Mobilising Stakeholders to Inform the Development of a Science-based Decision Support System for Coastal Wetlands in the ASEAN Region

DISCUSSION PAPER
Regional Summary of the Project Outputs

Prepared by: UNEP-WCMC
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This paper was prepared by the UN Environment Programme World Conservation Monitoring Centre (UNEP-WCMC) team as the technical partner of the ASEAN Centre for Biodiversity (ACB) in this project.

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Photo by DNP Thailand
EXECUTIVE SUMMARY

To support the sustainable management of coastal, marine, and wetland ecosystems and achieve positive outcomes for the environments, societies, and economies of the Association of Southeast Asian Nations (ASEAN) region, the ASEAN Centre for Biodiversity and partners have identified the need to coordinate access to data of national and regional importance for decision-making through the development of a regional science-based decision-support platform.

In order to understand the information and capacity needs of governments (the anticipated primary users of the platform) and other stakeholder groups in the region, the challenges they face around marine and coastal decision-making, and the potential opportunities for greater cooperation, a process of national and regional consultation was held with representatives and stakeholders from all 10 ASEAN Member States, including national workshops, a regional experts forum, and an online survey. These activities were structured with the view to inform the design of the new platform. There were 197 survey responses in total, with an average of 41 participants per national consultation, representing stakeholders from across government, non-governmental organisations, academia, and the private sector.

Respondents reported a wide range of relevant data that is collected and utilised in the region, most commonly those around species names and images, biophysical elements such as water quality, and socioeconomic data, including population trends. These data are used for several objectives relating to marine and coastal decision-making in the region, including for monitoring species’ statuses and environmental condition, planning and decision-making, modelling future trends, and ensuring compliance. These data were also reported to support activities such as education and research. Commonly produced outputs included maps and technical reports, in addition to others such as statistics, videos, and magazines. Respondents expressed a need to access more complete and relevant data, and to increase partnerships and data/knowledge sharing. The consultation indicated that data curation in the region most commonly occurs through storage within spreadsheets, particularly for government participants, though data are also stored in other digital formats or as physical copies.
Marine and coastal decision-makers and stakeholders responsible for resource management in the region identified several challenges relating to the environment, including habitat degradation, species endangerment, and poor habitat connectivity, as well as socioeconomic factors such as pollution, overfishing, and development threats. Management challenges including lack of capacity, resources, and financing were also emphasised. There were reported issues surrounding data collection (e.g. lack of equipment and funding), data processing (e.g., lack of technical expertise, inconsistent formatting), data storage (e.g., lack of storage capacity and equipment), and data analysis (e.g., lack of software licenses, incomplete or irregularly collected data, inconsistent methodologies). There were also reported challenges surrounding limited data sharing, lack of common standards (especially for sharing of best practices), language barriers when sharing information, difficulty gaining buy-in from local communities, and poor metadata availability.

Respondents generally indicated that there was a need for new functionalities, either on a new platform or through building on an existing platform, to support marine and coastal decision-making in the region. They also indicated that access to existing databases on species and habitats, resources on best practices and lessons learned, and opportunities for knowledge sharing with regional experts would be the most useful features to them. Respondents stated that they would be willing to share data to this platform, though it was noted that this may be more difficult for governments, and that legal tools such as Memoranda of Understanding would be required. There may be several opportunities for the new platform through linking with the various existing online platforms—including the SEA Knowledge Bank—and datasets, metadata and networks in the region, from local to regional scales. The new platform may also provide an opportunity to link experts (both in the region and beyond) with managers to support capacity development activities and sharing of best practices.

Existing regional platforms in the ASEAN region, namely the ASEAN Biodiversity Dashboard and the ASEAN Clearing House Mechanism, may already provide many of the required functionalities for supporting marine and coastal resource management and decision-making in the region. However, the consultations revealed that many respondents had limited prior knowledge of these platforms' existence. Rather than duplicating efforts, an effective way forward may be to extend the functionality of these platforms whilst strengthening marketing and outreach, rather than building from scratch.

Findings from this consultation process broadly support the need for an improved regional platform for marine and coastal decision-makers and resource managers. Based on these findings, this discussion paper recommends that the platform has a regional focus (mobilising and consolidating local to national data), expands upon the existing ASEAN regional platforms, and avoids duplication of processes and services by linking with existing platforms. Specifically, amendments to the existing ASEAN Biodiversity Dashboard platform may help address potential users’ reported objectives, challenges, and capacities by incorporating the following features:

- Ability to share and download data (e.g., species profile, biophysical, and socio-economic data), with accessible metadata and consistent formatting where possible.
- Ability to overlay spatial data and produce downloadable static and dynamic maps.
• Access to standardised guidance and methodologies for data collection and analyses.
• A visualisation dashboard, including national and regional overviews, which would enable rapid insights into key statistics and processed data.
• Space to share expertise, such as a discussion forum or directory of experts.
• A resource repository or e-library for technical reports and documents, including sharing of best practices and lessons learned. A gallery for photographs and videos was also widely requested.
• Considerations for collaborating with local communities, such as resources for citizen science approaches and guidance on community engagement.
• Considerations for improving collaboration among government agencies, particularly those without an environmental mandate, including providing access to data and guidance or lessons learned on inter-ministerial collaboration.
• Offline or low-bandwidth functionality and a mobile site or application.

Many of these features are covered, to some extent, by the existing regional data platforms in the ASEAN region, and so building on these may be an important option for consideration. Other key considerations will include establishing data sharing agreements and prioritising key data (e.g. on wetlands, coral reefs, and wildlife).

In conclusion, the consultation process has revealed a collective will among respondents, including government representatives, to share and contribute coastal, marine, and wetland data to a science-based decision-support platform, as well as a regional need for such a platform. Strong partnership networks already exist among organisations of prospective users and across scales; creating additional links and partnerships could facilitate further sharing of knowledge, data, and resources. Participants identified several challenges, needs, and opportunities surrounding management of the marine and coastal environment, providing insights into how a new or improved regional data platform might help to address these. Building on this discussion paper, the information and recommendations collated here will inform the development of the platform, intending to support informed decision-making on marine and coastal management across the ASEAN region.
INTRODUCTION

The Association of Southeast Asian Nations (ASEAN) Member States host approximately one third of the world's coastal and marine habitats and almost 2 million km² of inland water ecosystems, including coral reefs, mangroves, swamps, rivers, estuaries, and seagrass ecosystems. Coastal, marine, and wetland ecosystems are of high socio-economic importance in their explicit use in economic activities (e.g. for the fisheries and tourism sectors) as well as implicitly for the many ecosystem services they provide (e.g. carbon sequestration, flood protection, and cultural values).

Globally, the health of coastal, marine, and wetland ecosystems and the communities who depend on them are under threat by the three planetary crises of biodiversity loss, climate change, and pollution. As a result, there is a need for these ecosystems to be managed sustainably, achieving positive outcomes not just for the environment, but also society and the economy, in a way that is equitable and works across scales.

In order to achieve this, decision-makers and ocean stakeholders require access to reliable information which meets their diverse needs. Decision-making that is informed by accurate, reliable, and timely data can improve the speed and effectiveness of management actions. At present, data required to coordinate national and regional management of key coastal, marine, and wetland ecosystems in the ASEAN region are often not synthesised in easily accessible formats, nor in a centralised manner. This may be exacerbated by capacity issues and other challenges surrounding data collection and understanding.

1 ASEAN Centre for Biodiversity (2017). ASEAN Biodiversity Outlook 2. ASEAN Centre for Biodiversity, Philippines.
Aligning with the ASEAN Strategic Plan on Environment, the ASEAN Working Group on Coastal and Marine Environment (AWGCME) Action Plan, and the ASEAN Socio-cultural Community Blueprint 2025, the ASEAN Centre for Biodiversity (ACB) and partners have identified the need to coordinate access to data of national and regional importance, in order to support the conservation and sustainable management of coastal, marine, and wetland biodiversity and associated natural resources in the ASEAN region. However, an understanding is first required of the current challenges that stakeholders face around marine sustainable management, their needs and capacity gaps in achieving their objectives, and potential opportunities for meeting those needs.

To inform the design and development of a decision-support system, or online 'platform', that aids the sustainable management of marine and coastal environments in the region, this discussion paper explores the following key points:

1. The objectives of stakeholders;
2. The challenges in achieving these objectives that stakeholders find most difficult to overcome due to data limitations and the decisions and actions they would like to take if there was sufficient information;
3. The strengths and weaknesses of the current resources and platforms that stakeholders use;
4. Stakeholders' capacity needs relating to the access, use and interpretation of data.
5. Which elements of data sharing and use across the region are working well; and,
6. The need for a decision-support platform, its content, its core functionalities, and regional sharing arrangements that could support its development.

To address these points, ACB, the UN Environment Programme World Conservation Monitoring Centre (UNEP-WCMC), and national partners in ASEAN Member States (AMS) conducted an online survey and national/regional consultations (see Section 2) with government officials and other stakeholders within the region. A review of existing data platforms was also performed to understand what may be missing currently and how stakeholder needs can be further met (section 2.3 and 2.4, respectively).
2 METHODOLOGY

2.1 Online survey

An online survey developed by ACB was distributed to coastal, marine, and wetland management stakeholders in the ASEAN Region. The survey contained 30 questions relating to (a) the mandate and role of stakeholder respondents’ respective institutions, (b) the coastal, marine, and wetland resources of interest and geographical area in which they operate, (c) the data they require to effectively manage marine, wetland, and coastal resources, (d) the extent to which respondents collaborate with other organisations, (e) the key challenges faced by respondents, and (f) recommendations relating to the creation of a new platform to facilitate the sharing of coastal, marine, and wetland information.

2.2 National consultations

ACB conducted nine national consultations with government representatives and marine resource stakeholders from Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, the Philippines, Thailand, and Viet Nam - in addition to a national report from Singapore – including participants from ministries of environment, ministries of agriculture, academic institutions, non-governmental, and private sector organisations. These were designed to complement and build upon the information gathered during the online surveys by generating discussions around the objectives and decision-making needs of stakeholders in the region, while facilitating the sharing of best practices and lessons learned amongst participants.
2.3 Review of existing online platforms

The ASEAN Biodiversity Dashboard (ABD)\(^1\) and the ASEAN Clearing House Mechanism (ASEAN CHM)\(^2\) were reviewed to determine:
- The main purpose of the platform and the primary users;
- The data and resources available on the platform;
- The ability of users to access and export data and resources;
- The ability of users to contribute and share data and resources on the platform; and
- The need for extra features, functionality and resources based on the results of the survey and national consultations.

2.4 Regional experts’ forum

The regional consultation forum aimed to facilitate technical discussions among national focal points of the AMS as well as experts on biodiversity data management in coastal, marine, and wetland environments.

The consultation aims were to:
1. Validate and assess the feasibility of outcomes of the consultation process;
2. Explore synergies among regional data sharing platforms and how resources can be optimised; and,
3. Discuss the approaches and mechanisms in regional information sharing that will support informed- and science-based decision-making for the conservation and management of coastal, marine, and wetland environments in the ASEAN region.

National experts presented summaries of the outcomes of their national consultations, noting key priorities for their respective countries. In addition, the presentation of existing regional information-sharing platforms provided the context of the landscape any new Decision-Support System would be entering into. A summary of findings from the national consultation process was given by UNEP-WCMC. Additional opportunity for input from representatives and experts present was given in the form of moderated discussions.

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\(^1\) ASEAN Biodiversity Dashboard: https://dashboard.aseanbiodiversity.org
\(^2\) ASEAN Clearing House Mechanism: https://asean.chm-cbd.net
3.1 Users and respondents

The consultation process included a diverse group of stakeholders, comprised of government, academics, and the private sector (Figure 1). Each national consultation session was well attended (an average of 42 external stakeholders per session). Government representatives, the anticipated primary users of a future regional decision-support platform, contributed the greatest proportion of responses to the survey (45%). In addition, stakeholders from universities, research institutes, non-governmental organisations, and private sector organisations also attended.

From the 197 survey responses received, the majority reported that their organisations principally operate at national levels. However, many of these noted that they also operate across at least one other governance scale (e.g. internationally, regionally, or at a community level).
3.1.1 Objectives and use of data

A variety of data use cases were common among stakeholder groups. In particular, monitoring activities (e.g., of biophysical conditions, species status and movement, and socio-economic conditions) and the data produced by these underpin a wide variety of other management objectives reported by stakeholders, as indicated in the figure below.
However, there was variation among the objectives for data usage reported by different stakeholders, principally in terms of scale, the partnerships involved, and the ability to affect changes in policy, as in Table 1.

**Table 1:** Differences between stakeholder objectives for use of data in the ASEAN region.

<table>
<thead>
<tr>
<th>Governments</th>
<th>Academia and Research Centres</th>
<th>NGOs and Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tend to focus most on using data for <strong>planning and decision-making</strong>, for monitoring species status, and for enforcement.</td>
<td>Tend to focus most on using data for <strong>monitoring</strong> physical conditions of coastal/wetland/marine areas, for monitoring species status, and for planning and decision-making.</td>
<td>Tend to focus most on using data for <strong>planning and decision-making</strong>, <strong>monitoring</strong> species status, and monitoring economic activities in relevant communities.</td>
</tr>
</tbody>
</table>

**Figure 2:** Objectives of stakeholders for using data, grouped under reported thematic areas (in bold). Arrows show how data and resources from activities (shown in blue boxes) may contribute to others.
Governments | Academia and Research Centres | NGOs and Others
---|---|---
Unsurprisingly, government respondents are much more interested than other groups to use information to support compliance with **reporting requirements**. Supporting compliance with reporting requirements for multi-lateral environmental agreements (e.g. Ramsar, Convention on Biological Diversity) may be a major benefit provided by a decision support system.

Common objectives of this group include:

- Policy development and planning (supporting activities include monitoring, evaluation, analysis activities)
- Production of Information, Education, and Communication (IEC) materials and other resources
- Report-writing
- Monitoring compliance with MEAs
- Establishing/managing Marine/Coastal Protected Areas

Of course, national governments focus on national scale. Cooperation between national and local governments sometimes presents difficulties.

Common objectives of this group include:

- Research, education, monitoring
- Providing inputs to policy
- Monitoring compliance with multilateral environmental agreements (MEAs)

Academics and researchers reported looking at connections between trends at different scales (national, regional, and global).

According to survey results, NGO respondents are more likely than other groups to focus their objectives on the local scale.

Common objectives of this group include:

i. Monitoring and evaluation of projects
ii. Advocacy campaigns
iii. Education and training
iv. Feedback to key stakeholders
v. Management planning and consulting with communities
vi. Identifying problems/areas where conservation efforts may be required
3.1.2 Knowledge products

Stakeholders from the consultation process indicated that marine, coastal, and wetlands data were used to produce a wide range of knowledge products, including (in order of most to least frequently reported):

- Spatial maps
- Technical reports
- Analytical graphs
- Statistical tables
- Videos
- Magazines
- Materials for public dissemination (e.g. infographics)

Many of these are used in combination. For example, the production of educational and training knowledge products, most notably highlighted as an objective for NGOs and in academia, were drawn from many other knowledge products.

3.2 Data availability and challenges

3.2.1 Data availability

When surveyed on data availability (referring to frequency of collection and use), more than 100 respondents across all stakeholder groups reported ‘species information’ as the most frequently used or collected, with a particular focus on species’ taxonomy (includes Common Names, Scientific Names, Local Names of species) and imagery. Such data were frequently utilised, particularly by governments, with average monthly or shorter time periods (e.g., Daily/Weekly). In contrast, non-governmental organisations (NGOs) reported they were more likely to collect or use data on the location of priority species, a topic which was less commonly reported by government respondents.

A wide variety of biophysical data are also collected and used in the region, most frequently were those of solid waste, coastal or wetland pollution, and occurrence of illegal or destructive activities. However, such data are not collected as frequently as species data – biophysical data across all categories are more often used on a monthly to yearly basis rather than daily or weekly. Of the parameters collected, data on humidity and nesting beaches appear to be least commonly collected – though two prospective government users indicated that they would like such data collected more regularly. Climate change impact data on species, habitats, and coastal communities were reported as being collected by over 100 respondents, typically either bi-annually or annually. Examples of data collected by stakeholders, as reported in survey responses, include monitoring of temperature and rainfall levels. These data illustrate indicators of climate change rather than explicit climate change parameters (e.g., sea level rise). Additionally, nearly all respondents who answered the data availability section confirmed that they engage in knowledge sharing through best practices/lessons learned in Integrated Coastal Management, often occurring on a yearly basis.

The socioeconomic data most commonly collected included livelihood dependency on fisheries resources and ecosystem service valuation on coastal, marine, and wetland resources, with such data primarily collected annually and occasionally daily or weekly. However, government
respondents collected data on livelihood dependency on fisheries less often relative to other respondents, with more focus on collection and use of ecosystem services valuation data, characteristics of communities, and population trends in coastal areas.

The national consultations further revealed the large number of data collection activities ongoing within AMS. For example, one country reported annual data collection of data relevant to building species habitats such as seagrass, mangroves, coral reefs, and wetlands, which are collected every 1-3 years, in addition to other regular data collection from government ministries and national organisations. There was strong emphasis on the volume of available data at the local and provincial level, which participants believed were underutilised in decision-making.

The sources of the environmental and socioeconomic data most frequently cited by survey respondents were coastal, marine, and wetland resource inventory surveys, data from regular monitoring stations, and data from the International Union for Conservation of Nature (IUCN) repositories. These are also the sources of data reportedly used most by governments. While other sources of data e.g., journal articles, local government reports, and NGO reports, are not used as regularly by respondents, they noted that they still play a significant role.

Consultation participants used a wide range of data storage methods for coastal, marine, and wetland resource data. By far the most popular of these methods utilised across all respondents is to encode and store data in Microsoft Excel, with fewer respondents reporting that data is stored digitally using different globally accepted formats (e.g. Darwin Core for species data). Further, 25 stakeholders noted that data is still stored in non-digitised forms such as printed data.

Just over half of government respondents have existing platforms for sharing information online, with at least 26 unique websites/platforms for sharing coastal, marine, and wetland information at a national scale identified. From this list, the websites and platforms that may feed into a regional decision-support platform are listed in Appendix 1.

3.2.2 Challenges

In both the survey and national consultations, stakeholders were asked broad questions about what challenges they encounter when making decisions about marine, coastal and wetland areas.

The challenges identified can broadly be grouped as being environmental, socioeconomic and/or managerial in nature, as explained in greater detail in Table 2. Environmental challenges are issues which stakeholders hope to tackle through their work, whereas socioeconomic and management challenges are issues which slow stakeholders’ progress in achieving their objectives when managing coastal/marine/wetland areas.
Table 2: Challenges identified by stakeholders in relation to decision making regarding marine, coastal and wetland areas.

Stakeholders described a range of environmental pressures (e.g. habitat degradation) and also highlighted key areas of concern such as endangered species and lack of habitat connectivity. These are central issues in which stakeholders are seeking to drive change (e.g., to reduce habitat degradation, to protect endangered species, to improve habitat connectivity).

Socioeconomic pressures present stakeholders with a variety of challenges (e.g., pollution, overfishing, and infrastructure development). Many of these pressures may be worsened by management challenges. For example, illegal hunting and fishing can be difficult to tackle if enforcement capacity is low. Meanwhile, the environmental pressures created by infrastructure development may be closely related to a lack of awareness, consensus, or engagement (relating to lack of capacity) with other government agencies or local communities.

Management pressures cited by stakeholders (prospective users) include a lack of capacity (staff, equipment, expertise, training), a lack of data storage space, a lack of regional coordination on transboundary issues, and a lack of budget. Management challenges may be exacerbated by spatial/temporal constraints (e.g. collecting data at wide spatial/temporal ranges). These can present major obstacles to users' achievement of their objectives.

With respect to the management and the use of coastal, marine and wetlands data, specific challenges included a lack of capacity and expertise in the following areas (in order of most to least frequently reported in the survey):

1. **Data collection**: including technology, equipment, funding and technical expertise.
2. **Data processing/encoding**: including technical experience, use of non-standard methods, and the lack of consistent formatting.
3. **Data storage**: including a lack of storage space, technical expertise and equipment.
4. **Data analysis** including technical expertise, availability of software, incomplete or irregularly collected data and inconsistent data collection methodologies.

Additional challenges identified through the national consultations related to limited publishing of data sources which is linked to difficulties finding certain data, as well as further areas delineated in Table 3.
Table 3: Data challenges identified by respondents, from collection to application

<table>
<thead>
<tr>
<th>Topic</th>
<th>Significance</th>
<th>Challenges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data sharing</td>
<td>Where data is not shared, data gaps can dilute the evidence base needed for effective policy.</td>
<td>Lack of established data sharing agreements. Hesitancy around data sharing relating to concerns over privacy/data sensitivity, plagiarism, or being given due recognition in data ownership. Storage of data in disparate locations on external hard drives and personal computers, rather than being stored centrally online.</td>
</tr>
<tr>
<td>Sharing best practices and lessons learned</td>
<td>Access to examples of relevant projects – their successes, weaknesses, and how these were reached – can be a key resource with which users can improve their own initiatives.</td>
<td>Hesitancy around data sharing (as described above). The need to translate knowledge products into multilingual versions. Lack of common standards for comparing cases. Lack of thorough utilisation of insights once shared. Lack of a common, standardised process or repository for sharing of these materials.</td>
</tr>
<tr>
<td>Political issues</td>
<td>Interdepartmental buy-in, supported by sufficient budget and capacity, is a key foundation when transforming insights into impact.</td>
<td>Limited budget and capacity. Limited political buy-in and/or inertia to change existing practices. Limited consensus or in-depth knowledge amongst non-environmental government ministries on sustainable management of marine/wetland/coastal biodiversity and its socio-economic benefits. Legislative barriers especially on decision-making on issues involving multiple organisations. For example, participants in one of the national consultations cited the challenge of overlapping (and sometimes conflicting) mandates between coastal conservation and coastal development across or within organisations, as well as that existing information systems do not sufficiently facilitate integration between different governmental departments.</td>
</tr>
<tr>
<td>Local community knowledge and buy-in</td>
<td>Some local communities contribute to data monitoring and demarcation of protected areas. Even when they do not, local communities' buy-in is often vital to the success of projects.</td>
<td>Some communities which collect data lack the necessary expertise to provide reliable data regularly. Some communities do not see the long-term benefits of working together to protect wetlands.</td>
</tr>
<tr>
<td>Topic</td>
<td>Significance</td>
<td>Challenges</td>
</tr>
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<td>----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Data requirements</td>
<td>Data obtained from existing data sharing platforms may not be useful for different coastal, marine and wetland resource managers across the region.</td>
<td>Due to the varying sizes of AMS and areas of interest covered by different organisations, stakeholders require data at varying resolutions to assist with in decision making processes.</td>
</tr>
</tbody>
</table>

### 3.3 Opportunities

The following section covers opportunities identified by respondents, including data sources (Section 3.3.1) and also platforms and networks that already exist (Section 3.3.2).

#### 3.3.1 Sources of data in the region

In developing or enhancing a regional decision-making platform, it is important to consider where data will come from. Survey responses indicate that most prospective users, including government users, work with a variety of partners to collate information. These partner organisations operate across all administrative levels, from international and national to the provincial, local, and community levels.

The majority of respondents, and most government respondents, stated there is a need for a new (or improved) platform. Two prospective users stated there was not a need for a platform due to a “lack of resources” and “its difficulty.”

The survey (supported by the national consultations) indicated that the most important platform functionalities for prospective users are:

- Access to useful and validated data, including data relevant to marine protected areas, habitats, and species.
- Resource repositories containing information on lessons learned plus an ‘e-library’ containing references on best practices in coastal, marine, and wetland areas’ conservation and management.
- Trusted knowledge sharing through discussion forums and a directory of marine, wetlands, and coastal experts.
- Visual components and libraries, such as an interactive mapping dashboard, photo gallery and video vault.

Additional features identified included:

- Consolidating and synthesising existing data sources internationally and within each Member State, including from research institutions.
- A discussion forum for platform users to share questions, solutions and ideas.
The diagram below (Figure 3) indicates the popularity of platform features requested by survey respondents. Since survey respondents were asked to select features from a predefined list, the list is not exhaustive. Discussions with stakeholders during national consultations revealed further insight into what features might be needed which do not necessarily appear in this list, as well as ideas of how the features given in this list could be consolidated.

**Figure 3:** Ranked list of platform features most required by survey respondents, categorised by feature type. The numbers in each bar represent the number of survey respondents who reported this feature.

Most survey respondents said their organisations would be willing to contribute data to the platform, with just over half of the government respondents stating they were willing to share data. Just six respondents (most of which were government officials), stated that they would not share data. Reasons provided as to why respondents may not wish to share data included insufficient data or no data to share, requirement for institutional approval, and requirement for shared data to be associated with proper acknowledgment. The remainder provided no further details.

The types of information respondents were willing to share included:

- **Habitat information:** including databases on protected areas, national marine protected areas, biologically significant marine, coastal, and wetland areas, plus the ecological condition of key habitats and associated biophysical data such as sea water quality.
• **Species databases:** predominantly updated annually, including key species lists and status, plus data from surveys of migratory waterbirds, shorebirds, cetaceans and other marine mammal populations, plus benthic and reef fish community structures.

• **Knowledge sharing:** including lessons learnt, best practices in coastal, marine, and wetland management, case study results, enforcement issues, policy recommendations, awareness campaigns, published papers and thesis summaries.

• **Supporting resources:** including photographs and technical/project reports.

More than half of respondents, including government users, stated that their organisation required legal tools to enable data sharing. The most frequent legal tools stated were formal data sharing agreements such as Memorandum of Understanding or Memorandum of Agreement, while several respondents noted that data taken from governments would require institutional permission.

Participants in the consultation process also indicated a number of key considerations that they would like to see from a new or enhanced regional data platform:

1. **Generating buy-in:** Respondents emphasised the importance of holistic decision-making and generating ‘buy-in’ from non-environmental government ministries as well as local communities. Establishing a shared vision and understanding of a) the current biodiversity and socio-economic situation (as provided by monitoring data and trends) and (b) solutions and methods for responding to environmental challenges within countries and across a region was of high importance to many.

2. **Sharing best practices and lessons learned:** Respondents noted that more effective sharing of best practices and lessons learned would aid effective planning and programming purposes. This included obtaining information on what worked and what didn’t from others within the region, including community-based best practices, focusing on projects of a comparable size, scope, or type, as well as from outside the region, particularly relating to new technologies.

3. **Avoiding silos:** Respondents noted that sharing of data and knowledge amongst stakeholders and between disciplines and organisations was crucial to determine the current situation and to inform future action (e.g., policies, programmes). This was highlighted as a current challenge at national and local levels (e.g. between government agencies and with local communities) as well as at the regional level (e.g. in transboundary biodiversity management).

4. **Regional perspective:** Since effective management of coastal zones and the ocean requires data from outside a single nation, many noted the importance of comprehensive transboundary information and the need for effective data sharing among the ASEAN member states. For example, some government representatives expressed their interest in sharing data that would support knowledge on the conditions and pathways of migratory species such as birds and turtles.
3.3.2 Opportunities for complementing existing platforms

Opportunities can also be seen in the wide array of platforms and networks that already exist, and the data and expertise available therein.

The challenge of enforcement (e.g. within MPAs) is one example of this. Although cited as a major challenge by many, both in response to the survey and during national consultations (e.g., Thailand, Lao PDR), enforcement efforts are already being supported by networks and platforms which exist or are being developed. For example, as of October 2020, there were already plans to set up an interactive platform to facilitate the sharing of information on the nature and extent of illegal, unreported, and unregulated (IUU) fishing activities under the ASEAN Network for Combating IUU Fishing.

Meanwhile, several national data platforms were reported to exist. For pollution, a major area of concern for many AMS according to survey and consultation session findings, Lao PDR's Department of Pollution Control already has its own database, with similar national repositories of data seen elsewhere. As noted by national consultation attendees, several AMS already have a high standard of biodiversity archival systems and/or data provision platforms, as well as many under-utilised provincial datasets (see Appendix 1 for detailed list of available national and regional platforms).

As a result, rather than duplicating support on a new platform, there may be an opportunity to create linkages with existing tools, including by pulling data in from other databases. This would align with a concern stated by many in the national consultations that, where possible, any new platform should avoid duplicating services or data input processes which are already in place elsewhere.

Similarly, although many participants reported challenges relating to lack of expertise, others noted that networks of skilled experts already exist. Instead of an outright lack of expertise, the major challenge may be that these experts are not connected regionally on the issue of coastal/wetland/marine decision-making through a single platform.

Although many participants cited general management challenges, and reported projects varying in size and management types, there are some clear parallels between projects/areas in different countries. This could indicate a potential opportunity for sharing of best practices and/or lessons learned across stakeholders working to manage similar areas at different scales across the ASEAN region. Indeed, according to the survey, sharing of best practices and lessons learned is the second-most popular feature desired by respondents from a new regional platform (see Figure 3). Some national consultation respondents suggested it may be useful to hear about best practices from experts and practitioners from both inside and outside the ASEAN region.

It may be advantageous to leverage these existing strengths, creating a platform which not only facilitates the sharing of data, but also of expertise, best practices, and lessons learned.
3.4 Existing regional platforms

This section presents and summarises some of the key existing regional platforms in the ASEAN region, which may provide some complementarity or interoperability with, or a basis for, a new data sharing platform.

3.4.1 The ASEAN Biodiversity Dashboard (ABD) platform

With support from the European Union through the Biodiversity Conservation and Management of Protected Areas in ASEAN Project (BCAMP), the ASEAN Centre for Biodiversity (ACB) partnered with NatureServe in the development of the ASEAN Biodiversity Dashboard to provide ASEAN stakeholders with an interactive online platform for visualising key geospatial biodiversity datasets and indicators. It was designed to support conservation decision-making processes in the ASEAN region through up-to-date and real-time biodiversity data. These datasets are sourced from ASEAN Member States (AMS), ASEAN Clearing-House Mechanism, and external global data sources. The ASEAN Biodiversity Dashboard platform aims to support ASEAN regional stakeholders such as government officials, the academia and research centres, NGOs and other entities.

The ASEAN Biodiversity Dashboard platform provides users the ability to view a range of spatial biodiversity data, including data related to species, migratory waterbirds flyway sites, and habitats such as seagrass beds, mangroves and coral reefs, protected areas, ASEAN heritage parks and key biodiversity areas. The platform also includes a range of biodiversity indicator trends. All datasets available on the platform are derived from open access data sources.

Opportunities for extending the platform further may include:

- Functionality for users to contribute additional AMS-validated marine and coastal datasets, with checks for credibility;
- Functionality for users to export high-quality graphics and animations for use in external outputs;
- Functionality for users to select specific areas of interest, or upload area shapefiles, and carry out basic analyses (e.g., percentage protected area coverage);
- Increased usability for working at spatial scales lower than the regional or national level; and,
- Inclusion of links to related resources on the ASEAN Clearing-House Mechanism (ASEAN CHM) platform.

3.4.2 ASEAN Clearing-House Mechanism (ASEAN CHM)

The ASEAN Clearing-House Mechanism (ASEAN CHM) platform is a regional information exchange hosted under the Convention on Biological Diversity (CBD) domain name (https://asean.chm-cbd.net) and national Clearing-House Mechanism sites. It aims to support ASEAN regional stakeholders.

The ASEAN CHM platform was designed to provide users with access to a range of tabular biodiversity, area-based and habitat datasets. Related resources such as a biodiversity conservation initiative repository, biodiversity reference e-library, policies database, biodiversity conservation and management best practices database, photo gallery and video vault are also
found in the platform. Additional resources include a directory of staff, partners, and biodiversity conservation champions. The platform provides capacity building information including guides for creating a national Clearing-House Mechanism, and organising species and protected area databases. There is also a link to ASEAN biodiversity assessment information for a range of ecosystems and drivers of biodiversity loss, as well as the ASEAN Biodiversity Outlook report series. The platform also provides clear links to the ABD platform and information and maps on ASEAN Heritage Parks.

Opportunities to improve the ASEAN CHM site further include:

1. Functionality for users to contribute additional credible and AMS-validated marine and coastal datasets, as well as relevant resources.
2. Functionality for users to export data, data summaries and statistics for use in external outputs.
3. Updating links (e.g., to national Clearing-House Mechanism websites, training courses, the Integrated Publishing Tool (IPT)).
4. Creating a clearer pathway to a dataset library.

National consultations suggested many stakeholders across different ASEAN countries have limited prior knowledge of these two existing platforms. Furthermore, some users who were aware of the two platforms were unsure of the functionalities of the platforms and what types of information were available on them. Specifically, during the consultations with both Malaysian and Philippine stakeholders, several participants (principally non-government) were unaware of the data contained within the ASEAN platforms and how to download data from them. The key challenges and weaknesses of the platforms, noted by participants, included the limited availability of monitoring data on migratory species and the migration routes taken in the ASEAN region, as well as data at finer spatial resolutions more suited to local needs. Stakeholders in Singapore indicated that they are not currently using the ASEAN Biodiversity Dashboard for decision making surrounding coastal and marine resource management and instead depend on national resources. Although current geospatial functions on the platform were said to be easy to navigate, stakeholders noted that certain data on the ASEAN Biodiversity Dashboard (e.g., species occurrences, habitat-building species) are not accurate enough (in terms of resolution) to base decisions on. Recommendations made to enhance the usability of the platforms include making more data available at higher resolutions and ensuring that any data uploaded is adequately verified. However, significant resources would be required to ensure that verified data at different resolution measures are maintained on existing platforms.

During the Regional Experts’ Forum, ACB noted that the future for the ASEAN Biodiversity Dashboard should involve policymakers, the private sector, conservationists, and the general public. Emphasis was placed on building synergies, promoting use of the dashboard, bridging existing gaps in a science-based approach to decision-making, as well as standardising methodologies to enable more streamlined data organisation and management across the region and the marine realm, including understanding changes over time.
3.4.3 Coordinating Body on the Sea of East Asia (COBSEA)

The Coordinating Body on the Sea of East Asia (COBSEA) was present at the Regional Experts’ Forum, and indicated that COBSEA would be interested in partnering with ACB in developing a decision support system. It was emphasised that any new decision support system must be sustainable following development, in terms of maintaining users and resources. Attention must be paid as to how the decision support system would be kept up-to-date in the long-term, and other participants noted that capacity building would be necessary to ensure that data providers were able to continually deliver data to the decision support system.

3.4.4 Seas of East Asia (SEA) Knowledge Bank

The Seas of East Asia (SEA) Knowledge Bank (www.seaknowledgebank.net), developed by PEMSEA, aims to enhance capacity and performance of integrated coastal management (ICM) investments, and contains many features which resonate with features required of an ocean, coastal, and wetland decision support system by national consultation participants. The platform provides a range of knowledge products and services, and it also facilitates networking among stakeholders for the sustainable development of large marine ecosystems (LMEs) and coasts in the East Asia Region. PEMSEA has been continuously working to extend its interactive features. The current features of the SEA Knowledge Bank are listed in Table 4 (below).

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
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<tbody>
<tr>
<td>Integrated Coastal Management (ICM) regional interactive map; ATSEA2 and ASEANO Projects interactive maps</td>
<td>ICM is a flagship programme. The interactive ICM map captures and consolidates the East Asian Sea region’s contribution to the global sustainable development agenda, especially through progress of region in ICM implementation. Clicking on the map allows the user to access images, technical reports, and further data. The ATSEA2 interactive map shows the location of sea turtle sightings in the region, and it has similar interactive features. It is currently under development.</td>
</tr>
<tr>
<td>E-library</td>
<td>Provides access to resources created by PEMSEA and its partners.</td>
</tr>
<tr>
<td>State of the Coasts reporting</td>
<td>Provides link to rapid assessment tool to allow local governments or others to assess the state of their coasts.</td>
</tr>
<tr>
<td>Capacity development</td>
<td>Contains information on training courses, webinars, and other resources provided by PEMSEA. It also links to the PEMSEA network of learning centres (PNLC) and SDG directory. The PNLC is comprised of 18 universities and research institutions across the region. It promotes knowledge sharing through a variety of mechanisms.</td>
</tr>
<tr>
<td>ICM certification</td>
<td>Allows local governments and others to assess their potential for ICM certification.</td>
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<tr>
<td>Ocean investments</td>
<td>Provides information to those interested in investing in ICM projects or in attracting investment for ICM projects. It also helps to assess investment readiness.</td>
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<tr>
<td>Feature</td>
<td>Description</td>
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<tr>
<td>E-directory of ocean experts</td>
<td>The list is continually updated with experts that PEMSEA has worked with in the past.</td>
</tr>
<tr>
<td>PEMSEA network of local governments (PNLG) SDG tracking tool</td>
<td>Aims to consolidate local government members' achievements, especially those related to SDG6.11, 6.12, 6.13, and 6.14. Members share baseline information on their progress on various indicators for targets.</td>
</tr>
<tr>
<td>Partner ocean knowledge portals</td>
<td>Showcases and provides links to portals including IW Learn, CCRES, WPEA, Glo Fouling Partnerships, and YSLME to facilitate users to find as much information as possible through the Sea Knowledge Bank as a one-stop shop for marine knowledge insights.</td>
</tr>
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</table>

Many of these features resonate with features requested by participants of a regional decision support system (DSS) for oceans, coasts, and wetlands. As a result, there may be opportunities for collaboration or consultation in development of the regional decision support system.

### 3.5 Developing a new Decision Support System in the context of existing global, regional, and national tools

It is important that any new Decision Support System does not duplicate existing functionalities within existing or planned regional tools. Instead, the system can harness the strengths of resources at national, regional, and global scales in order to develop a platform for which there is a niche in the informational and decision-making landscape.

There is an opportunity for coherence with other data tools and systems on the global scale. Such tools and systems include UN Biodiversity Lab 2.0 (providing spatial data relevant to biodiversity), GEMS Ocean (in terms of the synthesis of marine data and its dissemination to decision-makers), the World Environment Situation Room (particularly WESR Ocean, which displays key spatial data relating to Oceans according to UNEP's three flagship themes of climate change, biodiversity and nature, and chemicals and pollution. It also packages and curates information to be useful to policymakers, particularly through its ‘storymaps’). In terms of the usefulness of a new Decision Support System to reporting, linkages may also be possible with tools such as DaRT (Data Reporting Tool for Multilateral Environmental Agreements).

As well as creating linkages with global tools, making connections with regional initiatives and taking advantage of existing expertise and resources could bolster the success of a new regional decision support system for oceans, wetlands, and coasts. Furthermore, in cases where national data repositories and information systems already exist, many representatives at the Regional Experts' Forum and in national consultations suggested that interoperability between these systems and any new Decision Support System could help to relieve some of the burden on country data providers and enhance the effectiveness of the new system.

The ASEAN Biodiversity Dashboard and ASEAN Clearing-House Mechanism are key platforms, with a wealth of existing resources, which could be built upon to help create a regional one-stop shop for information and decision support relating to management of coasts, ocean, and wetlands, particularly for users within national government.
4.1 Implications of findings and options for the Platform

4.1.1 Overall concept

Results from the survey and national consultation sessions broadly confirm both the need, and support for, a regional platform.

Based on the reported needs, challenges, and opportunities, the following priority attributes were identified for a decision-support tool/platform:

**Covers a regional focus:** 70% of government respondents suggested that there is a need for a regional/ASEAN-wide platform. A regional tool would support government users’ reported objectives by facilitating the management of transboundary issues (e.g., monitoring of species status and species movement, habitat connectivity, protection of endangered species, management of coral reefs), as well as providing opportunities for the exchange of expertise and best practices/lessons learned information across the region. By operating at a regional scale, such a tool would also support the work of organisations working internationally by highlighting trends across the ASEAN region. The platform could also offer a central location through which organisations (e.g., NGOs, academia) can share information more readily with environmental ministries and other governmental stakeholders, while also facilitating mainstreaming of information across governmental ministries. Furthermore, since just over
half of government respondents reported having an existing platform for sharing information – with many of these platforms operating at the national scale – it seems the niche available may be for a platform which facilitates and consolidates data sharing, storage, and access at the regional scale.

### Expands upon the ASEAN Biodiversity Dashboard and ASEAN Clearing-House Mechanism:
These resources already support users’ cited objectives of visualising key biodiversity datasets and indicators spatially, accessing up-to-date biodiversity data, and information exchange, among other aspects. In this way, these platforms provide strong foundations from which additional functionalities could be added and integrated to extend the usefulness of the platforms.

### Avoids unnecessary duplication of processes and services:
One way in which the functionalities of the ASEAN Biodiversity Dashboard could be extended further is through connections with other platforms (e.g., regional enforcement platforms, national platforms), connecting to data elsewhere (e.g., via APIs or web map services) and avoiding additional data input burden for users.

#### 4.1.2 Functionality considerations

The broad set of options highlighted in this section have been developed based on the following aspects:

- **Users’ reported objectives:** Functionalities have been suggested which would support targeted users to fulfil their objectives related to sustainable management and decision-making for coastal, marine, and wetland areas.
- **Users’ reported challenges:** Functionalities have been suggested which would help users to overcome challenges which they face currently.
- **Users’ reported existing capacities, strengths, and concerns:** Functionalities have been suggested in view of what might feasibly be built using existing resources.

Based on respondents’ reported output production, development of the platform could include the following features or functionalities given in Table 5 (below):

<table>
<thead>
<tr>
<th>Feature</th>
<th>Further details</th>
<th>Reason</th>
<th>Status in ASEAN Biodiversity Dashboard (ABD), ASEAN Clearing-House Mechanism (ASEAN CHM), or related tool</th>
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<tbody>
<tr>
<td>System for sharing data (especially on MPAs, habitats, species, threats to marine/coastal/wetland ecosystems).</td>
<td>Data requested include <strong>species</strong>, <strong>biophysical</strong>, and <strong>socio-economic data</strong>. If possible, it would be useful to access real-time information, with alerts offering an additional benefit.</td>
<td>Access to shared information in a centralised database was the most popular feature selected by survey respondents. Participants in national consultation sessions also reported that lack</td>
<td>Databases on ABD and ASEAN CHM are hosted on both internal and external mirror sites and links to these sites are provided. Downloading datasets from CHM and ABD</td>
</tr>
<tr>
<td>Feature</td>
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<tr>
<td>Data shared regionally on the platform should be made available in its raw format to be easily exported so that users can perform their own analyses offline.</td>
<td>Participants in national consultation sessions also reported that lack of storage space and capacity, as well as incomplete data and inconsistent formatting, present major challenges to achieving their objectives.</td>
<td>To ensure data security, and to monitor and access the logs from the server, users may request from ACB, through its Biodiversity Information Management (BIM) unit, a unique API token as parameter to download the datasets.</td>
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<td><strong>Easily accessible metadata</strong>, including the date that the relevant data was collected, the data source (e.g. name of organisation and/or platform the data was retrieved from). Contact details and/or a simple procedure to send a ‘request’ for data or documents to the relevant data provider would also be beneficial.</td>
<td>The data provided through the system would be important for helping to support government policymaking and planning, compliance with reporting to multilateral environmental agreements, evaluation of past interventions, enforcement (e.g. of Marine Protected Areas), and education and training, as illustrated in Figure 2. The data may also be useful in academic research, for planning and evaluation in the private sector, and for planning and research by NGOs.</td>
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<tr>
<td><strong>Data format</strong>: In survey responses collected as of October 2021, 71% reported that their marine and coastal data were encoded in Microsoft Excel form, whilst 39% reported storing in analogue form, and 27% digitised using a globally accepted format.</td>
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<tr>
<td><strong>Maps</strong></td>
<td><strong>Map overlays</strong> for displaying features of interest (e.g., species, biophysical, and socioeconomic data) through interactive maps.</td>
<td>Participants in the survey and national consultations mentioned several objectives which may be best facilitated through the use of spatial data. For example, NGOs from the Philippines stated an interest in identifying priority sites for new projects, as well as using area-specific marine/coastal/wetlands data to plan and monitor those projects. Meanwhile, government representatives from the Philippines report using Google Earth satellite images to assist them in spatial planning, providing further evidence of a strong use case for interactive maps. Spatial data also support in Marine Spatial Planning activities (e.g. in Quang Ngai province, Viet Nam). Maps may also be particularly useful for visualisation and use of certain types of data, such as for tracking species movement or viewing protected area boundaries.</td>
<td>ABD has an interactive map component displaying biodiversity data and indices. No current functionality to select or upload specific sites or areas of interest. No current functionality to convert and download images from map components. ASEAN CHM provides links to the ABD and the ASEAN Heritage Parks database.</td>
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<td>Feature</td>
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<tr>
<td><strong>Data standards/data reformatting</strong></td>
<td>Standardised methods and guidance for data input/uploads. Results suggest that these methods would need to be easily adopted or automated, particularly for more detailed standards such as Darwin Core which the survey indicated was not widely used by stakeholders.</td>
<td>Data are currently obtained from multiple sources and stored using different methods. An existing mechanism of online and offline encoder that captures and digitises information available in CHM. Darwin Core is being used for species data and WDPA standards for Protected Areas. Remote data entry is accessible in the ASEAN CHM as a way of uploading data to the database in real-time.</td>
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<tr>
<td><strong>Data visualisation dashboard/overview</strong></td>
<td><strong>Infographic dashboard</strong> linked to tabular datasets. The dashboard could present key statistics and processed data. <strong>General overviews</strong> which can be interpreted easily by non-experts. These overviews could act as a venue to track national/regional progress towards national goals or international goals (e.g., CBD targets) and include other relevant information e.g., species lists.</td>
<td>This would help to provide a high-level overview for users (e.g. policymakers) who may interact with the platform to extract key takeaways, rather than to conduct in-depth analyses. ABD provides infographics on national indicators and species counts (<a href="#">link to Malaysia indices dashboard</a>). ABD provides infographics on national indicators and species counts, as well as time animations of ASEAN region indices. ASEAN CHM provides national biodiversity overviews for species and ecosystems. The ASEAN CHM provides interactive graphs showing trends in species and PA data. These graphs utilise data from ASEAN Biodiversity Outlook, AMS National Reports and global data sources. These graphs are currently being migrated to the Bioland Tool format.</td>
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<td>Feature</td>
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<tr>
<td><strong>Space to share expertise</strong></td>
<td>Knowledge exchange (e.g., Discussion forum, Directory of experts): This could include being able to directly request documents from other users (as requested by some research participants) through an experts’ directory, or through discussion based in a discussion forum. This functionality is closely aligned with the functionality suggested below: sharing of best practices and lessons learned.</td>
<td>Lack of capacity, expertise, or funding were reported as major challenges by some respondents. However, there is a wealth of expertise and experience available, as indicated in national consultation sessions. A discussion forum may help to connect different stakeholder types within and across countries to share expertise. This function may be used in conjunction with a space for sharing best practices and lessons learned. As well as allowing users to find relevant experts, greater collaboration could be fostered across different countries in the ASEAN region, as well as between different user types (e.g. government environment agencies, non-environmental government agencies, NGOs, academia).</td>
<td>Feature not currently provided on ABD. ASEAN CHM provides directories of AHP managers, ASEAN Champions of Biodiversity and Friends of Biodiversity including donors, focal points and partners. Discussion forum feature not currently available on either ABD or ASEAN CHM.</td>
</tr>
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</table>

1 In the survey, lack of capacity and technical expertise was cited as the most or 2nd most popular challenge across data issues relating to management/use of coastal/marine/wetland data (e.g. data collection, data analysis, data processing, data storage). Feedback from the national consultation sessions reinforces this.
### Table: Features for Sharing Best Practices and Lessons Learned

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<thead>
<tr>
<th>Feature</th>
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</table>
| **Space for sharing best practices and lessons learned** | Scale and project focus could be important ways to organise these best practices.\(^2\)  
Similarly, it may be useful for users to input projects they are currently working on, and categorise these by type. That way, users will be able to quickly find contact details of those running initiatives with a comparable scale or focus (and access materials provided on those initiatives, if possible). | Survey results showed that sharing of best practices and lessons learned was the second-most popular feature desired by respondents from a new regional platform.  
Participants from all industry sectors represented in the national consultations indicated that it was useful for information on best practices and lessons learned to be made available to stakeholders. | Feature not currently provided on ABD.  
ASEAN CHM provides biodiversity resources such as ‘Good Practices in Biodiversity Conservation in the ASEAN Region’ and ‘Biodiversity Policies in the ASEAN Region’ |
| **E-library for technical reports and documents** | This may include reports published by national and local government units.  
This functionality/feature also aligns closely with the need to share best practices and lessons learned.  
Recommend considering how the process of uploading documents could be simplified to support contributions. | This feature was selected by around half of survey respondents. | Feature not currently provided on ABD.  
E-library feature provided in ASEAN CHM.  
A link to the e-library will be provided in the ASEAN BD and the ASEAN CHM. |

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\(^2\) NGOs from the Philippines mentioned the advantages of being able to replicate practices at different spatial scales (local, sub-national, national, regional)
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<thead>
<tr>
<th>Feature</th>
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<tbody>
<tr>
<td>Gallery for photographs and videos</td>
<td>Copyright licensing will be of particular importance for photographs and videos.</td>
<td>Images could be used in reports and IEC materials. Some suggested including photos submitted by concerned citizens filed as reports.</td>
<td>Feature not currently provided on ABD. Photo gallery (page under construction) and video vault features provided in ASEAN CHM.</td>
</tr>
<tr>
<td>Materials to support collaborations with local communities</td>
<td>This may include materials to provide guidance on collaborating with local communities or running citizen science projects. Alternatively, data flows could be organised in such a way as to permit access to allow easy input of data from citizen science projects into the platform.</td>
<td>Many cited a lack of awareness in local communities about marine conservation issues, or a scepticism about the interdependence of marine conservation and economic development. However, many also cited the importance of local communities' input – as partners, as data collectors, and as managers of coastal/wetland/marine areas. As a result, it may be advantageous to share materials which support successful cooperation with local communities. Materials and avenues to support citizen science could therefore help to support the objectives</td>
<td>Feature not currently provided on ABD. Possibly available in CHM 'Biodiversity Resource' section.</td>
</tr>
<tr>
<td>Feature</td>
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<tr>
<td>Space to collaborate or share materials with other government agencies</td>
<td>This might include providing access for non-environmental government agencies, including guidance on collaboration or mainstreaming information across government ministries, or providing downloadable processed data (e.g. via the data visualisation dashboard as mentioned above).</td>
<td>Many cited a lack of awareness in some non-environmental government ministries about marine conservation issues, or a scepticism about the interdependence of marine conservation and economic development. This was thought to sometimes contribute to a lack of funding or conflicts of interest with other government projects.</td>
<td>Feature not currently provided on ABD or ASEAN CHM.</td>
</tr>
<tr>
<td>Offline functionality/ Mobile friendly/ Mobile application</td>
<td>This may include pre-download or low bandwidth download options. A mobile-friendly site or application would allow greater access by those without personal computers.</td>
<td>National consultations with participants from Malaysia and the Philippines highlighted that internet problems (either by being slow or no connection) prevent people from using the existing ASEAN platforms. Recommendations discussed were the ability to use platforms offline or on mobile devices when unable to access a PC (i.e., during fieldwork).</td>
<td>Downloading data is available on both the ABD and ASEAN CHM. However, there may be opportunities for expanding offline functionality. A mobile app for the ASEAN CHM e-library currently being developed for both iOS and Android. The application will be available soon.</td>
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<td>Feature</td>
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<tr>
<td>Interoperability</td>
<td>Streamlining of data inputs between a new tool and major existing national data repositories.</td>
<td>Much data already exists but is not available centrally to all countries in the ASEAN region. Stakeholders are generally eager to avoid duplicating services or data input processes already in place elsewhere. Existing resources delivered by other global and regional bodies indicate that collaboration could help to harness expertise in delivering requested features as well as to avoid duplication of functionalities and ensure greater uptake by users who see a niche use case in the features delivered by ASEAN.</td>
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</tbody>
</table>

### 4.1.3 Further data considerations

According to the consultation process, data that may be most useful to include on a new platform (or to add it to the existing platforms) would be those relating to wetlands, coral reefs, wildlife (especially endangered marine species), mangrove forests, seagrass, estuaries, fish and fisheries, and coastal erosion (according to survey responses), although the specificities of what aspects of these are of greatest interest are less clear. More regularly collected biophysical data (e.g., sea surface temperature), time series data, and land-use/development changes in the coastal regions may also be favoured. Finally, some suggested it may be useful to tag and organise these data according to attributes such as taxonomy, spatial area, scale, to make relevant data easier to find.
For any data hosting functionality, a data sharing agreement within the country is needed. Aspects of such an agreement noted by national consultation participants are proper attribution of datasets with DOIs and full citations for data downloads, plus the development of data sharing agreements or Memorandums of Understanding for the sharing of sensitive information (e.g., distribution/nesting sites of species prone to harvest). Such sensitive information should only be available to parties who have signed agreements.

4.1.4 Opportunities and threats

The survey, national consultation sessions, and Regional Experts’ Forum revealed several strengths which may support development of a regional decision support system.

- **There is a collective will among respondent organisations to share and contribute coastal, marine, and wetland resource data to the platform.** In addition, respondents provided a wide range of databases (e.g., species and area/habitats) and resources (e.g., technical reports, best practice in coastal, marine, and wetland management and policy recommendations) that they were willing to share.

- **A strong partnership network already exists among the prospective users’ organisations** and creating additional links and partnerships could be a useful way to facilitate further sharing of knowledge, data, and resources.

- **Most prospective users work with partners operating across multiple administrative levels and collectively have a strong partnership network across all levels,** from international to the community level.

- **Existing initiatives and resources provide a wealth of data and expertise with which to develop decision support functionalities.** Organisations such as COBSEA and others have voiced their interest in collaboration.

It may also be useful to bear in mind threats or weaknesses which were mentioned by participants during national consultation sessions and the Regional Experts’ Forum. These concerns include the following:

- **Willingness and capacity to share data.** Considering the opportunities this raises for collective sharing of data, it would be useful to assess whether specific legal mechanisms, such as Memoranda of Agreement or Memoranda of Understanding, could be applied to all respondent organisations and partner organisations. There is also an opportunity in use of a data sharing protocol as a less legally intensive option.

- **Stakeholders’ capacity to provide data.** For the decision support system to be successful in the long-term, quantity and quality of data and information are vital. Representatives at the Regional Experts’ Forum noted that capacity-building may be key in enabling data partners to provide the data necessary to make the platform useful and successful.

- **Facilitating and incentivising data provision.** Data that is collected and stored, and reports that are currently produced, are likely to be in different languages from across the ASEAN region and may be in different scripts. Representatives from the Regional Experts’ Forum suggested that, for data and resources within a new decision
support system, assistance should be provided to enable data providers to translate and transform text. This concern is linked to a wider idea that data providers must be given the support, capacity, and incentive to provide good quality and quantity of data to ensure the success of the support system. It is recommended that the process of providing data is made simple, with templates provided to ensure data received into the platform is standardised where possible.

- **Marketing and outreach to encourage uptake of the decision support system, as well as the existing ASEAN Biodiversity Dashboard and ASEAN Clearing-House Mechanism.** The national consultations revealed that some participants were unfamiliar with these platforms or with the full extent of the products and services they deliver. To ensure the success of any new decision-support functionalities, marketing and outreach may be important in securing a substantial and engaged user base who can use these services to support action and impact.

- **The niche purpose of a regional decision support system.** Some participants in the consultation process called into question what a regional decision support system could provide that would add value to existing understanding of trends at the national scale. One option may be to give greatest focus to pressures which are enacted at a regional scale, such as the migration of species and management of transboundary protected areas. Harnessing biodiversity and nature, climate change, and chemicals and pollution (which are major areas of focus for UNEP, COBSEA, and the GEMS Ocean solution currently under development) are all transboundary issues which could help lend focus to the framing of a new ASEAN decision support system for oceans, coasts, and wetlands. As well as providing a regional overview that is nonetheless useful at the national scale, the decision support system could find relevance at a national scale by helping to fill data gaps experienced by some countries in the region, and could position the ASEAN Biodiversity Dashboard to a greater extent, as a centre for discussions and exchange of expertise between key stakeholders – including scientists, government representatives, and others – within the ASEAN region.

### 4.1.5 Final recommendations on functionalities and next steps

Potential next steps for developing an ASEAN regional decision support system for marine, coastal, and wetland ecosystems and the societies and economies that depend on them could include:

- **Prioritising functionalities to be delivered**, based on the outcomes of the consultation process. Possible priority areas may include:
  - Hosting key data from across the region, especially data which is useful and validated at a regional scale (e.g. species data, particularly on migratory species).
  - Features for strengthening networks of partners, practitioners, and other biodiversity data holders, to facilitate the sharing of information among stakeholders in the ASEAN region, and helping to build a community of practice around marine, coastal, and wetland ecosystems. Challenges of lack of capacity and/or expertise may be partially addressed through facilitating conversations between scientific experts and decision-makers, and through facilitating the sharing of best practices. PEMSEA, whose SEA Knowledge Bank already contains an e-directory of ocean experts, may be a key collaborative partner in strengthening this network and community of practice. Connected to this is the possibility of:
- **Evaluating possibilities for a ‘think tank’ approach** to the decision support system through consultation with similar bodies in other parts of the world, strengthening conversations among stakeholders in the region and enhancing applications of research in practice.

- **Identifying possibilities for developing these functionalities in the context of the ASEAN Biodiversity dashboard and ASEAN CHM**, as well as through consultation and collaboration with experts from other regional initiatives (e.g. PEMSEA, COBSEA) which have voiced their willingness to collaborate and may have strengths in these areas.

- **Developing a data sharing policy specific to biodiversity-related information** within the region, to be agreed on through consultation with stakeholders and ASEAN Member States.

- **Assessing the capacity of data providers to contribute to and use the planned functionalities.** Develop guidance, support, and provide capacity-building to ensure data providers can deliver what is needed to make chosen functionalities successful. The results of the consultation process have suggested that, in addition to a need for a decision support system, there is a strong need for capacity development and support. Capacity-building activities may be required to support the regional decision support system. There may be some scope for capacity development materials to be delivered online (e.g. provision of guidance materials for engaging with local communities, guidance materials on best practices for marine spatial planning or protected area management, guidance materials and templates to support data collection and processing).

- **Identifying opportunities for marketing and outreach**, to ensure stakeholders are aware of the platform and how to use it. Key opportunities for this may include the development of new functionalities, the launch of the platform, and ongoing management of new decision support functionalities, especially if hosted as extensions of ACB's existing online platforms.
Data platforms identified through the survey and used by stakeholders in the region, that may be particularly relevant to a new or updated regional decision-support platform.

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