IDENTIFYING FACTORS EFFECTING SUCCESS IN COMMUNITY-BASED SEA TURTLE CONSERVATION PROJECTS IN MALAYSIA

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INTRODUCTION

Community-based conservation (CBC) stems from the concept that if conservation and development objectives can be simultaneously met, then the interests of both parties can be served (Berkes, 2004). CBC emphasises that involving local communities is essential for the sustainable management of natural resources (Menon *et al.,* 2007). This is seen as a more equitable conservation philosophy (Rivera & Newkirk, 1997).

Traditional top-down conservation approaches can be ineffectual and not tailored to local needs, especially in developing countries (Berkes, 2004). Conservation involving the community is often more popular and valued significantly over top-down, state-led projects (Lepp & Holland, 2006). If conservation policies are locally supported then higher enforcement naturally follows (Singleton, 2000). When the community benefits from conservation initiatives then a change in the incentive structure of how to utilise resources evolves (Balint & Mashinya, 2006).

Whilst CBC can be highly successful, there are a significant number of cases where it has failed. Corruption, ineptitude, poor enforcement and nepotism have frequently led to failure and disenchantment with the CBC approach (Robbins, 2000). It is therefore important to learn about the conditions in which CBC initiatives are successful (Berkes, 2004). A comprehensive literature review by Rechlin *et al*. (2008) concluded that, whilst the literature almost uniformly endorses CBC, there is inadequate guidance as to how to carry it out. The aim of my research was to identify underlying factors contributing to the successful establishment of sea turtle CBC projects in Malaysia.

Sea turtles in Malaysia

Historically, Malaysia has been extremely important to sea turtles with six species in its waters and four nesting on its beaches. These four are the leatherback (*Dermochelys coriacea*), olive ridley (*Lepidochelys olivacea*), hawksbill (*Eretmochelys imbricata*) and green (*Chelonia mydas*) species (Chan,

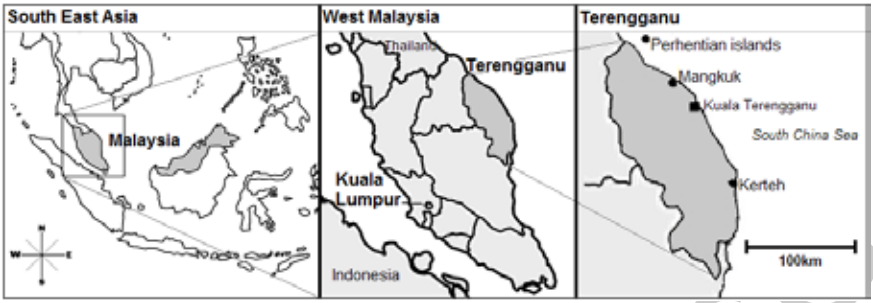

Fig. 1. Map of Malaysia, the state of Terengganu and the three study site locations: the Perhentian Islands, Mangkuk and Kerteh. The state capital, Kuala Terengganu is also given.

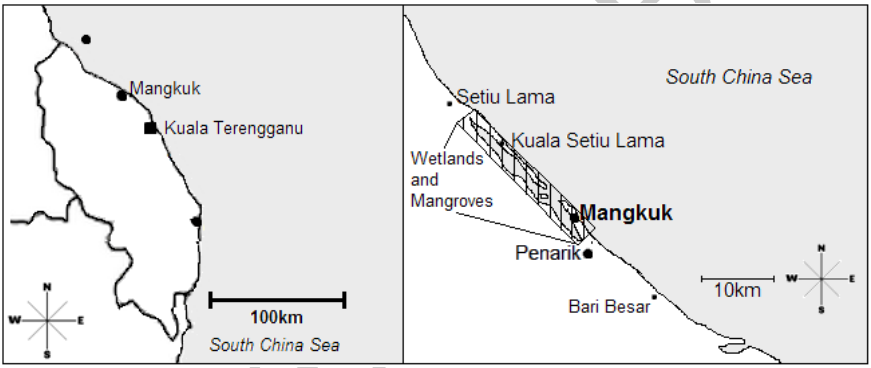

Fig. 2. Map of Terengganu and the location of Mangkuk where PEWANIS is based. The main areas of wetlands and mangroves are shown. Mangkuk is approximately half way along an 8km spit.

2006; WWF, 2011). However, there have been steep population declines of all species over the past five decades.

Terengganu, a state in West Malaysia, has historically been a stronghold for sea turtles with sandy, wide beaches along its entire coastline. Rantau Abang beach in Terengganu once hosted the largest rookery of leatherbacks in the world with 10,000+ nests annually in the 1960s and 70s (Chan, 2006). Due to fisheries interactions, a long history of egg exploitation and uncontrolled tourist development, this has dropped to four nests per year, a decline of over 99% (Chan, 2006; Chan & Liew, 1996 and Chan, 2009).

From a population of around 500 in the mid-80s, olive ridleys are now thought to be extinct in Terengganu (Chan, 2009). The leatherback and olive ridleys have been described as on the verge of extinction in Malaysia (Chan, 2006; Chan & Liew, 1995).

Hawksbill populations have declined from an average 55 nests in the mid-80s to around 14 per year presently (70% decline) (Chan, 2009).The green turtle is the last species to have a significant presence in Terengganu with approximately 2300 nests per annum (25% decline from around 3500 in the mid-80s) (Chan, 2009).

Although sea turtle populations have dramatically declined in Malaysia, there is proven potential for population recovery if long-term sustained conservation is adopted, even from small populations (Hays, 2004; Dutton *et al*., 2005).

Notable threats to sea turtle populations in Malaysia include incidental by-catch from fishing, egg harvesting (which is legal for all but leatherbacks in West Malaysia), uncontrolled tourist development, sewage pollution and plastic litter (Chan, 2006; Chan *et al.,* 1988; Halim *et al.*, 2001). Threats to habitats include transformation and degradation of nesting beaches and the various deleterious impacts of climate change, rapid globalisation and population growth (Shanker & Pilcher, 2003; Wright & Mohanty, 2002). There is also a lack of public and stakeholder awareness in Malaysia (Shanker & Pilcher, 2003; WWF, 2011; MDOF, 2008).

Study sites

Interviews were carried out with three CBC groups in the state of Terengganu between July and August 2011. Each project was visited at least twice. Figure 1 illustrates the locations.

Site descriptions

PEWANIS

Approximately 50km north of Kuala Terengganu is Mangkuk (Fig. 2). This is where the *Persatuan Wanita Kampung Mangkuk Setiu* group (PEWANIS) was set up in 2008. This translates as the Women Entrepreneurs of Mangkuk Village in Setiu (a district in Terengganu). The community makes up a traditional rural fishing village characteristic of the region (Figs 3 & 4). The area has rare wetland and mangrove habitats as well as an important nesting beach for green turtles.

The World Wide Fund for Nature (WWF) founded PEWANIS in 2008 with the objective of protecting sea turtles and rare painted terrapins and fostering participation in mangrove replanting (Sharma, 2010).

PEWANIS is a women's group with a committee made up of mostly unemployed homemakers. The group is funded through corporate sponsorship by Nestlé and through enterprising. Two full time staff paid by WWF assists the group with technical support.

Fig. 3. The Pink House (PEWANIS).

Fig. 4. Beautiful palm trees fill the space between the villagers' homes and the short 100m walk to the beach.

Fig. 5. The PEWANIS hatchery.

The biggest threat to sea turtle populations around Mangkuk is egg consumption and overharvesting. Sea turtle eggs are consumed raw as a delicacy in Malaysia, especially in Terengganu (Hong *et al*., 2009). In Peninsular Malaysia sea turtle eggs are collected by permit holders employed by the Department of Fisheries (DOF) for transportation to government hatcheries (Fig. 5). The collection of eggs is governed by licensing systems. However, due to the lack of manpower and DOF staff to monitor large areas, enforcement is usually insufficient to monitor illegal collection of eggs which are mostly sold at market in Kuala Terengganu (Hong *et al*., 2009).

MEKAR

The second project studied is the *Persatuan Khazanah Rakyat Ma'Daerah* group (MEKAR) which translates as the Ma'Daerah People's Heritage Society. This is based in Kerteh which is a well developed town in southern Terengganu (Fig. 6). The CBC group was started by WWF in 2007 and Kerteh chosen due to the area's important nesting beaches for green turtles. The group focuses solely on sea turtle conservation; the biggest threat locally is negative fisheries interaction. MEKAR works with local fishermen to curb the usage of illegal nets and has established a communicative network to report turtles injured or trapped in fishing gear as well as reporting the use of illegal equipment. MEKAR also has a public awareness programme

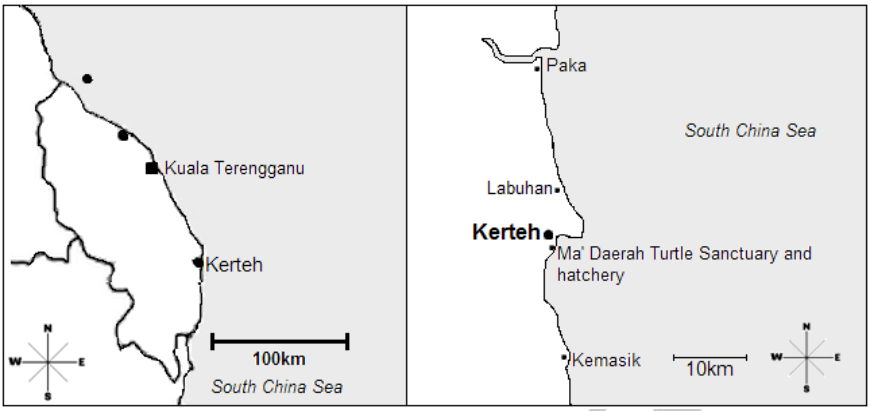

Fig. 6. Map giving the location of Kerteh where MEKAR is based. Kerteh lies approximately 1km from the coast, and Ma'Daerah Turtle Sanctuary is 1.5km away where the nesting beach is.

Fig. 7. MEKAR and PEWANIS raising awareness and selling products in a mall near Kerteh where MEKAR is based.

Fig. 8. Beach at Ma'Daerah (MEKAR).

Fig.9. Tourist welcome sign at Ma'Daerah.

which includes an annual road show along the coast of Terengganu. The MEKAR committee consists of educated professionals, many of whom are teachers, and is chaired by a local school headmaster.

MEKAR often participates in joint awareness events with PEWANIS members (Fig. 7). MEKAR is funded through commercial sponsorship, most notably by Shell, BP and the Small Medium Enterprise (SME) bank of Malaysia.

The government hatchery is at Ma'Daerah where corporate sponsorship has funded facilities for guests including dormitories and a large presentation hall. Tourists can visit and stay at Ma'Daerah where educational talks and experiences with nesting sea turtles are offered (Figs 8 & 9). Annually, local people are given the opportunity to stay for free at Ma'Daerah and experience nesting sea turtles in the hope of engendering support for their conservation. Terengganu was the poorest state In Malaysia until large oil reserves were discovered in the 70s and 80s. There is a large local presence of petrochemical companies, and it is for this reason that corporate sponsorship is mostly made up of oil and gas companies.

HOPE

The third project studied is Help Our Penyu (HOPE) (penyu = sea turtle in Malay), a project based in a village on the Perhentian Islands. This project has not been able to successfully establish itself, but is in an early stage of development. The Perhentian Islands are located 16km from the coast in the North of Terengganu in the Pulau Redang National Marine Park (Fig. 10). HOPE was in its first year as a CBC project when I visited, but has recently disbanded.

The group was founded by a Malaysian and an expatriate from England living permanently in Malaysia. The management consisted of a Chairman (Malaysian), Founder (English) and a Project Manager (English). Staff wages were funded primarily through volunteers and to an extent from donations.

The activities of HOPE were split across both Perhentian islands. Figure 10 shows the location of the village (Fig. 11) on Pulau Kecil and Bubbles Dive Resort (BDR) on Pulau Besar. The beach where BDR is based is an important nesting and breeding area for green turtles (Figs 12-14). Volunteers stayed at BDR whilst carrying out direct conservation with sea turtles. This included monitoring the beach at night, presenting educational talks and cleaning the beach. HOPE started from an existing conservation programme at BDR in 2007 and only expanded into a CBC programme in March 2011. Volunteers split their time between the islands, staying at BDR for five nights a week, and the village for two nights.

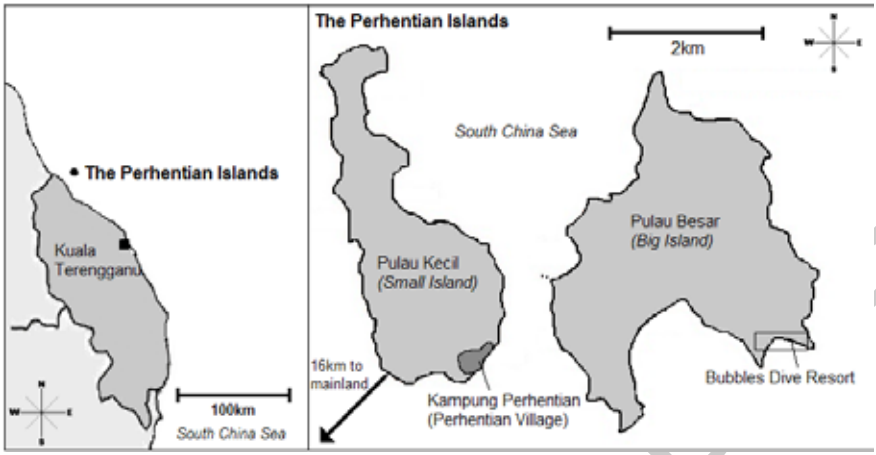

Fig. 10. Location of the Perhentian Islands (left), and schematic map of the islands (right).

The village where the CBC project was based can be characterised as traditionally Malay. A house in the village is open in the afternoon where toys and art equipment are free to use for children. The local primary school hosts a weekly Turtles Need Trees club run by HOPE which is open to all children. The club teaches marine environmental issues focusing on sea turtles. There is no direct activity with sea turtles when staying at the village as the beach there does not host a large number of turtles. The group was planning to expand the project and undertake community development projects.

The Chairman, who was also the community liaison education officer of HOPE, left in May 2011 due to internal conflicts and low wages (later contacted and interviewed). Without a Chairman, HOPE cannot function and cannot easily receive funding through official routes. This limits the scale of donations available. After the Chairman left the village, the Founder resumed responsibilities and employed a new Malay speaking community liaison and education officer in June 2011.

Due to internal conflicts between the management of BDR and HOPE, after what was seen as unacceptable requests to change conservation activities, HOPE withdrew from BDR on the 30th July 2011. Therefore HOPE and BDR no longer work in partnership. The project manager, who was based at BDR and managed the volunteers, then resigned but stayed in the village until the end of August 2011 (and was also interviewed).

Fig. 11. Perhentian village (HOPE).

Fig. 12. Nesting sea turtle just after dawn at Bubbles Dive Resort (HOPE). Photo by Douglas Martin.

Fig. 13. Nest at Bubbles Dive Resort. Photo by Douglas Martin.

Fig. 14. More and more development on the Perhentians with threat to sea turtle beaches.

METHODS

Interviews

To gain insight into the management and history of each CBC group, interviews with prominent members were undertaken. A set interview with fifteen open-ended questions was used (see Appendix) with a total of eleven interviewees: four from MEKAR and PEWANIS and three from HOPE. Interviews from PEWANIS were transcribed into English as interviews were conducted by a translator. Interviewees from MEKAR and HOPE had a high level of English and translating was not necessary. All interviews were recorded and typed before being transferred for analysis using NVivo. This software package is useful for coding themes into different 'nodes' from which detailed analysis and qualitative modelling can be undertaken. This can be used to identify the most frequently arising themes and words in interview transcripts.

Questionnaires

The second objective considered the opinions and perspectives of local people living within the communities where projects have been successfully established. This was attained through community questionnaires. Interviews preceded questionnaire design and themes identified from interviews were used to build a concise and pertinent set of nine multiple choice mostly Likert scale styled questions. These were distributed randomly. At PEWANIS half were given to PEWANIS members to complete and disseminate to neighbours. The other half were given randomly to people around the village. At MEKAR, questionnaires were distributed at a busy shopping mall in Kerteh. A total of 92 questionnaires were returned, 46 each from both PEWANIS and MEKAR.

Descriptive statistics were used to summarise the questionnaire dataset using Excel and SPSS. Percentages were also formulated. Data were compared between the projects using the Mann-Whitney U test to analyse statistical differences between responses (at 95% level of significance).

RESULTS

Interview results

Interviews were recorded and transcribed. Interviewee answers were analysed and content from transcripts was extracted and grouped into sub-themes under the main themes of '*environment*', *'community'* and *'economics'*. For example, where an interviewee discussed donations from corporations, that piece of text will be grouped under the theme '*Corporate Funding'*. Text was extracted from all interviewee transcripts and grouped together for manual comparison. Through this I could identify what themes are most talked about and analyse why.

Economic themes

'Financial sustainability', the value of *'Contributing to the Local Economy'* and *'Corporate Sponsorship'* were the most discussed themes in this category. Interviewees particularly discussed the importance of financial sustainability as a key goal. Corporate sponsorship was essential for the success of both PEWANIS and MEKAR. The importance of the project contributing to local economics was particularly important at PEWANIS. Founding members of the organisation were initially mocked for joining an organisation with no economic return. Members of the community could see no value in contributing to conservation, a concept that was totally new to them. PEWANIS gained popularity when enterprise began bringing money into the village through donations to the community and when members made money through working with the organisation.

Community themes

References were more evenly spread across the Community sub-themes. '*Community Support*' accounted for 32% of all references in this grouping. Questions focused around gaining community support but this was a theme discussed without prompting throughout all sections of the interview. Another clear observation was the '*Lack of knowledge/understanding of conservation'* sub-theme which arose ten times across three interviewees at PEWANIS (11% of the total references). There was only one reference to this at MEKAR. This illustrates the lack of environmental knowledge members of Mangkuk village had prior to the development of PEWANIS. This also shows the importance of education and the value it has. Lack of education was a key hurdle to PEWANIS' development; the second was seeing the financial benefit the CBC group could bring locally.

'Increased knowledge of conservation in the community' was marginally the third highest ranked with 10% of total references. At HOPE, which was mainly created by Westerners, '*Cultural respect when developing the CBC project'* was important and referenced five times across all interviewees from HOPE.

Sea turtle conservation themes

'*Environmental awareness*' was by far the most frequently discussed theme accounting for 38% of all references to themes in this grouping. This was principally evident at MEKAR where there were 19 references. This was followed by '*Formally educating others'* with 19% total reference coverage. These both relate to education. '*Formally educating others'* was most commonly mentioned at HOPE due to references to the school club, but was not discussed by interviewees from PEWANIS at all.

It is clear that the presence of sea turtles led to Mangkuk (PEWANIS) and Kerteh (MEKAR) being chosen as sites by WWF. HOPE was chosen due to a pre-existing sea turtle conservation programme at Bubbles dive resort.

MEKAR hosts an annual road show along the coast of Terengganu as part of their public awareness programme. This was cited as the main tool in gaining community support, and also as a method of conservation through environmental education. Education was extremely important for developing an interest in conservation at both sites. Understanding the concept of conservation and its potential benefits was not enough at PEWANIS, where enterprise and generating income was more important for garnering support.

Questionnaire results

Data from Likert style questions were transferred into a table, and these are expressed as percentages. PEWANIS and MEKAR responses are given within the same tables (Tables 1 and 2). Data from both projects were then combined.

The results of the questionnaire show strong support for PEWANIS and MEKAR. 91% of people stated that they were either Supportive or Very Supportive of the idea of a CBC project being created in their area. This rose to 95% once the projects were established.

89% of respondents stated that they Strongly Agree or Agree that they have benefitted from the CBC project. 85% of the community felt that they strongly agreed or agreed that a community project using the same approaches could work in different places in Malaysia. This means both the community and experts agree that a project using the same approaches could work elsewhere, at least in Malaysia.

88% of respondents Strongly Agreed or Agreed that sea turtles had benefitted from the CBC project. Although this is encouraging, the results do not indicate how much people feel they have benefitted. 71% of respondents either Strongly Agreed or Agreed that the project had economically benefitted the community whilst 27% Neither Agreed or Disagreed and may have been unsure. Only one person stated they disagreed that the community had economically benefitted, indicating that the majority of people asked felt that there was some economic benefit.

Patterns of current sea turtle egg consumption

A section of the questionnaire examined sea turtle egg consumption at each site. Both MEKAR and PEWANIS have strong anti-egg consumption campaigns as this is a leading cause of population decline. Respondents were asked whether they still consumed sea turtle eggs since the project was set up. If respondents stated yes, then they were asked how often they consumed eggs and if this was less or more than before the project was set up. Twelve respondents (13%) stated that they still consume sea turtle eggs. Nine of

Table 1. Results from questions measuring support in the community given as percentage value. N = Number of respondents.

	N	Very Supportive	Supportive	Somewhat Supportive	Little Support	No support
How much did you first support the idea of a community conservation project being created here?						
PEWANIS	46	24 (52%)	17 (37%)	1 (2%)	4 (9%)	0
MEKAR	46	18 (39%)	24 (52%)	3 (7%)	1 (2%)	0
How do you feel now that the project is established?						
PEWANIS	46	25 (54%)	20 (43%)	0	1 (2%)	0
MEKAR	46	20 (43%)	22 (48%)	3 (7%)	1 (2%)	0

Table 2. Results from questions measuring attitudes based on agreement level to statements, given as percentage value. N = Number of respondents.

	N	Strongly Agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree
'I feel I have benefitted because of [this project]'						
PEWANIS	46	24 (52%)	19 (41%)	2 (4%)	0	1 (2%)
MEKAR	46	14 (30%)	25 (54%)	7 (15%)	0	0
'I think this community project could work elsewhere in Malaysia using the same approaches'						
PEWANIS	46	19 (41%)	18 (39%)	7 (15%)	0	2 (4%)
MEKAR	46	20 (43%)	22 (48%)	4 (9%)	0	0
'The sea turtles here have benefitted because of this community project'						
PEWANIS	46	21 (46%)	21 (46%)	4 (9%)	0	0
MEKAR	46	22 (48%)	17 (37%)	5 (11%)	0	2 (4%)
'[This project] has economically benefitted the community'						
PEWANIS	46	17 (37%)	19 (41%)	10 (22%)	0	0
MEKAR	46	9 (20%)	21 (46%)	15 (33%)	1 (2%)	0

these stated they consumed them on an annual basis, whilst three stated they eat them weekly. Of these 12 respondents who still consume sea turtle eggs, none is an active member of either MEKAR or PEWANIS, but all live in the local community.

Twice as many respondents from MEKAR consumed sea turtle eggs compared with PEWANIS. Considering that the consumption of sea turtle eggs is an engrained part of culture in Terengganu, results indicate a low rate of consumption, especially when considering the frequency of consumption.

DISCUSSION

Data analysis, literary research and experience in Malaysia have led me to conclude that the following factors were the most important in leading to the success of these projects.

Funding

Funding is used to provide staff, facilities and equipment that enable project activities. Equipment is also needed to develop enterprises which can lead to financial sustainability. Interviewees stated that corporate funding was essential to the success of PEWANIS and MEKAR. A lack of funding was a key factor leading to the dissolution of HOPE, because staff wages could not be paid which fuelled internal conflict.

Corporate funding

The benefit of corporate funding is its reliability and its resulting robustness as a funding source. Agreed dates for set amounts of money allow budgeting based on concrete future incomes. Both PEWANIS and MEKAR have benefitted highly through their association with WWF which attracts and channels commercial funding.

A frequently occurring theme from PEWANIS and MEKAR interviews was that commercial funding was stated as essential to the success and establishment of their respective CBC groups. Two interviewees from HOPE stated that corporate funding is the most sustainable source of funding, whilst the third stated tourism. It is important to remember though that commercial funding can conversely be detrimental as it can impose obligations towards objectives and agendas of the donor company (Platteau & Gaspart, 2003). Donor agencies may require visible results in a short period of time which forces the community group into avenues which do not contribute to long-term institutional strengthening. It is therefore desirable for a state of financial sustainability to be attained.

Financial sustainability

Self-sufficiency allows freedom from reliance on donors. Corporate funding

effectively pays for conservation, whilst self-sufficiency through community-based ecotourism (CBE) and other enterprises leads to a change in incentive structure which is more sustainable. This is proposed as a major advantage of the enterprise-based approach to conservation (Kiss, 2004).

No interviewees stated that their group is currently financially sustainable. Several interviewees from PEWANIS saw financial sustainability on the horizon but none from MEKAR and HOPE. Although PEWANIS is younger than MEKAR, the CBE programme is much more established. This may be due to the areas in which each group is based. Mangkuk has outstanding natural beauty with rivers, countryside and a freely accessible coastline. Kerteh is more developed, westernised and detached from Ma'Daerah nesting beach by 1.5km.

Community support

Support in the community is an integral and defining aspect of community-based conservation. This includes active and passive participation. The data indicate that community support was high for PEWANIS and MEKAR. Undoubtedly, economic benefits drove community support for PEWANIS. At MEKAR, support was won through engendering environmental pride and to an extent through contributing to the local economy.

Anti-egg consumption policies seemed well supported at PEWANIS and MEKAR sites. The frequency of egg consumption appeared low with 13% of respondents (12) stating that they still consume eggs. 75% of these (9) only eat them yearly and 92% (11) of consumers eat eggs less than before. This could be due to increased awareness about the impacts of consuming sea turtle eggs or due to external factors such as wider societal changes in food choices or market forces (e.g. increased cost). Egg consumption was higher at MEKAR, perhaps due to factors of town size and dissemination of policies, or because currently the incentive structure within Kerteh does not lead to reduced consumption because of lower economic gains for local people.

Creating alternative and new economic opportunities

Developing community-based enterprises contributes to funding and develops community support which can lead to enhanced social capital as communities work together to develop enterprises. This establishes a direct linkage between conservation and local benefits which alters incentive in favour of protecting biodiversity in the long term (Berkes, 2007; Kiss, 2004). A comprehensive study of community-based enterprise by Salafsky *et al*. (2001) found that whilst enterprise strategies can lead to conservation, they only work under limited conditions and never on their own. Therefore enterprise complements conservation but does not provide a panacea to integrating

development and conservation. Nevertheless, in terms of reaching financial self-sufficiency this remains an important success factor (Salafsky *et al*., 2001; Bookbinder *et al*., 1998).

Sea turtles attract a natural popularity which can be used to benefit non-consumptive enterprises including eco-tourism experiences (Campbell & Smith, 2006). Well managed wildlife-centred recreation involving sea turtles can lead to their long-term conservation (Wilson & Tisdell, 2001). This is a resource characteristic of sea turtles utilised by all groups to provide income and increase awareness (Tisdell & Wilson, 2002).

Ultimately, eco-tourism capacities must be adapted to suit regional infrastructure and tourism opportunities (Foucat, 2002; Colchester, 1994). In the Perhentians, a heavily touristic area, HOPE aimed to alleviate pressures caused by traditional tourism which often has adverse impacts on sea turtles (Tisdell & Wilson, 2002). With PEWANIS and MEKAR, a new tourism industry has been stimulated. At Mangkuk, a common theme was the lack of knowledge about conservation and why conservation may be an activity local people should participate in. Although some members were mocked for taking part in an activity that did not produce an income, once the group's entrepreneurial arm started to produce profit the level of support in the community rose and more members were attracted.

Social capital

Collective management of resources through CBC develops and enhances social capital (Western *et al*., 1994). Social capital is a concept describing community connectivity and cohesion (Pretty & Ward, 2001). Whilst a lot of time is spent on achieving economic sustainability in conservation circles, social capital is a commonly proposed framework for addressing social sustainability (Lehtonen, 2004). However, social capital is also linked to economic performance which is measurably enhanced where there is strong capital (Knack & Keefer, 1997). Furthermore, social capital fosters collective action and strengthens the institutional capacity needed for sustainable development (Tai, 2007).

Another value of social capital in conservation is the benefit of improving the efficiency of society for sharing new ideas and concepts (Pretty & Smith, 2004; Lehtonen, 2004). The trust that develops between members also lubricates cooperation and attracts more members (Pretty & Smith, 2004). The difficulty with social capital in policy design is its elusiveness as an empirical concept (Stone & Hughes, 2002). As a result, the process of measuring, evaluating and understanding social capital is complicated and therefore hard to initiate in policy (Ishihara & Pascual, 2009).

Economic benefits may be more evident at PEWANIS due to perceptibly higher social capital in Mangkuk which retains a smaller and more traditional

community structure compared with Kerteh. There is enhanced social capital here as the community developed collective management and saw tangible economic returns. Benefits are also more perceivable at PEWANIS where donations are made to the community when (for example) there is a death in the family, a hospitalisation, or pupils get good examination results. This is valuable for benefitting and gaining the support of the community and may be more effective in smaller rural communities (like Mangkuk) where there is a system of community governance redistributing funds (Bowles & Gintis, 2002).

Technical support and 'outside-in' relationships

CBC projects can benefit through affiliation with governmental and non-governmental institutions. In fact it is highly unusual for CBC projects to be conceived and initiated by the community (Western *et al.*, 1994). NGOs were also quicker to adopt CBC approaches when they were popularised in the 1980s (Alcala, 1998). PEWANIS and MEKAR both operate in partnership with an NGO (WWF) and the local government (Department of Fisheries). This is a desirable system because the community carry out conservation and enforce legislation with advice and guidance from an NGO (and often funding) with the support of the government. By comparison, HOPE only worked with fisheries staff on an informal basis when the DOF collected eggs from staff. There was no formal agreement and no technical advice from an outside agency. All interviewees of HOPE stated that insufficient experience led to many problems which were avoidable with hindsight.

The importance of environmental education

There was a lack of understanding of the concept and value of conservation where PEWANIS and MEKAR are based. At PEWANIS, education empowered individuals to learn skills, gain confidence and understand the impacts of their actions, whilst fostering members' personal and social development and raising community awareness (Mehta & Heinen, 2001). WWF promote environmental education as a tool for conservation with the aim of shifting understanding so that the link between the environment and personal wellbeing and economic circumstances is made (Fien *et al.*, 2001).

CONCLUSION

Government initiated strategies to protect sea turtles in Malaysia have largely failed, as evidenced by the dramatic and continued decline in sea turtle populations in recent decades. Conservation efforts were traditionally centred on the designation of marine parks, but many of these are prohibitively expensive and therefore unenforceable. Expansion of CBC programmes in Malaysia may set up a more efficacious conservation regime, using a structure that has worked internationally.

By studying two successful CBC programmes and deconstructing the essential components we can identify underlying factors that can be replicated for sea turtle conservation at different locations. This can be especially valuable to individuals lacking empirical and theoretical experience. Using the same approaches, it is feasible that these methods could work elsewhere and internationally (especially other parts of Malaysia and south east Asian countries with similar cultures and development). The key components identified are support in the community and engendering this; concrete funding, and the presence and enhancement of social capital. Where funding is used to build enterprise there is a chance of financial independence from donor organisations. Corporate funding was essential for the success of PEWANIS and MEKAR. A self-enforcing organisation where conservation and development are linked, e.g. at PEWANIS, perpetuates growth. WWF was an essential component in orchestrating the two successful projects. Guidance and funding was essential to success, which highlights the importance of outside-in agencies with these examples. Lack of reliable funding and experience ultimately led to the dissolution of HOPE.

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Developments

Since these data were collected and report written, the project where HOPE was based has been developed into 'Ecoteer House – Perhentian Community & Conservation Project'. This is managed by the Founder and newly acquired staff and it is hoped will become a success.

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APPENDIX – INTERVIEW

General Questions

1. Why was this site chosen to set-up a community-based conservation project?
2. Were there any difficulties during the establishment of this project?
3. How did the community respond to the project?

   3a *Was everyone in the community supportive?* [Passive or active support?]

   3b ***If no****: How did the project gain support?*
4. Do you think this project could work elsewhere in Malaysia?
5. What do you think are the main factors preventing the creation of more community-based conservation projects in Malaysia?
6. What do you think were the main factors that made this project successful?
7. Please state what you think is the most important factor guiding the success of a CBC project?

Economically Focused Questions

8. What do you think is the most sustainable way to fund CBC projects?
9. How does this project fund itself?
10. Do you think this project is financially sustainable?

    10a ***If No:*** *what do you think is needed to make this project financially sustainable?*

Environmental Focused Questions

11. How does sea turtle conservation benefit from this project?
12. What methods have been employed to conserve sea turtles?
13. Do you think these methods are sustainable and repeatable elsewhere?

Socially Focused Questions

14. How does the community benefit from the project?
15. How does the community benefitting influence the continued success of project?