

the legitimacy of customary law. Although such a recognition is hard to put into practice, workshop participants felt that customary regulations are not often *adequately* acknowledged and supported in national legislation.

These and other concerns of the participants were reflected in 14 recommendations, about the recording of relevant traditional knowledge, research on customary practices, national profiling of traditional knowledge and customary practices,

reviewing regional constitutional and legislative provisions and international law relevant to customary marine tenure and management systems, case studies and potential for transfer of known effective customary marine resource management systems, compilation of literature and other databases, mechanisms for the collection and dissemination of information, educational and training requirements, and specialised workshops and other events. Further information can be obtained from the Forum Fisheries Agency.

Database and annotated bibliography project

by K. Ruddle

A database and annotated bibliography project on traditional marine resource management and knowledge is being conducted by Kenneth Ruddle, supported by the Centre for Development Studies, University of Bergen, Norway, through a small grant from the Royal Norwegian Ministry of Foreign Affairs. The objectives are:

—to provide users with a PC-based standardised database of existing published and unpublished literature (including reports, students' papers and theses, newspaper clippings, etc.) on traditional marine resource management and knowledge; and

—to publish an annotated bibliography on the same topics.

Some 1,000 items for inclusion have been collected so far from around the world, but with a special emphasis on the Pacific Basin. Members and readers are urged to assist in making the coverage as comprehensive as possible by searching their files and any libraries or archives to which they have access and send copies of relevant material to the editor of this *Bulletin*, for processing and entry into the database and bibliography. (We will arrange to have these deposited eventually in the SPC library.)

Traditional marine environmental knowledge is invaluable for fisheries management, protected areas planning and environmental impact assessment

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Knowledge of the local marine environment and the movements and behaviour of marine animals is remarkably rich in some Pacific Island fishing cultures. It offers resources managers a short cut to some vital basic natural history data needed for managing nearshore marine resources.

The timing and location of reef fishes' movements provides a good example. Year after year many reef fish migrate to specific locations on the reef, to aggregate there for several days, usually in a particular moon phase, in order to spawn. Local fishermen often know the precise timing and pathways of these migrations and the locations of the aggregations into which they feed. For example, a few years ago, the fishermen of Palau provided me with information on the lunar periodic spawning

aggregations of more than twice as many species of reef fish as such information could be found for in the scientific literature for the entire world (Johannes, 1981). I have since obtained similar information in Yap, Pohnpei, the Marshall Islands, Kiribati, Papua New Guinea, Western Samoa and the Solomon Islands*.

Such information is very valuable for stock assessment. Populations of most species of coral reef fishes are normally scattered over large areas. Under these conditions it is almost impossible to get a useful notion of stock sizes. But the difficulties are greatly reduced if the biologist knows where and when a species aggregates to spawn, and can carry out visual surveys there.

* For reasons I do not understand, I have been consistently unsuccessful, however, in obtaining such information for isolated, lagoonless islands.

Spawning aggregations also provide a useful focus for management, that is, for the regulation of fishing pressure, because exceptional catches are often made from them. For a detailed discussion of the potential applications of aggregation-based management of reef fishes see Johannes (1980).

Some spawning aggregations have been wiped out by overfishing or by coastal development projects that blocked their migration routes before marine resource managers became fully aware of their existence and the need to protect them. These include not only a number of grouper spawning aggregation in the Caribbean (e.g. Olsen and LaPlace, 1978) but also a grouper spawning aggregation in Palau (Johannes, 1981) and a number of bonefish and goatfish spawning runs in Kiribati (Johannes, unpub.). Many more such runs have undoubtedly been destroyed without any record. Island fisheries divisions need to catalogue as many as possible of those that remain as a first step in ensuring their protection. The task can be greatly simplified by tapping the knowledge of local fishermen.

Traditional marine environmental knowledge can also play an important role in the siting and the management of coastal protected areas (Johannes and Ruddle, in press). It is often superior in important respects to information gained by means of conventional resource surveys performed by imported consultants constrained by insufficient time and money.

Local fishermen's knowledge of the timing and location of significant biological events is not restricted to spawning aggregations. Certain otherwise unremarkable beaches may serve as nookeries for nesting sea turtles, or come alive with spawning land crabs during certain lunar periods and seasons (Johannes, 1981). What may look like an insignificant and relatively barren islet to a reserve planner during a site inventory made in one season may be thronged with breeding seabirds, sea turtles or, in rarer cases, sea snakes, in others. In the absence of such local knowledge, protected area planners are thus liable to overlook areas with high conservation value.

Traditional environmental knowledge can also be invaluable in environmental impact assessment in coastal areas (Johannes, in press). Local people can help greatly in identifying local vulnerable species and habitats, and locating them in both space and (in the case of migrating animals) time. For this reason Maragos and Elliot (1985) relied heavily on the environmental knowledge of local fishing communities in producing marine resource atlases

for a number of Pacific Islands.

Such knowledge is disappearing as the older people who possess it die without finding anyone who is interested in receiving it. Recording it is thus an urgent matter. Allowing it to disappear is like watching a library full of unique and priceless documents burn without raising a hand to quench the flames.

In later issues of this bulletin I will deal with some of the methods that have proven useful in obtaining and using such knowledge, and with why efforts to do so have sometimes failed.

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