

Participatory Management to Reduce the Impacts of Flooding, Flash Floods, and Landslides

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ABSTRACT

This study on reducing the impacts of flooding, flash floods, and landslides in areas at risk examines important factors for successful management, particularly promoting public participation, which permits individuals to play important roles in various fields. “Inform” is the first step, when the government provides people with information on the process or decision, which is followed by listening to opinions (Consult), as a supplement to the government's decision. Next, “Involve” is an opportunity for people to participate in operations or to suggest ways to make decisions. Then, “Collaboration” is the point where the public sector representatives participate by partnering with the government in every step of the decision. And lastly, “Empower” is a stage that gives the highest roles to the people, who make decisions, as well as developing the bureaucratic system and processes that encourage people to become more involved. The full process is known as “participatory government management.” This is a means of sustainably reducing the impacts of floods, flash floods, and landslides.

Keywords

Public participation, Participatory management, Guidelines for effective disaster management

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Introduction

At present, landslides are frequent and severe in Thailand. They are due in most cases to human behavior, such as deforestation, farming on sloping areas, destruction of topsoil, etc., resulting in the occurrence of landslides and leading to unavoidable damage. Because of differences in topography, each area is at risk from various disasters. For example, in the case of the basin area of the lower Kwai Yai River, the main river has a total length of 380 kilometers, flowing through Umphang District, Tak Province and three districts in Kanchanaburi Province, namely Mueang Kanchanaburi District, Si Sawat District, and Thong Pha Phum District. The lower Kwai Yai sub-basin is considered an area that is at risk from landslides, floods, and flash flooding. In the past, however, the danger of landslides in Thailand was not very severe. In general, landslides tend to occur at the same time as or following floods caused by rainstorms that bring severe, continuous rain. Therefore, owing to gravity, the soil and rock mass are not able to hold the massive amount of water. As a result, the risk of landslides and the potential impacts greatly increase.

In the past, most problems were caused by people in the area, largely because many villagers

did not see the importance of their role in managing the land. Other weaknesses were the self-interest of the villagers, lack of financial resources, weakness of the leaders, conflicts between villagers, disagreements, their mistrust of civil servants, lack of unity, and tendency to discriminate against one another.

An important issue in disaster management is that community-based development is necessary. There should be a major effort to deal with the disaster and have the least loss, and there should be strategy formulation and management of programs, activities, and projects. Initially, what must be considered as a guideline to solving various problems is participation in community development activities, paying attention to participation in community planning and project meetings in order to reflect the real problems in the community. Participation will lead to the formulation of guidelines with the government for solving problems. People in the area should establish groups in the community in order to receive information quickly and conveniently. Groups may be established in the form of directors and members, who choose their own management committee, donating assets and labor, as well as jointly planning development activities, operating in an appropriate manner,

evaluating periodic performance, preventing and preparing for emergency management, and planning systematic reconstruction after the disaster.

Therefore, the research team conducted a survey and used the collected data to discover ways to promote public participation in participatory management, with the goal of reducing the impacts of floods and sudden floods in the lower Kwai Yai sub-basin. General recommendations include providing information (Inform) about the alert alarm, providing current situation information through various convenient and fast channels with accurate information, as well as thoroughly educating the public about the disaster. The field of consultation (Consult) involves opening the stage to listen to opinions from the public seriously and consistently on a regular basis and using public opinion to consider and solve problems in concrete and clear measures. As for "Involvement," it could be done by encouraging people to take an active and concrete role. Representatives from the public sector could play a role and become involved in recognizing various issues, participating in policy-making, and planning various projects related to flooding and landslides. Cooperation promotion (Collaboration) can be achieved by allowing people to participate in policy formulation and in making plans. The activities organized by the government should provide space for people to participate, which would include creating a support network in both private and civil society areas. Finally, with the empowerment of the people (Empower), whenever there are problems of flooding, flash floods, and landslides in the area, the public is able to plan, make decisions, and solve problems independently without having to wait for orders from the government, as well as being able to allocate enough funds to help support the people's operations. This participatory process not only would enable the community to see value in themselves, but also would create a direction for sustainable development and offer management models with greater participation by preventing the occurrence of modern natural disasters. The ultimate goal is to obtain a quality of life that is environmentally friendly, as well as to create a balance between conservation and integrated utilization of nature.

Research Objectives

1. To study people's participation in community development activities, such as community planning/ project meetings, being a member of a group in the community, donation of assets/labor, being a member for planning development, practice planning, evaluation, prevention and preparation, emergency management, and restoration after the disaster, as well as other factors.
2. To promote public participation on the issues involving information (Inform), consultation (Consult), involvement (Involve), cooperation promotion (Collaboration), and people's empowerment (Empower) in relation to participatory management, as an effective way to reduce the impact of floods, flash floods, and landslides.

Conceptual framework

With regard to the promotion of public participation in participatory management, the research team synthesized and presented the conceptual framework of the research by applying the concepts from four types of participation: Cohen and Uphoff (1980); Kowit Phuangngam's four-step participation (2002, p. 8); the five-step development of the Bureau of Educational Standards, Office of Rajabhat Institutes Council, Ministry of Education, Bureau of Higher Education Standards and the Ministry of University Affairs (2002, p. 116); and Arnstein's "Ladder of Citizen Participation" (1969), which divides the people's participation ladder into eight steps.

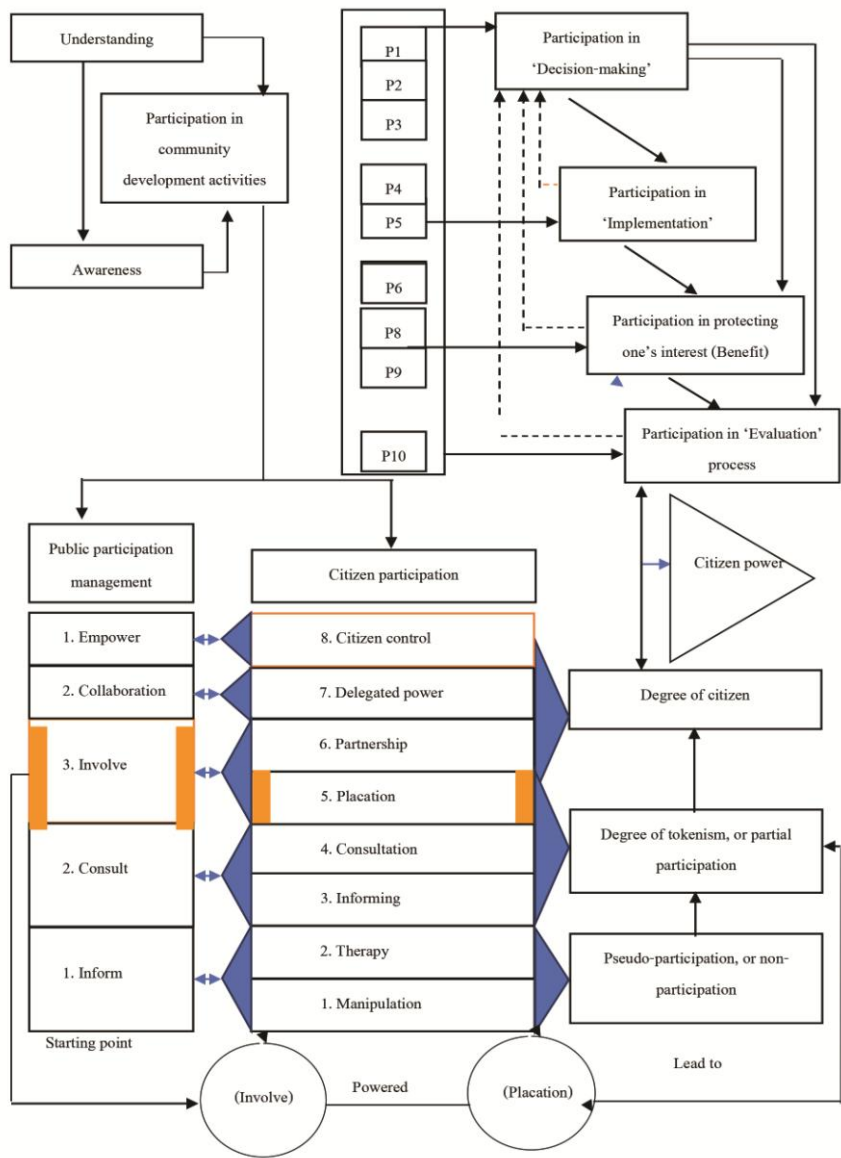
In Arnstein's model, the higher steps on the ladder represent more power of the people. Steps 1 and 2 are not considered public participation, so they are labelled Non-participation. Steps 3 to 5, also known as Tokenism, mean that people have the opportunity to provide information but have no decision-making power. In steps 6, 7, and 8, citizens have the power to make decisions, which is called Citizen Power. In this model, participation at the partner level (Partnership) is the beginning of the role and power of the people. The application is developed in the work of Sopa Madlang (2008), who builds on Arnstein's principle that decision-making power is a basis for determining participation levels, summarized as an eight-step

ladder with three types of participation, which are pseudo-participation or non-participation, partial participation, and authentic participation.

The research team also applied the concept of people’s participation with the civil service, based on the Office of the Public Sector Development Commission (2014), which specifies five levels of public participation, so that relevant parties and government agencies may design

participatory public administration suitable to the level of opportunity given to people to participate in the government activities.

From the review and extraction of knowledge and theoretical concepts of integrated synthetic participation, the researchers developed the concepts into a theoretical framework, which is described in Figure 1.



Notes: P1 = Participation in community planning/ project meetings
P2 = Regarding participation in community membership activities
P3 = Donating property/materials/labor
P4 = Being a committee member
P5 = Participation in development planning
P6 = Participation in operations
P7 = Participation in evaluation

P8 = Prevention and preparation
P9 = Emergency management
P10 = Restoration after the disaster

Figure 1: Review and extraction of knowledge, and theoretical concepts of integrated synthetic participation to develop into a theoretical framework.

Source: *Participatory Management to Reduce the Impacts of Flooding and Sudden Floods in the*

Lower River Kwai Yai Sub-basin, by Prachaya Chumnaseaw et al., 2018, Bangkok: National Research Council of Thailand (NRCT).

Figure 1 shows the framework of the theory of cognition and awareness, in which we see that participation is a result of the cognitive process. That is to say, when a person is stimulated by certain stimuli, or senses the stimuli, knowledge will be obtained. After perception, the next step is to understand that conceptualization leads to learning, which ultimately leads to awareness. Understanding and awareness lead to actions or behavior of the person towards the stimuli, and the behavior can be expressed as participation behavior, that is, a public participation process resulting from the relationship between understanding and awareness. It is an important foundation for promoting public participation.

The creation of public participation to reduce the impact of natural disasters would provide opportunities for people and those involved in all sectors of society to participate with the government. The five levels of public participation (Office of the Public Sector Development Commission, 2014) are as follows:

1. Receiving information (Inform) is considered the lowest level of public participation. However, it is the most important level because it is the step in which the government allows people to enter the participation process. Informational methods can use various channels, such as publications, various electronic media, exhibitions, newsletters, press conferences, or posting and providing information via websites;

2. Consultation (Consult) is a process that allows the public to participate in providing information, facts, and opinions to support government decision-making in various ways, such as providing opinions, taking polls, organizing public forums, or commenting on official websites;

3. Involvement (Involve) is an opportunity for people to participate in operations or to suggest ways to make decisions. It ensures that information and opinions, and the needs of the people, will be considered by the government. Involvement activities may include workshops to consider public policy issues, public hearings, or the establishment of a working group to suggest

policy issues. This step includes opportunities for the public to play a role in policy-making and planning, and taking some responsibility for the village;

4. Cooperation (Collaboration) allows a group of people, or their representatives, to participate by being a partner with the government in every step of the decision-making and hold joint activities continuously, such as a committee of local people who hold community meetings in the village on a regular basis, and holding activities with the public and private sectors;

5. Citizen empowerment (Empower) gives the highest level of role to the people by allowing people to make decisions, such as having referendums on various public issues, so people have the chance to make all decisions, including establishment of village funds, dividing the people into work groups, and enabling the community to know the problems and solve the problems by themselves.

The significance of all five levels of participation is based on the concept of the four forms of participation by Cohen and Uphoff (1980), which suggests that participation must start from the following issues:

1. Decision-making: In the decision-making process, the first step is the determination of needs and priorities and then, choosing policies and related citizens. There is initial decision-making, decisions made during the planning process, and decisions made during the implementation of the plan;

2. Participation in operations (implementation): The component of the implementation of the project comes from the question of who can benefit from the project and how will it benefit them, such as resource support, administration, coordination, and assistance;

3. Participation in receiving “benefits”: In addition to the importance of quantitative and qualitative benefits, planners must also consider the distribution of interests within the group, and the benefits of the project, including positive and negative benefits, which will be beneficial or harmful to people in society;

4. Participation in “evaluation”: The important things to note are the public’s comments, likes, and expectations. These issues influence the behavior of people and their

participation in community development activities.

Participation of citizens can also be described in the form of a ladder – the eight steps of Arnstein (1969) (participation ladder). First is the organizing step, and the second step is treatment sessions. Together, they are pseudo-participation or non-participation, in which people have not reached authentic participation. In this phase, the decision-making procedures are limited within only a small group of people in power. They would make decisions without revealing to the public the content, method of decision-making, positions, or the authority of those in power. The first two steps were created to compensate for authentic participation. The true purpose of these two steps is not to give people access to participation in planning or controlling a project but to help the power holder to carry out the project.

The third to fifth steps progress to the level known as ritual participation or partial participation. The third step is listening to news, and the fourth step is consulting, which indicates that public opinions are increasingly being heard by those who hold power. However, under these conditions, members of the public do not have the power to guarantee that their opinions will be fully considered by the authority. When participation is limited to these levels, there is no way to change the condition. The fifth step is a higher level of participation, in which some authorities allow members of the public to give advice. However, the decision-making power is still with the authority.

The highest steps are at the level known as “the power belongs to the people,” which increases the level of participation in decision-making. The public can enter the sixth stage as a partner, allowing them to participate in trade-offs with the authorities. As for the seventh step, it is an advanced use of power through agents. The eighth step is the level of strong control by the people, where the public is able to exercise power in the decisions of society through representatives or the people who exercise the power itself.

Prachaya Vesarush (1985, p. 58) described major problems and obstacles that tend to arise from the people, namely the ignorance caused by lack of education, lack of assets, the weakness of leaders, and conflicts between villagers when they

are involved in activities that offer benefits, among other problems. Furthermore, Jintana Thongrod (1996, p. 19) sees other problems and obstacles limiting the participation of the villagers: (1) villagers still do not see the importance of their roles; (2) villagers are tired of working with civil servants and bureaucracy; (3) they have personal obligations in the family; (4) they lack unity and split into small factions; (5) some villagers are self-interested and have disagreements; and (6) some village leaders are not trusted by the community.

These problems may be aggravated during the management of a disaster, which is harmful to the lives and property of the people, damages the property of the state, and may damage the economy, society, and environment at several levels. The disaster might be caused by nature, in a spontaneous occurrence, or it may man-made, either intentionally or unintentionally. Although we cannot stop most disasters, we can monitor and track events, and make preparations for dealing with the destruction that may occur.

Therefore, if people and communities have a greater ability to participate in the management of disasters they might face, it would help reduce the severity of the incident, and would also greatly help support the operations of the relevant government departments and local organizations to solve problems.

Scope of the study

This study on promoting public participation in participatory management to reduce the impact of flooding, flash floods, and landslides in the lower Kwai Yai sub-basin – including communities in Kanchanaburi Province that are affected by floods, sudden floods, and landslides – was conducted in three districts and 15 sub-districts:

1. Eight sub-districts in Muang District: Pak Phraek Sub-district, Nong Ya Sub-district, Tha Makham Sub-district, Kaeng Sian Sub-district, Nong Bua Sub-district, Lat Ya Sub-district, Wang Dang Sub-district, and Chong Sadao Sub-district;

2. Six sub-districts in Si Sawat District: Tha Kradan Sub-district, Nong Ped Sub-district, Mae Krabung Sub-district, Dan Mae Chalaeb Sub-district, Na Suan Sub-district, and Khao Jot Sub-district;

3. One sub-district in Thong Pha Phum District: Chalae Sub-district.

The research team has applied principles from the Department of Disaster Prevention and Mitigation by using its selection criteria to determine the severity of the risk areas (based on the chance that the disasters are likely to happen), such as area characteristics (pan-basin area, lowland river basin, areas adjacent to the foothills or in the hills/mountains); history of past disasters and damage assessment from the impact on life and property (population, number of houses); impact on agriculture (agriculture, livestock, fisheries); impact on damaged infrastructure (roads, bridges, reservoirs, weirs, dams); and other factors (Department of Disaster Prevention and Mitigation, Office of Research and International Cooperation, Research and Development Group, 2013). The researchers conducted studies in providing information (Inform), listening to opinions (Consult), which would promote cooperation (Collaboration) and involvement (Involve), and thus “Empower” people. The researchers analyzed information with a participatory local assessment technique (Participatory Rural Appraisal – PRA) from various sources. Details are in two parts, as follows:

Part 1: Study of citizen participation in public administration by organizing a public forum to find a solution with focus group discussion, group interviews, and in-depth interviews by selecting sub-districts and sample groups affected in the 15 sub-districts listed above;

Part 2: Study of participation in community development activities on the issues of planning meetings/projects in the community; being a member of a group in the community; donation of assets/labor; and being a member in development planning, practice, evaluation, prevention, and preparation in emergency management, as well as rehabilitation after the disaster. The researchers looked for evidence of public participation on the issues of providing information (Inform), listening to opinions (Consult), promoting cooperation (Collaboration) and involvement (Involve), and empowering people (Empower) by studying primary data through survey research, using questionnaires as the research tool.

The population and key informants or stakeholders impacted by flooding, flash flood, and landslides in the lower Kwai Yai sub-basin came from civil servants and officials in the Department of Disaster Prevention and Mitigation, local government officials, civil servants and regional officials, religious groups, community leaders, business people, merchants, farmers, fishermen, freelance workers, and members of the general public from the local population living in 15 sub-districts within the aforementioned three districts of Kanchanaburi Province.

Results

The results of the participatory public administration study are described below:

(1) At present, the methods and tools for providing information to people in the area are primarily news from the provinces and districts, radio, local broadcast system, local alarm tower, and warning signs in the community. They provide information on many areas of concern and perform several important functions: (1) learning the benefits of forests and joint maintenance of the forest, (2) observing the upstream forest and allowing communities to participate in surveillance of risk areas, (3) organizing village committee meeting, (4) informing the village about news by broadcasting news by car or by local broadcasting line, or via radio, television, social media, phone calls, or signaling using local knowledge, (5) posting highland announcements about meeting points for evacuation, (6) providing public relations boards to inform residents about emergency phone numbers, and (7) frequently holding disaster preparation reviews and having a coordinator within the community. Having strong community leaders also improves communication, and people in the villages help to spread information by word of mouth;

(2) The methods and tools for listening to people in the area are varied: (1) having community leaders attend meetings with staff and bringing public opinions to the higher-level meetings, (2) arranging meetings or informing a community in an area that is expected to be affected, (3) finding ways to prevent and respond to disasters that will occur, (4) exchanging ideas based on water level monitoring in rivers and streams, (5) observing water

situations, (6) organizing training, (7) exchanging ideas to help villages prepare defenses and safe areas, and (8) organizing personnel in local administrative organizations so that they will explore, listen to opinions, and promote information in all dimensions;

(3) The methods and tools for allowing people to take an active role in the area include (1) providing an opportunity for the persons such as sub-district chief, village headman, community leaders, and civilians to play a role in policy-making and planning for public hearings, and conveying information from the meetings to the community, (2) letting people learn how to work with the government sector, by establishing working groups, determining responsibilities in the village, finding volunteers in the community, and setting up groups to monitor the water level, water color, and changes in the river. Moreover, it is important to have a strong sub-district headman, village headman, village committee, and volunteer groups. The state should also create convenient systems that allow better cooperation between community leaders, subdistrict headmen, village headmen, and private and government agencies in all areas, which would allow the public to participate in activities that the government agencies operate. Increasing the means of broadcasting community radio news would also help communication;

(4) The current situation suggests many guidelines, methods, and tools for promoting cooperation with people in the area: (1) holding community meetings and arranging for community representatives and community leaders to attend the meetings, (2) establishing a water management working group for both government agencies and communities, (3) organizing training to educate the locals about various disasters, (4) rehearsing plans for moving to higher ground, (5) monitoring occurrences by observing reservoirs and dams, (6) promoting watershed forest planting activities, (7) promoting activities to maintain the cleanliness of waterfront homes, (8) forming a self-management team to develop the village, the community, the local temples, the local schools, and the local public health centers, (9) building weirs (both overflow and semi-permanent weirs) to slow down the water, (10) obtaining governmental support for modern tools, including machinery

and equipment, (11) improving coordination and cooperation between the communities and the government, Electricity Authority, Department of National Parks, Disaster Prevention and Mitigation, local government organizations, and external private agencies, (12) having strong community leaders who are accepted by the community, and (13) establishing working groups, network cooperation, and community volunteers; (5) Some of the guidelines, methods, and tools for empowering local people are

(1) establishing a village fund, (2) forming work groups in the village, (3) dredging canal water, (4) establishing a water bank, (5) constructing slow-water weirs and semi-permanent weirs, (6) and keeping the houses near the riverbanks clean. Furthermore, the village headman and the village leaders should hold meetings to discuss and solve problems that occur in the community, so arranging meetings or conducting village communities in which villagers are involved in community development planning is essential. It is clear that community leaders have an important role in creating opportunities to cooperate. The leaders should also have a follow-up process to assess the success of the promotion of public participation, as well as to determine solutions to problems in the event that mutual empowerment is not successful. Additionally, government agencies, both the management and the administrative department, should come to speak with relevant parties, providing knowledge and understanding in preparation for disasters, as well as providing opportunities for people and all relevant parties to participate with the government in the area to comment on the development of risk areas. Having the necessary equipment, machinery or materials would be a major help, as well.

The suggestions above would play a role in overcoming the obstacles that hinder the participation of people in promoting local participatory activities. It is found that the problems fall into three broad categories, which are mainly due to the structure of Thai society, as discussed below:

1. Social differences

There is distinct diversity in the study area in terms of religion, traditions, culture, and occupations. The majority of the people are Buddhists, and there are also Christians and Muslims; what they wear is similar to what the

people of other provinces in the central region wear. Some locals usually live in large families, particularly the Karen, Kha, and Khamu people. There are many tribes, including the Karen, Hmong, Yao, northeastern Thai, Burmese, Mon, Miao, and Kralang. They all have different traditions. For instance, the Kaplong people in Thong Pha Phum District, Kanchanaburi, have traditions rarely seen in Thailand. The local diversity includes their careers. Most of them are farmers, such as cassava and sugarcane farmers; many raise animals, such as dairy cows, pigs, chickens, and ducks, and some engage in fish farming. Some have careers in industries such as sand dredging, wood processing, stone breaking, and processing agricultural products. Such differences are important factors that can cause problems in promotion of knowledge and participation in management, each population area is influenced very much by their reliance on the natural environment. If disaster strikes, the local people also tend to believe that disasters are a supernatural punishment, as if they had done something that violated the customs or was offensive to the local spirits.

2. Control of local politics

The local political system is controlled by a minority of people. Most people in the area are residents, but they do not have the opportunity to participate in the management of government projects at various levels, because the people in the community receive news and information from the leaders in the community through the local broadcasting line, car broadcasting, warning signs in the community, and monthly meetings. For example, in Srisawad District, the community receives news and information from provincial and district authorities, after they inform leaders in the community. There are regular meetings, word-of-mouth communication between people in the community, and vocal announcements in the village. However, there is still not much access to information in the community, because most areas are mountains and forests, so access is a challenge. The Subdistrict Administrative Organization acts as the main government office. People use local broadcasting channels and provide opportunities for the locals to take roles in determining policies and planning for managing their village in Srisawad. Unfortunately, it was found that government agencies in the community

provide few opportunities for people. The locals could only take a minor role in the policy-making process, but they should have cooperation from public representatives. For instance, in Thong Pha Phum District, the government agencies have provided opportunities for the public to participate and collaborate with community leaders and private agencies by trying to access the local communities in all areas.

3. Lack of effective mechanisms for resource distribution

An example of an effective mechanism is the allocation of power to the locals, whether it is forming a village fund by having the locals manage the fund, or forming working groups to work around the village for the sake of the village's effectiveness in terms of problem awareness and solving problems. The locals should also participate in meetings and activities and should first help themselves. Efforts should be made to empower community leaders or representatives to allow people to participate in community development planning, with forums to exchange ideas and development of risk areas in order to comply with the government's policy regarding plans for special economic development zones. There should be an opportunity for people to share opinions on the condition and problems of the community on a regular basis.

Guidelines for effective disaster management

Effective disaster management requires cooperation from all sectors, including government, private, and public sectors, to solve problems that occur, with both natural and man-made causes. Effective management begins with surveillance, monitoring, problem-solving, and rehabilitation after the disaster. Collaboration between all sectors creates cooperation at all levels, both before, during, and after the occurrence of the incident. It also helps social networks to work together to solve problems and results in a comprehensive solution from the concept of disaster management based on communities. It indicates that the management process is a complete system "with an emphasis on community participation in brain-storming, joint decision-making, and implementation of every step." Management proceeds from good preparation, including risk assessment and process analysis in order to find ways to prevent damage

and reduce risks. Other essential factors include management and implementation of plans during a disaster and major reconstruction after the disaster, as well as tracking, inspecting, and evaluating disaster risk management. Relying on the community as a base requires close cooperation between communities and organizations at the regional and national levels. The public, private, or external organizations would continue to provide advice only in matters that are necessary and beyond the capacity of the community to take action by themselves.

Community-based disaster management operates on the principle that the community is at risk and is directly affected by the disaster. People must fight to deal with the disaster and minimize it, as it is public-centered management and because no one understands the advantages, disadvantages, problems, obstacles and opportunities of the community as well as the people in the community. Communities must be involved and must be the masters of disaster management, with the goal of establishing community-based disaster management, as follows:

1. To reduce the risk and vulnerability of communities from the effects of disasters in areas with high chances of disaster by changing the concepts and roles of the community, from people waiting to receive help to people willing and able to protect and reduce the impact of the risk of disaster themselves;

2. To strengthen the capacity of the community's self-reliance in terms of analysis and

assessment of risk, as well as assessing their ability to manage events;

3. To cultivate an attitude supporting a culture of prevention rather than correction;

4. To enhance development, because, when communities are able to protect and preserve their own life, properties, resources, and environment, it enables the state to save money on solving community problems.

5. To attain a stable community where people have a safe lifestyle, which is the ultimate goal.

In addition, to promote public participation in participatory management, the concepts of disaster management for flooding, flash floods, and landslides must not be ignored. The study of Chaiyut Chinnarasri et al. (2015) states that, in the management of sudden floods and landslides, people should focus on the development of early warning systems and forecasts, emphasizing social relationships, and focusing on long-term risk mitigation policies. In the management of sudden floods in all three phases – before the disaster (preparation), during the disaster (response), and after the disaster (rehabilitation) – it is necessary for the public sector to participate, and there should be an organization that acts as a leader in coordinating and disseminating information, although people in risk areas are well aware and understand the causes and effects of sudden floods and landslides. An efficient disaster management approach with various steps is illustrated in Figure 2.

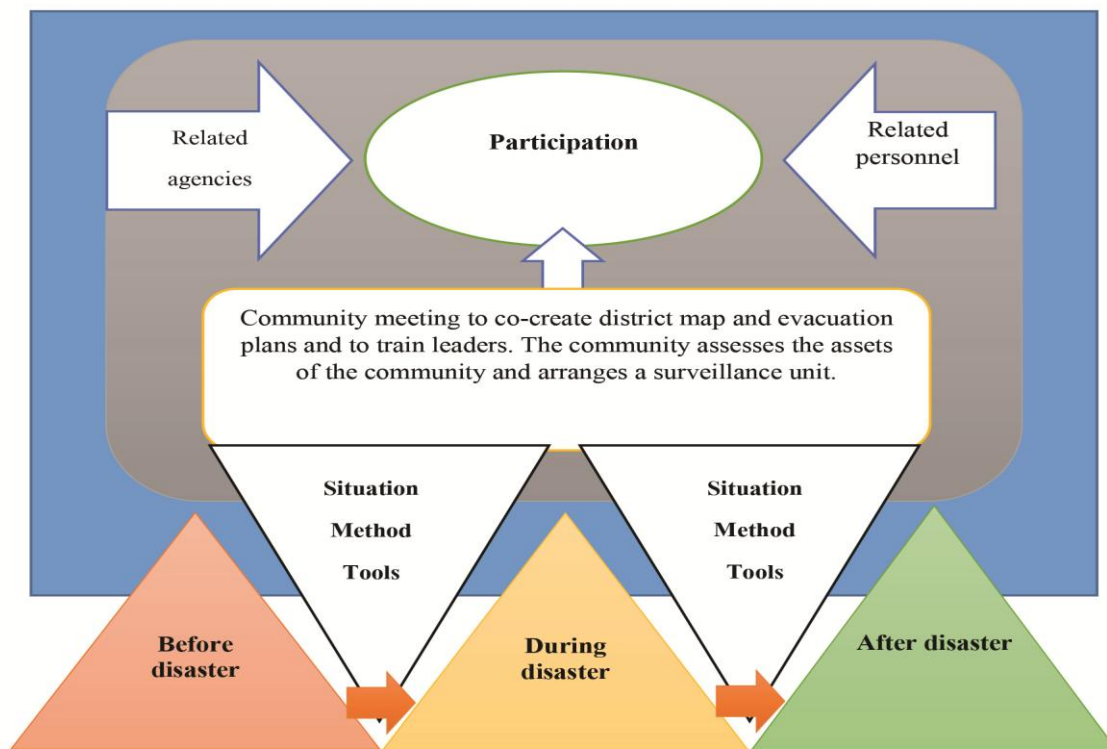


Figure 2: Steps and elements in an effective approach to disaster management.

The illustration shows the general principles of public participation in participatory management. The details pertaining to management of floods, flash floods, and landslides are listed hereunder.

1. Participation

1.1 Relevant agencies include government, public sector, private sector, sub-district administration organizations, provinces, the Ministry of Public Health, state enterprises, foundations, and health centers;

1.2 Related personnel are primary health volunteers, community volunteers, village headmen, community leaders, and civil defense volunteers;

1.3 Contents and methods comprise community meetings to map the district, jointly developing an evacuation plan, training community leaders, assessing community property, and setting up a surveillance unit.

2. Before disaster

2.1 Situations: continuous rain observation, tracking the weather, and observing the height and color of the water;

2.2 Contents and methods: constructing dams and weirs to slow down water; preparing

food, drinking water, consumer products, flashlights, and medicine; surveying risk areas; public relations; practicing evacuation and disaster prevention; first aid training; and checking the alarms;

2.3 Tools: local broadcasting lines and channels, public relations signs, general signs, escape routes, shelter plans, public relations boards, Line, Facebook, and telephone numbers.

3. During disaster

3.1 Situations: people who are able to help themselves, people not able to help themselves, and pets and farm animals;

3.2 Contents and methods: village surveillance, higher ground migration alert, preparation for necessary items such as government documents, valuable assets, drinking water, and clothing. The village committee organizes duties according to people's expertise, assesses the severity of the disaster, and organizes routes for assistance;

3.3 Tools: warning signs, escape route signs, local broadcasting line, honking car horns, using whistles and drums, and radio communication.

4. After disaster

4.1 Situations: help, support, and remedy; surveying damage; giving medical treatment for the elderly and the disabled, disabled children, victims, and other injured persons; and managing the deceased;

4.2 Contents and methods: (1) compensation, temporary accommodation, clothing donations, food, construction materials, (2) preparing registration records for victims, and assistance to agriculture and rehabilitation, (3) repairing damaged buildings, (4) recovering at health centers, and (5) assessing the damage. Psychologists, medical teams, and the remedies from the government will need to be organized;

4.3 Tool: local broadcasting channels.

Therefore, raising awareness about the dangers and serious impacts to the people would help encourage people to participate in disaster management. It would also accustom the locals to using local knowledge transferred from generation to generation to monitor, prevent, avoid, and alleviate sudden flooding. This includes teaching them to observe and learn the environmental signs and alarms, so that they are able to interpret alterations in nature; they may also need techniques for living and local adaptation, so organizing a forum to exchange ideas would be useful. These methods are necessary and would help make the surveillance and alarm systems more effective.

Conclusion

To reach its full potential, effective disaster management requires cooperation from all sectors, including government, private, and public sectors to solve problems that occur from both natural and man-made causes. It begins with surveillance, monitoring, and problem-solving and leads to rehabilitation after the disaster. It can be seen that collaboration between all sectors in solving disaster problems can create cooperation at all levels. Both before, during, and after an incident, social networks have to work together to solve problems, which results in a comprehensive solution from the concept of disaster management based on communities. It indicates that the management process is a complete system "with an emphasis on community participation in brainstorming, joint decision-making, and implementation of every step"

Creating public participation to reduce the impacts of floods, flash floods, and landslides can

be done at all levels and from various perspectives. Some methods can be done easily, yet others require time. It depends on the public's need to participate, the costs, and the ability to provide opportunities for people to participate. Public participation is sometimes a sensitive issue, so the government must develop knowledge and understanding in providing accurate information to the public. It should also listen to public opinions, provide opportunities for the public to participate, and develop skills and potential of civil servants at all levels concurrently. Vital principles consist of the following:

1. Providing information to people in the area by focusing on news from provincial and district authorities, radio, local broadcasting lines, providing knowledge about the benefits of forests and ways to jointly save the forest, allowing communities to participate in surveillance of risk areas, having strong community leaders, encouraging everyone in the village to help inform each other, and reviewing preparations for disaster response;

2. Listening to public opinion in the area by allowing community leaders to attend meetings with government authorities, presenting ideas at high-level meetings, conducting community meetings to find ways to prevent and respond to disasters, conducting joint surveillance in the area, and preparing prevention and safe areas to support the populace during disasters;

3. Involving people in the area by providing opportunities for selected representatives to play a role in policy-making and planning in public hearings, which should be broadcast to the community, as well as receiving support from the government. The government must establish a facilitation system to coordinate cooperation with community leaders, private sector organizations, and government agencies in all areas. People should be allowed to participate in activities that government agencies carry out, as well as increasing the channels for broadcasting community radio news by distributing it to all areas in the community;

4. Promoting cooperation with people in the area by organizing community meetings in the village. Both government agencies and communities should form working groups on water management, organize training to provide knowledge about various disasters, hold drills,

make evacuation preparation plans, and organize watershed forest planting activities and activities to maintain the cleanliness of waterfront homes. In addition, they need to build weirs to slow down the water (both overflow and semi-permanent weirs), support the use of modern tools, improve cooperation and coordination with the government and private external agencies, and build a collaborative network with community volunteers;

5. Empowering the people in the area by establishing village funds, forming work groups in the village, organizing meetings to discuss issues, and solving problems that occur in the community. Government agencies should come to give knowledge and increase understanding in preparation for disasters in the high-risk areas. Local people and all other related parties should be given the opportunity to participate and express their opinions regarding the direction of the development in the area. There should be a follow-up and evaluation of the work process to assess the success and failure of the joint operations. If there is success, everyone should learn how the development can be sustainable, or if there is a failure, ways to solve the problem together should be discussed.

The people participation process described in this paper can succeed if the bureaucratic work processes are adjusted in ways that allow people to participate, which is also known as “participatory government management.” It can be the most effective way to reduce the impact of floods, flash floods, and landslides in the lower Kwai Yai River sub-basin and maintain sustainable benefits for communities and people in the area.

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