Capacity building and policy development in Belize marine protected areas, an example for Caribbean integrated coastal management

M. James C. Crabbe[1,2]

1. Institute for Biomedical and Environmental Science and Technology, Faculty of Creative Arts, Technologies and Science, University of Bedfordshire, Park Square, Luton, LU1 3JU, UK; james.crabbe@beds.ac.uk
2. Department of Zoology, University of Oxford, The Tinbergen Building, South Parks Rd, Oxford OX1 3PS, UK; james.crabbe@wolfson.ox.ac.uk

Received 01-VIII-2013 Corrected 04-II-2014 Accepted 24-III-2014

Abstract: Sustainability science can, through capacity building, allow for integrated stakeholder management of the vital Caribbean marine ecosystems. We did a capacity building exercise in two major coral reef areas in Southern Belize. The key outcome was a six-month personal/professional action plan developed by each participant about tactics for leading, educating and supporting issues regarding sustainable development and tactics for collaboration to influence policy decisions. Our results can be applied across the Caribbean. Rev. Biol. Trop. 62 (Suppl. 3): 287-291. Epub 2014 September 01.

Key words: hurricanes, bleaching, MPAs, climate change, global warming, Belize, Jamaica.

Against a backdrop of natural and anthropogenic insults, an important question is: how can management practices maintain sustainable coral reef ecosystems? Integrated Coastal Zone Management (ICZM) is a complex worldwide governance issue requiring an integrated or coordinated approach. It involves many relevant stakeholders and policy initiatives need to be developed over long time scales. Ideally, marine ecosystems (i.e., corals and seagrass beds) should be closely linked to terrestrial ecosystems such as mangroves and coastal forests. In developing management policies, education and training to enhance human skills and institutional capacity in resource management is critical (Wescott, 2002). Both developed and developing countries have used capacity-building programs (Kaplan, Liu & Hannon, 2006; Rogers, Johnson, Warner, Thorson & Punch, 2007). While many, if not all, of these programs involve building competencies and empowerment in local communities, few of them involve policy makers or government officials (Mequanent & Taylor, 2007). Partnerships can be vital for ICZM, particularly where government policies link to local stakeholders (e.g., beach clean-up groups and marine wildlife associations) to produce collaborations that can involve people with vested interests in the coastal ecosystem (e.g., fishers, tour operators) and in ongoing management frameworks.

The effective application of ICZM to coral-reef ecosystems should address a number of themes including:

1. Use of ecosystem and economic parameters to quantify the needs of marine reserves.
2. Development of tactics for leading, educating, and supporting issues regarding sustainable development of coral reef ecosystems.
3. Incorporation of all relevant stakeholders into the formulation of policy issues pertaining to marine resource management zoning plans.

We therefore undertook a capacity-building exercise around Marine Protected Areas (MPAs) which involved both local Belizean

NGO community workers and a government fisheries officer, so that community engagement could be directly interfaced with fisheries operations and policy. Our methodology involved the development of personal action plans to facilitate the future of sustainable MPAs in the MesoAmerican Barrier Reef system. Our approach meant that each individual produced plans that reflected not only their own priorities, but were tailored to their own abilities. Team discussion meant that personal plans were interlaced throughout the group, so that the whole became greater than the sum of the parts.

MATERIALS AND METHODS

Capacity building: We undertook the capacity building exercise in respect of two MPAs in Southern Belize. There are two major coral reef areas in Southern Belize, the Sapodilla Cayes Marine Reserve (SCMR, a World Heritage Site), and the Port Honduras Marine Reserve (PHMR). The SCMR is a 125km^2 reserve and has had a collaborative agreement with the Belize Fisheries Department and the Toledo Association for Sustainable Tourism and Empowerment (**TASTE**) to manage the area since its declaration in 1996. The PHMR is a 414km^2 reserve, and has been managed by the Toledo Institute for Development and Environment (**TIDE**) since its declaration in January 2000.

The capacity building team consisted of one officer from the Belize Fisheries Department, three senior officers from NGOs involved in managing Belize MPAs (TIDE, TASTE and Friends of Nature), and a Facilitator (the author of this paper) from the UK. These individuals were chosen because they had direct contact with both NGOs (Non-governmental organisations) and CBOs (Community-based organisations), and the government Fisheries Department, thus maximising exposure of capacity building while keeping the numbers of participants within workable limits. Daily meetings, lasting between 1-2h, took place on Lime Caye in the SCMR, Abalone Caye in the PHMR, and in Punta Gorda Town, over a 10-day period in August 2007. Discussions, led by the Facilitator employed a modified nominal group technique (Sample, 1984) to identify priorities related to personal action plans. Four rounds were employed; round one was based on the Delphi technique and further rounds on the nominal group technique approach (McCance, Fitzsimons, Keeney, Hasson & McKenna, 2007). Specifically, after initial meetings which revolved around frank discussions on the interface been the Fisheries Department and MPA management by NGOs, each participant developed a personal action plan to facilitate and improve the sustainability of the MPAs in Southern Belize. There was repeated iteration of these plans between the participants, and the final production of a policy for sustainable management of both the marine reserves in the Sapodilla Cayes and in Port Honduras.

RESULTS

Capacity building outcomes: The key outcome was a six-month Personal/Professional Action Plan developed by each Belizean participant outlining how they will personally and professionally strive to meet the capacity-building objectives above, and influence policy development. Specifically these plans involved:

a. Tactics for leading, educating and supporting issues regarding sustainable development in Southern Belize; and
b. Tactics for collaboration with other stakeholders to collectively influence policy decisions in Southern Belize.

Discussion among the participants and facilitator as described in the Field methodology section resulted in the generation of a series of tactics to be adopted around a number of themes *viz*: Organisation and management, Education, Support and Policies (Crabbe et al., 2010). Table 1 identifies a set of twelve management operational needs identified by the participants as their united action plan that

TABLE 1

1. Ecosystem zonation redesignated to balance stakeholders' wishes and evidence-based fisheries catches.
2. A community-based research program developed via participants. This involved local fishers, with qualitative and/or quantitative research methods.
3. Data of high accuracy recorded. Quantitative ecosystem data needs to be verified statistically.
4. Co-management plans between NGOs, communities and fisheries departments to address problems of illegal fishermen from states or countries outside the governance of the MPAs. This is a significant problem in reef areas close to Belize.
5. Regular public meetings of stakeholders fostered, as well as regular education events. Action plans were developed and monitored by staff and stakeholders alike.
6. Effectiveness of zoning monitored and quantified. This relates to fishing practices as well as ecosystem health.
7. Alternative livelihoods for fishers (e.g., in the tourist industry) fostered and maintained. Government agencies were involved in linking tourism and economic development.
8. Tourists monitored and encouraged sustainably. All stakeholders were involved, with penalties for unsustainable practices.
9. Effective management linked to the country's economy. This is helped in Belize as fishing, and tourism are both important parts of the country's gross domestic product (GDP).
10. NGOs and MPAs link together. In areas where different NGOs are responsible for MPA management, as in the MesoAmerican Barrier Reef, and where MPAs are distant from one another, it was helpful to link both NGOs and MPAs so that a greater area of reef could be managed
11. Regular information to all stakeholders, from the politicians to the local communities, maintained. Communication linked to the communities served (e.g. some oral, some printed, some via internet).
12. Management plans passed into law. The involvement of government officers –e.g., fisheries officers– as partners is key to this important outcome, to ensure appropriate policing if resources are made available.

involved partnerships among government, non-governmental organizations (NGOs), and communities to improve ICZM. Each individual member then implemented their action plans and the united action plan with the communities that they represented.

DISCUSSION

Marine Reserves are an important tool in sustainable management of the Belizean coral reefs (Cho, 2005; Williams & Polunin, 2000). The need for case studies in building integrated coastal management capacity has been powerfully made (Jorge, 1997; McDuff, 2001; Wescott, 2002). Normally representatives of all stakeholders (including fishermen, dive-boat operators, etc) would be included in such a capacity-building exercise. Our particular process was chosen as it represented key stakeholders in the MPAs of Belize, while being an efficient way of engaging a Facilitator from abroad. Targeting a government ministry worker and policy maker is a relatively new approach in this area. Our study group members were highly focused and motivated to improving management of the Belize MPAs, and were strongly committed to both short- and long-term acceptance of the study group's goals for sustainability and resource management by stakeholder groups. One reason for this was the experience and responsibilities of the individuals concerned – selection as to who was in the group was a key operational factor. However two groups were missing from the capacity-building exercise – someone from the political arena, and someone from the University of Belize. We feel that it will be important in the future to involve both these sectors, the former to ensure that policy development becomes law, and the latter to ensure the sustainable monitoring of the reefs. Political engagement is of particular interest, as unlike the Great Barrier Reef, where management is the responsibility of a single country, Australia, the Mesoamerican Barrier Reef is

managed by Mexico, Belize, Guatemala and Honduras, all countries which have different management policies.

Our capacity building case study has produced new ideas to improve organisation, management, education, support, and policy development in MPAs in Southern Belize. In addition, we suggest that MPAs need to share regulation, enforcement and conservation, underpinned by scientific research. A major challenge for the participants in this exercise will be to maintain iterations among and between their constituent groups to ensure continued sustainability of both the reef and the fishing practices.

The involvement of a Fisheries officer in our capacity building has resulted in direct transfer of information from the communities to the Government department. The Facilitator has also directly communicated the outcomes of our study to the Director of Fisheries. The personal action plans that were produced have been implemented, taken back into their constituent communities, and the NGOs TASTE and Friends of Nature have been incorporated into a single NGO, which spans several MPAs in Southern Belize. Previously, there were areas between MPAs that were not monitored or policed, resulting in much illegal fishing. Our approach is also part of a wider picture in marine resource management in Belize, where, for example, communities and fishermen are being exhorted not to catch parrotfish (*Scaridae*), as grazing by that species is critical to reef resilience and restoration (Mumby, Hastings & Edwards, 2007). In summary, our approach is part of a complex relationship (Gray & Hatchard, 2008) linking an ecosystem-based approach to fisheries management with comprehensive stakeholder participation.

Although MPAs are important conservation tools, their limitations in mitigating coral loss from acute thermal stress events suggest that they need to be complemented with policies aimed at reducing the activities responsible for climate change (Eakin et al., 2010). One way forward is to have networks of MPAs (Keller et al., 2009), and they could be more effective in conjunction with other management strategies, such as fisheries regulations and reductions of nutrients and other forms of land-based pollution. Developing MPAs as part of an overall climate change policy for a country (Söderholm 2012) may be the best way of integrating climate change into MPA planning, management, and evaluation.

ACKNOWLEDGMENTS

I thank the Earthwatch Institute and the Oak Foundation (USA) for funding the Capacity Building, and Burton Shank (Conservation International) for essential help with the GPS coordinates in Belize. Also thanks to Charley Hitchcock and Dennis and Sandra Garbutt for their vital organisational support during the Belize project.

RESUMEN

Desarrollo de capacidades y desarrollo de políticas en áreas marinas protegidas de Belice, un ejemplo para la gestión integrada de la costa del Caribe. La ciencia de la sostenibilidad puede, a través del desarrollo de capacidades, permitir la gestión integrada de los actores interesados en estos ecosistemas marinos vitales del Caribe. Realizamos un ejercicio de desarrollo de capacidades en dos importantes arrecifes de coral al sur de Belice. El resultado clave fue el desarrollo de un plan de acción personal/profesional de seis meses para cada participante sobre técnicas para liderar, educar y apoyar los problemas acerca del desarrollo sostenible y técnicas para influir en decisiones políticas. Nuestros resultados se pueden ejecutar a lo largo de todo el Caribe.

Palabras clave: huracanes, blanqueo, cambio climático, calentamiento global, Belice, Jamaica.

REFERENCES

Cho, L. (2005). Marine protected areas: a tool for integrated coastal management in Belize. *Ocean and Coastal Management*, *48*, 932-947.

Crabbe, M. J. C., Martinez, E., Garcia, C., Chub, J., Castro, L., & Guy, J. (2010). Is capacity building important in policy development for sustainability? A case study using action plans for sustainable Marine Protected Areas in Belize. *Society and Natural Resources*, *23*, 181-190.

Eakin C. M., Morgan, J. A., Heron, S. F., Smith, T. B., Liu, G., Alvarez-Filip, L., Baca, B., Bartels, E., Bastidas, C., … , & Yusuf Y. (2010). CaribbeanCorals in Crisis: Record Thermal Stress, Bleaching, and Mortality in 2005. *PLOSONE, 5*(11), e13969. doi:10.1371/journal.pone.0013969

Gray, T., & Hatchard, J. (2008). A complicated relationship: stakeholder participation and the ecosystem-based approach to fisheries management. *Marine Policy*, *32*,158-168.

Jorge, M. A. (1997). Developing capacity for coastal management in the absence of the government: a case study in the Dominican Republic. *Ocean and Coastal Management*, *36*, 47-72.

Kaplan, M., Liu, S-T., & Hannon, P. (2006). Intergenerational engagement in retirement communities: a case study of a community capacity-building model. *Journal of Applied Gerontology*, *25*, 406-426.

Keller, B. D., Gleason, D. F., McLeod, E., Woodley, C. M., Airame, S., Causey, B. D., Friedlander, A. M., Grober-Dunsmore, R., … , & Steneck, R. S. (2009). Climate Change, Coral Reef Ecosystems, and Management Options for Marine Protected Areas. *Environmental Management, 44*, 1069-1088.

McCance, T. V., Fitzsimons, D., Keeney, S., Hasson, F., & McKenna, H. P. (2007). Capacity building in nursing and midwifery research and development: an old priority with a new perspective. *Journal of Advanced Nursing*, *59*, 57-67.

McDuff, M. D. (2001). Building the capacity of grassroots conservation organisations to conduct participatory evaluation. *Environmental Management*, *27*, 715-727.

Mequanent, G., & Taylor, D. F. R. (2007). The big push approach to African development and local capacity building: understanding the issue. *Canadian Journal of Development Studies*, *28*, 9-26.

Mumby, P. J., Hastings, A., & Edwards, H. J. (2007). Thresholds and the resilience of Caribbean coral reefs. *Nature*, *450*, 98-101.

Rogers, J. L., Johnson, T. R. B., Warner, P., Thorson, J. A., & Punch, M. R. (2007). Building a sustainable comprehensive Women's Health program: the Michigan model. *Journal of Women's Health*, *16*, 919-925.

Sample, J. A. (1984). Nominal group technique: an alternative to brainstorming. *Journal of Extension, 22*(2), 1-2.

Söderholm, P. (2012). Modeling the Economic Costs of Climate Policy: An Overview. *American Journal of Climate Change*, *1*, 14-32.

Wescott, G. (2002). Partnerships for capacity building: community, governments and universities working together. *Ocean and Coastal Management*, *45*, 549-571.

Williams, I. D., & Polunin, N. V. C. (2000). Differences between protected and unprotected reefs of the Western Caribbean in attributes preferred by dive tourists. *Environmental Conservation*, *27*, 382-391.