WIOMSA Policy Brief:

Bridging the gap between science, management and decision-making







This policy brief was produced from a MASMA project of the Western Indian Ocean Marine Science Association (www.wiomsa.org) entitled ***Use of Research Outputs by Management Authorities: Assessment of Current Practices and Identification of Capacity Building Needs.*** The aims of the study were to improve the understanding of how scientific information is integrated in marine and coastal management under different institutional arrangements; and contribute to establishing the effectiveness of relationships between scientists and decision-makers in addressing management issues. Further information can be obtained from the following sources:

- Celliers, L and Rosendo, S. (2015) Use of Research Outputs by Management Authorities: Assessment of Current Practices and Identification of Capacity Building Needs. Western Indian Ocean Marine Science Association. MASMA Consultancy Report, 136pp.
- Western Indian Ocean Marine Science. (2015) Use of Research Outputs by Management Authorities: Assessment of Current Practices and Identification of Capacity Building Needs Y A Summary Report. WIOMSA. 20pp.

Despite being regarded as the least studied region of the Indian Ocean, the Western Indian Ocean (WIO) region has a long history of coastal and marine research and capacity building. In recent decades, scientific research on the ecological and human dimensions of coastal and marine ecosystems in the WIO has expanded significantly. This is evidenced, for example, by the remarkable growth and breadth of research presented at the biennial Western Indian Ocean Marine Science Association (WIOMSA) Scientific Symposium, a premier regional scientific event that enjoys an international reputation for excellence.

While the importance of using the best available scientific evidence to inform management decisions in the WIO region is widely recognised, knowledge of how decision-makers articulate research needs, scientists produce useful outputs for management and, in general, the extent to which research outputs are used by decision-makers, is still limited.

The policy cycle and making decisions

Policies guides decision-making of politicians and resource managers. Policies can also become entrenched in legislation. Policy-making often follow a cycle involving bringing an issue to the attention of policy makers (agenda setting), defining the different options to address that issue (formulation, based on data, information and knowledge), implementing actions to achieve goals (implementation); and assessing whether the actions are actually achieving those goals (monitoring and evaluation). Most decisions could be conceptualised in a similar manner: becoming aware of an issue and prioritising it, defining a course of action (potentially amongst many options), implementing those actions, and assessing whether they are having the desired impact. The availability of appropriate, reliable and correct data and information - also known as scientific evidence - supports the policy cycle at every phase.

It is important to acknowledge that making decisions in the context of the WIO social, economic and natural reality are affected by many factors other than bio-physical state. Making decisions on coastal and marine resources is an inherently political process in which scientific evidence is only one amongst many influencing considerations. A decision-maker, as an individual, is also influenced by own experiences, expertise and judgment. These are all important factors determining not only what decisions are made, but also how they are made.

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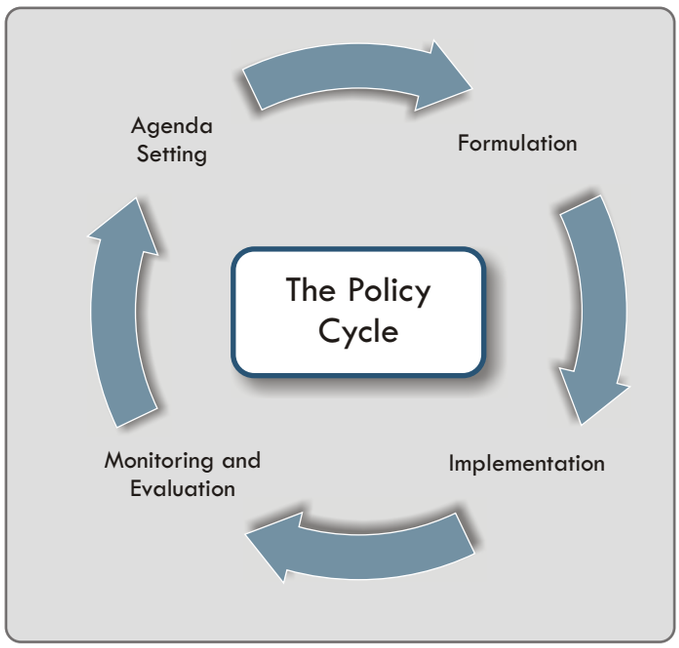
At the institutional level, capacity and incentives to engage with scientific evidence are key issues affecting the decision-making process and its outcomes. Self-interest and corruption may also be powerful factors affecting how decisions are made.

COASTAL GOVERNANCE AND MANAGEMENT

All countries in the WIO experience environmental degradation to a varying extent. Coastal and marine habitats and resources of the WIO are subject to habitat destruction, pollution and resource overexploitation, fuelled by drivers such as rapid urbanisation, industrialisation, population growth and market expansion. Climate change is further exacerbating pressures on marine and coastal areas. Management responses require an understanding of the interplay between social and economic processes, and environmental change. Impacts or the outcomes of decision-making are often difficult to predict. It is often beyond the control of individual countries to address some of drivers of environmental change. Making decision on coastal and marine resources is a complex undertaking which often has uncertain outcomes.

Furthermore, governance processes in many countries are inadequately structured and ill-equipped to effectively respond to the inherent complexity of marine and coastal issues, increasing

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and conflicting demands for natural resources, rapidly changing environment and greater exposure to natural disasters.

The allocation and management of coastal and marine resources are often influenced by a myriad of conflicting legislation, various policies and management agencies normally distributed between administrative levels from national to local government. Policies frequently focus on developing particular sectors without considering the impacts on other sectors. This leads to overlapping management mandates, duplication of responsibilities and expenditure, and conflict between management entities. It also means that some issues are overlooked and not adequately addressed. In the WIO countries, the expression of coastal and marine research priorities in support of national interests is - except for many of the high-value living marine resources - rather weak.

Moreover, many management institutions in the WIO face significant capacity limitations. This includes a lack of staff with relevant training, and overall limitations in resources required for decision-making. Such limitations are not always apparent at the central / national government level, but can be severe at sub-national lower levels of government. It means that there is often capacity to formulate sound national legislation and policy, but at local level there are serious capacity deficits to adequately implement, enforce and monitor decisions.

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WIO nations have long recognised the complexity and limited effectiveness of piecemeal coastal and marine management and made efforts to address them through an approach called Integrated Coastal Zone Management (ICZM). This approach emphasises capacity development, including human capacity building, and institutional and legal framework development. The development of strategies and actions to achieve goals and objectives is an

important aspect of coastal governance. Scientific knowledge and governance are two key features of ICZM, and successful and ongoing implementation thereof may result in an improvement in the flow of information between science and management.

The creation of institutional structures as part of IZCM implementation allows for potentially wider use of scientific evidence, and also more opportunity for the identification of issues requiring further scientific research. While many countries have made progress in developing ICZM strategies, plans, policy and even legislation (often as part of donor-funded initiatives), implementation has often been slow or weak, partly because of lack of sufficient and steady financial resources and a lack of human capacity.

ENGAGEMENT BETWEEN MANAGEMENT AND RESEARCH

The extent to which management authorities engage with scientific evidence varies considerably between and within countries, and then also between different sectors. Formulating a management plan for a marine protected area (MPA), for example, is preceded by a review of existing studies, which is often commissioned to consultants. In some cases, management plans may require procuring new scientific data and information (evidence). The monitoring and evaluation (M&E) phase of policy or decision-making requires collecting data to assess changes in key indicators. In many countries, the capacity and resources of MPA authorities for M&E is limited and there is often insufficient data to assess whether an MPA is achieving its management goals. Thus, one could say that the link between science and management is stronger in the planning and formulation stage, but generally weaker in implementation and M&E.

In the WIO, there is generally a strong relationship between fisheries research and fisheries management. Most countries in the region have established fisheries research institutes whose mission is to produce scientific research in order to inform management of the resource. The extent to which this leads to scientifically-informed fisheries management is another matter. It seems to be relatively effective for high-value species such as prawns where stock assessments are done to inform fishing quotas. However, economic or social interests sometimes speak louder than scientific evidence. In Tanzania, for example, restrictions on prawn fishing took time to establish even though there was both observational and scientific evidence of declining stocks. For other types of fisheries, there is a much weaker relationship between science and management. Part of this problem is related to the fact that many fisheries do not have management plans, particularly artisanal fisheries. With the move towards fisheries co-management, management plans for areas under the jurisdiction of Beach Management Units and Community Fisheries Councils will become increasingly common. This will provide an opportunity for management informed by science, particularly through partnerships with Non-Governmental Organisations (NGOs).

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Scientific research often contributes to evidence of the scale of resource degradation and demonstrating the function and the socio-economic values of ecosystems. Combined with pressure from the public (or certain groups within society) this has been successful at placing issues on the decision-making agenda. Societal pressure does not usually come from scientists alone, but from a combination of different interest groups.

Mechanisms to improve the use of scientific information for decision-making

- Defining national research agendas for coastal and marine management;
- More effective and targeted dissemination of research;
- Improving the accessibility of scientific data and information to end-users at national and sub-national level;
- Improving the generation of knowledge through directed research programmes and projects;
- Promoting hybrid or negotiated knowledge for management. "Scientific evidence" often needs to be seen in context of the reality of coastal communities;
- Support institutional arrangements for and the implementation of ICZM at a national and regional level;
- Support the development and consistency of State of the Coast reporting at regional, national and sub-national level;
- Promote the participation of scientists, managers, decision- and policy-makers in national or global awareness raising campaigns; and
- Arrange national coastal and marine research and management symposia or conferences.

CAPACITY BUILDING NEEDS IN RESOURCE MANAGEMENT AUTHORITIES

There are different types of management authorities, from national ministries responsible for policy development to local governments and protected area management structures responsible for policy implementation and day-to-day management. These require very different interventions in order to improve capacity to request and use scientific evidence.

National Scale

Institutions responsible for development of policies, programmes and strategies at national level include both politically appointed officials as well as technical staff. On the whole, at national level there is often sufficient capacity (if not always political will) to source and apply science to policies, legislation, plans and strategies. Some potentially relevant capacity building interventions aimed at management authorities include:

- **Reinforcing the capacity of decision-makers to formulate policy and associated research needs** through strategic planning that includes "visioning" and the development of future scenarios. These involve considering how emerging trends and developments might potentially affect policy and practice. It would give policy-makers greater capabilities to understand current and future drivers of change and plan accordingly, including identifying and prioritizing research issues that can help address emerging challenges.
- **Enhancing mutual understanding of how scientific and management communities operate** through specific training to help address some of the prevailing misconceptions. Another way to enhance this mutual understanding is to promote secondments of managers to research institutions and of scientists to management authorities or ´job-shadowing'.

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Local Scale

Management authorities responsible for implementation and day-to-day management at the local level tend to face many capacity challenges. Improving the technical knowledge, skill and experience of staff working in local government or agencies may contribute to better use of data and information for planning and management processes. Again, there is no 'one size fits all' approach to strengthening technical capacity at this level, but it involves improving understanding of key ecological and socio-economic principles and approaches for coastal and marine management. Examples include the use of the precautionary approach, the ecosystem approach, adaptive management, collaborative and co-management methods and the integration of gender issues. This could be achieved through training, and training of trainers in management authorities.

CAPACITY BUILDING STRATEGIES TO OVERCOME BARRIERS TO EFFECTIVE INTEGRATION OF SCIENCE

Overcoming the barriers to effective integration of scientific evidence into management and decision-making processes cannot be achieved only through focusing exclusively on management authorities. There are a number of strategies focusing on scientists, managers and science communication that can be supported to strengthen the link between science and marine and coastal management. These include:

- Develop training courses and other opportunities for scientists to develop communication skills, write policy briefs and learn about policy processes;
- Develop training and other means to allow managers and decision-makers to understand the scientific process, its value, but also its limitations;
- Making managers, decision-makers and resource users routinely part of the design and execution of research projects. This would contribute to linking research to specific needs. It is also important to recognise that the scientific process is slow and resource intensive. This requires longer-term funding, including funding aimed explicitly at enhancing the impact of research;
- Design funding strategies that incorporate nationally defined research priorities for coastal and marine management;
- Compile project-level lessons-learned in linking science and policy / management and identify successful impact pathways. Promote their use in new projects;
- Support projects that combine research and demonstration or implementation activities. There are some successful cases of this approach in the WIO which can also provide useful lessons; and,
- Require research projects to identify management implications of their findings and contribute results to new or existing open-access databases.

CONCLUSION

Most of the experiences of scientist and managers in the WIO region indicate a persistent perception that science to policy is predominantly a one-way affair, from producer to user. There certainly is a much stronger role for policy-makers and their advisers in developing research questions and agendas. It is also true that managers and decision-makers often do not understand the limits of scientific data, the inherent risks and the issues of temporal and spatial applicability. Concomitantly, in a space as complex as the coastal and marine environment, scientific data is not the only informant of decision-making. The task of connecting or co-producing scientific knowledge with users is not an automatic process, and there needs to be a concerted effort to own the problem of producing usable science in the WIO.

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