Small islands: protect or neglect?

An Indonesian case

BY SOENARTONO ADISOEMARTO

Introduction

Indonesia is a largest archipelagic state situated in the equator, occupying an area bounded by L 95°E, L 141°E, M 6°N, and M 11°S, stretches for 5,100 km from the Indian to the Pacific Ocean, with a total land area of 191 million hectares (MSPE 1993). This geographic area is associated with territorial waters of some 317 million hectares and an exclusive economic zone (EEZ) of about 473 million hectares. These total areas make up about 2,1% of the globe surface. The total coastline length of the islands make up about 81,000 km (about 14% of all the coastline in the world).

This archipelago has more than 17,000 islands of extremely diverse in size, shape, age and ecological characteristics (Fig. 1). Roughly there are 3 categories of island sizes found in Indonesia, namely:

a) main islands (the Greater Sunda islands) of *Kalimantan* (53, 583,400 ha), *Irian Jaya* (41,480,000 ha, on New Guinea), *Sumatra* (47,530,900 ha), *Sulawesi* (18,614,500 ha), and *Java* (13,257,100 ha);

b) much smaller islands of *Nusa Tenggara* (the Lesser Sunda islands) with a total area of 8,074,000 ha, and *Maluku* (the Mollucas) with 7,801,900 ha;

c) very small islands, which with the larger islands make up a total of more than 17,000 islands in the archipelago.

The larger islands such as Sumatra, Java and Sulawesi, some of the Nusa Tenggara Islands, and some of the smaller islands such as the Krakatau are greatly influenced by the presence of vulcanism. In the whole country there are some 100 volcanoes alive and exerting an ongoing influence on soils.

The sea is also featuring some specific characteristics. The depths are varied considerably, as a consequence of being on two different continental shelves. The Greater Sunda Islands are on *the Sunda Shelf* with sea depth among the islands of around 200 m or less. The eastern part of the country is located on *the Sahul Shelf*, including the Papua New Guinea Island (the western part of which is the Indonesian Irian Jaya), and its associated *Aru Island*.

This article is focused on the small islands of Indonesia, based on the consideration that more comprehensive accounts on these islands may be presented for further purpose. So far, works on small islands in Indonesia are sporadic and over-all outlook has never been accounted for. This situation has disadvantage that the development of the islands may not be comprehensively planned.

The purpose of presenting this article is to expose the conditions of these small islands from the following aspects:

1. the geography: number and locations;
2. their natural conditions: mainly on the biotic aspects;
3. the status in the management, conservation and utilization: their roles for the country and for the world;

Figure 1 **The three archipelagic states: Indonesia, Malaysia, and the Philippines.**

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4. treatments have been given in relation to the protection of the islands;
5. the trends of their status and conditions: so that action may be planned for the purpose of conserving their roles and functions;
6. and in the future, realistic plan of actions may be developed for the maintenance of these islands to keep on functioning and playing important roles for human welfare.

Naming of the islands

Naming the geographical elements, such as cities, towns, districts, villages, mountains, mounts, hills, rivers, lakes, seas, and islands, is important for administrative order in the management of the country. These official documents will be the important references for running the government, by the societies, mass media, school teaching, map developers, etc. This has further needed urgent endeavour in the official and permanent naming of these geographical elements (DEPDAGRI 2003). In relation to the geographical naming, Indonesia as a member of the United Nations has an obligation to submit reports on the standardization of the geographical names of islands and island groups in the form of National Gazeteers, as official documents, to fulfil the requirement for obtaining international recognition.

Indonesia has a long endeavour ever since from the issue of *Juanda Declaration* in 1957 to the issue of the *Act Number 17 of 1985*, concerning the Ratification of the United Nations Convention on the Law of the Sea, 1982 (UNCLOS). UN Resolution I/4, 1972 requires every state the formation of National Names Authority with jobs in developing policy on the standardization of the geographical names in their territories. It is important that the naming of geographical elements to be done and made uniform in the spellings as well as in the names, since these have the function as one of the communication media.

Naming more than 17,000 islands is not an easy job. For the greater islands, it is relatively easier. For the small islands there are a number of difficulties. The first difficulty is the definition of the small islands. UNCLOS has set definition on small islands (Article 121) as "1. An island is a naturally formed area of land, surrounded by water, which is above water at high tide." Our concern is on the small islands. The second difficulty is the standards used in defining small islands. There are various standards for defining small islands (Bengen 2003). The Ministerial Decree No. 41, 2000, of the Department of Marine and Fisheries define small island as an island of equal to or less than 10,000 km^2 in area, with the population of less than 200,000. This number may be modified into 500,000. At the Commonwealth Science Council Meeting in 1984, it has been decided that the area of small island is at the maximum of 5,000 km^2.

Office of the Hydro-Oceanography (DISHIDROS) of the Indonesian Navy published in 1987 the total number of islands in Indonesia. The count has come to 17,508 islands. However, in the last few years, Indonesia has lost four of its islands, leaving 17,504 in the possession. These are 2 islands to Malaysia (Sipadan and Ligitan), and 2 (Kambing and Yako) to East Timor (Timor Leste). In addition there are 5 islands of the Seribu Islands in Jakarta Bay have gone due to abrasion, several have been merged to other islands, and some others are facing threats due to sinking (Susetyo 2003). In that year the number of named islands was 5,707, and in 1992 the National Coordinating Agency for Surveying and Mapping (Badan Koordinasi Survai dan Pemetaan Nasional – BAKOSURTANAL) came to 6,115 named sea and ocean islands, and 374 river islands. The surveys are still going, and it is believed, that the number of the named islands is increasing. Department of Internal Affairs in their survey in 2002 revealed a new number of 7,387 named islands, and the rest, 10,117 are still unnamed. Each of the province in the country is at present doing reidentification of the islands present in their provinces. It is hoped that in the end of 2003 the number will be identified correctly. Counting the number of islands and the coastline length is being verified by applying remote sensing technology (Hasyim *et al*. 2003). Out of these named islands, 67 islands are the border islands, facing India (5), Malaysia (22), Singapore (3), Vietnam (3), the Philippines (10), Australia (15), Timor Leste (1), Palau (7), and PNG (1), while 12 of these need special attention since they are the outermost islands, bordering Indonesia from the neighbouring countries. These are Rondo (Aceh – Sumatra), Berhala (North Sumatra), Sekatung, Nipa (Riau – Sumatra), Marore, Miangas, Marampit (Nort Sulawesi), Batek, Dana (East Nusa Tenggara), Fani, Fanildo, and Bras (Papua).

The naming of the islands (including change/renaming, deletion, and giving new names) is using the following principles and flow scheme:

1. proposed by the local area people to the head of the village;
2. the village head will process further together with the Village Representative Assembley, to be forwarded to the subdistrict authority;
3. the subdistrict authority will further submit the proposal to the district authority or city mayor;
4. the district authority or mayor will appoint the Committee on the Naming of the

Blotched Hawfish *Cirrhitichthys aprimus* on anemone tentacles.

Geographical Elements to study and do research;

5. the results will be used as tha basis for naming the geographical elements concerned by decree of the district authority or mayor;
6. the Local People Representative will receive the copy of the decree.

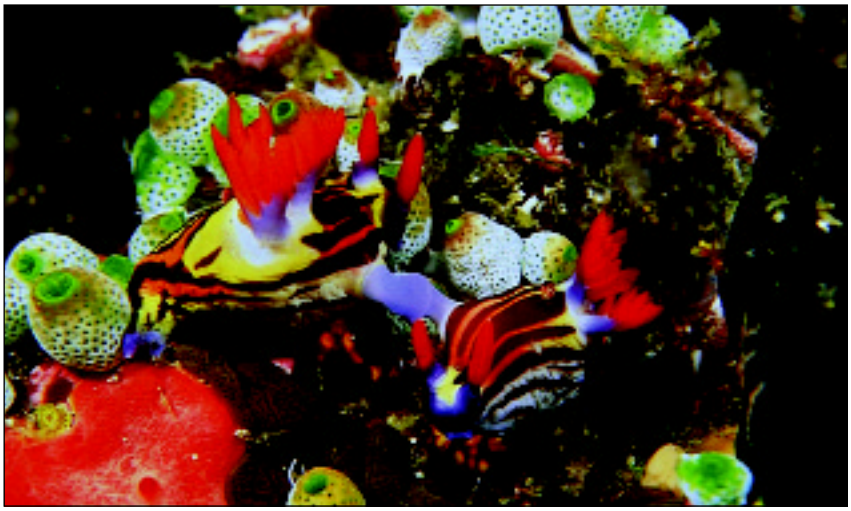
There are other technical principles that are used for naming geographical elements, including islands:

a) using roman alphabets;
b) using local names;
c) using national language;
d) avoid names indicating discrimination;
e) avoid using names of people still living;
f) avoid names of companies;
g) avoid foreign words, except there is historical background;
h) avoid too long name;
i) complying international convention;
j) complying national laws.

As there are more than 10,000 islands in Indonesia still unnamed (mostly small islands), there is a strategy for naming these islands. The first step is socializing the policy of island naming, followed by technical capacity building to the local instruments, preparing a policy in the form of the planned Presidential Decree on the Naming of the Geographical Elements, and the planned Decree of the Minister of Internal Affairs on the Naming of the Geographical Elements (including islands). The next steps are developing cooperation and network with the technical institutes in charge of the naming, namely DISHIDROS, BAKOSURTANAL, and Department of Marine and Fisheries, in standardizing the island names.

Small islands of Indonesia

Since the Third International Hydrological Programme (IHP-III) of the UNESCO developed one of its thematic programmes on small islands, the standardization of small island definition and limitation has become important. Based on the fresh water requirement and need, small island defined as less than 1,000 km^2 with less 10 km in width. However, there are quite a number of islands with 1,000-2,000 km^2 in area having common characteristics and problems with those of islands of less than 1,000 km^2. UNESCO finally defined the small island as having area of less than 2,000 km^2. UNESCO further differentiates very small islands from small islands, based on the limitation of fresh water resources. Small islands with not more than 100 km^2 in area or with not more than 3 km in width are catagorized as very small islands (UNESCO 1991). However, in this article, those two catagories will be treated equally.



Mating nudibrach *Nembrotha purpureolineolata.*

It is suggested that if the definition of small island is including socio-economic use and demographic aspects, the utilization of small island should be based on conservation. With this consideration, only 50% of the area of small island may be utilized. Combined with the definition set by the Department of Marine and Fisheries, islands with less than 2,000 km^2 should be occupied by less than 20,000 people.

Islands may be catagorized based on the origin of the formation and be classified into several types. Many of the small islands of Indonesia fall into the following categories:

1. *vucanic islands*, included in this category are Bali, Lombok, Sumbawa, Flores, Sumba, Wetar and Timor, the Krakataus, Banda, Tidore; the tectonic islands of this category are Nias, Siberut and Enggano, west of Sumatra; the monadnock islands include Batan, Bintan and Belitung, east of Sumatra; mixed genesis islands are Haruku, Nusa Laut, Kisar and Rote;
2. *raised coral islands*, such as Sangihe Islands, Solor, Alor, Lembata;
3. *lowland islands*, as for example Pulau Seribu (*Thousand Islands*) in the Bay of Jakarta, Samalona in Sulawesi; a subcategory of this island type is the alluvial islands, which is exemplified by the islands in the estuary of the Mahakam river in Kalimantan;
4. *atolls*, such as Tukang Besi and Takabone Rate.

Small islands are characterized by the following features:

a) separated from the main island;
b) water resources are limited, with small water catchment, consequently the surface water will directly flow to the sea;
c) sensitive and vulnerable to the external influences, natural as well as man-made;
d) containing endemic species with high ecological value;
e) aquatic area is relatively greater than terrestrial area; relatively isolated from that of the main island or continent;
f) no remote *hinterland*.

Development programmes on the small islands

Development in Indonesia has been reoriented to the development in marine sector. Small islands have great potentials for the development of resource-based industries, such as fisheries, manufacturing, and tourism. These islands will provide productive natural resources (Retraubun 2003). Small islands are potential resources in having coral reefs, seagrass, mangrove, fishery resource, as biological resources, as well as non-biological resources such as mining and marine energy.

Coral reefs

There are two kinds of use of these resources, direct use such as the fish habitat, producer of biotic components and rock-lime, and indirect use such as the formation/barrier against the sea abrasion. It has been discovered that coral reef contains bioactive agents for medicines, foods and cosmetics.

Seagrass

This resource is found in a shallow clean and clear sea of 2-12 m deep. For the small islands, seagrass is important since it produces detritus and nutrients and stabilizing soft substrates by enticing its root system. Seagrass is also playing role as the hiding place for many of marine biota for their life development. This resource may be used for marine culture.

Mangrove

The potential value of mangrove has been well known. In addition to its function ad the barrier against abrasion, as wind-breaker, and protector against tsunami, habitat for shrimp larvae and fish fries, mangrove is also important as the provider of biological resources. It produces wood, bioactive compounds etc. The natural condition of small islands is good for such species that are adaptable to the sandy substrates and low input of organic sediments that is a group of *Avicennia*.

Fishery resource

Ecologically, small islands are associated to coral reefs. It can be expected that the biological resources found in this environment are those closely related to the biota inhabiting coral reefs.

Non-biological resources

Directorate General of Geology and Mineral Resources of the Department of Energy and Mineral Resources has made a list of small islands in producing minerals, including the companies that have been operating on the islands. Not less than 25 small islands have been mined for their minerals.

Marine energy

Ocean thermal energy conversion may be developed in small islands as alternative energy to anticipate the exhaustion of conventional energy such as coal, gas, etc.

In addition to the materials provided by small islands, these islands are also able to give service, such in tourism. There are several types of potential tourism developed in small islands, such as marine tourism, terrestrial tourism, and cultural tourism. Small islands also open opportunity for the development of certain industries, especially maritime industries, ship building and repair. Potential inventories on small islands are continued to be carried out, individually as well as in integrated way (Matindas *et al.* 2003)

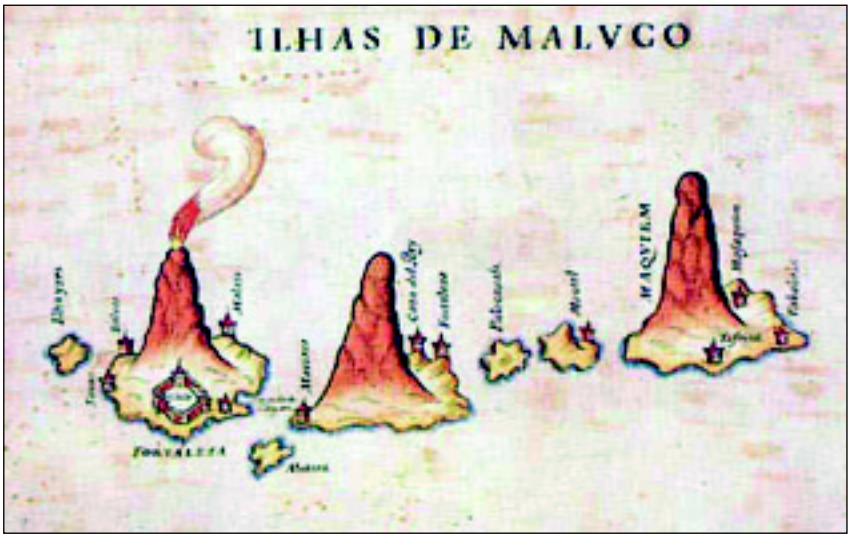
Where to go and how to develop such potentials into actual values? Activities have and will be done on some of the small islands. The results of these activities may be able to be used for planning for developing the small island potentials into the actual values. The following is the list of activities on the islands.

Past activities

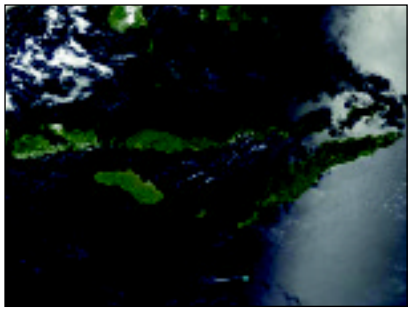
Interest on the Malay Archipelago had been shown by previous explorers and naturalists, such as George Everhard Rumph (Georgii Everhardi Rumphius) for Ambon and the neighboring islands of the eastern Indonesia in the second half of the 17th century (Honig & Verdoorn 1945) and Alfred Russell Wallace (Wallace, 1890). The activities on exploring and revealing the islands' treasures had been going on for many decades that follow.

Krakatau volcano erupted in 1883, leaving the volcanic island into one-third of the total size. The devastation happened as well on the neighboring islands. In 1933, fifty years after the eruption, Dammerman (1948) gave detailed accounts on the evolutionary succession of the fauna to this island-complex. Expeditions, explorations, and inventories have been conducted, and turned this island complex into a natural laboratory in biology and evolution.

Inventories, surveys and researches have been conducted in some strategic small islands for various purposes. Around Java, in addition to Nusakambangan Island, there were activities done in Panaitan Island at the western tip of Java. Limited observation was done on the distribution of some groups of molluscs.



The Moluccas, from the "Livro das Plantas das Fortalezas, Cidades e Povoaçoes do Estado da India Oriental 1600s.



Similar study was also done on Rupat Island in Riau Province (Sumatra). On some of the Thousand Islands complex, observation on fish fluctuation was also conducted. Around Sumatra, the small island activities had been carried out in Siberut, Unggas and Rupat on mangrove covering studies on communities and zonation. On other islands, around Kalimantan, the study was on mangrove floristic, while in Aru Islands (Maluku – the Moloccas) on preliminary aspects and in Buru was on mangrove potentials. On Ambon Island, study was made to observe the population of Polychaeta.

On-going and being planned

- *Nusa Kambangan Island* (108.03.30-108.45.00 EL; 7.40.30-7.46.30 SM)
  Research on the flora of the island and on the coastal zone of this island has been carried out for some decades (Partomihardjo *et al*. 2001, 2003; Rumantyo *et al*. 2003). The aims of the researches are to lay foundation for the sustainable management of the island.
- *Pulau Seribu*/*Thousand Islands* (106.25-106.40 EL; 5.24-5.40 SM)
  Marine Park management, including conservation of biological resources: marine fauna and flora; mangrove; coral reefs (BTNKS 2000)
- *Karimun Jawa Islands* (110.-110.40 EL; 5.40-5.57 SM)
  Marine Park management, including conservation of biological resources; marine fauna and flora, coral reefs, seagrass and algae, mangrove, coastal forests, fauna and other marine biota. Researches are conducting on this islands regarding aspects of conservation and sustainable use of the resources.
- *Bunaken National Park* (124.28-124.49 EL; 0.57-1.50 NM)
  Underwater wonders are found here. This island complex is protected as a national park to make sure the sustainability of the island biota. However, some mainland activities with their polluting impacts have caused threats to the islands.

The Indonesian National Development Program 2000-2004 has set policy regarding the national development on small islands. To comprehend the development policy, the following is some of the important ones.

1. provision of services in the isolated and remote area, especially transportation;
2. integrated coastal zone and marine development, including mapping of their potentials;

3. increasing control on the utilization of the islands' potentials;
4. capacity building for the local populations for economic development, by selecting the right investments.

This policy will have to be followed up with conceptual studies, identifications and analyses. A matrix of the policy on the development of small islands and remote islands has been formulated, by identifying the size of the islands and the potentials that may be utilized on the respective islands.

Over-all outlook

Looking over the activities that have been carried out on the small islands of Indonesia, it is obvious that there has no comprehensive and sustained undertaking. The activities, except on some islands, are sporadic and abrupt. There is no clear pattern of the research activities. It is, therefore, rather difficult to plan solid program on the protection of the islands that need the protection badly. Data on the islands must be available, if the protection plan will be developed fruitfully.

Many of the small islands are even neglected, as for example some islands of the Thousand Islands at the Jakarta Bay. The neglect is mainly due to the ignorance of many of those who are supposed to give care to the existence of small islands, namely in exploration, inventory, observation and research. It is no wonder that the development of small islands, especially their management that includes conservation and sustainable use, is not in happy destination and proper rate, since scientists in the aspects of island potentials, biotic and non-biological, of the islands are very limited in number, and their understanding on the existence of small islands and research program are limited. Their involvement, role and contribution in the development of small islands are, actually, very much needed.

Emperor Angelfish *Pomacanthus imperatur.*

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