The contribution of grey literature on a pathway to sustainable fisheries: Case studies from Cambodia, Indonesia, Philippines and Viet Nam

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Abstract

During 2022, FAO and SEAFDEC completed a project to identify, record and analyse research under the scope of Sustainable Development Goal (SDG) indicator 14.4.1 – proportion of fish stocks within biologically sustainable levels. Research and data on the status of stocks is essential for their sustainable management and in ensuring they contribute to food security, employment and trade. The challenge of assessing and sustainably managing a country's national stocks is even more critical in the context of climate change given changes to the marine environment. Focusing on four countries in southeast Asia, (Cambodia, Indonesia, Philippines and Viet Nam), this project sought to increase the visibility of research and data sets previously only available at local and national levels. The research and data identified during the project would be analysed to identify knowledge strengths and gaps in the region, therefore contributing to the sustainable management of marine fisheries in the region. At the start of the project, a search methodology was agreed and used to search the ASFA database. Fifteen participants from four countries were recruited with access to, and knowledge of, their institution's holdings, research and data on stock assessments and marine fisheries. Training on the search methodology was given to participants who recorded relevant results on OpenASFA. The project resulted in 1,047 resources being recorded by participants which are now freely searchable on the FAO Fisheries and Aquaculture website. This compares to only 350 results identified using ASFA database- demonstrating the need for efforts to be made to improve the accessibility of research produced in the region. Many of the results recorded by participants could be classed as grey literature which can suffer from a lack of resources to adequately catalogue and make findable, preventing the research and data from informing further research and policy making decisions. Barriers in to sharing data in particular were raised by participants and further work is needed to implement open data policies whilst ensuring adequate protection of data rights, for example by ensuring credit is given to the collecting institute/ researcher. To meet the global challenge of climate change and SDG target 14.4 on sustainable fishing, the capacity to store, share and access research and data on fish stocks is required at local, national and international levels. Whilst improving the visibility of research and data from the region, the project has also highlighted the challenges of ensuring data and information is made FAIR on an ongoing basis.

Introduction

For over fifty years, the Aquatic Science and Fisheries Abstracts (ASFA) partnership has worked to promote the world's research on aquatic environments, with a particular focus on grey literature. The ASFA partnership model, which as of 2023 involves over 100 institutions worldwide, ensures the participation of producers of grey literature, who are themselves best placed to catalogue resources for inclusion on the ASFA database. Having made efforts in recent years to update its technologies and business model, notably with the launch of OpenASFA in 2021, ASFA is able to openly share its records (Castillo, 2023). OpenASFA is a Virtual Research Environment (VRE) for the creation, storage and publication of abstracting and indexing records related to all aspects of aquatic sciences, fisheries and aquaculture. From OpenASFA, records are shared with different information products, including a search interface on the FAO website, (where records are available as JSON-LD), and the full ASFA database which is hosted by ProQuest and available to

subscribers only. Since its launch in 2021, OpenASFA has made further updates including the coverage of datasets and the option to deposit the full text. Although registration is required to deposit records and full text, there is no financial cost to using OpenASFA and all records can be freely searched, without registration, on the FAO Fisheries and Aquaculture website.

Having undergone rapid technological advances, ASFA sought to understand the impact of OpenASFA by conducting a project to meet a specific information need. Following discussions with the Southeast Asia Fisheries Development Center (SEAFDEC) Secretariat, a project was formulated to identify and analyse research and data related to Sustainable Development Goal indicator 14.4.1 – the proportion of fish stocks within biologically sustainable levels. The SEAFDEC is an autonomous inter-governmental body in the regional fishery field with a long history of working closely with the fishery sections of its member countries. As the SEAFDEC works to promote sustainable fisheries in the region through the meetings, training courses, workshops, etc., SEAFDEC was the best supporting organization for ASFA to work with in establishing the connection between FAO and member countries of the region to collect all the research and data, particularly grey literature which requires local knowledge to locate and catalogue.

For a region such as Southeast Asia, reliant on fish and seafood as the primary source of animal protein (FAO and OECD, 2017), adapting to the challenges of climate change is essential in achieving and maintaining food security. In order to sustainably manage fisheries and implement science-based advice, research and data on the status of stocks is needed. However, many stocks in the region have an unknown status due to insufficient data (Sharma, 2021). The project would therefore assess whether research and data on stocks in the region existed; how such research and data is managed; and what role, if any, a service such as ASFA could play in improving the visibility of these resources. Therefore, the project had two goals:

(1) identifying and analysing the research and data being produced in Southeast Asia of relevance to SDG 14.4.1;

(2) identifying strengths and gaps in knowledge, as well as making recommendations for enhancing the availability of research and data.

Methodology
The project was split into three stages, each of which are discussed in detail below.
1. Development of project scope and search strategies
2. Identifying and recording research and datasets held in local and national collections
3. Quality control and analysis of results

Stage one: Development of project scope and search strategies
To ensure the focus of the project on SDG indicator 14.4.1, a detailed search strategy was developed that encompassed the geographic, taxonomic and subject keywords that would be used to identify and index relevant resources. Developing the search strategy resulted in a number of additions to the ASFA thesaurus under the theme of stock assessment. Furthermore, a list of 53 taxonomic terms of commercial interest was compiled that participants would be asked to prioritise seeking research and data for. The full search strategy and list of taxonomic terms of commercial interest is contained in the project report: *Identifying research and data related to Sustainable Development Goal (SDG) Indicator 14.4.1. Case studies from Cambodia, Indonesia, the Philippines and Viet Nam.*

Once developed, the search strategy was tested on the ASFA database, hosted on the ProQuest platform, which resulted in just 350 relevant results being identified. These 350 results were shared with participants to give an idea of the kind of resources that were within the scope of the project.

Stage two: Identifying and recording research and datasets held in local and national collections

This stage involved working with fifteen participants, listed in table 1, who were recruited from Cambodia, Indonesia, Philippines or Viet Nam, each with experience in information management or stock assessments. The participants were provided with training on the search methodology and how to identify relevant resources, as well as how to record results on OpenASFA. Participants spent a total of 10 days for training and recording their results, with a total of 1,047 records being created in total.

Name	Institution	Country
Suy Serywath	Marine Fisheries Research and Development Institute (MaFReDI)	Cambodia
Tan Sokhom	Faculty of Fisheries, Royal University of Agriculture (RUA)	Cambodia
Madiareni Sulaiman	BRIN - National Research and Innovation Agency	Indonesia
Ria Ariani	BRIN - National Research and Innovation Agency	Indonesia
Pamela Damayanti	Ministry of Marine Affairs and Fisheries	Indonesia
Duranta Kembaren	Research Institute of Marine Fisheries	Indonesia
Tirtadanu	Research Institute of Marine Fisheries	Indonesia
Ledhyane Ika Harlyan	University of Brawijawa	Indonesia
Martin F Floro	Capiz State University	Philippines
Ethelyn Magdaong Abaday	Mindanao State University – Naawan Campus	Philippines
Joy Geromiano	SEAFDEC/AQD	Philippines
Mary Grace Oliveros	SEAFDEC/AQD	Philippines
Sean Hoang	Fisheries Protection and Development Department Viet Nam Directorate of Fisheries	Viet Nam
To Van Phuong	Nha Trang University	Viet Nam
Hai Yen	Viet Nam Institute of Oceanography	Viet Nam

Table 1 List of participants in FAO-SEAFDEC project

Stage three: Quality control and analysis of results

All records submitted by participants were verified by the project team to ensure they were relevant to SDG 14.4.1 and correctly catalogued. Any duplicates were also removed at this stage. Following this review, a total of 1397 relevant records was identified, whose metadata was exported to Excel to conduct analyses.

A broad analysis of records created by participants and those available on the ASFA database was conducted, followed by a more specific analysis of the taxonomic keywords assigned to records. The analysis is presented in full in the recently published report (Superio et al, 2023), however a summary is presented below.

Of the total 1,397 records identified as part of this project, just under 75 percent came from participants with the rest coming from the ASFA database hosted by ProQuest. This indicates that many resources are missing from ASFA's database and further efforts should be taken to increase the volume of research being recorded on ASFA's database.

Just over half of the records were journal articles (702 references or 50.3 percent). Many journals were published by universities or research institutions in the countries and therefore not always easily findable online (see table 2). Dataset was the least recorded type with just under 10 percent (139 references). Datasets were recorded only by participants and not covered on the ASFA database on ProQuest. Despite the project's focus on the importance of data, many participants struggled to identify and record datasets.

Type	Frequency	Percentage
Journal articles	702	50.3
Books	447	32
Book chapters	109	7.8
Datasets	139	9.9
Total	**1397**	**100**

Table 2 Distribution of the Gathered Publications and Datasets per Type

Each of the references was assigned one of the subcategories described in table three. Stock information and stock assessment ranked as the most recorded subcategories, indicating high compliance with the search strategy.

Subcategory	Frequency	Percentage
Fishing vessels	31	2.2
Environmental impacts	33	2.4
Catch history	73	5.2
Biological parameters	227	16.2
Fishing gear	252	18
Stock assessment	369	26.4
Stock information	412	29.5
Total	**1397**	**100**

Table 3 Distribution of the Gathered Publications and Datasets per Subcategory

All references were assessed as to their online availability. A reference was considered to be available online if the full text was accessible online without subscription or cost. This revealed that 71.6 percent of references were available online, with 873 of these references being recorded by participants and 127 coming from ProQuest. Of the 174 references recorded by participants that were unavailable online, the reason was often due to lack of repository to store the resource, rather than protection due to commercial reasons. Participants requested the option to store the full text of the resource on OpenASFA, which was implemented at the end of the project.

Source	Frequency	Percentage
Available online	1000	71.6
Unavailable online	397	28.4
Total	**1397**	**100**

Table 4 Distribution of the Gathered Publications and Datasets per availability

Source	Format	
	Available online	Unavailable online
Participants	873 (87.3%)	174 (43.8%)
ProQuest	127 (12.7%)	223 (56.2%)
Total	**1000 (100%)**	**397 (100%)**

Table 5 Distribution of the Gathered Publications and Datasets
Grouped according to Source and Format of Publication

An analysis of the taxonomic keywords was undertaken to understand the volume of research and data that could contribute to understanding the status of stocks in the region, particularly for species of commercial interest. The dataset used to perform the taxonomic analysis can be downloaded from here:
https://data.d4science.net/CW4s.

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The 1397 records identified during this project had a combined total of 6720 taxonomic keywords, giving an average of 4.8 taxonomic keywords per record. Of the 6720 taxonomic keywords, 1556 were for unique names. These high numbers are testament to the care participants took to create detailed metadata to describe the resources.

Despite the high level of taxonomic indexing, analysis revealed a concentration on a small number of species with the top ten most recorded taxonomic terms aggregating 63 percent of all references, which increased slightly to 64 percent of references when looking only at the subcategory stock assessment. Whilst only one species of commercial interest was not assigned as a keyword to any references, when looking only at the subcategory stock assessment, 11 species were not recorded, indicating research efforts are concentrated on a small number of taxa.

Discussion and conclusion

This project provided a snapshot of the research and data available under the scope of SDG indicator 14.4.1 in Southeast Asia. Each participant indicated further resources were available however were unable to record them in the 10 days allotted to this project. The relatively high proportion of materials, just under 30 percent, which were not available online; the number of resources not recorded due to time constraints; and the diverse platforms which resources are stored on, indicates the need for maintaining the OpenASFA collection on SDG indicator 14.4.1. A common barrier to sharing research is the lack of planning and resources to ensure their long-term accessibility. Many reports are published only on a website, available for a short period of time before they disappear or become lost. OpenASFA therefore presents a single and stable platform on which to share research and data. However, whilst creating a record for a resource on OpenASFA is a short task and there is no financial cost to usage, an institution must support the work and ensure sufficient time and resources are allocated to performing this task. A shift in attitudes towards information management is needed to persuade institutions to give the necessary time and resources to making their research and data findable, accessible, interoperable and reusable (FAIR) in the long term. This is required in particular for data, with project participants expressing difficulty in gaining permission to share even the metadata for a dataset due to concerns over ownership.

Describing the benefits of FAIR research and data is critical to achieving this shift and ASFA shall work with its partners to produce materials to highlight the individual and institutional benefits of OpenASFA in promoting and sharing research and data. Whilst libraries have transitioned to digital for many years, the appearance of full text online is in danger of being perceived as a substitute for the traditional library skills of cataloguing and classification, which are vital in ensuring a resource is findable. Making the case for investment in the cataloguing and indexing of a resource as a necessary component of document management needs to take place.

Recommendations for future work and conclusion

To ensure the work of the project is not lost, ASFA formulated four recommendations for future work based on lessons learned:

1. Understand and overcome barriers to sharing data: further work is needed to give institutions the confidence, incentives and technologies to share data. The project recommended compiling best practices for data sharing related specifically to fisheries data.
2. Ensure online accessibility of materials: in addition to digitizing print only materials, producers of grey literature require an information management plan to ensure their publications and data are stored on a sustainable repository and accessible online.
3. Improve the visibility of Doctoral / Master Theses: the project uncovered a high volume of dissertations/ these that are relevant to performing stock assessments. Particular attention is needed to ensure resources are FAIR due to potential language barriers and difficulty of searching and accessing individual university repositories.

4. Maintain and update the OpenASFA collection: ten days was an insufficient time period to record all relevant resources and, in order for the collection to remain useful, regular deposits and records are needed. Ongoing, voluntary contributions from project participants and ASFA partners in the region are needed to ensure the collection remains of use to understanding the status of stocks in the region.

In summary, the project met its goals of identifying and analysing the research and data being produced in Southeast Asia of relevance to SDG 14.4.1 and identifying the strengths and gaps in knowledge, as well as making recommendations for enhancing the availability of research and data. The 1047 records created by participants, compared to the 350 records identified on the ASFA database, reveals the breadth of resources that are not being captured on the ASFA database without projects such as these, and the 28 percent of materials that are not available online, indicates the risk of this research and data being lost. ASFA looks forward to building on the lessons learned as part of this project and working with the authors, producers and publishers of research and data to ensure it is findable and accessible online.

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