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Comparative assessment of stakeholder management in traditional Fijian fishing-grounds

ANDREW J. COOKE[1], NICHOLAS V.C. POLUNIN[2]* AND KOLINIO MOCE[3]
[1]*FAO, BP3971, Antananarivo, Madagascar,* [2]*Department of Marine Sciences & Coastal Management, University of Newcastle, Newcastle upon Tyne NE1 7RU, UK and* [3]*Naduri Village, Vanua Levu, Fiji*
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Summary

The customary tenure of reef areas in many parts of the South Pacific offers an obvious context within which fishery resources might be managed cooperatively between customary-rights owners and fisheries personnel in government, yet the local foundations for such co-management have received little critical attention. Seven customary fishing rights areas (CFRAs) in Fiji were the focus of the present study, the objective being to compare management of CFRAs subject to differing levels of fishing access and ascertain those factors most influential to local management practices. The intensity of access ('access pressure') was measured as the number of licences issued per CFRA and per unit area, while management was assessed as an index, based on evidence of five aspects of management (management structure, marshalling of information for management, approach to goodwill payments, management measures and patrolling and enforcement) derived from questionnaires. Management varied amongst the CFRAs, one of the seven being essentially unmanaged because of a breakdown in succession between chiefs. There was little evidence for management responding uniformly to access pressure; rather, two CFRAs evinced a certain management aptitude regardless of this pressure, and two other CFRAs evinced relatively little management although pressure was high. A simple survey technique can indicate useful contrasts amongst CFRAs in functional local management, and thus be useful for guiding decisions about where to make investments in local management or co-management.

Keywords: customary tenure, fisheries, management, fishing rights

Introduction

In many parts of the South Pacific, coastal fishing is subject to the customary tenure of kinship groups. Such tenure typically extends to the seaward limit of coral reefs and has been referred to as customary marine tenure (CMT) (e.g. Johannes *et al*. 1993). Pinkerton (1989) and others (e.g. Munro & Fakahau 1993) have argued that CMT systems should be viewed positively by governments since they provide a vehicle by which state and customary stakeholders may work in partnership to share the burden of management, in what is termed co-operative management or co-management (e.g. Jentoft 1989), but many types of dialogue may occur between local and central-governmental managers (Sen & Nielsen 1996).

Fiji is remarkable in possessing a well-established system of traditional fishing grounds known as *qoliqoli* which enjoy some legal recognition, are officially referred to as customary fishing rights areas (CFRAs) and appear to be the only case worldwide where such tenure has been accurately mapped (N.K. Dulvy, personal communication 1999). Some Fijian CFRA owners have been taking it upon themselves to manage their fishing grounds (Adams 1993), and it has been proposed (IUCN 1993) that targeted investments should be made to develop one or more Fijian CFRAs as models for joint management by state and customary owners, with the intention that successful experimentation in one CFRA could facilitate the expeditious development of effective management in other CFRAs. To date, such investment does not appear to have been made, in spite of the apparently favourable circumstances in Fiji and the wide interest in alternatives to science-based fisheries management (e.g. Roberts 1997).

Four fundamental attributes of Fijian CFRAs need to be understood before embarking on any assessment thereof. Firstly, tribal lands and coastal waters in Fiji are traditionally regarded as a single, indivisible unit, which, together with its indigenous people, is referred to as a *vanua*, which may comprise one or more *yavusa*; each yavusa corresponds to a clan and its lands and waters. Each yavusa is subdivided into one or more *mataqali* (sub-clans). The Chief of a vanua (the 'Chief Paramount') is traditionally regarded as the owner or supreme guardian of the land, waters, resources and people of the vanua. Every indigenous Fijian is registered at birth as belonging to a particular mataqali (and therefore vanua and yavusa). The boundaries of the vanua and yavusa correspond to modern administrative boundaries (Ravuvu 1983).

Secondly, CFRAs correspond with the recognized boundaries of vanua or yavusa according to whether, historically, the fishing grounds have been subdivided between several yavusa or maintained as a single CFRA shared between several yavusa of the same vanua. While lands are further subdivided to the mataqali level, fishing grounds have mostly

* Correspondence: Dr Nicholas Polunin Tel: +44 191 222 6675 Fax: +44 191 222 7891 e-mail: n.polunin@ncl.ac.uk

been maintained as larger units. CFRA boundaries are legally registrable and generally extend to the seaward limit of the coral reef (Waqairatu 1994). CFRAs collectively are referred to as demarcated waters (Fisheries Act Regulations, Cap 158).

Thirdly, every indigenous Fijian is traditionally regarded as having the right to fish the qoliqoli (and therefore CFRA) of his own yavusa (Ravuvu 1983; Waqairatu 1994). While the customary right does not in theory extend to Indo-Fijians, who make up a little over 50% of the population, in practice Indo-Fijians are allowed to fish for subsistence in the qoliqoli applicable to the district in which they are registered on the electoral roll (Ratu Soso Katonivere, Tui Tavua and others, personal communications 1994).

Fourthly, the Fisheries Act 1942 (Cap 158) requires anyone fishing commercially inside one or more CFRAs to obtain a licence from the government. Such a licence will not be issued without a written permit from the Commissioner for the Division (the largest unit of administration in Fiji) in which the relevant CFRAs are located. According to the legislation, the Commissioner may impose conditions on the permit, including restrictions on fishing area, method, season and species. Before issuing such permission, the Divisional Commissioner must 'consult' the owners of the CFRAs concerned and, by well-established practice, will only issue a permit in accordance with written permission of the CFRA owner. One important consequence of this elaborate procedure is that the CFRA owner is able to impose legally binding management restrictions upon the permission to fish commercially.

Fong (1994) provided the first detailed study of a customary management system in respect of any CFRA in Fiji, noting in that particular case (Macuata on the large island of Vanua Levu) the existence of a degree of collaboration between the customary owner and the Fisheries Division. The purpose of the present study was to compare stakeholder management amongst a number of CFRAs around the principal island of Viti Levu, and to explore the factors that might be expected to influence any variations in management practice, including the intensity of access to resources ('access pressure') and degree of collaboration with government authorities.

Methods

Study areas

Studies were carried out during May–July 1994 on a cluster of CFRAs in north-western Viti Levu (hereafter 'Region 1') (Fig. 1). Following a review of methodology and results from the first region, investigations were extended to a cluster of CFRAs in eastern Viti Levu ('Region 2'). Both study regions have a relatively high population density and had previously been described as being subject to 'moderate to high' fishing pressure (Zann 1992). Region 1 is mainly sunny and dry, supporting substantial sugar-cane cultivation and an

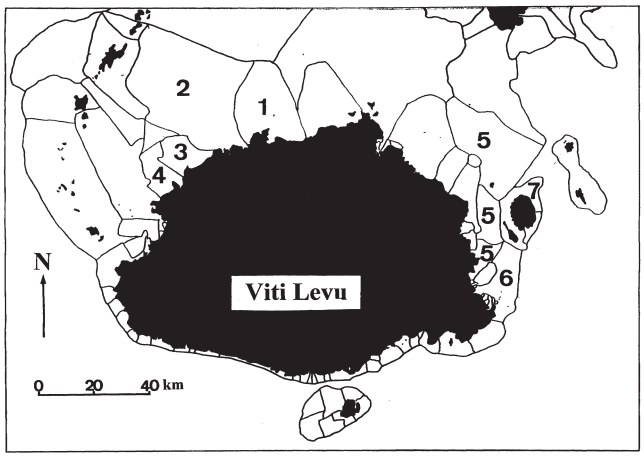

Figure 1 Diagrammatic map of Viti Levu in Fiji, showing the locations of the CFRAs: 1 = Tavua; 2 = Votua; 3 = Ba; 4 = Vitogo; 5 = Verata; 6 = Kubuna; 7 = Levuka.

Indo-Fijian population that is higher than average. Region 2 is mainly cloudy and wet, its population is almost entirely indigenous-Fijian in make-up, with virtually no Indo-Fijian commercial fishing.

Region 1

Four CFRAs were studied in Region 1, namely Tavua, Votua, Ba and Vitogo.

Tavua CFRA is owned by the Tui Tavua who at the time of the study was also the Minister responsible for Fisheries, and he regards the CFRA as the property of his family. An unusual feature of Tavua was the presence of deep-water fishing inside the CFRA limits, and dynamite fishing was considered a particular problem. A few years prior to the study, two boats belonging to Honorary Fisheries Wardens (unpaid government appointees) had been dynamited by persons unknown, widely believed to have been fishers who had been informed upon by the Wardens for dynamite fishing.

Votua is jointly owned by the three yavusa of Votua village, who were traditionally the personal fishers (*gonedau*) of the Tui Ba. While chiefly power (i.e. power residing in the chief) over the three yavusa had previously been held by a single family, the family line had died out, and thus ownership of the qoliqoli became vested jointly in the three yavusa. They own few lands, so that the CFRA is their principal asset. A unique feature of Votua is that access by most fishers to the fishing ground is along the Ba estuary past Votua village, facilitating policing by the customary-rights holders. Votuans have a reputation for militant enforcement of their fishing ground and were the first in Region 1 to impose an access fee in 1988.

Ba CFRA (full name Ba and Tilivabukuya) is owned by the Tui Ba, who regards herself as sole owner. A unique feature is that most fishers using Ba are day-fishers (A. Raiwalui and J. Ah-Tong, personal communications 1994).

Vitogo (full name Vitogo and Vidilo) is registered in the names of the Vanua of Vitogo and the Yavusa of Vidilo. While ownership rested with the Tunuloa yavusa of the Vitogo vanua, chiefly power in Vitogo had been transferred to a rival family, which apparently denied the Tunuloa yavusa the right to manage the CFRA. The attitude of the Tunuloa Chief (which was atypical for the CFRAs studied) was that the government now owned the CFRA (the people retaining only the right to fish) and was responsible for management. A significant feature of Vitogo is that it embraces the city of Lautoka (Fiji's second largest urban centre) and is undoubtedly subject to heavy subsistence fishing pressure and, in the view of the owner, significant unlicensed commercial fishing.

Region 2

Three CFRAs, or assemblages of CFRAs, were studied in Region 2, namely Verata, Kubuna and Levuka.

Verata is an assemblage of three CFRAs, namely Verata No. 1, Verata No. 2 and Verata & Namena, the last of which is shared with the Namena vanua. The attitude of Verata management is one of full ownership. There was a substantial subsistence fishery (Passfield 1994).

Kubuna is owned by the Tui Kubuna, the highest-ranking Chief of Fiji, who regards herself as full owner of the fishing ground. Kubuna CFRA is rich in reefs and being close to Suva, it was thought by the owner to be subject to significant poaching, a contention supported by van der Meeren (1996), who identified a number of management issues related to the lack of community participation in the management of this fishing ground.

The Levuka CFRA is owned by Tui Levuka who at the time of the study resided at Levuka and regarded himself as owner of the fishing ground. Noteworthy features of Levuka are its distance from any large urban centres, a very wet climate and the presence of the tuna canning factory of the 98% nationally-owned company PAFCO.

Assessment of CFRA fisheries

The study focused on the commercial artisanal fishery operating inside CFRAs. Licensing data were obtained from the Fisheries Division's own records (maintained at District offices) and the records of the Divisional Commissioner. In most cases, the Fisheries Division gave the highest number of licences, suggesting that sources elsewhere were less complete. A combination of these sources was used to provide information on the number and type of licensed fishing vessels permitted to fish in a given CFRA. Such information provided an *a priori* measure of the commercial artisanal-fishing access pressure in a given CFRA. Fisheries officers were routinely consulted on any question of interpretation or reliability concerning the Fisheries Division data.

A total of seven fishers were questioned closely on their fishing activities (five from Region 1, two from Region 2), questionnaires (Cooke 1994) being used as a framework for the interviews, although not completed by the fishers themselves. Visits were made to markets and to landing points in order to identify the species represented in the fisheries. Middlemen, fish merchants and boat builders were questioned in a semi-structured manner on various aspects of the fisheries.

CFRA managers did not themselves have data on rates of resource extraction from specific CFRAs, and although they were aware that their CFRAs were sometimes subject to poaching, they had no means of quantifying fishing pressure. Thus, the only statistic for which they had reliable information on which to base a management response was the number of permits they had themselves issued for the CFRA. An a priori measure of fishing access pressure was therefore obtained by dividing the number of permits by the area of the CFRA. Interviews with fishers, Fisheries officers and others indicated that artisanal fishing was influenced by the distribution and accessibility of different ecosystems within CFRAs (e.g. open water, mangrove and coral reef). Data on the number of fishing permits were obtained from official records retained by the Fisheries Division and District Commissioner's offices, and additionally from CFRA owners who retained such records. Total areas of CFRAs were measured from Native Lands and Fisheries Commission maps, while the areas of reef and mangrove in CFRAs were measured from published 1:50 000 maps.

Inspection of several hundred licence records at Lautoka and Ba Fisheries offices revealed that only a handful of fishers had obtained permits to fish in more than one CFRA over a period of several years. Fisheries officers at Ba and Lautoka expressed the opinion that fishers frequently strayed into CFRAs adjacent to those for which they were licensed although evidence of the practice had not been systematically gathered. A consequence of the fishers practice of each obtaining a permit for only one CFRA would be that the number of issued licences for a given CFRA could be greater or less than the number of vessels actually operating in that area. However, in the absence of any means for quantifying this form of poaching, there was no basis for taking it into account in the measurement of resource access pressure. Thus, just two indices of access pressure were generated, namely (1) the absolute number of permits per CFRA and (2) the number of licences divided by the surface area of the CFRA in question (or the area of reef within the CFRA). The latter index was used to compare access pressure amongst CFRAs.

Assessment of CFRA management

The perceptions and actions of CFRA managers were investigated through management questionnaires and semi-structured discussion. Management questionnaires (Cooke 1994) were submitted to a total of seven qoliqoli managers (five in Region 1, two in Region 2), and responses were obtained from all seven.

The questionnaires sought information on the following topics: (1) decisions affecting the CFRA; (2) boundaries of

Table 1 Aspects of CFRA management used to derive a comparative management index.

Class of management action	*Specific attribute*
Management structure	Chief personally involved in management
	Existence of management committee
Marshalling information	Hearsay or general common knowledge relied on
	Meetings held as and when needed
	Regular meeting held to discuss CFRA management
	Input invited from Fisheries Division
	Input invited from fishers
	Input invited from other users such as women
	Fishers' information used to monitor management
Approach to goodwill payments	Fixed goodwill payments used
	Fixed payments increased in the last 5 years
	No payment required but entry to fishery restricted
	Payments scaled according to type of gear used
	High goodwill payment deliberately used to limit fishing effort
Measures taken or contemplated	Standard permits with conditions endorsed used
	Reef area bans
	Gears restricted (not merely through supplementary fees)
	Bêche-de-mer fishing banned
	Subsistence fishing zone or fishing reserve
	Sunday fishing banned
	Area ban extended to land
	Mangrove area bans contemplated
Patrolling and enforcement	Honorary Fisheries Wardens appointed
	Active patrolling
	Active steps taken to deal with illegalities
	Illegalities reported to Fisheries

the CFRA; (3) access to the CFRA; (4) goodwill payments (payments made for access); (5) management measures adopted; (6) sources of information for management; (7) poaching, dynamiting and other illegal activities; (8) patrolling and enforcement; (9) women and fishing; (10) mangroves; (11) management perceptions and policy; (12) CFRAs and the law, and the need for reform. Questionnaire responses were supplemented by semi-structured discussion with the managers of all CFRAs other than Ba, the Chief of which chose not to discuss management in person with us, but took considerable care over completion of the questionnaire.

Working from the questionnaire responses, practices of the CFRA owners which might reasonably be regarded as constituting 'management' were identified under each of the following: (1) management structure, (2) marshalling of information for management, (3) the approach adopted with regard to goodwill payments, (4) specific measures taken or contemplated, (5) patrolling and enforcement (Table 1). In each case, a score of one or zero was assigned according to whether a given management practice was present or absent, respectively. Thus, the CFRAs exhibiting the greatest number of defined management measures received the highest scores.

Background information on the CFRAs was gathered to supplement the questionnaire responses. Particular attention was paid to circumstances of managers which might affect their freedom or inclination to act in a managerial manner. Naturally, it cannot be guaranteed that all pertinent factors came to light, especially during a brief investigation of this kind. In this respect, the third author was able to provide valuable insights into the workings of the Fijian social system that might have been closed to foreign investigators working alone.

Results

Over 90% of the fishing vessels in Region 1 were locally constructed 8 m half-cabin plywood boats accommodating crews of 3–4 fishers and powered with 40 hp outboard motors. Most vessels possessed a wooden icebox for the storage of ice and catch during fishing trips, and these were typically of about 1 m^3 in volume, permitting a maximum catch per trip of about 400 kg, according to fishers interviewed. Trip length varied from one to five days according to location. Vessel usage was about 40 weeks per year, with an average of 2–4 nights per week and an average catch of 100 kg per night. These data indicate an annual catch per boat of approximately 10 t. In Region 1, approximately 300 fishers purchased 1400 t of ice in pellet form annually from the Lautoka and Ba ice plants, constituting 4.7 t per boat per year.

Vessels in Region 2 were full-cabined and adapted for longer fishing trips in heavy rainfall. Personnel of the fisheries company PAFCO at Levuka who sold ice to fishers reported a typical trip length of one week. Trips of one week

or more were the norm in the Verata area of Region 2 (K. Passfield, personal communication 1994) and catches of about 10 t per vessel per year have been reported (Passfield 1994).

Licensing and management of CFRAs

Region 1: Tavua

Since Tavua is 680 km^2 in area (of which 150 km^2 is composed of reef and 28 km^2 mangrove) and since 127 commercial fishing permits were issued in 1993, it was the best-subscribed CFRA in Region 1. Management was carried out by the Tui Tavua in collaboration with the Fisheries Officer for Tavua and the assistance of the *Turaga ni koro* (village head). The management met at least annually and solicited input from the Fisheries Division and fishers. No goodwill payments were made by fishermen, but access was limited to residents of Tavua Province. The fishers' association was expected to contribute to social projects. Fisheries and the Chief operated a streamlined licensing procedure. Management restrictions were set out in a standard form of permit and included: (1) no *bêche de mer* (sea-cucumber) fishing, (2) no taking of corals, (3) no netting across the Korosi Pass, (4) a limit of 20 nets per fisher and minimum mesh size of 7.5 cm (3 inches), and (5) reef closures at Marava Reef (9 months in 1992 and all of 1994). Management also set a limit each year to the number of permits, and was considering a novel rotation scheme for access to mangroves for crab fishing which was popular. The Fisheries Officer participated in naval fishing patrols, patrolled himself in a Fisheries boat 10 times a year, and took a close interest in the prosecution of dynamite fishing cases.

Votua

Since Votua is 1580 km^2 in area (of which 210 km^2 is composed of reef and 60 km^2 mangrove), it is amongst the largest CFRAs in Region 1 and was well subscribed; 103 permits were issued in 1989, 119 in 1990, only 54 in 1993, but this went up to 86 by mid 1994. Management was undertaken by a 10-member committee representing the three yavusa making up the original vanua of Votua and which met regularly 4–5 times a year; the local Fisheries officer usually attended. Information was solicited from fishers and Fisheries personnel. Decisions were made by simple vote or by the three Chiefs. Access fees in 1994 were F$100 for Fijians and F$300 for Indo-Fijians, the latter also subject to a supplement of F$200 for use of nets. Fees had been increased in 1989 and 1994. Management measures (specified on a standard form permit) included: (1) no shrimp netting in Ba estuary, which was limited to Votuans, (2) no taking of under-size bêche-de-mer (bêche-de-mer fishing was totally banned in 1992), (3) no taking of clam or pearl shells, (4) no fishing in Nadele-Qwana mangrove area, and (5) no use of dynamite. Conditions (2) and (5) repeated government regulations. Consultation with the Fisheries Division appeared to be limited to attendance by Fisheries officers at CFRA meetings, although on a few occasions the local Fisheries officer had accompanied Votuan fishers making checks on passing fishing boats. Honorary Fishing Wardens had been appointed and there were frequent patrols. There was no indication of reporting to Fisheries or police; rather, the Votuans tended to take matters into their own hands, sometimes through threat of violence. It is likely that Votua was collecting goodwill payments at the expense of neighbouring CFRAs, because fishers very rarely paid more than one goodwill fee, yet it was believed by CFRA owners and Fisheries officers that fishers licensed to fish in Votua often fished in adjacent areas.

Ba

Since Ba is 200 km^2 in area (of which 65 km^2 is composed of reef and 5 km^2 mangrove), it is a small CFRA and relatively well subscribed, with 32 permits issued in 1993. Meetings were not held and no input was solicited directly from Fisheries or fishers, reliance being based on hearsay; in fact, the Chief confirmed that she lacked information for management. A fixed goodwill payment of F$200 was applied, which was increased from F$100 in 1993 to reflect the rise in the price of fish. The only management measure to date had been closure of Malevu Reef in order to: (1) alleviate bait fishing pressure, (2) protect corals, (3) protect fragile vegetation of the small island, and (4) stop uncontrolled bêche-de-mer fishing. No standard form permit was issued, the above rules being transmitted verbally. There was no evidence of cooperation with the Fisheries Division, and no indication of any patrolling, although Honorary Fisheries Wardens had been appointed, but no special steps had been taken to deal with illegalities.

Vitogo

Since Vitogo is 240 km^2 in area (of which 65 km^2 is composed of reef and 14 km^2 mangrove) and with an estimated 40 permits (management kept no adequate records) issued in 1993, it was relatively well subscribed. For management purposes, information was not marshalled, however, and no meetings were held. Payment of some goodwill to the Tui Vitogo (not the Tunuloa yavusa) was indicated, but no details were given. Fishers' responses to questionnaires, which were completed when filing licence applications at Lautoka Fisheries office, indicated that goodwill paid to the Vitogo Chief amounted to F$40–50 or a gift of *yaqona* (ceremonial drink derived from the root of a plant), but only in some cases. There was no evidence of any management measures, cooperation with the Fisheries Division, patrolling or enforcement.

Region 2: Verata

The combined CFRAs have a total surface area of 1033 km^2, of which 103 km^2 is composed of reef and 15 km^2 mangrove. Verata No. 2 comprises mostly open water in a remote area and thus it is likely that Verata No. 1 (110 km^2, of which 43 km^2 is composed of reef and 15 km^2 mangrove) attracts most of the fishing pressure. Eleven permits were issued in 1993,

and 23 in 1994. Management was carried out by relatives of the Tui Verata, who lived in the capital. Meetings were held as and when the need arose, with women specifically included and reflecting the importance of the subsistence fishery. Goodwill fees for commercial fishing were very high at F$1000 (increased from F$500 in 1992), and were intended to keep down the number of fishers, although an undisclosed 'reduced rate' applied to local fishers. The conditions of every permit were stated to include: (1) no fishing close to Verata village (to protect the subsistence fishery, (2) no spear fishing, (3) no fishing at night, and (4) separate permit required for nets. No standard form of permit was used. No Honorary Fisheries Wardens had been appointed and no patrolling or enforcement measures were adopted, the view apparently being taken that control of abuses was not feasible.

Kubuna

Since Kubuna is 300 km^2 in area, of which 150 km^2 is composed of reef and 12 km^2 mangrove, it is particularly rich in reefs (50% of the total area). A noteworthy feature of Kubuna was the high goodwill fee (F$1000) intended to restrain the number of vessels, and only 16 permits were issued in 1993. Management was effected by the Chief in close consultation with the Fisheries Officer for Nausori. Informal meetings between the Chief and the Fisheries Officer were held only as and when needed, and this was not regular. Management relied and acted upon the recommendations of the Fisheries Division. Information was not solicited directly from fishers. Goodwill was a fixed payment of F$1000 irrespective of gear and had last been increased in 1991; the high fee was expressly intended to limit fishing effort. Other management measures, including a ban on bêche-de-mer fishing with scuba gear and on Sunday fishing, were set out in a standard form of permit. Individual fishers had been banned for non-payment or late payment of goodwill. The fishing ground was closed entirely for the whole of 1990 to mark the death of the previous Chief. Honorary Fisheries Wardens had been appointed and patrolling was effected by them as well as other local fishers and the Fisheries Division. Patrolling was, however, considered by the owner to be insufficient to deter most poachers. The activities of licensed fishers were 'closely monitored' for contravention of the permit conditions. Illegalities were reported by Fisheries to the Chief and dealt with according to the law.

Levuka

Levuka has a total area of 351 km^2, of which 95 km^2 is composed of reef and <1 km^2 mangrove. Permits had varied in number, being 24 in 1988, 29 in 1989, 38 in 1990 (when nearby Kubuna was closed), 22 in 1992, 6 in 1993 and 10 in 1994. Management was effected by the Chief, who relied on hearsay information. There were no active management measures, no management meetings were held and there were no goodwill payments, although a traditional request and presentation of yaqona had to be made to the Chief. The Chief was setting certain rules which were: (1) closure of Makogai Island for clam restocking (a project by the Fisheries Division) and turtle nesting, (2) ban on use of compressed air, especially for bêche-de-mer fishing, and (3) ban on coral collecting. There was no cooperation as such with the Fisheries Division. One Honorary Fisheries Warden had been appointed, and did some patrolling, but there was no active patrolling by the owner.

Comparisons of CFRAs

The CFRAs varied in total area, in reef area and in the number of licences (Table 2), and the number of licences per CFRA in 1993 was strongly positively correlated with reef area ($r^2_{adj} = 0.72$, $p = 0.005$). The number of licences per unit area differed amongst the CFRAs (Table 2). Tavua had the greatest number of licences per unit both of total and of reef area. Verata had the fewest licences per unit of CFRA area, while Levuka had the fewest licences per unit of reef area (Table 2).

Management indices also spanned a considerable range between one for Vitogo and 18 for both Tavua and Votua (Table 3). Overall, management index was not correlated with reef area for all CFRAs. However, if Vitogo, where chiefly succession had broken down, was excluded, management was significantly associated with reef area, although not total CFRA area ($r^2_{adj} = 0.59$, $p = 0.046$).

Overall, across all CFRAs, there was no significant relationship between management index and number of

Table 2 Area and licence (1993 except where indicated) data for the CFRAs

Region	*CFRA*	*CFRA area (km^2)*	*Reef area (km^2)*	*Fishing licences*	*Licences per km^2 CFRA*	*Licences per km^2 reef*
1	Tavua	680	150	127	0.187	0.847
	Votua	1580	210	86[a]	0.054	0.409
	Ba	200	65	32	0.160	0.492
	Vitogo	240	65	40[b]	0.167	0.615
2	Verata	1033	103	23[a]	0.022	0.223
	Kubuna	300	150	16	0.053	0.107
	Levuka	351	95	10[a]	0.028	0.105

[a] = 1994 data
[b] = estimated

Table 3 Management scores and management indices for the CFRAs by category of management (– = not applicable).

Class of management action	*CFRA*						
	Tavua	*Votua*	*Ba*	*Vitogo*	*Verata*	*Kubuna*	*Levuka*
Management structure							
Chief is personally involved in management	1	–	1	0	0	1	1
Management committee exists	1	1	0	0	1	0	0
Marshalling of information							
Hearsay or general common knowledge relied on	1	1	1	0	1	1	1
Meetings held as and when needed	1	1	1	0	1	1	1
Regular meeting held to discuss CFRA management	1	1	0	0	0	1	0
Input invited from Fisheries Division	1	0	0	0	0	1	0
Input invited from fishers	1	1	0	0	1	0	0
Input invited from other users such as women	1	0	0	0	1	0	0
Fishers' information used to monitor management	1	0	0	0	0	0	0
Approach to goodwill payments							
Fixed goodwill payments used	–	1	1	0	1	1	0
Fixed payments increased in the last 5 years	–	1	1	0	1	1	0
No payment required but entry to fishery restricted	1	0	0	0	0	0	0
Payments scaled according to types of gear used	–	1	0	0	1	0	0
High goodwill payment deliberately used to limit fishing	0	0	0	0	1	1	0
Measures taken or contemplated							
Use standard permits with conditions endorsed	1	1	0	0	0	0	0
Reef area bans	1	1	0	0	0	0	1
Gears restricted (not merely supplementary fees)	1	1	0	0	0	1	0
Bêche-de-mer banned	1	1	0	0	0	1	0
Subsistence fishing zone or fishing reserve	0	1	0	0	1	0	0
Sunday fishing banned	0	0	0	0	0	1	0
Area ban extended to land	0	1	1	0	0	0	1
Mangrove area bans contemplated	1	0	0	0	0	0	0
Patrolling or enforcement							
Honorary Fisheries Wardens appointed	0	1	1	1	1	1	0
Active patrolling	1	1	0	0	0	0	0
Active steps taken to deal with illegalities	1	1	0	0	0	0	0
Illegalities reported to Fisheries	1	1	1	0	0	1	0
Management index	18	18	8	1	11	13	5

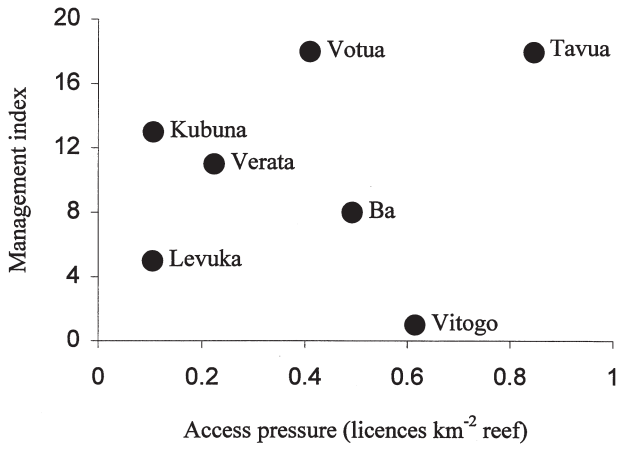

Figure 2 Plot of management index against artisanal-fishery access pressure (number of licences per unit area of reef) in the seven CFRAs.

licences per CFRA. However, a significant correlation between management and number of licences was found for Regions 1 and 2, if Vitogo was excluded (r^2_{adj} = 0.61, p = 0.041), although there was no correlation between management index and access pressure (number of permits per unit area either of total CFRA or reef within the CFRA).

Kubuna, Verata and Votua had low access pressure, but possessed a responsive management, while Vitogo and Ba both had low levels of management although experiencing substantial access pressure (Fig. 2). Tavua showed evidence of having strong management in the face of high access pressure, while Levuka had little management with low access pressure (Fig. 2).

Discussion

The most significant finding from the present study is that stakeholder management varied in extent and character amongst the CFRAs studied around Viti Levu. Some areas,

notably Tavua and Votua, indicated quite a high degree of management, while others exhibited very little or, in the case of Vitogo, effectively no management. We acknowledge that the relative weighting of management variables (Table 2) might have varied, and if so, this weighting would have influenced the results obtained. However, for the time being, we can see no objective basis for weighting management variables, and therefore treated such variables as being equally important as each other. We suggest that the approach which we have used might be applied elsewhere in the South Pacific, where appropriate tenure systems exist and it is thought these might be enhanced to support effective management of marine resources (e.g. Dalzell *et al.* 1996). Clearly, there is reason to assess management regimes, because these are not all the same, and successful achievement of investment objectives in projects to elucidate or enhance such management will rely on such information being available.

A factor which appeared markedly to affect the degree of management was chiefly succession. Vitogo, which evinced no management aptitude, almost had suffered a breakdown in succession of its ownership. However, Votua, which had also suffered a breakdown in chiefly succession, scored highly on management aptitude. It is worth briefly reviewing what had actually happened in these two cases. The fact is that while chiefly succession of Votua had broken down, in the sense that the original chiefly family had become extinct, it seems that this had not itself led to a breakdown in management. Rather, the situation of joint ownership appeared to have encouraged a sense of rivalry between the three yavusa to contribute the most effectively to management. In Vitogo, however, chiefly power and CFRA ownership had been split between two rival families, compromising management.

Since Vitogo was also in an area of relatively high fishing pressure, this CFRA may be considered to have been vulnerable to fishing pressure. While clearly a desirable route to successful management, management involving both government and local institutions (e.g. Jentoft 1989; Nielsen & Vedsmond 1999) apparently depends on stability of those institutions if it is to be reliable and sustainable. In countries other than Fiji, such as in the Philippines (e.g. Russ & Alcala 1996) and St Lucia in the Caribbean (H.A. Oxenford, personal communication 1998), arrangements for local fishery closures have also proven vulnerable to changes in the local institutions involved.

Apart from Vitogo, the two CFRAs with the lowest scores, namely Ba and Levuka, were those which had no recorded connection with the government. Verata, which scored a little better than these, was assisted partially by a member of the acting Chief's family who occupied a senior position in the Ministry for Fijian Affairs, and took a personal interest in administration of the vanua to which she belonged.

Originally, we sought data on total fishing pressure and catch rates from the various CFRAs; however, these proved not to be available through Fisheries and, in particular, no such information was available to the CFRA managers. What we did therefore was to use the absolute number of licences per CFRA (which also permitted calculation of the number of licences per unit of CFRA area or area of reef in the CFRA), which was the sole measure of access pressure available to the CFRA managers. A consequence of this is that we do not know how much licensed fishers were exploiting resources in CFRAs adjacent to those for which they had permits. We suspect that certain CFRAs may essentially be 'flags of convenience', where access to a CFRA is relatively easy and a neighbouring CFRA is large and evidently productive. Amongst the CFRAs which we investigated, none of the managers was aware of the extent of such abuses, and although Kubuna indicated that poaching might be substantial, such recognition did not appear to have led to an appropriate adaptation of management regime.

Correlation between management index and the number of permits in those six CFRAs where the chiefly authority was not disrupted indicates that CFRA managers were, if anything, more likely to respond to the number of permits than to access pressure (measured as number of permits per unit area) within their areas. However, this correlation was obtained only by exclusion of Vitogo, and we advocate caution when interpreting such relationships, given the qualitative nature of several of the management characteristics involved, the small sample size and the complexity of the situations concerned. In general, we are inclined to conclude that the variation in management amongst CFRAs which we observed could not readily be attributed to factors such as the number or density of permits.

The existence of a privileged connection with Fisheries was positively related to a higher degree of management, the four highest-scoring CFRAs having some link with the Fisheries Division. In the case of Tavua and Kubuna, this involved inviting specific input from Fisheries, while for Votua, it was only a matter of reporting illegalities to Fisheries. One implication is that a link with the Fisheries Division, and perhaps other government departments, is associated with a more developed management regime. In such cases, it would appear that a condition of co-management has been achieved. Such instances support the notion that ownership provides scope for greater local management, because the owners stand to benefit from management (e.g. Castilla & Fernandez 1998). It is worth noting, however, that it remains unproven whether or not the high management aptitude evinced by CFRAs such as Tavua, Votua and Kubuna had led to conservation of fisheries stocks.

Of those CFRAs with Fisheries connections, however, Votua scored highly in management while apparently soliciting little help from Fisheries. This highlights the fact that cooperation with Fisheries is not necessary for a high management index, according to the method which we used to assess it. If a CFRA owner were sufficiently motivated to act alone, then a high management index could still be achieved. Votua had much scope for just such motivation because, as we have noted, this grouping of three yavusa owns no lands, the fishing ground being the only source of revenue. Votua was in fact the only CFRA reputed to use threat of violence to support its management regime.

The present study has shown that a simple and rapid survey technique can indicate useful contrasts amongst CFRAs in functional management terms. Such results offer a basis for guiding investments in projects to facilitate or explore the development of local management, perhaps in the context of elaborating strategies to promote local management or co-management on a wider scale, as suggested by IUCN (1993). Applying such an approach to the CFRAs of this study, Vitogo presents a case of management in difficulty, warranting direct support or research aimed at identifying the causes of management breakdown so that such problems can be avoided in other areas. If it were sought through investment to understand better the circumstances surrounding actual collaboration between Fisheries and local management, then Tavua and Kubuna might be considered useful foci for study. Votua would be a worthy target if the objective were to understand better the conditions under which more spontaneous management might arise.

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