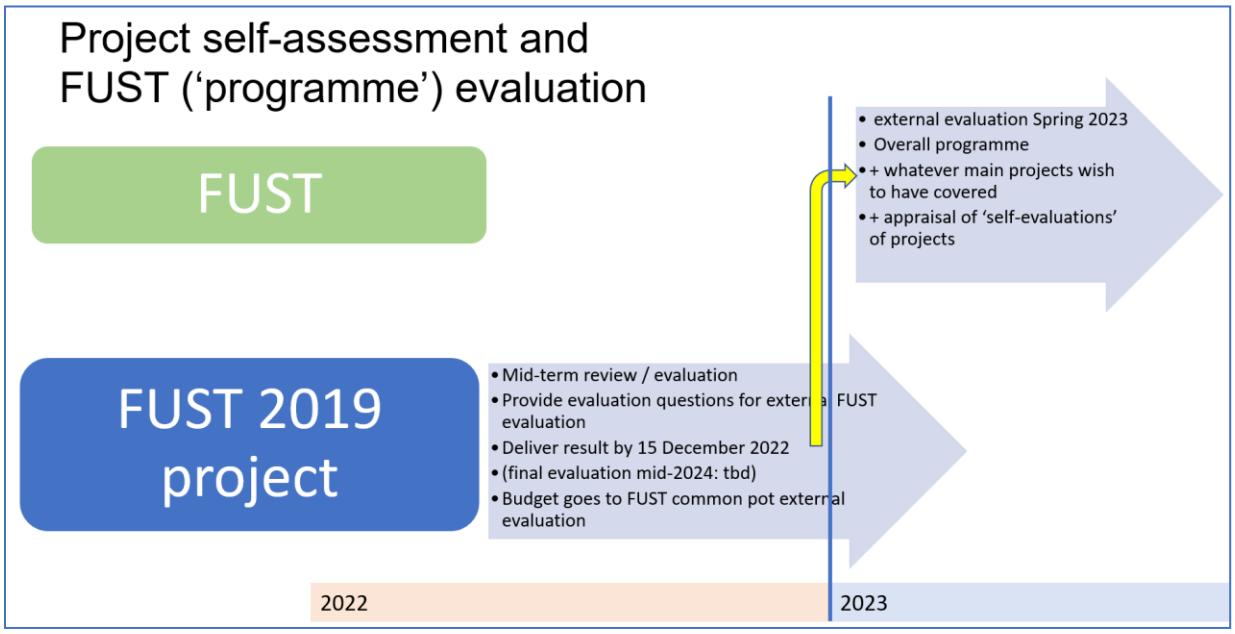
- Provide a forward-looking perspective on how the collaboration between the Flemish Government and UNESCO within the framework of the Trust Fund can further be strengthened.

B. COVID delays mitigation: combination of project self-assessment with the external evaluation

The four Large-Scale FUST projects which were approved for funding by the Flemish Government in December 2019, which were officially started in 2020 during the COVID-19 pandemic, all suffered implementation delays due to the pandemic. This means that, despite their initial plans for a 36-month implementation period, the actual implementation of these projects has not yet finished. As a result, the FUST Steering Committee agreed that the planning of the overall FUST evaluation should consist of:

- 'mid-term' self-assessments of these projects, with an opportunity to provide evaluation questions to be addressed in the overall external FUST evaluation;
- an external FUST evaluation that would complement the 'mid-term' self-assessments.

The results of these four main project 'mid-term' self-assessments are available at the start of the external evaluation.



C. Evaluation questions

The following is a list of indicative and generic evaluation questions. A more specific set of evaluation questions shall be drafted and validated during the inception phase of the evaluation, especially taking account of the results described in '*COVID delays mitigation*' above, so that the external evaluation efforts are complementary to those already evident from the project progress reports produced in December 2022. The CLIMWAR project (started 2017) also provided an extensive report, including self-assessment, at the end of 2022.

In line with the main purpose presented above, the evaluation will focus on the following two main aspects.

- **Adequacy of FUST Governance, management and coordination mechanisms:**

Coherence:

- In what ways could the deployment of resources under FUST be optimized to enhance the potential impacts of the invested financial resources (e.g., ensuring complementarities with other UNESCO donors in order to multiply effects and avoid duplications)? (Question AC-1)

Efficiency:

- How effective and efficient are the governance, coordination, advisory, management frameworks established under the trust fund by the two sides? This includes the meetings of the Steering Committee and bilateral consultations between UNESCO's relevant services and the Flemish Government (in particular with BSP, the Natural Science Sector, IOC and concerned field offices) and the project selection process in Flanders. (Question AE-1)

- **Assessment of projects funded under the Trust Fund, in particular the following selected Large-Scale projects: OTGA 2, OIH, PACMAN, CLIMWAR and BE-RESILIENT**

- *Relevance:*

- To what extent was the timeframe, the geographic coverage and thematic coverage of the projects adequate within the context of the overall programmes? (Question R-1)
- What is the current and future potential of the projects to contribute to relevant UNESCO's/ the Flemish government policies in the light of the 2030 Agenda? (Question R-2)
- To what extent did the selected projects meet stakeholder and beneficiaries' needs in consideration of regional, national and basin scale (local) priorities? (Question R-3) Has there been particular attention to consideration of how scientific and science-based activities can be true enablers, how the projects related to specific area-based disadvantaged groups, indigenous peoples, and any social and environmental concerns specific to the project and, more generally, of gender equality? (Question R-4)

Coherence:

- How has the support provided through FUST complemented/reinforced UNESCO's programmes, in connection with the contribution of these programmes to strengthening UNESCO's C/4 (medium term strategy) and C/5 (programme and budget)? (Question C-1)

- *Efficiency:*

- Have the selected projects produced the outputs in the project documents in a timely manner (considering delays due to the COVID-19 pandemic)? (Question E-1)
- Were the human and financial resources used efficiently? (Question E-2)
- Were opportunities seized to develop potential synergies with relevant networks and partners? (Question E-3)
- To what extent have partnerships and cooperation with implementing partners been effective? (Question E-4)

- *Effectiveness/Signs of Impact:*

- To what extent have expected results for the selected projects been achieved? (Question I-1) What were the key enablers and key challenges for such achievements? (Question I-2)
- Was an adequate monitoring framework/methodology put in place in order to achieve the expected results and maximize the success of the projects? (Question I-3)
- If there were differences between the real and the expected outputs, were these discussed between UNESCO and the Government of Flanders? (Question I-4)

- What have been the longer-term effects of the projects within the respective institutional, country, regional and international contexts (including potential for replication and multiplier effects)? (Question I-5)

- *Sustainability:*

- What mechanisms (including in terms of communication) have been put in place to ensure that the projects and/or their effects are sustainable over time and or scaled up/ replicated elsewhere? (Question S-1)
- In what ways have the project activities (and their outputs and effects) contributed to the visibility of the selected projects, of Flanders and of UNESCO? (Question S-2)
- Did the project lead to new opportunities for international scientific cooperation, and if so, did this involve scientists from Flanders? (Question S-3)

Specific questions related to the selected large-scale projects to be examined by the evaluators are included as annex of the present ToRs. In responding to the main evaluation questions presented in this chapter, the evaluation team will need to consider the indicative list of questions in the annex (as sub-evaluation questions or suggested questions to be included in their data collection tools).

D. Evaluation Methodology

We suggest that the evaluation team undertake the evaluation using the following evaluation methods:

a. **Desk study** to review all relevant documents and literature, including:
   i. Flanders/UNESCO Science Trust Fund agreement;
   ii. Minutes of the meetings of the relevant Steering Committees between the donor agency and UNESCO, as well as those established for individual projects;
   iii. Project documents;
   iv. Progress reports;
   v. Mid-term self-assessments;
   vi. Other related documents to the extent relevant (including national, regional, brochures, posters, multimedia products, media coverage, …);

b. **Interviews (**conducted in person or with videoconferencing facilities) with representatives from relevant stakeholders, including from:
   i. UNESCO Headquarters, Paris (BSP, SC and IOC);
   ii. Flemish Government, Brussels;
   iii. UNESCO's Field offices strongly involved in FUST projects
   iv. Selected constituencies associated with a particular FUST project

c. Up to five **missions** (three to UNESCO Headquarters, one or two to Belgium). No field missions are foreseen to the countries of implementation of the selected FUST projects under review.

d. **Other relevant data collection** method as proposed by the bidder.

The findings, conclusions and recommendations resulting from the evaluation shall be expressed in a report to be drafted by the evaluation team and to be submitted to UNESCO and the Government of Flanders.

E. Evaluation Team composition

The recommended composition of the evaluation team will be of **at least two senior consultants:** an evaluation expert and a scientific expert. The evaluation team members should **collectively demonstrate experience in all the thematic areas** to be covered by the evaluation and should have **no previous involvement in the design and implementation of activities under review.**

The consultants should possess the following **mandatory qualifications and experience**:

Senior evaluator (team leader):

- An advanced university degree in social sciences, economics, political science or one or more of the relevant fields related to the evaluation; (Master level or above)
- At least 10 years of professional experience in designing and leading programme or policy evaluations at the international level;
- Demonstrated experience in applying quantitative and qualitative data collection methods;
- Excellent oral communication and writing skills in English;
- Excellent analytical skills and skills in producing succinct, clear materials.

Scientific expert:

- An advanced university degree in hydrology, geoscience, oceanography or other relevant fields related to the evaluation; (Master level or above)
- At least 10 years of professional experience in designing and leading programme and policy in one or more of the thematic fields related to the evaluation;
- Excellent oral communication and writing skills in English;
- Excellent analytical skills and skills in producing succinct, clear materials.

Moreover, it is **desirable** that the evaluation team collectively demonstrates the following qualifications and characteristics:

- Knowledge of the UN system and in particular of UNESCO's programmes in the fields of Natural Science, notably IHP, MAB and IOC activities;
- Experience with assignments for the UN;
- Understanding and application of UN mandates in Human Rights and Gender Equality;
- Experience in designing and conducting programme and policy evaluations in one or several of the fields covered by this evaluation.

Preference will be given to evaluation teams that are gender-balanced and of geographically and culturally diverse backgrounds.

Verification of these qualifications will be based on the provided technical proposals and CVs. Moreover, references, web links or electronic copies of two recently completed assignments should be provided (preferably evaluations in relation to programmes in the field of science).

The evaluation assignment is estimated to require approximately 50 - 60 professional working days (to be distributed among the evaluation team).

3. Planning and implementation arrangements

Evaluation Reference Group

A reference group will be established to oversee and ensure transparency of the evaluation process, as well as to quality assure the evaluation methodology and the deliverables. The reference group will be composed of representatives from the Bureau of Strategic Planning (BSP), the Natural Science sector (including representatives from IHP and MAB also from UNESCO's concerned filed offices), the Intergovernmental Oceanographic Commission (IOC); the Division of Internal Oversight Services' (IOS) Evaluation Office and the representative from the Government of Flanders. The group will accompany the evaluation process by advising on the composition of the external evaluation team, providing inputs to the development of the evaluation questions, feedback on the inception report and draft evaluation report, and guidance on the appropriate actions to be taken in response to the evaluation recommendations.

Management Arrangements:

- Relevant programme officers from the Science Sector and IOC will provide the evaluation team with all relevant documentation and access to relevant key stakeholders;
- BSP and the relevant Science Sector and IOC programme officers will identify UNESCO staff, Flemish Government officials and national officials to meet with during the field interviews/visits as well as the dates for the interviews/visits;
- The relevant Science sector and IOC programme officers and BSP will inform UNESCO staff, Flemish Government officials and national officials of the objectives of the evaluation and of the field visits in advance.

Logistics:

The evaluation team will commonly be responsible for their own logistics: office space, administrative and secretarial support, telecommunications, printing of documentation, travel, etc. They will also be responsible for administering and disseminating all methodological tools such as surveys, and logistics related to travel. UNESCO will facilitate access to relevant stakeholders, including UNESCO staff at Headquarters, Field Offices and beneficiaries and partners engaged in the project delivery.

4. Deliverables and schedule

The evaluation will consist of three main deliverables: (i) inception report, (ii) draft report and (iii) final report.

The Draft and Final Evaluation reports should be written in English and structured as follows:
1/ An executive summary (maximum 3 pages)
2/ Report (maximum 30 pages excluding 3 pages of executive summary and the annexes) taking into consideration the scope of the evaluation (see above):

- Background information on the FUST;
- Purpose of evaluation and Methodology;
- Major findings, including achievements and challenges that impacted the project delivery (including on UNESCO's programmes – IOC, MAB, IGGP and IHP) and the wider aspects of cooperation developed under FUST;
- Lessons learnt (from both positive and negative experiences);
- Conclusions;
- Recommendations;
- Annexes (ToR, list of people interviewed, data collection instruments, key document consulted, statistics and other evidence collected throughout the evaluation, consultant's profiles etc).

5. Timeframe

The evaluation shall be conducted during a period of 5 months, from March to August 2023.

The draft report shall be submitted to UNESCO by 15 July 2023 and the Final report at the latest by 15 August 2023. The timetable includes a workshop to present and discuss draft findings.

Activity/Deliverable	**Timeline**
Formal launch of the evaluation	Mid-March 2023
Inception report	Mid-April 2023
Data collection and analysis phase	Mid-April to Mid - June 2023
Workshop with Evaluation Reference Group	Mid-June 2023
Draft Evaluation report	15 July 2023
Final Evaluation report	15 August 2023

6. References

Relevant Evaluation Resources

UNESCO (2023). UNESCO Evaluation Manual. Paris: UNESCO. Retrieved 12 January 2023: https://unesdoc.unesco.org/ark:/48223/pf0000383948.locale=en

UNESCO (2022). *UNESCO Evaluation Policy*. Paris: UNESCO. Retrieved 12 January 2023: https://unesdoc.unesco.org/ark:/48223/pf0000381664.locale=en

UNEG (2020). *UNEG Ethical Guidelines for Evaluation*. New York City: United Nations Evaluation Group. Retrieved 14 June 2021 from: http://www.unevaluation.org/document/detail/2866

UNEG (2010). *UNEG Quality Checklist for Evaluation Reports.* New York City: United Nations Evaluation Group. Retrieved 29 May 2020 from: http://uneval.org/document/detail/607

UNEG (2014). *Integrating Human Rights and Gender Equality in Evaluations*. New York City: United Nations Evaluation Group. Retrieved 29 May 2020 from: http://www.unevaluation.org/document/download/2107

UNEG (2017). *Norms and Standards for Evaluation*. New York City: United Nations Evaluation Group. Retrieved 29 May 2020 from: http://www.unevaluation.org/document/download/27

Relevant UNESCO resources

UNESCO. General Conference (2014) *Medium Term Strategy for 2014-2021* (41C/4). Paris: UNESCO. Retrieved 8 February 2022 from: https://unesdoc.unesco.org/ark:/48223/pf0000227860.locale=en

UNESCO. General Conference (2022) *Medium Term Strategy for 2022-2029* (41C/4). Paris: UNESCO. Retrieved 8 February 2022 from: https://unesdoc.unesco.org/ark:/48223/pf0000378083

UNESCO General Conference (2022). *41C/5: Approved programme and budget 2022-2025: first biennium 2022-2023.* Retrieved 8 February 2022 from: https://unesdoc.unesco.org/ark:/48223/pf0000380868.locale=en

UNESCO General Conference (2020). *40C/5: Approved programme and budget 2020-2021: second biennium of the 2018-2021 quadriennium.* Retrieved 8 February 2022 from: https://unesdoc.unesco.org/ark:/48223/pf0000373473.locale=en

UNESCO General Conference (2018). *39C/5: Approved programme and budget 2018-2019: first biennium of the 2018-2021 quadriennium.* Retrieved 8 February 2022 from: https://unesdoc.unesco.org/ark:/48223/pf0000261648.locale=en

UNESCO General Conference (2016). *38C/5: Approved programme and budget 2016-2017: first biennium of the 2014-2027 quadriennium.* Retrieved 8 February 2022 from: https://unesdoc.unesco.org/ark:/48223/pf0000244305.locale=en

Relevant FUST resources

FUST website: https://fust.iode.org.

Additional resources pertaining to the specific 5 large projects are indicated in the attached annex.

ANNEX

Summary of the 5 large scale projects and related evaluation questions arising from the 'mid-term' project self-assessments to be considered for the external evaluation of FUST phase V (2019 to 2023)

Description of the Ocean Teacher Global Academy (OTGA) project

The Ocean Teacher Global Academy (OTGA) is a global network of Regional and Specialised Training Centres delivering training to support IOC Programmes. The goals of OTGA are to:

1) Develop a portfolio of packaged courses related to the needs of IOC, as well as other partners and stakeholders
2) Deliver courses online and blended learning format, through its network of training centres

OTGA aims at building equitable capacity related to ocean research, observations and services in all IOC Member States. OTGA is an endorsed Action of the UN Decade of Ocean Science for Sustainable Development and contributes to building capacity and accelerated technology transfer for the Decade. OTGA also contributes to the UN SDGs to conserve and sustainably manage ocean and marine resources by 2030 and to build the scientific and institutional capacity needed to achieve the SDGs.

OTGA is also developing collaborations beyond UNESCO/IOC to position itself as the training hub for ocean sciences, including topics related to the management of the impact and interactions with human activities.

The COVID-19 pandemic has accelerated the transition to fully online learning and OTGA has taken full advantage of the open and flexible nature of its e-learning platform.

Resources:

- https://classroom.oceanteacher.org
- https://oceandecade.org/actions/oceanteacher-global-academy-building-capacity-and-accelerated-technology-transfer-for-the-ocean-decade/

Project Evaluation Questions

Proposed questions to be addressed to the leaders of the RTCs and STCs:

1. Has the OTGA 2 project contributed, and if so in what way, to the viability of your training centre beyond the duration of the project (end planned for mid-2024)?
2. What are the tangible benefits from being part of a global training network, for example, in terms of collaboration or reuse of training content developed by other training centres?
3. Identify programmes/projects that are using your RTC/STC/general OTGA facilities (online platform) and describe how they collaborate or engage with OTGA.

Proposed questions to be addressed to stakeholders (from the IOC regional commissions and IOC programmes):

1. To what extent has OTGA been contributing to capacity development of ocean professionals in your region?
2. How has your programme used OTGA to develop capacity (and address to priorities and needs as defined in 'IOC Strategy on Capacity Development and transfer of marine technologies')?

Description of the Ocean InfoHub project

The Ocean InfoHub Project supports a global network of distributed information and data resources related to the ocean. The project facilitates discovery and interoperability of existing information systems through the lightweight Ocean Data and Information System (ODIS) architecture. This enables users from Member States and other partners to discover and more easily access global oceans information, data and knowledge products for management and sustainable development. The Project has had a focus on co-design with three pilot regions in particular: Africa, Latin America and the Caribbean (LAC), and the Pacific Small Island Developing States (PSIDs), to meet their unique user community (thematic and language) requirements.

The Ocean Data and Information System (ODIS) architecture provides the interoperability layer and supporting technology to allow existing and emerging ocean data and information systems, from any stakeholder, to interoperate with one another. This enables and accelerates more effective development and dissemination of digital technology and sharing of ocean data, information, and knowledge. ODIS is not a centralised system,but provides a collaborative solution to interlink distributed and independent systems for common goals.

Together with global project partners (including IOC resources: OceanExpert, Aquadocs, the Ocean Best Practices System (OBPS), and the Ocean Biodiversity Information System (OBIS) and partners in the three pilot regions (Africa, LAC and PSIDs), the process of co-design has enabled a number of global and regional nodes to test the proof of concept. OIH has successfully implemented global and regional search and discovery hubs as a demonstration of this system.

Through these activities, the Ocean InfoHub is enabling a digital ecosystem where users, from any entry point, can discover content and services that they require, while also having opportunities to become content creators themselves.

OIH Resources:

Ocean InfoHub Website
https://oceaninfohub.org/

OIH Technical documentation:
https://book.oceaninfohub.org/index.html

Ocean InfoHub 2-min Video
https://drive.google.com/file/d/1SIeKjSRm-ZpUviOWIVhZ9qpOT2ZAxXOF/view?usp=sharing

Ocean InfoHub 4-page Brochure
https://drive.google.com/file/d/1TeWhcciX6UVcQMh9HAsfxG-jKd-3BOlj/view?usp=share_link

OIH Global Search hub demonstration site
https://search.oceaninfohub.org/

Project Evaluation Questions

Proposed questions to be addressed to OIH Project steering committee and regional coordination group members:

1. How effective and efficient are/were the governance, coordination and management structures of the project in (i) engaging end users in co-design; (ii) diverse constituencies and (iii) mainstreaming OIH/ODIS as a data ecosystem for IOC and other partner organizations, including the UN ocean decade?
2. To what extent was the timeframe, the geographic coverage and thematic coverage of the project adequate?
3. What interfaces can we build, within the scope and budget of the project, that assist end users for management or decision-making or policy development?

Description of the PacMAN Project

Through the FUST-funded Pacific Islands Marine Bioinvasions Alert Network (PacMAN), IOC-UNESCO has partnered with the University of the South Pacific in Fiji in an innovative project to strengthen marine biosecurity. One of the major threats to ocean biodiversity are invasive species transported by human activity. These species can disrupt the local ecosystem, obstructing local economic activities. PacMAN will utilize cost-effective environmental DNA (eDNA) methods to monitor the species living in Suva port and provide early warnings of invasive species, therefore enabling effective action to manage the threat. Taking a unique co-design approach with the local stakeholder community in Fiji, PacMAN is guided by an advisory board chaired by the Ministry of Environment and including the Ministry of Fisheries and Forests, the Maritime Safety Authority, the Fiji Ports Corporation Ltd, the Biosecurity Authority of Fiji, as well as regional bodies like SPC and SPREP. PacMAN is developing a holistic monitoring program and a decision support tool to aid environmental managers and policy makers in managing the marine environment. To ensure local capacity development in the field, the first PacMAN scientific training course on eDNA was held in Suva in November 2022. Through this work PacMAN will facilitate the protection of the marine ecosystem and the services it provides in Fiji and the Pacific Islands at large.

PacMAN resources:

- PacMAN website: https://pacman.obis.org
- PacMAN bioinformatics pipeline: https://github.com/iobis/PacMAN-pipeline
- PacMAN scientific training course: Marine Invasive Species Early Detection: Utilising Molecular Tools: https://classroom.oceanteacher.org/course/view.php?id=839
- PacMAN YouTube playlist: https://www.youtube.com/playlist?list=PLlgUwSvpCFS5dQo4P2i2WiST1_i3NuGoD
- PacMAN news article on training course: https://www.unesco.org/en/articles/ocean-information-one-liter-seawater.

PacMAN Project Evaluation Questions

Proposed questions to be addressed to the members of the PacMAN Advisory Board (project stakeholders):

1. Which local science and technical capacity has PacMAN been able to develop in Fiji, and how effective is it considering local needs and capacity?

2. What has been the impact of PacMAN for Fiji with regards to raising awareness and management of marine invasive species at the appropriate levels (national/regional)?
3. Are there any shortcomings or gaps the project should still deal with to be able move into a sustained monitoring system?

Description of the CLIMWAR project

The project 'Enhancing Climate Services for Improved Water Management (CliMWaR)' aims at strengthening the provision of reliable climate services and thus increasing resilience to climate change. This includes three types of activities: 1) Region-wide activity implementation: strengthening of climate services and capacity building of national hydrometeorological agencies. 2) Implementation of integrated climate services in Member States, based on monitoring and early warning, vulnerability assessment and in support of proactive drought and flood management strategies and policies. 3) Outreach to men and women who are local and national stakeholders and capacity building of key actors to improve resilience to climate variability and change. The CliMWaR website can be found at https://en.unesco.org/climwar

Project Evaluation questions

The external evaluation could include evaluation questions which are a follow-on from the ones already addressed in the December 2022 progress report:

1. What do you consider as the major contribution of the CliMWaR project in terms of climate services and water resources management?
2. What do you consider are the main outputs, outcomes and/or impact of the CliMWaR project?
3. How has the project supported IHP Flagship Initiatives, strengthened regional collaboration and networks, as well as south-south cooperation?
4. What do you consider were the major challenges regarding the implementation of the CliMWaR project?
5. Which of the objectives do you consider the CliMWaR project has contributed to?
6. What is your appraisal on the four pillars of CliMWaR implementation?

Description of the Be-Resilient project

The Context

Climate change impacts are observed across Southern Africa, with water-related hazards causing massive flooding, landslides and severe droughts, significantly affecting natural resources and posing a direct threat to human security. While climate change is global, solutions to offset effects or risks depend on local conditions. As sites for experimentation and demonstration of sustainable development, UNESCO Biosphere Reserves (BRs) have the potential to become global observatories for climate change adaptation and mitigation. The project therefore aims to strengthen BRs and their communities to address climate change challenges and associated water-related hazards. The project works with established and proposed BRs to pilot effective pathways towards climate change adaptation, using a multidisciplinary approach with 4 Lines of Action:

Climate Change Impact Assessment
To identify BR's vulnerability to climate change, a climate impact analysis for Southern Africa, with focus on the identification of vulnerable BRs; was followed by a Climate Risk Informed Decision Analysis (CRIDA) in selected BRs.
Subsequently, one or more climate change indicators are being identified for each BR in the region, allowing the use of BRs as global change observatories, while recognizing the variability of their environmental functions.

Tool development for Disaster Risk Reduction (DRR)
This component focusses on development and application of innovative climate services, through applied research and technology transfer. The first one addresses the link between drought risk and food security, providing pathways for local farmer communities to benefit from the foresight of climate science and remote sensing products to reduce their vulnerability to water scarcity and unexpected crop failure. The second line of work addresses the lack of a fully operational flood monitoring and early warning system (MEWS) that can provide crucial information on potential short-term risks. A third line of work focusses on the threat of landslides that have generated significant damage and loss of life in BRs.

Education for Sustainable Development and Citizen Science
To ensure wider impact of lessons learnt from the BRs, the project will build capacity of teachers through Education for Sustainable Development (ESD). Teacher materials were developed aligned with the curricula of primary and secondary teaching, or looking at specific local challenges, with elements of ecosystemic thinking using local biosphere elements, and inclusion of DRR.
Active engagement of communities in the BRs is further achieved through Citizen Science, particularly through youth groups. This builds additional awareness and also generates useful local data that benefits the accuracy of forecasts for disaster risk reduction. This aims to pilot the blending of Citizen Science information with regular meteorological station networks and remote sensing data into calibrated, bias-corrected input fields for drought and flood monitoring and early warning applications.

A strengthened Man and Biosphere Programme
All project activities are expected to strengthen the BR network and the role of BRs in Southern Africa, using existing and potential BRs sites to provide pathways for expansion of the project impact as well as upscaling of the project in later phases. The project will organize dedicated activities to allow exchange of experiences and lessons learnt between stakeholders in these potential BRs, including in countries that have no BR or have no effective governance in place in order to facilitate their creation and functioning.

Project Outputs
- Climate change indicators in BRs identified
- CRIDA pilot case studies developed
- Innovative tools for DRR piloted in BRs
- Schools in BRs integrate concepts of ESD and DRR
- Citizen science activities support data collection for DRR
- Regional and transboundary exchange of lessons learnt in BRs

Target Project Sites

Biosphere Reserves	Country	Other Sites	Country
Kogelberg	South Africa	Drakensberg	Lesotho
Mount Mulanje	Malawi	Chimanimani	Mozambique /Zimbabwe
Cape West Coast	South Africa	Milange	Mozambique
Waterberg	South Africa	Honde Valley	Zimbabwe
Kruger to Canyons	South Africa	Harare Wetlands	Zimbabwe
Lake Chilwa Wetland	Malawi	Tsehlanyane-Bokong	Lesotho
Cape Winelands	South Africa	Lower Zambezi Escarpment	Zambia
Vhembe	South Africa	Lochinvar and Blue Lagoon	Zambia
Middle Zambezi	Zimbabwe	Makgadikgadi Wetlands	Botswana
Gouritz Cluster	South Africa	Okavango Delta	Botswana
Magaliesberg	South Africa	Greater Sossusvlei-Namibi Landscape	Namibia
Garden Route	South Africa	Waterberg	Namibia
Quirimbas	Mozambique		
Groot Marico	South Africa		
Lubombo	eSwatini		

Partners & Beneficiaries
UNESCO National Commissions and national IHP and MAB Committees
Flemish Institute for Technological Research (VITO) to develop the Drought and Crop Yield Monitoring Application
Princeton University / Princeton Climate Analytics to develop the Flood Monitoring and Early Warning Application
Catholic University of Leuven (KULeuven) to develop the Climate Change Assessment and Landslide Assessment
Alliance for Global Water Adaptation (AGWA) to support the Climate Risk Informed Decision Analysis (CRIDA) in Biosphere Reserves
Deltares to support the development of Adaptation Pathways in Biosphere Reserves
US Army Corps of Engineers to support and co-fund the Climate Risk Informed Decision Analysis (CRIDA) in BR through Shared Vision Planning
MAB programme of the German National Commission
USAID Resilient Waters Programme to co-organize activities on Climate Change Adaptation in selected BR
BR Management structures and Targeted communities exposed to drought and flood risks will benefit from the tools developed to reduce vulnerability and improve resilience to climate variability in BRs.

Project Evaluation questions

1. To which extent has the project been able to demonstrate that Biosphere Reserves can provide a context to generate relevant data and knowledge that can support co-production of solutions to environmental challenges by combining local and various types of scientific knowledge and the direct participation of men

and women community members in decision-making for local DRR and climate change adaptation?

2. What is the impact of this project on community resilience in the participating Biosphere Reserves, i.e. in better preparing the communities for disasters, and for the progressive impacts of increased climate variability and change?
3. Which added value to the MAB and IHP programmes has the project provided through its approach to integrate the MAB and IHP programme objectives and expertise?
4. To which extent has the project had a catalytic impact in southern Africa on strengthening the network of Biosphere Reserves and resulting in demand for this scientific approach to support communities in addressing climate change challenges and associated hazards?