

RESEARCH

Open Access



The impact of coastal grabbing on community conservation – a global reconnaissance

Maarten Bavinck^{1,2*}, Fikret Berkes³, Anthony Charles⁴, Ana Carolina Esteves Dias⁵, Nancy Doubleday⁶, Prateep Nayak⁷ and Merle Sowman⁸

* Correspondence:

j.m.bavinck@uva.nl

¹University of Amsterdam, Amsterdam, the Netherlands

²Arctic University of Norway, Tromsø, Norway

Full list of author information is available at the end of the article

Abstract

"Coastal grab" refers to the contested appropriation of coastal (shore and inshore) space and resources by outside interests. This paper explores the phenomenon of coastal grabbing and the effects of such appropriation on community-based conservation of local resources and environment. The approach combines social-ecological systems analysis with socio-legal property rights studies. Evidence of coastal grab is provided from four country settings (Canada, Brazil, India and South Africa), distinguishing the identity of the 'grabbers' (industry, government) and 'victims', the scale and intensity of the process, and the resultant 'booty'. The paper also considers the responses of the communities. While emphasizing the scale of coastal grab and its deleterious consequences for local communities and their conservation efforts, the paper also recognizes the strength of community responses, and the alliances/partnerships with academia and civil society, which assist in countering some of the negative effects.

Keywords: Coastal grabbing, Community-based conservation, Social-ecological systems, Socio-legal studies, Property rights, Canada, Brazil, India, South Africa

Introduction

Globalization and urbanization have had profound impacts on rural landscapes throughout the world (Giddens 1990; Jones 2015; Chen et al. 2014). Despite such trends, almost half of the world's population is still rural in nature, often congregated in place-based communities.¹ Rural communities are a crucial part of local social-ecological systems (Berkes et al. 2003). The collection of rural communities with which we are especially concerned – those sprinkled along the seaboard of four continents – have a history of livelihoods dependent on coastal natural resources, particularly involving fishing or related professions. The relation their inhabitants have with adjacent land and sea areas is long-term and intense, and in some cases may be characterized as conservation. Such conservation of resources and the spaces in which they are embedded is for them a logical concern, enshrined in and practiced through systems of customary knowledge and management (e.g. Gelcich et al., 2006; Berkes, 2015; Armitage et al. 2017).

The topic of this paper is the phenomenon of coastal grab, or the appropriation of coastal space - including sea and land - by interests external to the community.² We deliberately choose to consider the interface of land and sea as most coastal communities depend on access to both spaces. Coastal grab is closely related to the process of globalization. Scholars and practitioners have drawn attention to large-scale land grab (Fairhead et al. 2012; Borras and Franco 2012; Kaag and Zoomers 2014), frequently taking place across national borders, affecting local inhabitants who depend on these lands in profound ways. Water-grabbing, or the legal and illegal use and control of water by powerful actors for their own benefit, too is a topic of concern (Franco et al. 2014). A similar process – sometimes termed ocean-grab - is argued to be taking place in the world's oceans (Bennett et al. 2015; TNI 2014), such as through privatization of fisheries (Olson 2011; Pinkerton and Davis 2015). This may well have detrimental effects on communities' livelihoods and practices of conservation.

The paper aims first to document the phenomenon of coastal grab (as distinct from ocean grab by spatial scale and line of impact) and analyse its features in various geographical settings. Secondly, it recognizes particular modes of coastal grabbing and investigates the impact of coastal grab on community conservation. Such impact may take two forms. The first is when coastal grabbing results in the effective exclusion of communities from the space and resources on which those communities depend. The second form affects the motivation and capacity of communities to engage in conservation. The article is organized in the following manner: the next section provides a theoretical perspective on coastal grab, and is followed by the case studies, which focus on property rights and power and use a social-ecological systems approach, whereby social systems and ecological systems are considered intertwined and interdependent. The case studies are subsequently synthesized and discussed. The last section draws conclusions on the nature of coastal grab and the effects of coastal grabbing on community conservation, and seeks new insights that might emerge from the analysis and areas of focus.

Dynamics of coastal grab

The concept 'coastal grab' has a pejorative quality: the verb 'to grab' refers to the act of appropriation in obviously disapproving terms. It is in this normative sense that social movements and organizations involved in the defence of local inhabitants and their rights refer to land and ocean grab; the term is also intended as a call for political action. For scholars with more analytical ambitions, the term is reminiscent of Harvey's 'accumulation by dispossession' (Harvey 2004). The latter formulation emphasizes the supposed motives of those doing the 'grabbing', namely capitalist accumulation. In employing the noun 'dispossession', Harvey highlights the fact that a 'grab' would involve the undoing of a regular state of affairs – it sets aside an existing set of property rights that imply 'possession' and creates new ones. The term 'grab' additionally suggests involuntariness and force, and reminds us that economic activities are carried out not only through markets but also through plain robbery (Polanyi 1944). Nevertheless, robbery too is suggestive of a transfer of property rights, and it is to the socio-legal analysis of property that we now briefly turn.

Benda-Beckmann and co-authors (2006) remind us that "property concerns the organisation and legitimation of rights and obligations with respect to goods that are

considered valuable” (Benda-Beckmann et al. 2006:2), as well as that property regimes may vary substantially from context to context. They additionally point out that property consists of ‘bundles of rights’ organized in different ways, and that legal pluralism brings about encounters between people adhering to different notions of property. Ribot and Peluso (2003) add to this by emphasizing that accorded rights are not necessarily enjoyed in practice, and that one requires ‘bundles of power’ to actually do so. Finally, property conveys responsibility.

In the commons literature, rights and responsibilities go together. People who have a right to share a resource also hold responsibilities to follow a certain set of rules-in-use that have been established by that society. These collective choice rules tend to be socially enforced through sanctions (Ostrom, 1990).

These matters of rights, responsibilities and property are very relevant at a local level. “Local resource users”, Gadgil et al. (2003) argue, “have come to play an increasingly significant role in [...] resource and environmental management” (Gadgil et al. 2003:189). Organized into place-based communities, such users have a strong stake in the maintenance of the ecosystems on which they depend. The common property arrangements that they entertain often contain rules on allocation and use as well as on conservation and management. After all, for such dependent ecosystem people, “continuity in the production of basic goods is never unimportant” (Dalton 1962: 365). These crucial relationships between people and their natural environments are embraced in social-ecological systems analysis that takes the perspective of sustainability and resilience (Berkes et al., 2003; Armitage et al. 2017).

A systems perspective also embraces an important breakthrough in science, namely the understanding that nature is seldom linear and predictable, and that adaptive management is essential for continued resilience. Adaptive management, or learning-by-doing, emphasizes feedback learning (Berkes et al. 2003:9). Local institutions are recognised to play an important part in the practice of adaptive management and conservation, as well as in transformational learning (e.g. Wilner et al. 2012). Surveying the global evidence on adaptation to climate change, Agrawal for example points out that local institutions “play a central role in all observed adaptation efforts and practices” (2010:175). Building on similar observations, the Community Conservation Research Network (CCRN)³ highlights how local communities around the world have similar functions with regard to the challenges of sustainability. Local knowledge of the environment is a vital ingredient in their conservation practices (Armitage et al. 2017).

The action of grabbing has important effects on how communities relate to their natural environments. If local environments are entirely or partially impounded, and communities lose their rights and powers of access, use and management, the relationship between social and ecological systems also alters. Community members adapt their lifestyles for better or for worse, and responsibility for the natural environment dissolves. New social-ecological systems may emerge, displacing the ones in which communities play a role.

The following section provides examples of coastal grabbing from different parts of the world. We consider the identity of the ‘grabbers’ and ‘victims’, the scale and intensity of the process, and the booty – the resources that ‘grabbers’ are interested in. Our main interest is, however, in what this means for the connections between the communities and their environments and for their conservation efforts.

Case studies

Overview of case studies

Table 1 summarizes several characteristics of our case studies, located in four countries around the world. These cases have been selected for illustrating both community conservation initiatives and encroachment (grabbing) processes. We have aimed for a balanced geographical representation of cases, and made use of the in-depth, case-specific knowledge of the authors. The case studies make use of the following conceptual outline:

- The setting: country, location, history of the case
- The ‘grabbers’: who are they? From which level do they derive?
- The purpose of ‘grabbing’: what is the value (and intensity/scale) that is being taken?
- The ‘grabbed’: what exactly is being grabbed; what kinds of property rights are involved?
- How have the ‘victims’, i.e. the community, reacted?
- What has been the government’s role?
- How much ‘space’ is left for community conservation?

It will be noted that the ‘victims’ are long-time residents of the local community, and that while the grabbing process is often described as commencing long ago, the case studies all refer to events that are of recent origin, involving the entry of aquaculture companies, industrial firms, as well as conservation agencies. Governments are often seen to be supportive of encroachment processes. The consequences of grabbing are a loss of access to land or ocean space as well as available resources, and/or the negative impacts on the local community of increased levels of pollution, as a result of the grab. This impacts livelihoods, ways of life, as well as community conservation.

Case study 1: Port Mouton Bay, Canada

On the Atlantic coast of Canada, in Nova Scotia, fishing has sustained human populations for over ten thousand years, beginning with the Mi’kmaq indigenous people, and then adding generations of settlers from Europe, for over five hundred years. We focus on the case of Port Mouton Bay, a community in southwestern Nova Scotia, southwest of Halifax. This community, like most, along the coast of Nova Scotia, has been and continues to be very much a fishing community. Not only does fishing drive the local economy, the second economic sector, tourism, also relies heavily on the touristic attractiveness of local fishing activities. However, Port Mouton Bay, as with many other fishing communities in Atlantic Canada, has been affected by a variety of forms of coastal grabbing, as new uses of the coast have appeared (Charles 2012; Charles et al. 2010; Kearney et al. 2007; Wiber et al. 2010). Here we focus on the appropriation of coastal space and marine environmental quality for other uses, notably pen-based finfish aquaculture, and the community response to coastal grabbing.

Spurred on by provincial and federal governments keen to expand fish farming activity across the region, a farm was established in Port Mouton Bay in 1995 that transitioned to Atlantic salmon (*Salmo salar*) aquaculture under new owners in 1997. As the number and size of the pens increased over time, aquaculture impacted both the local

Table 1 Key characteristics of case studies

Country and location	Drivers/grabbers	Victims	Time period	Effects	Responses
Canada, Nova Scotia, Port Mouton Bay	Aquaculture (government)	Community members, especially local fishers	Since 1995	Contamination; loss of space and resources	Protest/link-up with external partners; perform citizen science; lobby politically and engage in policy processes
Brazil, Paraty area, Tamoiós MPA	Federal Conservation Agency	Traditional small-scale fishers and farmers (Caíçaras)	Since 1990	Loss of space and resources	Protest/link-up with external partners; negotiation
South Africa, west coast, Olifants Estuary	Government/mineral companies	Coloured (small-scale fishers/farmers)	Since 1994	Loss of access to resources and possible contamination	Protest/link-up with external partners; negotiation
India, Bay of Bengal, Chilika Lagoon	Industrial aquaculture; higher caste actors supported by other elites	Caste-based fisher people	Since 1980s	Loss of fishing space and resources	Protest; negotiation

fishery and the tourism sector. The increase in the amount of fish excrement resulted in high biological oxygen demand, leading to dead zones in the Bay, reduction of lobsters in the Bay and disappearance of eelgrass beds and species which depend on eelgrass “nurseries”. Losses in ecosystem services and local biodiversity followed marine environmental quality deterioration (Loucks et al. 2014). This had direct impacts on fishing, not only with fewer lobsters available in the Bay, but through related increases in operating costs, as fishers had to travel further to fish. At the same time, there was collateral damage to beach resources from the organic matter deposited in the water by the fish pens, which then washed up onshore, fouling sand and air. This led to a loss of aesthetic value that reduced wellbeing in the community and degraded the economic value of the seascape for tourism.

Sites deemed suitable for aquaculture, even on a long coastline such as that in Nova Scotia, are limited. The coastal grabber in the Port Mouton case is a combination of private aquaculture operators and multiple levels of government. The initial aquaculture company has been traded, expanding its reach in the process, by using government incentives and licensing, leading to degradation of an area previously used by local fishers, and for tourism and recreation. While under Canadian law, local commercial fishers have no *de jure* territorial rights (notwithstanding standing questions of indigenous fisheries) Port Mouton fishers have used and occupied the area for many generations, and it is this genealogical depth that supports ethical and moral claims to rights of participation in management decision-making and policy development. Arguably, these rights to participation by community members are recognized, as evidenced by the acceptance of the participation of the community and its interventions in consideration of licensing of the fish farm and regulatory provisions for aquaculture more generally (Doubleday et al., 2004; and in prep.).

The community responded to these changes in a variety of ways. Faced with further expansion of aquaculture operations in 2006, people around the Bay formed a network called the Friends of Port Mouton Bay (“The Friends”) entirely supported by volunteer efforts, prior to forming a legal entity in 2015. In the first stages of its activity, The Friends engaged in research, public education, lobbying and protests, seeking to highlight the inappropriateness of locating fish farms in Port Mouton Bay, for oceanographic, ecological and socioeconomic reasons.

The Friends received little support from provincial or federal governments. It happens that in Canada, at both provincial and federal levels, the “fisheries” department is also the “aquaculture” department, and the latter function has included promotion of aquaculture at least as much as regulation. Reflecting that priority, the governments largely opposed the wishes of the communities surrounding Port Mouton Bay, rejected their research, and denied their rights to participate in management of their resources. However, federal interests were not uniformly hostile to local participation: Parks Canada in particular worked to develop partnerships for ecosystem restoration. The municipal government was more responsive than provincial and federal levels, and supportive of local concerns for the environment, seeing the importance of the fishery and of efforts to expand economic opportunities in tourism.

The Friends acted to assert space for conservation in a number of ways, most importantly through their own research and self-management. Significantly, fishers drew on their capabilities for self-organizing, a key to resilience in social-ecological systems

(Doubleday, 2007). Coupled with self-regulation, this enabled many of the lobster fishers of Port Mouton Bay to lead by valuing their role as responsible fishers and abiding by regulatory requirements. The Friends also drew extensively on the local knowledge of fishers about the resources they harvest and the coastal environment, including the ecology and life cycles of a range of species. Assisted by volunteer oceanographers, The Friends invested directly in research on currents in the Bay, eelgrass distribution, marine ecohealth, and related ecological diversity and productivity, as well as on the impacts of aquaculture. They engaged in social science research to develop a demographic and socioeconomic baseline for their community for future planning (Friends of Port Mouton Bay 2016). They also initiated relationships with some universities and researchers, particularly connected to eelgrass and water chemistry.

Even though the governments left little “space” for community self-management, the people of Port Mouton Bay created their own opportunity to practice conservation through citizen science and community-based environmental monitoring (Conrad and Hilchey 2011). Nevertheless, the community has continued to live under the threat of even more coastal grabbing, as the forces of fish farm operators and provincial and federal government maintain a push for further aquaculture development, despite the risks posed. In particular, the federal government has not lived up to its responsibilities for fisheries and impact assessment (Hutchings and Post 2013). Thus, only time will tell whether the community – with its strong social cohesion and its capacity to learn over time and to innovate – will be able to counter those forces and maintain the wellbeing of Port Mouton Bay into the future.

Case study 2 Tamoios Marine Protected Area, Brazil

Tarituba is a coastal community in the Paraty area, southeastern Brazil, and home of the Caiçara people, a group of mixed heritage descendants of Portuguese, Africans, and Brazilian indigenous people. Caiçara people have traditionally depended on natural resources for their livelihoods, combining small-scale fishing with small-scale agriculture (Diegues 2000). The community has 430 residents of which 65 are small-scale fishers, relying on fisheries for both local food security and income (Hanazaki et al. 2013).

The Tamoios marine protected area (MPA) is an “ecological station”, one of the most restrictive protected area categories in Brazilian law that only allows for scientific research and environmental education (Government of Brazil 2000). Tamoios MPA, created by a Federal Decree in 1990 but only implemented in 2006, covers 29 islands and their surrounding marine areas of up to one kilometre. The restricted zone completely includes the marine area adjacent the Tarituba community.

The community views Tamoios MPA, as established in their main fishing grounds, grabbing local coastal areas, and imposing unfair restrictions that affect fishing livelihoods. Managers see themselves as acting on behalf of their Ministry in a high-priority area for conservation. They do not see themselves as “grabbers”, but some of them understand that the establishment of the MPA was carried out top-down, disregarding local community livelihoods (Lopes et al. 2013). Others have a different point of view, emphasizing that they are preserving coastal ecosystems by enforcing existing MPA boundaries. Coastal grabbing is occurring at the community and regional levels, including Tarituba and neighboring communities (Lopes et al. 2013). With respect to the

intensity of grabbing, Tarituba is most endangered as the entire marine area that surrounds the community is within the Tamoios MPA; fishers are allowed neither to fish nor to cross the area to access other grounds.

Locally, coastal fisheries were conducted with a mix of common property and state property regimes but in effect open-access (Begossi et al. 2012; De Freitas 2014) until about 2000. With the implementation of Tamoios MPA in 2006, the management regime shifted to state property (De Freitas 2014). In this sense, local fish resources were taken away from Caiçara people. However, the Caiçara have traditional rights under Brazilian law to use local resources to sustain livelihoods, as they are recognized as a “traditional” population. According to the Federal Decree 6,040/2007, Traditional Peoples “occupy and use territories and natural resources as a condition for their cultural, social, religious, ancestral and economic reproduction, using knowledge, innovations and practices generated and transmitted by tradition.” The same decree considers Traditional Territories as “The necessary spaces to the cultural, social and economic reproduction of traditional peoples and communities, whether used permanently or temporarily (...).”

Tarituba fishers reacted to the implementation of the MPA by contesting the imposed restrictions. The reaction of the community to enforcement included stress and fear of surveillance related to government agents, the abandonment of commercial fishing by some fishers, and an informal agreement with MPA managers banning the fishing of the valuable species snook (*Centropomus undecimalis* and *C. parallelus*).

The fishers also reached out to fishing industry organizations, which in turn complained about the top-down approach of MPA implementation, disrespectful enforcement practices, and the unequal treatment of different users regarding compliance of rules. In 2009, the City Council of Paraty, with support from the Municipal Fishers’ Union, formally demanded the Federal Conservation Agency to allow small-scale fisheries inside Tamoios MPA. This was supported by action, including that of a Federal congressman who fished inside Tamoios MPA in 2012, in support of the call for legal approval of fishing and tourism inside Tamoios MPA. This resulted in his apprehension by law enforcement (De Freitas 2014).

The various community responses and actions mentioned above led the Federal Conservation Agency to formally begin elaborating a Term of Agreement with fishers in order to allow small-scale fisheries in two sets of islands close to Tarituba. The Agreement requires the monitoring of small-scale fisheries designed through a participatory approach. In 2013, fishers and managers, along with other organizations such as the Paraty fishers’ union, the municipal and state agencies in charge of management, and the university designed a participatory monitoring program for local fisheries to fulfil the requirements of the Term of Agreement. All participants contributed to setting goals and indicators of this program (Dias 2015).

Although the Agreement has not yet been signed by the Conservation Agency, and in spite of political instabilities that led to uncertainties regarding its approval, the participatory monitoring is an opportunity to initiate joint management towards conservation issues, and to foster community-based conservation that considers local knowledge and practices. Although this particular case appears to be a small victory for the small-scale fishers of Tarituba, loss of resource access due to MPAs is only one of a range of stresses. Small-scale fisheries of the region have been losing control of coastal areas to tourism, industrial development, and large-scale fisheries as well (Begossi et al. 2012; Berkes 2015).

Case study 3 South Africa, Olifants Estuary

Dispossession of local and indigenous people's land and resources and restrictions on access to natural resources have been an ongoing feature of South Africa's socio-political past from earliest colonial times, through the apartheid era until the present (Fabricius et al. 2004; Claassens and Cousins 2008; Büscher 2014). This has been acute in coastal areas due to the economic value of resources (diamonds, titanium, forests and fisheries) as well as the value of coastal land for residential and tourism development. At the time of the democratic elections in 1994, South Africa had inherited a highly unequal and fragmented society with high levels of poverty and social injustice. Yet, despite a progressive Constitution (1996) and a plethora of new policies and legislation, 22 years on, poor rural communities face ongoing threats of loss of or restrictions to land and resources due to conservation initiatives, coastal development and mining activities. The recent state-driven initiative known as "Operation Phakisa" to grow the "blue economy" focuses on promoting the offshore oil and gas industry, marine phosphate and diamond mining as well as mining of coastal and offshore heavy mineral sands. Researchers, civil society activists and NGOs are raising concerns about the rate at which prospecting rights and mining licences are being awarded to multi-national companies without full disclosure of the extent of the operations envisaged, adequate consultation with Interested and Affected Parties (I&APs) and increasing evidence of non-compliance with environmental and labour legislation (Kapelus, 2002; Mbatha and Wynberg, 2014).

This case study reports on the threat of mining to the livelihoods, way of life and community conservation plans of the people of Papendorp and Ebenhaeser living adjacent to the Olifants estuary on the west coast of South Africa. These communities, who were forcibly removed from their lands in 1926 and relocated to land adjacent to the Olifants Estuary, have been reliant on the estuary for -fishing and small-scale farming on surrounding lands for nearly a century (Sowman 2009; Williams 2013). They have been engaged in a land claims process for over twenty years and have recently been awarded a settlement that will lead to the restoration of lands lost in the late 1920s (EcoAfrica, 2013). The fishers have been working closely with researchers from the University of Cape Town and an NGO, Masifundise, to develop an alternative vision and management plan for the estuary - one that recognises their rights to resources but also addresses ecological and fisheries management objectives (Jackson et al., 2013). The agreements that were finally reached on the estuary management plan (EMP) and the enhanced relationships amongst fishers and other estuary stakeholders are viewed as a very positive outcome and an opportunity to advance sustainable livelihoods and conservation interests (Sowman, 2017). Key to the EMP was a decision to establish a community conservation area at the mouth of the estuary. However, in April 2016, the fishers learned that an Australian mining company, Mineral Sands Resources (MSR) (Pty) Ltd with various subsidiaries in South Africa had submitted a mine prospecting application for heavy mineral sands, phosphates, garnet, precious stones and diamonds on two farms that abut the north bank of the Olifants Estuary. The proposed mining area covers approximately 4500 ha, a large section of which has been identified as a critical biodiversity area. The southern boundary of the mining area borders on the sensitive Olifants Estuary and associated habitats (approximately 15 km in extent) while the western border is adjacent to the seashore and extends northwards for

approximately 20 km. To the north, the proposed mining area lies adjacent to an existing mine, Tormin Mineral Sand Mining, which is owned by the same Australian company. Ongoing allegations about environmental transgressions and bad labour practices at the Tormin site (Groundup, 2015), as well as a lack of response from the Department of Mineral Resources (DMR) to requests by civil society to investigate these alleged transgressions, have created much suspicion amongst local community members towards the company and its intentions.

Fishers at the Olifants Estuary as well as other community members, are particularly concerned about the negative impacts that the proposed mining activities may have on estuarine habitats, water quality and sediment movement as well as scenic views and sense of place. Of particular concern is how this may affect their livelihoods and plans for tourism development and conservation. Although the Basic Assessment Report (BAR) for the prospecting phase has indicated that no drilling of experimental holes will take place on the estuary banks (Du Toit, 2016), fishers are concerned that once approved, environmental controls will be ignored. They are also concerned that should prospecting yield favourable results and mining be approved, the company will request to extend the mining area into the estuary and out to sea, as happened at the Tormin site. The lack of accessible information, consultation and transparency associated with the Tormin mine as well as processes associated with the BAR for the new prospecting application have led to several letters from civil society as well as an NGO, Centre for Environmental Rights, to the DMR requesting further information, highlighting inadequacies in the assessment and decision-making processes as well as possible transgressions at the existing Tormin mine site.

Although there is a policy and legislative framework in place to regulate the mining sector, the increasing power of the mining sector in South Africa, with strong political backing presents a serious threat to coastal communities like Ebenhaeser and Papendorp, whose livelihoods depend on coastal resources. This rapid increase in coastal and marine mining, coupled with the expansion of marine MPAs, means that coastal communities are often the ones bearing the brunt of these neoliberal conservation and economic expansionist policies and practices and are becoming further marginalised. The lack of capacity and political will at all levels of government to act in the interests of poor local communities exacerbates their vulnerable condition (Luckscheiter and Al-Zubaidi, 2016). Consequently, fishers of the Olifants Estuary are once again forced to mobilise their community, and enlist support from researchers, NGOs and civil society organisations. This may help to ensure that their voices are heard, their rights and source of livelihoods are protected, and the quality of the environment that provides opportunities for enhancing local economic development and plans to declare a community conservation area are not undermined.

Case study 4 Chilika Lagoon, India

The setting of this case study is Chilika Lagoon on the east-coast of India near the Bay of Bengal. Chilika is known as the largest brackish water lagoon in Asia with a water spread area of about 1200 sq km that fluctuates seasonally. It is also a Ramsar site that hosts a rich diversity of flora and fauna (e.g., 710 plant and 800 animal species,

including 225 varieties of fish). An estimated 400 thousand caste-based fishers and their families live in and around the Lagoon in about 150 villages (Nayak and Berkes 2010). The history of community conservation in Chilika Lagoon is evident from the presence of well-defined institutional arrangements (e.g., norms and rules, village fish cooperatives, and fisher federation) and community livelihood engagement in a healthy ecosystem where the fishers address the lagoon as “mother Chilika”.

Community conservation in Chilika received a major setback with the onset of shrimp aquaculture; prawn that had little value previously became “pink gold” (Kurien 1992). In India, intensive shrimp aquaculture gained momentum in the mid-1980s. Chilika Lagoon caught onto the trend, as investors and policy makers found it highly suitable for intensive shrimp aquaculture. Soon a culture of encroachment became rampant, whereby non-fishers, driven by profit motives and supported by elites in the bureaucracy and political circles, took up large-scale aquaculture replacing customary fishing areas that were earlier controlled by caste-based fishers (Nayak and Berkes 2011). Our data shows that 91% of the fisher villages experienced fishing areas encroachment by 2007. By early 1990's, there were attempts by the state government to withdraw policy support for caste-based capture fishery by extending legal rights to non-fishers.

For the higher-caste non-fishers, the main purpose of grabbing was profit. *De facto* control of the lagoon also helped them to establish their supremacy over water, in addition to their traditional control over land. Such control also helped them gain an upper hand in the long-standing caste politics in Chilika. For the state government, the purpose of grabbing was to bring Chilika under the neoliberal economic policy so that the Lagoon acts as a source of resource extraction, seafood export and foreign revenue. The scale and intensity of grabbing can be ascertained from the fact that about 80% of the lagoon customary fishing space continues to be impacted by illegal shrimp aquaculture (Nayak 2014).

Fishers use a well-known metaphor which best explains the level of their reaction: “For the poor, when hunger becomes unbearable, movement and protest becomes our last resort” (Nayak and Berkes 2010). This suggests that social and political struggles and movements are the ultimate options for the fishers when social, economic, political and environmental problems resulting from aquaculture have become rampant. Fishers realize that when everything seems to be going against them and nothing really works in their favour, coming together to protest such actions becomes an obligation. In the past such protest movements have been effective in keeping the grabbers at bay. For example, the multinational Tata company, which had been holding 1400 ha for industrial shrimp aquaculture, withdrew in 1992 due to massive protest and lobbying by fishers which resulted in a denial of environmental clearance from the central environment ministry. The 1999 anti-aquaculture protest movement launched by the Fisher Federation with support from the National Fishworkers' Forum and the World Forum of Fish-Harvesters and Fish-workers helped to halt the passing of the controversial 2002 Chilika Bill for over fifteen years. Legal activism has led to successful court cases resulting in the State High court and the federal Supreme Court banning aquaculture in and around the Lagoon. In addition, the Chilika Fisher Federation continues to play a leadership role in fighting for fishers' rights.

After the India polity's acceptance of neoliberal policies from 1991 onward, there was pressure on government to facilitate capital investment in the Lagoon and harness its contributions for export revenues and expansion of the national economy. Consequently, the State Government introduced a new policy in 1991 which legalized shrimp aquaculture in Chilika and transferred 6000 ha of customary fishing area to non-fisher villages. Even though the policy was later revoked, the transferred fishing areas continues to be under the control of non-fishers. Annual fishing area lease fees were increased by 27%; it became mandatory for the lease to be administered by the FISHFED (a state organisation that replaced the fishers central cooperative society) making it harder for the fishers to obtain regular lease. Further, in 2002 a controversial Odisha Fishing in Chilika (Regulation) Bill, promising to reserve 30% of the Lagoon fishing area for non-fishers and industry, was introduced in the state legislative assembly. The state is reticent to enforce court orders banning aquaculture and to protect the Lagoon and its fishers from the adverse impacts of rampant aquaculture.

With constantly increasing fishing area encroachment, there is not much actual physical space left for sustaining community conservation in Chilika, unless aquaculture-related encroachments are rolled back, consistent with court decisions. However, there is still significant institutional and legal space available for community-based conservation to occur. For example, there is significant opportunity to revive village cooperatives and reengage them in fishery management. Most cases of outmigration are temporary or seasonal in nature, which makes it possible for migrating fishers to reoccupy their customary fishing spaces if aquaculture is vacated. Legal space for community conservation can be created in the Chilika Bill before it becomes a law.

Discussion

While each case study presented in Section 3 has its own unique characteristics, we shall not dwell on those but rather focus on the features that they share, both with each other as well as with experiences elsewhere. The authors note that the cases used here are selected from a larger set and are representative (rather than unique) within each national context. The case studies are thus reflective of the wider processes of transformation confronting coastal communities in many parts of the globe.

Table 1 (column 5) points out that the core events to which our cases refer have all occurred within the past three decades, especially the 1990's. Looking at the transformation of the local social-ecological system in each case, first we see a loss of local control, and loss of local property rights and common-property systems (Ostrom, 1990; Benda-Beckmann et al., 2006). Second, neoliberal policies and practices, driven by global commodity prices and leading to capitalist accumulation (Harvey 2004) are the likely explanation in three of the four cases, the exception being Brazil. In all four cases, the state is exercising its powers to re-allocate resource rights as it sees fit, including allocation to government conservation in the Brazil case. But the state is not monolithic. Some agencies and local governments may be in support of communities. In one notable case (India), courts uphold the traditional resource rights of caste-based fisher communities, challenging the state, which continues to 'give away' these rights to more powerful interests, including multinational corporations.

The historical, as well as the political, context of each case is significant. Many of the events that are described have roots in earlier historical periods. The processes of dispossession affecting black and coloured peoples in South Africa, as well as indigenous peoples of the Americas, commenced in the colonial period and still provide an important context for community identities and survival. While the fishing castes of Chilika Lagoon, India, and the local fishers of Port Mouton Bay, Canada, have different histories, it is interesting to realize that 'historical rights' of fishers to land and sea play an important role in the current policy debate.

The drivers of grabbing are mostly economic (e.g. aquaculture in Canada and India; mining in South Africa). Other drivers are conservation policies (such as the implementation of MPAs in Brazil) and political support for fast-tracking economic development (such as in South Africa). The cases provide insightful illustrations of the disruption of livelihoods and social-ecological systems as a consequence of the establishment of new industrial enterprises such as aquaculture and mining. These ventures remove livelihood space but also inflict harm (or potential harm) through ecosystem damage and/or pollution. The result is often impoverishment, displacement, out-migration and loss of cultural identity. It is important to note that governments have often supported these changes, directly or indirectly. After all, industrialization is generally viewed as essential for the realization or maintenance of economic prosperity. 'Blue growth' has become a new chapter in the planner's manual, redirecting attention to the economic potentials of coasts and seas, but away from the social and economic well-being of local communities.

While coastal people are inevitably impacted by development, throwing established social-ecological systems into disarray, the case studies also cast light on alternative, and sometimes bold sets of responses. First, affected people have organized themselves and fought the changes that were inflicted upon them. The fishers in Chilika Lagoon, India, thus bundled their forces in a regional organization called Chilika Fisher Federation that fought against the encroachment of aquaculture. They have found allies in doing so, with support in national and international fisher organizations, as well as in the courts. The Friends of Port Mouton Bay helped to conduct research, public education, lobbying and protests against aquaculture development. While much of government was unsupportive, they were able to forge useful links with some departments, and with some universities. In Paraty, Brazil, small-scale fishers affected by the MPA won support from the university, as well as some sectors of government. South African small-scale fishers have been regularly assisted by NGOs and university researchers to fight for their rights, as guaranteed by the post-apartheid constitution. Regarding the role of governments, local governments were typically more supportive than federal and state levels. This seems often due to the fact that local government is closer to the communities' reality and more aware of local issues than higher levels of government.

In most cases, local responses and social movements have not managed to reverse the tide. They have, however, often created breathing space for local communities to carry on with their activities, despite the grabbing of space and resources. New adaptations of livelihood and ecology have come about. In some instances, such as in Port Mouton Bay, the protest movement has galvanized confidence in local knowledge, infusing it with new insights and connections. Here, the local social-ecological system has actually been given a boost. The fishers of Olifants estuary have likewise been

prompted to expedite the establishment of a community conservation area due to threat from mining.

Thus, coastal grabbing crises have triggered a diversity of responses, including joint action, partnerships, and political engagement. While grabbing is in itself a negative phenomenon from the community perspective, we see that it may also provide an opportunity to empower local groups and foster community agency towards conservation and appreciation of local knowledge. The Friends of Port Mouton Bay provides an example of how, in responding to grabbing, a community can be inspired to undertake its own science and conservation initiatives, despite little government support. Although the forms of coastal grabbing may vary, the impacts on those with place-based knowledge and 'genealogical depth' share fundamental characteristics, ranging from degrees of economic loss to radical dispossession. Similarly, the responses in different cases share features of resistance, such as alliances, civil disobedience, protest, lobbying, and appeals to local knowledge and to science in attempts to influence policy and decision-making.

Conclusion

This paper has considered the phenomenon of 'coastal grabbing' in different geographical settings, paying special attention to its effects on coastal communities and their conservation efforts. We have understood 'grabbing' as a phenomenon involving the relatively sudden and forceful transfer of property rights over resources and coastal space, taking place in recent decades. The perpetrators may be government, NGOs and/or industry, and may possess intentions varying from economic development to conservation. We do not necessarily consider these intentions as 'wrong', but seek to counterpoise them against the interests of local communities that have histories of reliance on their natural environments. Being strongly aware of these dependencies, local communities have frequently developed local commons arrangements for conserving the resources on which they depend. As these arrangements come under stress through the appropriation of coastal space and resources, motivations to continue conservation are reduced, but sometimes also invigorated through partnerships with external parties within civil society.

By providing case studies from different parts of the world, and indicating the complexities involved in 'coastal grabbing' as well as in the reactions thereto, we hope to encourage other scholars to engage with this phenomenon. Combining a social-ecological systems analysis with a socio-legal property perspective, we have also suggested a perspective relevant to the task at hand. Systematic studies of coastal grabbing at local as well as regional levels are imperative for understanding the ongoing process of coastal transformation, as well as for challenging its undesirable effects.

Endnotes

¹The sociological literature on communities is rich and diverse (Jacobs 2015), and indeed social scientists identify a range of forms of 'community'. We focus here on communities as congregations of people settled over longer periods of time in specific localities, with genealogical depth, who depend in large measure on their natural environments. (cf. Doubleday, Mackenzie, and Dalby, 2004). Such communities are not

homogenous, and experience conflicts alongside cooperation, but community members are interdependent and share a set of values (cf. Kearney and Berkes 2007).

²“Coastal grab” refers to the observed phenomenon of contested appropriation of coastal (marine and terrestrial) space and resources by outside interests and “coastal grabbing” refers to the multifarious actions by which “coastal grab” occurs. For ease of comparison we use “grabbing” for the actions and the consequences, and the term “grabbers” for the agents of “grabbing”.

³CCRN etc. www.CommunityConservation.Net

Acknowledgements

The authors are grateful to the Community Conservation Research Network (CCRN) and the Canadian Social Science and Humanities Research Council (SSHRC) for their support. They also wish to thank three anonymous reviewers for their insightful comments on an earlier draft.

Authors' contributions

ACED has authored the section on Brazil; PN the section on India; MS the section on South Africa; TC, ND and FB the section on Canada. MB authored the first drafts of introductory and concluding sections and gathered the various geographic contributions; other authors corrected and added to the whole. All authors read and approved the final manuscript.

Competing interests

The authors declare that they have no competing interests.

Publisher's Note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Author details

¹University of Amsterdam, Amsterdam, the Netherlands. ²Arctic University of Norway, Tromsø, Norway. ³Natural Resources Institute, University of Manitoba, Winnipeg, Canada. ⁴School of the Environment and School of Business, Saint Mary's University, Halifax, Canada. ⁵School of Environment, Resources and Sustainability, University of Waterloo, Waterloo, Canada. ⁶Department of Philosophy, McMaster University, Hamilton, Canada. ⁷School of Environment, Enterprise and Development, Faculty of Environment, University of Waterloo, Waterloo, Canada. ⁸Department of Environmental and Geographical Science, University of Cape Town, Cape Town, South Africa.

Received: 24 November 2016 Accepted: 11 March 2017

Published online: 14 June 2017

References

- Agrawal, A. 2010. Local institutions and adaptation to climate change. In: Mearns, R. and A. Norton (eds.), *Social dimensions of climate change, equity and vulnerability in a warming world*, World Bank, pp. 173–197.
- Armitage, D., A.D. Charles, and F. Berkes. 2017. *Governing the Coastal Commons*. London: Earthscan/Routledge. in press.
- Begossi, A., S. Salyvonchik, V. Nora, P.F. Lopes, and R.A.M. Silvano. 2012. The Paraty artisanal fishery (southeastern Brazilian coast): ethnoecology and management of a social-ecological system (SES). *Journal of Ethnobiology and Ethnomedicine* 8: 22.
- Benda-Beckmann, F., K. von Benda-Beckmann von, and M. Wiber. 2006. The properties of property. In *Changing properties of property*, ed. F. Benda-Beckmann, K. Von Benda-Beckmann Von, and M. Wiber, 1–39. New York/Oxford: Berghahn.
- Bennett, N.J., H. Govan, and T. Satterfield. 2015. Ocean grabbing. *Marine Policy* 57: 61–68.
- Berkes, F. 2015. *Coasts for People. Interdisciplinary Approaches to Coastal and Marine Resource Management*. New York and London: Routledge.
- Berkes, F., J. Colding, and C. Folke (eds.). 2003. *Navigating Social-Ecological Systems: Building Resilience for Complexity and Change*. Cambridge: Cambridge University Press.
- Borras Jr., S.M., and J.C. Franco. 2012. Global land grabbing and trajectories of agrarian change: A preliminary analysis. *Journal of Agrarian Change* 12(1): 34–59.
- Büscher, B., W. Dressler, and R. Fletcher (eds.). 2014. *Nature™ Inc. - Environmental conservation in the neoliberal age*. Tucson: University of Arizona Press.
- Charles, A. 2012. People, oceans and scale: governance, livelihoods and climate change adaptation in marine social-ecological systems. *Current Opinion in Environmental Sustainability* 4: 351–357.
- Charles, A., M. Wiber, K. Bigney, D. Curtis, L. Wilson, R. Angus, J. Kearney, M. Landry, M. Recchia, H. Saulnier, and C. White. 2010. Integrated management: a coastal community perspective. *Horizons* 10: 26–34.
- Chen, M., H. Zhang, W. Liu, and W. Zhang. 2014. The Global Pattern of Urbanization and Economic Growth: Evidence from the Last Three Decades. *PLoS ONE* 9(8): e103799. <http://doi.org/10.1371/journal.pone.0103799>.
- Claessens, A., and B. Cousins (eds.). 2008. *Land, Power and Custom: Controversies Generated by South Africa's Communal Land Rights Act*. Cape Town: University of Cape Town Press.
- Conrad, C., and K. Hilchey. 2011. A review of citizen science and community-based environmental monitoring: issues and opportunities. *Environmental Monitoring and Assessment* 176: 273–291.

- Dalton, G. 1962. Traditional production in primitive African economies. *The Quarterly Journal of Economics* 76(3): 360–378.
- De Freitas, R. R. 2014. Implicações de políticas de conservação e desenvolvimento na pesca artesanal costeira em uma área marinha protegida da Baía da Ilha Grande. Doctoral Thesis, State University of Campinas, Brazil. 273p.
- Dias, A. C. E. 2015. Fisheries participatory monitoring at Tarituba community (Brazil): reconciling conservation and small-scale fisheries. Master Dissertation, State University of Campinas, Brazil.
- Diegues, A.C., R. Arruda, V. da Silva, F. Figols, and D. Andrade. 2000. *Os Saberes Tradicionais e a Biodiversidade no Brasil*. São Paulo: NUPAUB-USP and MMA Press.
- Doubleday, N. 2007. Culturing Adaptive Co-Management: Finding “Keys” to resilience in Asymmetries of Power. In *Adaptive co-management – collaboration, learning and multi-level governance*, ed. D. Armitage, F. Berkes, and N. Doubleday, 228–246. Vancouver: UBC Press.
- Doubleday, N., A.F.D. Mackenzie, and S. Dalby. 2004. Reimagining sustainable cultures: constitutions, property and art. *Canadian Geographer* 48(4): 389–402.
- Du Toit, A. 2016. Draft Basic Assessment Report and Environmental Management Programme Report for application WC 30/5/1/1/2/10240 PR, prepared by A Du Toit and submitted to Department of Mineral Resources, Republic of South Africa. https://www.google.co.za/?gfe_rd=cr&ei=XprkWKmgD4ip8wel06TYDw#q=Draft+Basic+Assessment+Report+and+Environmental+Management+Programme+Report+accessed+16+March+2017
- EcoAfrica. 2013. *Settling the Land Claim. Community development and Land Acquisition Plan (CDLAP) for Ebenhaeser and Papendorp. Final technical report, prepared for the Department of Rural Development and Land Reform*. Cape Town: EcoAfrica. December 2013.
- Fabricius, C., E. Koch, H. Magome, and S. Turner (eds.). 2004. *Rights, Resources and Rural Development: Community-Based Natural Resource Management in southern Africa*. London: Earthscan.
- Fairhead, J., M. Leach, and I. Scoones. 2012. Green Grabbing: a new appropriation of nature? *The Journal of Peasant Studies* 39(2): 237–261. doi:10.1080/03066150.2012.671770.
- Franco, J., L. Mehta, and G.J. Veldwisch. 2014. The global politics of water grabbing. *Third World Quarterly* 34(9): 1651–1675.
- Friends of Port Mouton Bay 2016. Our Documents. <http://www.friendsofportmoutonbay.ca/documents.html> (accessed: 5 March 2016).
- Gadgil, M., P. Olsson, F. Berkes, and C. Folke. 2003. Exploring the role of local ecological knowledge in ecosystem management: three case studies. In *Navigating social-ecological systems – building resilience for complexity and change*, ed. F. Berkes, J. Colding, and C. Folke, 189–209. Cambridge: Cambridge University Press.
- Gelcich, S., et al. 2006. Co-management Policy Can Reduce Resilience in Traditionally Managed Marine Ecosystems?. *Ecosystems* 9(6): 951–966.
- Giddens, A. 1990. *The Consequences of Modernity*. Cambridge: Polity Press.
- Government of Brazil. 2000. *Lei do SNUC 9.985. Diário Oficial da União (19/07/2000)*. Brasília: Câmara dos Deputados.
- Groundup. 2015. State accused of letting Tormin damage West Coast, Groundup 14 December 2015. <https://mg.co.za/article/2015-12-14-00-state-accused-of-letting-tormin-damage-west-coast>, accessed 17 March 2017.
- Hanazaki, N., F. Berkes, C.S. Seixas, and N. Peroni. 2013. Livelihood diversity, food security and resilience among the Caiçara of coastal Brazil. *Human Ecology* 41: 152–164.
- Harvey, D. 2004. The ‘new’ imperialism: accumulation by dispossession. *Socialist Register* 40: 63–87.
- Hutchings, J., and J. Post. 2013. Gutting Canada’s Fisheries Act: no fishery, no fish habitat protection. *Fisheries* 38: 497–501.
- Jackson, S., M. Sowman, and J. Cox. 2013. *Fishers’ proposals for fishery management in the Olifants River. Technical report prepared for the Olifants Estuary Management Forum, by the Environmental Evaluation Unit*. Cape Town: University of Cape Town and Masifundise Development Trust.
- Jacobs, B. 2015. Community sociology. In: Wright, J.D. ed.) *International Encyclopedia of the Social & Behavioral Sciences*, 2nd edition, pp 361-8. Elsevier.
- Jones, A. 2015. Globalization – geographical aspects. Wright, J.D. ed.) *International Encyclopedia of the Social & Behavioral Sciences*, 2nd edition, pp 239-246. Elsevier.
- Kaag, M., and A. Zoomers (eds.). 2014. *The global land grab – beyond the hype*. London: Zed Press.
- Kapelus, P. 2002. Mining, corporate social responsibility and the “community” The case of Rio Tinto, Richards Bay Minerals and Mbonambi. *Journal of Business Ethics* 39(3): 279–296.
- Kearney, J., and F. Berkes. 2007. Communities of interdependence for adaptive co-management. In *Adaptive co-management – collaboration, learning and multi-level governance*, ed. D. Armitage, F. Berkes, and N. Doubleday, 191–207. Vancouver: UBC Press.
- Kearney, J., F. Berkes, A. Charles, E. Pinkerton, and M. Wiber. 2007. The role of participatory governance and community-based management in integrated coastal and ocean management in Canada. *Coastal Management* 35: 79–104.
- Kurien, J. 1992. Ruining the commons and responses of the commoners: Coastal overfishing and fishermen’s actions in Kerala state, India. In *Grassroots Environmental Action: Peoples Participation in Sustainable Development*, ed. D. Ghai and J. Vivian, 221–258. London: Routledge.
- Lopes, P.F.M., E.M. Rosa, S. Salyvonchik, V. Nora, and A. Begossi. 2013. Suggestions for fixing top-down coastal fisheries management through participatory approaches. *Marine Policy* 40: 100–110.
- Loucks, R.H., R.E. Smith, and E.B. Fisher. 2014. Interactions between finfish aquaculture and lobster catches in a sheltered bay. *Marine Pollution Bulletin* 88: 255–259.
- Luckscheiter, J., and L. Al-Zubaidi. 2016. *Rights and Resources: Building Community Voice in the Mining Sector. Perspectives, Issue 1, April 2016*. Cape Town: Heinrich Boll Stiftung.
- Mbatha P. and R Wynberg. 2014. Mining and the myth of benefits in South African rural coastal communities. In R. Wynberg and M Hauck (eds). *Sharing Benefits from the Coast: Rights Resources and Livelihoods*. UCT Press.
- Nayak, P.K. 2014. The Chilika Lagoon social-ecological system: an historical analysis. *Ecology and Society* 19(1): 1. <http://dx.doi.org/10.5751/ES-05978-190101>.
- Nayak, P.K., and F. Berkes. 2010. Whose marginalisation? Politics around environmental injustices in India’s Chilika Lagoon. *Local Environment* 15(6): 553–567.
- Nayak, P.K., and F. Berkes. 2011. Commonisation and decommissionation: Understanding the processes of change in Chilika Lagoon, India. *Conservation and Society* 9: 132–145.

- Olson, J. 2011. Understanding and contextualizing social impacts from the privatization of fisheries: an overview. *Ocean and Coastal Management* 54: 353–363.
- Ostrom, E. 1990. *Governing the Commons*. Cambridge: Cambridge University Press.
- Pinkerton, E., and R. Davis. 2015. Neoliberalism and the privatization of enclosure in North American small-scale fisheries. *Marine Policy* 61: 303–312.
- Polanyi, K. 1944/2001. *The great transformation – the economic and political origins of our time*. Boston: Beacon Press.
- Ribot, J.C., and N.L. Peluso. 2003. A Theory of Access. *Rural Sociology* 68(2): 153–181.
- Sowman M. 2009. An Evolving Partnership: Collaboration between 'experts' and a net-fishery. Gateways International Journal of Community Research and Engagement Vol. 2.
- Sowman, M. 2017. Turning the Tide: Strategies, Innovations and Transformative learning at the Olifants Estuary, South Africa. In: Armitage, D., Berkes, F. and Charles, T. (eds). *Governing the Coastal Commons: Communities, Resilience and Transformation*. London: Earthscan/Routledge, in press.
- TNI. 2014. *The global ocean grab – a primer*. Amsterdam: Transnational Institute.
- Wiber, M.G., M.A. Rudd, E. Pinkerton, A. Charles, and A. Bull. 2010. Coastal management challenges from a community perspective: The problem of 'stealth privatization' in a Canadian fishery. *Marine Policy* 34: 598–605.
- Williams S. 2013. Beyond rights: developing a conceptual framework for understanding access to coastal resources at Ebenhaeser and Covie, Western Cape, South Africa. PhD Dissertation, University of Cape Town, South Africa.
- Wilner, K.B., M. Wiber, A. Charles, J. Kearney, M. Landry, L. Wilson, and On behalf of the Coastal CURA Team. 2012. Transformative learning for better resource management: The role of critical reflection. *Journal of Environmental Planning and Management* 55: 1331–1347.

Submit your manuscript to a SpringerOpen[®] journal and benefit from:

- ▶ Convenient online submission
- ▶ Rigorous peer review
- ▶ Immediate publication on acceptance
- ▶ Open access: articles freely available online
- ▶ High visibility within the field
- ▶ Retaining the copyright to your article

Submit your next manuscript at ▶ springeropen.com
