Environmental Management (2018) 62:877–891
https://doi.org/10.1007/s00267-018-1094-6

Building Stakeholder Awareness and Engagement Strategy to Enhance Biosphere Reserve Performance and Sustainability: The Case of Kien Giang, Vietnam

Chu Van Cuong[1,2] · Peter Dart[3] · Nigel Dudley[4,5] · Marc Hockings[1,6]

Received: 5 September 2017 / Accepted: 6 August 2018 / Published online: 22 August 2018

Abstract

Local application of the biosphere reserve concept in Kien Giang, Vietnam was examined to see how it compared with other biosphere reserves both in Vietnam and internationally and from that to assess the level of adoption and what could be limiting processes. This was undertaken mainly through qualitative document analysis, field surveys, and extensive interviews of stakeholders. While the designation the Kien Giang Biosphere Reserve and establishment of the management regulation conformed with the conceptual model and criteria outlined by UNESCO, the practical implementation has been inadequate to achieve the desired outcomes of the biosphere reserve concept. There was limited public awareness and understanding of the biosphere reserve approach because of poorly developed communication channels. Top-down, state-control based on a strong sectoral approach to biosphere reserve planning and management hindered stakeholder and community participation. Weak engagement from the Province as the designated lead agency in biosphere reserve governance limited cross-sectoral collaboration in the delivery of the biosphere reserve mandated functions. External projects were perceived by community stakeholders to have only a temporary impact on biosphere reserve operation because of their small, short-term scale with the project maintaining control over funding and design of individual activities. Without proper investment in public awareness and improvement of Biosphere Reserve governance leadership, the desire for development of strategic public–private partnerships to support implementation remains unfulfilled and the Biosphere Reserve model will, as a consequence, contribute little to the long-term biodiversity conservation and socio-economic development in the region.

Highlights

- Kien Giang Biosphere Reserve theoretically follows the international guidelines but has weak management practice.
- Limited understanding of the BR concept hinders operation and management.
- Top-down, state control constrains stakeholder participation and biosphere reserve governance.
- Small-scale and short-term interventions by external projects are perceived to contribute little to biosphere long-term operation and sustainability of the biosphere reserves.
- Improved public awareness and engagement is needed to build community participation in Biosphere Reserve operation and fulfilment of the aims of the designation.

Electronic supplementary material The online version of this article (https://doi.org/10.1007/s00267-018-1094-6) contains supplementary material, which is available to authorized users.

✉ Chu Van Cuong
van.chu@uqconnect.edu.au

[1] School of Earth and Environmental Sciences, University of Queensland, Brisbane, QLD 4072, Australia

[2] Tam Dao National Park, Tam Dao, Vietnam

[3] School of Agriculture and Food Sciences, University of Queensland, Brisbane, Australia

[4] Equilibrium Research, Bristol, UK

[5] Industry Fellow, School of Earth and Environmental Sciences, University of Queensland, Brisbane, Australia

[6] UNEP World Conservation Monitoring Centre, Cambridge, UK

Keywords Biosphere Reserve · Stakeholder awareness · Stakeholder engagement · Biosphere reserve performance · Sustainability · Kien Giang

Introduction

The global system of protected areas (PAs) plays a vital role in biodiversity conservation (Watson et al. 2014). The number and extent of PAs have increased remarkably since the 1970s under various national and international targets, with the intended outcome of mitigating biodiversity loss and poverty reduction. However, successive targets for PA establishment and management have not been met, resulting in increasing pressure on biodiversity and natural resources (Secretariat of the Convention on Biological Diversity 2010). PAs, by themselves, cannot be a safe refuge for ecosystems and the species they encompass because they are often isolated islands surrounded by major environmental disturbance and modification of landscapes (Batisse 1985; McNeely 1993; Palomo et al. 2014). However, PAs can contribute significantly to human welfare if they are properly managed (McNeely 1994) through the environmental services they deliver (Stolton 2010). Hence, the Aichi Target 11 under the Convention on Biological Diversity (CBD 2010) calls for the conservation of at least 17% of terrestrial area and 10% of the world's oceans by 2020 through effectively and equitably managed, ecologically representative and well-connected systems of PAs, and other effective area-based conservation measures integrated into the wider landscapes and seascapes.

Initiated by UNESCO in the 1970s under the Man and the Biosphere Program (MAB), Biosphere Reserves (BR) aim to reconcile biodiversity conservation with economic development, in a way that is not possible under conventional PAs which focus on nature conservation only (Batisse 1997; Ishwaran 2010; UNESCO 2010; Coetzer et al. 2014; Cuong et al. 2017b). The conceptual BR model as outlined by the Seville Strategy (UNESCO 1996a) is built around PAs as the core of the BR, but with a defined buffer zone and transition area, each with different rules/strictures defining activities that can be undertaken in each zone and which support delivery of the three principal functions defined for BRs of conservation, sustainable development, and logistic support. However, BR activities occur in both the legally defined PA with designated natural resource management operational "rules" as well as in the buffer zone and transition area that are common without legal status and concomitant "regulated rules" and across which there are a range of different land uses and stakeholders (Batisse 1997; Ishwaran et al. 2008). Successful implementation relies on having a compliant landscape designation of the BR site as well as commitment and support from central and state government that encourages setting up a reliable management system which encompasses a broad-ranging stakeholder participation and partnership (Coetzer et al. 2014; Cuong et al. 2017a, b).

Although the MAB (and BR) program is an international initiative, the country members determine implementation within their territory. The right to initiate a BR nomination is delegated from the UNESCO MAB program to the participating country (UNESCO 1996a). The country then provides the relevant information on the proposed zonation and management scheme, which aligns to standardized criteria from the Statutory Framework (UNESCO 1996b), to the MAB secretariat for consideration. These requests are strongly conditioned by the socio-economic development pressures within the initiating country, state or province that influence the extent to which there is support for BR implementation (Brown 2002; Ishwaran et al. 2008; Coetzer et al. 2014). Thus, the Lima Action Plan endorsed by the UNESCO in 2016 (UNESCO 2016) sets up new strategic directions and actions that support the effective implementation of the Seville Strategy and Statutory framework for the World Network of Biosphere Reserves (WNBR) aiming to develop and strengthen models for sustainable development in the WNBR while also contributing to the United Nations Sustainable Development Goals to 2030[1] and other international environment agreements (United Nations 2015).

In this article, we examine how the Kien Giang Biosphere Reserve (KGBR) model works under the current institutional framework and is influenced by the particular socio-economic and cultural features of Kien Giang Province. The factors that inhibit or facilitate the BR implementation and the roles of external projects in supporting the operation of the BR model at the site level are explored through investigating the following research questions:

[1] Relevant Sustainable Development Goals to implementation of the Lima Action Plan are (1) End poverty in all its forms everywhere, (2) End hunger, achieve food security and improved nutrition and promote sustainable agriculture, (8) Promote sustained, inclusive and sustainable economic growth, full and productive employment, and decent work for all, (12) Ensure sustainable consumption and production patterns, (13) Take urgent action to combat climate change and its impacts, (14) Conserve and sustainably use the oceans, seas and marine resources for sustainable development, (15) Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss, and (17) Strengthen the means of implementation and revitalize the global partnership for sustainable development.

(i) Are the BR conceptual model and international criteria consistently and appropriately applied in Kien Giang?
(ii) What are the key factors influencing BR operation?
(iii) What is the role of external project support and how sustainable is the BR model operating in Kien Giang without project support?

Research Methods

Research Location

Kien Giang was officially recognized in 2006 as the fifth of nine BRs in Vietnam. At 1.1 million ha, it is the second largest BR in Vietnam with very diverse lowland wetlands, karst mountains, coastal and marine habitats (Kien Giang Province People's Committee 2005; Dang 2009). Only 37,000 ha in U Minh Thuong and Phu Quoc National Parks (NP), Phu Quoc Marine PA and Hon Chong-Kien Luong lime-stone PA were designed as the core area of the KGBR for legal conservation of their enclosed ecosystems, habitats and the 2340 plant and animal species, including endangered or iconic species such as Hairy Nose Otters (*Lutra sumatrana*), Sarus Crane (*Grus antigone*), and Dugong (*Dugong dugon*) (Kien Giang Province People's Committee 2005). The buffer zone and particularly the large transition area were designed to promote sustainable economic development and generate income for over 735,000 people (40% of the total provincial population) whose primary activities are agriculture, fishery and forestry production (Kien Giang Statistic Office 2016). The very diversity of cultural and historical features (e.g., 43 national and 21 provincially recognized relics/heritages, and 388 annual festivals and cultural events) makes the province an attractive tourism destination with over six million visitors to Kien Giang in 2015 (Kien Giang Province People's Committee 2015). Particularly popular tourism locations (e.g., Phu Quoc, Kien Luong, and Ha Tien) draw visitors from Vietnam and as well as Southeast Asian countries and they provide opportunities for developing quality indigenous tourism and service products. Although having the potential for economic development and income generation, recent tourism activities and development are posing high risks to the natural environment and biodiversity due to the lack of integrated planning and management (Cuong and Dart 2011; Carter 2013; Cuong et al. 2014).

Because of its location in the lower Mekong Delta, 75% of Kien Giang mainland area is predicted to be affected by sea level rise by the end of this century (MONRE 2012). Coastal forests mainly formed by melaleuca (*Melaleuca cajuputi*) and mangroves occur along 74% of the *c*.200 km provincial coastline, not only providing secure sources of income for the coastal communities but also contributing to coastal protection (Duke et al. 2010; Cuong et al. 2015). However, the total provincial forest area decreased from 60% in the 1990s to only 8.5% in 2015 (MARD 2016) as a result of large-scale forest conversion to rice and industrial shrimp aquaculture (see e.g., Biggs 2005; Son and Tu 2008; Cuong and Dart 2011; Hoa et al. 2013). The pressure for provincial socio-economic development and income generation coupled with the sector-based management approach are challenging the sustainability and resilience of the last fragmented forest areas in the province (Hawkins et al. 2010; Cuong and Dart 2011; Cuong et al. 2015). The terrestrial and Marine PAs that were legally established and designed as the core zone of the KGBR have not yet effectively protected natural resources as they suffer from illegal harvesting and poaching (e.g., Dang et al. 2001; Stuart 2004; Giles et al. 2005; Hamman et al. 2006; Hines et al. 2008; Nuwer and Bell 2014). Unsustainable land and sea management for rice production, aquaculture, and fishing are occurring across the buffer zone and transition area of the KGBR and this poses a high risk of production decline and income collapse, particularly under the predicted climate change impacts (ADB 2011; Cuong and Dart 2011). Limitations of traditional, sectoral planning and management, and demands for sustainable development led to the change in the management approach through the establishment of the KGBR in 2006.

The Biosphere Reserve Management Board (BRMB) was set up to assist the Province People's Committee (PPC) to manage and deliver the BR approach across sectors and management agencies in the province. This Board is led by a PPC vice chairman and its members are representative managers from seven Departments, Kien Giang Union of Friendship Organization (a social, political organization), 10 Districts, Phu Quoc NP, U Minh Thuong NP, Phu Quoc MPA, and Forest Protection Management Boards (FPMB) (Supplementary Online Material, Figure S1). This multi-agency governance structure aims to coordinate and promote cross-sectoral participation and collaboration in planning and management of the KGBR for biodiversity conservation, sustainable socio-economic development, and development opportunities for local communities (Kien Giang Province People's Committee 2010, 2014; Cuong and Dart 2011; Brown 2012). Additionally, the KGBR Operations Office was set up as a permanent entity funded by the PPC, to support BRMB in BR administration and communication. This office has five full-time staff and is under the direct management of the Department of Science and Technology Director who is the standing vice chair of the BRMB. However, similar to the other Vietnam BRs, there are no community or enterprise representatives in the governance structure of the KGBR.

Data Collection

Research methods included document analysis and primary data collection through site observation, focus group discussions, in-depth interviews, and a participatory workshop aimed to maximize the benefits from data triangulation and multipronged analysis in order to overcome the bias often inherent when using a single data collection method (Mack et al. 2005; King and Horrocks 2010). Three field visits to Kien Giang were conducted to collect data and information by the principal researcher who had more than 3 years working experience as project manager for the Conservation and Development of the Kien Giang Biosphere Reserve Project, funded by Australian Department of Foreign Affairs (DFAT) and implemented by German International Cooperation (GIZ) between 2008 and 2014 (hereafter GIZ/DFAT project). The project aimed to assist Kien Giang authorities and local communities develop and implement a sustainable natural resource management program with a focus on improvement of PAs and coastal forest management in Kien Giang province (Cuong and Dart 2011; Brown 2012). In 2014, GIZ and DFAT significantly reduced the project funding for the Kien Giang component of the Coastal Management Systems Project (formerly the Climate Change and Coastal Ecosystems Project) ending the project field activities.

In the first visit (January–March 2014), the principal researcher met with the Management Board and staff of the BR Operations Office to discuss the data collection method and decide on the target locations and informants to include in the survey. During this visit, focus group meetings and in-depth interviews were conducted with local government-employed informants (managers and staff from the Province, District and Commune People's Committees, Provincial Departments, NPs, PAs, Forest Protection Management Boards (FPMB), social–political organizations, i.e., Farmer Association, Youth Union and Womens Union, and GIZ/DFAT Project). During the second field visit (May–July 2014), focus group meetings and interviews were conducted with local people in four selected villages (Vam Ray, Cong Su, Bai Thom, and Vinh Lac (Fig. 1)). These villages were selected based on the recommendations from the BRMB that they represent local communities in the buffer zone and transition area who have a high level of resources use and conflict over the establishment of the NPs, PAs, and protection forest.

Five focus group meetings were organized to engage 165 participants (75 staff and managers from Province, Districts, Communes, Provincial Departments, NPs, PAs, FPMBs, social organizations and projects, and 90 local people). In these meetings, participants were engaged in discussing the general questions relating to (1) BR model, local understanding and application of the BR approach; (2) advantages and disadvantages of the current sectoral and NP systems and how the BR approach can be used to solve the limitations of these conventional management systems in the context of the local culture and political/governance structures; and key factors influencing operation and management of the BR model in Kien Giang. Because the villages in the survey area are small (approximately 25–40 households), all household representatives were invited to the focus group discussion. All participants then were asked if they would voluntarily participate in the face-to-face interview stage and the personal interview schedule set up.

Draft survey questions developed after the focus group meetings were presented to the BR Operations Office staff for comment and then finalized by the principal researcher.

In-depth interviews were conducted in person based on semi-structured questionnaires. The interview took place over approximately 1 h and respondents were asked:

- If they have heard or knew about the KGBR before the focus group meetings?
- To give personal perceptions about the BR approach and its operation compared to Protected Area management.
- To rate the key BR impediments identified from the group meetings using a Likert Scale from 1 (strongly disagree) to 5 (strongly agree).
- How often they communicate with BRMB and BR Operations Office?
- To provide their personal opinion about the factors promoting and hindering the performance and management effectiveness of the KGBR.
- To give their opinion about the impact of external projects on the operation of the KGBR.
- To give their opinion on future operation and challenges to the long-term sustainability of the KGBR in the absence of external project support and solutions for improving BR operation.

Twenty-five out of 30 invited participants attended a half-day stakeholder workshop held during the third visit in April 2016. In consultation with the BR Operations Office, the participants were selected based on (1) their participation in the focus group meetings and in-depth interview, (2) participants knowledge of the BR and traditional management systems (through involvement in the focus group discussions and in-depth interview), (3) representative BRMB, managers and staff of the provincial departments, management agencies, business enterprise association, GIZ/DFAT project and local communities, and (4) gender consideration. Findings were presented and discussed at the workshop. The participants also added any comments relating to the survey results which they were given and then asked to nominate whether they "agreed" or "disagreed" with the study findings on particular BR management issues.

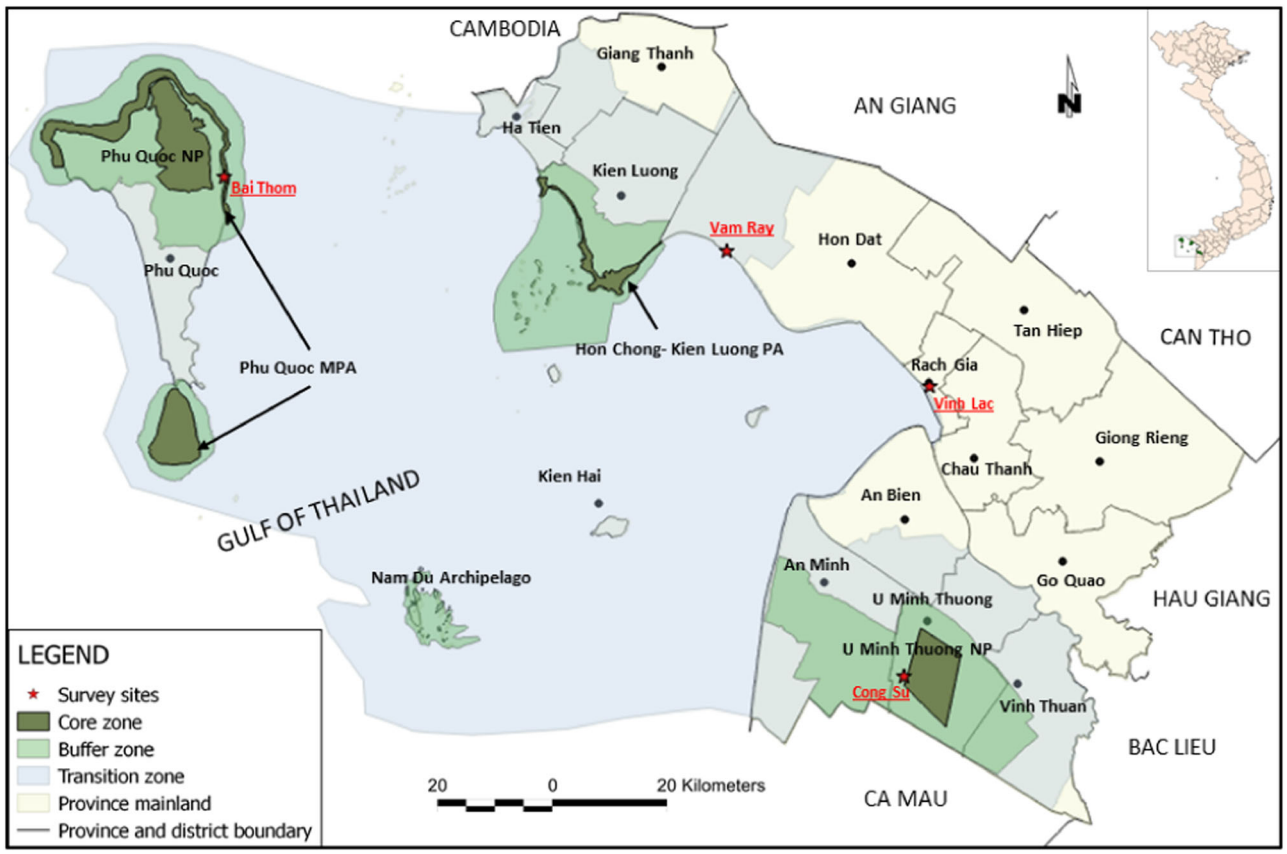

Fig. 1 Survey sites in Kien Giang Biosphere Reserve

Data Analysis

The compliance in the application of the BR approach under the provincial socio-economic development and management context in Kien Giang was checked using existing legal and official documents such as BR nominations, management regulations, and annual reports. Informants rating for key impediments to operation and management of the BR was analyzed and graphed based on their means and standard deviations using SPSS 20.

NVivo 10 was used to code the texts after dividing into two respondent groups of local government staff (hereafter KGS) and local people (hereafter KGL) using the collected information from 142 survey forms (details of coding structure in Supplementary Online Material, Figure S2). Statements/opinions about the promoting and hindering attributes for BR operation and management were coded using references to key identified factors as described in Cuong et al. (2017b). All identified factors deriving from the coding process were then calculated as percentages and ranked from 1 (factor has the highest relative importance of statements relating to requirements or impediments for BR management success) to 11 (factor has the lowest relative importance of statements relating to requirements or impediments for BR management success). Based on the ranking order of these factors, a graph presenting a combination of X (Impediment) and Y (Requirement) was developed. Similarly, informant's statements about the role of external project(s) in support of operation and management effectiveness of the KGBR, project limitations and challenges of the BR model in the case of external project support cessation was coded and analyzed.

Results

Survey Participants

A total of 142 informants (out of 165 people who participated in focus group meetings) were interviewed. Half the informants were representatives of the local government and agencies (provincial managers, departments, NPs, PAs, and district and commune staff) and mainly had professional and university degrees while the other half were local people (farmers, fisherman, and small business owners) with school education background. Most interviewees (66%) were males (detail in Supplementary Online Material, Table S1).

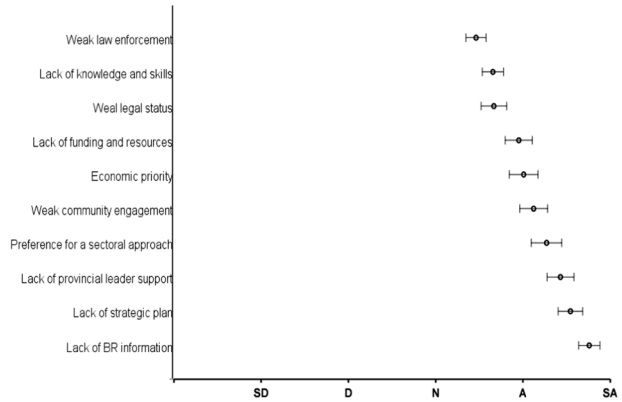

Fig. 2 Participants' perception of the key impediments to operation and management of the KGBR. The figure shows the means and error bars (=95% CI) using the Likert scale rating from 142 informants (1 = SD: strongly disagree; 2 = D: disagree; 3 = N: neutral; 4 = A: agree; 5 = SA: strongly agree)

Management Application of Biosphere Reserve Concept Model and International Criteria in KGBR

The scoring system applied to the Vietnam BR system (Cuong et al. 2017a) was used to compare the compliance between international criteria outlined in the (Seville) Statutory Framework for BR network (UNESCO 1996b) and their application in the management of the KGBR (detail in Supplementary Online Material, Table S2). The study revealed that management of the KGBR was followed thoroughly in five out of eight applicable Seville articles relating to BR definition (article 1), BR functions (article 3), designation procedure (article 5), publicity (article 6), and periodic review process (article 9). Two Seville criteria relating to participation in the global network (article 7) and regional and thematic sub-network (article 8) were not directly addressed, but the Management Regulation for KGBR encourages the participation of the BRMB in international cooperation for information exchange, research collaboration, and funding mobilization. Although the Management Regulation for KGBR theoretically responded to the key article 4 of the Seville Statutory Framework dealing with criteria for nominating a BR, it lacked practical ways for supporting BR implementation. For instance, although the BR conforms to the conceptual model of landscape designation with the core, buffer zone, and transition area, only 3% of the KGBR was designed for biodiversity conservation. The planning and management decisions for the KGBR to date only involved the Provincial Departments and agencies, while the local community and private sector have even now, no involvement in BR governance and management structure. Finally, although an action plan has been submitted to the PPC as called for by the KGBR Management Regulation, it is pending approval after 20 months.

This section addressed research question (i) about the application of the BR concept. It indicates only a partial understanding of the potential benefits of the BR model and indicates that the BRMB, while concerned to have the KGBR compliant with the UNESCO guidelines, has done too little to implement them for the benefit of the community, stakeholders, and Provincial economy and biodiversity.

Impediments to Operation and Management of the KGBR

Focus group discussions identified ten key impediments that are hindering BR operation and implementation (see Fig. 2). Based on this, informants were asked to rate each impediment during the in-depth interview process. Figure 2 shows that the five most important impediments which pertain to research question (ii) were:

- limited information pertaining to, and local knowledge of, the BR due to the weakness of the awareness and communication campaign,
- lack of strategic management plan,
- weak support and engagement from the provincial and department leaders,
- preference by the BRMB for a sectoral approach,
- weak community involvement.

Factors Influencing Management of The Kien Giang Biosphere Reserve

Based on the list of 11 referent factors identified from the global survey of BR management effectiveness (Cuong et al. 2017b), the Nvivo coding process identified only eight factors (Stakeholder participation and collaboration, Awareness and communication, Finance and resources, Management and implementation, Economic development, Governance, Monitoring and evaluation, and Regional integration) belonging to three functional groups (BR Designation, Participation, and Delivery) which influence operational management of the KGBR. Provincial managers and staff did not have any opinion about three out of the five success factors identified in the global survey that relate to BR Designation (Landscape planning and zonation; Learning orientation and system thinking; and Research linkage). Notably, all five factors relating to BR Designation were not captured in the local community perception (Table 1).

Stakeholder participation and collaboration, Finance and resource, Management and implementation were perceived to be the most influential factors by two respondent groups comprised of government employees and local people. Both

Table 1 Factors influencing biosphere reserve management as perceived by provincial managers and staff, and local people in Kien Giang

Group factors	Factors identified from survey of the World Network of Biosphere Reserves	Factors perceived by Kien Giang managers and staff	Factors perceived by the local people in Kien Giang
Designation	Landscape planning and zonation	No	No
	Regional integration	Yes	No
	Learning orientation and system thinking	No	No
	Monitoring and evaluation	Yes	No
	Research linkage	No	No
Participation	Stakeholder participation and collaboration	Yes	Yes
	Awareness and communication	Yes	Yes
	Governance	Yes	Yes
Delivery	Finance and resources	Yes	Yes
	Management and implementation	Yes	Yes
	Economic development	Yes	Yes

respondent groups perceived the lack of Awareness and communication as the greatest hindrance to BR operation, but government-employed respondents did not consider it to be a strong factor for promoting BR performance. While informants from the government group perceived Governance as the most significant influencing factor (Fig. 3a), it was considered the least important by the local people who considered Economic development to be the major factor influencing BR operational management (Fig. 3b).

Awareness and communication

Only 88 out of 142 (62%) of informants knew of, or had heard about KGBR before the focus group discussions. Fifty-four percent (48 informants) obtained BR information from training and involvement in the GIZ/DFAT project activities, and the rest through mass media (e.g., Internet, newspapers, local television, and radio). There was a significant difference between two informant groups. Among the informants who knew of the KGBR, 83% (61 out of 73 people) were from the government-employed group, while the figure was only 39% (27 out of 69) for the local community group.

Ninety percent of respondents from the government-employed group and 96% from the local community considered the lack of public awareness and communication to be the most important factor hindering the operation and management of the KGBR. Even though they knew of the existence of the BR in the province, many informants failed to distinguish the difference between the way the BR should function and the traditional PA conservation approach. This limitation hinders the application of the BR concept through management practice as noted by this respondent from the government-employed group:

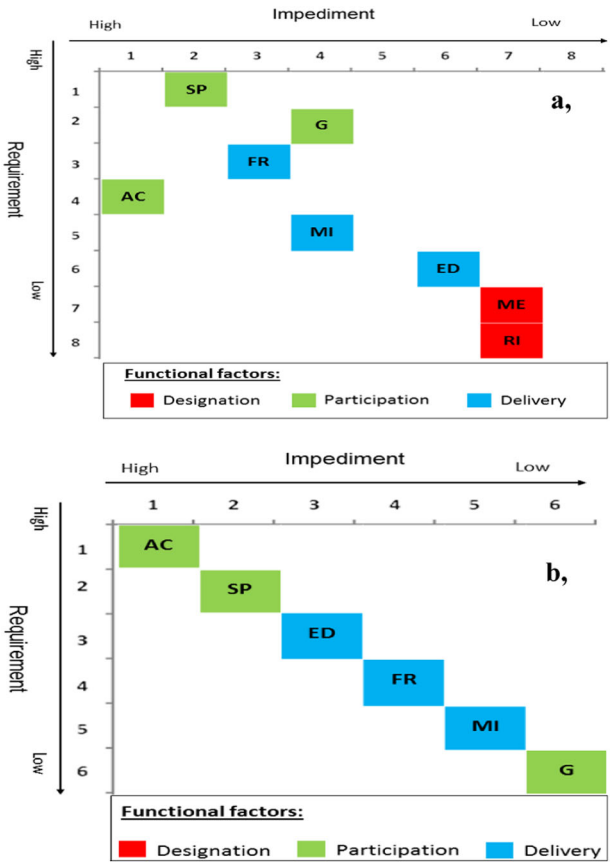

Fig. 3 Perception of factors influencing operation and management effectiveness of the KGBR from government employees **a** and local people **b**. *Y* axis presents the relative importance of informants' perceptions about the requirements for biosphere reserve success; *X* axis presents the relative importance of informant's perceptions about the impediments leading to management failure in KGBR. SP stakeholder participation and collaboration, AC awareness and communication, FR finance and resources, MI management and implementation, ED economic development, G governance, ME monitoring and evaluation, RI: regional integration

> "Nearly a decade after recognition, the BR concept is quite strange in both working offices and public domain. Many people, including Provincial leaders and BRMB members still believe in a loss of economic development and investment opportunity from having the BR due to the supposedly stricter conservation and environmental protection regulations" (Respondent KGS #12).

Misunderstanding of the differences between the BR and PA approaches was also apparent with commune staff and local people:

> "It [biosphere reserve] was set up for conservation without proper alternative livelihood options and compensation for the local fisherpersons who have lost traditional fishing places and thereby income" (Respondent KGS #72).

and

> "BR is the place for conservation of forest, wildlife and environment. All people need to follow the laws and government regulations" (Respondent KGL #25)

The study also shows a weak communication between BRMB, Operations Office, and local stakeholders in Kien Giang. Only 11 out of 142 informants (7.7%) had communication with BRMB and its Operations Office. However, the communication occurred rarely (once to twice a year) and is mainly related to the GIZ/DFAT Project funding and activities that directly involved the Departments and agencies. Sixty-seven percent of respondents from District and Commune offices and all informants from the local community group did not know of the existence of the BRMB and location of the KGBR Operations Office.

With regard to future communication, 74% of informants expected to maintain or establish contact and communication with the BRMB and Operations Office largely because of their expectation of getting more involved in projects and funding sources. The remaining respondents (26%) and mostly from the community group did not want to establish contact and communication because they could not foresee any benefits for them coming from the BR.

Stakeholder participation and collaboration

Stakeholder participation and collaboration was perceived as one of the two most important factors influencing BR management. Eighty-two percent of respondents noted the theoretical advantages of the BR model for promoting stakeholder participation and collaboration which in turn enhances BRMB coordination and addresses fragmentation and overlap of effort and activities often arising from conventional governance processes of planning and management. Evidence of sectoral cooperation in BR planning was typically perceived by this respondent from the government-employed group:

> "Departments, NP and PA agencies start sending draft management and investment plans to obtain advice from BRMB prior to finalizing and submitting for approval from PPC and Ministries" (Respondent KGS #7).

However, most informants (83%) voiced concern about the current weak sectoral participation. Because government departments and agencies are not obliged by law to manage or direct their activities in accordance with the BR concept, it takes time for the BR approach to become operational within the sector and supplant the traditional conventional planning and management activities even though the KGBR has been in existence since 2006. This is illustrated in the following response:

> "The new approach [Biosphere Reserve] necessarily takes time to understand and then be adopted into the legal system. The Departments currently only involves in BR activities such as information sharing and exchanging at the specific request of the PPC vice chairman" (Respondent KGS #29).

This reflects the resistance to change within the Departments that needs to occur to support the successful operation of the BR! While it was realized there is a need to engage local people in BR planning and management, many informants voiced their concern about the limitations for a meaningful community participation process imposed by the lack of understanding of the BR concept. The top-down, conventional approach to operations by state agencies does not encourage local peoples involvement in BR planning and management.

> "We do not see any differences between PA and BR approach as they are still planned and operated by the provincial authorities and agencies" (Respondent KGL #29).

Governance

Informants from local communities perceived Governance was of the least importance for BR management. This is because they have not yet been involved in, or engaged by, the governance or management structure of the BR in Kien Giang. In contrast, respondents from the government group

considered having strong governance as the second most important factor promoting success. However, current and recent BRMB representatives are the PPC vice chairman and participating Department and agency managers. Being a part-time and unpaid assignment, and coupled with their lack of understanding about the BR coordination role discourages the Chair and Board members from investing their time and effort in BR activities.

> "We do not have a strong and continual leadership to maintain stakeholder collaboration and facilitate BR activities like Cat Ba BR[2] because the BRMB is only a part-time activity and constant turnover[3]Most managers and Board members still do not know what BR coordination stands for and how to deliver it?" (Respondent KGS #6).

Additionally, the BRMB only has members drawn from Peoples' Committees at Province and District levels of governance, Provincial Departments, NPs, PAs, and FPMBs (Supplementary Online Material, Figure S1). Thus, it is lacking community and industry representatives in governance as indicated by the vice chair of the BRMB:

> "The current BRMB only represents the Province and Department leaders. Thus, establishment of an Advisory Council is needed to include community, enterprise and scientific representatives in BR governance under the Seville guidelines and Provincial Management Regulation" (Respondent KGS #7).

Finance and resources

Finance and resources were perceived as the third factor influencing KGBR management. Seventy-three percent of informants voiced their concerns about low staff capacity and experience, and lack of funding for BR implementation. The main responsibility to allocate funding for BR operation rests with the PPC (through Department of Finance) but due to the provincial budget limitation, BR appears to exist largely in title only because of the limited resources for implementation.

> "Much attention is paid to the international title and its showcasing rather than giving real resources to manage and use the BR concept effectively" (Respondent KGS #12).

Management and implementation

Sixty-three percent of the informants voiced their concerns about the limitations of, and irregularities associated with, BR Management and implementation. Lack of strategic management plan and delivery mechanisms were the key hindrances to the promotion and implementation of the potential associated with the BR concept. Especially, public awareness campaign, law enforcement (in the core zone), and new alternative income options for those who are living around the PAs and dependent on the core zone's natural resources, were the most significant concerns of informants, but there was no evidence to show that these activities are taken into account by the current BR management.

> "Very few activities in awareness improvement, especially promotion and use of BR brand for tangible outcomes that demonstrate its advantages compared to the traditional NP management, have been organized by the BRMB" (Respondent KGS #41).

Economic development

In contrast to government-employed respondents, local people perceived Economic development to be the third important factor influencing management effectiveness of the KGBR. Seventy-seven percent of respondents from the community group voiced their concern about environmental destruction from large scale infrastructure and development projects in Kien Giang[4] while there is limited contribution of the BR model to improvements of livelihoods and alternative incomes[5] for the local communities. As a result, it is difficult to persuade them to engage in the BR management for protection of natural resources and biodiversity.

> "The Vietnamese proverb says 'the hungry belly has no ears'. Many poor people rely on natural resource exploitation i.e. fishing, timber and fuel wood harvesting for their daily life. Recently, we do not

[2] Cat Ba BR was established in 2004 and is located in the North of Vietnam with a practice of maintaining continuity in the chairperson position even when they move to a different role in the Province governance.

[3] Within 4 years from 2010 to 2014, the BRMB experienced four changes of its chair and Management Board members.

[4] Coastal forest ecosystems in Phu Quoc NP, inland wetlands (plain of reeds in Ha Tien and Kien Luong), provincial mainland mangrove forest, lagoon (Dong Ho), and limestone outcrops (Kien Luong).

[5] BRMB has developed a list of 16 potential products to be supported by BR brand certification and labeling, e.g., Phu Quoc pepper, Phu Quoc fish sauce, U Minh honey, and Sac Ran dried fish. However, there was no detailed plan and mechanism to promote local production for these products.

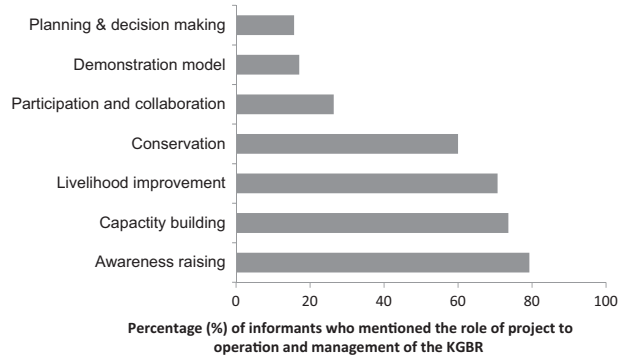

Fig. 4 Percentage of informants who mentioned the contributions of the KGBR Project to biosphere reserve management in Kien Giang ($N = 88$)

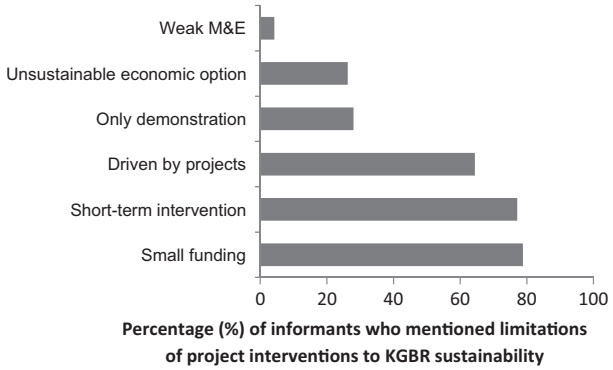

Fig. 5 Percentage of informant opinions about the limitations that affect projects contributions to the sustainability of the KGBR ($N = 88$)

get any additional benefits and incomes from having a BR" (Respondent KGL #13).

Local Perception of External Project Support for BR Management

This section addresses research question (iii) on the role of project support for the sustainability of the BR model. Ninety-eight percent of informants who had experience with the GIZ/DFAT project and activities perceived its positive contribution to operation and management of the BR. Environmental awareness and capacity building (i.e., short trainings, workshops, and study tours) for provincial managers and staff, and local people were perceived to be the two most significant project contributions. The improvement of BR knowledge and management skills supports staff and local people in the development of a strategic plan for integrating conservation, restoration of coastal forest, and livelihood improvement. Additionally, promoting stakeholder participation and cooperation in planning and delivering of BR activities, establishing the demonstration models for local learning and providing updated information for planning and decision making processes were thought to be other significant contributions of this project (Fig. 4).

Examples of the project contribution to BR operation as perceived by government staff were:

> "A wide range of activities such as awareness raising, capacity building and demonstration models using participatory approach were undertaken by the project. New partnerships and connections have been established between Province and research institutes, universities and donors with project assistance. Evidence and information from project surveys on biodiversity, forest and related management issues is useful for planning and decision-making" (Respondent KGS #29).

And an informant perception from local community group:

> "Project built fences [wave breaking Melaleuca fences] and planted mangroves to protect new dyke, land and properties from sea water flooding. They also provided a small fund and technical training to support women undertaking fish farming and planting of a new variety of coconut" (Respondent KGL #23).

However, 83% of informants perceived little impact of the project on the long-term sustainability of the KGBR. Among of the reasons given were the small scale of activities supported (79%), short-term intervention of the on-ground activities (77%), project control of the funding and activities (64%) (the local partners and communities often think that they are in a weak position or powerless in final decision making about the project activities and spending of project funds) (Fig. 5).

Perception of the government-employed informants who are BR managers about the project support for the sustainability of the KGBR is illustrated in the following comment.

> "Support for on-ground activities is often via small, short time demonstrations with ambitious targets and this kind of small-scale and quantitative-focussed activity is unconvincing for learning and scaling up. Specific support for developing and implementing KGBR Action Plan began in 2014, but it was cut-off due to the change in project structure and focus by the end of that year" (Respondent KGS #12).

Fig. 6 Percentage of informant opinion about challenges to sustainable operation of the KGBR in the absence of project support

Fig. 7 Informant perceptions about the ways to improve operation and sustainability of the KGBR as a percentage of survey respondents

Perception of the local people about the project long-term impact is illustrated by the following quote:

> "The integrated mangrove restoration and livelihood models demonstrate an appropriate intervention but we are not sure of the sustainability of these small scale works. Without continuous investment in expanding the narrowing mangrove fringe (because of sea inundation), over 25 local families here and their livelihoods are likely again to be at risk from sea water" (Respondent KGL #13).

Future Operation of the KGBR and Enhancement of Management Processes

Ninety-eight percent of informants were concerned about the sustainability of the KGBR in the situation where project support declines or disappears. Insecure funding and resources to continue on-ground activities and secure achievements, weak support and engagement of the provincial leaders, low BR management and communication skills, weak participation and cooperation from involved departments and sectors, and frequent change of the governance leadership were the five major challenges to the future BR operation (Fig. 6). Weak legal status was perceived to be the least significant challenge, but it was still a concern of some informants.

> "Lack of national legal recognition means that BR will continue to be a secondary issue in the political and funding agenda at both national and provincial level" (Respondent KGS #20).

Regarding solutions for BR operation and sustainability, informants suggested that key requirements (Fig. 7) were:

- improvement of public awareness and understanding of the BR approach;
- improvement of leadership;
- management plan approval from the PPC and subsequent implementation;
- improvement in stakeholder participation and engagement, particularly from local communities and non-government actors;
- capacity building to improve working experience and skills for managers, staff and local communities;

> "The periodical review report will be soon prepared and submitted to UNESCO which means that the BR model is expected to be maintained but its performance and contributions to conservation and sustainable socio-economic development in the province will greatly depend on the level of public awareness and provincial leader commitment" (Respondent KGS #12).

Discussion

A simple check against the BR conceptual model and international criteria revealed that KGBR shows compliance with respect to the conceptual model in relation to landscape designation, but our study revealed a limitation in management practice. The BR approach which addresses biodiversity conservation coupled with sustainable development and the logistical support needed, is a challenge to implement (Coetzer et al. 2014; Popelier and Vaessen 2014). Lack of awareness in the community of the BR concept leads to the local misperception about the difference between the main aims of the conventional PA management and the BR model. This has two consequences,

firstly, similar to findings from many other studies (e.g., Fraga 2006; Wallner et al. 2007; Bosak 2008; Kusova et al. 2008; Elbakidze et al. 2013), we found that lack of understanding of the BR model leads to the fears of local stakeholders that the BR will limit exploitation and use of forest, land, and natural resources for socio-economic development in Kien Giang. Secondly, confusion about how a BR should work on the ground (UNESCO 2010; Reed and Egunyu 2013) leads to lost opportunities to exploit the potential advantages of the BR to promote conservation and local economic development, while BR management is concerned about the deregistering of the BR title by UNESCO if their international criteria and instructions are not met. Consequently, attention was paid to compliance and its apparent functioning, but little investment and management effort were made towards making the model work effectively.

Successful implementation of the BR approach needs a strong public–private partnership and engagement from government and non-government stakeholders (UNESCO 1996a; 2010; Ishwaran et al. 2008; Stoll-Kleemann and Welp 2008; Stoll-Kleemann et al. 2010; Cuong et al. 2017b). Management experience of the WNBR showed that multi-sectoral participation and collaboration only works sustainably under the BR framework with a strong voluntary stakeholder dedication. In contrast, our findings in Kien Giang showed that the participation and collaboration process mainly occurred under the direction of the PPC vice chairman rather than through stakeholder voluntary and willing participation.

Our study raises a critical question about the long-term sustainability of the working partnership between BR management and stakeholders as it depends on a stable and committed BRMB which in turn depends on a strong sectoral involvement. In practice, there is currently a rapid Management Board turnover. Additionally, the BR concept is a broad-based community-wide planning instrument. Thus, strong local community buy-in and engagement is necessary for successful implementation of the BR program (e.g., Stoll-Kleemann 2005; Stoll-Kleemann and Welp 2008; Stoll-Kleemann et al. 2010; Schultz et al. 2011; Coetzer et al. 2014). This will need a strong commitment by the state level management agencies for decentralization and empowerment of local communities coupled with adequate support to ensure that the BR is managed according to the original designation rhetoric.

Our case study also indicated that when the top-down, conventional state control approach is applied to BR management, the local people do not have a strong sense of "their ownership" of the BR and this leads to the community not caring what happens in the BR similar to the Australian BRs (Matysek et al. 2006). Thus, engaging local communities and private industries in BR planning and decision management would help to build a place-based, participatory governance for implementing a shared BR vision across the landscape (UNESCO 2016).

A distinct feature of the BR management approach is that it is about coordination and facilitation and that its activities do not overlap with or repeat a state management process (Bioret 2001). To support BR operation at the landscape level, however, it still needs a governance structure mandated by the province that can influence the policies and integrate stakeholder's interests into activity agendas (Ishwaran 2010). Thus, establishment of the BRMB that is chaired by the PPC vice chairman with representatives of the provincial departments and agencies is required for strong and enduring leadership which then enables the building of the partnership with the community and local stakeholders such that they then become involved in the BR activity as in examples from Canada (Edge and McAllister 2009; Goerge and Reed 2016). However, our case study showed that the rapid changes of the top and key managers militated against the kind of governance structure that provides continuing coordination and facilitation services. Rapid change of personnel in the BRMB would not be so disruptive if the sectors represented on the Management Board were committed to the principle of cooperation between and within sectors in matters relating to the BR functions.

Limited funding and resources for BR implementation is a general problem throughout the WNBR (Brown 2002; UNESCO 2010; Popelier and Vaessen 2014) and this is the case in Kien Giang. This limited the execution of "on-ground" activities needed to create tangible outcomes for both conservation and generation of sustainable livelihoods, outcomes that differentiate the BR from conventional PA management and thereby provide more legitimacy and engagement within the community. Because of the lack of financial support to engage qualified staff with appropriate local expertise and experience, at the operational and site management level (Schliep and Stoll-Kleemann 2010), there are less opportunities for capacity building of BR staff and community organizations. This limitation of staff long-term career development prospects discourages people from seeking the additional external funding and project activity needed from industry, private sector, universities, and research institutes. Additionally, lack of funding support does not allow local people to implement livelihood programs and alternative options that encourage using natural resources in a sustainable way.

The Statutory Framework (UNESCO 1996b) requires the development of a management plan or policy that defines how management of the BR will occur, particularly the human activities in the buffer zone. However, the absence of a formalized management plan implies that the BR concept was only adopted in theory and lacks integration in

the formal management framework and socio-economic development context such as the provincial and district socio-economic development plans, and management plan of provincial departments, NPs and PAs. Whilst there is a lack of integrated management planning for BRs as an entire unit, with the management of the original core zone only, BR values are critical as reflected in the slogan "Conservation for Development and Development for Conservation" (see UNESCO Hanoi 2013; Cuong et al. 2017a).

Economic development with tangible livelihood benefits for the local people is a core function that distinguishes BR from PA management (UNESCO 1996a; Stoll-Kleemann 2005; Cuong et al. 2017b). However, successful implementation of the BR objectives of biodiversity conservation and sustainable development for the local communities has proven a key challenge (UNESCO 2010; Coetzer et al. 2014; Reed 2016). On the one hand, there is on-the-ground evidence that overriding economic development projects ignore the precautionary principle with respect to environmental integrity and services, e.g., road and infrastructure, large-scale aquaculture and rice production, and cement production that are destroying sensitive and high value environmental areas (Cuong and Dart 2011; Carter 2013; Godfrey 2016). On the other hand, when management efforts largely focus on biodiversity conservation, the livelihood development opportunities and rights of the rural and indigenous people who lost their access and traditional incomes from the establishment of the PAs are often ignored (Lu et al. 2003; UNESCO 2010; Reed 2016). Thus, eco-tourism and promotion of the BR branding for the local products using environmentally-friendly production techniques must be a priority solution to preserve the natural environment, promote sustainable development, and provide alternative sources of incomes for the local communities and support for BR activities (UNESCO 2016; Cuong et al. 2017b).

There is substantial evidence for positive contributions by external projects to BR operation and management (Cuong and Dart 2011; Brown 2012; Cuong and Brown 2013), but it appeared that project activities were perceived to have only a temporary impact on the operation of the BR because of their small scale and short time intervention. There was a misperception of the role of the project models by the community who expected them to be maintained by external funding in the future. Conversely, there was an expectation by the funders that, if successful, the models would then be taken up by other agents or members of the community per se. This illustrates the difficulty in transitioning from small-scale livelihood development models to acceptance and uptake within the wider community of the benefits of adopting the model's process. Additionally, the model projects did not put enough effort into developing community understanding of the reasoning and intention behind the model and engagement and this limited subsequent "buy in" by the community; a very common problem with development projects. This consequently led to the lack of interest and active involvement in project activity implementation from local stakeholders resulting in a cessation of the activities beyond the project completion as also observed in Cat Ba and Cat Tien BRs (Brooks 2010; Brooks et al. 2014). Thus, such projects in support of the BR should take into account the length of the intervention needed to develop the understanding by the local stakeholders of the project aims, while also leaving enough time to build a strategy that adaptively evolves in accord with local circumstances and develops its own dynamic and activity continuity.

Conclusions

The paper examines how the BR concept and approach was interpreted and used in planning and management in Kien Giang and it reveals a mismatch between the BR concept and implementation at the site level. Lack of awareness and communication at the different levels of governance, particularly in local communities was considered the most hindering factor to the successful operation of the BR model. In addition, unstable leadership with genuine grassroots mobilization hindered broad stakeholder participation and successional collaboration processes. Current application of a strong state-control and sectoral approach in planning and management weakened BR governance and limited funding and resource opportunities for effective BR delivery. Thus, developing and implementing an awareness and communication strategy is critical to improving public awareness and support for a BR approach (UNESCO 2010, 2016). This would encourage greater stakeholder engagement in collective decision-making and help to shift entrenched political ideals/memes that resist opening up to include the BR approach in planning, resource allocation, and delivery of a BR shared plan and vision (Cuong et al. 2017a). In addition, development of business strategy plans to diversify BR operational income—such as from payment for environmental services, revenue from using BR branding, park entrance fees, and non-traditional sources (e.g., enterprises, projects, universities and research institutes) are essential to address BR finance limitations (UNESCO 2016).

Acknowledgements We thank Kien Giang BRMB, Department managers and staff, and local people for their support and participation in the group meetings, interviews, and stakeholder workshop. This work was

funded by the Australian Government Endeavour Scholarship Award, GIZ/DFAT—Conservation and Development of the Kien Giang Biosphere Reserve Project, and School of Earth and Environmental Sciences, University of Queensland.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

Ethics Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

References

ADB (2011) Climate change impact and adaptation study in the Mekong Delta—Part A, final report: climate change vulnerability and risk assessment study for Ca Mau and Kien Giang Provinces. Institute of Meteorology, Hydrology and Environment (IMHEN), Hanoi

Batisse M (1985) Action plan for biosphere reserves. Environ Conserv 12:17–27

Batisse M (1997) Biosphere reserves: a challenge for biodiversity conservation and regional development. Environ: Sci Policy Sustain Dev 39:6–33

Biggs D (2005) Managing a rebel landscape: conservation, pioneers, and the revolutionary past in the U Minh forest, Vietnam. Environ Hist 10:448–476

Bioret F (2001) Biosphere reserve manager or coordinator. Park 11:26–28

Bosak K (2008) Nature, conflict and biodiversity conservation in the Nanda Devi biosphere reserve. Conserv Soc 6:211–224

Brook SM, Dudley N, Mahood SP et al. (2014) Lessons learned from the loss of a flagship: the extinction of the Javan rhinoceros *Rhinoceros sondaicus annamiticus* from Vietnam. Biol Conserv 174:21–29

Brooks AM (2010) Constraints and enabling factors for effective conservation in Vietnam: Cat Ba Island case study. Dissertation, The University of Queensland

Brown JD (2002) The integration of man and the biosphere. Georgetown Int Environ Law Rev 14:741–765

Brown SM (2012) The conservation and development of the Kien Giang Biosphere Reserve: adaptation to climate change. Asian J Environ Disaster Manag 4:489–510

Carter RW (2013) Sustainable management of natural resources: guidelines for developing tourism in Kien Giang Province, particularly the Ha Tien-Dong Ho area. Agriculture Publishing House, Ho Chi Minh City

CBD (2010) Strategic plan for biodiversity 2011–2020—COP 10, decision X/2. Convention on Biological Diversity, Montreal, Canada

Coetzer KL, Witknowski ETF, Erasmus BFN (2014) Reviewing biosphere reserves globally: effective conservation action or bureaucratic label? Biol Rev 89:82–104

Cuong CV, Brown S (2013) Using biosphere reserve as an integrated planning and management tool: a case study in Kien Giang, Vietnam. In: Davis S (ed) Future nature, future culture(s). Noosa Biosphere Limited & CQ University, Noosa, Queensland, p 157–164

Cuong CV, Dart P (2011) Conservation and development of the Kien Giang Biosphere Reserve: climate change, conservation and development—lesson learned and practical solutions. Agriculture Publishing House, Ho Chi Minh City

Cuong CV, Dart P, Dudley N, Hockings M (2017a) Factors influencing successful implementation of biosphere reserves in Vietnam: challenges, opportunities and lessons learnt. Environ Sci Policy 67:16–26

Cuong CV, Dart P, Hockings M (2017b) Biosphere reserves: attributes for success. J Environ Manag 188:9–17

Cuong CV, Russell M, Brown S, Dart P (2015) Using Shoreline Video Assessment for coastal planning and restoration in the context of climate change in Kien Giang, Vietnam. Ocean Sci J 50:413–432

Cuong CV, Tri NH, Hockings M, Dart P (2014) Action plan for conservation and promotion of the values of the Kien Giang Biosphere Reserve for the period 2013–2015 and vision to 2020

Dang NX (2009) Rapid assessment of flora and terrestrial animals in key areas of the Kien Giang Biosphere Reserve. Kien Giang, Vietnam

Dang NX, Anh PT, Tuyen LH (2001) New information about the Hairy-Nose Otters (Lutra sumatrana) in Vietnam. IUCN Otter Spec Group Bull 18:64–75

Duke N, Wilson N, Mackenzie J, Hoa NH, Puller D (2010) Assessment of Mangrove Forests, shoreline condition and feasibility for REDD in Kien Giang Province, Vietnam. Conservation and Development of the Kien Giang Biosphere Reserve Project, Rach Gia, Kien Giang

Edge S, McAllister ML (2009) Place-base local governance and sustainable communities: lessons from Canadian biosphere reserves. J Environ Plan Manag 52:279–295

Elbakidze M, Angelstam P, Sandstrom C et al. (2013) Biosphere reserves for conservation and development in Ukraine? Legal recognition and establishment of the Roztochya initiative. Environ Conserv 40:157–166

Fraga J (2006) Local perspectives in conservation politics: the case of the Ria Lagartos Biosphere Reserve, Yucatan Mexico. Landsc Urban Plan 74:285–295

Giles BG, Ky TS, Hoang DH, Vincent ACJ (2005) The catch and trade of seahorses in Vietnam. Biodivers Conserv 15:2497–2513

Godfrey C (2016) Phu Quoc feels growing pains as development booms. http://e.vnexpress.net/news/travel-life/phu-quoc-feels-growing-pains-as-development-booms-3487852.html. Accessed 24 October 2016

Goerge C, Reed MG (2016) Building institutional capacity for environmental governance through social entrepreneurship: lessons from Canandian biosphere reserves. Ecol Soc 21:18

Hamman M, Cuong CT, Hong ND, Thuoc P, Hien BT (2006) Distribution and abundance of marine turtles in the Socialist Republic of Viet Nam. Biodivers Conserv 15:3703–3720

Hawkins S, Phuc XT, Phuong PX et al. (2010) Roots in the water: legal frameworks for Mangrove PES in Vietnam. Katoomba Group's Legal Initiative Country Study Series. Forest Trends, Washington, DC

Hines E, Adulyanukosol K, Somany P et al. (2008) Conservation needs of the Dugong dugon in Cambodia and Phu Quoc island, Vietnam. Oryx 42:113–121

Hoa NH, McAlpine C, Pullar D, Johansen K, Duke NC (2013) The relationship of spatial temporal changes in fringe mangrove extent and adjacent land-use: case study of Kien Giang coast, Vietnam. Ocean Coast Manag 76:12–22

Ishwaran N (2010) Biodiversity, people and places. Australas J Environ Manag 17:215–222

Ishwaran N, Persic A, Tri NH (2008) Concept and practice: the case of UNESCO biosphere reserves. Environ Sustain Dev 7:118–131

Kien Giang Province People's Committee (2005) Kien Giang Biosphere Reserve. Proposal submission to UNESCO. Kien Giang Province People's Committee and MAB Vietnam

Kien Giang Province People's Committee (2010) Decision No 811/QD-UBND of the Kien Giang Province People's Committee establishing the Biosphere Reserve Management Board

Kien Giang Province People's Committee (2014) Management regulation for Kien Giang Biosphere Reserve

Kien Giang Province People's Committee (2015) Report of provincial socio-economic development 2010–2015 and directions for 2020

Kien Giang Statistic Office (2016) Statistical yearly book. Rach Gia, Kien Giang

King N, Horrocks CH (2010) Interviews in qualitative research. SAGE Publications, London

Kusova D, Tesitel J, Matejka K, Bartos M (2008) Biosphere reserves: an attempt to form sustainable landscapes. A case study of three biosphere reserves in the Czech Republic. Landsc Urban Plan 84:38–51

Lu Y, Chen L, Fu B, Liu S (2003) A framework for evaluating the effectiveness of protected areas: the case of Wolong Biosphere Reserve. Lanscape Urban Plan 63:213–223

Mack N, Woodsong C, Macqueen KM, Guest G, Namey E (2005) Qualitative research methods: a data collector's field guide. http://www.fhi360.org/sites/default/files/media/documents/Qualitative%20Research%20Methods%20-%20A%20Data%20Collector's%20Field%20Guide.pdf. Accessed 24 August 2013

MARD (2016) Decision of the Minister of Agriculture and Rural Development about anoucement of the national forest area. Ministry of Agriculture and Rural Development, Hanoi. http://tongcuclamnghiep.gov.vn/van-ban-hanh-chinh/cong-bo-hien-trang-rung-nam-2015-quyet-dinh-so-3158-qd-bnn-tcln-ngay-27-7-2016-a3094. Accessed 13 October 2016

Matysek KA, Stratford E, Kriwoken LK (2006) The UNESCO Biosphere Reserve Program in Australia: constraints and opportunities for localized sustainable development. Can Geogr 50:85–100

McNeely JA (1993) Parks for life: report of the IVth world congress on national parks and protected areas. World Conservation Union, Grand, Switzerland

McNeely JA (1994) Protected areas for the twenty-first century: working to provide benefits for society. Biodivers Conserv 3:390–405

MONRE (2012) Climate change and sea level rise scenarios for Vietnam. Natural Resources, Environment and Maps Publishing House, Hanoi

Nuwer R, Bell D (2014) Identifying and quantifying the threats to biodiversity in the U Minh peat swamp forests of the Mekong Delta, Vietnam. Oryx 48:88–94

Palomo I, Montes C, Martín-López B et al. (2014) Incorporating the social-ecological approach in protected areas in the anthropocene. Bioscience 64:181–191

Popelier L, Vaessen J (2014) Final evaluation of the Madrid action plan for biosphere reserves. http://unesdoc.unesco.org/images/0022/002280/228056e.pdf. Accessed 11 May 2015

Reed MG (2016) Conservation (in) action: renewing the relevance of UNESCO Biosphere reserves. Conserv Lett 9:488–456

Reed MG, Egunyu F (2013) Management effectiveness in UNESCO Biosphere Reserves: learning from Canadian periodic reviews. Environ Sci Policy 25:107–117

Schliep S, Stoll-Kleemann S (2010) Assessing governance of biosphere reserves in Central Europe. Land Use Policy 27:917–927

Schultz L, Duit A, Folke C (2011) Participation, adaptive co-management, and management performance in the World Network of Biosphere Reserves. World Dev 39:662–671

Secretariat of the Convention on Biological Diversity (2010) Global Biodiversity Outlook 3. http://www.cbd.int/iyb/doc/prints/factsheets/iyb-cbd-factsheet-gbo-en.pdf. Accessed 20 April 2013

Son NT, Tu NA (2008) Determinants of land-use change: a case study from the lower Mekong delta of southern Vietnam. Electron Green J 1:1–12

Stoll-Kleemann S (2005) Indicators and evaluation of sustainable natural resource management and governance in biosphere reserves. In: UNESCO (ed) Global change impact in mountain Biosphere Reserves. Sierra Nevada Biosphere Reserve, Spain, pp 237–245

Stoll-Kleemann S, De La Vega-Leinert AC, Schultz L (2010) The role of community participation in the effectiveness of UNESCO Biosphere Reserve management: evidence and reflections from two parallel global surveys. Environ Conserv 37:227–238

Stoll-Kleemann S, Welp M (2008) Participatory and integrated management of biosphere reserves—lessons from case studies and a global survey. GAIA Ecol Perspect Sci Soc 17:161–168

Stolton S (2010) Vital sites: protected areas supporting health and recreation. In: Stolton S, Dudley N (eds) Arguments for protected areas: multiple benefits for conservation and use. Earthscan, London, p 13–23

Stuart BL (2004) The harvest and trade of reptiles at U Minh Thuong National Park, Southern Vietnam. Traffic Bull 20:25–34

UNESCO (1996a) The seville strategy for biosphere reserves. UNESCO, Paris

UNESCO (1996b) The statutory framework of the World Network of Biosphere Reserves. UNESCO, Paris

UNESCO (2010) Lessons from biosphere reserves in the Asia-Pacific region, and a way forward: a regional review of biosphere reserves in Asia & the Pacific to achieve sustainable development. UNESCO, Jakarta Office

UNESCO (2016) Lima action plan for UNESCO's Man and the Biosphere Program and its World Network of Biosphere Reserves (2016–2025). http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/SC/pdf/Lima_Action_Plan_en_final.pdf. Accessed 23 April 2016

UNESCO Hanoi (2013) Biosphere Reserves in Vietnam: a first assessment of their values and management effectiveness. Hanoi, Vietnam

United Nations (2015) Transforming our world: the 2030 agenda for sustainable development. http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&referer=http://www.un.org/sustainabledevelopment/development-agenda/&Lang=E. Accessed 14 September 2016

Wallner A, Bauer N, Hunziker M (2007) Perceptions and evaluations of biosphere reserves by local residents in Switzerland and Ukraine. Landsc Urban Plan 83:104–114

Watson JEM, Dudley N, Segan DB, Hockings M (2014) The performance and potential of protected areas. Nature 515:67–73