

Participatory-based Mapping as An Approach for Marine and Coastal Community in Protecting and Strengthening Their Aquatic Culture and Ecosystem

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Abstract. The Indonesian government in 2014 stated that coastal and small island natural resources are protected, conserved, and managed together by local government and local communities to take an active role toward, supporting the livelihood of its communities. This is such an outstanding step that will benefit the local community towards its local wisdom and culture in protecting their marine and coastal area. This paper elaborates the methodology in conducting the participatory mapping in the coastal area and its importance for the local communities. Regarding the local community-based management, one of the obstacles that occur in its local community is the way to identifying its managed potential area. To overcome the problem, the local community needs to be able to map their potential resources and local wisdom in managing it. This is program-based action research aims to prove that the participatory mapping conducted by the local communities in the small island such as Binongko is one of the effective approaches to support and strengthen the marine and coastal area, as well as their local wisdom.

Introduction

Several studies that have been conducted in recent years have shown the benefit served by the ecosystem, including its cultural landscape formed by human-nature relations, nonetheless from its methodology, the cultural perspectives are having lack of consideration in the assessment. (Plieninger et al., 2013). The mainstream methodology in assessing the ecosystem as the natural resources is more likely to separate the state of the local communities which are attached by the landscape. Meanwhile, there is an increasing recognition that positive changes are more likely to be initiated when the attitudes, beliefs, or preferences of the people managing or depending on resources are considered in the identification of problems and the development of solutions (Ramirez 2015). To overcome such problems, one of the approaches that could be taken by the scientist and other professionals is the participatory approach, which has been long-used by community organizers in the field. The participatory mapping provided a new way to map these remote lands and indigenous populations (Herlihy 2002; Herlihy and Leake 1997; Knapp and Herlihy 2002). Participatory mapping has allowed indigenous groups to produce and to varying degrees distribute counter-representations of indigenous landscapes, including boundaries that delineate 'their' lands from those of the state and other indigenous groups. Through counter-mapping, indigenous groups thus continue to produce boundaries that are, in many ways, products of historical struggles and tensions within indigenous communities, and which

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also attempt to reconfigure relations with a plethora of state agencies and other external actors (Sletto, 2009). Participatory mapping has become an indispensable tool in indigenous peoples' struggle to claim their land and resources rights. It has also, however, come under criticism for its potential to increase state regulation, replace indigenous conceptions of territory and property, and create conflict (Roth, 2009). A participatory process should strive to build partnerships with key local actors and incorporate them in such a way that they can identify their stake in the process and their contribution to decision-making. However, this said, facilitating organizations must also be willing to accept the risk that working in partnership with local people can involve compromise. Objectives may be altered or perhaps even changed completely in the process (Ericson, 2006).

The powerful concept from participatory mapping or community-based mapping is to support and strengthen the community resilience that is often put aside from modern development. Social or community resilience is defined as the ability of groups or communities to cope with external stresses and disturbances that could be caused by the social, political, and environmental dynamic. This definition highlights social resilience concerning the concept of ecological resilience which is a characteristic of ecosystems to maintain themselves in the face of disturbance. There is a clear link between social and ecological resilience, particularly for social groups or communities that are dependent on ecological and environmental resources for their livelihoods. But it is not clear whether resilient ecosystems enable resilient communities in such situations (Adger, 2000). One of the communities that face a high risk of resilience is the coastal and small island communities. Small island communities are also known as the brittle ones. They can be easily isolated when communication and transportation with the mainland are disrupted. But at the same time, as the result of their dependence on communication and transportation, the small island communities become more sensitive to their surroundings. They can closely observe and monitor changes in their environment such as seas, clouds, animals, plants, and insects; and celestial bodies such as the moon, sun, and stars (Hiwasaki et al., 2014). That local knowledge is the product of the intensive interaction among nature and humans, which is priceless at some point, but failed to be considered as the prominent data in the government's perspectives. Resilience can be defined in many ways. It is the buffer capacity or the ability of a system to absorb perturbations, or the magnitude of disturbance that can be absorbed before a system changes its structure by changing the variables and processes that control behavior (Holling et al., 1995). Communities use local materials and methods to prevent and/or mitigate such hazards, and adapt to and prepare for them. Rituals and ceremonies are based on traditional or religious beliefs. Together with customary laws that govern behavior, these rituals engender and reinforce respect for the environment, strengthen social cohesion, and thus help communities to better face and respond to the impacts of climate change and climate-related hazards (Hiwasaki et al., 2014).

Marine and coastal ecosystems provide a wide range of other important services to human society, including medicines, natural shoreline protection against storms and floods, water quality maintenance, and other cultural and spiritual benefits (UNEP, 2006). Our marine ecosystem is not only supporting humans' safeties, but also is a unique, extraordinary, and vital element of our planet, where it is covering more than 70 percent of its surface. It sustains life by generating oxygen, absorbing carbon dioxide from the atmosphere, and regulating climate and temperature. Marine fisheries and aquaculture provide more than 15% of the global protein in people's diets and directly support more than 43 million jobs. Fish provide more than 50% of dietary protein for people (FAO, 2008). Protecting the marine ecosystem with its coastal area is not only the responsibility of its local communities but also entire nations when it comes to climate change. Even if mitigation measures aimed at reducing greenhouse gases and slowing climate change are implemented now, the earth's climate will keep changing in the short term to medium one caused by the lag effects of temperature in the atmosphere. This will result in significant impacts, particularly in the marine ecosystem. Years of experience from the small island community must have been built the local knowledge by their interaction with nature, how to face problems that have been occurred before or possible complex problems in the future, and also which part of the marine ecosystem should be protected, restricted, and which part that should be organized well towards its use.

In Southeast Sulawesi Province, Binongko Island is one of the small and outermost islands. As a small island with rich culture, Binongko also has its own customary territory and the sacred site so-called *Kaombo*. The existence of their own culture attached to their own laws and norms should be attached to their state's determination as they are of Wakatobi National Park conservation area. Now that The Indonesian government gives access to local communities together with the local government in managing their natural resources, also hits back against the communities regarding the way of doing it. The government with the template of working in marine and coastal areas most of the time does not comply with the way of local communities in delivering their information. At this point, participatory or community-based mapping could be one way to integrate local knowledge with the concept of conservation dan development in a governmental state of work.

Method

The implementation of the participatory mapping in the local community in Binongko Island was conducted using the steps from JKPP (Jaringan Kerja Pemetaan Partisipatif) as explained in the figure below:

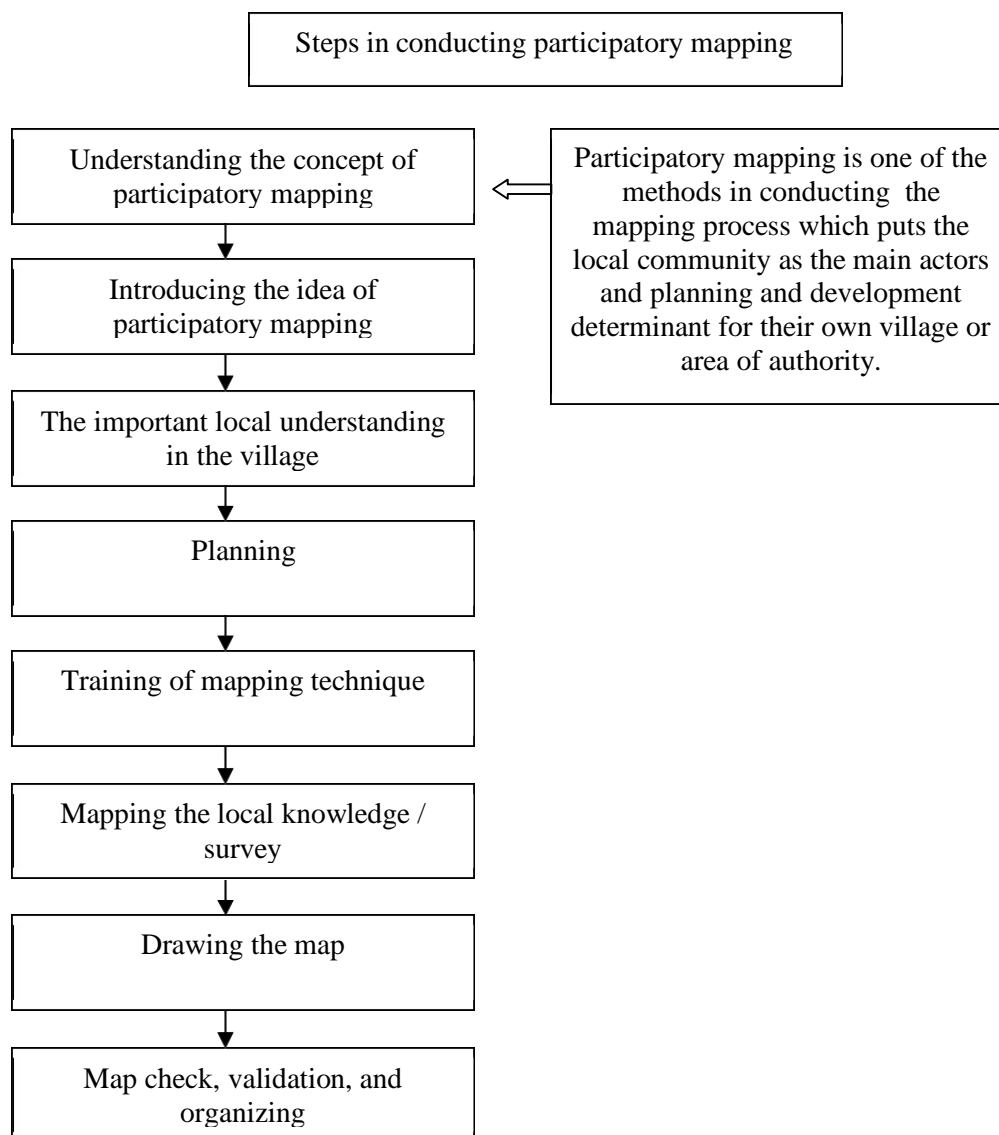


Figure 1. Steps in participatory mapping

As one of the small islands in the Wakatobi National Park, Binongko Island is stated as the outermost island which rich marine natural resources. The rich biodiversity of its marine ecosystem made the local community of Binongko Island need to protect their island and marine area. The participatory mapping was conducted by the WWF Indonesia together with JKPP and SLPP of Southeast Sulawesi. Taken for a week, the process was initiated from the socialization of participatory mapping to the representatives of the local community, including men and women, adults and young people, public figures, and the general public of Binongko Island. The step was then followed by *Diskusi Kampung* where every participant could deliver their local knowledge about the marine and mainland natural resources. This is an important step that should not be skipped and it could take one to two days to elaborate on communities' local wisdom in managing their natural resource, and local knowledge that has been transferred by their grandparents. All information should be written in order to be mutual data for communities. The next step is the training. Entire participants should be trained to use the GPS and compass as the main tools for mapping. After one day of training, the participants were then divided into four groups to do the coordinate tracking. Before, aside from the margin, the participants also took the coordinate of mangroves, sacred sites, and also the *Kaombo* itself.

Result

The result of the participatory mapping in Binongko Island is the identification of the sacred area in the mainland and marine area that is successfully created into the form of a map and agreed with all members of Binongko Island's local community. Through the serial discussion and field mapping, then the map of the *Kaombo* produced and proposed as follows.



Figure 2. The result of the proposed *Kaombo* area in Binongko Island

After drawing the sketch of their area on the training day, the participants went to the field to take the coordinates of the agreed points. When the coordinate taken is digitized, then the result of the map becomes as shown in the figure below.



Figure 3. Map of Kaombo in Binongko Island

Kaombo has a clear territorial. Inside the *Kaombo* there are rope boundaries to the south and north and rock boundaries to limit *Kaombo* from shore to deep sea. *Kaombo* in Wali is located at the end of the inner village south of Wali, which borders the village of Haka on the coast of Wengka-Wengka. End limit in the south there is a rope line on Wengka-Wengka Beach, while in the north There is a rope line on Selo Beach. The natural boundary is at a distance of about 300 m. from the coast meters known as Bulugo Moriri (yellow stone/rock). Long the southern and northern ends are more than 600 meters apart to use a rope. One of the rules about *Kaombo* against users is only may pass (no-take), *Kaombo* is a no-take zone area. *Kaombo* is a shifting movement, meaning that the location of the *Kaombo* can move. Originally *Kaombo* was the entire coastal village settlement, and now its location is only certain ones. The purpose of moving the location of the *Kaombo* is coral restoration with an open and closed harvest pattern.

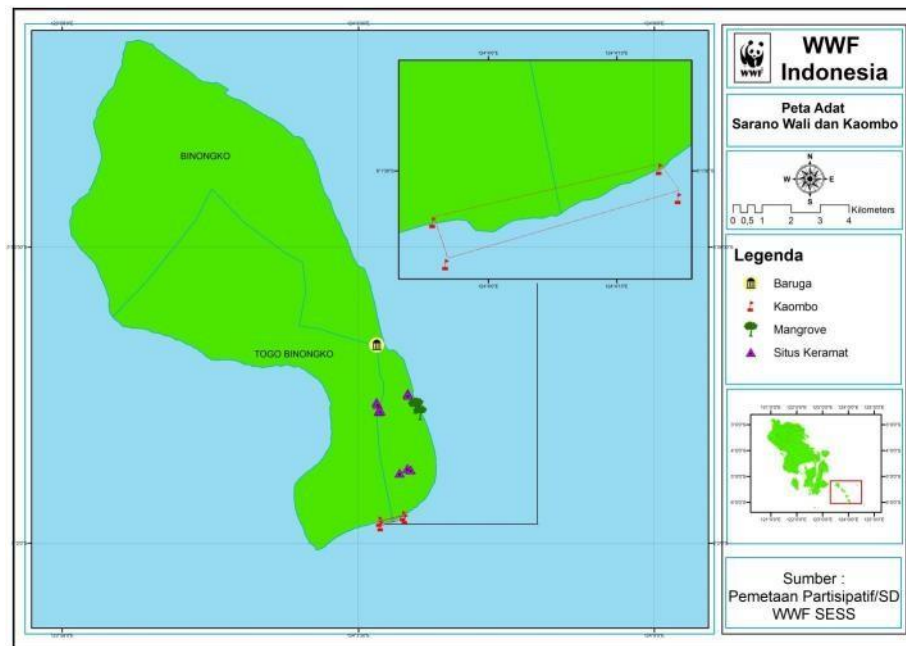


Figure 4. Traditional map of Sarano Wali and *Kaombo*

The entire community of Wali District has the right to *Kaombo*. The Guardian community has the right to determine which *Kaombo* is closed and open. Community rights are also related to the use and prohibition of other users to enter or take advantage of *Kaombo*. *Kaombo* is private, but the rights are attached to individual ownership. The *Kaombo* personal nature is attached to objects and private property rights that have value economy for the owner. As for the *Kaombo* which is general in nature, are required to comply with customary rules regarding coastal *Kaombo* and have the right to prohibit and use when *Kaombo* is being opened. In the Wali society, there are two layers of social structure, namely: customary leadership structure (*lakina*), religion (*imam*), and government (*lurah*) as well as the structure of the general public. The right of the two social layers that divided into (1) Management Structure of Custom (*lakina*) which has the right to regulate and carry out functions to customs relating to *Kaombo*, giving customary sanctions, customary fines (*poka*), regulating the customs regarding the location of *Kaombo* set the opening and closing of *Kaombo* and conflict resolution in society. (2) Management Structure of Religion (*imam*) who has the right to regulate society through rules of religion, which is related to social interaction and institutions in society, such as marriage, calamity, grief, birth, and conflict in society. (3) Management Structure of village government who has the responsibilities to facilitate the interests of indigenous peoples by administration relating to matters of public relations, such as civil registration, public relations with government, and the interests of the overall bureaucratic system. (4) Social strata Ownership who has the rights in the village government and is assisted by *Ling Loji* (who takes care of the customer matters) and *Ling Tanialandi* (who is in charge of religion). (5) The general public has the right to maintain private property and access to common property resources regulated by collective agreements that are authorized by the customary system, religion, and local government.

Discussion

The view of *Kaombo* according to the young Wali are; (1) *Kaombo* is believed by the community as something dangerous so it should be abolished because it is contrary to religious law. This is because if a person steals someone else's property and the object is bombed, then people will die. *Kaombo* means prohibition. (2) Symbol (water bottle) the stored water is given a spell and causes pain to people who violated it. The water bottle is usually attached to a fruiting tree, like a mango and banana. (3) *Kaombo* is a belief that is understood by the people who are ancestral heritage. (4) *Kaombo* is identical to the symbol attached to objects that cannot be taken. (5) Symbols are spells placed on objects such as talismans. (6)

Kaombo is a norm and rule that is trusted by society. (7) *Kaombo* as a sign of prayer that is trusted by the community.

In the *Kaombo* management pattern, there is a kitchen leadership (three stoves), which means that there are three leaders who have the right to make joint decisions with the community. The three authorized leaders are 1) Lakina, 2) Imam and 3) Lurah. Third Kitchen leadership has its respective roles and functions, namely: (1) Lakina and its derivatives function to regulate *Kaombo* by custom. (2) The Imam and his descendants have the function of regulating religious matters relating to religious matters muamallah. (3) The village head and his descendants have the function of regulating community relations, customary institutions, and religion with administrative government.

There are three sanctions for violators of the *Kaombo* rules, namely light sanctions in the form of warnings, moderate sanctions in the form of strong warnings, and severe sanctions in the form of social punishments or fines. The mechanism for giving sanctions is preceded by the Lapungga ritual which means is a community gathering. This is done in order to provide information to all Wali communities there has been a violation of the *Kaombo* rules. Giving Sanctions are led by Sara Hokumu which consists of Sara Kisi (priest) and Sara Adati (lakina). In giving sanctions for violations against *Kaombo*, recognize the fine system called *Poka*. The value of one *Poka* when converted into 24,000. System. The sanctions contained in the Sarano Wali are social sanctions for perpetrators of violations of customary values and mutual agreement. The conflict resolution mechanism is carried out using customary rules through the humanitarian and family approach. If the offender is the community Guardian, then it is resolved with kinship and there is a deterrent effect for violators in the form of social sanctions, namely being socially ostracized. If the offender is outside society, it will be consolidated with the rulers of the offending community, then just tried and sentenced. If a violation occurs and causes public problems related to crime, it will be submitted to the authorities who previously settled the case according to custom.

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