The role of social capital in a common property resource system in coastal areas: A case study of community-based coastal resource management in Fiji[1]

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Abstract

This article analyses how bonding and bridging social capital function in community-based coastal resource management as common-pool resource management in Fiji. Strong bonds among villagers help disseminate information and knowledge in the community. A kinship-based village structure contributes to a high degree of accountability among those villagers nominated as fish wardens, who are responsible for monitoring marine resources. Increased cooperation between non-governmental organisations (NGOs) and local villages has encouraged "weak ties", which allows villagers to gain access to new knowledge and information on coastal resource management. When a non-governmental organisation adopted an "individual participatory approach", by allowing individual villagers to participate in management, a project was more successful than hitherto in incorporating resource users' knowledge and experience into management planning. That resulted in a higher congruence between institutions and local conditions.

Introduction

Coastal resources are important for large numbers of Pacific Islanders. In particular, small-scale fishing, normally conducted between the shoreline and the outer reef slope, provides an essential source of income and animal protein (Gillett and Lightfoot 2001; King and Lambeth 2000; World Bank 1999). However, no consensus exists regarding the long-term sustainability of coastal resource use. Some studies demonstrate that in the South Pacific, coastal ecosystems and their resources are increasingly threatened from various sources (Huber and McGregor 2002; UNEP 1999; World Bank 1999), including both land- and ocean-based human activities.

Responding to the demand for the conservation of coastal resources in the Pacific Islands region, considerable funds and effort have been directed in recent decades at reducing pressure on coastal resources, and solving problems of their degradation. Simultaneously, the practice of coastal resource management has evolved. In particular, a major shift occurred from a centralised or "top-down" approach to resource management, to what is commonly called community-based or a "bottom-up" approach. This shift is clearly visible in the Pacific Islands, where halting and reversing the degradation of the coastal environment by working with local communities is now the norm in both government policy and international donor strategies (e.g. King and Lambeth 2000; LMMA 2003).

Social capital and common-pool resource management

This article summarises a doctoral study I conducted of the functions of social capital in community-based coastal resource management (CBCRM) in Fiji, where non-local organisations assist local residents in their management activities. The term "social capital" has gained increasing popularity among academics and practitioners, who view it as useful in delivering desirable outcomes in social and economic development. Based on a review of key literature on social capital (e.g. Coleman 1988; Côté and Healy 2001; Fukuyama 1995; Harpham et al. 2002; Lin 2001; Putnam 2000; Putnam et al. 1993; Woolcock 1998), social capital in this study is defined as a set of values, such as the norms of reciprocity, and social relations embedded in the social structure of a society, that enable people to act collectively to achieve their desired goals. The most important point is that by developing social capital, a group of people can build trust, which affects the degree of their collaborative actions.

Theories of common-pool resources (CPR) are particularly important in the study of the governance of

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natural resources, and they explain why social capital is necessary in CBCRM. The literature on "new institutionalism" demonstrates a general consensus that building institutions that empower local communities is a prerequisite for long-lasting resource management. This is because institutions reduce uncertainty by providing structure to management (North 1990) and by clarifying those actions that are permitted and those that are prohibited (Oakerson and Walker 1997). Further, institutions affect the way a community evolves over time because they affect people's choices by: 1) influencing the availability of information and resources, 2) shaping incentives, and 3) establishing the basic rules of social transactions (Nicholson 1993). As CPR researchers have argued (e.g. Ahn and Ostrom 2001; Ostrom 1990; Ostrom 1998a; Rudd 2000), a certain level of trust among resource users is necessary to sustain institutions. To avoid common problems caused by the two key elements of subtractability and excludability, long-lasting CPR use requires cooperation among users (Ostrom 1990); to some extent, users need to share norms and understand rules regarding resource use so as to maintain institutions.[3] As a result, it follows that social capital plays a critical role in CPR management.

To examine empirically how social capital functions in CBCRM as a case of CPR management with external interventions, the research reported on here focused on the two-dimensional nature of social capital, expressed by bonding and bridging capitals. *Bonding social capital* is defined as ties among somewhat homogenous groups, and represents social capital within the community, whereas *bridging social capital* is defined as ties across diverse social groups, and corresponds to the concept of social capital between the community and external organisations (Gittell and Vidal 1998; Putnam 2000: 22–23).

The concept of a two-dimensional nature of social capital is helpful in explaining the CBCRM situation in Fiji. Fijians themselves characterise village life as a source of their identity and a symbol of unity. These strong ties — or strong bonding social capital — have been an important factor in enabling Fijians to cooperate in maintaining an institution that is vital to protecting their resources, and in particular, the system of customary fishing grounds known as *qoliqoli*. On the other hand, as a response to the problem of resource degradation caused by unsustainable methods of resource use, NGOs have promoted CBCRM projects in Fijian villages. The theory underlying these projects is that of CPR, promoting self-governance by villagers. In doing so, NGOs empower community members by providing knowledge, skills and suggestions in order to revive traditional resource use practices, specifically a marine protected area (MPA) or *tabu*[4] (Veitayaki et al. 2001:1). In short, NGO projects aim to build bridging social capital in the context of CBCRM.

As a conservation tool for coastal resources, MPAs have been used throughout the Pacific with a community-based approach. In the case of Fiji, the Locally Managed Marine Areas (LMMA) Network has introduced locally managed versions of MPAs as a means of coastal conservation at the community level. The LMMA Network was launched in October 2000, and was formed by a group of marine conservation practitioners, such as communities, academics, NGOs, donors, and government agencies. An LMMA is defined as "the overall marine area being managed by the local community or resource-owning groups (or co-managed with outside assistance) (LMMA 2005:11). Although the site of an LMMA can vary widely in purpose and design, two aspects remain constant: 1) a well-defined or designated area, and 2) substantial involvement of communities and/or local governments in decision-making and implementation. Parts of LMMAs can be declared as a "full reserve" or a "species-specific no-take zone", depending on local conditions and conservation purposes.

Methods

Using an analytical framework built on the literature of CPR and social capital, I analysed how social capital both acts as a catalyst in CPR management, and influences the durability of CBCRM with intervention from external organisations such as NGOs. Since the challenge of CPR management is to get people to collaborate to maintain institutions, one way to measure "long-lasting CBCRM" is to examine: 1) whether resource users share a common understanding of the rules, and 2) whether they follow these rules.

3. Douglass North defines institutions as "the rules of the game in a society or, more informally, are the humanly devised constraints that shape human interactions." While state legislation is a kind of institution, institutions can also be informal: norms are similar to rules but are considered the informal standard among a group of specific individuals. It is important to note that institutions are different from "organisations" which are "groups of individuals bound together by some purpose to achieve objectives" North, D.C. 1990. Institutions, institutional change, and economic performance. New York: Cambridge University Press.
4. Tabu, originally practiced for social and spiritual purposes, is a temporary closure of part of qoliqoli or a prohibition on fishing for certain species. In particular, when a high chief dies, a 100-day tabu is often imposed on a certain part of qoliqoli as a sign of respect. In the context of community-based coastal resource management in Fiji, tabu means an MPA where people are not allowed to catch any marine creatures. The LMMA Network considers that LMMAs are different from MPAs because they are characterised by local ownership and/or control, whereas MPAs are typically designated by levels of management via a top-down approach. However, following the IUCN's broad definition, the term MPA is used here to describe LMMAs in Fiji

Numerous scholars (e.g. Bullen and Onyx 1998; Halpern 2005; Woolcock and Narayan 2000) have pointed out that the measurement of social capital is controversial. The forms of social capital are society-specific and diverse at the operational level. Indeed, they change over time. Therefore, the instruments for measurement must focus on a range of dimensions of social capital (Narayan and Cassidy 1999). This study follows previous studies that have attempted to measure social capital and socioeconomic outcomes across a number of rural villages in different developing countries (Grootaert et al. 2003; Narayan 1997; Narayan and Pritchett 1999). Based on those studies, the social capital indicator framework (Fig. 1) was used to examine bonding and bridging social capital in the context of CBCRM in Fiji.

The study sites are the districts of Cuvu and Wai, which are 2 of 21 districts within Nadroga/Navosa Province, on the southwest coast of Viti Levu Island. Both districts have worked on CBCRM projects with NGOs within the framework of the Fiji LMMA. Owing to their different proximity and access to the market economy, these two areas were expected to possess different characteristics that could be conceptualised as bonding and bridging social capital. On the other hand, the two areas had the following three characteristics in common: 1) they possess attributes of a CPR case under the Fijian customary marine tenure system; 2) residents have received support in their coastal management activities from such external organisations as NGOs, for MPA establishment; and 3) coastal management activities supported by external organisations, such as management planning, involve community participation.

The first study site is the Cuvu District,[5] located by the main highway and close to Sigatoka town. The tourism industry in and near the district provides employment for residents. Owing to these conditions, and consistent with those sociologists (Gilbert and Gugler 1982; Sandel 1984) who argue that a modernised community lacks shared values, it was expected that the communities of Cuvu District would possess a relatively low level of bonding social capital and a high level of bridging social capital. Since 1999, the Partners in Community Development in Fiji (PCDF), an NGO, has been actively involved in CBCRM in Cuvu.[6]

The second study site is Wai District, which has six villages, and is located in the western Nadroga/Navosa Province. Four of these villages, including the main village of Lomawai, are located along the coast, approximately 5 km away from the main highway. The other two are inland. Since 1999, the World Wide Fund for Nature (WWF) Fiji Programme has worked with residents of the villages of Wai on a community project for coastal resource management. Compared with Cuvu District, Wai District is remote, and it was expected that villagers would have a higher level of bonding social capital and lower level of bridging social capital.

Fieldwork for data collection was conducted over an eight-month period in 2003 and 2004. Fifty-three interviews were conducted with various respondents, including village leaders, traditional chiefs, elders, fish wardens, village women, NGO staff, government officials, and others. To acquire quantitative data, an individual survey was conducted

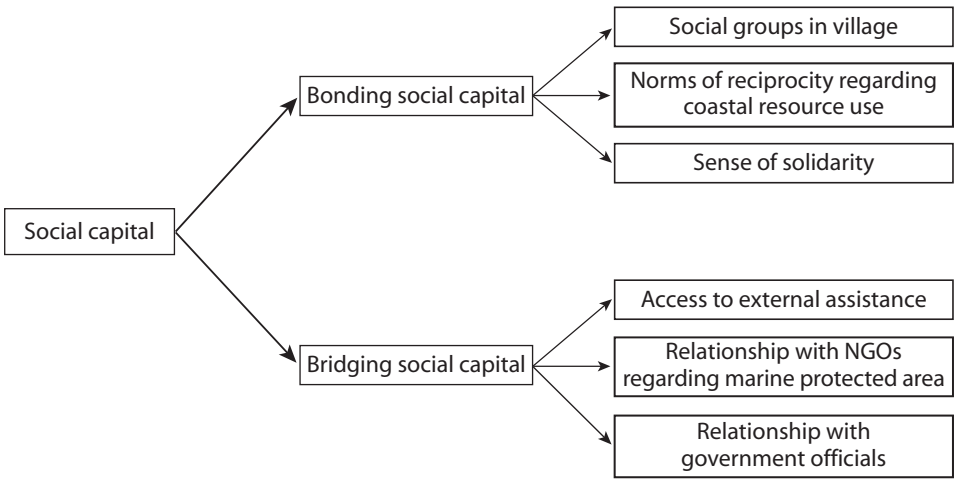

Figure 1. Social capital indicator framework in this study.

5. Cuvu District comprises seven coastal villages that traditionally share a customary fishing ground with the neighbouring village of the District of Tuva. Because of this historical relationship among the villages, an NGO, PCDF, has worked with all eight villages in a coastal management project since 1999 . Therefore, for the purpose of my research, the study site of Cuvu refers to the area that includes these eight villages.
6. Cuvu District and PCDF withdrew from the Fiji LMMA Network in 2004.

with 60 individuals in Cuvu and 62 individuals in Wai. In addition, Fijian government documents were reviewed for background information. Triangulation (Maxwell 1996; Patton 2002; Tashakkori and Teddlie 1998) allows a researcher to combine data and information collected through these multiple methods and to confirm whether they are accurate.

CBCRM institutions in Cuvu and Wai

The types of rules this study is most concerned with are those of resource boundaries and appropriation. Understanding boundaries is important for clarifying what is being managed, and for whom. In short, defining the boundaries of CPRs is the first step in any kind of collective action (Ostrom 1990). By reducing uncertainty as to who will benefit from management practices and who will pay the costs, clearly defined boundaries increase the chances of success. Two types of CPR boundaries exist in CBCRM cases in Fiji. These are the boundaries of *qoliqoli* and those of MPAs, used as the main tool in the conservation of resources in coastal areas. Figure 2 shows how these boundaries are defined on maps, based on an official map of *qoliqoli*.

Coastal waters and natural resources are shared by the State and Fijian people. Although this dual ownership system is complex and often misunderstood by the people (Lagibalavu 1994), villagers in Cuvu and Wai are well-informed on this issue, and clearly understand how property rights are assigned. Residents of both districts learned of the property rights arrangement regarding their fishing activities in the *qoliqoli* as part of NGO-assisted coastal projects. All villagers also possess a common understanding of MPA boundaries.

Residents of Cuvu and Wai districts also have a good understanding of appropriation rules. Every villager knows that all fishing is prohibited in their MPA, as are certain types of fishing gear. It seems that although villagers lack accurate knowledge regarding mesh size restricted by the Fiji Fisheries Act, they understand that the use of fine mesh nets is prohibited.

To examine the sustainability of CBCRM as CPR management, an important question is whether resource users follow the rules. If the number of residents following the rules is small, then the institution is unlikely to be stable. Despite rule compliance being essential for enduring resource management, neither of the NGOs had collected data on whether or not villagers actually followed local rules. Given the difficulties of directly measuring rule compliance, the individual questionnaire survey asked respondents their *perceptions* of rule compliance in their particular village.

Figure 3 shows villagers' perceptions of their compliance with MPA rules in their waters. It can be seen that only 40.4% of Wai residents "always follow", or, "follow most of the time", the fishing rules. Fifty-six percent answered that either "some don't follow" or "most of us don't follow" the rules. In contrast, Cuvu residents showed better compliance with MPA rules: 72% of Cuvu respondents answered "we all follow" or "most of the time we follow" MPA rules. However, other interviewees revealed that some people broke appropriation rules. Those rule breakers are both people from outside of the villages and the villagers themselves. Interviewees identified reasons for rule breaking, including a lack of awareness of the importance

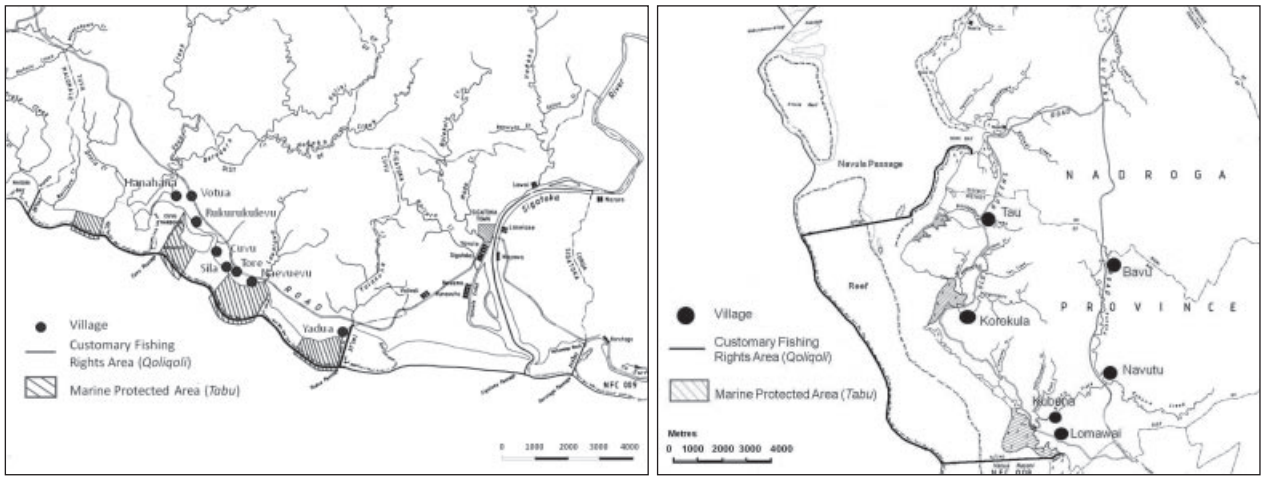

Figure 2. *Qoliqoli* and MPAs in Cuvu and Wai.[7]

7. The original *qoliqoli* maps produced by the Ministry of Fijian Affairs were modified by the author.

of conservation and a decreased respect for other residents by the younger generation.

Bonding social capital in Cuvu and Wai districts

The theoretical literature (Fedderke et al. 1999) posits that bonding social capital helps the rationalisation of rules and norms within a group, by facilitating the flow of information that encourages members to conform. Fijian society places traditional obligations and demands on individuals, especially those living in villages, which has resulted in some dominant characteristics, including a sense of strong bonds that has implications for long-lasting CBCRM.

(a) Social groups in villages

Most social groups in both districts are church-related. This includes Sunday school for children, the youth group (Methodist fellowship), and women's and men's groups. Membership of these groups is open to all residents, and, other than gender and age, there is no special requirement to join a group. As a result, most people join one of these groups unless he/she belongs to a denomination other than the Methodist church. All of these groups regularly hold weekly meetings.

In addition to church-based social groups, villagers identified some social groups in the villages of both districts. Mothers of village children join the mothers' club at a primary school, to help with school activities. Male elders form an elders' group, but female elders remain in the women's group. A rugby team has been organised exclusively for men in Cuvu, but there is no sporting group or team for women. Villagers say that this reflects better job availability for women in the tourism sector near the villages. One of the villages in Cuvu (Rukurukulevu) also has a *meke* group of only young residents that occasionally performs *meke*, a traditional Fijian dance, for tourists in nearby resorts. Apart from the elders' group, no group is involved in CBCRM-related activities. Since elders' opinions are highly respected in village life, decisions made in their meetings may affect CBCRM-related activities.

(b) Norms of reciprocity regarding coastal resource use

Studies suggest that Fijians generally have strong kinship-based ties, which foster reciprocal relationships (Frazer 1973; Nayacakalou 1978; Ravuvu 1983). Fijians seem to commonly recognise the presence of high levels of reciprocity, and all interviewees emphasised how strong their kinship ties are, and how they help each other in daily life. In formal and informal conversation, many respondents often mentioned the significance of family and their responsibility to other family members. Further, Fijians recognise a high degree of reciprocity, even between different clans or tribes.

To examine reciprocal relationships among villagers in relation to marine resource use, the survey asked participants 1) what they do when they borrow fishing gear, and 2) what they do when they have extra fish in their catch. (Table 1 shows whether residents borrow fishing gear from other residents, and Table 2 shows what obligations they have for the borrowed fishing gear.) In Cuvu District, 24 out of 59 respondents (40.1%) answered that they borrowed fishing equipment. For men, 60% of respondents answered that they borrowed fishing gear, whereas only 26.5% of women did so. Although most women go fishing, many do not use equipment, since they mainly reef glean. Thus, the ratio of women who need to borrow fishing gear is low relative to men.

Among those who answered that they borrowed fishing gear, 75% gave part of their catch to the gear owner. Cuvu villagers explained how reciprocal relationships worked, and all emphasised that they did not pay money among themselves: "When we come back [from fishing], and if we got a lot of fish, we have to give part of the catch to the net owner, so that they can give [lend] a net to you every time you ask, otherwise very bad. … People never pay in our village. You just give some fish when you come back, because we are all like cousins".

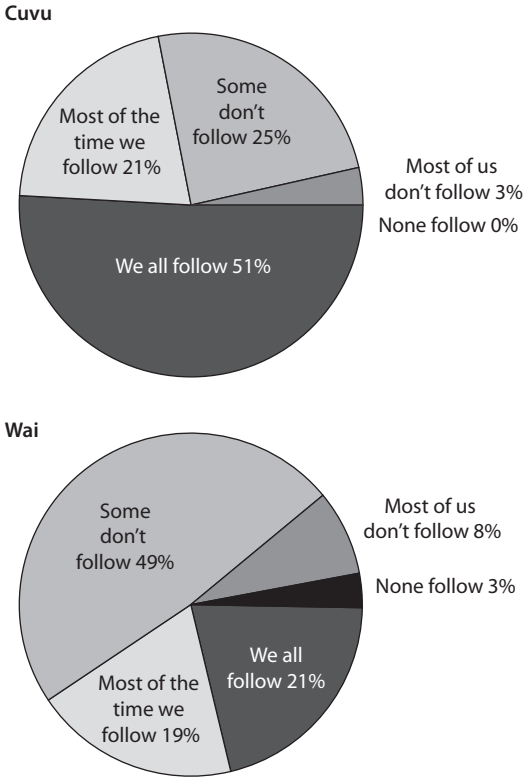

Figure 3. Compliance with MPA rules ("Would you say that fishing rules in the village waters are followed by the residents?") (Cuvu: n=57, Wai: n=62).

In Wai District, women borrow fishing gear from others more often than men do. Whereas 43.3% of female respondents answered that they borrowed fishing gear, 66.7% of males owned fishing gear and did not borrow equipment from others. Since many residents of Wai depend on fishing for their income and because fishing equipment is important, more people own their own gear than do residents of Cuvu. This applies particularly to males because they need to use relatively large nets and a boat to catch enough fish to sell.

In contrast to those in Cuvu District, three out of nine Wai male respondents who borrow equipment from others, stated that they pay money to the owner. Villagers explained that men sometimes borrowed a motorboat and the money they paid to the owner was for the cost of fuel, rather than for the use of the boat. Females do not usually pay for borrowed fishing gear. Although the sample size may not be large enough to draw any definite conclusions, 13 out of 14 female respondents (92.9 %) who borrow fishing gear from others reported giving part of the fish catch to the owner. Although none of the female respondents answered that they pay money, informal interviews revealed that they usually pay USD 0.58[8] per person per day for fuel when they use a boat for fishing.

Table 3 shows how villagers distribute their excess catch. Residents of Cuvu do not sell excess fish, except for in a few cases, such as sea cucumbers. Instead, most respondents (86.4%) give the excess to their relatives, who then share it among their other family members.

Like Cuvu, residents of Wai also reciprocate, by sharing fish they catch with others. For example, when I visited the villages, my host family received complementary fish from a cousin and other relatives and served it for her. When there was a ceremony to mark the 100 days after the death of my host mother's brother, relatives and neighbours provided a feast and shared the cost. The family would do the same for relatives and neighbours on future special occasions. However, in everyday life, fishing is an important source of income for Wai villagers. After putting aside fish for their own family, most respondents (75.5%) either sell their catch to middle persons in the village or in the town markets.

(c) Sense of solidarity among villagers

To examine residents' sense of solidarity, respondents were asked who they thought would act to deal with a situation in which there was a sudden decline in local fish catch. Nearly 83% of respondents of both districts answered that they would collectively solve the problem, although different levels of action were suggested (Table 4). In Cuvu, nearly half (48.3%) responded that the entire district would work together to solve the problem, whereas about one-third (32.8%) thought the entire village would work together.

Interviews also revealed that Cuvu residents generally consider solidarity at the district level to be important for MPA management, although some villages of Cuvu claim nested property rights at the village level (Sano in press). The following opinion reflects the villagers' attitude that unity leads them to better ideas and solutions in resource management: "If every village does conservation individually, then there could be problems. But if we have the whole district work together, anybody fishes in the area work together, conservation will become stronger, because everyone will respect the MPA ideas."

In Wai, the ratio of people who answered that they would collectively solve the problem was lower. While 30.5% of respondents chose the village level as the level where problem solving actually occurs, 16.9% chose the district. In addition, 22% answered that all village leaders work together. One notable finding was that 23.7% of respondents in Wai answered that the NGO would be able to deal with the problem, a far higher percentage of respondents than in Cuvu (1.7%). Although it is difficult to draw a definite conclusion, this suggests that Wai residents share a common belief that someone else would solve their problems.

Bridging social capital in Cuvu and Wai districts

Whereas bonding social capital is strong social ties within a community, bridging social capital is "weak ties", which can provide a group with information, opportunities and technology that the group does not possess. Information flows can be facilitated by bridging social capital because of enhanced transparency and reduced transaction costs. Granovetter (1973) argues that less intense relationships with others are a source of strength because they provide access to new information or other kinds of resources unavailable to those locked into highly dense, self-contained networks.

(a) Access to external assistance

Neither of the two districts has received large-scale development projects. They have obtained support from NGOs only for building small-scale infrastructure and mangrove planting, in addition to regular

8. 1 Fijian dollar = 0.58 US dollar

Table 1. Use of borrowed fishing gear.

	Cuvu District			Wai District		
	Male	Female	Total	Male	Female	Total
Use borrowed fishing gear	15 (60.0%)	9 (26.5%)	24 (40.1%)	9 (33.3%)	13 (43.3%)	22 (38.6%)
Don't use borrowed fishing gear	10 (40.0%)	25 (73.5%)	35 (59.3%)	18 (66.7%)	17 (56.7%)	35 (61.4%)

Table 2. Obligation for borrowed fishing gear.

	Cuvu District			Wai District		
	Male	Female	Total	Male	Female	Total
No obligation	5 (33.3%)	1 (11.1%)	6 (25.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Pay money	0 (0.0%)	0 (0.0%)	0 (0.0%)	3 (33.3%)	1 (7.1%)	4 (17.4%)
Give part of fish catch	10 (66.7%)	8 (88.9%)	18 (75.0%)	6 (66.7%)	13 (92.9%)	19 (82.6%)
Total	15	9	24	9	14	23

Table 3. Use of extra fish in catch.

	Cuvu District			Wai District		
	Male	Female	Total	Male	Female	Total
Sell in village	1 (4.0%)	1 (2.9%)	2 (3.4%)	17 (63.0%)	12 (40.0%)	29 (50.9%)
Barter with other residents	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (3.7%)	0 (0.0%)	1 (1.8%)
Give to chief	2 (8.0%)	1 (2.9%)	3 (5.1%)	1 (3.7%)	1 (3.3%)	2 (3.5%)
Give to relatives	22 (88.0%)	29 (85.3%)	51 (86.4%)	5 (18.5%)	9 (30.0%)	14 (24.6%)
Give to other residents	0 (0.0%)	1 (2.9%)	1 (1.7%)	0 (0.0%)	1 (3.3%)	1 (1.8%)
Sell in market	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (7.4%)	7 (23.3%)	9 (15.8%)
Other	0 (0.0%)	2 (5.9%)	2 (3.4%)	1 (3.7%)	0 (0.0%)	1 (1.8%)
Total	25	34	59	27	30	57

Table 4. How to solve a resource problem ("If there were a sudden decline in fish catch in village waters, who do you think would act to deal with the situation?")

	Cuvu	Wai
Each household would deal with the problem individually	1 (1.7%)	1 (1.7%)
Members of sub-clan among themselves	4 (6.9%)	0 (3.4%)
The entire village working together	19 (32.8%)	18 (30.5%)
All village leaders working together	4 (6.9%)	13 (22%)
The entire district work together	28 (48.3%)	10 (16.9%)
NGO	1 (1.7%)	14 (23.7%)
Government official	1 (1.7%)	3 (5.1%)
Total	58	59

support from national government subsidies for the installation of flush toilets. Wai District received the attention of academic researchers in their development-related project.[9] Development projects implemented by outside organisations in the two districts are summarised in Table 5, which shows that Wai had a few more than Cuvu. However, a qualitative analysis suggests that these were small in scale and short in duration. Therefore, I assumed that the two districts possess similar levels of bridging social capital in terms of access to external assistance in village development.

(b) Relationship with NGOs regarding MPAs

The CBCRM projects in Cuvu and Wai both started in 1999 with assistance from NGOs, namely PCDF and WWF. Interviews with officers of these two NGOs revealed that both "emphasised a bottom-up approach in promoting the conservation of coastal resources". The NGOs take residents' participation and initiative seriously, as stated by two officers: "Communities themselves are involved in decision making. All issues must come up from the community. It's a community management plan. That's why we conduct community workshops and we bring all stakeholders in the workshops, fisheries, environment, forestry and agriculture," remarked one NGO officer. "We didn't make the *tabu* [MPA]. That was the initiative of the people. We facilitated talks in the villages and everybody agreed to it," stated another NGO officer.

Although both NGOs took participatory approaches, opportunities given to villagers varied between the two districts. To measure the degree of villagers' participation in MPA planning, respondents were asked how many times they attended a workshop or training on MPA. Table 6 shows that workshop attendance was different between the districts ($P<0.05$, t-test), and demonstrates that Wai villagers had a relatively limited opportunity to attend workshops related to MPA management.

Table 6. Difference in number of attendance in workshops between districts

Mean		*T*-value	*P*-value
Cuvu	Wai		
2.47	1.98	2.516	.013

Cuvu: n=55, Wai: n=60

It seems that the lower levels of participation in Wai resulted in part from how WWF planned workshops. Management-related workshops organised by WWF were held in one of the villages of Wai, and some residents selected from other villages travelled to join the workshops. As one respondent stated, "Since 1999, March this year [2004] was the first time they [WWF] went to all the villages one by one. Before, WWF paid the participants the fare to come to this village...Five people were chosen from each village. They chose the community reps from each village, *Turaga ni Koro* [village leader], maybe one or two women, and two youth from each village".

It is noteworthy that villagers' perceptions of NGO presence also seem to differ between the two districts. In the survey, 19.4% of Wai respondents answered that the NGO made decisions regarding fishing rules (Fig. 4). In contrast, less people in Cuvu answered that the NGO did so (6.7%). This difference might have resulted from the different participation processes of each project. Cuvu residents had more chances to attend management planning workshops because they were held in five different villages in the initial stage of the project. Further, more frequent participation in the planning stage might have promoted villagers' sense of

Table 5. Projects in Cuvu District and Wai District supported by outside organisations.

	Title	Target group	Year	Sponsor/implementing organisation
Wai	Installation of tanks for drinking water	Lomawai and Kubuna villages	1996	OISCA
	GIS as a Planning Support Tool for Community Integrated Tourism Development Project	Representatives from all villages	2004 (2 days)	Department of Tourism and Hospitality, University of the South Pacific
	Mangrove planting	Lomawai Village	2004 (1 day)	Peace International Association
Cuvu	Children's Forest Programme	Students of Cuvu District school	1993	OISCA
	Mangrove planting	Yadua and Tore villages	1995	OISCA

9. "GIS as a Planning Support Tool for Community Integrated Tourism Development Project" was implemented by the Department of Tourism and Hospitality of the University of the South Pacific.

project ownership and familiarity with the NGO. In other words, the degree of participation in CBCRM projects might depend on how bridging social capital of villages is constructed. Cuvu residents were more likely to become involved in CBCRM than Wai residents.

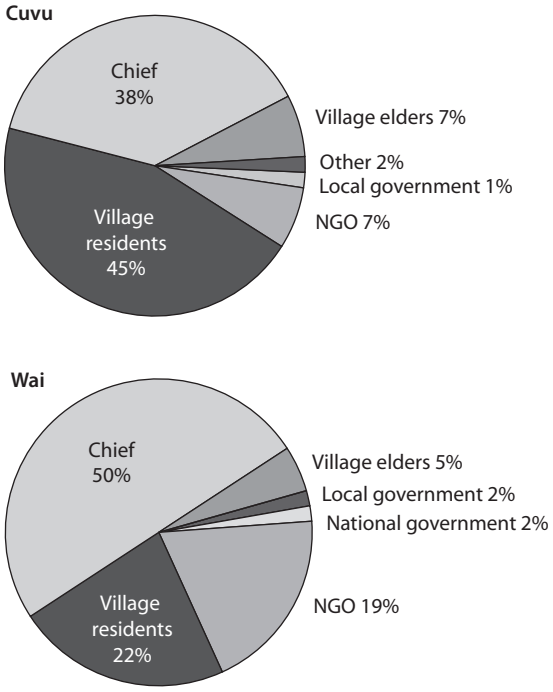

Figure 4. Decision-makers ("Who makes decisions about changes to the fishing rules?") (Cuvu: n = 60, Wai: n = 62)

(c) Relationship with government officials

For NGO officers, collaboration with government is the key to implementing long-lasting resource management. During project preparation, both NGOs (PCDF and WWF), first made contact with the districts through the provincial office. Generally, such local branches of government agencies such as the provincial office, Fisheries Department, Forestry Department and Environment Department, are invited to village workshops because NGOs consider that building a bridge between villages and government agencies is important for the sustainability of CBCRM. As a PCDF Officer explained: "When we hold workshops in the villages, we invite the officers to present … We invite representatives from the Fisheries and the Environment Departments so that we can have the integrated approach. This is necessary, because once we will pull out from the project, the government will be still responsible for the project." However, it seems that villagers do not always acknowledge government support in their CBCRM activities. Only 1.7% of Cuvu respondents and 5.1% of Wai respondents answered that government officials would act to deal with the situation if there were a sudden decline in the fish catch in their village waters. No respondent stated that government was helpful in CBCRM. In fact, owing to a lack of funding and expertise at the provincial office, the government is not able to implement its own projects on resource management, although it recognises the importance of resource management.

To summarise, the bridging social capital, operationalised as the formal and informal relations between the villages of the two districts and the provincial government, is weak. Owing to a lack of manpower and budget, it is apparently difficult for provincial officers to visit every district, as instructed by the government. In particular, neither budget nor staff in the provincial government is dedicated to CBCRM, although the officer is aware of its importance. Instead, the provincial government intends to facilitate NGO involvement in CBCRM, thus building bridging social capital in villages.

Functions of bonding social capitals in CBCRM in Cuvu and Wai districts

The major theoretical functions of bonding social capital are first to facilitate common understanding and knowledge among resource users, because strong ties among villagers make knowledge diffusion easier, and second to make rule enforcement easier because reciprocity can be used in social dilemmas involving an assessment of the likelihood that others are conditional cooperators.

Drawing on material obtained during fieldwork, I argue that, in the case of CBCRM in Cuvu and Wai districts, bonding social capital plays two critical roles to make institutions work. These are promotion of common understanding and shared knowledge, and better rule enforcement.

(a) Promotion of common understanding and shared knowledge

Bonding social capital in the context of CBCRM facilitates the diffusion of knowledge and information among villagers. Owing to strong bonds, information and knowledge are disseminated smoothly among villagers. An example of this was found in well-organised village meetings. In each village of Cuvu District, meetings are held every two weeks, and all adults attend. According to the survey, 83.3% of respondents in Cuvu answered that when there is any change in fishing rules, they obtain information in village meetings (Fig. 5). If necessary, additional meetings are held. Although because of both custom and hierarchy, women and youth are normally quiet during meetings, all villagers hear about both the content and the process through which decisions are

made. Even when a person is absent, it is not difficult for him/her to receive information as a result of the high level of bonding social capital based on the close relationships among family and relatives. In addition, all respondents answered that the village leader is responsible for information dissemination. Since villages in the two districts are relatively small, residents are able to share information.

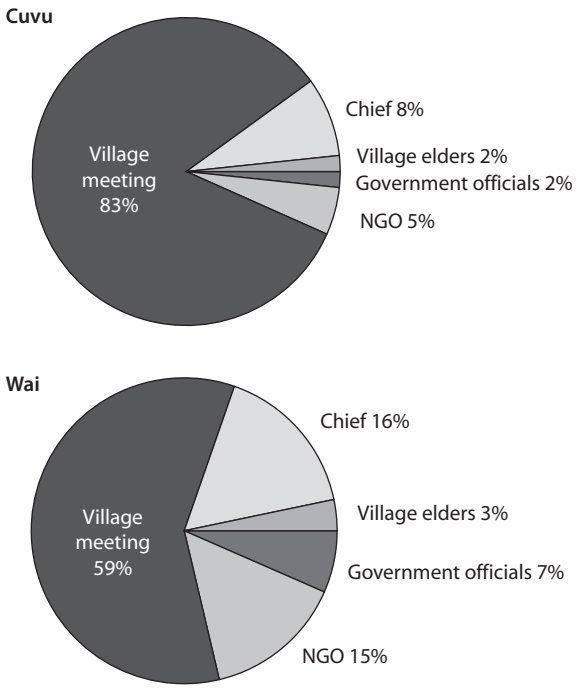

Figure 5. Information source in village (Cuvu: n = 60, Wai: n = 61)

Like Cuvu, the villages of Wai District hold meetings in their community hall every other Monday. All adults must attend. Although compared with Cuvu, more respondents chose an NGO and the chief as an information source, 59% of Wai respondents answered that they would know in the village meeting if there were any change in the fishing rules. Wai village leaders suggest that they have strong connections with other leaders, so the sharing of information among them is easy. Important information from other villages, such as MPA openings, is then passed to village members in the Monday meeting and shared. One villager emphasised the significance of information sharing to make the MPA effective: "It's better to tell people where *tabu* is so that no one will go in. In each village, Turaga ni Koro [village leader] has to go through the process [of information sharing] to tell people that they can just go fishing in the village water, but they cannot go in the *tabu* area." Better rule enforcement — Provision of low-cost adjudication

Rule enforcement is necessary for long-term CPR management (Gibson et al. 2005), and bonding social capital is important in the provision of appropriate monitoring and sanctions. In the districts of Cuvu and Wai, fish wardens, selected from villagers for the purpose of monitoring, are accountable to other villagers for keeping an eye on resource conditions and user behaviour. Villagers know the fish wardens personally, as they are locally chosen from the community and understand their roles in CBCRM. As Ostrom argues (2000:151), trust based on strong bonds among fish wardens is a necessary condition for enduring CPR management. The result is that the rest of the village can be motivated to cooperate, without fear that they are being taken advantage of.

Villagers' sense of reciprocal obligations also helps keep sanctions graduated. Bonds based on kinship allow for local sanctions to be just a simple warning, because the level of trust and reciprocity among villagers is high and mistakes tend to be forgiven. In economic terms, the cost for rule enforcement remains low. As Ostrom (1990) argues, low-cost rule enforcement is a necessary condition for long-lasting CPR management.

Functions of bridging social capital in CBCRM in Cuvu and Wai districts

The literature (e.g. Fedderke et al. 1999; Grafton 2005) suggests that the theoretical functions of bridging social capital are three-fold. Bridging social capital promotes stakeholders' understanding of CBCRM and its rules by: 1) bringing new knowledge and technology from external groups, 2) building links across neighbouring communities and other external stakeholder, and 3) organising consistent rules in multiple layers of nested enterprises.

(a) Villagers' understanding and knowledge of CBCRM

Bridging social capital facilitated access to and the creation of knowledge of MPA in villages. Every villager in the two districts stated that the idea of establishing an MPA was brought by NGOs. Although NGOs gave credit to villagers themselves for starting the conservation activities in their villages, it is apparent that the knowledge and technology were transmitted from outside through NGOs' village activities. Although an officer of the NGO admitted that making an MPA by enclosing only a small portion of *qoliqoli* is not effective enough for biodiversity conservation, bridging social capital certainly contributed to the creation of knowledge in villages for residents to take action in the management of natural resources.

In Cuvu District bridging social capital seems to have had clearer effects. Through the workshops organised by PCDF villagers developed a recog-

nition that conservation is important for sustaining their life. NGOs recognise that knowledge transmission from them to villagers is significant for long-lasting resource management. Officers of both NGOs expect villagers to act as resource managers in their own village. Following Clark's (Clark 1995:310) argument that resource users can be the day-to-day managers in implementing resource management, NGOs consider that assisting villagers to organise themselves as monitors of resource uses is an effective strategy. In addition, the WWF officer said that villagers who are trained in their project are expected to disseminate their knowledge and experience to other villages, in order to extend proper management of natural resources. An officer of another NGO based in Suva, and who is also involved in the FLMMA Network, confirmed this dissemination effect: "After we made success in one district, people in other villages became interested in marine conservation and having *tabu* [MPA] in their villages. They learned the success from the project leader in another village and asked us to work in their village. Sometimes the media, like radio and newspaper, helps information passed on, but the important point is local people who experienced a good practice in conservation tell other locals in their own words." Building links across neighbouring communities and other external stakeholders for low-cost adjudication

Internal mechanisms based on bonding social capital at the village level are significant for villagers to make the local rules clear at their level. On the other hand, where a community has conflicts with an individual or group outside the community, links across the community may be necessary to mitigate the conflict, because they facilitate communication and knowledge exchange between parties. Such cases could include adjacent or neighbouring communities or other outsiders.

In Cuvu, external ties have been extended to solve potential conflicts with a neighbouring community. Owing to the mobility of coastal resources, establishing rules in one village without doing so in a neighbouring village will produce ineffective institutions that might not be long lasting. Therefore, building networks among villages can provide them with opportunities for inter-communication and knowledge sharing. One village (Yadua) has started collaborative work with a neighbouring village, which has not been involved in the project. To make monitoring easier, Yadua village (Cuvu District) planned to relocate their MPA near the border of the neighbouring village, Volivoli. This cooperative link between villages should support sustainable use of resources.[10] The shared knowledge about conservation may eventually affect neighbouring villagers in their future use of the *qoliqoli*.

(b) Consistency of rules and management strategies at multiple levels

Governance activities organised in multiple layers of nested systems that range from small to large can solve diverse problems involving issues of different scales (Ostrom 1990:102; Ostrom 2000:152). Rules at one level must take rules at other levels into account, or else the system may become incomplete and its sustainability uncertain. If bridging social capital transfers knowledge from government to citizen, it should help to organise rules and strategies of management at the grassroots level consistent with government policy. In other words, if bridging social capital transfers knowledge of national laws to villagers, then community rules made as part of the CBCRM project activities in the two districts should be consistent with the existing legislative framework. For example, villagers are appointed as fish wardens by the Minister for Agriculture, Fisheries and Forests, and their duties are specified in the Fisheries Act. Through NGOs' effort to involve government agencies in the project, the Fisheries Department dispatched its officer to the villages to train and certify the wardens. NGOs also provided the villagers with information on the current national law regarding property rights of marine resources. In the two study areas, villagers understand how the law regulates resource ownership between the nation and local resource users. This has helped to increase common understanding in CBCRM, and to keep the management system consistent and stable.

Bridging social capital also functions to sustain consistent management strategies so as to facilitate sustainable use of resources on a larger scale. Both Cuvu and Wai have conducted coastal management activities within the framework of LMMA, although Cuvu later left the Network. The LMMA Network has developed a "Learning Framework" to share knowledge, skills, resources, and information among participating projects. Participating projects use the framework for monitoring activities, and expect to use the information for understanding the factors that contribute to the success or failure of project activities. NGOs that initiated CBCRM projects in Fiji are well recognised by the government officials at the provincial level, owing to their mobility and financial support.

10. For the purpose of this thesis, bonding social capital is defined as ties among residents within a single district. The ties between Yadua and Volivoli are considered bridging social capital, although it involves neighbour relationships between indigenous Fijians.

Effects of bridging social capital on rule compliance

So far, the results of this study concur with the theoretical functions of bridging social capital as suggested in the literature (Fedderke et al. 1999; Grafton 2005). However, I wish to stress that bridging social capital can affect people's compliance with the rules of resource use. Ostrom (1990) states that the presence of good rules resulting from appropriators' participation does not ensure that appropriators will follow them. She argues that the monitoring of rule conformance could be more important than participating in decision-making. However, in case studies, appropriators' attitudes were affected by the opportunity of participating in the rule-making process.

Every village in both Cuvu and Wai districts has nominated two fish wardens who conduct irregular monitoring activities. On the other hand, no regular external monitoring is implemented, and no external sanctions are effective in both districts. Although there is no distinctive difference between districts regarding monitoring and sanctioning, the degree of compliance with local resource use rules is higher in Cuvu than in Wai. This is the result of the difference in the degree of villagers' participation in rule-making between the two districts, caused by the different project procedure and approaches of the two NGOs. As one respondent commented:

Before the project started, WWF visited first to see the clan chief in the main village of the district. This resulted in a specific project activity. In short, the project put an emphasis on the chief's opinions, and the opportunity for villagers' participation in decision making regarding MPA establishment was limited. Few residents who actually engage in fishing activity were involved in the rule making, and thus lack a sense of participation in the rule making process. One fisher perceives the decision regarding the MPA establishment to have been made unilaterally by the chief: "When the *tabu* [MPA] was put, only chief decided where to put it. Nobody else was involved."

According to this fisher, the previous chief's decision on the location of an MPA, is not sufficient in protecting juvenile fish. Although these fish are found in the river mouth, the MPA cannot protect them sufficiently because it is set in a different place. As the fisher continued: "*Tabu* [MPA] should be put in a place where fish grow. I have seen a lot of baby fish in the river mouth area, but people fish in this area. Now we have *tabu* in other place but it should be in the river mouth. The location should be changed. Other people, I mean fishermen, know this too. If the chance is given, I would like to raise this in the village meeting." The current chief agreed with the fisher's opinion that participation was not enough. Although the residents of Wai who participated in the study respected the previous chief, some discontent was observed with the rule that the ultimate authority lay with the chief and how his decisions may have affected the residents' compliance to MPA rules. Specific attributes of the particular resource need to be considered in rules in CPR management, as argued by Ostrom (1990), as one of the principles for long-enduring CPR is that "Appropriation rules restricting time, place, technology, and/or quantity of resource units are related to local conditions and to provision rules requiring labour, material, and/or money" (Ostrom 1990:90).

Detailed in her later work (Ostrom 1998b), and one of the important points this principle suggests, is that the rules must have a linkage with local ecological conditions. However, as a Wai villager stated, the specific attributes of the marine resources in these particular areas, which have been built up in interactions with villagers' resource use patterns, were not taken into account in designing rules in use. The ecological congruence between institutions and local conditions may not be as strong in Wai District, owing to a project process that failed to incorporate villagers' local knowledge, particularly in rule making. This discourages villagers from complying with the rules of resource use.

Conclusions

In this article I have analysed the function of bonding and bridging social capital in CBCRM in Cuvu and Wai districts. Previous studies on Fiji argued that traditional practices that contribute to conserving coastal resources have been largely maintained (e.g. Veitayaki et al. 2001). Operations of those practices, such as imposing seasonal bans, temporary no-take areas, or restricting particular types of fishing methods, are supported by strong bonds that have been formed in Fijian communities. Traditional norms of hierarchy restrict people's behaviour and require obedience to the community's rules. These rules are often arbitrarily imposed by a chief or another elder, and strong bonds that facilitate trust among the people in the community are necessary to maintain long-enduring CBCRM institutions.

By building bridging social capital with NGOs, villages of Cuvu and Wai gained access to new knowledge and information on coastal resource management and MPAs. Bridging social capital between Fijian communities can work to mitigate or avoid conflict between them, by facilitating understanding of CBCRM objectives and rules in another village. Further, bridging social capital connects the village and different levels and types of organisations, particularly government agencies. By providing not only knowledge to villages, but also incor-

porating government agencies into the process of CBCRM, local rules, such as the village fish warden system, can be consistent with the existing legislative framework, thereby leading to greater stability in the entire management system.

The two NGOs chose different strategies in their community-based projects, and the results were different. When relationships were built that took into consideration the interests of each community member, rather than considering the community as a homogeneous unit, rule compliance was higher. The "individual approach", which allowed individual villagers to participate in the process of MPA formulation, was more successful in the involvement of community members. The lack of participation failed to incorporate resource users' knowledge and experience into management planning, resulting in the lower congruence between institutions and local conditions. However, to enable generalisation of the effect of NGO approaches to CBCRM, further examination is required of how other factors, such as attitudes of the chiefs or the degree of each villager's involvement in the market economy, is responsible to villagers' compliance with local rules.

The study reported on here aimed to explain how different types of social capital function in CBCRM in Fiji. It does not make any assumptions of moral superiority of a given type of social capital in Fijian society. However, whatever the characteristics of social capital in a particular community, rural Fijians are increasingly under pressure to participate in a global economy, thus bringing pressure on local natural resources. These changes in the lives of Fijian people require higher levels of bridging social capital for the purpose of coastal management. This allows people in a small community to obtain the new ideas, technology and funds that are necessary to improve the status of natural resources. To improve marine resource management at the village level, the challenge is to identify a strategy for building bridging social capital that is consistent with the bonding ties that already exist.

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