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Co-producing Better Management Practice standards for shrimp aquaculture in Indonesia

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Abstract

Better Management Practices (BMPs) are designed to standardize on-farm practices and improve the (environmental) performance of shrimp aquaculture. The design and implementation of aquaculture BMPs in Indonesia has been facilitated through NGO-led multi-stakeholder initiatives, which translate global norms, knowledge and policy goals into local knowledge and practices. This paper analyses this process of translation in East Kalimantan, and questions the extent to which technically focused BMPs are co-produced; representing the combined knowledge and interests of the actors involved. The paper concludes that when led by non-state actors such as NGOs, BMPs are not only a tool for negotiating technical changes in production, but also contribute to the ongoing politicization of social and environmental issues around shrimp aquaculture.

Introduction

Better management practices (BMPs) for shrimp farming are designed to standardize on-farm practices and reduce the economic risk associated with disease and environmental degradation. Similar to third party certification standards, BMPs set out a range of technical indicators that producers can use as targets to improve their production practices (Vandergeest, 2007; Anh et al. 2011; Padiyar et al. 2012). However, unlike private certification standards, such as those of the Aquaculture Stewardship Council (ASC), Global Aquaculture Alliance (GAA) and Naturland, BMPs are in most cases not formally monitored by either governments or by third party auditors. Instead governments and NGOs alike use them to disseminate technical practices to producers in a more structured and formalized fashion in order to standardize production inputs and practices.

BMPs are based in large part on the Principles for Sustainable Shrimp Farming, developed by a consortium of international agencies including WWF (The Consortium 2006) and the FAO Code of Conduct for Responsible Fisheries (CCRF) (FAO 1995). When further defined at the national level, these international principles and codes are adapted to suit the specific demands of intensive and/or extensive production systems (e.g. Anh et al 2011; Padiyar et al. 2012). In geographically diverse countries such as Indonesia, these national level BMPs are further adapted to the range of production systems found in different regions or provinces by both government departments and

NGOs. In doing so these actors enact a process of translating a generic set of global concerns into local contexts with the intention of increasing the likelihood of adoption and subsequently performance of shrimp aquaculture.

Translating BMPs into local shrimp farming contexts has proven to be a challenging process. Despite their involvement, locally defined BMPs have been viewed with suspicion by governments and farmers as an attempt to supplant state regulation, and render social and political conflicts surrounding shrimp farming as technical problems with technical solutions (Ha and Bush 2010; Islam 2008; Li 2007; Vandergeest and Unno 2012). As argued by (Béné 2005), the perceived threat posed by BMPs is that advocates are able to “depoliticis[e] the problem of shrimp farming and refram[e] it into a neutral, bio-physical problem, where only technical - and not structural or political - solutions are required” (p. 611). Others have shown how BMPs fit into a wider technical system of non-state regulation by setting producers on the path towards more stringent private standards that facilitate access to international markets, such as ASC or GAA (Belton et al. 2009; Anh et al. 2011; Ha et al. 2012). With few exceptions (e.g. Konefal and Hatanaka 2010), these studies have largely ignored the capacity of NGOs or governments to facilitate this process of translation, and as such the extent to which the knowledge and interests of global and local actors influence their successfully co-production.

This paper analyses fills this gap in the literature by providing a detailed case study of a NGO-led multi-stakeholder process of co-producing BMPs and implementation in the northern part of East Kalimantan, Indonesia. In this case, co-production is not linked to any single event, but is instead seen as an outcome of networked places and processes stretching beyond the local and link to the global places and historical events (Goldman 2010). In order to understand this process, we first examine the extent to which NGO-led BMPs are able to capture and mitigate both technical and social challenges of production. We then examine the extent to which these BMPs (de)politicize social and environmental issues around shrimp aquaculture by including or excluding different knowledge and practices. In doing so we analyse the transfer of knowledge embodied in global principles to local actors and environments, the composition and content of multi-stakeholder meetings and the degree to which the final BMPs incorporated the practices of local producers.

We examine the process of translation in three parts. First, we review the process of developing the international principals in Aceh by WWF in partnership with other national and international organisations following the 2004 tsunami (ACIAR et al. 2007). We then analyse how WWF transferred these Aceh BMPs to two districts of East Kalimantan - Tarakan and Bulungan – through a series of multi-stakeholder meetings and a farm-level pilot programme. Based on these results we reflect on the position and role of WWF, as an international NGO, in mediating the politicization of shrimp aquaculture through technical BMP standards.

Co-producing standards

Research on aquaculture standards have focused on a range of questions related to the extent of expert and industry capture during their definition, the poor representation of producers from developing countries (Vandergeest 2007; Belton et al. 2010; Bush et al. 2013), and the effects of transferring globally derived knowledge into a national to local

settings (Béné 2005; Konefal and Hatanaka 2011; Bush and Belton 2012; Ha et al. 2013). A common theme running through these studies is how NGO-state-industry networks 'translate' global norms, knowledge and policy goals into local knowledge and practices, with questions focusing on the inclusion/exclusion of actors, consensus seeking in local settings, and the extent to which they lead to changes in production practices.

Translation can be understood as a process of knowledge co-production, emphasizing the creative friction that emerges between the interaction of different knowledge, each with their own grounds for belief, procedures for validation (Jasanoff 2004; Long 2001; Tsing 2005). Similar to findings into multi-stakeholder initiatives in other sectors, the technical definition of these standards does not occur in a vacuum. Instead the formation of the networks of actors that constitute these multi-stakeholder initiatives is as equally important to understanding which knowledge is translated into measurable standards and which knowledge is excluded (see Cheyns 2011; Anh et al. 2011; Ponte and Cheyns 2013). Put differently, co-production draws attention to how content is decided upon, as well as who is able to contribute to that content.

Co-production is seen in two distinct ways. From a managerial perspective it implies a collaborative process of stakeholder engagement designed to "address a defined problem and build an integrated system-oriented understanding of [a] problem" (Armitage et al. 2011: 996). Based on the notions of resource co-management, this perspective opens up the possibility to actively steer a process of co-production which results in a shared understanding of environmental problems that in turn results in conformity and effective management. However, from a critical perspective, and reminiscent of Cooke and Kothari's (2001) 'tyranny of participation,' co-production can also reveal the difference between the ingenuous inclusion of certain actors and meaningful collaborative process that lead to substantive stakeholder inclusion and empowerment. In this sense, the uniformed and formalized knowledge codified in BMPs is representative of the relations of power that negotiate the inclusion of different knowledges (Konefal and Hatanaka 2011; Ponte and Cheyns 2013). The conditions of including the knowledge and interests of actors in the final standards are therefore as fundamentally political as the conditions of exclusion (Cheyns 2011). In this sense, the final standards do not always represent the aims, perceptions, values, interests and relationships of actors with different technical and political capacities to contribute.

Co-production can also be observed through producer practices, which represent the outcomes of the discursive practice inherent in standard definition and implementation. In the case of BMPs, exploring practices and their outcome help to uncover how co-production continues beyond standard definition to standard implementation. We argue that by understanding these practices and their material outcomes, it is possible to distinguish how responsive standard setters are to producer innovation or localization. Following on from what Tsing (2005) labels 'friction,' our analysis explores the difference between discursive and material practice by focusing on the "awkward, unequal, unstable, and creative qualities of interconnection across difference" (p. 4). In the case of BMPs, this means identifying how the creative qualities of friction are expressed in producer practices, while also reflecting the willingness of the standard setters to re-negotiate the content of standards and, therefore, the collective knowledge they embody. This moves us beyond studies on the formalized standard setting processes in networks and multi-

stakeholder initiatives to explore the possibility of incorporating alternative practices and knowledge in standard formation and revision.

Site selection and methodological approach

The methodology adopted for this study is structured around what Marcus (1995) labels a 'multi-sited ethnography'; investigating the context within which decisions over standards for East Kalimantan were made, how different actors influenced these decisions, and how the different knowledge that constitute these standards have been communicated across space (also see Falzon 2009). This methodology is also complimentary to Tsing's (2005) claim that the connections between actor networks spanning global sites requires a heterodox approach, taking into account the spaces in which these actors operate (e.g. farms and workshops) as well as the connections between them based on material and informational flows.

Although based on a single 'case,' the process of defining standards and implementing and the friction between these processes is thought to be representative of the steps and processes common to multi-stakeholder processes in general. However, the goal of our analysis is not necessarily to provide generalizable results. Instead we seek to abstract our specific empirical findings (see Lund 2014) into the wider conceptual precepts of knowledge co-production, and in doing so contribute to a wider understanding of how knowledge is used by who and how.

Fieldwork for this study was conducted from 2009 to 2013 in Tarakan and Bulungan districts of East Kalimantan. Tarakan has developed as a major centre for shrimp processing companies thanks to its existing infrastructure for international trade (Ilman et al. 2009), and because of the value of the surrounding demersal fishery, both of which has attracted investment from Malaysian, Taiwanese and Japanese investors. Farmed shrimp are primarily produced in the Sesayap Estuary of Tarakan, Bulungan, Kabupaten Tanah Tidung and Nunukan districts (see Fig. 1). It is precisely the location of shrimp ponds in these remote islands that have given the shrimp from the north coast East Kalimantan a reputation of the high quality desired by Japanese shrimp importers, and subsequently the market for entrepreneurs to invest in super-extensive ponds of up to 100 ha in size.

Primary data was collected through in-depth interviews with main actors working in shrimp production and trade, as well as those working in regulation, policy and extension. The first group of actors consisted of eight pond owners, three middlemen and three cold storage owners, including those both included and excluded in definition of BMP for Tarakan. The second group were consisted of government functionaries of the Marine Affairs and Fisheries (MAF) office in Tarakan, as well as three officials from the same department at the provincial level of East Kalimantan,¹ and four at the national level. In addition, three Indonesia-based NGOs were interviewed both in Tarakan and Jakarta. Observations were also made during several visits to shrimp ponds, hatcheries, nurseries, and processing companies, as well as at meetings and seminars on sustainable shrimp production in both Indonesia and Europe – for example, during the WWF shrimp aquaculture dialogue meeting in Jakarta in March 2010. Secondary data was gathered by reviewing and examining data on both shrimp farming and better management practices from websites, newsletters, reports and newspaper articles.

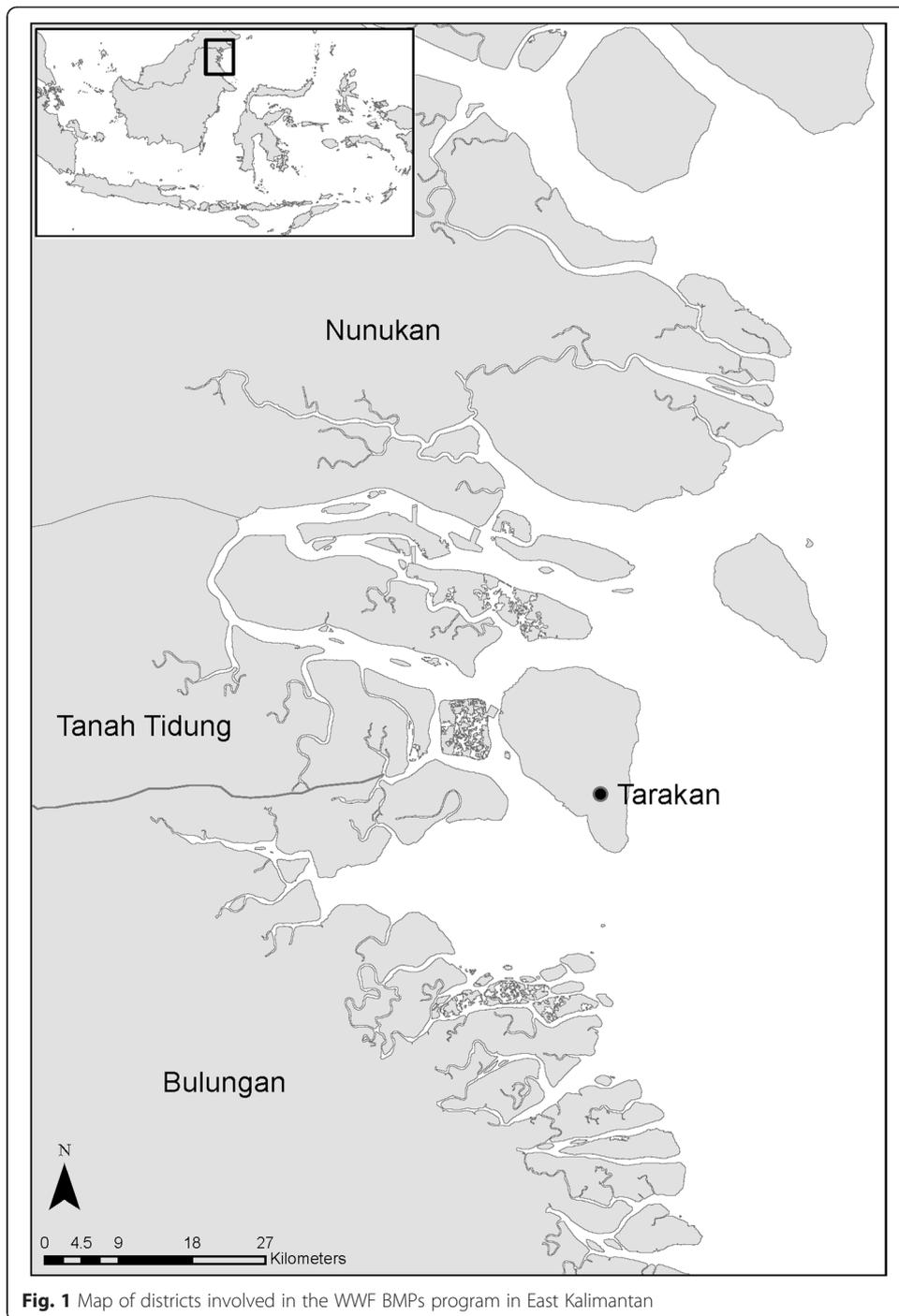


Fig. 1 Map of districts involved in the WWF BMPs program in East Kalimantan

Building the BMPs network

From principles to standards

The first BMPs in Indonesia were developed for Aceh through a collaboration of government departments with international and national NGOs, and development institutions as part of the of a wider reconstruction programme for shrimp aquaculture after the 2004 tsunami (ADB et al. 2007). Many international agencies offered assistance for

the rehabilitation of coastal regions, including the aquaculture sector that was one of the sources of livelihood of the inhabitants. However, as Rimmer et al. (2012) argue, many of the agencies involved did not have adequate technical capacity to rehabilitate shrimp ponds and their supporting infrastructure. Organisations such as WWF therefore saw the development of BMPs as a means of providing guidelines, based on the international principles for sustainable shrimp aquaculture, for these organisations to either reduce the risk of poor reconstruction or at best develop technically improved shrimp ponds. Although made difficult by the disintegration of community and farming structures following the tsunami, the Aceh BMPs have been criticised for not taking consideration local perspectives on reconstruction, and for reproducing previous practices instead of new, potentially more sustainable farming approaches; a pattern noted by McGregor (2007) in other initiatives for rebuilding Aceh.

The Aceh BMPs represent the first step of translating the international principles into the Indonesian context, and WWF-Indonesia saw them as an opportunity to create locally specific standards for other regions in country. As stated by a staff member of WWF-Indonesia, the international collaboration that went into the development of the Aceh BMPs provided considerable credibility within Indonesia. WWF-Indonesia planned to invest further in the development of other locally specific BMPs through the “development of pilot projects enriched with literature studies” (Interview, Jakarta, February 2013). WWF-Indonesia then entered a new phase of technical translation of the BMPs aimed at advocating environmental improvement by district level governments. Part of their wider advocacy strategy – including BMPs for 11 other aquaculture species – the translation process intended to address a widely perceived (see Smith et al. 2003; Satria and Matsuda 2004) lack of capacity for environmental policy and management at the district level.

The process of translating BMPs into ‘new’ local contexts in Indonesia is therefore not insulated from networks of global experts. It is instead part of WWF’s wider strategy to facilitate different organizations to input their experience and expertise into the promotion of responsible aquaculture production. However, unlike the development of the Aceh BMPs, WWF-Indonesia argued that the new round of BMPs translation should focus directly on local government, industry and shrimp producers. Nonetheless, the association of WWF-Indonesia with the global WWF network did mean that the BMPs they facilitated were also designed to assist shrimp producers in Indonesia to move towards international third-party certification, such as the ASC shrimp standards; developed through the WWF-facilitated shrimp aquaculture dialogue (ShAD). As we now go on to illustrate through the Tarakan case, these ‘localised’ BMPs remain closely linked to the wider ShAD process and, according to WWF-Indonesia, play a strategic role in preparing producers to be ready for ASC certification. They can therefore be seen as a bridge between knowledge of producers and the experts within the global environmental regulatory networks of which they are a part.

Building on business - WWF and MMA

The decision to move to Tarakan, with vastly different production systems to Aceh (see Table 1), was led by Mustika Minanusa Aurora (MMA); the largest processing and exporting company operating in that region. MMA was already actively developing

Table 1 Main technical differences of production system between Aceh and Northern part of East Kalimantan

Pond characteristics	Aceh (Source: Zainun et al. 2007)	East Kalimantan (Source: Ilman et al. 2009)
Size	2 – 5 ha/pond	5 – 25 ha/pond
Type	Mainly traditional, but there are also semi intensive and intensive ponds	Traditional extensive
Stocking	1000—20,000/ha (traditional) 20,000—60,000/ha (semi-intensive) 100,000—600,000/ha (intensive)	1 - 2/m ² - 10,000 - 20,000/ha
Feed	Algal growth in ponds, rice bran, pellet for semi-intensive; and for intensive farming system, feed is given as recommended.	Natural algal growth. No additional feed.

their own environmental programme, in part because of a new found environmental concern of the company's owner, but also in response to demand for 'green' shrimp from their main Japanese buyer Nicherei. The general manager explained the incorporation of environmental issues in their business strategy by arguing: "If we want our product to hit the market, we need a story [that can promote the product]. If our customers believe that our products are environmental friendly, organic, and pose no harm to the environment, [I believe] there would be a price increase to our products" (Interview, Tarakan, February 2009).

The demand for green products by Nicherei was originally focused on the reforestation in Kalimantan province in order to support their 'green shrimp' label. The first phase of collaboration focused on a 'environmental responsibility programme' which contributed US\$ 1 per box of shrimp sold to fund a reforestation programme in Kutai Kartanegara district of East Kalimantan. Recognising a mismatch between inland reforestation and their claim of 'green shrimp', MMA then proposed that Nicherei shift their funding to mangrove rehabilitation in Tarakan and the surrounding region. The resulting 'Forest of Life' project started in 2006 providing Nicherei and MMA the chance to claim mangrove reforestation as a marketable quality of their shrimp. Using the claim of a 'green made farm' on their packaging with further explanation that the shrimp were sourced from extensive systems that are 'close to the natural environment', they established what they perceived as a Japanese consumer driven scheme for mangrove rehabilitation.

The 'green made farm' label was successful in establishing a flow of funding, however after some poor technical results with their reforestation programme MMA requested the assistance of WWF to provide assistance on mangrove planting. In doing so WWF also became a key partner, providing legitimacy to the environmental claims of the company in return for establishing their own network in Tarakan. They were given office space at the MMA factory and access to the companies' suppliers, as well as a basis from which to develop relations with the local district government. In April 2008, WWF Indonesia, MMA, and Environment and the Tarakan Natural Resources Agency (*Badan Lingkungan Hidup* - BLH) signed an MoU stating that MMA, with assistance from WWF, had a responsibility to plant 150 ha of mangrove in five years. For WWF the document represented a formalization of their collaboration with the MMA, the enrolment of the government into their activities, and provided a statement of political support for introducing their BMPs programme.

Translation into a local setting

The collaboration with MMA provided a platform on which WWF could access and enrol local actors into the process of translating the Aceh BMPs to the local context of Tarakan. WWF supported at least three 'public' meetings to introduce the concept of BMPs, outline their experience from Aceh, and ultimately to develop a new set of BMPs for East Kalimantan. At the first consultation, held in August 2009, WWF invited government agencies from different sectors: the Marine and Fisheries Agency (MFA), Forestry Agency, and Environmental Agency from five districts: Tarakan, Bulungan, Kabupaten Tanah Tidung, Nunukan and Berau. The aim of the meeting was to enrol the five district governments by introducing the BMPs from Aceh and the process of developing BMPs suitable for East Kalimantan.

In the second meeting, held in January 2010, WWF reduced the number of government departments invited and brought in a selected group of local industry representatives. MFA were invited to chair the meeting and provide 'technical input' to the standards. The meeting was scheduled in Tarakan at the MFA office, with other departments who attended the first meeting (such as environment and forestry), excluded. WWF also invited representatives from fisher and shrimp producer organisations selected on the basis of their perceived ability to 'speak' in public. They were also key suppliers of MMA, who was the only one of seven export processors in Tarakan to be invited. On justifying this exclusive selection policy, the WWF officer reflected on close personal ties with MMA; "[WWF] involves MMA in the BMPs development because we have worked with them since the beginning. I would feel uncomfortable if we invited other cold storages to our project" (WWF field staff, Tarakan, January, 2010).

The exclusive and targeted selection of participants was reflected in the content and discussion of the meeting, as well as the subsequent strategy for trialling the draft BMPs. The head of MFA stated in her opening address that MFA give full support to WWF-Indonesia in the development of BMPs for Tarakan. She also argued that the BMPs provide a clear solution to the decline of shrimp production caused by producer mismanagement. According to her, BMPs also provide a solution to help the government support shrimp producers to improve the quality of farming systems in the Tarakan area.

However, the praise given by the head of MFA also reveals a subtext against which the BMPs were being introduced. In follow up interviews MFA argued that a 'third party' like WWF-Indonesia was needed to intervene in the management of shrimp farming across Northeast Kalimantan. While local government recognised key issues associated with producer practices, mangrove clearance and overfishing of broodstock from surrounding waters, they were unable to unilaterally control these activities. The exclusion of other government departments also avoided a potential institutional clash between forestry agency and other technical agencies around the illegality of farming on forestry land in some coastal area. Their attempts to draw in the provincial governor had failed because of the lack of jurisdiction of the province in district affairs and the relative isolation of Tarakan – on the periphery of Kalimantan and the Indonesian state (see Visser and Adhuri 2010). For the government, the definition of BMPs by a select group of actors represents the contestation over coastal resources.

The selection of pond owners by WWF also reflects the complexity of pond ownership and decision making over shrimp farming in the region. As described elsewhere,

there is a clear distinction between producers, who are in practice farm managers, and the pond owners who attended the meeting (Kusumawati et al. 2013). WWF expected pond owners to be resource persons; providing technical knowledge into the formation of the standards and, in doing so, legitimizes the BMPs in the wider farming community. But on reflection, the group selected was more representative of the patronage networks that control ownership of the shrimp industry than it was of technical knowledge on farming. The pond owners fulfilled their 'speaking' role as hoped for by the WWF, but as commented by participants in later interviews, were better at expressing their opinions (*bisa bicara*) than grounded technical knowledge of shrimp farming.

The political positioning of MFA and the selection of pond owners rather than farm managers to represent producer interests affected the outcome of the meeting. Instead of presenting the Aceh BMPs, receiving input, and translating them into BMPs for farming systems in Tarakan, WWF was met with resistance. During the meeting the pond owners refuted the knowledge of WWF because they perceived changes to the infrastructure of their ponds as capital intensive, and fundamentally opposed to the techniques they used on their farms and, perhaps most importantly, unrelated to the immediate problems they are facing in terms of falling productivity. This was captured by one pond owner who stated during the meeting that "If you show these standards to producers, they will shake their heads." He went on to argue that producers and pond owners alike "... never think about what good [pond] construction is like. We only know how to stock, maintain shrimp, and harvest them. That's it. If shrimp disease spreads, we would like to know how to deal with it and the cure" (Pond owner, Tarakan, January, 2010). Although the advice from WWF to change the design of ponds was backed up by the expert knowledge on which they are based, it created an immediate friction because of its abrupt introduction and radical shift from current practices.

Recognizing the resistance from the producers in the formal meetings, WWF changed their strategy to enrol the producers into the BMPs process through interviews and demonstration. The interviews were designed to collect the experiences and opinions of pond owners and their workers on issues related to production. The inclusion of workers was an important step given their absence at the formal meetings. However, the selection of producers remained narrow, continuing with suppliers to MMA. It was only in 2012, after the BMPs for Tarakan were issued, that this strategy was revised and new pilot farms in Tarakan were built to demonstrate the new set of BMPs to non-MMA related producers (WWF-Indonesia 2012). We now turn our attention to the experiences of producers prior to 2012 who were involved in the pilot project run by WWF and MMA to test the applicability of the Aceh BMPs in Northeast Kalimantan while at the same time from and contributed to the design of the Tarakan BMPs.

Translating BMPs into practice

The field-testing by WWF in partnership with MMA offered an opportunity to test the Aceh BMPs, translate them to the local conditions of Tarakan. In doing so WWF hoped to avoid the politicised debate of the meetings and overcome the producers critique that the BMPs were of no relevance to the challenges they faced. The goal was to develop a shared or co-produced set of BMPs that balanced the expert knowledge

embodied in the Aceh BMPs and the practice knowledge of the producers. We now turn to an analysis of our observations of WWF's testing of three specific BMPs from Aceh, the feedback received by WWF from producers and the reasoning behind rejection, acceptance and adaptation of these standards. We compare the BMPs from Aceh, producers' interpretation of and objection to the standards, and the ways in which the standards accommodated the wider interests of shrimp production in contested coastal land.

Pond location and mangrove rehabilitation

The location of ponds is a fundamental parameter in both the international principles for sustainable shrimp farming and the Aceh BMPs standards. The standard requires local government to establish rules for the construction of ponds in and adjacent to coastal mangrove forest. The original manual developed for the Aceh BMPs stipulated a minimum buffer zone of 150 m along the seaward facing edges of ponds (ADB et al. 2007). In the Tarakan BMPs this seaward buffer was maintained, but reflecting the location of ponds in the Seyasap delta, added a requirement for ponds to maintain a 50 m buffer along river facing edges of their ponds and to re-establish mangrove in and directly around the ponds in order to "increase the environmental carrying capacity" of the extensive shrimp systems (WWF-Indonesia, 2011). To comply with this adjusted BMPs, the producers in the farm trial were asked to plant mangroves along the dyke and the raised, shallow central areas inside the ponds (see Fig. 2).

The scientific justification for planting mangroves in and around the ponds is to increase the micronutrient load of the ponds, which in turn increases the production of bacteria and plankton upon which shrimp in extensive systems feed (Alongi et al 1999; Gatune et al. 2012). Other benefits include the provision of cryptic habitat for shrimp, increased shade cover to prevent algal blooms, and improved nutrient cycling (Paez-Osuna 2001; Primavera 1997; Robertson and Phillips 1995). All of these benefits are scientifically supported and are listed on the MMA website developed in partnership with WWF (see <http://www.shrimp.co.id/eng/index.php>, accessed on 15 November 2013). However, despite the scientific motivation for implementing these measures producers expressed technical concerns about increasing the mangrove cover of the ponds.

The producers did not accept the rehabilitation of the mangroves, arguing that the ecology of the ponds would be disturbed and the productivity of the ponds would

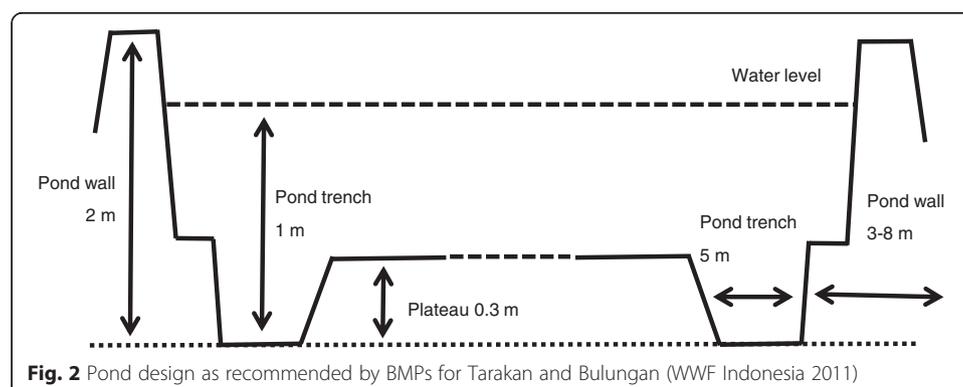


Fig. 2 Pond design as recommended by BMPs for Tarakan and Bulungan (WWF Indonesia 2011)

decline. But instead of rejecting the proposal outright, they proposed an alternative approach for planting mangroves on the dykes and inside the ponds at a wider spacing. Instead of the one to two meters spacing between trees they successfully negotiated a 10 m gap between trees. Their rationale for doing so was to protect the production of plankton, the main source of food in extensive shrimp systems, which require adequate sunlight to for photosynthesis. A secondary concern was that if mangroves become too dense dangerous wildlife would encroach on the 'forested' pond.

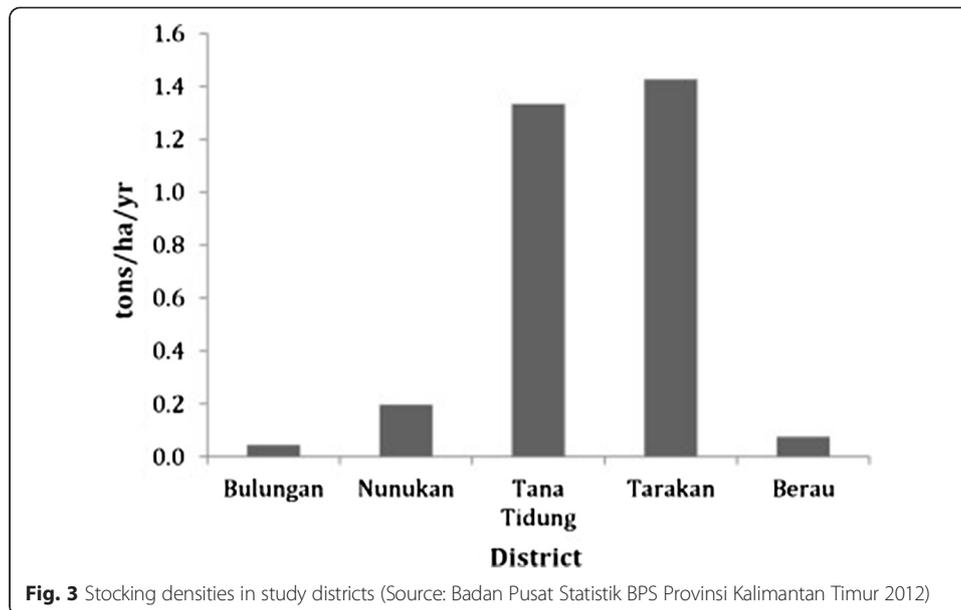
Although technically framed, the concerns of these producers were underscored by the wider politics of access and ownership to coastal land in Northeast Kalimantan. Under national law, the mangrove forest is part of production forest are (*Kawasan Budidaya Kehutanan*) falls under the ownership of the state through the Ministry of Forestry who issues user permits (Ilman et al. 2009). However, the administrative decentralization of the Indonesian state has reduced the enforcement of national forest regulation (e.g. Smith et al 2003). Once a forest is cleared, usufruct rights are granted by village leaders with customary rights over the forested land. Pond owners then need a letter from the sub-district head to acknowledge this permission before making a formal request (often in retrospect) to clear the forest and develop a pond to the district level MFA. This formal permission is often not sought because it enables MFA to levy a tax over production (*Surat Ijin Usaha Perikanan* or SIUP in Indonesian). As a result access rights remain ambiguous; as long as the producers do not convert the land back to forest, they are able to maintain their customary access agreement and avoid any legal enforcement.

The case demonstrates that although technically framed, resistance by producers to the BMP standard for pond location and mangrove rehabilitation is part of a wider conflict around access and use of coastal land. Planting trees in and around their ponds changes the status of that land and disqualifies them from continuing shrimp aquaculture. The final version of the BMPs for Tarakan and Bulungan (2011) maintained that mangrove needs to be planted around the dike, inside the ponds and around the water gate. But unlike the standards in Aceh they do not specify the exact distance between trees – leaving this up to the farmers. The standards therefore provide room for interpretation by producers, but in doing so feed into a wider politics of land-use.

Extensive traditional aquaculture practices

The BMPs standards also set out guidelines on the design and construction of ponds to create a productive farming system that reduced the incidence of disease and promote biodiversity. The both the meetings and the pilot programme gave considerable attention to the characteristics of the extensive system found in the Tarakan region in mind; open tidal water flows, variable pond size and shape, and low density in seed stocking (WWF-Indonesia 2011, p.1; see Fig. 3). However, despite the focus on these local conditions, nearly all changes to pond design and management was met with resistance.

The first concern of the producers focused on the economic rationality for large pond sizes. Capital costs for pond construction are based on distance from Tarakan and a cost per square meter, making little difference for the size of pond being built. However, other pond infrastructure is more cost sensitive. One of the biggest capital costs is the



construction of the gate through which water is exchanged and shrimp recruited to the pond and harvested. Each gate has one or two caretakers who live at the gate and manage the pond. Dividing larger ponds requires further capital investment and operational cost. But perhaps more importantly, the reduction in pond size also moves production to a higher intensity of production. The traditional extensive system is based on limited stocking of shrimp supplemented with wild shrimp recruited through water exchange (see Ilman et al. 2009). Smaller ponds mean that farmers move from a relatively less to more extensive form of production, which increases capital outlay and operational costs, as well as increasing production risk.

The proposals for pond management were based on the smaller size of ponds; including drying and liming the soil to reduce soil acidity, fertilizing the pond and managing water input (WWF-Indonesia 2011). These are well established measures for more intensive forms of production aimed at mitigating the incidence of disease by reducing the incidence of virus carrying organisms, reducing excessive nutrient loads and reducing the acidity of pond soil – all of which are also major factors in reducing the overall productivity of ponds (e.g. Tho et al 2011; Walker and Mohan 2009). However, producers state that none of these measures are feasible in their extensive systems. Contrary to the BMPs they argue that drying their ponds will trigger a higher level of acidity by drawing pyrite out of the soil. WWF countered that this can be overcome by washing, turning and liming the soil. However, this process becomes difficult because of the difficulty in ensuring that all points of the ponds are dry (Ilman et al. 2009). Other farmers do not empty their ponds at any point in the production cycle, instead keeping water in the canals in the pond during harvesting to maintain the stock of wild and juvenile shrimp.

The extensive production systems are also low cost, requiring minimal maintenance and input. The wider experience of shrimp aquaculture indicates that implementing BMPs measures on pond design and management would lead to higher stocking densities, feed and ultimately labour. Although incurring greater costs in the short-term,

Table 2 Observed and target metrics of MMA-WWF trial ponds based on BMPs (Source: <http://www.shrimp.co.id/eng/index.php> accessed on March 2012)

Metric	Observed	Target
Survival rate	< 20 %	30 %
Yield/ha	< 75 kg	100 kg
Average shrimp size	40 g	40 g
Quality of shrimp	Variable	Stable

these measures are expected to improve the overall efficiency of production in the long-term. However, the farmers see a range of risks associated with implementing the BMPs and increasing the intensity of production. First, the measures trialed in the pilot ponds by WWF failed – survival rates and yield per hectare were significantly lower and the quality of shrimp poorer (see Table 2).

Second, increasing the intensity of production is recognised by producers as increasing the risk of disease. This is supported by observations that open extensive systems have a higher incidence of viruses such as White Spot Syndrome Virus (WSSV) but with a lower virulence than in intensive systems (Dieu 2010). Producers are therefore faced with the prospect of following the BMPs under conditions of uncertainty and with a potentially higher degree of risk. They are faced with redesigning their ponds and changing pond management practices with little assurance that these practices would increase productivity.

Reflections on co-produced BMPs

BMPs are designed to combine global experiences on better management in shrimp farming, consultation with the local stakeholder and field experience of those initiating the translation process (Padiyar et al. 2012). But like any globally derived standards they are not introduced and translated in a social vacuum. The translation of the standards is a function and outcome of social relations between global actors embedded in expert networks and local actors embedded in politicised places and environments. Reflecting the findings of others, we concur that the particularities of place disrupt and transform the implementation of globally conceived standards (Foley and Hébert 2013; Roth and Dressler 2012). Our results demonstrate this on three levels: the formation of the networks that support the translation of the standards to Tarakan, the design of the multi-stakeholder meetings, and the farm-level BMPs pilot program.

The International Principles were published with the expectation that public and/or the private sector actors would use them to develop national policy or BMPs. The attempt to develop BMPs can therefore not be separated from the wider advocacy strategies of WWF as an international environmental NGO, especially given their role in the development of the BMPs for Aceh, the International Principles for Sustainable Shrimp Farming and the Shrimp Aquaculture Dialogue. Even though the adoption of the global standards should be suitable to the social, economic, and environmental conditions of the targeted area, the translation from principles to standards has led to some diversification in the content of the BMPs. However, as outlined by Mohan et al. (2010) most, if not all BMPs are closely related in content. In this sense, and supporting the findings of others (Anh et al. 2010; Belton et al. 2010; Cheyens 2011; Fransen and Kolk

2007), BMPs are co-produced in a network dominated by global expert actors with interests and agendas that transcend those of producers embedded in local places.

The multi-stakeholder meetings in Tarakan were designed to enrol local actors and manage a 'system-oriented' collaborative process of defining and codifying problems associated with shrimp farming into local BMPs. However, these meetings were unable to create a shared understanding of how aquaculture practices in extensive systems lead to environmental problems that in turn lead decreases the productivity of ponds. We argue this is because the inclusion of actors in the meetings was politicized in two different ways. First, the close relationship of WWF with MMA, that was instrumental for WWF to gain access to Tarakan, also restricted the inclusion of other processors and producers. Although no stipulation was placed on WWF by MMA, the relationship imposed a perceived obligation set by a 'pre-existing social arrangement' (McCarthy 2002) to restrict the programme to those involved in MMA's supply chain. Second, the active exclusion of pond owners and government actors in the second meeting avoided debate on the (il)legality of land use. Instead of creating consensus, the composition and content of the meetings fed into a politics of regulation and control over the environment by reinforcing global expert knowledge (cf. Cheyns 2011; Ponte and Cheyns 2013). The difficulties WWF faced in fostering consensus over the content of the BMPs reflected the relations of power within Tarakan that determine who is heard and who is not in the governance of the shrimp industry.

The politicization of BMPs during the meetings transferred over to the farm-level pilot program. The counter arguments of producers to BMPs for pond design, location and management were largely technical, but underscored by the politics of access and control over land and the distribution of economic risk to farmers rather than regulators. However, the pilot program did offer the producers an opportunity to enter into a technical dialogue with WWF over the design of the BMPs that was not possible during the meetings. The co-produced BMPs also represent the fine division between a technical outcome and the reification of highly contested political relations of aquaculture production. The examples we illustrate explore these divides. WWF acknowledges that the aquaculture practices in the region have emerged in response to the local challenges of production. However, with the goal of increasing the productivity of ponds, or at least mitigating current declines, they sought to adapt these practices to increase the relative intensity of production. But by not stipulating the distance on mangrove replantation around and inside the pond, WWF tried to minimize the issue of land ownership by 'rendering' (Li 2007) land access issues into technical terms.

Comparing the meetings and the pilot program questions the extent whether the co-production of knowledge is built upon a collective dialogue, or simply remains a 'transactional' form of co-production: 'I'll trade you this for that' (Needham 2008). It is not only the inclusion/exclusion from a process of co-production but, returning to Cooke and Kothari's 'tyranny of participation', also the quality of knowledge contributed. Who is included, how and when, then become important questions to determine why and how those participating contribute to the BMPs process at different moments and at events. The pond owners at the meetings enabled WWF to develop a meaningful dialogue and buy-in to the BMPs process because they are the primary decision makers. However, the technical focus of the meetings forced them to comment on production practices that are better captured by the experiential knowledge of farm managers. In

contrast, the pilot program provided technical input that reflects a transactional form of co-production, but provided by farm managers who are not responsible for subsequent decisions over major changes in infrastructure or investment in the ponds.

WWF has been successful in accessing complex local social networks responsible for shrimp farming in East Kalimantan. However, the results indicate that the BMPs are not only a tool to negotiate the technical dimensions of shrimp aquaculture, but create an extended 'site' of advocacy (cf. De Vos and Bush 2011). By expanding their networks, WWF can gradually extend their influence by acting as a conduit for international principles and debates around shrimp aquaculture to pond owners and agencies that have until now not been included in discussions around sustainability (Kusumawati et al. 2013). Despite the apparent failure of the multi-stakeholder process and farm trials in reaching a consensus based set of BMPs, the embeddedness of WWF in these local networks will enable on-going engagement and advocacy for conservation and sustainable production. But their ongoing success will be reliant on their ability to balance the technical and political dimensions of the BMPs.

Conclusion

Our study identifies a range of sites and events led by WWF-Indonesia, where the Tarakan BMPs were co-produced with processors, government and shrimp producers. The goal of translating BMPs into the local context through this multi-stakeholder process was to ensure both technical relevance and a higher rate of adoption and impact. Despite being supported by an international network of experts, we demonstrate that the resistance WWF faced in both the meetings and the pilot program indicates that the formulation of BMPs is far from a linear process of translation. Instead we observe that the activities implemented by WWF represent a process of co-production, through which attempts are made to incorporate and represent different knowledge in the content of the standards.

The results show that through this process of co-production, BMPs represent and perpetuate existing social relations of production, as well as a politics of environmental control and degradation. Despite the neutral scientific and depoliticized terms used in BMPs (Béné 2005), we therefore conclude that BMPs have the potential to contribute to the politicization of social and environmental issues around shrimp farming. Recognizing the political role of BMPs also reflects on the precarious role of NGOs such as WWF in leading the process of co-production. Despite the international label attributed to such NGOs, they need to engage with networks embedded in complex local political economies to co-produce locally relevant and effective standards. Close involvement in local networks may well lead to the formulation of relevant standards that will end up having a higher rate of adoption. However, the impacts of these co-produced standards may be compromised by how inclusive or exclusive the process of co-production is and the degree to which they justify existing farming practices and resource access.

Groups like WWF hope that BMPs will provide a stepping stone for farmer compliance with third party standards, such as ASC and GAA. For such hopes to be realized further research is needed to understand who benefits and who doesn't from their implementation. Doing so will make clearer the link between these different sets of

standards and over the long term may help avoid many of the criticisms of developing world and small holder exclusion leveled at third party certification schemes.

Endnotes

¹When we started the research and during the data collection, Tarakan and Bulungan were part of East Kalimantan province. During the writing this paper, Tarakan and Bulungan became part of newly established North Kalimantan province. However, we will still refer those districts as part of East Kalimantan.

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

RK designed the methodology, conducted the field work upon which the paper is based, and was the lead author of the paper. SB designed the methodology, assisted in analysis of the results and co-authored the manuscript. All authors read and approved the final manuscript.

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