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The Role of the Ocean Economy in the National Income Accounts of Indonesia

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1. INTRODUCTION

Indonesia is largest among the world's archipelago countries, with more than 17,508 islands and 81,000 kilometers of coastline. This means a surface area of 3.1 million square kilometers of water, outside Indonesia's EEZ (Riyadi, 2004). With the declining functions of the land-based economy in food production, the role of marine and coastal habitats gains more attention as alternative sources of foods, employment and incomes for the people of Indonesia. There are five main islands: Java, Sumatra, Kalimantan, Sulawesi and Papua. Moreover, many small islands are not shown on the map.

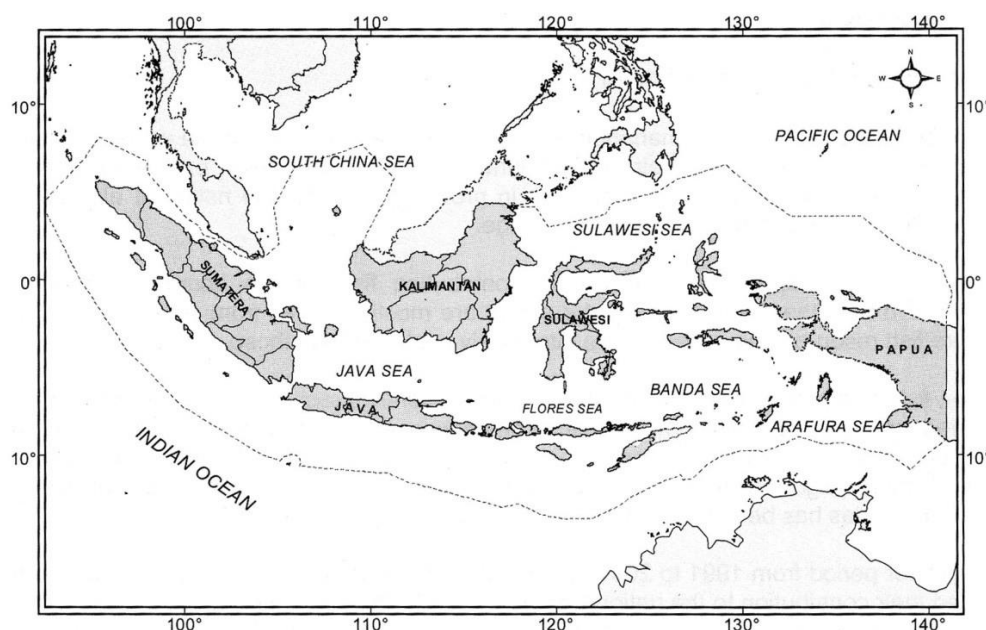


Figure 1. Map of Indonesian waters

Source: UNEP/GEF/SCS Technical Publication 15

Despite being an archipelago nation, the role of the seas and oceans was overshadowed by that of the land until very recently, given that Indonesia had historically focused on land-based development, revolving around the main staple of rice. The staple foods were considered as one of the basic need for the people, and a high rate of rice production was the main objective of Indonesia's First Five Year Plan of 1969 to 1974, in order to meet the large population's high demand for rice (129.2 million people in 1975). Extensive investment was intended to improve the agricultural infrastructure until Indonesia achieved a green revolution in the 1970s and 1980s and reached self-sufficiency in rice production in 1984.

However, when the population reached nearly 260 million people in 2015 (Department of Internal Affairs), the agricultural sector could not meet the demand for its staple foods, and Indonesia covered the rice shortage by importing rice from Thailand, Vietnam, and even from India. Not only the food sector, but others such as the forestry sector and the mining sector suffered from natural resource depletion in order to earn other sources of funding for economic development.

One sector that has not been utilized properly to support economic development is the marine sector. In 1999 the fourth president of Indonesia Mr. Abdurrahman Wahid declared the establishment of Indonesia's Marine and Fishery Department (Presidential Decree No. 355/M, 1999). Since then, the government of Indonesia has undertaken to manage the ocean and coastal resources as another sector capable of shouldering the country's sustainable economic development.

For more than 30 years (1965 to 1997) the average rate of growth of the Indonesian economy was around 7% annually, which allowed Indonesia to transition from a low-income country to a middle-income country. Unfortunately Indonesia remains trapped in the middle-income group. In 1978 Indonesia's economic growth fell precipitously by 13.6 per cent per year as a result of the world financial crisis of 1978. In 2000, the Indonesian economy bottomed out at zero per cent growth. In the following years the economic rate of growth gradually increased by 4.6 per cent annually from 2000 to 2004 by 6.15 per cent from 2010 to 2013.

2. THE OCEAN ECONOMY

The ocean sector is defined as an economic resource which includes two industrial groupings, namely: a) industries that extract the ocean resources, including offshore oil production, fisheries, and tourism; and b) industries that use ocean as medium of movement, operation, and innovation (Canada Oceans and Habitat Management Branch, 2005 and Colgan, 2004).

The Ministry of Ocean and Fishery of Indonesia announced that the ocean economy of Indonesia comprised roughly 14.85% of the nation's GDP in 2014. The total production of fish had only reached 15.26 million tons in 2012 or about 2.46 per cent of the nation's GDP in the first quarter of 2015 (Ministry of Marine and Fishery, 2015). However, the methodology used to measure the contribution of the ocean and coastal economies to the national economy's GDP has not been

explained. Furthermore, those activities on and in the ocean and coastal economies were not clearly mentioned.

The growth of the fishery sector itself was quite high (8.64% of GDP) between Q1 2014 and Q1 2015. The growth rate reflected the additional added value of the fisheries sector based on the conventional concept of GDP. In said concept, the economy of a country is broken down into 9 economic sectors or activities, which were further broken down into 26 sub-sectors. Nonetheless, there is no ocean and coastal sector, because the groupings are not based on ecosystem types, but rather on industrial activities such as the agricultural, mining and manufacturing sectors, etc. Therefore up to now, the GDP of Indonesia may lead to misinterpretation. This paper holds that the Indonesian GDP should be classified in two groups, namely GDP for the terrestrial economy and GDP for the ocean and coastal economy. Furthermore, each of them would consist of 9 economic sectors and 26 sub-sectors as described above. The *terrestrial economy* consists of 9 economic sectors, namely: agricultural; mining; manufacturing; construction; transport and communication; trade, hotel and restaurant; water, gas, and electricity; bank and other financial sector; and services; while for the *ocean and coastal sectors*, there may also be agricultural sector; mining; manufacturing; construction; transport and communication; trade, hotel and restaurant; water, gas, and electricity; bank and other financial sectors; and services.

In preparing a regional income account, the following steps should be taken: Identify group of activities on the ocean; Identify types of product and services; Measure the volume or the quantity each product and service; Find the market price of each product and service; Find the costs of inputs for each product and service; Find the added value of each product and service; Find the unit rent of each product; Find the depletion value of each product; Identify types of service found in the ecosystem and; Find the price or value of the environmental service if applicable. Some examples are mangrove forest, coral reef, sea grass, or quality of ocean water.

3. FORMULATING THE INCOME ACCOUNT

Indonesia has estimated its loss of economic benefits due to illegal fishing at as much of Rp 20 trillion or USD 2 million (at Rp 1000 per 1 USD) per year (Ministry of Marine and Fishery, 2015). The government of Indonesia will apply vessel monitoring system (VMS) in an attempt to achieve 50% effective ways to overcome problems of illegal fishing. This indicates how serious the

government of Indonesia paying attention on fisheries as the main products of the sea. In 2004 VMS in Arafura Sea could increase income of traditional fishermen by up to 28 per cent. In total it could save around Rp 501 billion from illegal fishing.

An example of regional income accounting can also be obtained using “WAVE” for Kotabaru as a marine region since in this region a sustainable potential of fishery can be recorded. We see that the sustainable potential stock of fish in Kotabaru District reaches the amount of 98 Tones/year. Potential stock of “kerapu” is about 10.2 Tones/Year; shrimp, 15 Tones/year; crabs, 220 Tones/year; *bawal*, 93 Tones/year; lobster, 96 Tones/Year and; seagrass, 447 Tones/Year (Ministry of Marine and Fishery). Meanwhile there are 4,149 fishermen households with 3,341 motorboat units, whereas there are inland fisheries with fishponds for 1,411 households equipped with 251 units of sailing canoe.

Together with growing awareness among practitioners, academics, and government officials about the function of the environment as one of the main life support systems, market-based instruments are being recognized as important analytical tools to support decision-making. Economic valuation therefore is one of these market-based instruments, which is widely recognized as an important approach, which can assist decision-makers in predicting economic efficiency among competing uses of natural resources, in order to achieve maximum net social benefits for the people.

However, few economic valuation studies have been undertaken in Indonesia, especially those related to coastal and marine resources. More studies have been done on inland resources, such as rainforests and protected areas. Among the coastal ecosystems that have been given attention are mangrove ecosystems, followed by coral reefs ecosystem, and sea grasses.

4. COASTAL ECOSYSTEMS OF INDONESIA

4.1 Fisheries Sector

During the 10 years from 1991 to 2001, Indonesian fisheries demonstrated a slight increase in their contribution to the national economy and from 1993 to 2004 the contribution of fisheries to GDP increased at an average of 4.27% annually (Central Statistical Agency of Indonesia, 2005-2006). In 2005 the fisheries sector was estimated at 2.38% of Indonesian GDP in 2004 and it decreased to 2.18% in 2005 (Indonesian Statistics, 2007).

Marine capture fisheries increased as much as 2.05% annually during the period 1991 to 2001. For the same period, fish landings for export of tuna and shrimp increased by an average of 8.49% and 5.48% annually, respectively. The potential fishery resources in Indonesia was estimated at approximately 451,830 tonnes/year for big pelagic fish, 2,423,000 tons/year for small pelagic fish, and 3,163,630 tones/year for demersal fish, 110,720 tons/year of prawn, 80,082 tones/year of coral fish, and 328,960 tones/year of squids. The sustainable potential production of coral fish was estimated at 80,802 tons annually per square kilometer.

4.2 Mangrove Ecosystem

At the end of 1990, the total area of mangrove forest was recorded at roughly 9.2 million hectares and approximately 57.6% of it was considered damaged. Shortly thereafter, the acreage and the quality of the mangrove forests declined (Kementerian Lingkungan Hidup, 2005). The total size of the Indonesian mangrove forest in 1993 was estimated at 4,355,533 hectares and consisted of tourism forest (522,070 hectares), protected forest (614,120 hectares), limited production forest (508,490 hectares), fixed production forest (847,970 hectares), converted production forest (799,214 hectares) and mangrove forest for other uses (3,794,281 hectares). Thus, the country had a total of 81,000 kilometers of coastline as the basic capital for the development of brackish-water fish culture, although this is in fact a threat to the mangrove forest. The total area with potential for brackish-water fish culture development is 866,550 hectares. Much of the mangrove forest area has been converted into fishponds. The Directorate General of Fishery estimated that the rate of growth of the fish ponds was about 3.67% per year (1998), and the total size of the fishpond was about 360,000 hectares in the year 2000. Another threat has appeared very recently, namely the conversion of mangrove forest area into palm oil plantations.

Among the main islands in Indonesia, Papua Island contains approximately 69.66% of the total mangrove area, while the rest of the islands each have less than 10% of the total area. The total area of mangrove forest in Indonesia is about 4,225,000 hectares. The share of mangrove forest on the other islands, from highest to lowest, is Sumatera (9.26%), Kalimantan (9.08%), Riau (6.53%), Maluku (2.37%), Sulawesi (1.72%), Java (1.18%), Nusa Tenggara (0.13%, and Bali (0.05%).

4.3 Coral Reefs

Besides mangrove, coral reefs and their associated marine life are one of the greatest natural treasures of Indonesia. The Indonesian coastal ecosystem has around 590 species and approximately 75,000 square kilometers of coral reefs, (about 12.5% of the total area of the world's coral reefs). Most of them are fringing reefs, which are far from the coast and separated by lagoons 40 to 75 meters deep (Cesar, 1996).

In 2005 the Research Center for Oceanography under the COREMAP program conducted a monitoring study on 686 coral reef stations and found that 5.83% of the reefs were in very good condition, 25% in good condition, 36.59% in average condition, and 31.92% in very poor condition. Comparing this data to that of 2004 indicates a fluctuating trend in the quality of the coral reefs¹.

4.4 Seagrass

Data on seagrass in Indonesia is still very limited, because until the end of the 20th century it was not considered very important and only few tangible benefits of seagrass resources were known. The seagrass bed in Indonesia covers approximately 26,700 hectares.

Like other coastal and marine ecosystems Indonesia's seagrass is also under threat. In Jana 60% of seagrass was destroyed due to over-fishing and destructive fishing methods, in addition to sedimentation from coastal development and waste water effluents.

Awareness of the total economic benefits derived from seagrass's goods and services was strongly promoted by the UNEP-GEF project "Reversing the Environmental Degradation Trends in the South China Sea and the Gulf of Thailand", which ran from 2002 to 2008.

¹ In 2004, 6.83% of the coral reefs were in very good condition, 25.72% in good condition, 36.87% in moderate condition, and the rest 30.58% in very poor condition, See Ministry of Environment, 2006. Based on coral reef survey in 1992 at 281 checking stations, it was found that the condition of coral reefs was poorer compared to the year 2004, during which 5.5% of the hard coral reefs were in very good condition, 21.7% in good condition, 33.5% in moderate condition, and 39.5% in poor condition (Harsono and Sukarno, 1992).

4.5 Marine National Parks

Marine national parks are one of Indonesia's national marine assets, but only recently have they garnered any attention. The pioneer studies on this type of ecosystem are the work of Jeff Weber (1996) and studies funded by USAID under the NRMP, National Agency for Planning and Development (BAPPENAS, 1996). In 2007 under the sponsorship of the Ministry of the Environment, Fauzi and Anna (2007) studied the Pulau Seribu Marine Protected Area (MPA) in the Northern part of Jakarta and estimated its economic value

The national system of income accounting in Indonesia has been adopting the SNA as proposed by the UN Statistic Office for measuring a country's GDP. Unfortunately this SNA only recognizes the economic sector according to economic activities under the agricultural, plantation, forestry and fishery sectors. This SNA records and computes specifically those products and services which have market transactions and market prices.

5. DEFINING THE OCEAN ECONOMY

Some industries are related to the ocean *by what they do*, such as marine transportation of goods and people. Other industries are ocean-related because of *where they are*. Tourism and recreation industries such as hotels or recreation services are ocean related when *located in the near shore area*. The reason for this distinction stems from the fact that the "ocean" and "coast" are two different resources. The "ocean" provides a variety of products and services such as food, recreation, and transportation. The "coast", on the other hand, is a region which provides access to the services of the ocean as well as being a specific economy within larger regions. The coast contains both ocean and many non-ocean related economic activities, and is much larger than the ocean economy. The coast economy describes the category of economic activity that creates much of the impact on coastal resources, while the ocean economy is the direct connection between the sea and the supported activities (Colgan, 2003).

Table 2. Broad Sectors and Industries of the Ocean Economy

Sector	Industries
Living resources	Fisheries harvesting and processing, aquaculture, seaweed harvesting
Marine construction	Construction of piers and wharves, dredging, beach reconstruction
Ship and boat building	

Sector	Industries
Marine transportation	Transportation of both freight and passengers plus manufacturing of equipment used in marine transportation
Minerals	Oil and gas, sand and gravel, miscellaneous other mineral resources
Tourism and recreation	Restaurants, lodging, recreation services, marinas, boat dealers
Scientific research	Oceanographic, biological, ecological
Government	Federal, state, and local agencies that use or manage ocean resources

6. THE NATIONAL INCOME ACCOUNT

6.1 The Ocean and Coastal Account

Until now the *ocean and coastal* account had not been recognized as an economic production sector in Indonesia's SNA, rather it has included only the fisheries sector, which records not only the fish products from the ocean and coastal area, but also the fish production from the inland fresh water area. In fact, there are so many activities found in the ocean and coastal areas, but the added values from those activities have been recorded according to the industrial grouping and not according to the ecosystem or area grouping. Consequently, *ocean and coastal* are not considered production sectors in the SNA. It follows that only fisheries garner sufficient attention to be included as a production sector in the national income account, to the exclusion of the *ocean and coastal* sectors.

6.2 Comparing the Forestry, Ocean and Coastal Sectors

The above case is also applicable to the forestry sector but in a different way. In the forest area or forest region, there are also many activities that are recognized according to the types of industry, such as saw mill, pulp mill, agricultural farming, palm oil plantation, tourism, etc. The forestry sector is well known in the SNA, but the added values in the forestry sector account consist of timber products and non-timber products as the primary products. The additional processes of production that use the forest and non-forest products as raw material inputs are usually included in the manufacturing industrial sector. This accounting system results in low figures for forestry contribution to the national GDP, at less than 1% annually. The impact of low contribution to the national GDP has caused the allocation of government national budget to be very small, less than one% annually. (Central Statistics Agency Indonesia, 2013). Thus, the

forest area has been used as a location for many other activities, which are not reflected in the value added account of forestry. Consequently, despite figuring in the SNA, many added values are attributed to other sectors of the economy.

On another note, ocean and coastal areas are not even included within the ocean and coastal account in the national income account. Instead, all value added created in the ocean and coastal sectors goes to each sector according to the types of industrial sector (except for fishery's value added, which has its own account), and the country's SNA lacks any ocean and/or coastal sectors.

In Indonesia a forestry region (*kawasan hutan*) may generate a vast array of economic activities. Even if there are no trees in the region, it may still be called a forest region. Again the added value of the forest sector as recorded in the national income account only comes from timber and non-timber products as primary products. Additional activities that use forest and non-forest products as raw materials are computed as value added in the manufacturing industry sector, trade sector, transportation sector, tourism sector, etc. In fact other activities are also found in the forest region, such as fisheries, mining, palm oil plantation, even trading activities, transportation and government offices, etc. Other products produced by activities out of the primary sector such as sawn timber, plywood and paper are not recognized as forestry outputs, resulting in the added values being attributed to the manufacturing sector. As a result, despite the fact that the forestry sector in Indonesia contributes the least to the national product account at about 0.9 per cent annually, it is well-known and produces more CO₂ emissions than any other sector, making Indonesia the third largest emitter of CO₂ in the world following China and the United States.

Indonesia has had trouble determining the GRDP of the forestry sector. The forestry ministry has attempted to compute the forestry GRDP in 2012 and 2013 of West Java and Banten Provinces. Data collection was done with the support of the Forest Holding Unit (*Kesatuan Pemangkuan hutan*), forestry firms of Perhutani, Conservation House of Natural Resource (*Balai Sumberdaya Alam*), Forest People Park (*Taman Hutan Rakyat*), National Park, and companies that hold permits for forestry use. The information gathered among others are any kinds of economic activity conducted in the forest region, as well as geothermal data from the Ministry of Energy and Mineral Resources. Consequently, in addition to the inclusion of other ordinary forest products such as timber and non-timber products, other non-forest activities are also included.

Table 2 indicates the nominal value of GRDP of 2011 in West Java and Banten Province together, according to the location (in the forestry region and out of the forestry region). The table shows that there are only five groups or

sectors found in the forestry region; namely: 1) Agricultural activities that include food production, plantation crops, forestry, and fishery; 2) The mining and quarrying sector, which consists of: natural gas, oil and quarrying; 3) The processing industry, which includes non-oil and gas, fertilizer, chemistry and rubber products industries; and 4) transport and communication, which consists of a transportation sub-sector and the services supporting the transport sector.

Table 2. Contribution of GRDP in the Forest Region to Total GRDP of West Java and Banten Provinces, 2010 (%)

	In forestry region	Out of forestry region	Total
1. Agriculture	0.10	11.71	11.81
a. Food crop	0.01	8.49	8.50
b. Plantation crop	0.00	0.71	0.71
c. Forestry	0.00	0.01	0.10
d. Fishery	0.09	0.91	0.91
2. Mining and Quarrying	0.30	1.36	1.67
a. Oil and natural gas	0.30	1.08	1.39
b. Quarrying	0.00	0.19	0.19
3. Manufacturing industry	0.00	39.37	39.37
a. Non-oil and gas		37.62	37.62
b. Fertilizer, chemical, and rubber products	0.00	4.68	4.68
4. Transport and communication	0.00	7.40	7.40
a. Transport	0.00	6.41	6.41
b. Supporting service for transportation	0.00	0.33	0.33
GRDP of West Jawa-Banten	0.40	99.60	100.00

From this experience, we learn that the SNA and even the SEEA are not sending the correct messages about the true function of the forestry sector within the national economy. It seems that ecosystem-based accounting is also needed alongside the accounting system according to economic activities. An archipelago country endowed with tropical forests, Indonesia contains many types of ecosystems. Among others we find the tropical forest ecosystem, river ecosystem, lake ecosystem, ocean ecosystem, coastal ecosystem, mangrove ecosystem, coral reef ecosystem, and seagrass ecosystem.

7. THE NEED FOR A NEW APPROACH

As aforementioned, many activities can also be found in and on the ocean and coastal ecosystems, such as fishing, oil extraction, transportation, tourism, shipbuilding, etc. For those two ecosystems, the SNA alone cannot solve the problem of misinformed accounting. The value added created in the forest region and ocean and coastal ecosystems should consist of many added values that come from many different activities which can be grouped as in the SNA system. In other words, we may find the agricultural sector, plantation sector, cattle-raising sector, industrial sector, trade sector, mining sector, tourism sector, transportation sector, electricity sector, etc.

When it comes to the ocean and coastal areas in Indonesia, many activities or industries may also be found as in many other countries. Therefore, “ecosystem accounts” as a satellite account should be developed in order to fully understand the functions or contributions of different ecosystems to the national economic income. However, we hold that the total economic values that incorporate the values of environmental functions, avoiding the double counting, is still much smaller for the total added value based on ecosystems compared to added values based on industrial activities, given that natural resources depletion and environmental degradation still occur continually in Indonesia. This is yet another reason why the governments, central and local, prefer to report the conventional gross regional domestic product (GRDP) instead of the Green GRDP, the latter of which would incorporate the values of environmental depletion and degradation.

8. IMPLICATIONS OF LOW FORESTRY VALUE ADDED

According to the Conventional GDP based on SNA, the forestry sector of Indonesia has been producing less than 1% of the country’s total GDP. Consequently, the forestry sector receives a small allocation of funds in the national budget, given that the forestry sector is assumed to contribute only a small portion of value added to the nation economy.

This also holds true for the ocean and coastal sectors, given that their contribution to the national income account is not taken into full consideration. Therefore, since the national income account includes only the fishery production sector, which covers both ocean-caught and freshwater fish, the fishery contribution is also low.

Other activities beside fisheries in the ocean and coastal sectors generate value, but it is attributed to the mining sector, manufacturing sector, trade and restaurant sector, transportation sector, tourism sector, etc. Nonetheless, there are some differences. Among others the forestry sector has a long backward and forward linkage when compared to the fishery sector. However, when the forestry sector is compared to the ocean and coastal sectors, there are many activities in the ocean and coastal sectors that are not based on the fishery sector, such as shipbuilding, tourism, hotels and restaurants, transportation, oil mining, etc. Thus, based the current SNA does not include the ocean and coastal sectors, rather only the fishery sector. Therefore, budget allocation based on the SNA is flawed. The forestry sector will not receive enough funding because it does not show information about the sector's true contribution to the economy. Similarly, the ocean and coastal sectors will not have any figures for their contribution to the national income account, which may lead the government to neglect entirely the development of the ocean and coastal sector. Accordingly, we must devise a new approach of accounting not according to activity sectors, but according to the ecosystem sectors.

Information and data on the ocean and coastal sectors are presently available but scattered throughout many different agencies. The scattered data must be compiled and analyzed to get a clear picture of the importance of the ocean and coastal sector to the Indonesian economy. The information and statistical data of this sector would be very useful in describing the economic value of activities directly related to the use of ocean resources or access. Following the Department of Finance of Canada, the most important step for us is to comprehend the recent available data, such as values of goods and services produced (GDP), the number of people employed by business establishments, total payments made to employees, types of business and establishments, scientific research (oceanographic, biological, ecological), and government activities (central and local agencies that use or manage ocean resources). These industries can be grouped into two different categories, namely industries related to the ocean by what they do (such as marine transportation of goods and people) and industries related to the ocean and coastal because of their location (tourism and recreation industries) (Colgan, 2003).

9. RECOMMENDATIONS

Based on the current SNA, the ocean and coastal sector does not exist, and in its place we find only the fisher sector. Therefore, SNA-based budget allocation will be flawed. The forestry sector will not produce information about the real contribution of the forestry sector; therefore, it will not receive enough funding from either the central government or the regional government. Similarly, the ocean and coastal sectors will not have any figures reflecting their contribution to the national income account if that contribution is calculated using the SNA. Thus, we must devise a new approach of accounting not according to activity sectors, but according to the ecosystem sectors. The ecosystem sectors can be a satellite account to the SNA. We need to improve our national income accounting for the ocean and coastal sectors with sustainable development principles: economically sustainable, socially sustainable, and environmentally sustainable (Ebarvia, 2014).

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