

## Back to first 'design principles': the issue of clearly defined boundaries<sup>1</sup>

by **Kenneth Ruddle**

### Introduction

Codification of traditional systems of fisheries common property resource management is now a widely discussed issue, particularly in Pacific Island nations. Inevitably, it implies boundary fixing. But given the complexity of social factors involved, particularly in an era of vast and accelerating social and economic change, it is probably not desirable to attempt to fix rigidly the social and physical boundaries of traditional rights areas, at least in terms of Western-style legal systems. As is well appreciated in parts of the Asia-Pacific region, customary law may well provide a more flexible resolution, that allows for the expansion and contraction of physical, social and resource boundaries (Ruddle, 1994).

In attempting to manage the four main existing or potential problems of fisheries—*resource flows*, *stock externalities*, *technological (gear) externalities*, and *allocation problems*—'conventional' fisheries management assumes an open access resource regime and focuses on fish stocks and stock externalities. In contrast, traditional community-based fishery management systems focused on resolving *gear externalities* and *allocation problems*. Different, also, is the fact that their implementation is based on *defined geographical areas* with *controlled access*, self-monitored by the local fishers, and enforced by local moral and political authority.

Design principles implicit in traditional systems address the issues of gear externalities and assignment by (1) controlling a fishing area as a strictly bounded *property*; and (2) establishing precise social boundaries, by rights, to define who has access *rights* to that area. Boundaries are set by *rules of operational behaviour* that then specify assignments of time and place within the group having access. Area control is sustained by rights of exclusion, or limited access, that maintain the private area of a local community of fishers against outsiders, and intra-group operational rules are sustained by local authority that has the power to invoke sanctions on offenders.

Now 20 years old, the seminal paper by Ciriacy-Wantrup and Bishop (1975) contributed enormously

to stimulating research on common property resources. But it also conveyed the unfortunate impression that common property resources, as compared with those under open access, were characterised solely by the presence of social boundaries that define persons or groups having access rights. Although boundary closure is a necessary attribute, alone it is insufficient to distinguish or even manage common property resources (Ostrom, 1990).

Although Ostrom (1990) tentatively added seven other basic 'design principles' to the list that characterises long-enduring, self-governing appropriators' institutions, she retains 'clearly defined boundaries' as the first design principle (Ostrom, 1990; 1992).

The definition of social, physical and biological boundaries around common property resources is undoubtedly a fundamental attribute and a first step in organising for collective action. But clear definition of physical, and particularly social group, boundaries seems to be especially difficult in fisheries, and is particularly problematical in tropical multi-species and multi-gear coral reef fisheries. In the Asia-Pacific region such fisheries are often characterised by complex rights and rules systems that have several or more inter-related boundary expressions, complexities that are exacerbated by rapid and multi-faceted social and economic change.

In such fisheries the prime importance of clear boundary definition must be questioned. In many instances it is probably neither possible nor desirable.

### Spatial boundaries

#### *The definition of fishing territories*

In the Asia-Pacific region the sea territory of a social group is usually within the reef and commonly, but not always (*see below*), defined by proximity or adjacency to its settlement(s), and by lateral and seaward boundaries. Communities or smaller social units maintain exclusive rights to all known adjacent submerged reefs. Seaward of the reefs the degree of exclusiveness of rights gradually declines.

<sup>1</sup> This is an adaptation of a paper presented in the 'Panel on Design Principles in the Governance of Common Property Resources', at the Fifth Annual Conference of the International Association for the Study of Common Property, 24-28 May, 1995, Bodø, Norway. I am grateful to Professor Elinor Ostrom for presenting the paper on my behalf

But this varies considerably according to both the local history of fissioning of human settlements and related migration, and the more recent processes of national modernisation, particularly the geographical dispersion of kin groups.

In Solomon Islands, as in other parts of Melanesia, for example, the inshore marine waters controlled by a social group are not necessarily those adjacent to its landholdings. The situation is far more complex than that.

In the Lau and Langalanga lagoons of Malaita Province, for example, whereas the coastal or 'saltwater' people hold rights to reefs and marine waters, the interior-dwelling 'bush' people also hold extensive sea rights, as well as large tracts of land in the interior of the island (Akimichi, 1978, and pers. comm.).

In some places reefs belong to inhabitants of the interior, and not to those owning the adjacent coastal land, as in parts of Rennell Island (Collenson n.d.) and Marovo Lagoon (Hviding, 1990).

At Marovo some groups have large sea territories but only small land holdings, whereas others control large land areas in the interior of the island, but have no sea territory. As everywhere, this is a consequence of historical processes of migration and settlement. In that area, to escape the endemic warfare of pre-Christian times, the ancestors of the present-day 'bush' groups hid in the interior, to escape the powerful coastal peoples.



Thus the coastal groups could establish the primary rights over sea and reefs still held by their descendants, most of whom still live in the traditional villages of 'coastal' or 'saltwater' people.

Further, inter-marriage between 'bush' and 'saltwater' people has led to some influential marine

rights-holders living among the interior 'bush' groups. However, they still retain primary rights in marine areas (Hviding, 1990).

Thus it is erroneous to assume that a 'community' on which traditional management is based always refers to a physically identifiable community, such as a village or the like, that can be delimited by precise social and geographical boundaries.

A 'community' in which traditional management rights are vested is a descent-based kinship group. As a consequence of personal factors such as inter-marriage, or of the alternative economic opportunities brought about by national development, among many other factors, almost inevitably these days the social boundaries of any such group will be geographically widespread.

But this is far from being the entire sea territory story. In addition to such 'secular space', the physical and social boundaries of sea territories are often complicated by claims to 'sacred space'. Examples occur in Melanesia and Northern Australia.

### *Sacred sea space*

Such sea areas are closely related to the ancestors of the present inhabitants of an area. 'Ancestors' is defined broadly to include mythological 'ancestral beings', as among the Yolngu Aboriginal People of North Australia.

They generally regard boundaries indicating ownership as manifesting acts performed by ancestral beings while travelling over an area. For example, during a submarine journey, an ancestral being may have surfaced and re-submerged several times.

Such points are marked by physical features such as sandbars, which have a sacred significance to the Yolngu. In this way seemingly isolated sites claimed by a clan are united by reference to acts performed by an ancestral being. Such boundaries are today regarded by the Yolngu as clear ownership boundaries of their resource territories (Davis, 1984).

Schug (1995a; 1995b) has recently demonstrated that the relationship to the marine environment of Papuan New Guinean communities along the northern coast of Torres Strait extends spatially far beyond exclusive fishing rights areas.

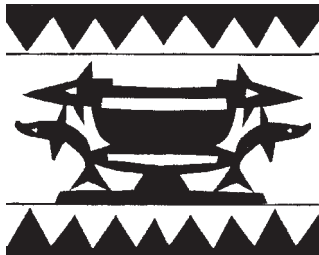
The much broader spatial attachment of the individual communities to the Torres Strait is based on:

- (a) the sacred quality and the 'spiritual essence' of ancestral figures embedded in the larger area, which has indefinite boundaries;

- (b) a geographically and socially very widespread mesh of interpersonal relationships through centuries of trade, inter-marriage, shared land and sea territories, and other social interactions, which yields an identity claim over the entire Torres Strait region;
- (c) an history of long-distance trading and resource use that extended all over the Strait; and
- (d) the claim of the inhabitants to be spiritually related to dugong and turtles, that range throughout the entire Torres Strait.

### ***Integrated resources territories***

Widespread in the South Pacific is the close conceptual and ecological integration of inshore fishery resource areas with adjacent land resource units as a 'corporate estate' held jointly by a kinship-based group. Typically, these estates embrace a connected range of terrestrial and marine resource zones. Land and sea and their associated occupations are



seen as economically and nutritionally complementary domains, and not dichotomized along Western lines into 'ownable land' and 'unownable sea' (Ruddle & Akimichi, 1984; Ruddle, 1988).

Examples include the Hawaiian **ahupua'a** (Meller & Horowitz, 1987), the Yap (Federated States of Micronesia) **tabinau** (Lingenfelter, 1975; Schneider, 1974), the Fijian **vanua** (Ravuvu, 1983), the Marovo (Solomon Islands) **puava** (Hviding, 1990), and the estate of the Yolngu aboriginals of North Australia (Davis, 1984), among others.

To rigidly define a boundary limited only to just the exclusive fishing areas of individual communities is clearly not an accurate representation of local reality, where such conceptual and managerial integration occurs. Were such a boundary used as a basis for fisheries management, it would probably be seriously dysfunctional.

### **Social boundaries**

Far more complex than defining spatial boundaries is the issue of social boundary definition (i.e., the spatial expressions of various rights and rules). Social boundaries can be based on either the individuals or social groups included.

Whereas social boundaries could be delimited and mapped, this would essentially be of academic interest only, since practical application would be so horrendously complex as to be useless.

Further, since social boundary relationships change as a response to external pressures on communities (Ruddle, 1993), their spatial expression would be in a constant state of flux, and so would require frequent redefinition. Therefore, under most circumstances, clearly defined social boundaries could never be attained.

Social boundaries are established and maintained by a combination of rights and rules. In many instances they are complexly interwoven.

### ***Rights***

Under traditional community-based systems, marine resource exploitation is governed by use rights to a property. A property right is a claim, consciously protected by customary law and practice, to a resource and/or the services or benefits that derive from it. Such a grant of authority defines the uses legitimately viewed as exclusive, as well as the penalties for violating those rights (Ruddle, 1994).

The characteristics of property rights may vary situationally. Common characteristics are exclusivity (the right to determine who can use a fishing ground), transferability (the right to sell, lease, or bequeath the rights), and enforcement (the right to apprehend and penalise violaters of the rights).

The right of enforcement, and in particular that to exclude the free-riding outsider, is a key characteristic, for without it all other rights are diminished either actually or potentially (Ruddle, 1994).

Throughout the almost all Asia-Pacific region, the members of fishing communities derive primary resource rights as members of a defined social group. Most commonly, traditional fisheries rights apply to defined areas, but superimposed on these may be the nested or countervailing rights of individuals or groups to species or technologies.

The social boundaries expressed by the two main types of right, primary and secondary, are impor

tant and complex, because overlapping and detailed regulations on the use of technologies and species are widespread.

#### (1) *Primary rights*

Most commonly primary rights are those to which a group or an individual is entitled via inheritance (i.e., a birthright), by direct descent from the core of a socially-bounded, descent-based corporate group.

Primary rights are generally comprehensive, since they alone confer access to all resources within a defined territory.

Inheritance, ancestral interests, social obligations, and cooperative relationships within a defined social group provide continuity of ownership and rights.

#### (2) *Secondary rights*

In contrast, secondary rights are more finely bounded, often being restricted to specific fishing methods. They are acquired through affiliation with a corporate group, by marriage, traditional purchase, exchange, as a gift, or as reciprocity for services. Sometimes they may be inherited.

Secondary rights are often given to residents of inland villages lacking direct access to the coast, particularly when such villages have historical and kinship ties with a coastal village (Ruddle, 1994).

In some societies rights to fisheries, which are usually to areas, are overlaid by other rights, generally those to species and gear types. Most such 'nested rights' are quite simple, like those to stone fish-trap sites.

But in some cases nested rights are complex. Such complexity is particularly well-exemplified by Ponam Island, Manus Province, Papua New Guinea, where owners of sea and reef areas do not have exclusive ownership of their tenured waters, owing to strict limits set by countervailing, nested rights.

That rights system is composed of three main independent, overlapping and bounded elements (Carrier, 1981; Carrier and Carrier, 1983; 1989):

- (a) ownership of reef and inshore marine waters;
- (b) ownership of species; and
- (c) ownership of fishing techniques.

### **Rules**

Rules give substance and structure to property rights by defining how a right is to be exercised, through specification of acts required, permitted and forbidden in exercising the authority provided by the right.

Thus whereas a right authorises fishers to work a specific fishing ground, their options in exercising it are governed by rules which may, for example, specify gear type used or seasonal restrictions, among other limitations. The more complete a set of rights, the less exposed are fishers to the actions of others (Ruddle, 1994).



Basic rules related to social boundary issues are those that define:

- (a) persons eligible to fish within a community's sea space;
- (b) access of outsiders; and
- (c) the distribution of the catch within the community.

#### **Eligibility rules: bounding the in-group**

In addition to holding rights, fisher groups in many societies are further bounded by community-based, national or cultural rules. Whereas in many societies inheritance from a defined corporate descent group and/or residence are the only eligibility rules, in others further pre-conditions must be met.

The sub-groups are defined by such criteria as caste membership, gender, marital status, and skill level, among many others.

***Inter-community access rules: boundary permeability***

Access controls are applied to outsiders: people from other social groups. There is often boundary permeability between neighbouring groups, a consequence of long friendship, kinship or other close association.

The more distant the 'outsider' group (socially or geographically), the less permeable are the boundaries. But increased commercial resource use often leads to the imposition of strong access controls, even on close neighbours.

Throughout the Asia-Pacific region, the rights of outsider fishers are usually closely specified by rules defining access conditions. However, there is considerable variation in local detail.

***The social boundaries of individual outsiders***

At Marovo Lagoon, Solomon Islands, for example, fishing rights are inherited as an integral part of all other rights and obligations entailed in kinship in a particular descent group.

Descent and inheritance are cognatic. An individual inherits group membership and associated primary rights from both parents. Thus a person's rights boundaries could embrace four group areas, if all grandparents were from different groups.

But other factors intervene. An individual's rights are normally strongest and most complete in a core area near his principal residence, but weaken progressively toward the boundaries of his rights area. They also tend to weaken through time, if not actively used.

When perceiving the exclusiveness of marine boundaries and handling questions of access in daily fishing, fishers tend to interpret kinship connections so as to operate as widely as possible. Often, their interpretation accords with that of the area's managers.

Disagreement occurs where managers feel that someone has interpreted kinship ties too liberally, and should really be defined as an 'outsider', and so confined within a closer boundary (Hviding, 1990).

In Kiribati an individual could enlarge his fishing rights boundary by acquiring secondary rights in

the area of another clan through marriage or as a gift. Persons away from their home island could expand their fishing rights boundary by a recitation and verification of their genealogy.

Acceptance of such an account by the clan elders enabled the claimant to take his rightful place in the meeting-house, and so to identify his relationship with others using the same place.

The logic is that those who shared the same place probably belonged to the same clan, and so would have shared land and sea rights (Teiwaki, 1988).

***The permeable social boundaries of groups***

In general, inter-community access is more likely to be granted to neighbouring groups than to those more distant, since neighbours are regarded as closer in kinship terms. Further, the rights of outsiders often relate not only to the general significance of a marine area to a host community, but also to the value of the resources therein.

In Lau Lagoon, Solomon Islands, for example, outsiders had the weakest claims to areas for net or trap fishing. The strength of their claims progressively increased from areas for collection of commercial shells, those for collection of shells for making shell money, areas for line-fishing or spear-fishing, becoming greatest in food shell-gathering areas (Allen, 1957).



***Distribution-of-catch rules: expanding the in-group boundary***

Rules that define which persons have access rights to harvested fish ascribe a social boundary of a fishery that is always wider than that of just the fishing group.

These are an extremely important set of rules in many societies, since in terms of equity within a

community re-allocation of harvested fish can be as or more important than access to fishing grounds (Collier et al., 1979; Kendrick, 1993).

Distribution of the harvest is fundamental in ensuring intra-group harmony and the stability of the traditional management system, especially if distribution is from higher-status persons, with species or other special access rights, to the community at large.

Such rules include those to provision the family and community, those required as subsequent and continual repayment for the acquisition of fishing rights, and those enmeshed in general community sharing and reciprocity and related norms concerning equity and fairness (Ruddle, 1994).

Re-allocation rules assume particular importance under conditions of *de jure* open access, as in Java, Indonesia, where access to fishing is dominated by outside economic elites, but where Javanese behavioural norms that insist on equity, fairness, and 'luck-sharing' ensure that people who need fish have access to some after it has been landed (Collier et al., 1979; Kendrick, 1993).

The importance of post-harvest re-allocation rules has been recently demonstrated for Pringi Village, East Java. Kendrick (1993:50) observes that:

. . . the strongest local institutions relating to the fishery have to do not with limiting access to the fishery resources, but with re-allocation of that catch once it reaches shore. Perhaps because of an inability to restrict access to the bay's resources, the locus of control may have shifted to land, where strong local institutions do exist for redistributing the catch of fish post-harvest.

Most local people cannot compete for access with capital-intensive gear such as beach and purse seines, and have no access to these gears. A concern with equity and fairness underlies these redistributive institutions. Access is open, but local institutions . . . demand that a large catch must be shared widely among the community.

Kendrick (1993) identifies three distinctive institutions for the re-allocation of harvested fish:

- (a) the share system;
- (b) use of temporary extra crew members; and
- (c) acceptable ways of 'taking' fish before it reaches the auction site.

Only purse seines and beach seines (large gears owned and operated by the economic elite) are subject to significant re-allocation rules. It is significant that the owners of these gears are largely non-Javanese, whereas the labourers and crew are Javanese. This is a further expression of the concept that local populations have the primary access rights to a local resource.

Further, these gears make relatively large catches of small, schooling pelagics, which are more easily re-allocated than other species, and both gears employ a large number of labourers. An estimated 10-30 per cent of the catch is re-allocated in this way from purse seine catches.



Catch distribution systems can be complex in terms of the categories of persons involved, as well as geographically extensive, as on Ulithi Atoll, Federated States of Micronesia. There, such valuable species as turtles are presented as tribute to the paramount chief, who slaughters and distributes them in a closely specified way.

Some parts are given to the women in the menstrual house on Mogmog Island. They distribute what they do not need to women on other islands and to the heads of the two highest-ranked lineages on Mogmog Island. They in turn distribute some to the heads of the lesser lineages (Ushijima, 1982).

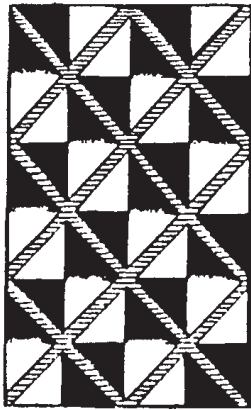
Women on Ulithi also have distribution rights because canoes, although owned by a lineage as a whole, are overseen by the women. This is because canoe hulls are made from mahogany logs obtained from Yap Island, in exchange for cloth made by the women of Ulithi.

Further, because post-marital residence is patrilocal, women are scattered throughout the various matrilineages of an island. As a consequence, the food-distribution system reaches all parts of all islands in Ulithi Atoll (Ushijima, 1982).

Fish distribution in the form of reciprocal exchange of goods also occurs among the islands of Ulithi Atoll. For example, ecologically-favoured Falalap Island provisions the rest of Ulithi with taro, breadfruit, sweet potato and banana.

However, Falalap lacks fishing grounds, and so must receive its fish from the other islands. In contrast, fishing rights areas are extensive on islands in Mangejang District, where, however, vegetable cultivation is precluded by the absence of a freshwater lens.

Thus there is an exchange of vegetables for fish between Falalap and Mangejang (Ushijima, 1982), thereby enlarging the social boundary of the fishery.



### Concluding remarks

It has to be appreciated that for any resource management system the most important boundaries are a reflection of social relationships, which are recognised in physical space.

Thus the important issue becomes the definition of all the social boundaries of all the stakeholding groups involved in a fishing system, rather than just definition of the physical and biological boundaries of the system.

Further, because marine inshore ecosystems are closely linked with those in the coastal terrestrial environment, physical and biological boundaries are not immutable; they are always evolving, and so not amenable to precise and permanent definition. Appreciation of this dynamic land-sea ecological linkage is clearly reflected in the island 'estate' management concept.

Similarly, the economic boundaries of systems are not immutable, especially in modern times. Local fishing systems are now increasingly linked with the global economy, with markets in industrial-service economies now driving fishing effort and species targeting in distant local systems.

Examples are legion: the demand by Hong Kong consumers, in particular, now drives the local and deleterious live fish trade in many coralline fisheries throughout the Asia-Pacific Region (Johannes & Rippen, 1995).

It is probably not necessary to have strictly delimited physical and social boundaries when pressure on resources is light, as where human populations are small. But when pressure increases, boundaries may be more firmly established. 'Anticipatory claims', as in parts of Solomon Islands (Ruttley, 1987), may reflect a perception of this, in addition to an increasingly perceived market value for the resources. Further investigation might also show that 'anticipatory claims' can be historically validated by 'ancestor rights'.

I have tried to demonstrate that definition of precise boundaries can be exceedingly complex in a non-Western case, as in the Asia-Pacific region. In focusing on the sea space actually defined and governed locally for present pragmatic purposes, we run the risk of ignoring the larger cultural picture that includes the ancestral realm, as in the discussion of the Torres Strait. In that context, 'anticipatory claims', as in Solomon Islands, are completely valid.

By the very nature of tropical coastal marine ecology, complex social relationships, the multiplicity of stakeholders, and the pressure of external forces, boundaries will have to be flexible and so change through time to remain situationally relevant. They will have to be operational boundaries to permit the management of the existing fishing system, and must be adaptable as the fishing system changes.

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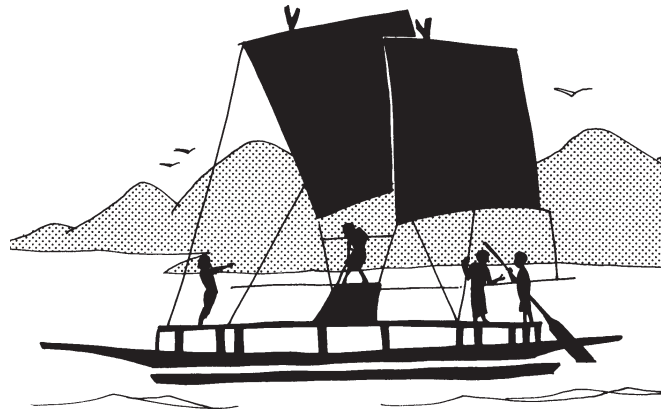
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## SPC runs fisheries management workshop

by Tim Adams

A Workshop on the Management of Pacific Island Inshore Fisheries was held between 26 June and 7 July at SPC headquarters. The workshop was mainly for the benefit of Government fisheries and marine resources managers in SPC member countries, but was also an opportunity for specialists from many parts of the world to discuss the current status of this discipline. The management of coral reef fisheries, particularly invertebrate fisheries, is a subject that is particularly prone to differing interpretations at the present time.

This was an attempt to provide Pacific Island fisheries managers with a clearer vision of the current options, advantages and pitfalls of the various management tools available to them.

For example, marine protected areas are widely promoted by some people for the maintenance of sustainable fisheries in adjacent areas, whilst others claim that individual transferable quotas are the universal panacea.