

1. Title: Promoting the Blue Economy in Community Participatory Based Industries for Poverty Eradication

Subtitle: Indonesian Blue Economy Policies 2012: Threats and opportunities in Nusa Penida

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Abstract

The Indonesian Government, as part of its fisheries industrialisation policy, aims to be the biggest exporter of seaweed in the world. It has adopted blue economy policies to mitigate potential negative effects of increasing production and harvesting from its marine environments.

This research used seaweed farmers from Nusa Penida, a small group of islands off the coast of Bali, Indonesia, as a case study. The islands are arid and the small population has historically consisted of poor farmers and fishers. In the late 1980s seaweed farming was fostered by a private company and later by local government and became an alternative source of income for local people. The experience of these seaweed farmers illustrates the complexity of implementing blue economy policies in specific community contexts.

Government policy, current implementation and regulation of production from seaweed farms in Nusa Penida, the activities of local Non-Government Organisations (NGOs) and the experiences and opinions of seaweed farmers were examined. Fifteen seaweed farmers contributed information about their backgrounds, aspirations, successes and failures in farming in this area.

However, threats to the viability of the seaweed farming industry cause pessimism among these farmers despite their current prosperity. Threats include pollution from increased tourism in their area, employment opportunities in adjacent tourism developments attracting young people away from their industry, inadequate marketing support for related abalone production, increased disease and pest fish in seaweed.

The experience of these farmers demonstrates the close relationship between on and off shore activities and between competing industries as well as the value to long-term environmental health of educating workers. The involvement of NGOs in delivering education and training is explained. Additionally, the changes in behaviour of those farmers with strong knowledge of the importance of maintaining pristine ocean ecosystems for the sustainability of their farming activities are identified.

The farmers reported receiving "good incomes" of approximately AU\$160-480 per month. Some farmers' incomes were improving because of increased prices for seaweed, some had received training that increasing their knowledge of optimal conditions for seaweed production and quality assurance. This training has resulted

in an increased desire to protect their environment. Some have reported funding tertiary education for their children from their increased resources.

Keywords: Seaweed farming, marine protected areas, Indonesia, blue economy, fisheries industrialisation.

2. Introduction

The focus of this research is on the implementation of blue economy practices on the Indonesian islands of Nusa Penida. These islands are located in the pristine waters of the island of Bali. The map below shows the location of the island, its marine protected area (MPA), main villages and coral reef.

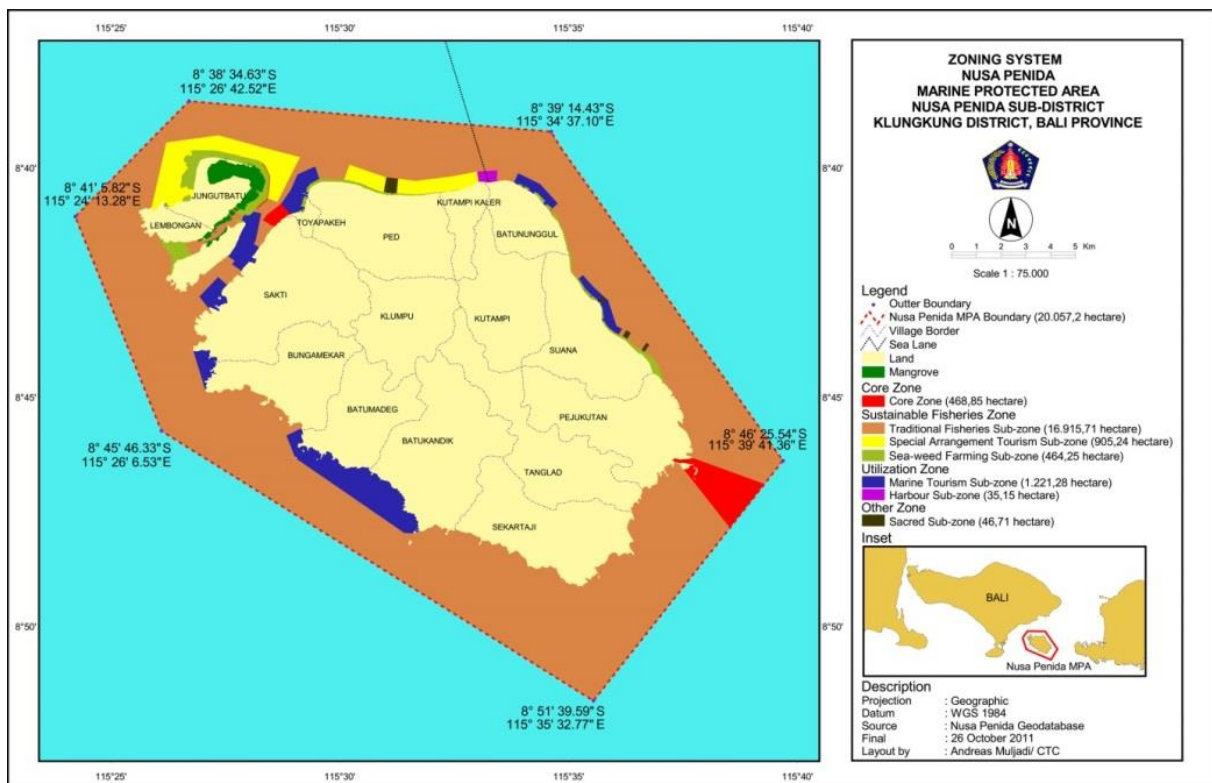


Figure 1 Nusa Penida Marine Protected Area (Coral Triangle Center 2011) (with permission)

The major source of employment in Nusa Penida is in commercial seaweed production including Kottoni (*Kappaphycus alvarezii*) and Spinosum (*Euचेuma dentilacum*) (Statistics of Klungkung District 2013; Sutardjo n. d. ; Welly et al. 2012). The major method used in the farming is off bottom (*tancap dasar*) growth of seed material on ropes attached to wooden stakes, harvested monthly. Nusa Penida was

chosen as a blue economy policy pilot project in 2012. Indonesian blue economy policy is a response to Indonesian national fisheries issues, including overfishing and ocean environment degradation from human activities.

The definition of blue economy used for the purpose of this research is based on Gunter Pauli's work which influenced the Indonesian government's policies. Pauli's work in line with other international institutions including United Nations Environment Program (UNEP) UNEP stresses the importance of green growth, environmentally friendly practices and socially inclusive methods and goals. UNEP and the Small Islands Developing States (SIDS) see blue economy as developing an ocean based economy (utilising marine resources) in a sustainable development paradigm (Pauli 2010; SIDS 2011, 2014; UNEP 2012; MMAF n. d.). Sustainable development has been defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (United Nations 1987). Pauli pointed out the importance of zero waste concepts, originally applied on land. Zero waste concepts not only include zero pollution but the utilisation of this waste to produce other economic goods creating additional employment and increasing social equity (DEKIN 2012; Pauli 2010; Sutardjo n. d.).

In this paper I will demonstrate that considerable progress has been made in Nusa Penida in the implementation of blue economy practices including in the area of zero waste as proposed by Pauli (2010) to create more employment and to increase social equity. The research was part of a larger investigation into the impacts of marine and fisheries industrialisation and blue economy implementation across tuna fisheries and fish processing in Cilacap (Central Java) as well as seaweed farming in Nusa Penida (Bali). The focus here is on impacts in Nusa Penida.

3. Practices of blue economy approaches toward national food security and poverty eradication

The Ministry of Marine Affairs and Fisheries (MMAF) signed a MoU with Gunter Pauli to implement blue economy concepts in Nusa Penida in 2012. The slogan for this intervention was: “the realisation of creative and innovative economic growth and development based on a clean and sustainable marine and fisheries industry by involving community and business” (Sutardjo n. d. , p. 105). The intervention involved a plan to be developed by local and multi-ministerial collaboration and the inclusion of private institutions to identify zoning issues; a master-plan for transportation infrastructure, telecommunications, clean water and energy; an environmental impact assessment by the Environment Ministry; a business plan by central and local government, investment promotion both nationally and internationally, and service improvements particularly for the gaining of investment permits. Specific areas to be investigated for the development of a blue economy in Nusa Penida included:

- Marine ecotourism. The highlights of Nusa Penida’s marine tourism are mola-mola (sun) fish and manta rays, along with a beautiful coral reef that attracted tourists, both local and international, to dive, snorkel and conduct other marine-based activities. Nusa Penida has further potential in developing water sports and other multiplier businesses including hotels, villas, restaurants and art shops.
- Seaweed farming. The plan focussed on developing seaweed processing and implementing zero waste, by using seaweed waste for food, pharmaceutical, medicine, and chemical materials. Nusa Penida’s seaweed farming also has potential in terms of visits and tours as part of its marine ecotourism.

- Fisheries. The plan was to develop fish processing activities in Nusa Penida applying the blue economy zero waste models to create value added products including food and snacks. Recreational fishing was also a part of the plan (DEKIN 2012).
- Other sectors for blue economy implementation included: shrimp aquaculture; alternative new energy such as wind, ocean wave, and biogas; animal husbandry and agriculture (Sutardjo n. d.).

The seaweed industry sectors targeted as part of the blue economy initiatives consist of: food production including carrageenan, ice cream, sweets, salad, jam, syrup, wafer, milk, and jelly; pharmaceuticals including soup, medicines, ointment, dental products, hair cream, cosmetics and medicines; and derivatives industries including textile printing, ceramic, poultry feed, fertilizer, paper and paint (Sutardjo n. d.). These industries would result from the implementation of zero waste as proposed by Pauli (2010).

Several respondents, including MMAF1 and MMAF3, stated that although initially Nusa Penida was to be the main site example for the implementation of blue economy principles this changed in 2014 and Lombok was nominated for further work in this area. The Lombok project is supported by the Food and Agricultural Organisation (FAO) and was renamed “blue growth” (Soesilo 2014; FAO 2014a). However there is no official report or journal paper related to developments in Lombok as it is the initial stages. So although Nusa Penida has not continued to be a high priority location, it was the focus for the first years of blue economy implementation effort. In this research it is seen as a useful project to make a preliminary examination of experiences and expectations from some of the targeted communities, in this case, seaweed farmers.

The world seaweed industry, valued at AU\$6.2 million annually, with 7.5-8 million tonnes production and increasing at about 10% annually (FAO 2014b, p. 26) is also the biggest sector in Indonesia's aquaculture fisheries sector. In 2013 it totalled about 3.4 million tonnes (over 15% of national fisheries product export), and placed Indonesia as the second biggest seaweed producer in the world after China (MMAF 2013). The latest results for Nusa Penida specifically, indicated that it contributed a relatively small portion of 106,188 tonnes in 2006 (BKPM 2015).

This research investigated the impacts of blue economy policies on seaweed farmers in Nusa Penida. The research questions were:

- What is the current status of the Indonesian Ministry for Marine Affairs and Fisheries' policy regarding fisheries industrialisation and Blue Economy?
- What does the policy and its implementation program promise, particularly with regards to sustainability and environment degradation?
- What are the impacts of the policy and implementation program on the affected communities and the environment?
- How can any benefit be increased and any negative impacts of this policy and program be mitigated?

Semi-structured interviews with fifteen seaweed farmers in Nusa Penida (see table 1 for demographic data) were conducted to investigate what impact the introduction of the policies of 2011 and 2012 had on their marine practices and what recommendations they might make, relating to these policies. In order to obtain a broader picture of the policy, interviews were also conducted with two key informants; a local (DKP2) and two national government officials (MMAF1 and MMAF3).

Total respondents (Seaweed Farmers)	15
Gender	
Male	11
Female	4
Address	
Nusa Ceningan Island	2
Nusa Lembongan Island	10
Nusa Penida Island	3
Age	
30-39	7
40-49	6
50-59	2
Ethnicity	
Balinese	15
Farming Methods	
Off Bottom (<i>Tangkap Dasar</i>)	15
Education Level	
No Education	1
Primary School (SD)	4
Junior High School (SMP)	1
Senior High School (SMA)	8
Tertiary Degree	1

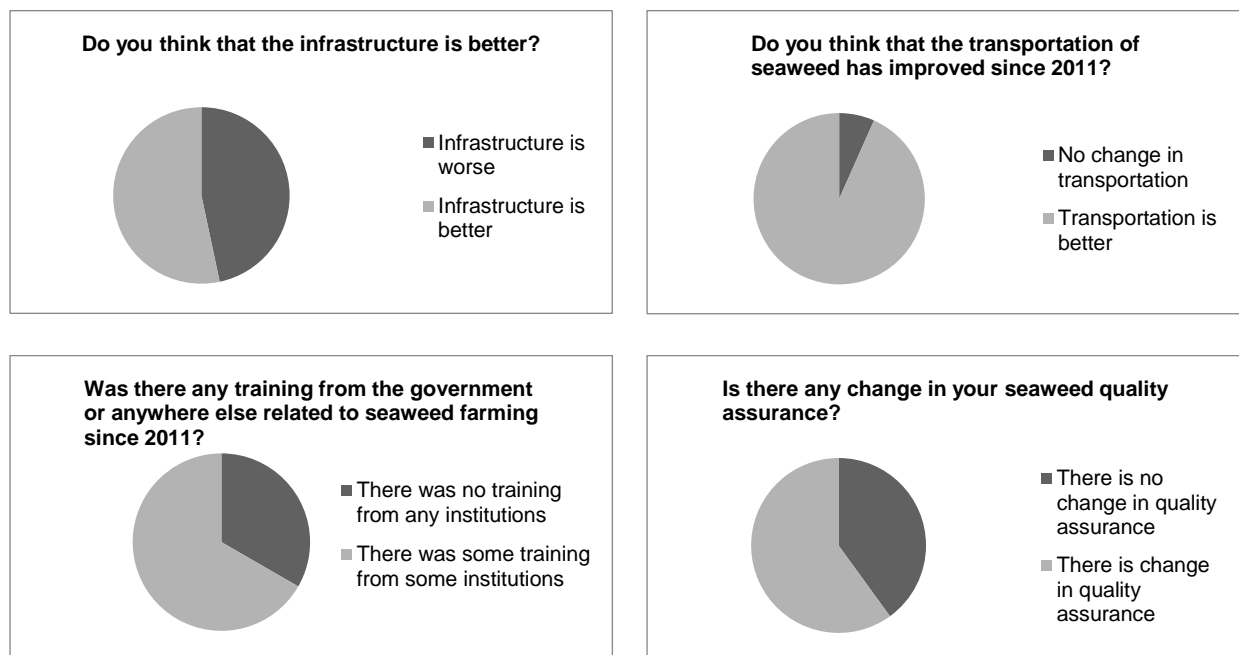
Table 1 Selected demographic characteristics of the respondents

The interviews ascertained seaweed farmers' views using the indicators developed by MMAF and Phillips for FAO (DEKIN 2012; MMAF 2011, 2012, n. d.; Phillips 1990; Sutardjo n. d.). The indicators are: policy development involvement, production, transportation, training, income, exchange value-“nilai tukar nelayan” (NTN) seen from saving, poverty, competition, quality assurance, infrastructure, investment, job opportunities, social equity and the environmental impact of their activities. The aim of interviews was to identify changes or impacts happening in communities and to detect if these came from blue economy policy implementation. Data was obtained in October-November 2014. Most respondents were recruited using purposive convenience and snowball sampling. The interview data was compiled using Microsoft Excel Spreadsheets and presented in tables, charts and graphs.

Other data collected and analysed, included policy documents from: ministerial media releases; official government documents such as the National Bureau of Statistics (BPS), MMAF statistics; and previous research reports.

3.1) Opportunities

Opportunities of blue economy policies in collaboration with fisheries industrialisation experienced by seaweed farmers interviewed in this research are shown in figure 2. This demonstrates a real positive change relating to some important policy indicators at the community level including: infrastructure, transportation, skills from training, quality assurance, competition, and reduction in the poverty level. Care must be taken in the attribution of all these changes solely to the fisheries industrialisation and blue economy policies of 2011/2012 as national and regional development has been ongoing and some previous policies are likely to have contributed to these experiences. However, these are major positive changes in line with Blue Economy aims.



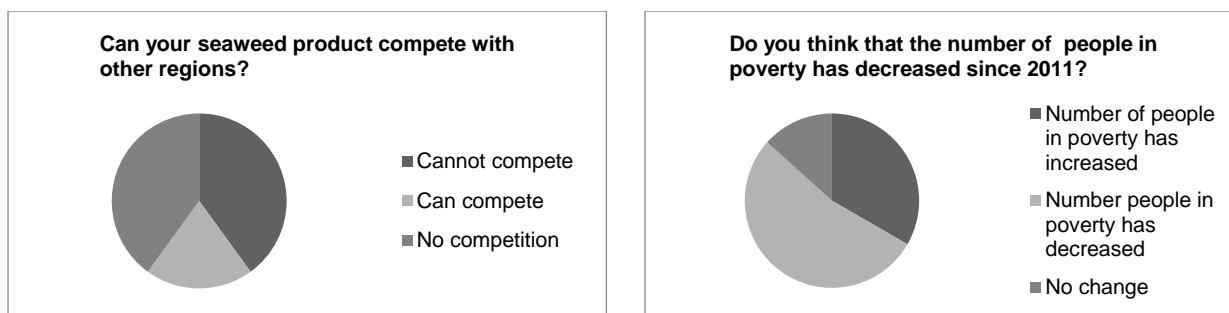


Figure 2 Policy indicators showing positive changes

A majority of seaweed farmers reported that Nusa Penida infrastructure has improved, including roads, and fast boats to the mainland (enhancing the transportation of the seaweed harvest). Middlemen or seaweed collectors (*cendak/ pengumpul/ kulak/ tengkulak*) play important roles in marketing seaweed in Nusa Penida similar to Achmad (2012); Firdausy and Tisdell (1991) findings. Seaweed collectors come to farmers in the harvesting season and buy the product directly from the farmers. It is distributed to bigger seaweed collectors in Bali and then transported to Surabaya or Jakarta to be processed and exported overseas. Most farmers stated that the number of seaweed collectors is enough to absorb all the product at every harvest. However, there are some problems related to price which are explored in the threats section below.

Training from government or other institutions including local NGOs such as the Coral Triangle Center (CTC), was acknowledged by respondents as a major influence on seaweed practices in Nusa Penida. The majority of respondents stated that they have received training including in new planting techniques and seaweed processing into food products (mostly attended by female farmers). The said training was usually conducted through the farmers groups (*kelompok*), therefore they said seaweed farmers who were not members of such a group did not benefit from this

training. Farmers who were not members of such groups stated that they learnt the skills from their parents or other family members.

The implementation of an integrated seaweed and abalone farming program was provided by respondents as an example of a new practice which was initially positive but failed because the opportunity was not adequately investigated and supported. Respondents reported that they received training from MMAF staff and implemented the practices in their farms and they found that abalone grew well. However they had failed to identify marketing channels for the abalone. Therefore, they could only sell the abalone at a very low price and discontinued raising them. Respondents (e.g. MMAF1) pointed out the importance of linking production, processing and marketing. This poor result is common where programs are short term and without longer term evaluation and development. However it indicates that continued, alternative or enhanced livelihoods for seaweed farmers might be available if adequately supported and resourced.

Seaweed farmers interviewed stated that quality assurance is a very important part of their activities. Quality influenced the price of their product, so the better quality the higher the price they received. The majority of respondents stated that they had changed the way they handled their post-harvest product, including improvements in drying the seaweed using mats after training (in the past they dried their seaweed on soil or sand). Additionally they now use the “para-para” (a specific tool part of MMAF fisheries industrialisation policy) to dry seaweed in the sun.

A significant number of seaweed farmers stated that there was no competition in their industry in Nusa Penida. The available middlemen or seaweed collectors absorbed their whole harvest. Occasionally, even before harvest time, seaweed

collectors approached farmers to pre-sell their harvest. Farmers also stated that their product was higher in quality than other seaweed products in the region because it had less chemical contaminants and this is preferred by buyers.

Seaweed farmers also reported a profound decrease in poverty in Nusa Penida since seaweed farming and tourism were introduced. One farmer (SF12) reported his capacity to send his children to university as evidence of his prosperity as a seaweed farmer. A local Klungkung Fisheries official (DKP2) added that poverty is now centred in the mountains or hills away from the coastline, where the locals still depend on agriculture in dry and arid lands.

Most seaweed farmers stated that their activities do not have any adverse impact on the ocean environment (almost zero waste), as all the seaweed is sold, except for pest growth (mainly algae) which is usually thrown on to adjacent land. One respondent (SF3) stated that sometimes farmers use the pest algae as compost or fertiliser for their coconut trees and consideration is being given to developing this into a commercial fertiliser product. In fact, farmers state that their activities are good for the ecosystem, demonstrated by the increasing number of fish in the farming areas. They believe that their farms are the nursery ground for small fish. One respondent (SF7) reported that in the past, coral was damaged to open up new areas for seaweed farming. However these practices have been discontinued since the Nusa Penida marine protected area was introduced. Further research is needed to see whether the processing activities in the seaweed factories receiving Nusa Penida seaweed have implemented zero waste practices in line with blue economy policies.

Although not specifically mentioned by respondents, but observed by the researcher, a significant number of women were employed part time in the seaweed farming industry, as farmers, but particularly in new processed products such as: seaweed chips, sweets, and soaps. This appears to be empowering a previously disadvantaged group in the community and part of this is the result of a community empowerment program organised by Poeloengasih et al (2013).

Other opportunities related to new technologies for Nusa Penida focus on the provision of electricity. Nusa Penida has benefitted from several initiatives in this area, including an extensive wind farm (*Pembangkit Listrik Tenaga Bayu*) installed by a Dutch company as well as a solar panel installation, in harmony with blue economy principles, and a cable underwater from Bali. According to the researcher's observation and interviews, these initiatives have failed because there was no provision for ongoing maintenance. Islanders currently resort to expensive and polluting diesel powered generators for their electricity needs (Alliance for Rural Electrification 2012; Atmodjo 2012; The Jakarta Post 2008; Manik et al. 2014).

An unexpected positive outcome identified by respondents with the implementation of the blue economy in Nusa Penida was the strengthening of local culture. "*Awig-awig*" is local written and oral knowledge which has been believed and applied by local people in Nusa Penida for centuries which is similar to that described by Satria, Matsuda, and Sano (2006). One important aspect of "*awig-awig*" is conservation. "*Awig-awig*" regulates the management of mangroves, and coral reefs, and prohibits the killing or catching of local birds. The researcher observed the success of this prohibition from the thriving number of birds in Nusa Penida in contrast to other regions in Indonesia. There is an obvious advantage in increased commitment to blue economy practice in maximising the incorporation of local knowledge in

conservation such as “*awig-awig*” with the implementation of blue economy policies. Such local knowledge could contribute to conserving the marine environment elsewhere and should always be taken into consideration for incorporation into the implementation of blue economy policies. This is an example of “bottom up” policy development, based on the knowledge of locals about their environment.

3.2) Threats

Seaweed farmers reported negative trends on a number of indicators including production, income, exchange value (seen by saving), investment and job opportunities which are shown in figure 2.

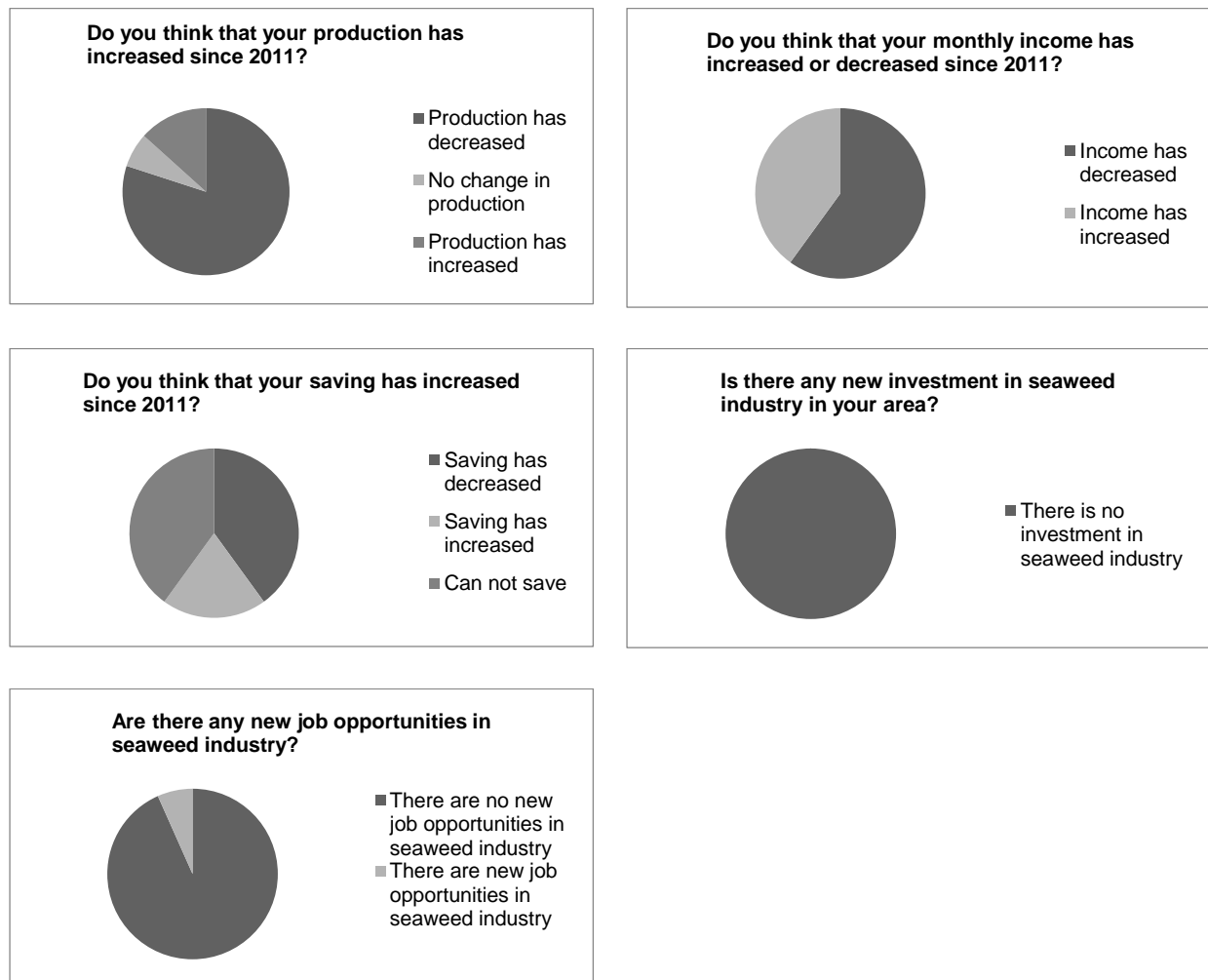


Figure 3 Policy indicators showing negative change

The majority of seaweed farmers interviewed reported that their production (harvest) has been decreasing, as supported by Nurhayati (2011, 2009). One respondent (SF1) stated that the decrease ranged from 500kg before 2011 to 200 kg in 2014. Another respondent (SF2) supported this statement and reported that in 2011 she produced about 1 tonne in one harvest, now he only produces about 500-600 kg. Another respondent (SF7) stated that her decrease is also about 50%. She added that in the past they could harvest seaweed twice each month, but now it was only once. Some farmers stated that occasionally they did not produce any seaweed at all because it has been eaten by fish or destroyed by disease (*ice-ice*).

The main reasons for the seaweed production decrease identified by farmers interviewed are:

- Pests including fish such as black jack (ikan tabasan/naso) and leatherjacket (ikan pogot) that eat the seaweed, as well as other pests or “gulma” particularly other endemic seaweed which is parasitic on the farmed seaweed, for example *Sargassum* sp. and *Ulva* sp (WWF Indonesia 2014). One farmer (SF1) stated that now he has to use nets around his seaweed to avoid fish eating it. Another farmer (SF4) added that he has stopped farming currently as the fish attack is too high, and all of the seaweed is eaten if he plants it.
- Diseases, particularly “ice-ice” or locally named “*busuk batang*” (rotten stem), is now commonly experienced by farmers, and has become the biggest issue for them. Farmers are requesting government conduct scientific research in an effort to overcome this problem.
- Low quality seed (*bibit*). One respondent (SF6) reported that the quality of seaweed seed has been degrading over time.

- Bad weather has increased including rain and extreme heat. Too much rain, and high waves impact badly on crops according to two respondents (SF6 and SF8) and this factor is supported by Largo (2001).
- Environmental degradation has resulted from the development of hotels, villas, and boats in Nusa Penida according to respondents and this is supported by Charlie, King, and Pearlman (2013); Charlie, Pearlman, and King (2011).
- Farmers also reported decreased incomes and reduced ability to save money, ranging from 25-75%. The main reasons given are: inflation and production decreases. As a result, farmers report accumulating debt to buy seed, ropes and other seaweed farming tools.

None of the farmers identified the possibility that increased pests and disease may result from the clearing of habitat or the use of mono-culture in seaweed production. Such negative results have been reported in evaluations of seaweed farming practices and also in literature on aquaculture and seaweed farming including Phillips (1990).

The farmers all said there were no major new investments in the seaweed industry in Nusa Penida. However, they said there were some mostly farmer group-owned, new small scale industries that were entirely operated by women. These were partly the result of a program implemented and reported by Poeloengasih et al (2013) to train people in new processing opportunities. Three respondents (SF6, DKP2 and MMAF1) reported that in the past there was an issue or belief that a seaweed processing factory would be built in Nusa Penida, but it was cancelled without clear reasons being known. They stated that in their opinion these reasons might include:

the small land holdings (Nusa Penida consists of small islands), a lack of other infrastructure facilities, the trend of decreasing production and/or a lack of initial funding from government.

Varga et al. (2013) argues that the impact of blue economy implementation is the creation of employment and the growth of other related industries. In contrast with Varga's propositions, a significant number of seaweed farmers reported that there were few job opportunities in their industry, as no real investment in modern processing factories has been made. They said that the decrease in income and production has contributed to the decrease of interest of local people in seaweed farming, particularly amongst young people. A number of farmers have moved into the booming tourism industries. This causes a problem with the regeneration of farmers as young locals are reluctant to enter the seaweed farming industry. According to some respondents, they preferred to enter tourism after graduating from high school, even though the income from farming was still slightly higher than low-level tourism industry jobs (the farmers reported receiving approximately AU\$160-480 per month), such as stewards or cooks. This trend was identified as early as 1996 by Long and Wall (1996).

The impact of the tourist boom in Nusa Penida since 1990 (Charlie, King, and Pearlman 2013; Charlie, Pearlman, and King 2011), is believed by some respondents (e.g. DKP2) to threaten the seaweed farming industry. Hotels were said to impact negatively on the sea environment particularly from their sewage and chlorinated swimming pool discharges that reduce water quality. This problem has been identified as a common issue in the Indonesian tourism industry, particularly in small islands, by Charlie, Pearlman, and King (2011); Charlie, King, and Pearlman (2013); Gureau (2009) and Ruchimat, Basuki, and Welly (2013). In addition to

pollution they reported detrimental effects to coral from tourism activities such as diving, snorkelling and releasing anchors on to the sea floor. The increasing number of hotels and villas using more coastal land has reduced the availability of local farmer's space to dry their product.

An important threat to the success of blue economy policy implementation in Nusa Penida is the lack of electricity generation capacity. The current use of diesel products is not appropriate and is expensive. The failures in alternative electricity provision have been due to a lack of maintenance. Before major investments such as underwater cables and wind farm construction are undertaken it is essential that future provision in terms of skills and resources for the maintenance of such infrastructure is identified and incorporated.

Other possible threats result from the social inequity between residents in mountain areas who rely on agricultural activities and are much poorer than coastal communities who are employed in seaweed farming. This was identified as early as 1992 by Firdausy and Tisdell (1992). It is not possible for poor people from mountain areas to farm seaweed because of limited suitable areas, although they are willing to do this. One respondent (SF2) reported that to buy a 5 are space for seaweed farming can cost about IDR 10 million. Also legal ownership of farming space is not yet available as coastal areas are owned by government, so rights of farmers are informal. Conflicts between families about borders were reported by one respondents (SF12).

3.3) Recommendation by Seaweed Farmers for Improved Blue Economy Policy Implementation

Seaweed farmers made a number of recommendations based on their experience of blue economy policy. They wanted more programs specifically related to the seaweed industry, these included development of new resistant seaweed seed with immunity to diseases such as 'ice-ice', the development of processing activities on the island, and the enhancement of ecotourism in the seaweed industry to the benefit of seaweed farmers (there is a concern that seaweed farmers don't currently benefit although their farming areas are used by tourism providers for tours). They would like water quality improvement by controlling waste and pollution from hotels, boats and households, and the development of more areas specifically for seaweed farming and drying. They would like to enhance seaweed quality to ensure they could get better and more stable prices including developing a logistics organisation like The Bureau of Logistics (BULOG) for seaweed harvest and marketing.

In the case of the abalone project the farmers identify the need for government to facilitate improved marketing so that they could find more buyers for their abalone and receive a better price for their product

They would like micro-credit or loans to develop their businesses, and more training in better seaweed management. They asked for better coral reef management because they believed this would contribute positively towards their farm health. Good governance was also seen to be important to mitigate future possible conflict between seaweed farmers and other stakeholders in Nusa Penida including the tourism industries and fishers. This was also identified as an important issue by

researchers such as Charlie, King, and Pearlman (2013); Charlie, Pearlman, and King (2011).

4. Funding Sources

This research was conducted as part of a Master of Philosophy program at University of New South Wales (UNSW) Canberra, funded by a University College Postgraduate Research Scholarship (UCPRS), with additional funds from the Australian National University Indonesia Project Research Travel Grant 2014 for field work in Indonesia.

5. Conclusion

There are complexities unique to each industry, community and nation in implementing blue economy policies. Opportunities and threats to implementation are identified by this research among seaweed farmers in a small group of islands of the Republic of Indonesia. Opportunities already realised in this community are in infrastructure, transportation, skills from training, quality assurance, competition, and reduced poverty levels which are demonstrated by positive responses from interviewees. Information obtained included an interesting case study of an opportunity lost to maximise an integrated seaweed and abalone farming program due to just one missing link in the supply chain for marketing the abalone. More generally, threats were identified relating to production, income, exchange value (as demonstrated by ability to save), investment, and job opportunities. Also this research reports the respondents' concern that the tourism industry has contributed threats to the future of seaweed farming, yet both are aspects of blue economy development. Clearly there are a number of important performance indicators needing attention from interested stakeholders. Respondents emphasised the need to maximise good governance in managing the potentially rich resources in Nusa

Penida. Charlie, Pearlman, and King (2011); Charlie, King, and Pearlman (2013) have made similar proposals in their papers about the importance of an Environmental Governance Network (EGN) to manage the resources and overcome possible conflict between stakeholders including seaweed farmers, fishers and tourism industries.

It is clear that the very success of some parts of blue economy implementation produces new challenges which must be addressed if success is to continue, e.g., reduction of pollution and ecosystem damage from the tourist industry and reduction of pests and disease which may be the result of extensive mono-culture farming. The industrialisation and intensification drives ongoing changes that demand solutions from an increasingly outward looking community. The blue economy is a policy that appears to contribute to the transformation of the social, environmental and economic character of Nusa Penida, with big opportunities that need to be optimised. Innovations such as renewable energy and other technical advances need to be shared between nations. The European Union's interest in this area may have relevance for development in Nusa Penida (Kaczynski 2011). However, ongoing maintenance of these technologies must be considered in implementation.

Balancing successful marine industrialisation practices with successful implementation of blue economy policies is essential if Indonesia is to achieve its goals of economic growth in a sustainable manner. Food security depends on reversing the depletion of ocean resources identified globally and in Indonesia specifically. Nusa Penida is a microcosm of the ways Indonesians can do things well and some of the things that need to be done to avoid threats to the process or the outcomes. Lessons learned on small projects throughout Indonesia can be used to enhance prospects of success in much larger endeavours.

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