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POLICY BRIEFS

Social capital and marine resources among coastal communities in eastern Indonesia

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Mr. Safrudin Amin

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About this policy brief

The disjuncture between high natural resource endowment and extremely poor socioeconomic conditions among eastern Indonesia's remote coastal communities is an important but under-theorised area of research (cf. Nasution et al, 2005). This policy paper approaches the problem by presenting two cases of coastal communities that have successfully realised the income-generating potential of accessible marine resources: long-line seaweed cultivators in Bungi Village, Southeast Sulawesi; and fishers and fish traders in Dufa-Dufa, North Maluku. Our analysis of these cases reveals high levels of community-based social capital in both locations. Social capital appears to have for new entrants to participate at various stages in the supply chain of these marine-based industries. The study also examines these fishing communities from the point of view of sustainability and adaptations to changing conditions which have reduced the environmental impact of drawing their livelihoods from the sea.

About the authors

Ma'ruf Kasim was awarded a PhD from Hokkaido University specialising in Marine and Coastal Ecology in 2006. He also holds a Masters of Science in Marine Biology from Bogor Agricultural University. Since 1997, Ma'ruf has been a permanent lecturer of the Faculty of Fishery and Marine sciences at Haluoleo University, Indonesia. He has presented at several international conferences and has published several articles in national and international journals. Ma'ruf was a team leader consultant of the Marine and Coatal Resources Management Program (MCRMP) for the region of MCMA-Southeast Sulawesi for the period of 2006-2007. His current research looks at improving the quality of seaweed cultivated by the community in Southeast Sulawesi.

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Social capital and marine resources among coastal communities in eastern Indonesia

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Background

This Policy Brief investigates poverty alleviation strategies through an in-depth study of the relative success of two coastal communities in eastern Indonesia. The variables we draw on are well established in development discourse and practice. Social capital is a community-based resource which is reflected in indicators such as trust, networks and a strong work ethic (cf. Putnam, 1993). Natural resource management includes general principles of management such as the ability to organise, coordinate and maintain good relations between workers (DuBrin, 2008), but is also concerned with the sustainable development of community-based marine resources. Governance is broadly 'the process of decision-making and the process by which decisions are implemented (or are not) implemented' (UNESCAP, n.d.).

The analysis is directed toward the broader challenge of finding innovative and sustainable ways to raise the living standards of coastal communities in eastern Indonesia. Towards this end, we identify and examine two cases of already successful coastal communities, focusing particularly on the roles of community-based social capital in income generation and social cohesion. In the final section, a number of policy implications are considered and possible government measures proposed that might encourage similar successes in other areas.

The site of the first case study, Bungi village, is located in the Mawasangka Timur subdistrict of Buton district, Southeast Sulawesi. Bungi village is relatively remote, requiring a two and a half hour drive from the provincial capital of Bau-Bau. The topography of the area features stone and sand, and at the time of writing the village itself has around 750 residents, including 186 heads of household. Most Bungi residents are ethnically Butonese, and livelihoods are based predominantly on seaweed cultivation and to a lesser extent fishing with nets, lines and traps. Bungi villagers began cultivating seaweed en masse in 1990, following the success of one or two local pioneers. Productivity increased steadily but then dropped dramatically during the 1998 economic crisis, and returned to a healthy state by 2000.

The second village, Dufa-Dufa, is located at the foot of Gamalama mountain in the North Ternate subdistrict, and is part of the urban setting of Ternate City; the provincial capital. This village can be reached by ship, or by airplane and a short taxi-ride from Ternate's Babullah Airport. Dufa-Dufa is a coastal village with a population of around 5,500 people. Nearly 75 per cent of workers are connected to the fishing trade, with land farmers comprising less than five per cent of the workforce. As will be discussed, the fishing industry in Dufa-Dufa has undergone a number of significant changes from the late 1970s through to the present.

Methodology

The primary-data gathering process began with descriptive surveys and informal interviews before employing focus group discussions (FGDs) and in-depth interviews. Each of these techniques was accompanied by first-hand ethnographic observation.

Case selection

Before selecting the two locations for the study, researchers visited and observed several other villages that possessed considerable marine resources, but whose populations, based on indicators of standards of living, did not appear to be capitalising on the natural riches in their vicinity. Bungi and Dufa-Dufa were selected as examples of villages whose main income source was derived from the sea, and where marine-based industries appeared to be thriving.

Survey and interview

After a preliminary survey of each location was carried out to confirm its suitability for the study, researchers developed a natural resource management survey questionnaire, and a social capital household survey. The former focused on community means of livelihood; existing natural resources; strategic resources utilised by the community; levels of activity among local groups; and the general role of government in each of these. The latter inquired into income levels; ownership of assets; housing conditions (the house itself, sanitation, and clean water sources); and education levels of the children within each household.

Focus Group Discussions (FGD)

In Bungi village, FGDs were conducted with three groups: owners of the seaweed cultivation areas and processing equipment; a women's group that helps with the cultivation process; and representatives of the wider community. These discussions focused on the main types and potential uses of the village's natural resources; group activities in relation to the management of natural resources; work and management problems; and community access to education, health, transportation, food, clothing and shelter.

Two FGDs were held in Dufa-Dufa; the first was with boat fishers, and the second with fish traders (known as *dibo-dibo*). Social capital was a guiding theme in both FGDs in Dufa-Dufa. Topics discussed with the fishers included their activities, income levels and income-sharing practices, and their social relationships with fellow workers and bosses. Discussions with the fish traders focused on their activities, marketing networks, and their financial and non-financial contributions to their families.

In-depth interviews

In-depth interviews in Bungi were conducted with the village head, three seaweed farm owners and a seaweed farmer. These interviews addressed levels of awareness regarding the importance of natural resource sustainability, and also levels of governmental support for the community's work activities. In Dufa-Dufa, in-depth interviews went more deeply into social capital as measured through practices such as income-sharing and marketing networks.

Findings

Harvesting marine resources

Bungi's main natural resources are seaweed, swimming crabs, and fish (*boronang, sunu, kakap, layang, kembung, ikan putih, ekor kuning*). Seaweed, the main marine resource extracted by the community, is a cultivated commodity with good potential for sustainable development. The seaweed takes around 45 days to grow and be ready for harvesting. The long line seaweed cultivation system is located within two kilometres of the village, thus minimising unnecessary outlays of time and money for transportation, and at the same time allowing for regular monitoring of various stages of the cultivation process.

Each of the 120 heads of household who collectively own the seaweed business receives an income of between IDR 1.08 and 3.24 million per month. Community incomes from sales of seaweed and various fish and non-fish resources also contribute to their prosperity. Most people in Bungi have been able to build permanent houses with corrugated iron roofing, concrete walls, and ceramic tiling or concrete floors. On top of this, they have been able to purchase and maintain home entertainment goods and motor cycles. Most Bungi residents also have their own toilets and functioning sanitation systems.

The owners of the seaweed cultivation business are the wealthiest people in Bungi. Incomes from within the community are generally high enough for families to fund their children through primary, junior and senior high school, and even in some cases university. Some within the Bungi community have enough income to purchase medicines from the community health centre (*puskesmas*), and some have been able to expand their current business ventures or to establish new ones. Overall, the Bungi community understands that protecting the health of the marine environment is essential to the sustainability of their seaweed cultivation business. Therefore, they do not use bombs or poisons to obtain fish and other marine resources.

Dufa-Dufa's fishers are generally of the opinion that there is an abundance of fish, particularly *cakalang* (a kind of tuna), and are willing to undertake the eight-hour motorboat trip around 20 times each month to catch this species. All of the Dufa-Dufa repondents consider themselves to be quite skilful at catching fish with the pole and line system, and none of them use bombs or poisons. Fishers who were asked described their catches as always reasonable (between 100 and 500 fish) and sometimes better (more than 500 fish). Most of the catches are inspected and counted by a pre-assigned middleman known as a *pelaksana*, who on-sells the catch to traders. Some of the traders then sell directly to the consumer, while a small portion smoke the fish (*fufu*) before selling them. Only a small portion of the overall yield is taken home for consumption by the fishers' families.

Social capital

The Bungi community has a village-level business group known as Gapoktan (seaweed farmer group association). There are over 80 Gapoktan members, comprising six representative groups from within the area. The group meets on the 20th of each month. Agendas for discussion often include problems relating to seaweed cultivation activities, such as levels and flows of financial capital, seaweed market prices, and pests and diseases. The Bungi community also has a women's group called Pekka (widows and elderly women's group). The Pekka

group usually holds meetings on the fifth of each month, at which they discuss issues related to their lives and livelihoods. Thirdly, the community has developed a tradition of holding regular social gatherings whose principal purpose is to offer mutual-support among members. Although similar gatherings, known as *arisan*, are common throughout Indonesia, this particular form—*arisan kawin*—is unusual.[1] Women from families who have children over 12 years of age join in this *arisan*, and the gatherings are carried out only when a child of one of the *arisan* members has a wedding.

The village community has strong family ties with mutually supportive networks within and across families. These are especially important at times when members are affected by tragedy and hardship. The high level of trust toward the village head and the community and spiritual leaders helps the Bungi residents to resolve problems with minimal conflict and discord.

As will be further discussed, the relative success and prosperity of the fisher and fish traders' families was to a significant degree underpinned by their community-based social capital. Families of fishers and fish traders in Dufa-Dufa are also relatively successful and prosperous. Fishers' incomes range from IDR 700,000 to 1.5 million each month, while in the female-dominated sphere of fish trading, earnings reach between IDR 2.5 and 3.5 million. Privately-owned assets can be placed into two categories: non-productive (house, furniture, motorbike, television, VCD player, jewelry, bank savings) and productive (boats, nets, boat motors, spice gardens and fruit trees, farm animals, small kiosks). Those who do not possess productive assets generally own non-productive assets worth less than IDR 100 million, whereas those having both productive and non-productive assets have combined assets worth between IDR 100 million and 300 million.

Most fishers and fish traders in Dufa-Dufa own the permanent houses in which they and their families live. As is the case in Bungi, these houses feature concrete walls, corrugated iron roofing, cement or ceramic flooring, and state-supplied electricity. The size of their house blocks, which is seen locally as an indicator of wealth and prosperity, ranges from 54 to 380 m2. Sanitation is quite good: all houses have toilets, most have good drainage, and most have and use trash bins for their rubbish disposal. All houses have sources of clean water from wells and/or the state-owned drinking water company. Finally, parents in these households work hard so as to support their children through school.

Many informants in Dufa-Dufa used the term *budaya sekolah* (pro-school culture). Indeed, the village statistical data shows many community members have finished senior high school (38.4 per cent of adults aged 16-60) and a significant number were university graduates (7.3 per cent). Informants unanimously agreed this acheivement would have been unthinkable 20 years ago.

Analysis

Management of marine resources

Bungi

Seaweed contains carragenan – the raw material for several products produced in the medical, food and cosmetics industries. Because of this, seaweed is an important commodity and is in high demand. The seaweed cultivation process is very simple; however, protecting it from pests and diseases requires constant

vigilance.[2] The relative ease of the cultivation process makes this a popular primary commodity for farmers. It does not require a large financial outlay, and in practical terms requires only the basic ability of tying the seaweed seeds to the 50 – 100 m long lines and securing these against currents and waves in the cultivation area. Keeping the farms clean and free from disease allows the seaweed to grow quickly, thereby increasing production.

Each long line can produce 30 kg of wet seaweed, which becomes nine kg when dried. Every month Bungi producers produce 10 – 30 long lines of seaweed; this therefore results in 300 – 900 kg wet (or 90 – 270 kg dry) seaweed. The price per kilogram ranges from IDR 9,000 to 12,000. As such, at IDR 9,000/kg the household income from the seaweed ranges from IDR 810,000 to 2.43 million per month; while at IDR 12,000/kg it is IDR 1.08 to 3.24 million.

This research shows that, from the total of 186 households in Bungi village, seven per cent earn IDR three million or more per month; 56 per cent have incomes of between IDR one and three million; 21 per cent IDR 500,000 to one million; and 16 per cent earn less than IDR 500,000. Most of those who earn between IDR one and three million are seaweed farmers, and those who earn more than IDR three million have enough capital to buy and sell the seaweed and other products, as well as to help other cultivators.

The quality of the seaweed has a large influence on its market price. The seaweed produced in Bungi is of a high quality. This is because most farmers are very attentive to the cleanliness of the cultivation, harvesting and drying steps in the production process. Buyers place great importance on how the seaweed is dried, and many prefer the Bungi produce that is dried on bamboo slats a safe distance from sand and refuse from the village. Currently, the villagers in Bungi do not process the raw material beyond drying. However, seaweed is an ingredient in a number of food products, including jelly, candies and dried foods, creating substantial potential to add further value to the product in the village and before the first point of sale. Training in the skills and methods to produce these products, which has proven successful in urban environments, would be necessary for enable villagers to take advantage of this potential.

Seaweed production has a real and positive impact on the community in terms of both its economic development and its benefits for the environment. Despite some fluctuations in the market value of the dried seaweed, even at low points the farmers' incomes are able to cover their daily and long-term needs, including education and health. When the price is high, they are able to purchase items such as electronic goods, refrigerators, motorcycles and additional speed boats.

A fortuitous aspect supporting the success of Bungi village is its semi-enclosed coastal topography, which allows farmers to grow seaweed year round. Through both the west and the east seasons, production is not adversely affected by big waves and strong currents. The lagoon-like bay protects the cultivation areas from the effects of any bombings carried out by fishers in neighboring areas. Another positive consequence of this protected environment is the stability, and sometimes steady increase, of several species of fish, such as *siganus sp* and swimming crabs (*portunus pelagicus*), which are also harvested by the community.

Dufa-Dufa

At the foot of Gamalama Mountain in Dufa-Dufa, people plant cloves, nutmeg and coconut for commercial purposes; they also plant cassava, banana and various vegetables mostly for their own consumption. However, fishing is the main economic activity.

Given that the Dufa-Dufa fishers operate a long away from their village, discussion here focuses not on coastal management but rather on the environmental impact of changes in catching technology. In the past, fishers used nets (*soma*), gill nets, hand lines, and even bombs and poison to catch various fish, including *deho, sunu* (coral fish), *bubara*, small fish such as *tude* and *julung,* and small numbers of *cakalang*. They used small boats called *sampan* or slightly larger ones with motors (*katinting*) to reach their fishing grounds located near Ternate Island, including Hiri (a small island along the natural migratory route of the *cakalang*).

However, a number of factors have forced the fishers to change their technology and methods. Fishers report that the populations of *tude* and *julung* fish have declined, while *cakalang* is now more plentiful and profitable. At the same time, the main fishing grounds to catch *cakalang* are steadily moving further and further from shore. It moved first to an area off Bacan on the neighbouring island of Halmahera, and then to the island of Batang Dua in the sea between Ternate in the east, Northern Sulawesi to the west and the Philippines Sea to the north. This area falls within Ternate's administrative zone. When at the end of the 1970s the *cakalang* grounds began to move increasingly offshore, the fishers ceased using *sampan* and *katinting* (which cannot cover these kinds of distances) and began to build bigger boats that use cylinders, have load capacities of over 10 tonnes, and carry up to 15 fishers.

The new fishing grounds are open to fishers from many areas, including illegal fishers from the Philippines. Some Filipino fishers have installed *rumpon*, which are artificial constructs that attract small fish and, in turn, larger fish such as *cakalang*. A range of informants stated that there are now around 1,000 *rumpon* in the area, and that these are significantly affecting the fishes' natural migratory habits. The *cakalang's* natural migration route takes them from Manado to Ternate waters, including the areas very close to Ternate Island such as Hiri and Bacan. However, due to the large number of *rumpon* in Manado waters, very few *cakalang* are making the journey to Ternate, forcing Ternate's fishers instead to travel further afield, to Batang Dua to fish in Manado waters.

At the end of the 1970s, Dufa-Dufa fishers discovered that the *cakalang* fish was especially marketable and profitable. *Cakalang* are pelagic fish which are best caught with the pole and line system. Their shift to this system has had a positive impact on both the financial and environmental dimensions of their fishing activities. Economically, the new catching method makes it possible for them to earn relatively high incomes, therefore enabling them to cover daily meals, school fees for their children, entertainment needs, health care and transportation.

The change to pole and line fishing has also enabled them to cease their environmentally destructive catching methods. These included the use of nets, which were harmful because they caught all fish (including small ones) and tended to damage the coral reef on the ocean floor. Their anchors also tended to destroy the coral, and the use of bombs and poison caused obvious damage. All of these methods were replaced by the environmentally-friendly use of pole and line technology.

Government support to the fishing industry in Dufa-Dufa

Until 2000, in Dufa-Dufa most of the fishing boats, and equipment such as nets and motors were obtained by fishers with their own capital. However, after 2000, the North Maluku Provincial Government and Ternate District Government established loan and grant schemes for collectives of fishers to purchase fishing equipment and boats outfitted for pole and line fishing, necessary for pursuing *cakalang*. In addition, the local government has also provided other smaller fishing boats such as *katinting* (smaller than a pole and line boat) and *pajeko*, nets, *rumpon*, and cool-boxes for fishers and fish traders. The United Nations Food and Agriculture Organization (UN FAO) also supported the industry by providing marine engines and small boats; however, the fishers considered the boats too small and not suitable for the sea conditions. Dissatisfactions were also raised over the distribution system.

Social capital

Bungi

As discussed above, the relative success of the Bungi community is in large part explained by their ability to manage and utilise their natural resources, in particular through seaweed cultivation. An important factor behind this success is the seaweed farmers group called Gapoktan. This group consists of representatives from all sub-neighbourhoods within the village, such that the entire village is represented. In the Gapoktan meetings, members share and discuss information on topics such as seed availability, aspects of the cultivation, harvesting and drying processes, pests and diseases, and market prices. The FGDs conducted in Bungi revealed that the problems most often discussed in these meetings were pests and diseases, as well as fluctuating market prices.

While not all of these problems are easily resolved, an equally important purpose of the meetings is to maintain a strong sense of togetherness. The Pekka women's group also maintain ongoing discussions, particularly in relation to the problems specific to the group members and their families. Another aim of this group is to facilitate the smooth and equitable distribution of government assistance.

The *arisan kawin* group is also notable for the sense of togetherness that it helps to generate and sustain. Any family planning their child's upcoming wedding is helped by other members of this *arisan* collective. This help is then documented by the family, and later they will help other members of the collective to arrange the wedding of their own children. Weddings require a large volume and wide variety of food and drink that would be difficult to obtain without the *arisan kawin*. Therefore the group provides strong support and a sense of certainty in the village.

A key to the strength of Bungi's togetherness is the high level of trust both among community members and towards the village head and the traditional community and religious leaders. This trust is sustained because traditional wisdom prevails in the community, particulaly in relation to important matters such as births, deaths and marriages, as well as annual harvest rituals. Community members ask for and receive help from the leaders in such matters. Traditional wisdom and cooperation (*gotong royong*) has a positive impact on community social life. It was observed that whenever village leaders struck their bell to call for community members to gather, members would soon come forward and enthusiastically engage with the topic at hand. They would then follow the advice and suggestions given by the leaders.

The farm owners and community leaders play a central role in the distribution and sharing of the seaweed cultivation areas. This adds further to the strength of the community, and helps to avoid possible conflicts between the various stakeholders, including those over traditional transportation routes. The cultivation areas are arranged in accordance with the rights of the first owners and the total number of farmers. This arrangement is maintained through an agreement involving farmers and the village-level governance institutions, including the village head.

The final source of social cohesion in Bungi discussed here is the loans given by the village and subdistrict-level traders to seaweed farmers who do not have the money to develop a business of their own. The farmer repays the loan by giving a portion of the dried seaweed in lieu of cash. This is very helpful for the many farmers who would otherwise not be able to obtain the necessary start-up capital. This loan system runs well in the village, due mostly to the high level of trust between the farmers and traders.

Dufa-Dufa

In Dufa-Dufa, the patron-client system enables the fishers and their bosses (the boat owners) to maintain relations of mutual benefit (see for example, Scott, 1972). The patron-client relationship functions not only in the work context; more broadly, it enables the relatively wealthy patrons to help the clients and their families who need interest-free loans. In return, the fishers/clients remain loyal to their boss. This loyalty includes supporting the boss' family's special activities (*hajatan*) such as weddings, wherein the fishers/clients provide their share of a catch without charge.

The patron-client relationship in Dufa-Dufa reflects the generosity of each boss toward his clients. The benefit for fishers and their families is their relatively high incomes, allowing them to meet their daily needs, build their own houses, and cover their children's education. As a result, most fishers have strong loyalty toward their bosses, such that it is very rare for a fisherman to leave one boss for another.

The patron-client relationships are also evident in Dufa-Dufa's income-sharing system. Once the catches are sold, some of the monies will be allocated for operational costs. The rest is then divided into two parts; 50 per cent for the boss, and the other 50 per cent shared equally among the boat fishers. Through this system, each fisher usually gets at least IDR 700,000 each month. The transparency of this system, along with the predictability of catch sizes and prices, further supports the relatively stable trust between fishers as clients and bosses as patrons.

In addition to the monthly income derived from the income-sharing system, the boss usually gives bonuses to each fisher of between IDR 50,000 and 200,000 and, depending on their total profits for that month, sometimes even more. There are also bonuses for fishers who work as '*jaga-jaga bak*', this being the fishers whose tasks are to keep the bait (*umpan*) in the boxes alive until they reach their fishing grounds, and, back at port after the fishing trip, to keep the *cakalang* fresh in coolboxes. Because these tasks are quite demanding, giving the *jaga-jaga bak* virtually no time to sleep, the bonus given to them is often 50 – 100 *cakalang*, which they can sell by themselves.

The *jaga-jaga bak* tasks are rotated among the boat fishers. Every month, each fisherman receives 100 – 200 *cakalang* to sell privately. As one fisherman remarked: "if I get 100 fish and sell them for IDR 10,000 each, then I make a million rupiah, and that's on top of the income of around IDR 700,000 from income sharing". Each fisher is free to bring home four or five *ikang makang* for consumption in the home, thereby also saving money that would otherwise be spent on purchasing fish.

Another form of social capital in Dufa-Dufa is the people's strong work ethic. According to several informants, this is derived from two factors: first, people's desire to put their children though school; and second, their motivation to build their own houses. These are known locally as *budaya sekolah* (pro-school culture) and *budaya bikin rumah* (pro-house building culture).

The female-dominated practice of fish trading in Dufa-Dufa relies on social capital in terms of a strong working ethic, social networks for marketing, and trust within those networks. The inceasing numbers of women fish traders (*dibo-dibo*) has had a strong impact in two domains: domestically, these women are significant economic contributors and even in some cases breadwinners; and second, in the public domain, they play important roles in the fish marketing networks. These two roles are motivated primarily by the ethos of wishing to have a nice house and educated children.

The significant role played by women, particularly wives, in household earnings appears to be inseparable from the socioeconomic dynamics of the fishing community (cf. Volkman, 1994). A *dibo-dibo* should be able to develop relations and networks with fishers, consumers and, particularly, fish distributors (*pelaksana*). The latter is very important for the traders since the *pelaksana* determines which traders get the highest quantity and quality of each catch. Boat fishers usually have a prior arrangement with the *pelaksana*, such that the latter receives a large amount of good quality fish. Back at the port after each catch, the fishers' wives are prioritised in fish distribution. Indeed, the fishers themselves can choose fish they consider to be of the highest quality, and then direct the fish distributor (*pelaksana*) to give those fish to their wives.[3]

Trust within these networks also acts as a form of social capital. Because of this, a woman trader (very few are men) can, even without financial capital, gain good earnings. A trader can simply approach and ask the *pelaksana* for some fish to sell, and after selling all of the fish will be expected to pay the *pelaksana* as soon as possible. Those who violate the rules of this arrangement, for example by not paying the *pelaksana* or only paying a portion and making various excuses, will on the next occasion be given only a small amount of fish. If the trader violates the rule again, she will no longer receive any fish to sell. This is the mechanism of maintaining trust as a function of social capital in the marketing process. With this sanction and rewards system, mutual trust in the marketing network is both maintained and strengthened.

Finally, the Dufa-Dufa community are strongly attached to the *arisan* system of social reciprocity. Fishing households are often members of more than one *arisan*. Many boat fishers have their own *arisan* with other fishers who work on the same boat. As a fisherman told Amin, "if there are 10 on our boat, and the yield after operational costs is IDR 10 million, the boss will retain IDR five million and the other IDR five million is for the fishers. However, before sharing the IDR five million among the fishers, we set some aside for *arisan*." Therefore fishers can count on periodically receiving a large sum of money.

Arisan is also popular among the fishers' wives and traders. For example, one informant, Lela, does not have any savings in the bank but is active in a number of *arisan*. She joins a special *arisan* among fish traders, as well as *arisan pasar* (which includes non-fish traders in Dufa-Dufa market) and a family network *arisan* (based on one's heredity).[4] In the family *arisan*, each meeting she gives IDR 110,000, and periodically receives IDR two million. Lela stated that 'our family *arisan* has around 60 members. It doesn't involve receiving a lot of money, but it does mean that each month we can meet each other and learn about each other's needs'. Several participants in the Dufa-Dufa FGD and in-depth interviews mentioned the family *arisan*. There are reportedly also *arisan* based on members' place of origin (such as Tidore and Hiri).

Social capital in the form of *arisan* prevails in the whole Dufa-Dufa community, including those involving farmers and those with other non-fishing occupations. One is called *arisan rumah* (*arisan* for house building).[5] There are several other forms of reciprocal social capital that assist with the coherence and functioning of the community as a whole.[6] All forms of social capital discussed above support the community and help them to maintain their social cohesion and solidarity, and contribute substantively to economic development at the local/community level.

Key findings and recommendations

Long-line seaweed cultivation in Bungi Village, Southeast Sulawesi

The traditional authority vested in the village head provides stability and continuity, which in turn helps to generate and sustain the deep reserves of social capital that have underpinned the village's successful foray into the seaweed cultivation industry specifically, and economic development more broadly. For example, the zoning of the seaweed farms is managed by the village head and community leaders. This is important in order to avoid conflict among the farmers. The village head also supports the widow and elderly women's group, and importantly the village head's wife is the supervisor of that group: along with support systems such as *arisan kawin*, this is an important source of social security.

Recommendation 1: The Buton District Government and Southeast Sulawesi Provincial Government should seek to understand the role played by the village head in developing the seaweed industry in Bungi, with a view to identifying successful strategies that could be replicated in other villages with appropriate conditions for cultivating seaweed.

If the raw seaweed product that is harvested could be further processed and packaged in Buton, this would imply considerable scope for increasing profitability for producers and income for the district as a whole. A major step in this direction would be to improve on and expand the reach of the current drying processes.

Recommendation 2: The Buton District Government should explore the possibilities for further processing of the raw product including sourcing start-up capital and the likelihood of attracting local investors.

Fishers and fish traders in Dufa-Dufa, North Maluku

The patron-client relationship functions well in Dufa-Dufa to support the economic development of fishing communities. Interest-free loans and other forms of largesse provided by fishing boat owners to fishers who work on their

boats create strong bonds of reciprocity between boat owners and crew that manifest in social relations beyond the sphere of work itself.

Recommendation 1: The Ternate Municipal Government and the North Maluku Provincial Government should attempt to disseminate information about the success of Dufa-Dufa's fishing industry, and the likely reasons behind it, to other villages that have not enjoyed similar success.

Ternate fishing grounds are in many cases exploited by illegal Filipino fishers, and their use of *rumpon* to catch fish has altered the natural migration routes of the main fish species harvested at a significant cost in catch, time and fuel to Dufa-Dufa fishers.

Recommendation 2: The Ternate Municipal Government and the North Maluku Provincial Government should cooperate to exercise tighter controls on illegal fishing, including by removing *rumpon* that are illegally placed in Indonesian waters by foreign fishers, and working with local fishers to monitor illegal fishing. One way of doing this would be to establish posts near fishing grounds, for example on Batang Dua Island, providing both a base for patrolling activities by sea police, and fish cold storage facilities. This would thereby greatly reduce the amount of time fishers spent traveling to and from the fishing grounds to unload their catch. It would potentially generate new markets, and new economic opportunities in transportation of fish from the cold storage to new markets.

Women who work as fish traders make important contributions to household economies. They rely only on social networks and strong credit relationships with fish distributors, which allows them to earn high levels of income even without substantial financial capital.

Recommendation 3: The government should support their activities by providing and upgrading market infrastructure with cool-room facilities, improving transportation links and coordination to allow distribution to markets further afield, and disseminating knowledge and technologies for preserving fish.

More generally, the social and economic practices detailed above are important in relation to strategies for coping with and adapting to rapid changes in the natural environment (see Adger, 2003). Related to this, there is a need to compile and/or make more readily available the research and results of related projects and practices in eastern Indonesia (see Curnow et al., 2007).

There is substantial scope for the marine resource harvesting practices and marketing and financial models that have emerged around them to be disseminated, trialed and modified in other, less economically-successful coastal communities in eastern Indonesia.

Notes

[1] *Arisan* is the general term used for a range of social collectives whose members contribute an agreed sum to a pool of money from which each member is provided with a lump sum payout on a regular, rotational basis. In this way, members are able to enjoy the benefits of a 'compulsory' savings scheme. However, members of *arisan* typically point out that the benefits are as much social as financial, strengthening bonds between the group's members.

[2] With this issue in mind, a drying system known as 'the vertical technique' has reportedly been developed elsewhere in Eastern Indonesia under the supervision of Professor James J. Fox (ANU).

[3] It must be acknowledged that this arrangement is not ideal for fish traders who are not wives of the fishers.

[4] In Dufa-Dufa market, Ms Lela joins in daily, weekly, and monthly *arisan*. In the daily *arisan* she gives IDR 10,000 every day; every day it is one member's turn to receive; and around every three months she too receives a IDR 1 million lump sum. She puts in IDR 75,000 each week to the weekly *arisan*, and receives over IDR 1 million about every two months.

[5] This is an important source of social capital because it not only motivates people to build their own house but also facilitates their ability to do so. In this *arisan*, members collect building materials or money to the equivalent value of, for example, cement or *seng* (corrugated iron). As such, when a member wishes to build a house, a number of the materials are soon readily at hand.

[6] These include *bari* and *liliyan*, which help a household to perform a social event such as a wedding reception; another is called *tahlilan*, which is a gathering after a member of a village member's family has passed away; yet another is *rorio*, this being money or other material (usually food both raw or cooked) given to the people or family who have a gathering, or what locally is called *karja.* Another form of social capital is *baku nyoji*; here money or other materials are given to a family who has an unwell member either at home or in hospital.

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