

ACCUMULATIVE REPORT

“SHARE AND LEARN TOGETHER TO COPE WITH CLIMATE CHANGE IMPACTS”

Participatory Action Research on the Local Knowledge in the Coastal and Small Islands to Build the Community Resilience in Reducing Disaster Risks related to Hydro-meteorological Hazards and Climate Change Impacts

BINGKAI INDONESIA - UNESCO

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Jogjakarta, 28 April 2012

EXECUTIVE SUMMARY

This accumulative report attended to summarize the result of series of participatory action research activity on local knowledge related to adaptation toward hydrometeorology hazards and climate change impacts of four target areas: Lipang Island and Kendahe Village (Sangihe Island); Sayung in Demak (Northern coastal area of Java); and Pengastulan (Bali). The implementation of all activity stages took 5 months starting on December 1st 2011 – April 30th 2012. Generally, this program aims to identify, analyze, and document local knowledge and wisdom at coastal area and small islands related to adaptation efforts toward hydrometeorology hazards and climate change impacts as parts of Disaster Risk Reduction and Climate Change Adaptation.

To collect necessary data, research on data was conducted through Participatory Action Research process involving local community by applying PRA (Participatory Rural Appraisal) techniques. The application of those techniques was adjusted with local community condition using 5 livelihood assets analysis as the basis. The assets cover human, environment, social and cultural, economy, and infrastructure.

Research findings showed that the communities in 4 research areas are facing the hazards that increase time to time. Particularly the hydrometeorological hazards and climate change impacts. The hazards are high waves, windstorm, abrasion, drought, flood, seawater flood, and plague.

Small islands areas such as Kendahe and Lipang possess higher risks due to climate change. Limited resources to fulfill basic needs such as food, clean water, energy, health, and education will negatively implicate and lead to the increasing vulnerability and decreasing capacity.

Pengastulan Village as part of Bali Province area suffers extra pressure from tourism sector development. Sayung area suffering from intense abrasion since 1997. But the threats of hazards have built a coping mechanism leading to adaptation efforts as a response toward environmental degradation.

Local wisdom in various forms such as traditional ceremonies, religious ceremonies, myths, and local regulation is the answer to existing natural system and changes. Religious or traditional ceremonies such as Tulude in Sangihe and Pangabeian in Pengastulan are thanksgiving expressions and forms of community reflection to not forget the mother nature. There will always be something to receive if human beings do not destroy. Prohibitions using mystical symbols are warnings on weather condition which is dangerous for human safety. It goes the same with spatial design; past experiences which have been proven bringing good things; prohibition to go to sea during Pangabeian ceremony which, in fact, is a bad weather in west wind season; Lipang community spatial design which is adjusted with abrasion hazard and west-wind (bahe); and Kendahe area which adjusts themselves with Awu volcanic eruption hazard.

The strength of local wisdom is still being preserved and implemented by local communities due to their believes on the values inside or as parts of believes developed in the community. However, at one point, the local wisdom can be degraded by various reasons. Therefore, it needs serious efforts to preserve the local knowledge and wisdom systematically. A specific research is also needed to identify local knowledge and wisdom level in coping hydrometeorology disaster risk increase influenced by climate change impacts.

It is significant to prevent ourselves from being trapped or overestimating local knowledge and wisdom as if they are the answers to all problems including disaster risks, unbalanced hazard level due to climate change, and high level of vulnerability which cannot be coped with available resources. If this situation happens, communities will have high risks of becoming disaster affected people.

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CHAPTER ONE

PLANNING OF ACTIVITIES

1.1. Background

Climate change is real. The phenomenon such as the delayed and shorter rainy season with intense rainfall and more intense heat significantly increased the threats of disasters such as floods, hurricanes, tropical cyclone, endemic, drought, El Nino, tsunamis and other catastrophic. For the coastal communities, climate change poses very serious threats. The small size of islands makes the people more vulnerable environmentally, economically, and socially. The vulnerability arises from islands' limited resources, export concentration, high dependence on strategic imports and remoteness, high transportation costs, and vulnerability to disasters threats exacerbated by climate change impacts.

Although there have been efforts at global, regional, and national levels for comprehensive disaster risk and climate change impact assessments, and their integration within development plans, less has been done at the community level, especially in coastal areas and small islands.

Bingkai Indonesia believes that the community always has the capability to adapt and to create coping mechanism to overcome the hazard risk and climate change impact. Many communities, especially those living in the small islands, have local and indigenous knowledge that are maintained and developed as a result of their extended interactions with the natural environment, including those related to natural hazards and climate change.

As Bingkai Indonesia found in Lipang Island, on the coast of Pacific in Northern Sulawesi, the people who were affected by the sea level rise and coast abration adapted to the changes by planting Nipa palm (*Nypa fruticans*) and Beach Almond (*terminalia cattapa*) trees along the coastline. Fishermen also moved the fish catchment area on the sea following the change in the fish migration route.

In Simeulue, Aceh, the community retain information about the *smong* (tsunami) through tales inherited from generation to generation through stories and traditional art; Nanga-Nanga, sikambang and nandong. *Smong* has become a collective memory part of the Simeulue community identity. Pieces of poetry about *smong* can be found at lullabies in Simeulue.

In the coast of Java, farmers and fishermen in Pandansari, Brebes, Jawa Tengah survive in the midst of extreme weather by planting salt water-resistant rice that previously planted by their ancestors. Such knowledge can be used to increase communities' resilience when hazards strike.

1.2. Objectives

This project was intended to;

1. identify, document, and record the existing local and indigenous knowledge within coastal and small island Communities related to hydro-meteorological hazard risk reduction and climate change adaptation Lipang Island and Kendahe Village (Sangihe Island), Sayung, Demak (Northern Coast of Java) and Pengastulan (Bali);
2. analyze how the local and indigenous knowledge have been used and maintained throughout the time by the community;

3. analyze how the local and indigenous knowledge have or can contribute to community awareness-raising and increased preparedness towards hydro-meteorological hazards and adaptation to climate change.
4. analyze the level of awareness of these coastal and small island Communities related to hydro-meteorological hazard risk reduction and climate change

1.3. Outputs

The expected results of this project were;

1. The identification of existing local and indigenous knowledge within coastal and small island communities related to hydro-meteorological hazard risk reduction and climate change adaptation in Lipang Island and Kendahe Village (Sangihe Islands), Sayung, Demak (Northern Coast of Java) and Pengastulan (Bali);
2. The documentation; written and audiovisual, of the local and indigenous knowledge within coastal and small island Communities related to hydro-meteorological hazard risk reduction and climate change adaptation
3. The action plan of the community in the research area to respond to the meteorological hazards and climate change adaptation

1.4. Activities

To achieve the expected results, activities to be done were as follow;

1. ***Internal coordination meeting of Bingkai Indonesia Team;***
This is the first step of project to develop the research tools and determine specific work plan and roles.
2. ***LINKs Expert Meeting;***
This meeting will invite 2 experts of research in local and indigenous knowledge to strengthen the research team that will be involved in this project, to share knowledge and experience to cross check the tools and methods that have been determined in the internal meeting as well as the work plan and role of each party. Bingkai Indonesia will also consult them on how to strengthen the content of the research. The other core agendas of the meeting are to unite the perception and understanding of the team, to develop strategy, scope, area, time and the final result of the project for each activity in order to see the result of the whole project.
3. ***Action Research;***
The action research is divided into two steps: Research of the secondary data and primary data research. The research for secondary data is conducted by analyzing existing data or document; research result, government and local government data, clipping, or other reference like books etc. The result of this secondary data research will be the basis for the field research (primary research).

While for the primary data, it will be collected directly from the field through the participatory process together with the local community by using PRA (Participatory Rural Appraisal) techniques. Technically, 9 primary tools of PRA will be prepared; 1) resource mapping, 2) transect-walk, 3) village history, 4) change and trend, 5) diagram venn, 6)seasonal calender, 7)livelihood research, 8) semi-structured interview dan 9) ranking.

The tools will be used and developed according to the need and local situation. As the use of the garden sketch, community mobility maps, tree of problem, cause and effect etc.

The topics discussed in this research are climate change adaptation and disaster risk reduction that is focused on indigenous and local communities' knowledge and patterns of adaptation that was developed in dealing with the threat of disaster or natural changes due to hydro meteorological hazard and climate change. For DRR, the research will be directed to the types of hazards, vulnerability and capacity of communities to get an overview of disaster risk. Here in after compared with other threats as climate change impacts in the future.

The principle of the PRA process is the involvement of communities in order to clarify or transfer knowledge between communities and generations, as well as across gender. By using different PRA tools, we can validate and cross check the collected information.

Generally, the methods of this research are;

- a. *Focus Group Discussion (FGD) with the target groups*; There will be 9 times FGD in each area which will be attended by the local community and key informants
- b. *Interview*; to dig deeper the data and information from the source or certain groups that are considered important.
- c. *Transect walk*; a method to directly investigate and discuss the research findings with the community and to find the alternative idea for problem solving.

In the end, a workshop will be held to socialize the information related to hazards and local knowledge identified and to get input and agreement from the community as well as to discuss the community action plan. This workshop will be attended by multi stakeholders.

4. Documentation

The local knowledge on the hydro meteorological hazards and climate change impacts identified will be documented in two formats:

1. Written documentation

Written documentation including;

- 1) ***The research result of PRA together with the community.*** *There will be 4 documents as the result from the 4 research areas.*
- 2) ***The accumulative research result;*** *which is the analysis of the result from the 4 sites related to the community efforts in dealing with the changes as the impact of climate change and disaster threats.*
- 3) ***Essay photos;*** *The research result packaged as story.*

2. Audiovisual media documentation

The local knowledge and adaptation on the hydro meteorological hazards and climate change impacts identified will be also documented in the format of ***documentary film***. This film will describe how the existing local knowledge can save

the community from the disaster threats. And, how long this local knowledge will survive in the dynamic pressure of climate change.

It is our expectation in the future; the documentary film can be developed from the real documentation to docudrama (fiction). This film will be easily understood as the advocacy media. The process will also involve the community, starting from the planning, drafting synopsis and scenario preparation, selecting the actors, and editing. The film will be screened and watched by multi stakeholders. This will be part of strengthening the community in discussing the climate change issues, disaster risk reduction, and their knowledge and how it contributes to strength them in dealing with the climate change impact and future community action plan.

5. Reporting;

All the project activities will be completed in the end of April. There will be midterm/progress report and final reports, in both Bahasa and English.

1.5. Time And Project Area

The project activities will be completed in 5 months. The project is expected to start in 1st December 2011.

This project will be focused to the coastal community in Sangihe, Bali and Central Java;

1. Lipang Island, Kendahe, Sangihe, North Sulawesi

Sangihe, a small island located in the border of Indonesia – Phillipines, has three specific characteristics are as "Small islands", "underdeveloped" and "disaster prone" area.

Lipang Island is inhabited by about 45 families of fishermen and farmers. The communities are impacted by the sea level rise and coast abration. The communities adapted to the changes by planting Nipa palm (*Nypa fruticans*) and Beach Almond (*Terminalia cattapa*) trees along the coastline. The fishermen moved the fish catchment area on the sea following the change of fish migration route.

2. Kendahe Village, Kendahe, Sangihe, North Sulawesi

Currently, the weather that is no longer predictable threatens the people life and hinders the distribution of their basic needs (food, clothing, health, etc) in Kendahe. The people change the livelihood from fishing to farming as the way to cope to the changes that no longer allows people to fulfill their needs from the sea.

Kendahe village is 2 hours from the Sub District of Kendahe, by Pambut, local transportation.

3. Pengastulan Village, Seririt, Buleleng, Bali

Pengastulan is a fishermen region in the north of Bali. It is not part of the famous tourist area in Bali. Pengastulan is an old village which has very strong tradition and beliefs of Hinduism as the religion of the people. The Balinese people are very accommodative to various information, culture and knowledge without leaving or discarding the local culture and customs and beliefs. The Balinese also has a well-spoken tradition,

accompanied by written documents. The example of such local tradition is the traditional Balinese calendar which is still widely used among the local people as the guidance in determining important events in their life.

4. Sayung Sub Distrik, Demak, Central Java

Northern Coast of Java is a high risk area to the impacts of climate change. Intrusion and abrasion are the real threats facing by coastal communities in addition to muddy flood (rob) and bad weather that inhibit Fishermen's livelihood. Sayung Village is one area that was drowned due to abrasion and rob. One village was even forced to be relocated. Number of interventions from various agencies, non-governmental organizations and universities were initiated on the condition of the area combined with the spirit of community to defend its territory from the threat of a wider abrasion.

1.6. Method And Approach

The method and approach used in implementing this project is participatory action research; a community-based approach to identify and develop ideas in responding to the problems faced by the community. In addition to the research result, another output of this participatory action research is the action plan of the community to solve the problems related to the DRR and Climate change adaptation.

Action research is the learning process of two cross culture where the scientific knowledge or the information from outside will be matched by the local condition; culture and environment. On the other hand, the local knowledge will be increased and strengthened by the scientific knowledge.

The method of the research is RRA (*rapid rural appraisal*) as the development of PRA (*Participatory rural appraisal*) to be focused on indigenous and local communities knowledge and patterns of adaptation that was developed in dealing with the threat of disaster or natural changes due to hydro meteorological hazard and climate change. For DRR, the research will be directed to the types of hazards, vulnerability and capacity of communities to get an overview of disaster risk. Hereinafter, it will be compared with other threats as hydro meteorological hazards and climate change impacts.

CHAPTER TWO

IMPLEMENTATION AND ACTIVITY RESULTS

2.1. Background

Originally, Indonesia possesses a very high level of hazard. Geologically and geographically, this country has disaster potential hazards such as earthquake, tsunami, landslide, and volcano eruption. Being located between two equators and having tropical climate with two seasons, Indonesia has potentials in suffering from disasters such as flood, landslide, typhoon, drought, forest-land-building fire, plaque, and pest. Those various disasters put Indonesia as a country called as a disaster supermarket, a disaster republic, a disaster country, etc.

Indonesia's wealth in natural resources is combined with the diversity of hazard in this country. Naturally, this condition is the logical consequence just as two sides of a coin. Several beautiful names of this natural wealth such as equator emerald, *gemah ripah loh jinawi* (very prosperous and very fertile), *ijo royo-royo* (green in color) in one side are accompanied by hazards in the other side.

Those hazards will bring bigger risks if they are not balanced with low vulnerability level and high capacity level in facing the existing hazards. Unfortunately, hazard and vulnerability level cannot be separated from benefiting available natural resources.

$R = H*V/C$ is the general formulation in showing risk level as an accumulation of hazard, vulnerability and capacity, and climate change impacts that significantly influence all variables of disaster risks i.e. hazard, vulnerability, and capacity.

Even though there have been numerous international agenda on responding global warming and climate change, yet the priority is still in mitigation that is lowering greenhouse gases. Meanwhile, the adaptation efforts needed due to the real impacts of climate change are far left behind. Eventually, at COP 17 in Durban, climate change adaptation got its proper portion by establishing the climate change adaptation committee.

Naturally, human beings keep doing copying mechanism and adaptation as an adjustment toward the environment to keep living and developing. The adaptation itself is comprehended as a behavioural adjustment to meet the environment. In climate change context, adaptation is a natural and social adjustment action a response toward the impacts of climate change and variability (IPCC, 2001)

Adaptation is flexible and a process which keeps continuing and sustaining and it does not end in one perfection point. Human adaptive behaviour can be explained by understanding their working system in interacting with the environment. The relation is made through medium of values, knowledge, believe, and various communal activities forming culture. The value system can be in the forms of myth, legends, or certain rituals. Long term practices coming from daily life experiences are then known as local wisdom (Wiratno, 2001).

Bingkai Indonesia in its partnership with UNESCO has tried to identify, analyze, and conclude findings in four research areas by applying participatory action research method and its PRA techniques, performing linking and learning process on community knowledge and local wisdom with local communities in Lipang Island and Sangihe Island – North Sulawesi; Pengastulan

Village-Bali; and Sayung Demak of Central Java, and documenting the findings as learning models of community efforts in adapting climate change impacts and reducing disaster risks.

Picture 1. Map of Research Location



Research findings have shown that climate change significantly influences the increase of hydrometeorology hazard. The impact of climate change has also significantly increased vulnerability, in this variable, vulnerability increase does not only correlate directly with hydrometeorology hazard but it also triggers vulnerability increase on geological hazards directly or indirectly. Climate change also decreases capacity level or at least causes the existing capacity becomes no longer enough in facing the increased hydrometeorology hazards.

The existing hazards in four target areas are related to hydrometeorology such as high waves, windstorm, abrasion, drought, flood, water sea flood, and plague. The frequency and intensity of those hazards increase periodically. Vulnerability in the areas also increases influencing community life particularly in basic need fulfilment such as water, food, health, and energy.

Knowledge and local wisdom developed in target communities become the main assessment focus. It is about how community deal with various existing hazards particularly hydrometeorology hazards and efforts in decreasing vulnerability and increasing capacity. This assessment also explores information related to climate change suffered by community in the form of constant season change and extreme events which is then related to community efforts in coping the hazards from time to time.

To scrutinize the analysis findings related to local knowledge and wisdom on adaptation and Disaster Risk Reduction, pentagon asset (sustainable livelihood) is used as analysis basis; human,

social (social-cultural), finance (economic), nature (natural resources), and infrastructures. Those five livelihood assets are then re-focused to the most basic five important sectors as part of Human Rights.

Findings in four target areas; Sayung, Pangastulan, Kendahe, and Lipang Island, have showed that the impacts of hydrometeorology hazards and climate change are getting more real and proven to influence community live in coastal area and small islands. These four areas are small examples of living reality in coastal area and small islands in Indonesia.

2.2. Objectives and Results

This participatory research aims to identify, analysis, and document local knowledge and wisdom in coastal area and small islands related to hydrometeorology hazards and climate change impacts as well as how the local knowledge and wisdom contribute towards community awareness raising and community preparedness in coping with hydrometeorology hazards and climate change impacts. This research also aims to analyze awareness level of community living at coastal area and small islands toward hydrometeorology hazards and climate change impacts.

In 5 months implementation (1 December – 30 April 2011), assessment has resulted identification and analysis on kinds of hazards and climate change impacts in 4 target areas i.e. Sayung in Demak, Pengastulan in Bali, Kendahe and Lipang in North Sulawesi; and other influencing factors toward disaster risk variable i.e. hazard, vulnerability, and capacity. There is also an analysis on the forms of local knowledge and wisdom in 4 target areas and how they contribute toward community awareness raising and their preparedness on hydrometeorology hazards and climate change impacts and on awareness level of community living in coastal area and small islands toward hydrometeorology hazards and climate change impacts.

2.3. Products

The assessment process implemented in four areas i.e. Sangihe Islands; Kendahe and Lipang; Pengastulan – Bali; and Sayung area has recorded several hazards with disaster potentials. Several disasters in the areas have become part of community history but other hazards are becoming part of community life. Those hazards tend to increase every year.

The existing local wisdoms have developed and become part of community life and up to now, they are able in coping the existing hazards. However, it has to be admitted that those local knowledge and wisdom will reach their maximum limits. Development of ages, culture, politic, economy, knowledge, technology, etc. will directly and indirectly influence the knowledge and wisdom.

Track record of the existing hazards particularly related to hydrometeorology hazards and climate change implication on disaster risks (hazard, vulnerability, and capacity) is formulated in three kinds of documentation. Local wisdom in coping disaster risks as part of disaster risk reduction or climate change adaptation is also in the documentation.

There is a documentation of action research assessment with PRA techniques application in four assessment areas. The assessment focus is livelihood asset or pentagon asset i.e. human, social (social-cultural), nature (environment), finance (economy), and physical (infrastructure).

This documentation was developed from participatory process with target communities. Researchers put themselves as facilitators and documenters. After writing process is finished, the document was sent back to each community to gain feedback or final verification from the writing process.

Other documentations are a documentary movie and a picture essay formulating written assessment findings in the form of audio visual and photos. The 20 minutes documentary movie entitled *Dancing on the Sea* tells about local knowledge and wisdom of target communities in dealing with existing hazards. The local knowledge and wisdom told in the movie are in the form of survival, coping mechanism, and adaptation.

2.4. Research process and findings at each targeted area

Participatory Action Research (PAR) assessment with the application of Participatory Rural Appraisal techniques was conducted at each target area based on planning. Kendahe I and Kendahe II at Kendahe Islands; and Lipang sub village in Lipang Islands are administratively part of Sangihe District – North Sulawesi Province. Other areas are Sub villages of Tambaksari and Morosari in Sayung Sub-district, Demak District, Central Java Province and Pengastulan Village in Sirit Sub-district, Buleleng District, Bali Province. To obtain data needed, the research carried out through *Focus Group Discussion (FGD) with the target groups*; Where there were at least 9 times FGD with the local community in each area, *Interview* to dig deeper the data and information from the source or certain groups that are considered important and *transect walk* to directly investigate and discuss the research findings with the community and to find the alternative idea for problem solving.

In the end of the field research activity, a workshop held to discuss the research identification related to hazards and local knowledge and to the community action plan.

2.4.1. Workshop on management and material discussion

The assessment process was initiated by a workshop involving the overall project team. One of the objectives of this workshop was to share team perception and the team was consisting of Bingkai Indonesia management as research implementing organization, research team, and documentary team. Perception sharing is the most basic thing related to the achievement of objectives, outcomes, and outputs; research implementation schedule, method and approach, assessment and documentation needs, and budget need.

Beside project-implementation-management issue, there was also a material discussion related to PAR and PRA techniques. PAR and PRA principles are the main references so the implemented assessment is not only about digging and collecting information from communities in target areas but it also has to be part of PAR and PRA vision that is community empowerment.

Participatory Action Research (PAR) is a two ways learning process from two cultures in which scientific knowledge or external information is adjusted with local condition, culture, and environment. Local knowledge is then enhanced and strengthened with scientific knowledge. Some PAR principals are PRA is an approach to revise social practices by transforming them and learning from the impacts of the transformation; PAR is a pure participatory which develop a sustainable spiral starting from planning, implementation on planning, observation, and reflection; PAR is a cooperation of all parties having the responsibility and interest on transformation actions as efforts to enhance their ability; PAR is a process of developing a systematic understanding to discuss actions and develop the actions so the social actions will definitely influence the social transformation; and PAR is a process involving all parties in theorizing their own experiences.

PRA techniques also share a similar idea that is a media of joint learning, information sharing, joint analysis, of idea collection from the community itself. PRA enables information triangulation developed in community so information diversity collected can be validated to generate objectivity. The validation or objectivity is not from researchers but from the community itself.

In this research context, PAR was implemented by collecting information and developing ideas in answering several problems in target communities. Activities were implemented using PRA methods with research variable on hazard, vulnerability, and capacity to identify the key variable that was disaster risks. Eventually, this research resulted community action plan that would be used by the community itself in solving various existing information.

Workshop in perception sharing and material discussion related to research method and techniques was conducted in Yogyakarta on December 3-4 2011. This activity was facilitated by Mr. Sofyan, a Disaster Risk Reduction Specialist from Mercy Corps Indonesia. He is one of MPO (Majlis Pertimbangan Organisasi/Organizational Advisory Board) of Bingkai Indonesia.

2.4.2. Expert Dialog Meeting I

To sharpen assessment material, a dialog was also conducted entitled *Local and Indigenous Knowledge (LINKs) Expert Meeting* at December 14 2011 in Yogyakarta. This dialog presented DR. Hendro Sangkoyo which is one of experts in climate change in Indonesia. Previously, the research team has conducted a library research as a basis to conduct a dialog with resource persons in LINKs.

General illustration of assessment focus at each target area was dialogued with the resource persons. Several existing key questions of the research were sharpened and they became references of research team and documentary team at field. Below is the questions:

1. *How are the findings of local knowledge and wisdom related to five livelihood assets and or basic sectors such as water, food, energy, health, and education?*
2. *How is community awareness level toward hydrometeorology hazards and climate change impacts?*

3. *How do local knowledge and wisdom contribute to community resiliency in coping with hydrometeorology and biological hazards closely related to climate change impacts?*
4. *What are the efforts taken by community in this area through local knowledge and wisdom to reduce disaster risks from hydrometeorology hazards and climate change impacts?*
5. *Who practice the local knowledge and wisdom? Are they still practiced by young generation? (This question is to analyse how local knowledge and wisdom are used and preserved by community.)*

These two activities become the basis of research team and documentary team in developing field assessment planning.

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No	Assessment Area	Assessment Schedule	Person in Charge	Documenters	Description
1	Kendahe I and II	January-March	Yoppie Cristian	Fajar Kuncoro Fitryantoro	Departure was based on weather condition and transportation availability
2	Lipang Island	January-March	Nur Nanung Widiyanto	Fajar Kuncoro Fitryantoro	Departure time to Lipang is plagued by bad weather; wind and rain that occurred in Indonesia as a whole; between December to February. In Sangihe, this condition affected the difficulty of getting a boat to go and return. The strong north wind result in high waves that are harmful for the sea transportation.
3	Pengastulan	January-March	Bambang Catur Nusantara	Fajar Kuncoro Fitryantoro	The challenge lies in time availability which was locally a busy time since community had to prepare traditional ceremonies such as Galungan and Kuningan
4	Sayung	January-February	Wahyu Alfi Hidayat Nindito	- Deri Prananda Halim - Fajar Kuncoro	There was a change in main researcher.

				- Fitriyanto	
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2.4.3. Library and Field Research

As a process, a library research as a basis of field research has been conducted before the workshop. The library research conducted before project workshop was still at general level and more as an introductory research. In the early workshop, the overall assessment team and documentary team were given an opportunity to present their early findings in each area related to demography, social-culture, economy, politic, assessment focus, climate change adaptation (CCA), and Disaster Risk Reduction (DRR).

From the early assessment, it can be identified that several areas have already had complete enough information even though the information is not focused yet on assessment focus that was community local wisdom related to CCA and DRR.

Literary research was systematically conducted after a shared perception is built on the objectives, outcomes, and outputs of the assessment as well as method and approaches used in the assessment. Literary research covers books, previous research documents, project reports, news of mass media, and other relevant documents.

2.4.3.1. Sayung

The assessment area is specifically focused in Bedono Village covering Tambaksari Village (7 HH), Pandansari Village (276 HH), Morosari Village (400 HH), and new Tambaksari Village (90 HH). There are two criteria of location selection. The first one is out of four villages at coastal area of Sayung Sub-district (Sriwulan, Bedono, Timbulsloko and Surodadi), Bedono is the most damaged sub village due to abrasion. Department of Sea data shows 124,12 ha of land affected from abrasion. The second one is there are unique local tradition and knowledge guiding community to do adaptation. We see Bedono sub village as a unique portrait to see community adaptation power which keeps surviving in the middle of environmental crisis.

To understand community's wisdom in coping climate change impacts and reducing hydrometeorology disaster risks, the assessment was conducted by collecting several thematically related data and information, assessment location, and historical actor subject in assessment area. Unwritten document or information became early input in understanding assessment area characteristics. Literary assessment was also conducted related to disaster risk management, climate change adaptation, local wisdom, and other closely related issues such as social-cultural, economy, or other specific issues such as food, water, energy, or coastal area sectors.

PRA techniques were implemented by joining several community activities such as fish catching, fish production, religious activity, infrastructure building, etc. PRA implementation is in form of small group discussion consisting of 3-4 people. Information collection was also done in bigger

group discussion with 8-10 people with discussion topic was community problems related to assessment theme, disaster risk reduction, and climate change adaptation. The tools used were resource mapping or village mapping, transect, ven diagram, trend and change, garden sketch (household spatial design), family interview, livelihood analysis, and seasonal calendar.

Seasonal calendar and livelihood research have provided information on community perception on normal and abnormal season as well as community adaptation pattern. The measurement was developed from community perception by comparing season signs at pasti heritaged through a series of technology or treatment response and fish pond management, dry land agriculture, sea activities, and its relations with important days tradition and community habits. Social history provides information on dynamic of area management at past and changes ever since.

Local knowledge and wisdom in the community of Sayung Sub-district coastal area cannot be separated from area long history. Based on verbal information by local community, Sayung coastal area was a nest of pirates who robbed boats at North Java coastal area. Kyai Mudzakir came to neutralize and conquer this area by diminishing violence tradition by spreading Islam religion. Kyai Mudzakir built an Islam religious social traditional institution system centred in Baitul Izzah Mosque in Tambaksari sub village. Kyai Mudzakir placed mosque as a centre or religious and knowledge learning.

Form of local knowledge and wisdom in the community is reflected in their traditions such as communal works, religious ceremonies, and several habit and prohibition system. Social institution existence becomes important in formulating punishment mechanism, social surveillance, continuing habit, and passing believe which is then manifested in action moral frame and finding an agreement point so there will be a strength of "*social enforcement*". Kinds of local knowledge and wisdom such as prohibition of oyster taking, prohibition of bird taking, and prohibition of mangrove cutting are parts of local wisdom development as area protection efforts.

Community climate knowledge system is passed from one generation to another generation recorded in *pranoto mongso* (season arrangement) calendar which becomes weather 'prediction' and coastal area community's guidance in doing fish pond activities, dry land agriculture, and fish catching. In *pranoto mongso*, there are also records on seawater flood characteristics influenced by solar energy. Community old generation still keeps their social memory because this tradition have even institutionalized through *Majelis Ilmu Kamisan* (a learning group). *Pranoto mongso* is used by the community as a guidance in seeing weather in general way (normal). However, younger generation only knows several general *mongso* (season) such as *mongso kanem* (the sixth season), *kapitu* (the seventh season), *kewolon* (the eighth season), *kesongo* (the ninth season), and *ketigo* (the third season).

In 1997, an abrasion sank west coastal hamlet area in Demak District and since then Sayung area has become famous. Sayung area became more famous after Babon River pollution done by several companies in the location. Researches, mitigation efforts, advocacy, and community organizing are implemented in the area by non-government organization, academics, or the government.

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area of Sayung Sub-district (Sriwulan, Bedono, Timbulsloko and Surodadi), Bedono is the most damaged sub village due to abrasion. Department of Sea data shows 124,12 ha of land affected from abrasion. The second one is there are unique local tradition and knowledge guiding community to do adaptation. We see Bedono sub village as a unique portrait to see community adaptation power which keeps surviving in the middle of environmental crisis.

Another strong reason in selecting the target area, which is Bedono Village, is the community's resiliency in coping extreme housing environmental changes and local tradition and knowledge developed as a response toward environmental changes. The adaptation is in the form of survival, coping mechanism, or permanent (long-term) adaptation pattern.

To understand community's wisdom in coping climate change impacts and reducing hydrometeorology disaster risks, the assessment was conducted by collecting several thematically related data and information, assessment location, and historical actor subject in assessment area. Unwritten document or information became early input in understanding assessment area characteristics. Literary assessment was also conducted related to disaster risk management, climate change adaptation, local wisdom, and other closely related issues such as social-cultural, economy, or other specific issues such as food, water, energy, or coastal area sectors.

Numerous research findings, program reports, or various information from various mass media has made it easy to conduct the early process which was literary research. Sayung area was once KAPPALA Indonesia program site so some of the community is part of KAPPALA Indonesia community. While most of Bingkai Indonesia members are also members of KAPPALA Indonesia and the situation has made the early research process became easy.

The developed relation pattern has made research process easy to do particularly in collecting early information or in field research. Moreover, local community used this research opportunity to develop Sayung area profile in video movie media.

PAR process with the application of PRA techniques was implemented by making adjustment with community schedule and habit such as during fish catching, fish processing, mosque activities, infrastructure building, or at community gathering places. Data and information collection with PRA techniques application was implemented in small group discussions consisting of 3-4 people. To scrutinize or deepen the collected information from community in the area, a bigger group discussion was held by involving 8-10 people which was also a media of doing cross-check or collecting other additional information. To collect specific information, a group discussion was held by involving females or elders.

Based on PRA function, one tool complements another tool. Information redundancy from using those tools is part of triangulation process to gain information validity. Group discussions involving community enable information transfer, knowledge transfer, and idea dialogue among community members in facing problems in their area.

PRA techniques were implemented by joining several community activities such as fish catching, fish production, religious activity, infrastructure building, etc. PRA implementation is in form of small group discussion consisting of 3-4 people. Information collection was also done in bigger group discussion with 8-10 people with discussion topic was community problems related to assessment theme, disaster risk reduction, and climate change adaptation. The tools used were

resource mapping or village mapping, transect, ven diagram, trend and change, garden sketch (household spatial design), family interview, livelihood analysis, and seasonal calendar.

In resource mapping or village mapping, there is a collection of basic information in Sayung area. Information on abrasion process, available resources, and resources in the past become a quite warm discussion topic. Several analyses on the causes of abrasion including assumptions about the abrasion caused by the dike for wave beraker are still in argument debates.

Seasonal calendar and livelihood research have provided information on community perception on normal and abnormal season as well as community adaptation pattern. The measurement was developed from community perception by comparing season signs at pasti heritaged through a series of technology or treatment response and fish pond management, dry land agriculture, sea activities, and its relations with important days tradition and community habits. Social history provides information on dynamic of area management at past and changes ever since.

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In technical practices, Sayung community uses nature signs to see seawater flood level in their area by seeing sea snails crawling at trees, woods, or houses. The level the snail becomes an indicator of the flood level. Therefore, community can do their preparation for the upcoming seawater flood.

For the action plan, the community will resolve the case of the sole holder and plan or expect to build the wave breaker the village boundary.

2.4.3.2. Kendahe

Field assessment in Sangihe Islands was conducted in two villages i.e. Kendahe I and Kendahe II. The assessment was conducted by developing a working team consisting of main researchers, co-researchers from local community, and local guide. Field assessment was 30 days long consisting 22 days with main researchers and the remaining 8 days by co-researchers and local guide to complete various additional needed information.

Field assessment was initiated by doing a perception sharing with local team i.e. co-researchers and local guide. This perception sharing was about objectives and output of the assessment, method, approach, and time schedule. Main researchers delivered material discussion related to assessment focus and PRA tools. Along with the activity, mapping on actors or stakeholders closely related to assessment focus was also performed starting from local government, traditional figures, community leaders, etc.

To directly see the condition of target areas, a joint observation was held with other assessment teams. Several basic information gained from library research and co-researchers as well as local guide was directly observed at fields. The observation process was also a media of introducing the team to local community and leading figures of the area.

Information collection process using PRA techniques was conducted gradually. PRA tools used were adjusted with local community condition. This assessment did not perform specific formal meeting. Yet the usage of PRA tools followed the pattern or habit of local community. Resource mapping or sub village mapping, for example, was performed at community gathering places such as in small groceries (warung) during free time or at beaches while waiting for fishermen returning from sea.

Similar method was also performed in applying PRA tools covering a) Resource mapping (village map), b) Trend and change table, c) Livelihood analysis, d) Season Calendar, e) Land Transect, g) Sea Transect (Sea Scratch), h) Village and Disaster History, i) In-depth Interview, j) Ranking Matrix, and k) Community Action Plan Development. The previously mapped community gathering places became media in information collection process and media in information and knowledge transfer among community members. The community gathering places used to apply PRA tools are churches and working places (nutmeg drying place and nutmeg peeling).

For information deepening, an in-depth interview was conducted with semi-structured interview pattern to resource person. For example, to gain information on disaster and village history, an interview was conducted with community figures or community leaders; to gain information from female perception, a discussion with female groups was held; and for transect walk at land and sea, information collection was conducted with community members who showed more interests by considering their understanding on assessment area.

The participatory PRA process has involved many communities in Kendahe I and Kendahe II. From various collected information, differences were identified in several issues. The following action was a cross check using other tools. The differences in information generally related to time or place were delivered into communities during plenary meetings or specific meetings designed to discuss information findings. If shared information could not be built, a plenary meeting would be held as a dialogue media. Direct dialogue of resource person and community members in one open meeting could be a media for sharing, strengthening, and making agreements. For community members who have not been aware of local knowledge and wisdom correlated with CCA and DRR, this meeting could become a media for sharing, learning, or knowledge transfer.

Significant issues generated from assessment findings are:

- Kendahe I and Kendahe II are disaster vulnerable areas with multi-hazard type. The existing hazard experienced by community has been dominated by Awu Volcano (volcanic eruption). Earthquake, tsunami, seawater flood, abrasion, typhoon, and extreme weather have not been considered as serious hazards. Such condition occurs because community have not directly experienced the impacts of the disasters due to incomplete information and the time period of the disaster (occurred in the past).
- Communities of Kendahe I and Kendahe II have implemented Disaster Risk Reduction principals to local knowledge or wisdom in sub village spatial design, house structures, road building, or various traditional activities dominated by hidden messages (symbolic).
- Community members have quite high vulnerability from livelihood aspect and basic need supply (food, education, energy, and health service). If the condition is related to climate change impacts, the vulnerability is higher.
- Efforts in Disaster Risk Reduction taken become important to be re-implemented particularly related to mitigation and preparedness efforts. The established disaster prepared team must be re-activated as a preparedness form of community on the existing hazard.

The participatory dialogue encourages various smart ideas from community. Traditional celebrations become important to be preserved accompanied with clear explanation. Community members of Kendahe I and II also realize that DRR and CCA are community responsibility with local community as the main actor.

Below is several follow-up as one action assessment process finding conducted in participatory way:

Below is follow up actions as one of participatory action research process results in Kendahe I and Kendahe II.

- a) Resource mapping and hazard mapping. This mapping is very important as a media for community in generating development plan; developing Kendahe area; encouraging and developing policy of environmental and social-cultural protection; and Disaster Risk Reduction (mitigation and preparedness).

- b) Enhancing human and local institutions resource strengthening. This capacity building is a capital in solving various problems in the community and in developing the area, identifying roles and responsibilities of government officers, and identifying community's rights and obligations. It is important to hold meetings involving all stakeholders in the area as community consolidation media.
- c) Encouraging and developing policies at local and district level to protect the area of Kendahe and revitalizing traditional regulation as regulations strengthening formal policies or community resiliency toward hazards
- d) Documenting Kendahe history as a learning media for all stakeholders and as a reference for local material teaching at schools
- e) Developing other kinds of productive plants such as *palawija* (second crop planted during dry season) and vegetables for community cultivation plant diversity and fulfilling local needs; and doing treatments for pest and plant disease to increase agriculture productivity
- f) Strengthening sea sector (fishermen) as part of promising community livelihood potential
- g) Developing multifunction public infrastructures and facilities as part of disaster management and climate change adaptation

2.4.3.3. Lipang Island

Lipang is a village called "Kampung Lipang" and a small island which is 9 ha (3 km²) large and located at 12 nautical miles north to Sangir (Sangihe) Besar land. Sangihe island is bordered with The Philippines at north. Lipang island is divided into three *Lindongan* (sub village) i.e. Lingongan I, Lingdongan II, and Lindongan III. The population of this island is 95 HH or 339 people. All Lipang people depend their lives from sea as fishermen using traditional boats called pump-boat (or *pambut* in local term).

Based on its history, Lipang island is closely related to major eruption of Awu Volcano located near Kendahe, north west direction of Sangir Besar Island in 1711. Some survivals of Kendahe kingdom in Makiwulaeng were displaced and they settled on Lipang Island. History has recorded and proven that Lipang Island was safe from volcanic eruption impacts and this area becomes a place to live.

Area assessment in Lipang Islands is quite similar with Kendahe I and Kendahe II. Assessment was initiated with literary research. Several documents for references are:

Sangihe Dalam Angka/Sangihe in Numbers (2008); Orang Laut, Bajak Laut, Raja Laut: Sejarah Kawasan Laut Sulawesi Abad XIX/Sea People, Pirates, Sea Kings: History of Sulawesi Sea Area XIX Century (Adrian, 2009); and Kearifan Lokal Sumber Inspirasi Spiritual, Moral, Etik Masyarakat Sangihe/Local Wisdoms: Spiritual, Moral, Ethical Inspiration Resources of Sangihe People (Makasar,2009). Relevant information on Lipang Island research is quite limited either in printed or on-line version.

Field research was performed together with team established from local community elements. The team consists of co-researcher and local guide; Mansur Macpal, Ahmad Mandak, and Sumardi Hoke.

Assessment in Lipang Islands did not experience a challenge because previously, the main researcher have had activities in this area to implement similar project in 2009. Therefore, several early stages could be conducted such as observation and key actors mapping to support assessment or approach toward key actors.

Local wisdom assessment related to hydrometeorology hazard influenced by climate change and disaster risk reduction was conducted by applying several PRA tools. The tools are village mapping made with fishermen and Lipang village secretary, interview to elaborate Lipang Village historical track, and transect at land and sea together with some local community members based on developed village map. From transect findings, several problems at each part of the island and the most suffering parties were identified. To complete transect findings, team had a joint discussion on general condition related to season and the changes occurred (trend and change).

From information collection, several significant findings related to local wisdom are that challenges faced by Lipang Sub village people are not limited to the increasing hazard and climate change impacts but they are related to geographical condition and ecological supporting system in general. So far with existing limitation, the community has *managed* those challenges using various local mechanism as an adaptation to narrow sea and land environment. Lipang people adapt well with the condition by developing various cultural mechanism in the form of certain value system and social control which are considered as capitals to survive and have proven effective for hundreds of year.

Local knowledge and wisdom developing in Lipang are form of copying mechanism and adaptation to the limited resources, facilities and infrastructures and alsd access to outside of the island. Lipang communities manage the existing resources, both land and coastal carefully. This are going on. This condition has been tested in the Bahe (west wind) where communities of Lipang were isolated nearly eight months due to bad weather. Similarly, during the long drought that hit the islands nearly one year, from 2002 to 2003. The community survived amid the extreme conditions. The limited resources, food, clean water, health and energy can be handled through the mechanism of social control. The local knowledge is still capable to respond to various threats that exist today.

Abrasion as one of the threat has occurred since the late '90s. The impact of abrasion, among others; 17 houses and the mosque submerged. Hundreds of coconut plants dead and one dock destroyed. Responding to the threat, the people anticipated it by reforestation in the coastal region. Communities also successfully proposed the building of wave breaker to local governments.

As the state territory border area, the territorial of the Republic of Indonesia is often violated by the fishermen from Philippines. Unbalance of the fishing equipments technology, both the boat and fishing gear, causing the fishermen of Lipang island increasingly marginalized. The lack of officers and law enforcement, increasingly weakened their bargaining position in dealing with the invasion of foreign vessels come into the Lipang islander governance area. These conditions seriously discussed by the community and became part of the followed-up plan.

PAR process with PRA techniques may eventually concluded the crucial points with the community, including the action plan. They are;

- a) The mapping of community resources and territory management. This mapping in order to endorse the assertion of the border of Kampung Lipang governance area. The boundary can be confirmed with a map of the area that formally recognized by various stakeholders. So that the sovereignty of the governance area will be stronger.
- b) Strengthening the previous values (local knowledge) that support ecological sustainability and carrying capacity of Lipang Island. In some cases, local knowledge need to be strengthened in the formal regulation; village regulation or another higher regulation (district regulations).
- c) Encourage the local governments to facilitate the procurement of gasoline stations specifically for the fishermen of the small island, patrol and law enforcement in the sea border. Scarcity of clean water in Lipang Islands, also needs to be addressed wisely. Clean water is a fundamental human right. Likewise, other public facilities, such as schools, health facilities and infrastructure such as wave breaker and reforestation.
- d) Revive the tradition like seke/meneke, basoma, Mala and tulude in order to further strengthen the communal system in public life that began affected by the foreign cultures, either individualistic or group.

2.4.3.4. Pengastulan

Pengastulan Village consists of 4 sub villages: Purwa, Sala, Sari, and Kauman. From historical side, there was a village called as Muntis Village which then became the origin of these existing three villages: Pengastulan Village, Bubunan Village, and Sulanyah Village. The division of these three villages is considered as a tree: Pengastulan as the timber, Sulanyah as the branch and leaves, and Bubunan as the bangsing-bun.

As part of a village, inter-village social relation can still be connected through Pura Gede. Community cooperation is showed by doing joint traditional ceremonies.

Participatory action assessment in this area was initiated with library research. Bali as a tourist destination area with a strong writing culture, keeps its historical records. Important records are still found in Pengastulan history. The main researcher found it easy to collect several early information as a basis in doing field assessment.

PAR with PRA tools application in Pengastulan got a positive response from the community. Various information flowed from local community related to hazard currently effecting the community such as abrasion and concerns on tourism development which is dominated by external parties. Pengastulan people do not want their area taken by external parties (Indonesian or foreign parties) because their position will remain the same: becoming spectators at their own land.

PRA tools application was performed in flexible way. Community tight schedule became researcher's main concern because the researcher was helped by local community in doing assessment process. Therefore, the researcher often had to wait for the best moment and time to do so. Locally, people in the area were busy preparing religious ceremonies of Galungan and Kuningan. The researcher had to put some respects to such situation. Tolerance as part of humanitarian value became one of main references of the assessment team.

The limited time availability put the researcher in a position to take the available opportunity. Spare time was used as effective as possible to elaborate several information related to local wisdom in dealing with hydrometeorology influenced by climate change and DRR. Several meetings were conducted in semi-informal way by specifically inviting some community members. However, generally, PRA assessment was dominated by using existing social media such as using small grocery stores as community gathering places, fish auction market, beaches, or several community houses as community gathering places.

The PRA tools used to gain information are resource mapping or village mapping, land and sea transect, garden sketch (household spatial design), family interview, livelihood analysis, and seasonal calendar. Primary data collection was held participatory in January to the middle of March 2012.

The tools were used by adjusting to present situation and condition. One tool was used several times with different communities including female groups to gain female perspective. To collect deeper information, a semi-structured interview or a household interview was used.

Kinds of hazards suffered by the community are abrasion, extreme weather and typhoon, flood, earthquake, tsunami, and Agung volcano eruption. Yet the most significant one is abrasion. Impacts of the abrasion are some houses destroyed and higher or stronger waves. If this condition is not immediately solved, it can threaten the people housing in this area.

Below is several significant findings on local knowledge and wisdom in Pengastulan area.

- Pengastulan community is still using Balinese calendar in their daily life. This calendar divides a year in 12 months called as *sasih*. Balinese people in general are still using this calendar for religious activities and for calculating season or weather.

- Traditional activities such as Pangabean occurring in the eleventh month (in Balinese calendar it is called as *jhesta*) is a thanksgiving ceremony on sea products and praying activity for fishermen's safety. During Pangabean celebration, community is prohibited to have activities at sea for three days. An event of a died fisherman who went to the sea during the ceremony becomes an example to other community members not to break the regulation. However, if we take a closer look, during *jhesta* month, the weather condition is bad and can be life threatening for fishermen going to the sea.

Interpretation in a more concrete way will more strengthen traditional regulation in the community of Pengastulan. This is significant for young generation who have been infiltrated by various knowledge so they can combine information that they gain to determine future attitude and action.

- Dam building at Sabha River is a form of mitigation to minimize the impact of river water volume increase and tidal surge. The dam was built based on community self-funding and made from sand filled sacks. This is community learning result from previous events.

2.4.4. Project Monitoring and Internal Meeting

Project monitoring was implemented in two models, by schedule and by process. Scheduled monitoring was performed based on a work plan previously developed through an overall team meeting consisting of management team, research team, documentary team, and supporting team. Scheduled monitoring was conducted in the second week of January and in the first week of March 2012.

The monitoring process was held by seeing activity process and overall results.

No	Process	Results	Challenges	Solutions
01	<i>Monitoring I</i>			
	<p>Bingkai Indonesia management represented by the MPO performed the monitoring process. Monitoring was conducted by seeing the development of research and documentation implementation.</p> <p>Monitoring material was initiated by seeing the activity plan (proposal), work plan, working team, and budget.</p> <p>Each person in charge presented process, results, challenges, and offered solutions in dealing the</p>	<p>There are a work plan and stages for each team's field implementation</p> <p>Formulated research questions as researchers' guidance</p> <p>There is an illustration of documentation format and stages</p>	<p>Research area of Sangihe Islands is an unpredictable area in season. The implementation period was at west season dominated by hard winds and rains while transportations to the area depend a lot on weather condition</p>	<p>Building intensive communication with contact person of local community and local non-government organization which understand well the weather condition in the area and transportation access to the location</p> <p>Preparing an</p>

	challenges			alternative plan by using sea access and considering the safety element (preparing life jackets, insurance, and knowledge on sea sailing)
02	Monitoring II			
	<p>14 March 2012 in Yogyakarta</p> <p>The second monitoring process was conducted by seeing the development of research and documentation implementation; both essay photo and film.</p> <p>Each of the person in charge presented results, challenges, and offered solutions in dealing the challenges</p>	Input and critics for revising the draft of the report, essay and film.	<p>There were a lot of information related to politic, economy etc found made the researcher a bit difficult to restrict the report writing in accordance with the agreed outline.</p> <p>For film and essay production team, the obstacles due to some crucial issues could not be documented due to the huge wave, especially when in Lipang and Kendahe. In addition to language problem.</p>	<p>Adjustments to the format of writing, and some problems which are not the core of this study. They written down in the additional explanation to describe how another factors influence the community in dealing with climate change impacts.</p> <p>For documenters; Re-image capture by the local co researcher and local guide.</p>

2.4.5. LINKs Expert Meeting II

In the middle of report writing process, Bingkai Indonesia invited experts to consult finding results at field and collect inputs related to scrutinizing analysis of problems identified at fields. Moreover, this meeting also aimed to consult temporary results of photo essay and movie to all involving teams. This meeting was held in Yogyakarta on April 1 2012 and joined by all researchers and participatory action research teams.

2.4.6. Reporting

Process of activity report “Sharing and Learning in Facing Climate Change Impacts” was performed in two stages, a progress report on February 20th 2012 and a final report on April 30th 2012. The final reports are a written documentation covering four research report representing 4 research areas, one accumulative report, a financial report, a photo essay entitled “Stories from Coastal Area: Portrait of Local Wisdom”, and a 20 minutes documentary movie entitled “Dancing on a Sea”.

CHAPTER THREE CONCLUSION AND RECOMMENDATION

3.1. Conclusion

Research process using PAR method and PRA techniques in four target areas: Sangihe Islands; Kendahe and Lipang in Bali; Pengastulan and Demak in Sayung area; on local knowlwdge and wisdom related to climate change adaptation and Disaster Risk Reduction generally results several conclusions.

1. Local knowledge and wisdom developed in the communities are still relevant substantially in facing hazards. Yet, climate change impacts on seasonal climate variable (unpredictable changes on rainy season and dry season), annual (changes in dry or rainy season period), decadal (extreme event such as el nino and la nina), and sea level raising also influence the local knowledge and wisdom. However, the local knowledge and wisdom keep adapting as a response toward the changes. The knowledge can be developed based on natural process where community learn in natural process. The example is community in Sayung area which uses snails to predict the seawater flood level in their area.

External knowledge related to problems in the community can also be accepted and developed such as beach abrasion mitigation effort by building a dam (wave-breaker), re-planting, taking preparedness efforts in facing hazards, establishing disaster preparedness team, emergency SOP, or building evacuation route.

2. Local wisdom in the form of traditional ceremonies using symbolic language interpreted as the answers of existing natural system. Religious or traditional ceremonies as thanksgiving expressions is a reflection of the community to not forget the mother nature. There will always be something to receive if human beings do not destroy. Prohibitions using mystical symbols are warnings on weather condition which is dangerous for human safety. It goes the same with spatial design; house design; past experiences which have been proven bringing good things; prohibition to go to sea during Pangabean ceremony which, in fact, is a bad weather in west wind season; and Kendahe area community spatial design which is adjusted with Awu volcanic eruption hazard.
3. Islands such as Kendahe and Lipang possess higher level of risks due to climate change. Limited resources to fulfil basic needs such as food, clean water, energy, health, and education will negatively implicate and lead toward increasing vulnerability and decreasing capacity.

Several past events, when this island was isolated for eight months due to bad weather, have made community in the area live in limited facilities. This condition will be worse if during similar period (bad weather condition), there is a disaster potential event such as plague, pest, or geological disaster such as volcanic eruption, earthquake, or tsunami.

Such condition will reduce community resiliency to survive and hamper external aid mobilization. Tsunami in Mentawai Islands can be a valuable lesson how islands area can be very vulnerable when two hazards strike at the same time i.e. tsunami and bad weather.

4. Climate change influencing hydrometeorology hazard which increases vulnerability or decrease capacity needs to be comprehended by all stakeholders especially communities with high level of risk. It needs an assessment that specifically identify the ability of local knowledge and wisdom in facing hydrometeorology disaster risk increase influenced by climate change impacts.

It is considered significant to prevent ourselves from being trapped or overestimating local knowledge and wisdom as if they are the answers to all problems including disaster risks, unbalanced hazard level due to climate change, and high level of vulnerability which cannot be coped with available resources. If this situation happens, communities will have high risks of becoming disaster-affected people.

5. The strength of local wisdom is still being preserved and implemented by local communities due to their believes on the values inside or as parts of believes developed in the community. However, at one point, the local wisdom can be degraded by various reasons for example young generation's perceptions on local knowledge and wisdom such as old-fashion ways of living, old thoughts, or past events. Therefore, it needs serious efforts to preserve the local knowledge and wisdom systematically.

Encouraging local knowledge and wisdom as part of formal law tool can generate a double impact. At one side, local knowledge and wisdom can be preserved since they are stated on a policy. Yet at the other side, it is considered weakening the values in the local wisdom itself. Community tend to ignore formal policies if they are not related to interests visually seen.

Ignorance of local wisdom which have been written on a policy even though it is in written and in a legal document form. The implementation at community level is weak. Therefore it needs a strong consideration on how to preserve this local knowledge and wisdom as part of community's life.

3.2. Recommendation

Research process in four areas: Sangihe Islands; Island of Kendahe and Lipang; Pengastulan – Bali; and Sayung of Central Java using PAR methods and focusing on local knowledge and wisdom related to climate change and disaster risk reduction becomes an inter-community interaction process. Inter-community dialogue on past condition, present condition, or future prediction becomes a dialogue room of several kinds and quantity of existing hazards, vulnerability, or capacity. Even though it has not specifically calculated the disaster risks in the area, but at community level especially community figures, local government staff, or community motivators; the objective condition is comprehended more.

The available resources and management system in the area are carefully re-checked by seeing the aspects of historical, trend and changes, community mobilization, and regulation or policy system. Local knowledge and wisdom ever existed and those which still exist become a joint reflection media at community level in facing hazards and changes.

The overall analysis results from the researches generates recommendation specifically addressed to:

3.2.1. *Government;*

Generally, government and local government need to realize kind and level of hazards in their areas. Awareness on hazards and its level will become the basis for government and local government in policy making, development planning and implementation, natural resources exploitation, and human resource capacity strengthening efforts.

Therefore, it is important for local government to:

- 1) Conduct disaster risk analysis by integrating a more details climate change impacts. The existing disaster risk analysis at province and national level becomes a reference by considering more on typical characteristics of each area. Related to climate change impacts, it has to be realized that climate change influences hydrometeorology and biological hazard level, decreases vulnerability level, or decreases capacity in the community

- 2) Disaster risk analysis results also include climate change analysis as the main reference or foundation for several things starting from policy making, regional development planning (RPJMD-RKT), human resource and institutional improvement, regional budget planning, or network expansion.
- 3) Islands area with limited access and resources to support the dignity of life needs to be encouraged and self-supported. Dependency on basic needs such as food, clean water, health service, education, and energy needs to be answered concretely through community and area strengthening planning.
- 4) Negative impacts disasters such as abrasion and efforts taken by the community need to be encouraged and facilitated. The form of support is not only in material such as wave breaker dam construction, mangrove planting, or house reconstruction but also in community capacity. The support needed is also in the form of community active involvement and award on the existing and developing local knowledge and wisdom in the community.
- 5) Putting local knowledge and wisdom as resources in the community. Therefore, a more specific mapping of local knowledge and wisdom is needed as values in formulating regional policies or development planning particularly related to climate change adaptation and disaster risk reduction.
- 6) Community participation must be comprehended and practiced based on its substance. Community involvement in planning, implementation, monitoring, and evaluation enables the synergy of project or program developed by the government.
- 7) Project or program that implemented by the government, need to be consolidated before. So that the impression of ego sectoral or overlapping can be avoided. As well as the model for society, how the program or project should be done.

3.2.2. Community

The recommendations to the community from the implementation of this participatory action research are;

- 1) Documenting the local knowledge and local wisdom that existed or is still using. The documentation should explain clearly about the meanings contained therein, including the history of local wisdom or knowledge.
- 2) Memperkuat kearifan lokal dan hukum adat atau kebiasaan/tradisi baik melalui disimulasi informasi, khususnya pada generasi muda atau anak-anak. Menterjemahkan secara baik simbol-simbol yang terdapat dalam upacara, tradisi atau kepercayaan yang ada.
- 3) Strengthening the local wisdom or knowledge and traditional laws, customs or traditions through dissemination of information, particularly to young people. Properly interpret the symbols contained in the ceremonies, traditions or beliefs that exist.
- 4) Looking at the types of hazards and the changes. These observations are also associated with vulnerabilities and capacity owned by the community. That can give an idea; how much or big the risks will be located to the community if the disasters occur. This analysis will also

be important for plannings in anticipation of or reduce the threats o hazards. Whether conducted by external parties (government, local governments, NGOs, universities or private) or by the community itself.

- 5) Engage actively in the exercise of a program or project undertaken in the community and be a critical partner in its implementation.
- 6) Developing the profile and strategic master plan for regional management and media that can unite the intervention or the initiation of the program from the outside or the community itself.
- 7) Building network with external parties to support the community efforts or plans to reduce the risk of hazards and climate change impacts.

3.2.3. Non Governemntal Organization

3.2.3.1. Bingkai Indonesia

Bingkai Indonesia as the learning center and civil society movement for ecological justice, documenting the results of this research in the video movies and essay photo essay to be used for the sustainability of the research, in particular to follow up the community action plan.

This internal recommendation is a form of organizational commitment and person in it to not stop working after this project is completed. Bingkai Indonesia, recently continued to garner the support of multi-party to follow up the results of the study. Both for the community development, capacity building and public awareness and advocacy.

The reseact products; reports, film and essay photo will be used as the media or material of discussion with any parties. All this research results are expected to be published in the web site of Bingkai Indonesia; <http://www.bingkaiindonesia.com/> so that can be easily accessed by public. The research result can be used to support another research that will be conducted by researcher from government, university and local, national or international organization, with the approval of Bingkai Indonesia.

3.2.3.2. UNESCO

To follow up the research results in a more kongrit, particularly as the recommendations generated. The most strategic step is to endorse the Government, Provincial Government at the study area, to jointly find alternative solutions to reduce disaster risks and impacts of climate change (adaptation).

Especially in the islands, UNESCO needs to build networks with others to create a community adaptation model in responding to the impact of climate change. Learning from the disaster in Mentawai, the local community were isolated nearly eight months due to bad weather, they deserve serious attention. Community dependence on external resources to meet basic needs: food, clothing, energy, health and education - even water, is crucial to be solved.

Kendahe and Lipang islands are the only two examples of inhabited islands in Indonesia. There are hundreds of islands which have similar characteristics. Even have higher vulnerability due to its position, limited access and public facilities as well as a very high dependence on resources from outside of the islands.

3.2.4. Academics/researcher

For academics who conduct studies, preferably involving the community as part of the research team. The involvement of the persons from these communities must be understood as part of efforts to increase the capacity of local resources. Not merely to facilitate the research process or obtain the field data and information needed.

The research of written documents, photographs and films should be submitted to the community as the public archives. Those documentation are important because it can be used for the reference to many parties, both for other research or references in the preparation of planning ahead.

CHAPTER FOUR

LESSON LEARNED

Local knowledge and wisdom of the community, either the unpracticed ones or the existing ones, go in line with community needs. Several symbols or myths are the adjustment form of present condition such as a symbol of marriage or adultery prohibition which is believed by Kendahe community as natural disaster related or prohibition of going to the sea during Pangabeian traditional ceremony in Pengastulan Bali, and other activities of requesting safety or gratitude expressions.

If we use linear logic for those symbols, it will be difficult to find a point of direct relation pattern of how adultery or marriage of one descendant can implicate to disaster event which at that time was related to Awu volcano eruption or sea offering ceremony to express gratitude and ask for a safety.

But if we take a deeper look, the symbols and process have a wide and deep meaning. Adultery or incest marriage, for example, brings impacts toward social system at the community. Moreover, there are possibilities of conflict potentials, unclear family line, and scientifically incest brings negative impacts toward the babies born such as disabilities. Prof. Alan Bittles, as quoted from BBC, the director of human genetic center in Perth Australia states:

“If two persons carrying recessive gene reproduce, their children will possess one of four chances to carry those abnormalities and one of two children has an opportunity as a carrier. It endangers same blood marriage or closely related family marriage, because the risks of disease or certain genetic condition are bigger”.

Surviving, coping mechanism or adaptation by community in facing environmental changes reaching to extreme condition become a learning on how a community benefit the available resources to keep their life and the running social system. Local wisdom greatly contribute to those efforts until community resiliency is tested.

However, various kinds and level of the existing hazards which increase every year can be a warning for all stakeholders particularly government and local government as the holder of responsibility in Indonesian Republic country implementation. Local knowledge and wisdom can be far behind the increasing disaster risk which is not realized by community or the government.

Tsunami disaster in Mentawai Islands which was accompanied by bad weather condition hampered the process of aid distribution from external parties. Meanwhile, resources in the area were not prepared for a major crisis event either from human resources, institutions that can perform disaster management or basic need supply such as food, clothes, clean water, health service or temporary shelters.

Sangihe Islands possesses similar characteristics to Mentawai Islands and in some aspects, Sangihe Islands have higher vulnerability. Sangihe Islands have an active volcano and other hazards (earthquake and tsunami, flood, landslide, and plague). Cultivation commodity is still dominated for fulfilling market demand instead for producing food or herbs. Food need, which is rice, is fulfilled externally as well as energy needs for transportation, fish catching, or electricity.

High dependency on external resources to fulfill basic need is at high level of risk if transportation access into the island which is also as a country border is cut. The tendency is getting bigger due to climate change impacts.

At the same case, various hazards in the area have significantly impacted community life such as abrasion, flood, landslide, typhoon, storm, and plaque. There have been quite many responses from the community in coping the hazards either in mitigation or preparedness. External parties such as local government, national government, or non-government organizations working with the community work more on sectorial aspects. The project or program is still dominated by main duty and functions or program focus. In the implementation, community involvement, local knowledge and wisdom, or significant issues developing in the community are often neglected. This condition happens constantly. Moreover, program sustainability is also not concerned.

Participatory dialogues generate a smart idea on the importance of an organization at local level which is able to be the media in uniting external intervention or initiative. Hamlet or village strategic planning becomes important as a reference document or local master plan so any parties implementing project in the area must refer to the master plan. This idea emerges in four research area and it must be practiced systematically by involving all stakeholders in the area particularly the community itself.

ATTACHMENTS;

1. Report of 4 research areas
2. Executive summary of research findings; Hazards and local knowledge
3. Financial report
4. Documentary Film
5. Essay Photo