RESEARCH ARTICLE

Social capital plays a central role in transitions to sportfishing tourism in small-scale fishing communities in Papua New Guinea

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Abstract Growing concerns about pressures of global change on small-scale fishing communities have resulted in a proliferation of livelihood diversification initiatives linked to tourism. Where the focus is often on the role of financial, physical, and human capital in influencing the uptake of new opportunities, we argue for more consideration of the role of social capital. We implemented 157 household-level surveys in small-scale fishing communities in Papua New Guinea and modelled the influence of social and other capital assets on people's perceptions of how easy it would be to become involved in sportfishing tourism. Social capital had a stronger influence relative to other forms of capital, with perceptions of reciprocity and satisfaction with leadership being the most influential aspects. Based on these results, we stress the importance of developing strategies aimed at understanding, building, and maintaining social capital and related social dynamics when implementing livelihood diversification initiatives.

Keywords Pacific Islands · Papua New Guinea · Social capital · Sportfishing · Sustainable livelihoods · Tourism

INTRODUCTION

Island nations in the Pacific are facing increasing pressures from natural resource extraction, population growth, globalisation, and climate-related processes. These are affecting the livelihoods and survival of small-scale fishing communities (Lauer et al. 2013). Diminishing natural resources and intensifying rates of global change are making the diversification of livelihoods through the uptake of new and sustainable alternatives increasingly

important for improving social and ecological resilience (Allison and Horemans 2006; Butler et al. 2014).

A livelihood comprises people, their capabilities, and their means of living, including food, income, and assets (Chambers and Conway 1992). The Sustainable Livelihoods Framework is an established tool designed to understand complex dynamics of rural livelihoods (Scoones 1998). The framework suggests that people's ability to achieve sustainable livelihood outcomes is influenced by a combination of macro- and micro-scale factors. At the macro level, these include vulnerability (e.g. cycles, trends and shocks beyond local control) and broader-scale governance including policies, institutions, and processes. At the micro or local level, people's livelihoods are governed in large part by their access to a combination of capital assets, which include social, human, natural, physical, and financial capital (DFID 1999).

Growing concerns about poverty, food security, and vulnerability to climate change in Pacific Islands have resulted in a proliferation of initiatives aimed at diversifying livelihoods in fishing communities (Govan 2011; Wood et al. 2013). Social and cultural considerations often take a back seat to other factors such as infrastructure, education, and financial needs in the implementation of these initiatives. However, social dynamics also play a crucial role in determining outcomes of economic development (O'Garra 2007; Curry and Koczberski 2013; McCormack and Barclay 2013). In practice, many alternative livelihood initiatives fail to achieve their intended outcomes due to overly simplistic expectations of how communities will engage with new income earning opportunities and failure to consider the constraints faced by isolated, traditional communities in transitioning to more Westernised forms of economic activity (Gillett et al. 2008).

In small-scale fishing communities, people's livelihoods and well-being are intimately connected to marine resources and resource governance tends to be devolved to the community level (Berkes 2010). Thus, application of the Sustainable Livelihoods Framework in such communities has confirmed that local dynamics such as household-level access to capital assets are central to influencing livelihood outcomes (Allison and Ellis 2001). Social capital is composed of relationships of trust, reciprocity, social norms, rules and sanctions, and networks. Its importance can be accentuated in very isolated communities, where limited or negligible access to physical and financial capital means that social and natural capitals, including the interactions between them, play more central roles in people's livelihoods (Allison and Ellis 2001; Pretty 2003).

Many alternative livelihood initiatives are linked to tourism (Mowforth and Munt 2009; Tao and Wall 2009) and the potential role of community-based tourism as a complementary livelihood opportunity has explicit mention in international policy on small-scale fishery management (FAO 2015). Nature-based tourism is commonly considered to have the potential to support development and marine resource management in the Pacific (Gillett et al. 2008) and in Papua New Guinea (PNG; Imbal 2009). However, for similar reasons as those mentioned previously in the context of economic development, tourism initiatives often fail to deliver their intended benefits (Harrison 2010; Bennett et al. 2014) and have been met with resistance by local communities in Melanesia (e.g. Sofield 1996). In PNG, it has been noted that successful tourism initiatives depend on local agency and engagement, and should not have extreme impacts on traditional ways of life, which are intimately tied to social and natural capital (Imbal 2009; Sakata and Prideaux 2013; Gabriel et al. 2017).

The early stages of tourism development are critical for shaping future outcomes (Mowforth and Munt 2009). For isolated communities such as many of those in Melanesia, people are likely to be unfamiliar with the concept of tourism and the opportunities it brings with it. Understanding what influences their beliefs about their capacity to enter into this new livelihood venture is an important first step in the livelihood diversification process. Resident perceptions of tourism have been used repeatedly to study the dynamics of this transformation from the perspective of local communities (e.g. Harrill 2004). One of the main motivations for conducting such studies is that negative attitudes among residents can hinder the success and sustainability of tourism destinations (Diedrich and Garcia-Buades 2009).

In this study, we focused on factors that influenced people's perceived transitions to sportfishing tourism as an alternative livelihood in West New Britain, PNG, a place

where livelihoods are heavily influenced by kinship and indigenous socio-economic values (Curry and Koczberski 2013; Curry et al. 2015). We used Classification and Regression Trees (CARTs) to explore the influence of five capital assets (social, natural, financial, physical, human) on how people perceive their potential transition into sportfishing and hypothesised that social capital would have the strongest influence on our dependent variable.

This research was part of a larger, interdisciplinary study that assessed ecological, social, and economic implications of sportfishing tourism in PNG. Worldwide, up to 700 million people participate in sportfishing, spending over US\$190 thousand million annually (World Bank 2012). Although most of the global expenditure is in developed countries, sportfishing tourism has the potential to promote conservation, diversify livelihoods, and generate resources to leverage sustainable development opportunities in tropical developing countries (Wood et al. 2013; Barnett et al. 2016). At the same time, sportfishing has the potential to generate environmental benefits by creating incentives to conserve targeted species and their key habitats (Idechong and Graham 2001). At the national level, sportfishing can provide additional revenue streams and lessen dependence on extractive industries (Kauppila and Karjalainen 2012). Sportfishers' desires to fish for new and exotic species in 'pristine' locations are likely to extend fishing impacts to more isolated species, cultures, and environments that have had little exposure to the influences of the developed world (ibid.), which has been the case for Black Bass fishing in PNG. Most of our understanding of how to achieve best practice in sportfishing tourism has been in the context of developed countries and there is a need to better understand the challenges specific to developing destinations (Wood et al. 2013; Barnett et al. 2016).

MATERIALS AND METHODS

Study context

We carried out household-level survey interviews in August 2015 in three communities in the Province of Western New Britain: Baia (inclusive of two settlements to the West of the main village called Silaleve and Loiloi), Vesse, and Somalani (Fig. 1; Table 1). These villages were selected as they are located in the vicinity of two sportfishing lodges; one at Baia and one on an island called Uluai, which is close to Vesse (3 min by boat) and Somalani (45 min by boat). All three communities relied predominantly on fishing and farming at the subsistence level (Table 1), and access to markets and basic infrastructure was very limited. None were accessible by paved

Fig. 1 Location of the sportfishing lodges neighbouring the study villages in West New Britain, Papua New Guinea. Vesse and Somalani are associated with the lodge at Uluai and Baia is associated with the lodge to the east of Kimbe, the main commercial centre in the province

Table 1 Demographic characteristics of respondents in three villages surveyed ($n = 157$)

Characteristics	Baia	Somalani	Vesse
Number of households interviewed	34	68	55
Percent of households interviewed	97	100	100
Percent of male respondents	65	75	76
Age of respondents			
Under 21 years old (%)	12	4	2
21–30 years old (%)	30	21	22
31–40 years old (%)	30	25	30
41–50 years old (%)	9	19	23
Over 50 years old (%)	18	31	24
Average grade respondent completed education	7 (SD 3.3)	8 (SD 3)	8 (SD 2.5)
Subsistence level ^a	1.9 (SD 0.4)	2.1 (SD 0.8)	2.1 (SD 0.8)
Average # occupations per household	5	6	6
Number of households with at least one member directly involved in sportfishing	4	1	3

^a Four-point ordinal scale of % fish and crops sold in market (4 is 100% sold at market)

road at the time this study was conducted. All communities had very limited access to health services (small facilities with several nursing practitioners) and access to education at the primary level. Baia was the most isolated community, located about 230 km north east of the regional centre of Kimbe. Besides a logging road only accessible by 4WD vehicles in the dry season, Baia was accessed by boat, which placed significant financial stress on those villagers wishing to access permanent markets or other facilities in the main town. At the time this research was conducted, the main source of income in this village was the sale of marine products and bush materials (e.g. sago, betel nut) in neighbouring logging camps and markets.

The other two villages were closer to Kimbe (between 3.5 and 10 km to the west), and were located on islands. Once on the mainland (about 30 min by boat), the villagers had access to infrequent public transport. Similar to Baia, the absence of a permanent market in the villages meant that locals must travel to Kimbe at considerable expense to sell their products. Most commercial products were crop or fish based, with some additional sources of cash being the sale of traditional mats, shell money, and canoe making. Vesse had some engagement in logging and oil palm, which was an additional source of cash flow for some community members. Sportfishing, the only form of tourism, had been present for more than a decade in Baia and

Table 2 Definition of capital asset variables

Capital asset variables ^a	Variable(s)	Measures
Human		
Skills, knowledge, ability to labour, and good health that together enable people to pursue different livelihood strategies and achieve their livelihood objectives (sheet 2.3.1)	Satisfaction with personal and family health Satisfaction with personal and family education level and access Satisfaction with ability to find employment	Composite ordinal scale (0–32)
Social		
Social resources upon which people draw in pursuit of their livelihood objectives (sheet 2.3.2)	Trust of other village members Perceptions of reciprocity in village Satisfaction with relationship with family and friends Satisfaction with relationship with people in village Satisfaction with leadership in the village Networks (# community organisations belonged to rescaled 0–10)	Composite ordinal scale (0–65)
Physical		
Infrastructure and producer goods needed to support livelihoods (sheet 2.3.4)	Household boat access	Ordinal scale (four-point scale; none: owns boat with motor)
Natural		
Natural resource stocks from which resource flows and services (e.g. nutrient cycling, erosion protection) useful for livelihoods are derived (sheet 2.3.3)	Satisfaction with access to food in sea and river Satisfaction with access to food from other sources Satisfaction with environmental health	Composite ordinal scale (0–32)
Financial		
Financial resources that people use to achieve their livelihood objectives (sheet 2.3.5)	Household Material Style of Life	Factor score

^a Definitions sourced from DFID (1999)

several years less in the other two villages. However, there were still relatively few households directly involved in the activity (Table 1). This was mostly due to the small-scale nature of the enterprise (e.g. lodge capacity of < 12 visitors in both locations) but was also representative of isolated communities in the early stages of tourism development. Despite the low level of direct participation in the industry, financial benefits were shared more extensively throughout the communities in the form of fees paid directly to village leaders by the tourism business. At the time this study was conducted, villagers in Somaleni were building a sportfishing camp 1 km up the river from their village. Once complete, the camp will have the capacity to accommodate up to 24 tourists.

Survey instrument

The household-level survey was designed to capture a broad range of social and economic factors related to people's livelihoods and experiences with sportfishing tourism. The independent variables used for this analysis were derived primarily from Likert-scale questions (0–10) to determine people's satisfaction and beliefs related to the five capital assets (Table 2). Our dependent variable was a five-point ordinal scale question about the perceived ease of becoming more involved in sportfishing tourism. We also collected basic demographic data (e.g. age, education level, gender) and a checklist of household items and facilities (e.g. electricity, roof material, piped water, etc.)

designed to measure the households' Material Style of Life (MSL).

The survey design was informed by a scoping study conducted in our study communities in 2015. It was translated into the local language, *Tok Pisin*, by the research team using a back-translation method and was piloted on *Tok Pisin* speaking students at the authors' home institution. Data collection was conducted in August to September 2015 by a team of researchers bilingual in *Tok Pisin* and English. As the communities were small (35–68 households), we aimed for a complete sample of households. Local assistants from each village were involved in facilitating the survey questionnaires, ensuring an almost complete household sample (Table 1). Surveys were implemented face-to-face with one member of each household over the age of 18.

Analysis

We interviewed one person from almost every household in participating villages resulting in a final sample of 157 households across the three villages (Table 1). We conducted our analysis using SPSS v.23.0.0 (2015). We attributed one variable, or combination of variables to each of the capital asset categories, resulting in five capital asset independent variables (Table 2). The composite variables representing human, social, and natural capital were composed primarily of subjective measures. Basic infrastructure related to health and education services was relatively uniform and very limited across all of the study communities. Thus, we considered people's satisfaction with the different factors that make up human capital to be a more accurate measure of how access to (or lack of) human capital might affect their potential involvement in sport-fishing tourism. Similarly, we considered people's satisfaction with environmental health and their ability to access food from natural resources to be a more accurate predictor of potential outcomes than objective measures, which would be hard to determine at the individual level. Social capital is notoriously complicated to measure objectively (Durlauf 2002). Where social networks can be observed and measured, the characteristics of the ties that link people together such as trust and reciprocity are more subjective and difficult to define, with their interpretation varies among individuals. Thus, it is not uncommon for studies on social capital to include subjective measures (Portela et al. 2013; Diedrich et al. 2017).

We used objective measures for physical and financial capital, as these are generally more tangible than the other capital assets. Access to both of these assets as defined by DFID (1999) was negligible across our study communities, so we used two proxy variables to represent each of them. In the case of physical infrastructure, we observed that

people in the community were differentiated largely by their access to or ownership of a boat (e.g. canoe, or with a motor). Boat access is an important household level item affecting people's livelihoods in small-scale fishing communities (Allison and Horemans 2006). For these reasons, we used boat access as a measure of physical capital. We used MSL to represent people's financial capital (or wealth) as using measures associate with the DFID definition (e.g. access to credit, savings accounts) was not relevant to most of the households in our sample.

A principal component analysis (Oblimin with Kaiser normalisation) of the items representing MSL revealed two main categories of households; those with 'higher MSL', characterised by more modern amenities such as access to a generator, TV, and electricity, and 'lower MSL', characterised by the household being constructed from traditional materials such as thatch roof and walls. 'Higher MSL' explained 22% of the variance in the data set and we used the factor score of this component as a proxy for financial capital.

We used CARTs to model the influence of our independent variables on our dependent variable. We used CART primarily because it accommodates data measured at multiple scales; does not rely on strict assumptions such as normality and homogeneity of variance; accommodates multiple interactions among variables; and is robust for use with categorical data with large numbers of categories (De'ath and Fabricius 2000). Our first model used the five capital asset variables as independent variables and our second model explored the influence of the disaggregated social capital asset variables on our dependent variable (Table 2).

A one-way ANOVA test with post hoc Tukey-*b* showed that there were differences across the villages for our dependent variable ($F(4.2, 75.9) = 3.2$; $p = 0.044$). Baia residents perceived involvement as slightly easier ($M = 3.5$; $SD = 0.6$) than Vesse residents ($M = 3.2$; $SD = 1.0$) and Somalani ($M = 2.9$; $SD = 0.8$) scored lower than Vesse. However, 'village' was included in the CART model as an independent variable and did not influence any of the splits, suggesting that individual level characteristics were more important than those at the village level in influencing the dependent variable.

Finally, we used the Gini coefficient as a measure of equality of distribution of the different types of capital within the study communities and conducted independent sample Kruskal–Wallis tests to compare relative levels of each of capitals across the three villages. In order to help with the interpretation of our CART models, we ran a Pearson's correlation analysis for MSL (i.e. financial capital) and the total number of household occupations across all the villages, based on the expectation that wealthier households had more diversified livelihood portfolios.

RESULTS

The means for all villages combined (Table 3) were highest for social, human, and natural capital (all < 7), lower for physical capital (< 6), and lowest for financial capital (< 4). The means for social, human, and natural capital showed relatively minor variations across the villages (e.g. < 1.5 on a 10-point ordinal scale), with Baia scoring slightly higher with respect to social and human and Vesse scoring slightly lower on natural in comparison to the other villages. Financial and physical capital showed more variation (> 2), both of which were lower in Baia relative to the other two villages. The Gini coefficients were mostly uniform and low for all of the capital assets across the villages, suggesting negligible inequality in the distribution of human, social, and natural capitals and minor inequality in distribution of financial and physical capitals. Although the correlation was relatively weak, our results showed, as expected, that wealthier households had more diversified livelihood portfolios ($n = 114$; $r = 0.3$; $p = 0.000$).

Seventy-three percent of respondents confirmed that they or someone else in their would be interested in becoming more involved in tourism, resulting in a sample of 114 responses for the dependent variable for inclusion in our CART models. The first model (Fig. 2) showed perceived ease of becoming involved in tourism was most strongly influenced by perceptions of social capital. This first split suggests a small group of individuals who perceived the highest level of social capital (e.g. > 51) mostly believed it would be very easy to become more involved in tourism. The other much larger group had lower scores for social capital and were more varied in their responses; notably, all of those who perceived it would not be easy were in this group. This group was further split by financial capital; those with higher scores were more varied in their responses to the dependent variable, and generally perceived it to be a little harder than those in the other group. Those in the group that scored lower for financial capital

were further split by natural capital; people with higher perceived access to natural capital tended to believe it was easier.

Our second model of the disaggregated social capital variables (ordinal scales of 0–10, except networks with was continuous) and the dependent variable showed that perceptions of reciprocity had the biggest influence on the perceived ease of being able to get more involved in tourism (Fig. 3). Those who scored higher were more likely to perceive it as ‘very easy’. This group was further split by satisfaction with leadership in the community, with those who were more satisfied believing it to be easiest.

DISCUSSION

The results confirmed that social capital had the strongest influence on people’s perceptions of how easy it would be to become more involved in sportfishing tourism. Financial and natural capitals further mediated this relationship (Fig. 2). When the social capital variables were disaggregated, perceptions of reciprocity in the community followed by satisfaction with leadership were the most influential (Fig. 3). Inequality was low, and comparative values for the capital assets reflected communities in the early stages of development, where financial and physical capital are low relative to natural and social capital (Table 3; Bebbington and Perreault 1999).

Our results correspond with the literature suggesting that social capital is crucial in early stages of development, as it helps to facilitate people’s adaptation to associated changes (Butler et al. 2014; Méndez-Lemus and Vieyra 2017). Moreover, studies in Melanesia have confirmed that social factors such as self-organised stakeholder agency, cooperation, and social relationships influence the ability of communities to cope with changes (Schwarz et al. 2011; Lauer et al. 2013) such as new livelihood opportunities

Table 3 Mean values and Gini coefficients for capital asset variables in the study villages

Variables ^{a,b}	Baia		Somalani		Vesse		All villages	
	Mean (SD)	Gini	Mean (SD)	Gini	Mean (SD)	Gini	Mean (SD)	Gini
Human capital	8.7 ^c (1.5)	0.1	7.9 (1.8)	0.1	7.6 (1.8)	0.1	8.0 (1.8)	0.1
Social capital	7.9 ^c (1.4)	0.1	6.8 (1.4)	0.1	7.0 (1.7)	0.1	7.1 (1.5)	0.1
Physical capital	4.5 ^c (2.5)	0.3	6.0 (2.6)	0.3	6.6 (2.9)	0.3	5.9 (2.9)	0.3
Natural capital	8.4 (1.5)	0.1	8.4 (1.5)	0.1	7.4 ^c (2.0)	0.2	8.1 (1.7)	0.1
Financial capital	1.8 ^c (1.4)	0.2	4.3 (3.2)	0.2	4.1 (3.5)	0.2	3.7 (3.2)	0.2

^a All capital variables have been recoded to 10-point ordinal scales to facilitate comparison of the means

^b Kruskal–Wallis test $p < 0.05$ for all variables

^c Post hoc test showed village to be significantly different to both of the other villages (all $p < 0.05$)

Fig. 2 Classification Tree on the influence of capital assets (social, physical, financial, natural, human) on villagers' perceived ease of becoming more involved in sportfishing tourism. Each of the three splits (nonterminal node) is labelled with the variable that determines the distribution of the observed variables in the subsequent terminal nodes. The misclassification (resubstitution) risk for the model was 33% (SE 0.044). The criteria were set to a limit of 3 sample folds, with a minimum of 20 cases nonterminal node and 10 cases per terminal node

Fig. 3 Classification Tree on the influence of the disaggregated social capital variables (trust, reciprocity, satisfaction with family/friends relationship, satisfaction with relationship with other villagers, satisfaction with leadership, and social networks, see Table 1) on villagers' perceived ease of becoming more involved in sportfishing tourism. Each of the three splits (nonterminal node) is labelled with the variable that determines the distribution of the observed variables in the subsequent terminal nodes. The misclassification (resubstitution) risk for the model was 33% (SE 0.044). The criteria were set to a limit of 3 sample folds, with a minimum of 20 cases nonterminal node, and 10 cases per terminal node

(O'Garra 2007; Curry and Koczberski 2013) and tourism (Sakata and Prideaux 2013).

In a broader development context, positive livelihood outcomes are often equated with economic growth, but it is important to note that simply creating opportunities to make money does not necessarily lead to positive impacts.

In the case of PNG and other indigenous economies, positive outcomes will fail to arise if economic growth initiatives are not embedded in local customs, law, and morality (Curry and Koczberski 2013; McCormack and Barclay 2013). In our study, the presence of social capital as a mediating factor in people's uptake of a new economic

opportunity reflects one facet of the importance of understanding local social dynamics in the early stages of development initiatives (Curry and Koczberski 2013). By identifying potentially marginalised groups (if combined with an assessment of equity as we did in this study) and the social factors that influence people's perceptions of new opportunities (e.g. leadership, reciprocity in our study), it is possible to lay foundations for monitoring the potential for social and subsequent economic breakdown, which can occur in indigenous societies undergoing economic development (Barclay and Kinch 2013).

Our study suggests a central role of leadership (Fig. 3), which has been shown to affect positive outcomes at the community level in similar studies related to the success of natural resource management in small-scale fishing communities (Govan 2011; Gutiérrez et al. 2011), and specifically in relation to the distribution of associated benefits (Diedrich et al. 2017). In many PNG communities, and in our study villages, local leaders play a central role in determining the distribution of economic benefits linked to natural resource use, where the interaction between people and natural resources is governed primarily by customary management systems (Banks 2008). These are complex socio-political relationships of local land and sea tenure, which regulate the use, access, and transfer of natural resources, which are governed in large part by elements of social capital (Foale et al. 2011). Since sportfishing tourism is an economic opportunity that draws on the value of natural resources, it is not surprising that people would look their leaders for both approval and support in becoming involved in the activity. Moreover, the presence of reciprocity in our model (Fig. 3) is indicative of a more collective society, which would be expected in a Melanesian context (Curry and Koczberski 2013; McCormack and Barclay 2013). Given that physical and financial capital were so low across the communities, cash-based activities such as storing and transporting fish to market relied on cooperation and asset sharing among numerous people. With the limited scope of tourism at the time of our study, it makes sense that people would rely on shared activities and assets to become more involved. For example, the lodge in Somalani was being built with widespread contributions of the villagers, with the agreement that the benefits would be shared throughout the community once it was complete.

Financial capital featured as the second most influential variable in our first model (Fig. 2). Although there was not a highly discernable difference between the two groups, the results indicated that those with higher financial capital could be slightly more dubious of their ability to become involved in tourism. Given that our measure of financial capital is a proxy, we cannot draw any strong conclusions about the role of financial capital in this model but it is

possible that because our results showed wealthier households to have more diversified livelihood portfolios, they had less time to engage in new economic activities. The time limitations faced by diversified households in engaging in new activities have been observed on other livelihood scenarios (e.g. Asfaw and Neka 2017) should be an important consideration for future research on tourism and alternative livelihoods.

Albeit a relatively weak influence, our models also showed that higher perceived access to natural capital was a mediating factor for people in lower income houses and with lower perceptions of social capital (Fig. 2). One possible interpretation for this is that those households required less time to access food for the household and thus felt they had more time to dedicate to new economic activities. Given they were also less wealthy households, their livelihood portfolios would also be less diversified, which would also potentially give them more time to dedicate to other activities.

Overall, people in our study communities were enthusiastic about becoming more involved in sportfishing tourism. It is not uncommon for communities in the early stages of tourism development to be supportive of the new opportunities it presents (Diedrich and Aswani 2016). However, it is important to consider the limitation that our study only looked at perceptions of becoming involved in tourism, which may not translate directly into actual involvement. As demonstrated by other studies on tourism and alternative livelihoods in comparable locations, it is highly likely that training and other capacity needs will need to be fulfilled to facilitate the transition (O'Garra 2007; Sakata and Prideaux 2013). In fact, the isolation, low infrastructure, and low proportion of people involved in sportfishing despite its presence for a up to 10 years in our study communities suggest that factors beyond local volition are limiting people's engagement.

Another important consideration is that, where some research in small Pacific Islands has suggested communities are relatively resilient to environmental change due to their accumulated experience of adapting to high environmental variability (Campbell 2009; Gough et al. 2010), studies have also shown that, due to their social isolation, they may be more vulnerable to recent changes brought about by economic development, tourism, and globalisation (Lauer et al. 2013; Butler et al. 2014; Diedrich and Aswani 2016). Moreover, due to the presence of customary tenure, any form of local alteration or redistribution of natural resource rights due to tourism or other activities could lead to conflict and confrontations (Sofield 1996; Banks 2008; Aswani et al. 2015). The critical nature of understanding the potential for socio-cultural tensions to arise in societies experiencing modernisation, especially where markets are not developed and livelihoods are

heavily influenced by kinship and indigenous socio-economic values has been recognised in PNG (Curry and Koczberski 2013; Curry et al. 2015).

Although our study did not reveal issues of inequality, it is important to recognise the potential for these to arise as a result of economic development, including the mediating role of social capital in this process. The importance of equality in community-based tourism initiatives is explicitly mentioned in the Small Scale Fisheries Guidelines (FAO 2015). There is a paradox in that additional sources of income can undermine social resilience through creating inequality but can also build resilience through livelihood diversification and improved financial capital (Adger et al. 2002). Moreover, negative impacts on social capital such as inequality resulting from economic development can lead to destructive negative feedbacks with natural capital (Dasgupta and Ehrlich 2013; Stoeckl et al. 2013). This has also been observed with respect to increases in physical capital. For example, Cinner and Aswani (2007) suggested that increased technological efficiency leading to less collaborative interactions with natural resources could diminish social factors that govern sustainable use, thus resulting in negative environmental outcomes. Since livelihoods and sportfishing tourism depend on a healthy natural environment, careful attention should be paid to ensuring negative feedbacks from unequal or inequitable distribution of benefits do not arise.

CONCLUSION

Although the connection between social capital and positive livelihood outcomes in small-scale fishing communities has been established in the context of natural resource management (Allison and Ellis 2001; Gutiérrez et al. 2011; Diedrich et al. 2017), to the best of our knowledge, few studies have focused on the role of social capital in influencing the uptake of alternative livelihoods, particularly in relation to tourism. Our results present a clear argument for taking into account social capital and its role relative to other types of capital for transitioning to alternative livelihoods in rural coastal communities. This is crucial for ensuring critical, mediating factors that are considered in the early stages of these initiatives, which may otherwise be overshadowed by pre-emptive interventions such as training programs and micro-financing. Where it is undeniable that building other types of capital is also crucial, we argue that comprehensive understanding and monitoring of locally defining characteristics and distribution of social capital should inform livelihood diversification initiatives.

Our study shows that social capital is more correlated than other forms of capital with people's perceptions of how easy it would be to become more involved in

sportfishing tourism in three communities in PNG in the early stages of development. Although these results are case specific, they are supported by a relatively small but growing body of literature highlighting the critical role of social capital in shaping sustainable livelihood outcomes. More extensive research could build on our findings by evaluating the role of social capital and other forms of capital in transitions into alternative livelihoods in different geographical contexts and with respect to different livelihoods (e.g. aquaculture), including how this changes over the course of the development trajectory. Moreover, we argue that social capital considerations should become more central to tourism livelihood and business development policy within PNG and in the broader Pacific. Monitoring and building social capital is potentially more complicated and time consuming than other aspects of community development such as capacity building, infrastructure development, and financing. Thus, it will be important to develop complementary strategies that focus on building and maintaining social capital in project communities.

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