The Regional Training Workshop on Methodologies for Coastal Inventories & Information Management

Appendix VII

PRESENTER : **LEONARD A. NURSE**
DIRECTOR, COASTAL ZONE MANAGEMENT UNIT,
BAY STREET, BRIDGETOWN,
BARBADOS

SUBJECT : **CONDUCTING AN INVENTORY OF COASTAL RESOURCES AND USES: CRITICAL CONSIDERATIONS**

Why undertake an inventory?

An inventory of coastal resources and use provides an *initial basis* and *critical first-order tool* for practicing integrated coastal management. The inventory can serve a number of useful functions, but principally the following:

- A useful preliminary planning instrument for assessing *overall development potential* of coast;
- a means of identifying groups of *potentially compatible (and incompatible) uses*, which is critical for coastal resource use allocation;
- 'checklist' to which *other potential uses* may be added, as the need arises. This is an acknowledgment that the 'resources' and 'uses' listed in the inventory are not finite, but can change over time, as a country's development goals, interests and priorities shift.

It is impossible to manage any resource efficiently unless we have appropriate (i.e. *quantity* and *quality*) information on the following:

- *Characteristics* of the resource; and
- Other *activities or uses* which may either *impact on*, or *be impacted by*, management of that specific resource.

Thus, it is vital to understand that an inventory of coastal resources, *on its own*, has little practical utility, unless it is combined with an inventory of activities or uses.

Characteristics

Simply knowing that a resource or activity exists is not particularly useful for management decision-making in the coastal zone. It is the *characteristics* of the resource (or activity) which are most important. These include:

- *location (where is the resource/use?)*: This defines the *spatial distribution* of the resource or activity. Does it occur at a *single site* or at *multiple sites*?

- *quantity/volume of resource*: is it commercially exploitable? How much can we afford to sacrifice or trade-off? How much should be preserved?

- E.g., Offshore Sand Reserves: If the *available volumes* are known, along with *sources* and *rates of production* of this sediment, *longshore transport rates* and *beach dynamics* (behaviour in response to changes in wave energy and nearshore current patterns), we can make prudent decisions about how much of this resource is extractable as construction aggregate; or whether any of it should be mined at all; or can some portion be dredged for beach nourishment purposes, without disrupting the littoral system?

- Quality: is the resource of uniform quality at all sites? What is the ecological (health) status of the resource?

- E.g. Coral Reefs: It is vital to know which reefs are healthy and productive, supporting viable fish and other communities; or which ones are stressed, for instance from high levels of pollutants such as nutrients (nitrate and phosphate); or which reefs exhibit the greatest amount of anchor damage, etc. This kind of information would be highly valuable for designing reef management strategies.

- Beach quality: suitability for swimming, recreation, tourism etc.

- *Type/category/class*: where possible and appropriate, resources should also be inventoried according to type/category, since different classes of a resource may have significant implications for contemplated use options.

- E.g. Fine sand, i.e. Mean grain size <0.25mm diameter, is generally unsuitable for beach nourishment. Sediment in this size category tends to be easily transported in suspension, from the foreshore, and well beyond the nearshore zone.

- *Seasonality*: is the resource (and by extension, the activity associated with its exploitation) *perennially available*, or is it only *available and/or accessible at specific times of the year*?

- E.g. Many fisheries are seasonal in nature, the timing of which may be affected by such factors such as mating, spawning, migratory patterns, etc. Successful

exploitation of such resources is therefore inevitably circumscribed by seasonality characteristics.

- Data on seasonality is equally important for reasons other than resource exploitation, e.g. *Stock/biodiversity preservation.* For instance, regulatory instruments such as "closed seasons" based on this information, may be implemented to ensure that species are not harvested to extinction (e.g white sea urchin in Barbados - *Tripneustes sp.*)

While it is true that inclusion of the above characteristics in the inventory may require a higher level of skills and resources, this is precisely the kind of information which coastal resource managers find most useful for decision-making. These attributes impact on:

- ACCESSIBILITY TO RESOURCE: e.g. *location* relative to potential users - how far does one have to travel to get to the nearest beach?; *seasonality* affects *timing of availability* and *abundance* of resource.

- 'EXPLOITABIITY' OF RESOURCE: This is partly determined by *quantity/volume* of asset. Quantity/volume also affects *allocation* (how many people can share in/benefit directly from the resource). Exploitability of resource may also partly be controlled by *quality* of the asset. Indeed, a resource which is available in great abundance, but is of poor quality, may not be widely exploitable.

- 'COST' OF EXPLOITING RESOURCE: This may be affected by spatial and temporal distribution of asset (*location*; *seasonality/abundance*; *quality*). It is important to understand that every item in the inventory does not necessarily constitute an economically 'useable' resource. However, this does not mean that they should be excluded from the inventory.

COMMON TOOLS OF THE TRADE

While there is no single 'correct' way to conduct a coastal resource and use inventory, the methodology should always be guided by the intended *purpose(s)* for which the instrument will be used.

The complexity and level of detail to be included will, in turn, be determined by the purpose.

Notwithstanding the above, there are certain common tools which are applicable to practically all inventories. These include:

- ARCHIVAL SOURCES, e.g. maps, charts, and other historical information. These can be used to provide a preliminary introduction to the general resources of the area to be studied. While such sources will not necessarily yield information at reliable spatial scales, they can be used to help plan the field program.

- CAVEAT: Great care should be exercised in using these sources. The authenticity of the information must be thoroughly checked and verified before ‘acceptance’.

- FIELD SURVEYS AND SAMPLING: These should be properly planned and designed before execution in the field. Prior planning will ensure that:

- The methodology is appropriate for the resource(s) being targeted.

- There are adequate resources (*number of persons, skills and equipment*), available at the times required, for conducting the survey. Experience has shown that there is sometimes a great temptation to “cut corners”, owing to funding constraints. This should be avoided even if it means reducing the number of items to be included in the inventory. An inadequate survey could yield misleading information, on which management decisions may be made.

- The survey team is properly briefed, so that all members are clear about what is required, so that work may be effectively coordinated.

- Reliable results will be achieved from the surveys/samples taken. For instance, if water samples are to be analyzed for bacteriological quality, they must be stored at the appropriate temperature and delivered to the laboratory promptly, so that the integrity of the samples is not compromised.

- REMOTE SENSING: This is widely acknowledged as an efficient and potentially cost-effective method for conducting coastal resource and use inventories. For while the cost of accessing some remote sensing technologies may be high (e.g. satellite imagery; radar), efficiencies are maximized as a wide range of resources and activities can be captured simultaneously. For example, a single set of high resolution images can provide valuable information on coastal vegetation, beaches, reefs, seagrasses, mangroves, tourism, settlement, recreation and other activities. However, there are a number of key considerations to bear in mind, where there is a heavy reliance on this technology:

- Highly specialized analysts are required to produce reliable, quantified data from these images.

- It is not so much the sophistication of the technology, but rather the quality (and accuracy) of the interpretation of the images that matters.

- Remotely sensed data must not be taken as gospel, unless extensive and careful ground-truthing has been undertaken by scientists and other specialists familiar with the area. The reality is that even the most highly skilled analyst is capable of ‘misidentifying’ features on images and aerial photographs.

- The only reality is what actually exists on the ground.

WHAT SHOULD ONE INCLUDE IN THE INVENTORY?

While there are many prescriptions for conducting coastal resource and use inventories, there is no need to be unduly constrained about what should be included or excluded.

There ought to be a clear purpose in mind for the output from the exercise - sustainable management of coastal and marine assets through:

- Efficient resource allocation and use; and
- Resolution of conflict among uses and users.

Against this background, it is therefore necessary to include:

- Present/existing resources and activities; and
- Potential/future resources/uses, to the extent that it is possible to identify these. This will help to guard against the premature foreclosure of future use options.

Adequate data, which can be converted to information, to achieve above goal.

Finally, it should be borne in mind that an inventory is not intended to be a static instrument. The information it contains essentially represents the “state of play” at a given period in time.

Since the main purpose of the inventory is to improve the quality of the coastal management process, it should be periodically modified and updated, as appropriate, if it is to retain its functionality.