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Preface

This report is a summary version compiled by the working group of " the International Comparative Study on Collection/ Dissemination of Information at the Time of Disaster," which was included in the research surveys of the Japan National Committee for the IDNDR.

Needless to say that to organize disaster information collection/ dissemination system, for example, to collect and disseminate disaster prediction information, to dispatch warnings like evacuation order, and to collect post disaster damage information, largely contributes to reduce damages. Particularly for those countries where the disaster prevention countermeasure plans are not well developed yet, this issue has of vital importance. By emphasising the issue, researched, analysed and discussed the possible ways of improvements by focusing on disaster-related information in developing countries, in particular on the dissemination and creation system/ organization of prediction/ warning.

In this study objectives are limited to the natural disasters such as volcanic explosion and wind/ flood damage. It is because 1) these kinds of disaster were expected to reduce their damage greatly by consolidating prediction systems, and " 2) the experiences of the developed countries may contribute to be the reference of the developing countries. Therefore sample counties were thoughtfully chosen both from developing and developed counties in these two cases as indicated below:

volcanic disasters
Indonesia, Philippines, Colombia, New Zealand, United States of America, and Italy

wind/ flood damages
Bangladesh, Thailands, Peru, China, Republic of Korea, United States of America, and Germany

In this report the state of the art of Japan is also described in comparison to other countries.

We started this survey research by collecting documentations both at home and abroad. Then country reports were asked to the scholars in the involving countries as well as to pay local survey visits to Indonesia, Italy, China and Italy by the members of the working group. The working group cordially express its deepest appreciation for those scholars and disaster professionals cooperated with us.

For the details of this summary version, please refer the main report in Japanese.

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1. Prediction and Warning System for Volcanic Eruption in Various Countries

In this report surveys are made and arranged on the state of the arts of the disaster countermeasures against the volcanic disaster, especially on the state of the arts of the prediction/ warning systems in those countries as Indonesia, Philippines, Colombia, New Zealand, United States of America, Italy and Japan. Hereafter the disaster prevention system and countermeasure, the observation system, and the information dissemination are introduced by each of the countries listed above and at the conclusion comparison is shown among those countries.

1.1 INDONESIA

the disaster prevention system/ disaster countermeasure

The national organization responsible for the disaster countermeasure is BAKORNAS. BAKORNAS, chaired by the Minister of Public Wealfare and Coordination, is composed of various Ministers or the officials appointed by the Ministers. There are the regional disaster organizations of the state level " First Class Natural Disaster Reduction Measures Execution and Coordinating Committee (primarily called SATKORLAK, now SATLAK)" and the municipal level " Second Class Natural Disaster Reduction Measures Execution and Coordinating Committee." They are composed of their respective organizations involved.

An advanced countermeasure for the volcanic explosion disaster. So called " hazard assessment maps" have been prepared for major volcanos (ca. 100) and they are opened to the public. Disaster plans and evacuation plans are prepared according to the " hazard maps" . These hazard maps indicate dangerous area (keep–off area) and warning area.

The Programme for Volcanic Hazard Reduction is now in operation in Indonesia. The Volcanological survey of Indonesia,VSI is the proceeding institution under the auspiece of the bureau of national survey on natural disaster reduction. Their purposes are the followings:

1) preparing a geological map, 2) volcanic disaster areal map, 3) watching the volcanos, 4) setting up the volcanic observatories, 5) observing by remote measuring instruments and satte1ite, 6) early warning system, and 7)education for disaster prevention

the observation system

VSI is under the umbrella of the Bureau of Geology and Mineral Resources in the Ministry of Mines and Energy. It takes the central role in observing volcanos. VSI is composed of the devisions of volcanic observation, volcanic mapping, volcanic analysis, information and records, and subterranean heat survey.

The observatries for major volcanos are equipped with several watching points. Each watching point have 2–4 staff and their monthly observatory reports such as the eye–observations and earthquake records are regularly sent to the VSI headquarters in Bandon City during ordinary times, but when the volcanic activities become busy, daily observatory records are reported via short wave wireless. The observatory results at the

local observatories are forwarded to the central government through the VSI headquarters and the Ministry of Mines and Energy(the authority to VSI) and at the same time the information are reported from the municipality via regional government to the central government and to the center for volcanic and Sabo (erosion control works).

Nowadays an information system is being developed to process the observatory data on volcanic activities by computers under the assistances of USGS and OFDA.

the information dissemination

The volcanic information presented by the observatries are as follows:
1) attention for the activities: pay attention for the more active volcanic activities
2) prepare for evacuation: prepare for the anytime evacuation within the classified area, at this phase those " disaster–weaks" such as the aged, the sick and children must evacuate.
3) evacuation for the dangerous area: do not work within the keep–off area
4) emergency evacuation: immediate evacuation from the classified area

When those volcanic information were presented from the observatory division, necessary instructions should be given to the residents through a discussion among the involving authorities.

If a staff at the watching point discovered any unusual volcanic activities, it must be reported to the VSI headquarters to ask for the instructions and at the same time the condition should be informed to the local entities. In the case the volcanic activity became more active and expected to be dangerous, the staff at the watching point transmits the local entities that the evacuation of the residents is necessary. The staff would also give explanations on the hazard assessment maps and information on safer places and the evacuation routes in order to assist the local entities' evacuation measures.

These disaster information are disseminated via short wave radio, amateur wireless communications, and telephones. In addition to the above communication measures, a traditional communication tool so–called " ton–ton" (a wooden alarm) is also employed.

1.2 PHILIPPINES

the disaster prevention system/ disaster countermeasure

The responsible organization for the Philippino disaster countermeasures is the National Disaster Coordinating Council NDCC established by the Presidential Order in 1978. NDCC is headed by the Secretary of Defence, composed of the Secretary of Presidental Office, the Chief Staff Officer of the Military, 15 secretaries from each ministry, National Economic Development Corporation, Philippines Information Bureau, Philipines Red Cross, and the Civil Defence Bureau is the Secretary. In various local level there are local disaster coordination council, State Disaster Coordination Council, Municipal/ Entity Disaster Coordination Council, and BARANGAI Disaster Coordination Council. They coordinate and carry out the disaster countermeasures.

Disaster Prediction/ Warnings are announced by the PHIVOLCS, Philippine Institute of Volcanology and Seismology. PHIVOLCS will, with cooperations with other governmental authorities, set up evacuation places and give recommendations for evacuation.

the observation system

Permanent observation networks are set up for the following five volcanos: Mayon, Taal, Hibok–Hibok, Bulusan, Canlaon.

The Pinatubo started its activities since April 1991. Because it had been inactive for about six hundred years, the observatory system was not established by that time. After the volcanic earthquake ground motion and the fumarol were discovered on April 2, 1991, an observation system was quickly set up with the cooperation of the USGS. As the observatory result indicated the eruption would be very soon, three various hazard maps were prepared immediately. These were pyroclastic flow, mud flow and ash fall hazard maps completed on May 23rd and published. USGS assisted PHIVOLCS to construct the observatory network on the earthquake ground motion and the ground strain. The results from the observatory network were recorded at the five various stations around and then reported to the central station in the Clark Air Base in the Philippines.

Preparing for possible mud flow a " Pinatubo Mud Flow Countermeasure Group" was organized. For observing the mud flows a radio network of rain gage, a flow sensor, a tripwire for pyroclastic flow observation were equipped. In addition, pyroclatic flow observation officers were appointed by the Civil Defence Agency and placed along the major rivers to do eye observations. The information from the observatory network are collected into the PVO Pinatubo Volcanic Observatory at the Clark Air Base in the Philippines and judged the possible mud flows as three different level warnings. These warnings is disseminated to the residents by the publicity cars.

Volcano Mayon has repeated its eruption for 45 times since 1616. In 1990 an emergency countermeasure plan named " Operation Mayon" was made by PHIVOLCS. The observations by this plan is carried out at two piloted stations using seismographs, distance gauges, tiltmeters, and rain gauges. A hazard map is prepared using the 1984 eruption as its model, which predicts that lava flow spread from the summit to the radius of ca. five km, pyroclastic flow will be the radius of five to ten km, and the ash fall damage will affect fairly much to 15 km down the wind. The mud flow damage is estimated to reach 7 to 13 km down along the valley.

the information dissemination

In Philippines forcasting/ warning information on the volcanos with continuous observatory networks are issued at the levels 1 to 5, which are set up by certain criteria. This must be reported from the PHIVOLCS to the President and each of the DDCs of the national, regional and prefectural levels at the latest one day before. The information are dispached to the communities in the form of prompt reports of volcanos are dispached through mass media.

The Warning and information concerning evacuation are disseminated through TV, radio, sirens and the oral information by the communities' leaders. Evacuation routes and refuge site (mostly schools)are practically indicated by taking account of wind and ash fall.

At Mayon three zones have been classified to make the evacuation recommendation easily. These three zones are Permanent Danger Zone=PDZ, Red Zone and Yellow Zone. PDZ spreads from the summit to within the radius of 6 km area where people are not permitted to reside. Warning level requires to keep off the PDZ. Red Zone is between the radius of 6 to 11 km from the summit where evacuation is required at Warning level When the eruption activities become more active, evacuation is necessary for the Yellow Zone (the radius of 8 to 15 km area).

1.3 COLOMBIA

the disaster prevention system/ disaster countermeasure

After the eruption of the Nevado del Ruiz in 1985, the Colombia government set up the " Sistema Nacional para la Prevencion y Atencion de Desastres" or the National System for Disaster Prevention and Attending in 1986. The respective points of this system are at its decentralized character and participation of the local communities. It is emphasised that the community level has the major responsibility for predicting the dangers and achieving re–settlement.

The following organizational disaster systems were set up after this system:
1) Community Committee, Regional Committee and National Emergency Committee
2) National Office for Disaster Prevention/ Hazard Mitigation (OND)
3) National Technical Committee
4) National Warning System
5) National Activities Committee
6) National Disaster Foundation

OND and the National Technical Committee have developed manuals and guidelines to build up plans for disaster prevention and emergency programme in each community, divide the autonomous community according to the dangerous condition levels, and suggested the items to prepare for the countermeasure by the guidelines and indexes.

The Guideline for preparing emergency plans is adopted by 17 research institutions which actively participate in the disaster prevention, the disaster countermeasures, and the recovery form disasters. This Guideline is organized and prepared by the community emergency committees under the administration and promotion of the mayor. The concepts of daily use are defined and the necessary steps for risk management are described in this guideline. It also includes the policy, the functions held by the private/public organizations, the minimum side to be considered within a consistent programme, and the process to define the responsibilities of each levels of national, departmental, and autonomous in the systematic/ administrative/ scientific aspects.

the observation system

For the dangers of volcanic eruptions INGEOMINAS,the Colombia National Geological Mines Institute is the supreme authority for the dangers of the geology. It owes the responsiblities to prepare hazard maps and to observe and to survey for the all the volcanos in this country.

Assisted by the Government of Canada and UNDRO, in 1991 the first national earthquake network in the South America started under the responsibility of INGEOMINAS with TELECOM's participation. At the completion of the earthquake network, INGEOMINAS and the National Disaster Foundation decided to equip with a nationalwide seismic network, the basic instruments for measuring the earthquakes. National Disaster Foundation adopted the first purchase of 25 accelerographs, and 3 out of 25 are already equipped in the country (data in 1990).

Within the area of volcanic studies the observatories of Manizales and Pasto have

already reached to the highest level and the government is to start observations of five other active volcanos. Recently the National Disaster Foundation permitted to purchase necessary facilities to guarantee the warning activities against 15 active volcanos. INGEMINAS has already prepared the hazard maps of 7 active volcanos.

the information dissemination

The Guideline defines that following actions should be taken before a geven emergency:

1) confirming the state
2) starting activities by callling the emergency committee
3) transmitting the information to the higher administration
4) making dicision and sending the assisting group
5) confirming the communication systems
6) giving the primary judgements (for the disaster's effect, the areal extent of damage, the state of the public service and its accessibility, etc.)
7) making decisions as the community's /regional countermeasures what and how far should be done
8) keeping the public order according to the degree of the state of emergency (transportation, price control, prohibit drinking, order of staying home, etc.)
9) giving first notice to the press organs
10) carrying out exactly in the case special countermeasure programmes were required under a particularly dangerous state

As for information to the communities, while a volcano is active the system created by the INGEMINAS should prepare one or more technical reports when deemed necessary. According to the above report OND, in order to unify the information, prepares an official written reportincluding technical information and indication to the committee. This report is circulated to the involving authorities and institutions, the representatives of the regional committees, in particular for the members of the technical and practical committees and all the information facilities.

1.4 NEW ZEALAND

the disaster prevention system/ disaster countermeasure

In New Zealand the central organ for disaster countermeasures are called " Civil Defence" and are found both in the national and regional governments. The regional Civil Defence takes direct actions against disasters, but in case the damage spreads widely or is severe, the national Civil Defence may take actions. Education and publicity of disasters are budgeted by the national Civil Defence. The national Civil Defence is administered by the national government and the regional Civil Defences are administered by the competent regional government(parliament), whereas the national and regional Civil Defences serve as same organs.

the observation system

For the past 40 years in New Zealand volcanic observation system has progressed separately by each volcano, and now there is a plan to integrate all the separated systems to build up a national system.

To date the warning/ observation system varies one another according to the respective volcano and the region. For example, in one case there is an official observation organization composed of a regional Civil Defence, national institutions, regional entities and universities, and in another case data are collected into the disaster prevention organization with an informally constructed system by personal relations among the regional Civil Defence and the local institutions.

The National Volcanic Contingency Plan is now on preparation. To build up an integrated system of both volcanic observations and early warning is on discussion. This is to equip with the observation system to each of the volcanic disastrous area in various regions as well as to set up criteria for a warning dispatch in each region. However, the observation data itself will be collected into one place so that the observation, the warning dispatch, and information dissemination might integratedly be done. The Observation Center, to be placed at TAUBO, will be the center of this system as well. All the volcanic scholars in New Zealand are planned to assemble. As the completion of the whole system is expected in 1995, from 1993 adjustments have started regularly.

Observation system applied in 5 regions (volcanos) are common understandings among the volcanic scholars and the national Civil Defence. This system may be the basis of the future discussion on volcanic observation/ warning system. The observation system is mainly to observe the earthquake activities and the ground deformation and at the level the volcanic tremor may easily be analysed at real time basis. For this purpose the goal is to equip with 3 to 5 seismograph for each of the system and to analyze with personal computers. The warning by this system is dispatched according to the 5 various levels proposed by the United Nations the criteria are now reconsidered.

the information dissemination

Dispatching the warnings depends on suggestions and advices from the volcanic scholars in the national institution and universities, and the warning is despatched by

the regional Civil Defence or a responsible administrator. All the disaster warnings are called Civil Defence Emergency but not always related to the volcanic eruptions/ disasters. There is no particular route for dispatching the warning. Regular telephone, wireless communication, and mass media are employed. Police and the Office of Forest Service are also appointed as the institutions to propose advices for dispatch of warnings so that the system is capable to dispatch warnings when abnormal is discovered by one other than scholars.

Under the National Civil Defence is the Volcanic Hazard Scientific Working Group composed of the scholars where reports on the present volcanic activities in the country, proposals for future observation systems and discussions for volcanic disaster education etc. are made. Among them the reports on the present volcanic activities of emergency or dangers of eruption are immediately transmitted to the national/regional Civil Defence, Police and Forest Guard Office as the Immediate Reports.

1.5 UNITED STATES OF AMERICA

the disaster prevention system/ disaster countermeasure

In 1980 when St. Helens erupsed the United States Geological Suervey expanded the programmes for the volcanic hazard mitigation, volcanic observation and volcanic studies in order to prepare for better response in the volcanic eruption risk areas in the United States. This programme purposes to observe the volcanic activities and hazard mitigation in order to give advices to the responsible administrators on disaster prevention in the competent area on the unseen dangers accompanying with volcanic eruptions of the 17 volcanos in the United States with higher priorities.

Disaster Relief Act of 1974 requires the USGS responsibilities for timely dispatch of the warnings of volcanic eruption and related activities. The final goal for the USGS volcanic disaster programme is to reduce the loss of human lives, properties and natural resources. In other words the following 4 goals represent them:

1) do the prior appraisal for the geologic/ water disaster risk to be accompanied with volcanic eruptions
2) observe the precurson of risky volcanos eruptions
3) conduct basic study on volcanics and water
4) provide with information concerning disaster risk for the people in the divisions of land use, emergency response programme and education of each of the Federal, State and Regional Government

The major responsible authorities and the cooperative bodies for each of the above listed 4 goals are listed below:

	major responsible authorities	cooperative bodies
volcanic hazard mitigation	USGS	federal/state land mines bureau FEMA state emergency service bureau
volcanic observation	USGS	federal agencies forest service land administr. state geo-mines bureau college/univ.
basic studies	USGS	state geol. survey scientists group incl. college/univ.
emergency response program	FEMA emergency response bodies in state/region	caution/ warning warning=USGS, Fed. Fed. Aviation Admin. Army Corps of Engineers Federal Forest Service, Land Admin. Bureau

The cooperative relations among the Federal Government centering the USGS and FEMA, State and Regional governments are seen variety of types. The Federal side, in particular the USGS encourage the state and regional governments to join the programmes and promote budgetary assistance for their proper activities as much as possible.

the observation system

Volcanic observation are made from various aspects such as seismology, global physics, global chemistry, and water. USGS purposes 1)to dispatch short term (a few hours to several days), 2) to predict eruptions and their distinctive effects, scale, extent and duration, and 3)to transmit the disaster warning to the responsible personnels in federal, state and regional government and to advise to put the emergency response plan into effect. Therefore the observation should keep its continuity and to be carried out without interruption.

USGS has several observatories over the United States such as the Hawaii Volcanic Observatory(HVO) at Kilauea, Hawaii, the Cascades Volcanic Observatory (CVO) is at Vancouver, Canada, near St. Helens, Washington, and the Alaska Volcanic Observatory (AVO) are both at Anchorege and at Fairbanks. These observatories are not only the base of volcanic observation in the region, they are the training center for volcanic scholars and the center for study and development of new observation technologies and/or instruments. From time to time these observatories provide with the observation results and arrange the information into the state of the volcanic activities, the precursor of eruptions, and kinds of the possible disasters, etc.

At Long Valley they had earthquake swarms immediately after the eruption of St. Helens in 1980. USGS in Menlo Park, California intensified its observation. This has been continued to date that it is as if the fourth Volcanic Observatory in the United States.

California State Plan for Volcanic Disaster Response estimates the eruption scale into three levels as small, medium and large.

the information dissemination

What is important for a volcanic disaster programme is in addition to progress the scientific/ technical project, to provide with necessary information to prepare for both the disaster education for the general public and the emergency response plan against the eruption and the secondary disaster(geological/ hydraulics).

The information are provided through the following two ways:
1) By direct cooperative work with the responsible officer of the local government at the time of eruption or the hydraulic disaster which may cause damage. In such cases to make decisions of keep out or recover of streets, sightseeing places, or a community evacuation, information of the current or predictable disaster would be provided with by face to face talks or phone calls. After discussing on the predictions on the volcanic activities provided by USGS, damage reduction measure such as to dispatch a warning may be taken.
2) Provide with information for the planners, responsible officers in the local government including the division responsible for security, developing services, and

present and future residents before the land use is decided.

Legal requirements for USGS on information supply and educational activities are as follows:

1) to dispatch cautions and warnings concerning volcanic eruptions

2) to publish reports, maps and news concerning volcanic disasters to the government and to the public

3) to organize and to participate meetings and workshops concerning emergency response plan with cooperations with other government organizations

1.6 ITALY

the disaster prevention system/ disaster countermeasure

When an abnormal volcanic activity is observed and regular disaster countermeasures b ecome necessary, upon consultation with the Governor, it is raised up to the Committee of Major Disaster which is an advisory organ to the Minister of Civil Difence (a committee co mposed of three scientists and two responsible administrators to evaluate the observation results, to discuss countermeasures and to report to the minister).

In the case this committee holds a meeting, representatives of the organs to which local volcanic observation data belong to (mostly the directors of institutes or observatories) are invited to explain the data and to propose the countermeasures. In response, the committee discusses on activities' prospects and necessary countermeasures and reports to the Minister. Thus the scientists directly involve not only scientific data analysis (prospects) but also the whole policy making procedure including the disaster countermeasures.

The Minister of Civil Defence makes the decision for the countermeasures in response to the proposal from the committee.

Thus in Italy responsibilities are not clearly divided into such a way that scientists for prediction and the administrators for warning dispatch. Scientists are expected their active involvement in the phase of disaster administration.

the observation system

Italian volcanic observation are shared by the national universities, in Parelmo, Pis a,and Roma that are under umbrella of the Ministry of University Science and Technology Re search, the Vesbio Volcanic Institute which has the longest tradition, and those institute s of hydrogeo science, international volcanic survey, geochronological/ isotope geochemist ry under the Italian Science Academy with cooperation to one another. Also an organizatio n integrating the volcanic scholars named the National Volcanics League takes the role of the window for the funds from the Ministry of Civil Defence. Currently this National Volc anics League takes the role to coordinate volcanic observation in Italy.

Routine observation concerning volcanos centered mainly by the Vesbio Volcanic Instit ute and the Institute of International Volcanic Survey. Universities take only the schola rly observations. The relations between these institutions and the universities are stron g enough to build up a close cooperation.

The National observatories share their administrative responsibilities. The Vesbios Volcanic Observatory administers the Mt. Vesbios, Campi Fregrei, and Ischia Island. The Institute of International Volcanic Studies is located at Catania at Mt. Etna, it administers Mt. Etna, Vulucano Island, Stromboli Island, and Pantelleria Island. Risk maps are prepared for major volcanos.

the information dissemination

Observation results are encouraged to the public. If an abnormal observation result is obtained, information is transmitted to the journalism by the decision of the director

of the observatory.

For example at the eruption of Campi Fregrei in 1983, to break off the citizens anxieties Naples Provincial Government set up many " information centers" here and there in the city to exhibit the observatory data for the citizens.
At the same time staff members of the said observatory agressively joined to the community forums held in the schools to present their views to provide with information based on scientific source.

Italian system of volcanic forecasting/ warning is featured with its particular flexibility. Once abnormal phenomena (earthquake/ eruption/ lava flow, etc.) are found, information on forecasting/ warning are provided by the heads of the observatories and institutions engaging routine observation. As they are almost fully responsible for the above activities, no standard or classification for forecasting/ warning information is produced. Because there is no standardized forecasting/ warning information, the head of an institution, paying various thoughts and cares, provides with information by his decision according to the situation.

1.7 JAPAN

the disaster prevention system/ disaster countermeasure

Japanese disaster prevention system against volcanic disaster is arranged, like other kinds of disasters, according to the Disaster Countermeasures Basic Act. In particular the governments of the prefectures and the municipalities around volcanos proceed preparing disaster plans emphasising on volcanic countermeasures within each of their regional/ local disaster plan. Many local entities have detailed descriptions in their regional/ local disaster plans of disaster prevention, disaster emergency response, warning dispatch/ dissemination and evacuation recommendation/ direction, and recovery measures.

Referring to the basic disaster organizations there are the Central Disaster Prevention Council at the national level, headed by the Prime Minister and composed of the involving ministries/ agencies and the Prefectural/ City/ Town/ Village Disaster Prevention Councils headed by each of the Governors/ Mayors and composed of involving organs at regional/ local levels.

When a volcano erupts, the prefectures and the municipalities set up a headquater for disaster countermeasures to put the emergency response into operation according to the previously planned disaster plan. At the national level centering the Land Agency the headquater for major disaster countermeasures in government is set up to proceed comprehensive emergency policy.

the observation system

The Meteorological Agency, university observatories, the National Center for Disaster Science and Technology, the National Institute for Geological Survey of Agency of Industrial Science and Technology, Hydrographic Department of the Maritime Safety Agency, and Geograrphical Survey Institute are all observe volcanic activities. There are 67 volcanos in Japan, and 18 out of 67 are continuously observed by the Meteorological Agency. 22 are under observation of universities. When the volcano becomes active, these institutions construct a system for emergency watching and observation in order to perform a centralized observation.

At a volcanic eruption volcanic scholars, the liaison council for prediction of volcanic eruptions composed of staff members of the volcanic observation/ survey and disaster prevention organs concerned (an advisory organ to the Meteorological Agency, the secretariat is in the said agency) makes a comprehensive decision about the volcanic activities according to the observation results from those referring organs.

The Geodetic Council of the Ministry of Education summarizes proceeding plans to predict volcanic eruptions and prepares " a national project for prediction of volcanic eruptions" every 5 years to give suggestions to the organs concerned.

the information dissemination

The Meteorological Agency presents three kinds of volcanic information as follows: 1) Regular Volcanic Information presented regularly to tell about the continuously observed volcanos; 2) Extraordinary Volcanic Information presented when a unusual

volcanic phenomenon is observed; and 3) Emergency Volcanic Information presented when human damages are possibly anticipated by volcanic activities. These volcanic information are transmitted to the concerning ministries/ agencies, to the govenors of the prefectures, to the mayors of cities, towns and villages, to the disaster prevention organs, and to press, and the above organs announce to the public.

The major communication media used at volcanic disaster as well as other disasters will be various wireless. Mass media, cable phones, and fax are used as well, yet the powerful media at a disaster are the various wireless bands such as the central disaster prevention wireless that connects central government and prefectural governments, the prefectural disaster prevention administration wireless networking within each prefecture, and the municipality disaster administration wireless in each municipality. In particular the municipality wireless is able to transmit information to the public all at once. It works effectively for prompt dissemination of warnings such as evacuation etc.

1.8 Summary and comparisons

TABLE 1-1 comparisons of disaster system/ countermeasures

country	legislation/ master plan	organizations
Indonesia	Presidential order	National Coordination Council for Disaster Prevention First Class Natural Disaster Reduction Measures Executive Coordination Committee Second Class Natural Disaster Reduction Measures Executive Coordination Committee
Philippines	Presidential order	National Disaster Coordination Society Regional Disaster Coordination Society State Disaster Coordination Society City/ Autonomy Disaster Coordination Society BARANGAI disaster Coordinating Society Local Committee/ Regional Committee and National Emergency Committee
Colombia	National System for Disaster Prevention & Countermeasures	National Office of Disaster Prevention & Countermeasures National Technical Committee National Warning System National Committee for Activities National Disaster Foundation
New Zealand	Volcanic Disaster Prevention Plan	National Civil Defence Regional Civil Defence
USA	Volcanic Disaster Programme	USGS Federal Emergency Response Organization State/ Regional Emergency Response Organizations
Italy		Major Disaster Committee which is an advisory organ to the Minister of Civil Defence
Japan	Disaster Countermeasures Basic Act	Central Disaster Prevention Council Prefectural Disaster Prevention Councils City/Town/Village Disaster Prevention Councils Headquarters for Disaster Countermeasures Headquarters for Major Disaster Countermeasures in Government

TABLE 1-2 comparisons of observation system and information dissemination

country	observation system		information dissemination	
	major organ	hazard mitigation map	volcanic information	dispatch media
INDONESIA	VSI	prepared for major volcanos	activity watch line prepare evacuation evacuation for dangerous area emergency evacuation	short wave radio wireless communications telephone TON- TON
PHILIPPINES	PHIVOLCS	prepared for major volcanos	levels I, II, III, IV, and V	publicity cars mass media siren oral dispatch
COLOMBIA	INGEOMINAS	prepared for major volcanos		
NEW ZEALAND	Volcanic Hazard Scientific Working Group planning a comprehensive system		Civil Defence Emergency new standards are planning	cable, wireless, mass media
USA	USGS	prepared for major volcanos	C Red B Amber A	mass media, community forum
ITALY	National Volcanics League	prepared for major volcanos	observatory head's decision	mass media information center community forum TV forum
JAPAN	Meteorological Agency Liaison Council for Prediction of Volcanic Eruption	prepared for some volcanos	Regular Volcanic Information Extraordinary Volcanic Information Emergency Volcanic Information	Mass Media Cable Phone Facsimili Disaster Wireless Communication