

University of Wollongong

Research Online

Faculty of Law, Humanities and the Arts -
Papers

Faculty of Arts, Social Sciences & Humanities

1-1-2017

Impacts of marine protected areas on livelihoods and food security of the Bajau as an indigenous migratory people in maritime Southeast Asia

Natasha Stacey
Charles Darwin University

Greg Acciaioli
University of Western Australia

Julian Clifton
University of Western Australia

Dirk J. Steenbergen
Charles Darwin University, dirks@uow.edu.au

Follow this and additional works at: <https://ro.uow.edu.au/lhapapers>



Part of the [Arts and Humanities Commons](#), and the [Law Commons](#)

Recommended Citation

Stacey, Natasha; Acciaioli, Greg; Clifton, Julian; and Steenbergen, Dirk J., "Impacts of marine protected areas on livelihoods and food security of the Bajau as an indigenous migratory people in maritime Southeast Asia" (2017). *Faculty of Law, Humanities and the Arts - Papers*. 3466.
<https://ro.uow.edu.au/lhapapers/3466>

Research Online is the open access institutional repository for the University of Wollongong. For further information contact the UOW Library: research-pubs@uow.edu.au

Impacts of marine protected areas on livelihoods and food security of the Bajau as an indigenous migratory people in maritime Southeast Asia

Abstract

Over the last decade, the global conservation agenda has increasingly recognized mobility as an important livelihood and management strategy for indigenous people, acknowledging the need to secure their ongoing access to natural resources within territorial waters and transboundary regions. A growing policy framework exists to support equity, indigenous rights, access to natural resources, participation in management of conservation areas and compensation resulting from loss of access to resources. The rights of indigenous peoples, including sea nomadic or migratory peoples,¹ were recognized in 1989 under Article 4 of the International Labour Organization Convention. Various resolutions, recommendations, declarations and principles, formulated at conservation meetings, including the Convention on Biological Diversity and the World Parks Congress (WPC), have acknowledged the need to secure ongoing access for indigenous mobile and nomadic peoples to natural resources within local and transboundary protected areas in order to enable them to continue to hunt, gather and fish for both subsistence and income-generating purposes.²

Disciplines

Arts and Humanities | Law

Publication Details

Stacey, N., Acciaioli, G., Clifton, J. & Steenbergen, D. J. (2017). Impacts of marine protected areas on livelihoods and food security of the Bajau as an indigenous migratory people in maritime Southeast Asia. In L. Westlund, A. Charles, S. M. Garcia & J. Sanders (Eds.), *Marine protected areas: Interactions with fishery livelihoods and food security* (pp. 113-126). Rome, Italy: Food and Agriculture Organisation of the United Nations. <http://www.fao.org/policy-support/resources/resources-details/en/c/853709/>

The designations employed and the presentation of material in this information product do not imply the expression of any opinion whatsoever on the part of the Food and Agriculture Organization of the United Nations (FAO), or of the International Union for Conservation of Nature (IUCN) concerning the legal or development status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. The mention of specific companies or products of manufacturers, whether or not these have been patented, does not imply that these have been endorsed or recommended by FAO, or IUCN in preference to others of a similar nature that are not mentioned.

The views expressed in this information product are those of the author(s) and do not necessarily reflect the views or policies of FAO, or IUCN.

ISBN 978-92-5-109606-2

© FAO, 2017

FAO encourages the use, reproduction and dissemination of material in this information product. Except where otherwise indicated, material may be copied, downloaded and printed for private study, research and teaching purposes, or for use in non-commercial products or services, provided that appropriate acknowledgement of FAO as the source and copyright holder is given and that FAO's endorsement of users' views, products or services is not implied in any way.

All requests for translation and adaptation rights, and for resale and other commercial use rights should be made via www.fao.org/contact-us/licence-request or addressed to copyright@fao.org.

FAO information products are available on the FAO website (www.fao.org/publications) and can be purchased through publications-sales@fao.org.

Impacts of marine protected areas on livelihoods and food security of the Bajau as an indigenous migratory people in maritime Southeast Asia

Natasha Stacey

Charles Darwin University, Darwin, Australia

Greg Acciaioli

The University of Western Australia, Perth, Australia

Julian Clifton

The University of Western Australia, Perth, Australia

Dirk J. Steenbergen

Charles Darwin University, Darwin, Australia

INTRODUCTION

Over the last decade, the global conservation agenda has increasingly recognized mobility as an important livelihood and management strategy for indigenous people, acknowledging the need to secure their ongoing access to natural resources within territorial waters and transboundary regions. A growing policy framework exists to support equity, indigenous rights, access to natural resources, participation in management of conservation areas and compensation resulting from loss of access to resources. The rights of indigenous peoples, including sea nomadic or migratory peoples,¹ were recognized in 1989 under Article 4 of the International Labour Organization Convention. Various resolutions, recommendations, declarations and principles, formulated at conservation meetings, including the Convention on Biological Diversity and the World Parks Congress (WPC), have acknowledged the need to secure ongoing access for indigenous mobile and nomadic peoples to natural

¹ The authors refer to indigenous migratory peoples as a subset of indigenous peoples whose livelihoods depend on extensive common property use of natural resources over an area. This includes those who use some form of mobility as a livelihood and management strategy. It includes sea nomads (i.e. historically foragers who lived on boats or in stilt houses, maintaining mobile and migratory livelihood strategies over large geographic areas.), nomadic pastoralists, transhumant herders, shifting agriculturalists and hunter-gatherers.

resources within local and transboundary protected areas in order to enable them to continue to hunt, gather and fish for both subsistence and income-generating purposes.²

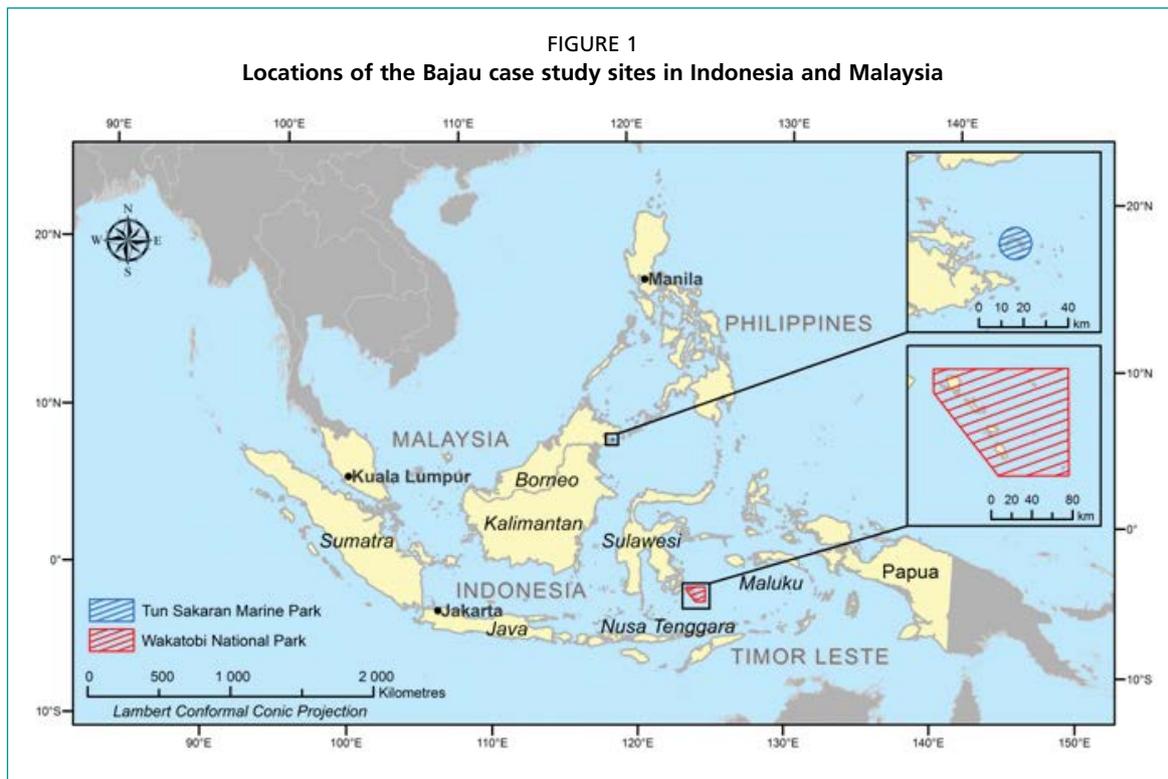
Migration is recognized as one of three broad livelihood strategies of rural peoples (Scoones, 1998). In the context of small-scale fisheries, the term “migration” is used in the literature to refer to the nomadic-like characteristics of fishing populations who support their livelihoods through pursuing opportunities based on spatial and temporal movements of fish populations along with other socio-economic drivers (Aburto, Thiel and Stotz, 2009; Cripps, 2009; Njock and Westlund, 2010; Jorion, 1988). Migration can take a number of forms as voluntary, permanent or temporary (Crona and Rosendo, 2011). Seasonal migration strategies from home or ancestral villages can be classified into two main categories: movement to “satellite bases” or seasonal encampments. This can involve spending short stays (weeks or a few months) in other recurrently visited locations or villages in a hut on a beach to fish or access nearby fishing grounds, or migration to another place as a semi-permanent move, although after a period of time – years or decades – one may move back to one’s ancestral village (Jorion, 1988). People can also alternate between extended periods of time living on boats and periods of residence in houses in a single or more locations.

While the global agenda is striving to accommodate this form of livelihood strategy, it is simultaneously misrepresented in conservation literature (e.g. Hoegh-Guldberg *et al.*, 2012). Stereotypes of mobile peoples as unsettled, with no home base or fixed address, and as variously uncivilized, backward or alien (Lowe, 2006) fail to recognize the complex and dynamic connections linking migratory people to particular locations, settlements and trading routes through kinship networks, patron-client ties and economic activity (Lowe, 2006; Gaynor, 2005; Stacey, 2007).

Area-focused conservation strategies, such as marine protected areas (MPAs), often conflict with cultural and livelihood practices of migratory or semi-nomadic maritime indigenous groups, with implications for food security within such communities. In this paper, these issues are examined in the context of maritime Southeast Asia. This region’s high marine floral and faunal biodiversity (Veron *et al.*, 2009) is acknowledged in the implementation of the Coral Triangle Initiative on Coral Reefs, Fisheries and Food Security (CTI-CFF), a multilateral partnership launched in 2009 involving Indonesia, Malaysia, Papua New Guinea, Philippines, Solomon Islands and Timor Leste, and focusing on six key shared issues, including food security and marine conservation. In this paper, case studies from Indonesia and Malaysia explore the connections between conservation, food access and food availability experienced by the Bajau, an indigenous mobile population numbering approximately 1.1 million people (Mead and Lee, 2007) in Southeast Asia (Figure 1).

The dependence of the Bajau on marine resources for food, housing and fuel reflects not only their historic role as seafaring traders, specializing in high-value products such as beche-de-mer, but also their maritime lifestyles. Until recently this involved families living entirely at sea and engaging with land-based communities primarily for trading purposes (Stacey, 2007), although with more recent sedentarization many Bajau communities now orient more to reef fish and other species closer to shore. Reef finfish, small pelagics, invertebrates, inshore and mangrove species, providing important micronutrients, protein and other minerals, play an important role in the nutritional health of these populations. Previous studies estimated that Bajau

² For example: 2002, Pre-WPC Dana Declaration on Mobile Peoples and Conservation; 2003, WPC Recommendation 27 Mobile Indigenous Peoples and Conservation in the Durban Action Plan endorsed the Dana Declaration; 2005, World Conservation Congress (WCC, Bangkok) Resolution 3.018 on Mobile people and conservation; 2008, WCC (Barcelona) Resolution 4.053 Mobile indigenous peoples and biodiversity conservation; 2012, WCC Resolution 076 Transboundary cooperation around and between large MPAS, which takes into account mobile or migratory populations and to follow the ocean currents (IUCN, 2012:108); 2013, Asia Parks Congress Asia Protected Areas Charter Statement for WPC 2014; and 2013, Asia Parks Congress.



Source: Observatoire-PNBA, 2015.

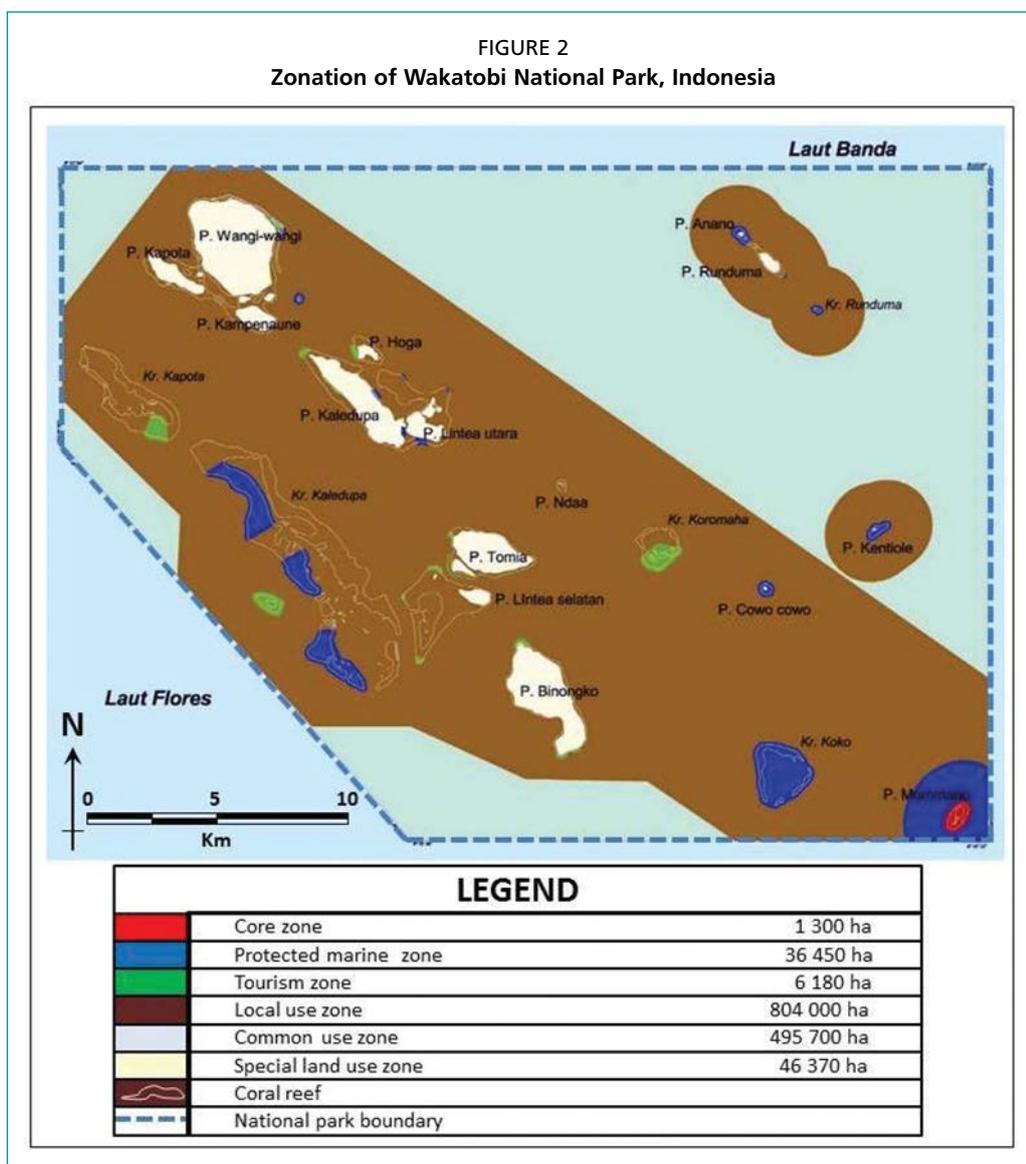
fishers are reported to collect over 300 marine species for food, medicine or trading purposes (May, 2005). While post-colonial governments' efforts to sedentarize the Bajau and other maritime communities in Southeast Asia have been generally effective, contemporary Bajau settlements are commonly built on stilts extending over the reef flats, indicating their ongoing close association with the maritime world and lack of ownership or usage rights over terrestrial resources in Southeast Asia.

In the region's small-scale fisheries, men and women assume complementary roles as part of their coastal livelihoods (Weeratunge, Snyder and Choo, 2010). These roles are changing for the Bajau in response to many external drivers (Gaynor, 2005). Women's diverse roles and their significant contribution to household food and livelihood security, and to local and regional economies through their participation in fisheries and aquaculture, include participation along the value chain as producers (e.g. reef gleaners, divers, inshore fishers), processors (e.g. in processing plants, drying fish) and local market vendors (Fitriana and Stacey, 2012). Moreover, they mediate access to food in households and, thus, the health and well-being of families, in their role as fishers and decision-makers on household food expenditure, as well as in their child-rearing roles.

CASE STUDY 1: THE BAJAU OF WAKATOBI NATIONAL PARK IN SOUTHEAST SULAWESI, INDONESIA

Designated in 1996 and covering 13 900 km², Wakatobi National Park (WNP) in eastern Indonesia encompasses the four main islands of Wangi-wangi, Kaledupa, Tomia, and Binongko, with a total population of around 100 000 people. The park's zonation, which was revised in 2008, is depicted in Figure 2. All fishing activity is prohibited within core zones (shaded red), marine protection zones (blue) and tourism zones (green), which collectively cover 3.4 percent of the total marine area of the park. Predominantly located on fringing reefs around the islands of Hoga, Kaledupa and Tomia, most of these no-fishing zones are relatively small, being less than 1–2 km² in extent. The largest no-fishing zone surrounds the remote atoll of Pulau Moromaho

in the far southeast of the marine park (Figure 2), with other no-fishing zones on the subtidal reefs of Karang Kaledupa in the west.



Source: Amended from Peta Zonasi Taman Nasional WAKATOBI, 2010.

The six Bajau communities, comprising approximately 7 000 people, are spread across four islands, with the largest on Wangi-wangi. The three-month survey of Bajau fishing activity conducted by the authors in 2004, recording catch, fishing location and techniques used in over 300 fishing trips, based upon the Sampela Bajau community on Kaledupa, revealed a high number of species targeted by Bajau fishers. Eleven families of fish accounted for 90 percent of the total catch, with emperor fish (*Lethrinidae*) the main target (28 percent of the catch), along with grouper (*Serranidae*), rabbitfish (*Siganidae*) and snapper (*Lutjanidae*), each representing around 8 percent of the catch. Fishing effort was almost exclusively concentrated over the nearshore reef and seagrass habitats, with less than 10 percent of fishing time spent beyond the reef. The catch composition and spatio-temporal distribution of effort recorded in 2003 is reflected in more recent surveys conducted in this region (Unsworth *et al.*, 2014).

The Bajau in WNP addressed food insecurity associated with the inherent unpredictability of fishing through the practice of food sharing, drawing upon and

FIGURE 3 AND 4
Bajau families trading the day's catch and View of Bajau village at high tide,
Sampela village, Wakatobi, Indonesia



Source: Photos courtesy of Julian Clifton.

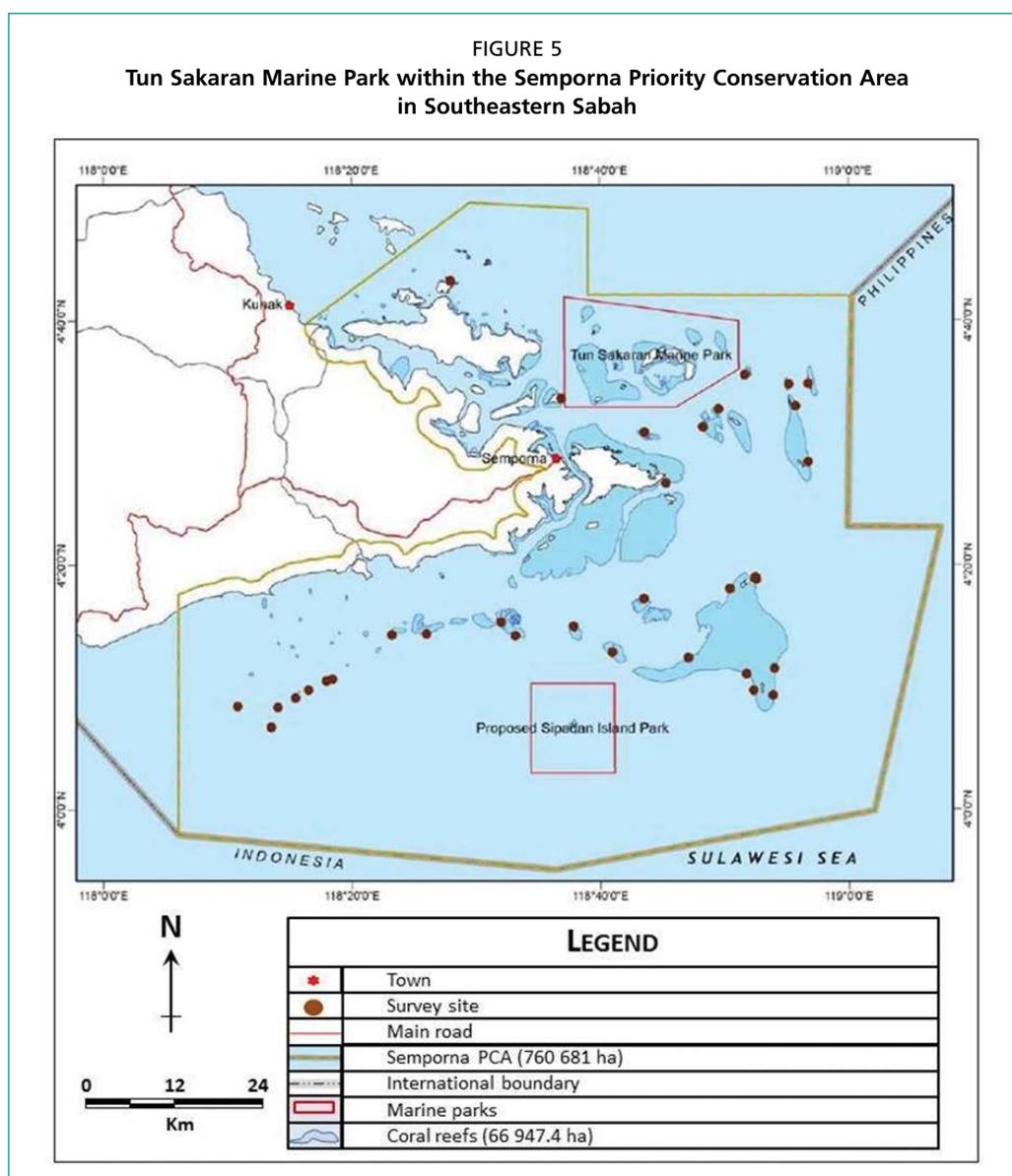
reinforcing interpersonal linkages through reciprocal distribution of daily fish catches between family members and fishing crews (cf. Sather, 1997). As changing fishing technology (e.g. natural fibre nets being replaced by nylon nets which require less ongoing maintenance) has resulted in fishing becoming less reliant on collective effort, food sharing has become less prevalent, although still practiced within extended families. Furthermore, the diversification of income-generating activities into areas including seaweed cultivation, government development projects and small businesses has resulted in growing heterogeneity with respect to household dependence on fishing. Members of a minority of better-off households are increasingly employed in the private or state sector, which has been boosted by reorganization of local government, while a majority of poorer households maintain strong engagement in everyday fishing, generating divided micro economies-of-scale within communities (Steenbergen, 2006). The divisions resulting from these internal differences will determine how individuals and families respond and cope with any potential shocks affecting their food security (e.g. health impediments or fishery collapse). However, a combination of gear limitations and cultural traditions exacerbate the exposure of Bajau fishers to food insecurity. Increasing sedentarization of Bajau communities (Clifton, 2015) has subjected nearshore reefs and seagrass meadows, particularly those near Bajau settlements, to higher fishing pressure and, potentially, overuse. Most fishing takes place using nets and lines deployed from small dugout canoes with a limited range, with access to offshore atolls and reefs only possible for six months each year due to regional wind conditions. However, all Bajau communities experience constraints on physical access to alternative terrestrial food sources, as very few Bajau individuals hold land ownership rights. The perceived decline in catches elicited in repeated surveys of fishers' opinions conducted by the authors over the past 15 years echoes studies of target species, such as octopus and *bêche-de-mer*, indicating an increased strain on food security. From a cultural perspective, however, the historical mobility of Bajau fishers entails a lack of incentive to initiate community-based fisheries management regulations in response to declining catches (Satria and Masuda, 2004), as fishers simply move to new moorings and fishing grounds. Bajau perceptions of causality, including a persistent belief in spirits' control over individual fishing, decoupling human actions taken in the present from future impacts, exacerbate such decline (Clifton and Majors, 2012).

The extremely small size of the no-take zones (NTZs) in WNP raises concerns, as reserves of this size may offer little protection to mobile demersal species, such

as those relied on by the Bajau (Born et al., 2015). The level of NTZ enforcement depends upon proximity to tourist activity in WNP, paralleling other MPAs in Indonesia where tourist operators play significant roles in supporting conservation (Steenbergen, 2013). Heavy policing of NTZs occurs particularly around the island of Tomia through support by the local tourist operator, while inadequate state funding mechanisms constrain enforcement elsewhere (Clifton, 2013). The overall effect of these NTZs may simply be to transfer fishing effort to neighbouring areas, leading to stress on economic and physical access to food among the Bajau. Designating NTZs in suboptimal locations is, therefore, unlikely to generate any benefits associated with food security for the Bajau. This is exacerbated by the exclusion of Bajau resource use practices from management decision-making processes.

CASE STUDY 2: THE BAJAU LAUT OF TUN SAKARAN MARINE PARK, EASTERN SABAH, MALAYSIA

Tun Sakaran Marine Park (TSMP) was gazetted in 2004 and covers an area of approximately 350 km² in the southeastern portion of Darvel Bay, eastern Sabah,



Source: www.naturalis.nl/en/news/zeeteam-expeditie/sempona-biodiversity-hotspot, last visited 28-06-16.
WWF-Malaysia, production date: October 2009.

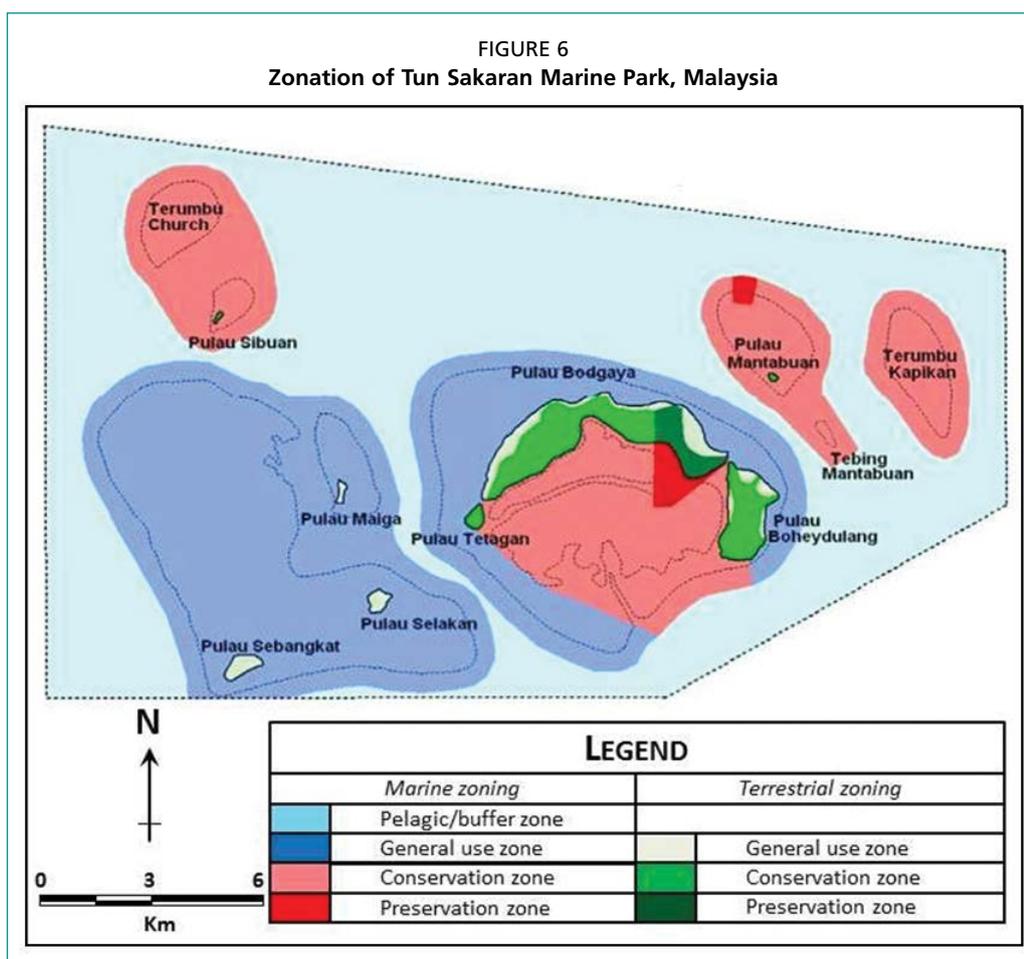
Malaysia (Figure 5). TSMP forms part of the Semporna Priority Conservation Area (SPCA) within the Sulu Sulawesi Marine Ecoregion, which constitutes a priority seascape in the CTI-CFF.

The population survey conducted in 2001 for the draft management plan indicated that the park included 2 061 residents, 25 percent of whom were Bajau Tempatan (“emplaced” Bajau, i.e. those who have long been sedentarized in the region) occupying the larger islands. They practice fishing, cultivation (e.g. fruit trees, including coconuts) and some seaweed cultivation, and are Malaysian citizens who have settled in the islands for some generations. Approximately 18 percent of the population were Bajau Laut (“sea” Bajau), who are now largely semi-sedentary, living either offshore of the main islands – the volcanic remnants Boheydulang, Bodgaya and Tetagen and the raised limestone platforms Selakan and Sebangkat – or in huts on the beaches of the sand cays – Maiga, Sibuan and Mantabuan – and using houseboats for regular travel. Almost all the Bajau Laut in the park are stateless, being neither Malaysian nor Philippine citizens. The remainder of the population are Suluk, originally from the Sulu Archipelago, where they are known as Tausug, who mainly practice seaweed cultivation in the general use zone north of Sebangkat Island.

A recent survey indicated that over 90 percent of Bajau Laut respondents cited reef fish as a “very important” or “fairly important” component of their diet, with octopus, sea cucumber, snails, clams, horseshoe crab, mangrove crab and sea urchins ranked as less important (Wood and Habibah, 2014), both for subsistence and trade (Sather, 1997: 109). However, all the reefs extending from the islands and sand cays in TSMP were declared either “conservation zones” or “preservation (i.e. fish spawning) zones” in 2009 (Figure 6).

Both of these zones preclude all resource consumption, thereby rendering them equivalent to NTZs and effectively barring the Bajau Laut residing within the park from harvesting the areas providing the main source of their food. Bajau Laut fishers have responded by fishing further afield, extending to the pelagic zones at the edges of the park and into the Sulu Sea beyond; 44 percent of the Bajau Laut in the SPCA survey report going further afield to catch fish (Wood and Habibah, 2014). This displacement of primary fishing area has also meant a change in primary technique, with almost exclusive reliance on hook and line fishing, rather than the spear fishing used in shallow waters by the Bajau elsewhere (cf. Sather, 1997: 105–116; BBC One, 2014). Much of the shallow water above seagrass in the park has been allotted to seaweed cultivation, clustered in what are now general use zones of the park (Figure 4). Because of past experiences of seaweed lines being fouled, seaweed cultivators, predominantly the Suluk, threaten any fishers they find in the vicinity of their seaweed lines, thus effectively barring the Bajau Laut and others from fishing there.

However, the park’s zonation has exerted an even greater impact on Bajau Laut women, who have traditionally contributed to household subsistence and market production by gathering various types of shellfish and other marine species found in mudflats and intertidal flats, as well as from shallow water in reef areas. With these areas now encompassed within the NTZs, women’s ability to sustain these contributions has eroded. Some Bajau Laut women have reoriented themselves to other activities, including basket, mat and other handicraft production, but the limited amount of marine tourism in the park has meant a limited market for such production; hence they earn little cash to exchange for food. Cash is essential for the Bajau Laut in order to purchase non-marine foodstuffs needed for their diet, especially the staple cassava flour. Their inability to grow any food on the islands of the park, to which they have no land rights, coupled with the diminution of opportunities to access cash due to restrictions on reef fishing and collecting has decreased their access to essential components of their diet, thus increasing their food insecurity.



Source: Amended from Tun Sakaran MNP information pamphlet [undated], accessed in 2014.

The other outlet for women, and to an extent men as well, is seaweed cultivation. However, a major impediment to pursuing this option is the requirement of Malaysian citizenship to gain a license to be allotted a plot in order to cultivate seaweed. As a result, many Bajau Laut have only been able to gain rights to glean what has dropped to the seabed below from the seaweed lines during harvesting. Bajau Laut women have turned to drying this gleaned seaweed for sale, though only on a very small scale. In addition, the increasing incidence of ice-ice disease (Uyenco, Saniel and Jacinto, 1981) accompanying intensification of seaweed cultivation in the region, in part as a result of increasing surface sea temperature, exacerbated by climate change, has led to declines in the harvests and of the proportion of the highest quality of seaweed, reducing the potential of this activity as an alternative livelihood. This is true even for those who have managed to establish their own seaweed lines, due to intentionally lax enforcement of licensing restrictions by Sabah Parks in compassionate recognition of the difficulties faced by the stateless Bajau Laut and Suluk, and with the hope of fostering better compliance with fishing restrictions.

The limitations imposed upon Bajau Laut livelihoods by the conservation initiatives in the eastern Sabah region must also be viewed in the context of the wider political restrictions imposed on them as stateless inhabitants of Sabah. In the wake of the “invasion” of eastern Sabah in February 2013 (Franco, 2013) by followers of a claimant to the Sulu sultanate seeking to enforce claims on this region, much of eastern Sabah has been designated the Eastern Sabah Security Zone (ESSZONE) by the Malaysian Prime Minister. As they are not Malaysian citizens, the Bajau Laut have been targeted within this security regime as potential facilitators of foreign incursions, given their knowledge of the Sulu Sea and the movements of security forces. Not only have the

Bajau Laut rounded up in and around Semporna been subject to deportation, but those continuing to reside in the area have been severely restricted in their fishing activities by the imposition of a dusk-to-dawn maritime curfew. The number of illegal Bajau Laut migrants to Berau and other parts of East and North Kalimantan that have long harboured Bajau Laut populations (Pauwellussen, 2015) began to increase shortly after the curfew was imposed, indicating that its effect on subsistence pursuits (e.g. nocturnal fishing) was forcing the Bajau Laut to flee to areas of (imagined) less restriction.

FIGURE 7 AND 8

Bajau Laut woman checking for shellfish and other food sources in shallow water off Selakan Island in a General Use Zone of Tun Sakaran Marine Park and Bajau Laut fishing in the pelagic zone of Tun Sakaran Marine Park, the last area open to them for fishing within the park



Source: Photos courtesy of Greg Acciaioli.

However, the subsequent deportation of many of the Bajau Laut apprehended by Indonesian security forces back across the border to Sabah has curtailed this option.

DISCUSSION

The preceding case studies have highlighted the presence of ongoing chronic stresses that, coupled with more recent developments, destabilize various aspects of food security for the Bajau. The continuing process of sedentarization, with its inevitable concentration of fishing effort, following from impediments to the former wider spatial distribution of fishing pressure enabled through nomadic fishing strategies, represents a potential driver of food insecurity and consequent resource decline, although there are insufficient data to conclusively demonstrate the significance of this in both case study areas. Climate change will exacerbate issues of food availability through altering marine environmental conditions, particularly water temperature, with the potential loss of coral and seagrass habitats and increasing incidence of diseases attacking seaweed plots. However, the timing and magnitude of these stresses remain uncertain. Set against this backdrop are more localized and, it could be argued, more significant drivers of food insecurity reflecting government policy decisions and priorities. In both case studies, aspects of marine conservation policy directly impact physical and economic access to food for the Bajau, which, coupled with broader policy decisions relating to marine security, are increasingly restricting the capacity of Bajau communities to adapt to these stresses.

Definitions of food accessibility and availability in the context of food security, when framed along lines of food production, distribution, pricing and markets (Cruz-Trinidad *et al.*, 2014), fall short in capturing livelihood systems of the Bajau, where food security hinges upon peoples' capacity to access natural food stocks through

nomadic, marine territory-based fishing strategies accounting for variable productivity and weather conditions, as among mobile land-based hunter-gatherer cultures. In the context of the Bajau, a more appropriate conceptualization of food accessibility would, therefore, include the physical capacity to harvest fish or other marine resources (i.e. with health and capacity to access transport and fishing technology), natural opportunity (i.e. sea conditions) and the political opportunity (i.e. policies, regulations and laws governing access and fishing practices). Similarly, food availability for the Bajau, as primary collectors in a supply chain, would highlight equally issues of ecosystem health and market distribution capacity, whereas secondary actors along the supply chain would relate more immediately to the latter. We explore these dimensions of food security in more detail below.

Food accessibility

The drive to meet recent international targets relating to MPAs, including the extent of NTZs, serves to further prioritize biological criteria over those relating to local communities' needs in marine planning activities. Consequently, the designation of NTZs may often further undermine food security among the Bajau, especially given the focus upon reef areas, a preferred Bajau focus for fishing and other food gathering. The extent to which food security among fishing communities can be enhanced by larval export and spillover from NTZs depends to a large extent on the biological productivity of the site, its size and the level of enforcement as well as on the level of exploitation outside the area (Hilborn *et al.*, 2004). When NTZs are located either in known spawning and aggregation sites, areas of tourist presence or remote atolls and reefs, rather than being based on detailed knowledge of fish behaviour within the entire marine park, the exclusion of fishing from these sites may be justified on biological grounds, but clearly has implications for food supply stability, particularly when opportunities to travel to alternative fishing grounds are limited.

The establishment of NTZs is usually predicated on biological criteria reflecting marine ecosystem biodiversity, after which zonation proposals are typically amended through consultative and decision-making processes with local stakeholders. Such processes have generally excluded Bajau communities from marine planning and conservation across Southeast Asia (Clifton, 2003; Foale *et al.*, 2013), reflecting their marginalized status and peripheral geographical distribution (Acciaioli, 2001) and the linking of the Bajau with destructive or illegal fishing practices (Pet-Soede and Erdmann, 1998). The socio-economic divides emerging within Bajau communities in WNP, resulting from increased incorporation of some sections of the Bajau population into private and government initiatives, produce disproportionate representation of economically and politically privileged households over the poorer, more fishing-active and most fishery-dependent households. Similar divides are evident in TSMP between the Bajau Laut and the Bajau Tempatan; although the former are most dependent on the fishery, as stateless inhabitants they are ineligible to participate in decision-making processes. Since consultative processes build on actors who are available and willing to contribute, underrepresented "shadow" groups remain excluded, even though these very groups show a higher direct livelihood dependence on fishing activity. While access to prime fishing grounds is imperative for the most fishery-dependent households, their lack of direct involvement in discussions around NTZ allocations means contestation over claims to access (and related non-compliance) will necessarily continue.

The broader sedentarizing policies in Indonesia and Malaysia mean Bajau livelihoods are increasingly becoming "place based". Moving between fishing grounds that are increasingly defined under particular jurisdictional control means former migratory livelihood strategies are no longer viable and often not even possible. This is echoed further in the way conservation management occurs, whereby community

involvement measures see the recruitment of the Bajau into roles that associate them with a defined area.

In TSMP, the impacts of the park are heightened in relation to women. Given the role of women in provision of household food security through their reliance on accessing areas inside the park for nutritious food sources such as shellfish, the restrictions imposed by the park have a flow-on effect, especially in the context of limited livelihood opportunities now available. It has been shown in other coastal contexts (e.g. Beaumier and Ford, 2010) that in times of food insecurity, it is women who often forgo meals when food supplies are limited. Further, a reduction in nutritionally important marine foods available to the household will have consequences for children's health.

Food availability

Besides fulfilling nutritional subsistence needs through their fishing, Bajau fishing households depend on market sales of fish and other marine resources for income, which they require to purchase other complementary foodstuffs needed for nutritional security. Land-based households, on the other hand, depend on the supply of these products at markets to be able to buy and consume fish. Bajau fishing activities thus constitute the base of local supply chains which connect inland non-fishing households with the food source. The local distribution of fish that upholds food security of a wider local population is largely conditioned by the Bajau's ability to supply fish. The Bajau thus play a significant role in maintaining food availability for households that do not engage in fishing. Placing barriers to their fishing capacity may, therefore, have cascade effects not only for food security for a larger population, but also for conservation efforts. Declines in fish supply or a rise in fish price may drive increased fishing activity by land-based groups. Such fishing activity would likely concentrate around inshore shallow coastal zones given their general inexperience in fishing. As a result, fish trapping and gleaning in the tidal zone, as well as targeting of juvenile fish in nursery areas which are not identified as NTZs (e.g. mangrove ecosystems) may well increase, putting further pressure on connected marine ecosystems.

While the cumulative adverse impacts of overfishing, destructive fishing and coastal development have long been highlighted in the Coral Triangle region (Burke *et al.*, 2012), climate change is introducing new dimensions of socio-economic risk and uncertainty, including those relating to food security (Hoegh-Guldberg *et al.*, 2009). Rising water temperatures increasingly compromise the capacity of reefs to support fish populations, while also contributing to diseases such as ice-ice that impact seaweed cultivation plots throughout the region. This will likely enhance the pressure to adopt other alternative income-generating activities, which in turn will lead to greater instances of conflict with other resource users on land and sea.

CONCLUSIONS

The rights and ability of indigenous peoples to maintain their cultural identity through following traditional means of resource usage are subject to various conventions and treaties at the international level that seek to support indigenous identity and access to resources. However, the means and tools applied to operationalize sustainability objectives simultaneously place greater impositions on food access and availability. The latter are manifest clearly in Southeast Asia, where marine conservation has taken centre stage to the detriment of indigenous semi-migratory and nomadic peoples' ability to sustain their traditional means of collecting and utilizing marine resources. However, the links between marine conservation and food security are only beginning to be evaluated in the literature (Foale *et al.*, 2013); evidence supporting the positive impacts of MPAs in regard to maintaining or improving food security in marine resource-dependent communities is also lacking (HLPE, 2014). Clearly, vulnerable or marginalized populations that are wholly dependent on marine resources for food

and purchasing power for other foods and staples will be adversely impacted by restricted access, necessitating empowering these communities to contribute actively to decisions that impinge upon their livelihoods. There is an urgent need to refine marine policy-making so that food security and poverty alleviation are seen as integral and complementary to conservation objectives (Rockefeller Foundation, 2013). This includes consideration of social spaces along with biological imperatives as a foundation for marine resource planning and management and potential of rotational access and use within a larger network of MPAs, which incorporates larger migratory fishing territories. This could potentially address issues associated with sedentarization and overuse of resources.

Maritime semi-migratory and nomadic communities and women in particular are, furthermore, crucial partners in future initiatives to understand, monitor and address the impacts of climate change on marine food security. Hence, actively engaging them and seeking their support in contemporary conservation programmes will facilitate their involvement in designing programmes to ensure the long-term sustainable use of marine resources.

REFERENCES

- Aburto, J., Thiel, M. & Stotz, W.** 2009. Allocation of effort in artisanal fisheries: The importance of migration and temporary fishing camps. *Ocean & Coastal Management*, 52: 646–654. doi:10.1016/j.marpol.2010.01.020
- Acciaoli, G.** 2001. ‘Archipelagic culture’ as an exclusionary government discourse in Indonesia. *Asia Pacific Journal of Anthropology*, 2: 1–23.
- Asia Parks Congress.** 2013. Message from the 1st Asia Parks Congress to the IUCN World Parks Congress, Sydney, 2014. 28 pp. (Available at http://www.env.go.jp/nature/asia-parks/pdf/4-2_wg_message.pdf)
- Congress, Sydney, Australia,** 2014. 28 pp. (Available at http://www.env.go.jp/nature/asia-parks/pdf/4-2_wg_message.pdf) (Accessed October 2015)
- BBC One.** 2014. Human Planet: Oceans – Into the Oceans. (Available at: <http://www.bbc.co.uk/programmes/b00llpvp>)
- Beaumier, M.C. & Ford, J.D.** 2010. Food insecurity among Inuit women exacerbated by socio-economic stresses and climate change. *Canadian Journal of Public Health*, 101(3): 196–201.
- Bornt, K.R., McLean, D.L., Langlois, T.J., Harvey, E.S., Bellchambers, L.M., Evans, S.N. & Newman, S.J.** 2015. Targeted demersal fishing species exhibit variable responses to long-term protection from fishing at the Houtman Abrolhos Islands. *Coral Reefs*, 34:4, 1297–1312, DOI: 10.1007/s00338-015-1336-5
- Burke, L., Reyntar, K., Spalding, M. & Perry, A.** 2012. *Reefs at Risk Revisited in the Coral Triangle*. Washington, DC, United States, World Resources Institute (WRI).
- Clifton, J.** 2003. Prospects for co-management in Indonesia’s marine protected areas. *Marine Policy*, 27: 389–395.
- Clifton, J.** 2013. Compensation, conservation and communities: an analysis of direct payments initiatives in an Indonesian marine protected area. *Environmental Conservation*, 40: 287–295.
- Clifton, J.** 2015. Maritime ecocultures: Bajau communities of eastern Indonesia. In S. Bohm, Z.P. Bharucha & J. Pretty, eds. *Ecocultures: Blueprints for Sustainable Communities*, pp. 27–43. London, United Kingdom, Earthscan Publications.
- Clifton, J. & Majors, C.** 2012. Culture, conservation and conflict: perspectives on marine protection amongst the Bajau of south-east Asia. *Society and Natural Resources*, 25: 716–725.
- Cripps, G.** 2009. Understanding migration amongst the traditional fishers of West Madagascar. Blue Ventures Conservation Report for ReCoMaP. (unpublished report)

- Crona, B. & Rosendo, S. 2011 Outside the law? Analyzing policy gaps in addressing fishers' migration in East Africa. *Marine Policy*, 35: 379–388. doi:10.1016/j.marpol.2010.11.003
- Cruz-Trinidad, A., Aliño, P.M., Geronimo, R.C. & Cabral, R.B. 2014. Linking Food Security with Coral Reefs and Fisheries in the Coral Triangle. *Coastal Management*, 42(2): 160–182. doi: 10.1080/08920753.2014.877761
- Fitriana, R. & Stacey, N. 2012. The role of women in the fishery sector of Pantar Island, Indonesia. *Gender in Aquaculture and Fisheries: Moving the Agenda Forward. Asian Fisheries Science*, Special Issue 25S: 159–175.
- Foale, S., Adhuri, D., Aliño, P., Allison, E.H., Andrew, N., Cohen, P., Evans, L., Fabinyi, M., Fidelman, P., Gregory, C., Stacey, N., Tanzer, J. & Weeratunge, N. 2013. Food security and the Coral Triangle Initiative. *Marine Policy*, 38: 174–183.
- Franco, J. 2013. The Sabah-Sulu Crisis; Time to revisit the Sulu Zone? RSIS Commentaries, S. Rajaratnam School of International Studies, Nanyang Technological University. (Available at <http://www.rsis.edu.sg/wp-content/uploads/2014/07/CO13044.pdf>)
- Gaynor, J.L. 2005. The decline of small-scale fishing and the reorganization of livelihood practices among Sama people in eastern Indonesia. *Michigan Discussions in Anthropology*, 15: 90–149.
- Hilborn, R., Stokes, K., Maguire, J.J., Smith, T., Botsford, L.W., Mangel, M., Orensanz, J., Parma, A., Rice, J., Bell, J., Cochrane, K.L., Garcia, S., Hall, S.J., Kirkwood, G.P., Sainsbury, K., Stefansson, G. & Walters, C. 2004. When can marine protected areas improve fisheries management? *Ocean & Coastal Management*, 47(2): 197–205. doi:10.1016/j.ocecoaman.2004.04.001
- HLPE. 2014. *Sustainable fisheries and aquaculture for food security and nutrition*. A report by the High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security, Rome.
- Hoegh-Guldberg, O., Hoegh-Guldberg, H., Veron, J.E.N., Green, A., Gomez, E.D., Lough, J., King, M., Ambariyanto, H.L., Cinner, J., Dews, G., Russ, G., Schuttenberg, H.Z., Peñaflor, E.L., Eakin, C.M., Christensen, T.R.L., Abbey, M., Areki, F., Kosaka, R.A., Tewfik, A. & Oliver, J. 2009. *The Coral Triangle and Climate Change: Ecosystems, People and Societies at Risk*. Brisbane, Australia, World Wildlife Fund (WWF).
- IUCN. 2012. Resolutions and Recommendations: World Conservation Congress, Jeju, Republic of Korea, 6–15 September, Gland, Switzerland, International Union for the Conservation of Nature (IUCN). 251 pp. (Available at https://cmsdata.iucn.org/downloads/resolutions_and_recommendations_2012.pdf) (Accessed October 2015)
- Jorion, P. 1988. Going out or staying home: Seasonal movements and migration strategies among Xwla and Anlo-Ewe fishermen. *Maritime Anthropological Studies*, 1(2): 129–155.
- Lowe, C. 2006. *Wild Profusion: Biodiversity Conservation in an Indonesian Archipelago*. Princeton, New Jersey, United States, Princeton University Press.
- May, D. 2005. Folk taxonomy of reef fish and the value of participatory monitoring in Wakatobi National Park, Southeast Sulawesi, Indonesia. *SPC Traditional Marine Resource Management and Knowledge Information Bulletin*, August (18): 18–35.
- Mead, D. & Lee, M.-Y. 2007. *Mapping Indonesian Bajau communities in Sulawesi*. Summer Institute of Linguistics. Electronic Survey Report 2007-019. 45 pp.
- Njock, J.-C. & Westlund, L. 2010 Migration, resource management and global change: Experiences from fishing communities in West and Central Africa. *Marine Policy*, 34: 752–760. doi:10.1016/j.marpol.2010.01.020
- Pauwelussen, A. 2015. The Moves of a Bajau Middlewoman: Understanding the Disparity between Trade Networks and Marine Conservation. *Anthropological Forum*, 25:4, 329–349, DOI: 10.1080/00664677.2015.1054343
- Pet-Soede, L. & Erdmann, V. 1998. An overview and comparison of destructive fishing practices in Indonesia. *SPC Live Reef Fish Information Bulletin*, 4: 28–36.

- Rockefeller Foundation.** 2013. *Securing the livelihoods and nutritional needs of fish-dependent communities*. New York, United States, Rockefeller Foundation. (Available at <http://www.rockefellerfoundation.org/blog/securing-livelihoods-nutritional-needs>)
- Sather, C.** 1997. *The Bajau Laut—Adaptation, History, and Fate in a Maritime Fishing Society of South-Eastern Sabah*. South-East Asian Social Science Monographs. Kuala Lumpur, Malaysia, Oxford University Press.
- Satria, A. & Masuda, Y.** 2004. Decentralisation of fisheries management in Indonesia. *Marine Policy*, 28: 437–450.
- Scoones, I.** 1998. Sustainable Rural Livelihoods: A Framework for Analysis. Institute of Development Studies Working Paper 72. Brighton, United Kingdom, IDS. 22 pp.
- Stacey, N.** 2007. *Boats to Burn: Bajo fishing activity in the Australian Fishing Zone*. Asia-Pacific Environment Monograph Series. Canberra, Australia, ANU E Press.
- Steenbergen, D.J.** 2006. People in Policy and Policy in People: An Actor-Oriented Analysis of Marine & Coastal Zone Management. The Case of Wakatobi National Park, S.E. Sulawesi in Indonesia. Wageningen University. (M.Sc. thesis)
- Steenbergen, D.J.** 2013. The Role of Tourism in Addressing Illegal Fishing: The Case of a Dive Operator in Indonesia. *Contemporary Southeast Asia*, 35 (2): 188–214.
- Unsworth, R.F.K., Hinder, S.L., Bodger, O.G. & Cullen-Unsworth, L.C.** 2014. Food supply depends on seagrass meadows in the Coral Triangle. *Environmental Research Letters*, 9(9).
- Uyenco, F.R., Saniel, L.S. & Jacinto, G.S.** 1981. The "Ice-Ice" problem in seaweed farming. In G.C. Trono, Jr & E.T. Ganzon-Fortes, eds. *Report on the Training Course on Gracilaria algae*, pp. 69–75. Manila, Philippines, Food and Agriculture Organization of the United Nations (FAO).
- Veron, J.E.N., Devantier, L.M., Turak, E., Green, A.L., Kininmonth, S., Stafford-Smith, M. & Peterson, N.** 2009. Delineating the Coral Triangle. *Galaxea. Journal of Coral Reef Studies*, 11: 91–100.
- Weeratunge, N., Snyder, K.A. & Choo, P.S.** 2010. Gleaner, fisher, trader, processor: understanding gendered employment in fisheries and aquaculture. *Fish and Fisheries*, 11: 405–420.
- Wood, E. & Habibah, Y.** (no date [2014]). Bajau Laut customs, viewpoints and perceptions concerning marine resource use in Semporna. Sabah, Malaysia. (unpublished report)