

# **Chapter 3**

## **Implementation Plan**

## **Chapter 3 Implementation Plan**

### **3 - 1 Implementation Plan**

#### **3 - 1 - 1 Implementation Concept**

The coordination among related implementation works for completion of the Project shall be required, because the Project concerns systematically many special fields such as volcanology, seismology, communication, civil engineering, etc. The acquisition and deployment of volcanic and seismic equipment is time constrained because their manufacturing, shipping, inland transport, installation, adjustment and commissioning take time. Therefore, time management should be given particular attention. In view of security and access problems in some selected Project sites, specially in some part of Mindanao, PHIVOLCS will be responsible in the operationalization of the systems.

For smooth implementing of the Project and avoiding delays and misunderstanding, communication and coordination with the responsible organization (PHIVOLCS), Embassy of Japan, JICA Philippine Office and concerned government authorities will be necessary and also special arrangement and consideration for inland transport will have to made due to a large number of the project sites and difficult of access problem to some Project sites in Mindanao island.

#### **1. Executing agency of the Project**

The responsible governmental agency of the Philippines for the implementation of this Project is PHIVOLCS under supervision of Department of Science and Technology (hereinafter referred to as "DOST") and it will be a signer of Consultant Agreement and Contract as the Client.

#### **2. Implementation Plan**

As for the implementation plan, it is necessary to discuss in detail and confirm the following points between PHIVOLCS and the Consultant during the implementation period of the detailed design.

- 1) Selecting and securing all the necessary Project sites and taking all necessary procedures to be completed by the Philippines side prior to the commencement of the Project.
- 2) Utilizing the existing commercial power supply, telephone line and other incidental facilities to be required for the Project.

- 3) Obtaining necessary radio frequencies (400MHz band) for telemeter systems to be supplied under the Project.
- 4) Ensuring an appropriate access or transportation to each Project site.
- 5) Taking necessary measures and making a special arrangement on security to Japanese nationals to perform our obligations against any force majeure during field survey, inland transport, civil work, installation work, etc.
- 6) Making appropriate and effective measures to ensure of the system and equipment to be supplied under the Project against any damage and disappearance during transportation, installation and operation.
- 7) Taking prompt necessary measures for tax exemption and customs clearance of the materials and equipment to be brought for the Project at the port of disembarkation.
- 8) Confirming the required budgetary allocation on capital cost and recurrent cost for appropriate operation & maintenance and also procurement of spare parts & consumables for the whole equipment and systems to be supplied under the Project.
- 9) Strengthening technical skill & capability of PHIVOLCS and establishing a maintenance system.

### **3 - 1 - 2 Implementation Conditions**

#### **1. Construction Conditions**

##### **1) Local Sub-contractors**

Generally in the Philippines, the technical skills and levels of the major private local contractors are relatively sufficient and suitable for implementation of the equipment installation work and civil work together with engineers of the contractor to be selected through tendering.

##### **2) Labour Condition**

Labourers are generally classified by their skills. Common labourers are classified into special fields and are employed when necessary. The skills of labourers are much varied and truly skilled labourers are quite a few.

### 3) Quality and process control

Concrete aggregate, cement, lumber, and other primary products as civil work materials are produced in the Philippines. Moreover, special equipment and system of the Project can be imported from Japan and/or O.E.C.D. (Organization of Economic Cooperation and Development) countries, so that reasonable level of quality can be expected.

## 2. Special Project Considerations

Existing equipment will be replaced at the existing Seismic Stations & Volcano Observatories. The method and timing of change from the existing equipment to the equipment to be supplied by the Project should be considered cautiously not to interrupt the operation in the Stations and Observatories.

The civil work of installation of steel poles and shelters for censors at the Project Sites can be adequately carried out by the local firms to be employed by a Japanese prime contractor.

There are many Project Sites which have an access problem because the Sites spread throughout the country, and furthermore the implementation period of the civil work and installation of the equipment is expected to be scheduled in the rainy season.

Supervision for time schedule should be required to avoid any delay of the work in putting an important point of coordination between transportation schedule of the equipment & materials and work schedule of civil & installation of the equipment.

In addition, the most considerable factor in implementing the Project is security of personnel to perform their obligations under the verified contract. Cautious consideration should be given in making appropriate arrangements for the delivery and installation of the equipment and systems and in taking necessary measures on security of the personnel against any force majeure and dangerous factors through discussions with PHIVOLCS and study in the Philippines. However, in accordance with the Minutes of Discussions by the Governments of Japan and Philippines during the Basic Design Study in the Philippines, the equipment and systems of the Project site in unensuring safety and view of the high risk will be delivered only to PHIVOLCS Head Office and the installation and other necessary works at the Project site will be held by PHIVOLCS on his responsibility.

### **3 - 1 - 3 Scope of Works**

Portions to be undertaken by the Japan side and the Philippines side for the implementation of the Project, Phase-I & II are as follows.

- Portions to be undertaken by the Japan side :
  - a. Procurement of all the necessary equipment and systems and also installation materials
  - b. Shipping and inland transport of the equipment and systems to the various Project sites
  - c. Installation work for the equipment and systems
  - d. Adjustment work for the equipment and systems
  - e. Commissioning for the equipment and systems
  - f. Provision of English installation, operation & maintenance manuals and on-the-job training
  
- Portions to be undertaken by the Philippines side :
  - a. Securing all the necessary Project sites
  - b. Fencing (if necessary)
  - c. Necessary measures against any damage and disappearance for the equipment & systems
  - d. Provision of commercial power supply at the existing manned sites
  - e. Provision of public telephone lines at the existing manned sites (if feasible)
  - f. Securing necessary number of frequencies for telemeter systems
  - g. Shifting and removing the existing obstructions on the Project sites

### **3 - 1 - 4 Consultant Supervision**

In accordance with the guidelines of Japan's Grant Aid Assistance and the basic design, the Consultant will be responsible for expeditious project implementation, forming project teams of detailed design and supervision for the implementation of the Project.

The Consultant is to dispatch at least one resident engineer to the Philippines at each implementation stage. This resident engineer of the Consultant will provide appropriate advise and direction to personnel of the contractor and will maintain close liaison with the PHIVOLCS, DOST, Embassy of Japan in the Philippines, the JICA Philippine office, etc. With respect to installation and adjustment works of the equipment and systems, the Consultant's engineers will be dispatched to the Philippines for timely installation guidance, inspection, etc. for each system. In connection with the volcanic & seismic systems and telemeter systems, performance test at a factory and also adjustments, inspections, commissioning of the systems and data reception and transmission conditions in the Philippines will especially be required.

## 1. Principal Guidelines for Supervisory Plan of the Consultant

- 1) Communicate closely with responsible organizations and personnel of both countries, and complete the Project in time in accordance with the implementation schedule.
- 2) In order to carry out the equipment installation work in accordance with the technical specifications and drawings, direction and advice will be given to contractor personnel without delay.
- 3) Local civil work methods will be adopted, and to the maximum possible extent, locally available materials will be procured.
- 4) Instruction for installation methods and technique will be provided to PHIVOLCS's staff and local contractors as technology transfer so as to maximize the Project effect.
- 5) Upon the Project completion, the contractors will be obliged to submit the installation, operation and maintenance manuals and also provide appropriate on-the-job training and guidance to the PHIVOLCS to ensure smooth operation and maintenance of all the systems.

## 2. Supervision Work of the Consultant

### 1) Supervision

The Consultant in coordination with PHIVOLCS will prepare the form of the Contract in accordance with JICA standard and select a Japanese prime contractor through tendering with PHIVOLCS, and also recommend the nominated contractor to the Government of the Philippines.

### 2) Confirmation of the drawings, materials and equipment

The Consultant will inspect and confirm shop-drawings, system drawings & diagrams and material samples submitted by the Contractor as well as performance and function of all the equipment and systems.

### 3) Direction for Construction

Based on a review of the implementation schedule, the Consultant will provide instructions to the Contractor and submit progress reports on the Project implementation to PHIVOLCS, DOST, Embassy of Japan in the Philippines, JICA Philippine office, etc.

4) Approval procedure for payment

The Consultant will cooperate in certification of payment, such as through examination of notice of approval and invoices in connection with implementation cost to be disbursed during the implementation period and upon completion of the Project.

5) Attendance for inspection

As required during the implementation period, the Consultant will perform inspections at each stage of the work based on confirmation of completion and fulfillment of the contract conditions.

The Consultant will be present at the handing over of the equipment and systems, at which point its tasks will be completed, with the approval of the Client. Reports will also be made to concerned personnel in the Government of Japan on all required items, such as progress reports during the implementation period, payment procedures, completion and handing over.

3. Dispatch of Engineers

During the Project period, the Consultant's engineers will provide supporting services on drawings, methods as well as inspections of the equipment and systems. In addition, these engineers will be dispatched to the Philippines, as required, for supervision on installation and adjustment stages.

### **3 - 1 - 5 Procurement Plan**

The procurement plan for materials, equipment and systems is oriented to local maintenance level and structure for the volcanic & seismic equipment and systems. The plan is deemed to be appropriate, in that recurrent costs have been estimated on the basis of PHIVOLCS's probable financial capabilities after completion of the Project.

The procurement plan has been designed, with full awareness of the current situation at PHIVOLCS, on the basis of the estimated useful life of each item, a regular maintenance cycle for the equipment and systems, a proper supply of spare parts for maintenance use, and procurement methods. Consideration has also been given to the preparation of installation, operating and maintenance manuals, related guidance, as well as training programs for PHIVOLCS.

The most considerable factors in supplying equipment and systems are maintenance method of the equipment and also availability of the necessary parts and consumables in the local market, the Philippines. The equipment procurement must take account of ongoing maintenance requirements after completion of the Project. Careful consideration should be given in making maximum use of local expertise when problems occur with a particular item of the equipment and systems.

#### **1. Equipment and Systems**

Many of the volcanic and seismic equipment and other systems will be difficult to procure locally. Thus, in connection with quality and maintaining levels of sophisticated systems, it will be absolutely essential to procure such components from member countries of O.E.C.D. including Japan. For quality control of each system, procurement of the equipment from member countries of O.E.C.D. will be easier than other countries. It is sure that procurement from member countries of O.E.C.D. would surely be advantageous to PHIVOLCS in consideration of durability & reliability of the systems and easy procurement of spare parts, operating procedures and maintenance techniques of the equipment.

The most important areas concerned regarding on supply of the equipment and systems involve regarding operation and maintenance methods and also procurement of necessary spare parts long after completion of the Project.

This will surely be a vital factor in determining the success of the Project. As might be expected, major concern from a maintenance standpoint relates to all the sophisticated system such as data processing and analysis systems, data server, etc., with being essentially computer systems. As activities of the private sector related to computer systems, there are many agents of the computer equipment in the Philippines. The activities of the private sector in the



Philippines will be useful for the computer systems and other sophisticated systems to be introduced under the Project.

Based on the above considerations, the procurement plan for the equipment should be designed with a view to achieving the maximum possible degree of standardization as well as ease of obtaining spare parts and maintenance service in selecting equipment and systems with which PHIVOLCS is already familiar and which can be maintained locally.

## 2. Civil Work Materials

The basic civil work materials such as concrete aggregate, cement, lumber, etc. can be obtained in the Philippines.

### 1) Cement

Supply is relatively stable. However, careful quality checks will be required during civil work.

### 2) Concrete aggregate

Concrete aggregate uses mainly either crushed or natural stone. Local supplies are stable and able to meet current demand in terms of both quantity and quality. For obtaining 210kg/m<sup>2</sup> of concrete strength for a foundation of a steel mast, a seismograph pier & shed, the local concrete aggregate is suitable for the Project.

### 3) Reinforced bars

Reinforced bars, as required for the production of reinforced concrete, can be locally sourced, and a reliable intensity value can be confirmed from the mill sheet obtained of the reinforcing bars.

## 3. Transport Routing for Materials

The principal port in the Philippines is Manila. Thus, the equipment and systems shipped by sea to the Philippines from member countries of O.E.C.D. including Japan will be unloaded at Manila and shipped or airlifted or trucked to the Project sites.

In addition, there are many Project sites which have an access problem, ex. Project sites deep in the mountains, or have a security problem. Therefore, cautious consideration should be given in making appropriate arrangements for domestic transport.

1) Air service

From the past actual record of 1996, 5,594,533 passengers and 82,519 tons of cargo were airlifted by the domestic flights of scheduled, non-scheduled and charter operations. In the Philippines, there are approximately 75 routes of domestic flight. And also 7,335,887 incoming (3,645,695) and outgoing (3,690,192) international airline passengers and 220,138 tons of incoming (123,552 tons) and outgoing (96,586 tons) cargo & mail statistics were airlifted by the international scheduled airlines at Manila, Cebu and Davao international airports.

2) Shipping service

There are many scheduled shippings between the Manila seaport which is the biggest in the Philippines and seaports in Japan (ex. Kobe, Nagoya, Yokohama). Most of cargo are handled and cleared at the Manila seaport. Due to the geographic condition of the Philippines, the shipping service is quite popular and active.

3) Domestic transport

The most considerable factor in delivering the equipment and systems to each Project site is domestic transport. Careful consideration should be given in making arrangements for the domestic transport and taking appropriate measures against any damage and disappearance during the delivery of the sophisticated equipment and systems and in ensuring safety of the Project implementation. This will surely be a vital factor in determining the success of the Project.

Only the Project sites in Batanes islands require air transport. Some of the Project sites in Mindanao island are located in the rural areas where muslim and communist rebels have their camp sites.

Possibilities of making arrangement for delivering the equipment and systems to all the Project sites are classified under four levels as follows.

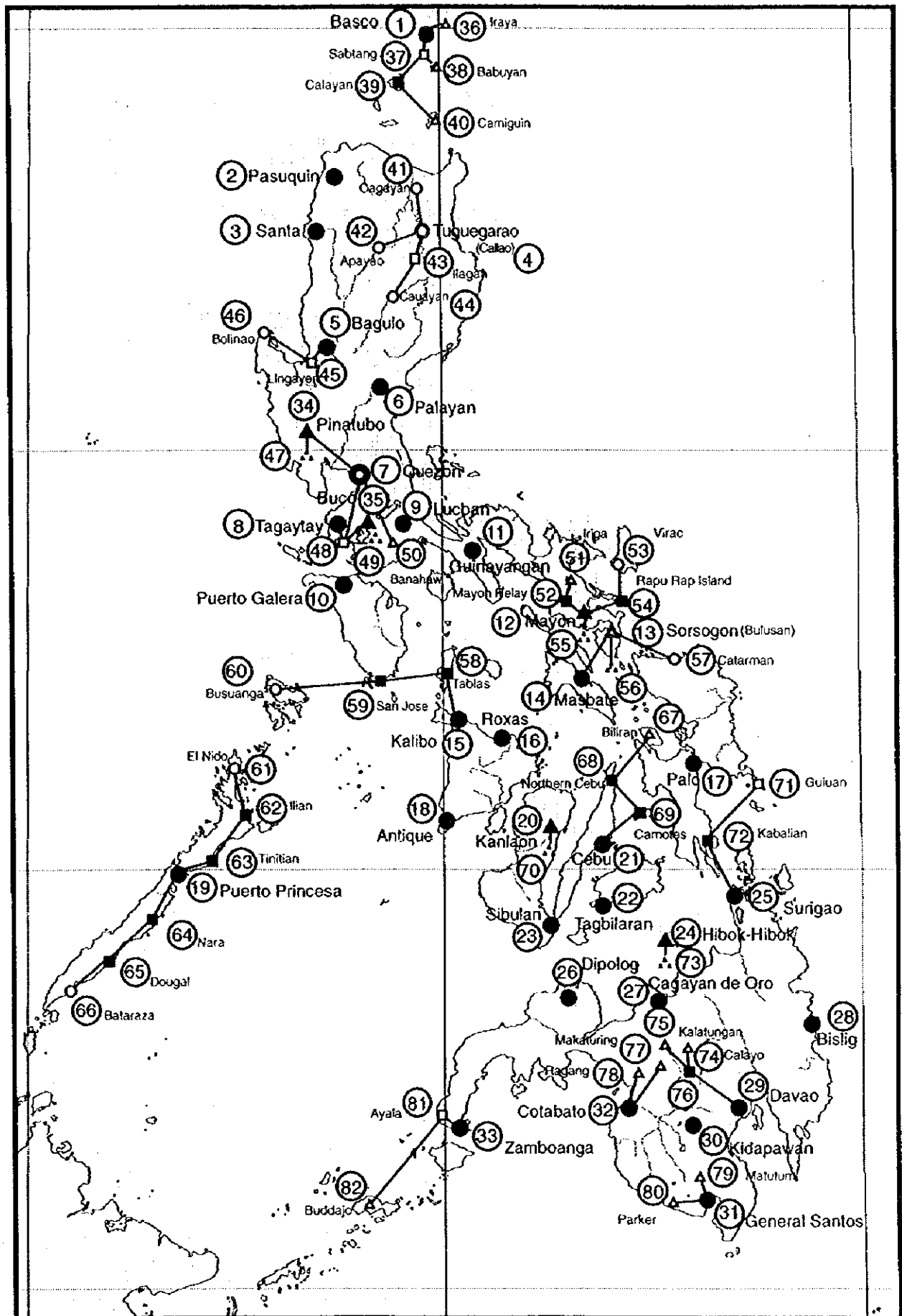
A : required transport is available

B : special arrangement is required

C : special arrangement is possible by PHIVOLCS but difficult

NO.	Site	Legend
1	Basco	B
2	Pasuquin	B
3	Santa	B
4	Tuguegarao	B
5	Baguio	A
6	Palayan	A
7	Quezon	A
8	Tagaytay	A
9	Lucban	A
10	Puerto Galera	B
11	Guinayangan	A
12	Mayon	A
13	Sorsogon	A
14	Masbate	B
15	Kalibo	B
16	Roxas	B
17	Palo	B
18	Antique	B
19	Puerto Princesa	B
20	Kanlaon	B
21	Cebu	A
22	Tagbilaran	B
23	Sibulan	B
24	Hibok-Hibok	B
25	Surigao	B
26	Dipolog	B
27	Cagayan de Oro	A
28	Bislig	B
29	Davao	A
30	Kidapawan	B
31	General Santos	A
32	Cotabato	B
33	Zamboanga	A
34	Pinatubo	A
35	Buco	A
36	Iraya	B
37	Sabtang	B
38	Babuyan	B
39	Calayan	B
40	Camiguin	B
41	Cagayan	B

NO.	Site	Legend
42	Apayao	B
43	Ilagan	B
44	Pinatubo ( Satellite )	A
44	Cauayan	B
45	San Manuel	A
46	Bolinao	A
48	Tagaytay R.P.	A
49	Taal ( Satellite )	A
50	Banahaw	A
51	Iriga	A
52	Mayon Relay	A
53	Viac	B
54	Rapu rapu Island	B
55	Mayon Relay	A
56	Sorsogon ( Satellite )	A
57	Catarman	A
58	Romblon	B
59	San Jose	B
60	Busuanga	B
61	El Nido	B
62	Ilian	B
63	Tinitian	B
64	Nara	B
65	Dougal	B
66	Bataraza	B
67	Biliran	B
68	Northem Cebu	B
69	Camotes	B
70	Kanlaon ( Satellite )	B
71	Guiuan	B
72	Kabalian	B
73	Hibok-Hibok ( Satellite )	B
74	Calayo	B
75	Kalatungan	B
76	Davao Relay	B
77	Makaturing	B
78	Ragang	B
79	Matutum	B
80	Parker	B
81	Ayala	B
82	Buddajo	C



Map of the Domestic Transport

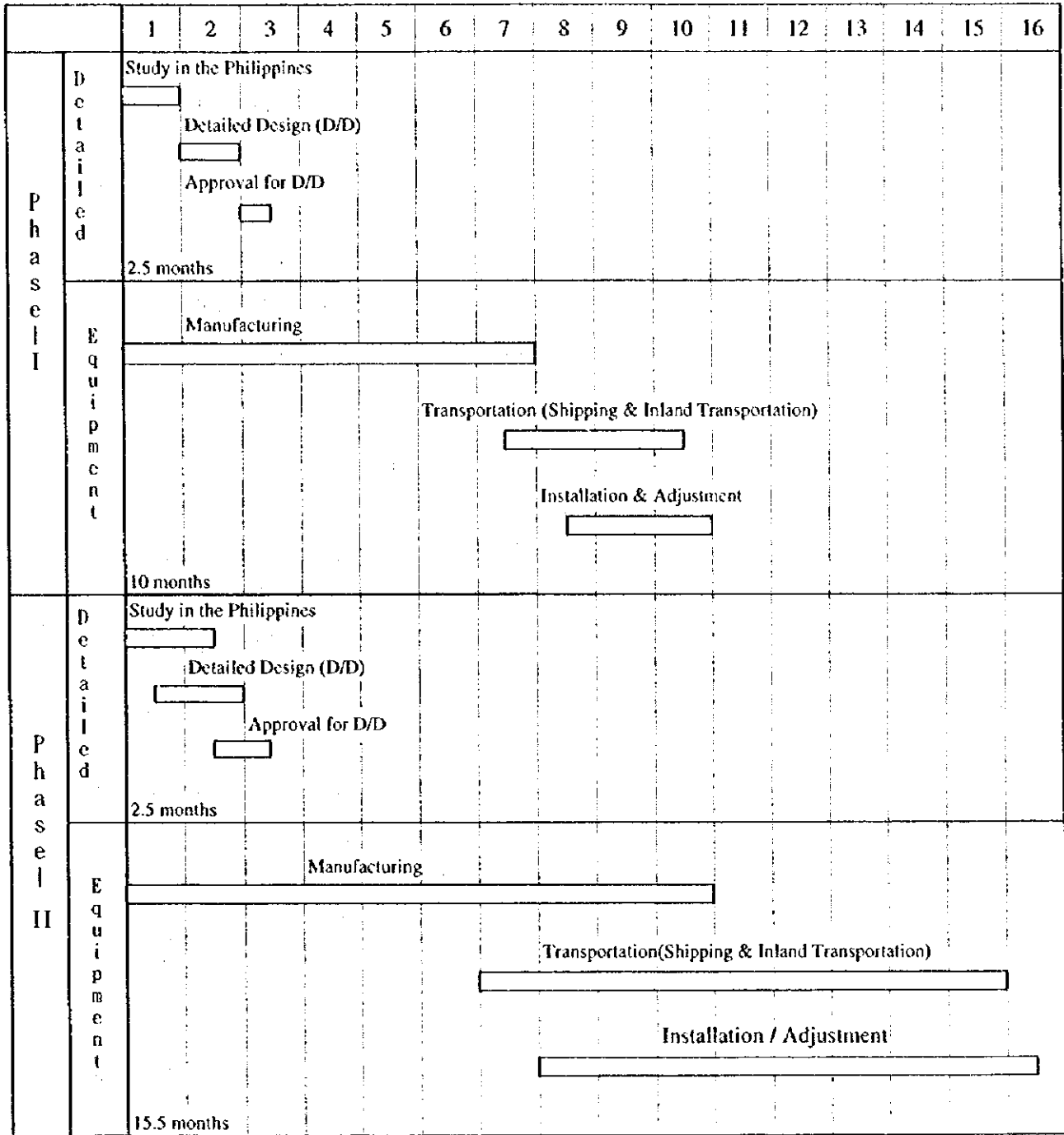
#### 4. Implementation Schedule

The Project is to be divided into 2 phases.

The Phase-I covers supply, installation and commissioning of the seismographs & data processors, computer desks & chairs, etc. including necessary spare parts, installation, operation & maintenance manuals and consumables. The work is to commence after signing of the Exchange of Notes, the Consultant Agreement, the detailed design, etc., which will require approximately 12.5 months to complete.

The Phase-II covers supply, installation and commissioning of the seismographs & drum recorders, portable seismograph systems with data acquisition systems, data processing & analysis systems (computer systems including software) and telemeter systems, computer desks & chairs, etc. including necessary measuring devices, spare parts, operation & maintenance manuals and consumables. Through the same procedure as in the Phase-I, approximately 18 months will be required from commencement to the completion of the work.

**3-1-6 Implementation Schedule of the Project**



### **3 - 1 - 7 Obligation of recipient country**

In the implementation of the Project (Phase-I & II) under Japan's Grant Aid Assistance, the Government of the Philippines is required to undertake the following necessary measures.

- 1) To secure land necessary for the sites of the Project and to clear, level and reclaim the land prior to commencement of the Project.
- 2) To provide facilities for distribution of electricity, telephone and other incidental facilities to the Project sites, if necessary.
- 3) To secure effective spaces at the existing facilities and to shift or remove the existing equipment and facilities for installation of the equipment to be supplied, if required.
- 4) To make the access roads and/or paths to the sites prior to commencement of the Project, if necessary.
- 5) To take care of all legal, administrative and documentary requirements in the Philippines.
- 6) To bear commissions to the Japanese foreign exchange bank for the banking services based upon Banking Arrangement.
- 7) To obtain tax exemption and to take necessary measures for customs clearance of the materials and equipment brought for the Project at the port of disembarkation.
- 8) To accord personnel whose services may be required in connection with the supply of products and the services under the verified contract such facilities as may be necessary for their entry into the Philippines and stay therein for the performance of their work.
- 9) To take necessary measures on security of personnel as described above to perform their obligations under the verified contract against any force majeure.
- 10) To provide necessary spaces at the Head Office and at the Project sites for the Consultant and the Contractor for the Project implementation.
- 11) To provide appropriate radio frequencies for telemeter systems to be established.
- 12) To establish proper and effective maintenance and utilization procedures for the equipment purchased under the Grant Aid.
- 13) To undertake incidental outdoor works such as fencing, gates and exterior lighting in and around the site, if necessary.
- 14) To take appropriate measures against any damage and disappearance of the equipment to be supplied.

### 3-2 Operation and Maintenance Plan

#### 1. Personnel Requirement for Implementation of the Project

The present number of technical personnel is sufficient to operate and maintain the equipment and systems to be supplied by the Project. For operation and maintain the equipment and systems, the following 24 maintenance team staff will be required at PHIVOLCS Head Office and 4 Sub Centers after completion of the Project.

#### PHIVOLCS Head Office

Computer maintenance team (two staff per team) : 2 staff × 2 teams = 4 staff

Instrumentation maintenance team (three staff per team) : 3 staff × 4 teams = 12 staff

#### Sub Centers

Instrumentation maintenance team (two staff per team) : 2 staff × 4 teams = 8 staff

Total 24 staff

At the present, 16 staff as maintenance team members out of required 24 staff are available in PHIVOLCS and remaining 8 staff can be adjustable within the existing personnel of PHIVOLCS, thereby, additional recurrent cost of organizing the above number of the maintenance team can not be expected.

#### Allocation of Maintenance Staff for the Project

SG	Position	Present	PHASE-II		
		H.O	H.O	Sub C	Total
SG19	Senior Science Research Specialist	1	0	0	1
SG16	Science Research Specialist II	3	0	0	3
SG13	Science Research Specialist I	8	0	0	8
SG11	Science Research Analyst	2	0	8	10
SG 9	Science Research Assistant	2	0	0	2
Total		16	0	8	24

SG : Salary Grade

H.O : Head Office

Sub C : Sub Center



## 2. Operation and Maintenance Plan

After completion of the Project, PHIVOLCS will play a role in operating and maintaining all the equipment and systems including computer software. Most monitoring stations are scattered within various island groups that require long air travel for maintenance teams coming from the Head Office. Travelling costs could be kept minimal if maintenance teams could be permanently assigned at the regional sub-centers to conduct routine check-up of the instrument, minor repairs for the existing stations and initial assessment of major technical problems for all stations. The Head Office will conduct repairs of major technical problems for the existing and remote stations.

The maintenance team in each regional sub-center will be composed of two PHIVOLCS staff members. The Head Office will have two sets of maintenance team-two computer maintenance teams (two staff per team) and four instrumentation maintenance teams (three staff per team). The Project will provide technical and on-the-job training of the staff members to familiarize with the technical components of the instrument. Each team will be given a complete set of necessary testing tools, diagrams, appropriate & effective operation & maintenance manuals and spare parts. A logbook for each station will be maintained to indicate a history of repairs done to the instrument to serve as a guide for other technical personnel who might encounter the same problem in order to minimize downtime of the instrument.

This would also serve as a basis to determine common spare parts used during repairs for future consideration in the quantity of spare parts to be procured.

Remote stations are geographically situated in isolated areas where public transport vehicles do not go due to bad road conditions. Only private and hired special vehicles could assess these areas. Hiring is expensive and requires long negotiation period to schedule a special trip especially during the rainy season. Therefore, even if capable personnel and spare parts are available, hiring of vehicles will delay maintenance and repair work, and would prolong the interruption of operation of the instrument. In this case, additional vehicles (4-wheel and motorcycles) to conduct the necessary maintenance of instruments deployed in the field should be considered. The deployment of vehicles to strategic PHIVOLCS stations would mainly provide transport for the equipment and technical staff during whose initial deployment and in subsequent regular maintenance and repair.

Vehicles are needed at the sub-centers in Baguio, Davao and Mayon stations, which are responsible for maintaining the instrument in stations within their regional scope. Together with Mayon and the Head Office, these stations will constitute an evenly distributed maintenance

team capable of reaching existing and remote stations to conduct repair and maintenance of the equipment. Under this condition, they could also conduct rapid and timely assessment of critical seismic and volcanic events especially those that warrant immediate investigation. For areas where road conditions make it difficult for ordinary four-wheeled vehicles to pass, two-wheeled vehicles could be used for narrow roads and difficult terrain. Those areas which require this type of vehicle are Bishlig, General Santos, Zamboanga, Cotabato, Kalibo, Palo, Callao, Guinayangau and Puerto Princesa. Serving as the management center of the institute, the Head Office would also serve as a major dispatch point for emergency response teams during volcano and earthquake crises, thus, field vehicles are requested for the operation of the Head Office.

Future maintenance costs for the equipment and systems have been calculated on the basis of the following conditions. The equipment and systems to be supplied under the Project will be supported by power backup systems, such as uninterrupted power supply, automatic voltage regulator and solar array. Therefore, the whole equipment and systems will be installed in a suitable and effective environmental condition. In case of normal operation of the equipment under the above said conditions, the annual maintenance cost for the equipment can be estimated.

The PHIVOLCS's maintenance capabilities have been amply confirmed on the basis of its experience. The technical skill levels of the engineers and technicians in PHIVOLCS are quite enough for maintenance of the equipment and systems. In addition, PHIVOLCS must obtain an annual maintenance appropriation at an early stage to be absolutely sure of its ability to procure these essential parts, as required.

Minimization of an annual operation and maintenance cost of PHIVOLCS has been considered in the basic design study, nevertheless the operation and maintenance cost for the equipment and systems to be supplied and installed under the Project will be required.

In order to minimize the operation and maintenance cost, it is necessary that PHIVOLCS must have the spacial consideration on implementation of appropriate operation & maintenance procedures will lead to the minimization of consumption and cut down on operation cost. In order for each responsible person to be able to appropriately and effectively perform his duty to avoid any failure, provision of installation, operation and maintenance manuals are indispensable. In addition, on-the-job training through actual use of the equipment and systems should be conducted to as many staff as possible in accordance with these manuals.

In connection with the equipment & systems operation and maintenance, consideration must be given to the following matters.

- Staff training
- Operation and maintenance structure of PHIVOLCS
- System failure incidence due to the difference of environmental condition from Japan
- Frequency of scheduled parts & consumables replacement and overhauls

The following methods will have to be applied to minimize the occurrence of failures and maintenance cost to be borne by PHIVOLCS.

- Reliable and durable equipment should be selected and procured.
- The equipment to be procured should possibly be as the same as operation and maintenance method and technique of the existing equipment.
- Unification of spare parts and consumables between the existing equipment and the equipment to be supplied under the Project should be considered.
- The power supply to the systems should be provided through UPS and auto voltage regulator (AVR).
- Consideration for selection and procurement of the equipment will be necessary for utilization of local activities in the occurrence of a failure.
- At the time of installation work of the equipment and systems, effective operation and maintenance method and technique should be provided through on-the-job training by a consultant and a contractor.

After expiry of the warranty period of 1 year after completion of the Project, PHIVOLCS will maintain all the equipment on its own. Thus PHIVOLCS should recognize the necessity for some special expenditures every time problem occur. However, in order to minimize expenditures on the part of PHIVOLCS for operation and maintenance of the equipment, standardization and unification of spare parts & consumables and selection of the most durable & reliable equipment should be undertaken as much as possible. Such a policy will contribute positively to reducing financial burden of future procurement of spare parts and consumables as well as reduce overall maintenance expenditures.

### 3. Estimation of Additional Expenditure for the Project

1) Electricity charge : Pesos 38,000/year

The electricity charge in 1997 of the Head Office and the existing volcanic & seismic stations is approximately Pesos 250,000/year. Based on the expenditure of the existing situation, additional electricity charge can be roughly expected as 15 percents of the electricity charge in 1997.

2) Telephone charge : Pesos 22,000 / year

The telephone charge in 1997 of the Head Office and the existing volcanic & seismic stations is approximately Pesos 220,000/year. Based on the expenditure of the existing situation, additional telephone charge can be roughly expected as 10 percents of the telephone charge in 1997.

3) Transportation services charge (courier service, mail, etc.) : Pesos 12,000 / year

The transportation services charge in 1997 of the Head Office and the existing volcanic & seismic stations is approximately Pesos 240,000/year. Based on the expenditure of the existing situation, additional transportation services charge can be roughly expected as 5 percents of the transportation services charge in 1997.

4) Travelling expenses : Pesos 290,000 / year

The travelling expenses in 1997 of the volcanic & seismic divisions is approximately Pesos 1,430,000/year. Based on the expenditure of the existing situation, additional travelling expenses can be roughly expected as 20 percents of the travelling expenses in 1997 and plus consideration of increasing rate for the last 3 years (2% / year).

$$(1,430,000 \times 0.2) \times 1.02 \approx \text{Pesos } 290,000$$

5) Office supplies cost : Pesos 676,000/year

The office supplies cost in 1997 of the volcanic & seismic divisions is approximately Pesos 845,000/year as follows.

Supplies & Material Cost in 1997

Volcanic Division : 944,000

Seismic Division : 1,194,000

Office Supplies Cost in 1997

Volcanic Division : 45% of 944,000  $\approx$  425,000

Seismic Division : 35% of 1,194,000  $\approx$  420,000

$$425,000 + 420,000 = 845,000 \times 0.8 = \text{Pesos } 676,000/\text{year}$$

Based on the expenditure of the existing situation, additional office supplies cost can be roughly expected as 80 percents of the office supplies cost in 1997.

6) Spare parts procurement cost : Pesos 712,000/year

The spare parts procurement cost in 1997 of the volcanic & seismic divisions is approximately Pesos 1,188,000/year as follows.

Supplies & Material Cost in 1997

Volcanic Division : 944,000

Seismic Division : 1,194,000

Spare Parts Procurement Cost in 1997

Volcanic Division : 50% of 944,000 = 472,000

Seismic Division : 60% of 1,194,000 = 716,000

$$472,000 + 716,000 = 1,188,000 \times 0.6 = \text{Pesos } 712,000/\text{year}$$

However, under this Project, all the existing systems will be replaced, thereby, the existing spare parts procurement cost can be spent for the equipment and systems to be supplied under the Project. Taking the above situation into consideration, additional spare parts procurement cost can be roughly expected as 60 percents of the office supplies cost in 1997.

7) Repair / maintenance of the government's vehicles cost : Pesos 290,000/year

The repair / maintenance of the government's vehicles cost in 1997 of the volcanic & seismic divisions is approximately Pesos 1,430,000/year. Based on the expenditure of the existing situation, additional repair / maintenance of the government's vehicles cost can be roughly expected as 20 percents of the repair / maintenance of the government's vehicles cost in 1997 and can be included 2% of the cost escalation for the last 3 years.

$$1,430,000 \times 0.2 \times 1.02 = \text{Pesos } 290,000/\text{year}$$

8) Gasoline & oil cost of the government's vehicles : Pesos 171,000/year

Under this Project, supply of 3 pick-up vehicles at Mayon, Davao and Baguio stations and 9 motor cycles at Bislig, General Santos, Zamboanga, Cotabato, Kalibo, Palo, Callao, Guinayangan and Puerto Princesa are scheduled at Phase-II.

Gasoline : Pesos 12 / liter

3 Pick-up vehicles : 6 liters/day (50km drive/day)  $\times$  Pesos 12 / liter  $\times$  20days/month  $\times$  12month/year  $\times$  1.1 (engine oil, etc.) = 19,008  $\times$  3 = 57,024 = Pesos 57,000

9 motor cycles : 4 liters/day (60km drive/day)  $\times$  Pesos 12 / liter  $\times$  20days/month  $\times$  12month/year  $\times$  9 motor cycles  $\times$  1.1 (engine oil, etc.) = 114,048 = Pesos 114,000

9) Local laborers employment cost : Pesos 619,000/year

For cleaning and securing the equipment and systems to be installed at 68 unmanned Project sites, employment of local laborers will be required.

68 laborers  $\times$  Pesos 700/month  $\times$  13month/year (including a bonus) = 618,800 = Pesos 619,000

(Locations of all the Project sites are not yet confirmed, therefore, the above calculated local laborers employment cost must be maximum.)

After completion of the Project, Phase-I and II, for the first year, all the equipment and systems are still under warranty by the contractor, no problems should be encountered. Spare parts for 2 years normal operation to be supplied under the Project should be adequate for the third year, and it is probably not expecting any major equipment failure because the whole system is still new. During these early years, therefore, operation and maintenance expenses should be modest. From the fourth year, practical operation and maintenance cost will be required and the following expense may be anticipated.

### Additional Expenditure of Operation and Maintenance Cost for the Project

In consequence of the above conditions, the additional annual expenditure of operation and maintenance cost for the Project after completion of the Project, Phase-I & II as described in the below table will be needed in addition to the present expenditure of operation and maintenance cost.

	1st year	2nd year	3rd year	from 4th year
Electricity charge	Pesos 38,000.	Pesos 38,000.	Pesos 38,000.	Pesos 38,000.
Telephone charge	Pesos 22,000.	Pesos 22,000.	Pesos 22,000.	Pesos 22,000.
Transportation services	Pesos 12,000.	Pesos 12,000.	Pesos 12,000.	Pesos 12,000.
Travelling expenses	Pesos 290,000.	Pesos 290,000.	Pesos 290,000.	Pesos 290,000.
Office supplies	Pesos 0.	Pesos 0.	Pesos 676,000.	Pesos 676,000.
Spare parts procurement	Pesos 0.	Pesos 0.	Pesos 0.	Pesos 712,000.
Repair/maintenance of the vehicles	Pesos 0.	Pesos 0.	Pesos 0.	Pesos 290,000.
Gasoline & oil	Pesos 171,000.	Pesos 171,000.	Pesos 171,000.	Pesos 171,000.
Local laborers employment	Pesos 619,000.	Pesos 619,000.	Pesos 619,000.	Pesos 619,000.
<b>Total</b>	<b>Pesos 1,152,000.</b>	<b>Pesos 1,152,000.</b>	<b>Pesos 1,828,000.</b>	<b>Pesos 2,830,000.</b>

Approximately 5 and 7 years after the completion of the Project, replacement of about 100 batteries (100A/h) of UPS equipment will be required for uninterrupted operation of the equipment and systems. However, it is not necessary in the "Additional Expenditure of Operation and Maintenance Cost for the Project" as described above.

The annual budget of PHIVOLCS in 1997 was Pesos 122,875,000, however, it included the head office building construction cost. Deducting the head office building construction cost from the 1997's annual budget is the actual annual budget of PHIVOLCS in 1997 which is Pesos 75,875,000. The annual expenditure of operation and maintenance in 1997 was Pesos 38,624,000 which is 51% of the actual annual budget of PHIVOLCS in 1997. In addition, the above additional expenditure of operation and maintenance cost for the Project (Pesos 2,830,000) is equivalent to 7.3% of the annual expenditure of operation and maintenance in 1997 and 3.7% of the annual budget of PHIVOLCS in 1997.

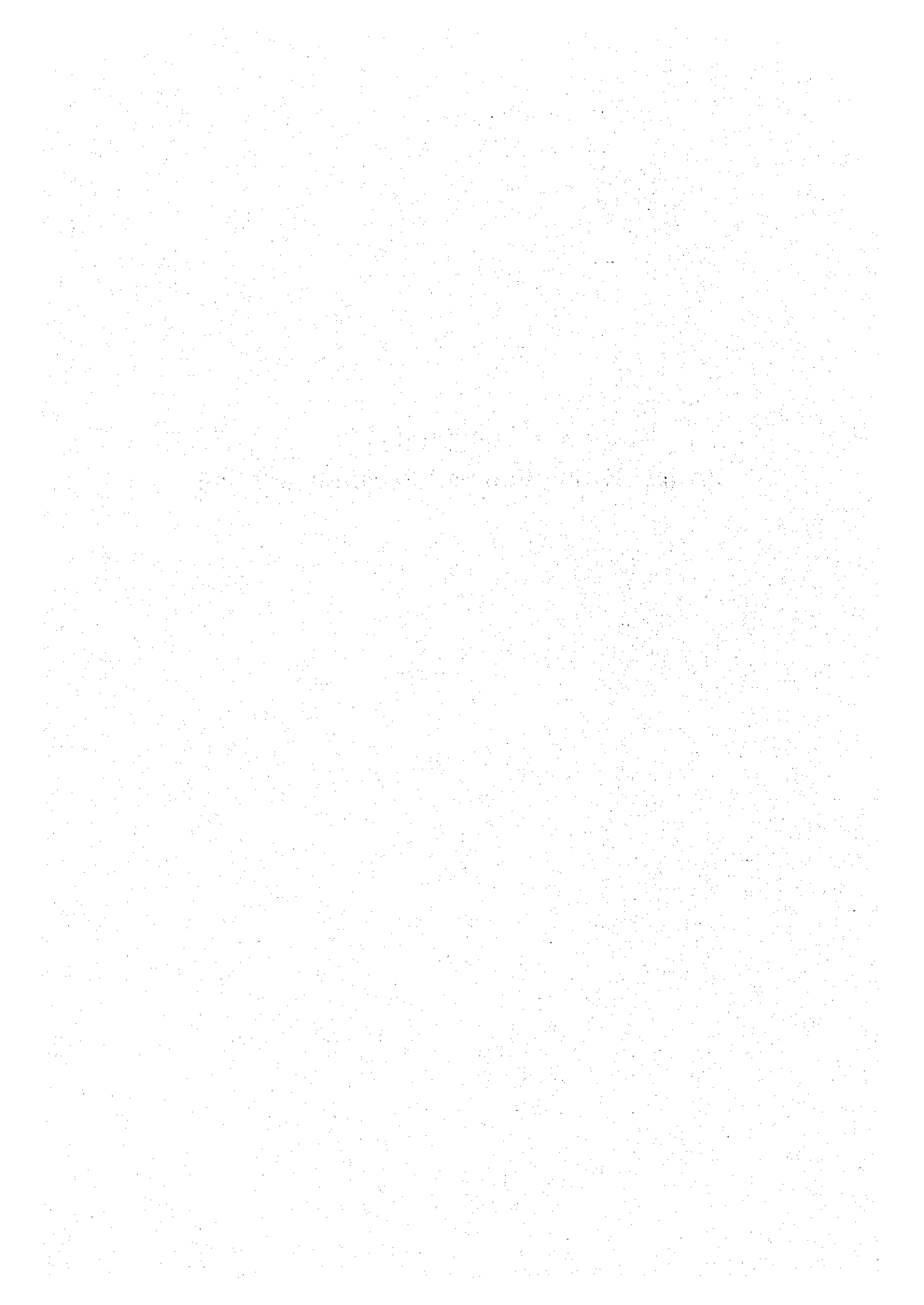
From 4th years after completion of the Project, Pesos 38,624,000 (annual expenditure of operation and maintenance in 1997) + Pesos 2,830,000 (additional expenditure of operation and maintenance cost for the Project) = Pesos 41,454,000 will be required and indispensable for smooth and uninterrupted operation of the equipment and systems to be supplied under the Project and it will be 54% of the annual budget of PHIVOLCS.

However, due to the present economical condition of the Philippines, the President order was issued to all the governmental departments to deduce 25% of the annual budget of the Government of the Philippines, thereby, under this circumstance, securing the additional budget for the Project will be expected some difficulties.

## **Chapter 4**

# **Project Evaluation and Recommendation**





## **Chapter 4 Project Evaluation and Recommendation**

### **4 - 1 Project Effect**

#### **1. Project Effect**

The Project will make the following objectives and the Philippines will benefit from the Project as the project effect.

- 1) Mitigation of natural disasters resulting from earthquakes, tsunamis and volcanic eruptions.
- 2) Prompt and necessary action of civil defence and relief for minimizing extensive loss and damage which are the determining factor for significant set-back of national economy and development activities of the Philippines.
- 3) Improvement of safety of the aviation operation and of people's life & property by providing more accurate information for the general public around the clock.
- 4) Preparation and enforcement of standard, regulation and other necessary rules on structure, civil defence, relief action, operation of transports, etc. for appropriate and efficient

After the implementation of the Project, the facilities of PHIVOLCS will greatly be improved and thus PHIVOLCS will be capable of contributing effectively to the mitigation of natural disasters by volcanic eruption, earthquake and tsunami and also to advancement of relief action and civil defence activity of the Philippines.

In addition, the accuracy and the reliability of volcano eruption detection & warning and seismic monitoring related to natural disasters will be improved. It is expected that with this PHIVOLCS can contribute to the reduction of volcanic and seismic disasters in the country. At the same time, overall standard of volcanic and seismic information will be in better position, and PHIVOLCS will thus be able to contribute in a greater perspective to reduction of the natural disasters generated by volcano eruptions and earthquakes. Further, the improvement of the volcano & seismic monitoring network as the result of this Project will highly enhance PHIVOLCS's activities and will put PHIVOLCS in a position to play its due role in the economic development of the Philippines.

Besides, volcano eruption detection & warning, tsunami forecasts and various kinds of volcanic and seismic information are provided to the general public of the Philippines through mass-media. The volcanic and seismic information are also provided to the other users, the governmental agencies (Office of Civil Defense, National Disaster Coordinating Council, Department of Social Welfare and Development, Philippine National Red Cross, etc.) in the country and international institutions. Thus, when the Project will be completed, it will have a high publicity profile.

Thereby, a national national volcanological & seismological network is an essential facility for the government of the Philippines to be able to develop successful risk mitigation strategies at an affordable cost. The national network should have a mix of seismographs so that both small and large earthquakes can be recorded without distortion both near to and far from the epicenter. In addition, a central monitoring facility receiving data telemetries from each station of the network in near-real-time is necessary so that the location can be done quickly and a appropriate warning sent to seismologists and then to clients including emergency managers, politicians and the media.

It is necessary to quantify the hazard throughout the Philippines so that appropriate land planning decisions can be made and so that appropriate building codes can be developed. It is also necessary to be able to determine the location and size of an earthquake quickly and accurately so that national and local emergency planners can respond effectively following an damaging earthquake. Emergency managers need also to be advised of the likelihood of damaging tsunamis following a large local or distant earthquake. The introduction of inadequate building regulations could result in building collapse and fatalities and be very expensive while unnecessarily severe building regulations could also be very expensive. The economic benefits of the Project in support of research and development activities. However, it is widely accepted that immediate warning systems and disaster preparedness can greatly mitigate the disastrous effects if these natural occurrences especially in the reduction in human injuries/losses and damage to properties.

The expected project effects to be generated by the Project are as follows.

- PHIVOLCS will be able to supply information of volcano eruption detection and earthquake and other necessary information to agencies concerning to reduction of natural disasters, Office of Civil Defense, National Disaster Coordinating Council, Department of Social Welfare and Development, Philippine National Red Cross, civil aviation sector and other information users for taking measures against natural disaster and making prompt relief action of the Government of the Philippines.

- The national volcanological & seismological network to be improved under the Project will be able to ensure continuous supply of necessary information on geologic phenomena to PHIVOLCS for contributing to accurately and speedily make detection and warning and to other agencies related to reduction of natural disasters for making prompt disaster relief action.
- In case of emergency and an evacuation warning of volcano eruption required to the general public, PHIVOLCS will be able to announce the warning immediately through the concerned governmental agencies and mass-media.
- PHIVOLCS will be able to conduct research & development on the impact of volcanic eruption, earthquake and other related geologic phenomena on the physical and socio-economic environment and recommend appropriate measures for the mitigation of impacts and rehabilitation of affected areas.
- To know the mechanism of geologic phenomena, PHIVOLCS will be able to adapt and develop technologies more particularly for volcanic eruption and earthquake prediction, volcano and seismic monitoring and disaster mitigation .
- PHIVOLCS will be able to improve his seismic detection capability minimum of approximately magnitude 4 in the whole regions of the Philippines for obtaining accurate hypocenter and focal depth determination.
- For minimizing the damage from future earthquakes, PHIVOLCS will be able to estimate the risk of them happening more accurately, so that building can be designed and constructed not to collapse during their expected life in the event that an earthquake does occur.
- For preparation and enforcement of standard, regulation and other necessary rules on structure, civil defence, relief action, operation of transports, etc. for appropriate and efficient development of the Philippines, PHIVOLCS will directly be able to contribute through the provision of necessary information on geologic phenomena.
- PHIVOLCS will be able to conduct research more accurately to increase the level of understanding/knowledge about volcanoes, volcanic eruptions and terranes, earthquake zones and mechanism, faulting, along with other related geologic phenomena.

- PHIVOLCS will be able to implement an aggressive science & technological information processing and dissemination program to promote public awareness on the significance of volcanic activity, earthquakes and related geotectonic processes and their threats and possible benefits to the people.
- PHIVOLCS will be able to identify, evaluate and characterize volcanic materials and energy products and generate/adapt technologies for their utilization for the people of the Philippines.

## 2. Verification of Appropriateness

In consequence of the implementation of the Project, the PHIVOLCS's monitoring, detecting and disseminating systems will be modernized. This will make it possible to continuously monitor and detect volcano eruptions, earthquake and tsunami, that lead to serious damage, and so can be expected to improve detection and investigation accuracy. PHIVOLCS will thereby be in a position to provide accurately timed detecting and warning to the general public, disaster relief organizations and aviation sectors.

PHIVOLCS has a plan for organizational restructuring and personnel deployment in connection with ongoing operation and maintenance of all the equipment and systems to be supplied under the Project. Judging by operating performance, engineers of PHIVOLCS have been satisfactorily nurtured, while an appropriate training system is also being planned. PHIVOLCS is, accordingly, deemed fully capable of operation and maintenance of the new systems. It has, therefore, been determined that the operation and maintenance plans for this Project are quite realistic.

Based on all the above consequences, it has been concluded that it would be appropriate to implement the Project under Japan's Grant Aid Assistance.

However, due to the following circumstances, a basic design study for implementation of the Project, Phase-II, will be indispensable.

- 1) During this Basic Design Study for the Project in the Philippines, exact locations of all the Project sites could not be confirmed due to under selection of the Project sites and implementation of all necessary propagation tests by PHIVOLCS.
- 2) Due to occurrence of the economical unstable situation and the recession in the Philippines after this Basic Design Study, operation and maintenance plan of PHIVOLCS must be reconsidered in accordance with the results of the basic design study for implementation of the Project, Phase-II.

#### 4 - 2 Recommendation

The Project is expected to produce the considerable benefits as mentioned above. The Project would substantially contribute to the development of the basic human needs in the people of the Philippines, the appropriateness of carrying out this Project under a grant-aid has been amply confirmed. Therefore, the implementation of the Project is inferred to be truly significant.

In addition, by improving and expediting the following items, the smoothness and effectiveness of the Project could be increased further.

- In order to operate the volcanic and seismic network system on an integrated basis, all information and data must be standardized and their monitoring must be conducted smoothly. It would be desirable, in this connection, that PHIVOLCS should strengthen the engineering section and improve appropriate operation and maintenance structure within the organization and a proper maintenance system for the whole systems.
- Considering its meager resource capability at the present, PHIVOLCS needs the full support of policy and decision makers to be able to tackle its enormous tasks. It also has to establish and strengthen linkages with local and international institutions for the upgrading of its facilities and manpower resources.
- For all the equipment and systems to be supplied under the Project, it is essential that competent maintenance engineers be secured for ongoing operations. To this end, an efficient and effective training plan should be established to ensure continuing development of a qualified technical personnel.
- For appropriate operation & maintenance and also procurement of spare parts & consumables for the whole equipment and systems to be supplied under the Project, necessary financial measures should be taken and also against any damage and disappearance of the equipment, appropriate measures should be taken by PHIVOLCS.
- In order to utilize information on volcano eruptions, earthquakes and tsunami for natural disaster mitigation, PHIVOLCS should make very close communication and association with the governmental agencies (Office of Civil Defense, National Disaster Coordinating Council, Department of Social Welfare and Development, Philippine National Red Cross, etc.) and international institutions as the governmental organization obtained a special obligation of mitigation of the natural disaster.

- After completion of the Project, Phase-I & II, PHIVOLCS will be able to accumulate observed data and information from the existing seismic & volcano observation stations by the public telephone dialing, therefore, for dissemination and issue of tsunami forecasts and warnings, at least 13 minutes will be required. However, in order to dissemination of the information on volcano eruptions, earthquakes and tsunami more speedily and accurately to the general public, the governmental agencies and other organizations concerned with natural disaster mitigation, dedicated links between PHIVOLCS Head Office and the existing seismic & volcano observation stations should be secured.
- For implementation of the Project, Phase-II, crystallization of exact locations of all the Project sites and completion of all necessary propagation tests by PHIVOLCS should be required prior to commencement of the implementation.

## **Appendices**





## **Appendix 1. Member List of the Survey Team**

### **(1) Basic Design Survey Team**

Mr. Masayuki WATANABE	Leader	Institute for International Cooperation, JICA
Dr. Nobuo HAMADA	Technical Advisor I	Japan Meteorological Agency
Dr. Takahiro OKURA	Technical Advisor II	Kyoto University
Mr. Hakushi HAMAOKA	Coordinator	First Project Division, Grant Aid Study Department, JICA
Dr. Tetsuro SUZUOKI	Chief Consultant	Japan Weather Association
Mr. Osami KANDA	Earthquake Monitoring	Japan Weather Association
Mr. Takashi SAITO	Equipment Planner I	Japan Weather Association
Mr. Keiji NAKAI	Equipment Planner II	Japan Weather Association
Mr. Yoshihisa UCHIDA	Procurement & Cost Estimation Planner	Japan Weather Association

### **(2) Explanation of Draft Report**

Mr. Masayuki WATANABE	Leader	Institute for International Cooperation, JICA
Dr. Nobuo HAMADA	Technical Advisor I	Japan Meteorological Agency
Mr. Hakushi HAMAOKA	Coordinator	First Project Division, Grant Aid Study Department, JICA
Dr. Tetsuro SUZUOKI	Chief Consultant	Japan Weather Association
Mr. Takashi SAITO	Equipment Planner I	Japan Weather Association



## Appendix 2. Study Schedule

### (1) Basic Design Study

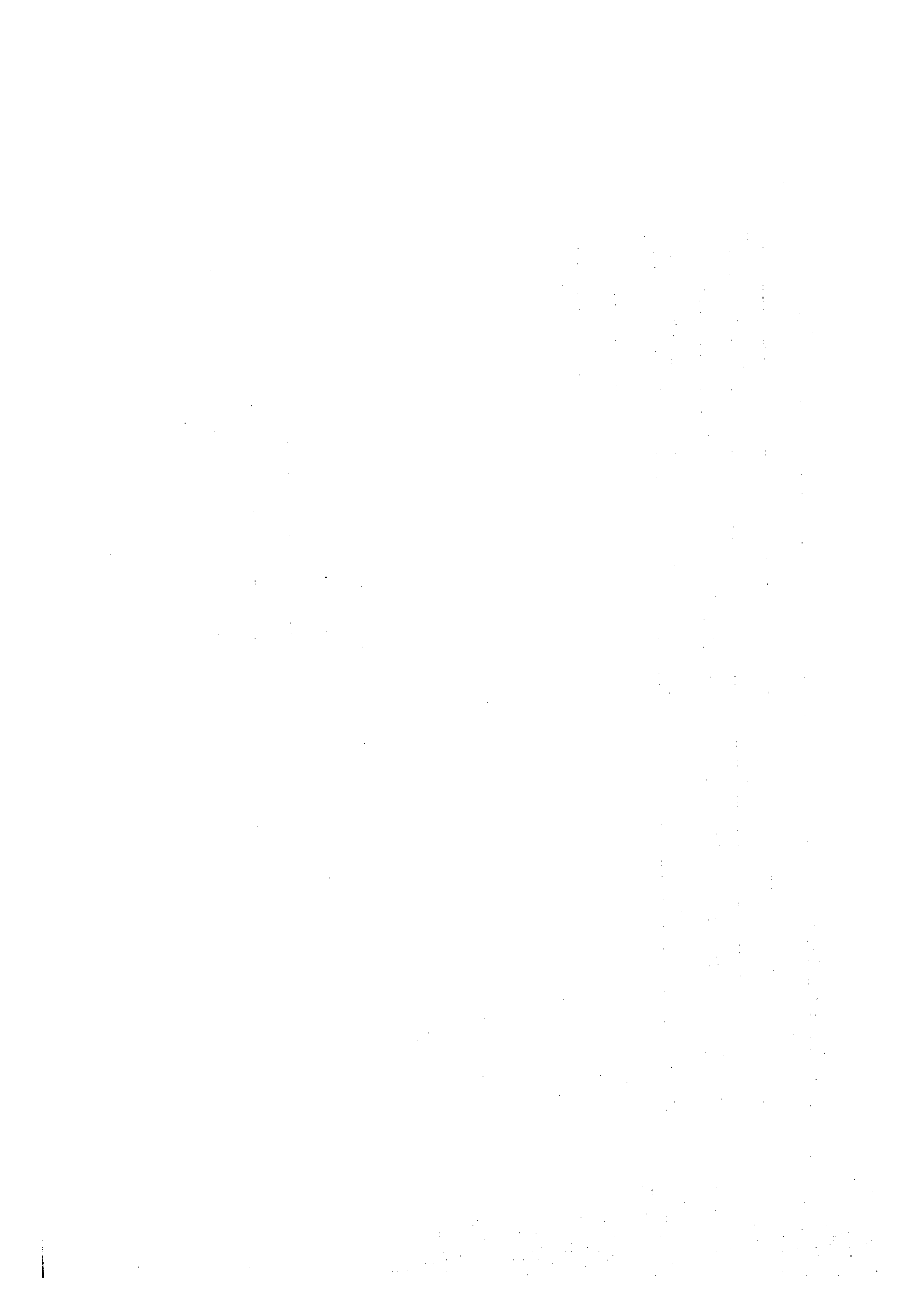
21 October, 1997 ~ 24 November, 1997

		Governmental Member					Consultant Member				
		Masayuki Watanabe Leader	Nobuo Hamada Technical Advisor I	Takahiro Okura Technical Advisor II	Hakushi Hamaoka Project Coordinator	Tetsuro Suzuoki Chief Consultant Management, operation and maintenance planner	Takashi Saito Equipment Planner I	Yoshihisa Uchida Procurement Planner Estimator	Osami Kanda Earthquake Monitoring	Keiji Naka Equipment Planner II	
1	21 Oct TUE	Karachi → Manila Narita → Manila Courtesy call on Embassy of Japan and JICA office									
2	22 Oct WED	Courtesy call on NEDA, and PHIVOLCS. Meeting with them									
3	23 Oct THU	Meeting with PHIVOLCS									
4	24 Oct FRI	(Manila → Cebu) Site survey at Lapu Lapu existing seismic station (Cebu → Davao)									
5	25 Oct SAT	Site survey at Taal existing volcano observatory Site survey at Davao existing seismic station (Davao → Manila)									
6	26 Oct SUN	Inner meeting and data collection for preparation of report									
7	27 Oct MON	Site survey at Tagaytay existing seismic station or Site survey at Taal existing volcano observatory									
8	28 Oct TUE	Inner Meeting, Meeting with PHIVOLCS Manila → Narita Inner meeting, Meeting with PHIVOLCS									
9	29 Oct WED	Discussion on Minutes Meeting with PHIVOLCS									
10	30 Oct THU	Signing of Minutes Data collection for preparation of report									
11	31 Oct FRI	Reporting to Embassy of Japan and JICA Manila → Narita Data collection for preparation of a report, inner meeting									
12	1 Nov SAT	Data collection for preparation of report									
13	2 Nov SUN	Data collection for preparation of report									
14	3 Nov MON	Meeting with PHIVOLCS Data collection for preparation of report									
15	4 Nov TUE	Site survey at Mayon existing volcano observatory Data collection for preparation of report									
16	5 Nov WED	Site survey at Buluan existing volcano observatory Data collection for preparation of report									
17	6 Nov THU	Meeting with PHIVOLCS Data collection for preparation of report									
18	7 Nov FRI	Manila → Narita Data collection for preparation of report									

	Masayuki Watanabe Leader	Nobuo Hamada Technical Advisor I	Takahiro Okura Technical Advisor II	Hakushi Hamaoka Project Coordinator	Tetsuro Suzuobi Chief Consultant Management, operation and maintenance planner	Takashi Saito Equipment Planner I	Yoshinisa Uchida Procurement Planner, Estimator	Osami Kanda Earthquake Monitoring	Keiji Nakai Equipment Planner II
19/8 Nov SAT							Site survey at Panauho existing volcano observatory		
20/9 Nov SUN							Data collection for preparation of report	Site survey at Bagyo existing seismic station	
21/10 Nov MON							Meeting with PHIVOLCS. Data collection for preparation of report		
22/11 Nov THE							Bidding of the Project to PHIVOLCS		
23/12 Nov WED							Data collection for preparation of report		
24/13 Nov THU						Reporting to JICA office	Data collection for preparation of report		
25/14 Nov FRI						Courtesy call on Embassy of Japan and JICA office	Data collection for preparation of report		
26/15 Nov SAT							Data collection for preparation of a report and inner meeting		
27/16 Nov SUN						Manila→Naria	Site survey at Hibok-Hibok existing volcano observatory		
28/17 Nov MON							Site survey at Cagayan de Oro existing seismic station		
29/18 Nov THE							Data collection for preparation of report		
30/19 Nov WED							Site survey at Kaibho existing seismic station		
31/20 Nov THU							Site survey at Luchan Tagaytay existing seismic station		
32/21 Nov FRI							Site survey at Puerto Princesa existing seismic station		
33/22 Nov SAT							Site survey at Puerto Princesa existing seismic station		
34/23 Nov SAN							Data collection for preparation of report		
35/24 Nov MON							Manila→Naria		

## (2) Explanation of Draft Report

		Schedule			
		Governmental Member		Consultant Member	
	Masayuki Watanabe	Nobuo Hamada	Hakushi Hamaoka	Tetsuro Suzuki	Takashi Saito
	Leader	Technical Advisor I	Project Coordinator	Chief Consultant	Equipment Planner I
1	15 Jan. THU	Tokyo⇒Manila (JL741)			
2	16 Jan. FRI	Courtesy call on NEDA and PHIVOLCS			
3	17 Jan. SAT	Courtesy call on NEDA			
4	18 Jan. SUN	Inner Meeting			
5	19 Jan. MON	Explanation of DF/R			
6	20 Jan. TUE	Explanation of DF/R, discussion on M/D			
7	21 Jan. WED	Signing of M/D, Reporting to Embassy of Japan, JICA Office			
8	22 Jan. THU	Manila⇒Tokyo (JL742) Reporting to NEAD and DOST			
9	23 Jan. FRI	Data collection for preparation of report			
10	24 Jan. SAT	Manila⇒Tokyo (JL742) Data collection			
11	25 Jan. SUN	Data collection			
12	26 Jan. MON	Manila⇒Tokyo (JL742)			



### **Appendix 3. List of Party Concerned in the Recipient Country**

- **National Disaster Coordinating Council**  
Mr. Fortunato M. Dejoras                      Executive Officer
  
- **Office of Civil Defence**  
Ms. Belen L. Tan Mnsa                      Chief, Planning and Programming Division
  
- **National Economic and Development Authority**  
Ms. Cristina C. Santiago                      Economic Development Specialist  
Public Investment Staff  
  
Mr. Jonathan Luna Uy                      National Economic and Development  
Authority Public Investment Staff
  
- **Department of Science and Technology**  
Dr. Estrella F. Alabastro                      Undersecretary  
  
Ms. Lydia G. Tansiusin                      Assistant Secretary
  
- **Philippine Institute of Volcanology and Seismology (PHIVOLCS)**  
**Head Office**  
Dr. Raymundo S. Punongbayan              Director  
  
Dr. Emmanuel G. Ramos                      Deputy Director  
  
Dr. Eddie L. Listanco                      Chief, Geology Geophysics R & D Division  
  
Dr. Jean C. Tayag                      Chief, Geologic Disaster Awareness &  
Preparedness Division  
  
Dr. Ernesto G. Corpuz                      Chief, Volcano Monitoring & Eruption  
Prediction Division  
  
Mr. Delfin C. Garcia                      Officer-in-Charge, Sismoological Observation &  
Earthquake Prediction Division  
  
Ms. Nanette V. A. Melosantos              Administrative Officer, Finance &  
Administrative Division  
  
Mr. Arnaldo A. Melosantos              Senior Science Research Specialis
  
- Cebu Seismic Station**  
Mr. Rolando Montanez
  
- Davao Seismic Station**  
Mr. Desiderio Cabanlit
  
- Baguio Seismic Station**  
Mr. Salvador C. Cesario
  
- Tagaytay Seismic Station**  
Mr. Rodrigo Medrano
  
- Buco Volcano Observatory**  
Mr. Orlando Guardacasa  
Mr. Eduardo Laguerta



**Bulusan Volcano Observatory**  
Mr. Andy Manlagnit

**Hibok Hibok Volcano Observatory**  
Mr. Luisito Salugsugan

**Cagayan de Oro Seismic Station**  
Mr. Marcial Labininay

**Kalibo Seismic Station**  
Mr. Felix A. Marte

**Lucban Seismic Station**  
Mr. Amando Avellano

**Puert Princesa Seismic Station**  
Mr. Robillo D. Sumandal

**- Embassy of Japan**  
Mr. Yoshiji Koyano

First Secretary

**- JICA Office**  
Mr. Hiroshi Goto  
Mr. Kazuo Sudo  
Mr. Hisakatsu Okuda

Resident Representative  
Deputy Resident Representative  
Assistant Resident Representative

MINUTES OF DISCUSSIONS  
BASIC DESIGN STUDY ON THE PROJECT  
FOR  
EARTHQUAKE AND VOLCANO MONITORING IMPROVEMENT PROGRAM  
IN  
THE REPUBLIC OF THE PHILIPPINES

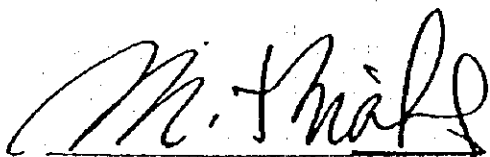
In response to a request from the Government of the Philippines, the Government of Japan decided to conduct a Basic Design Study on the Project for Earthquake and Volcano Monitoring Improvement Program (hereinafter referred to as "the Project"), and entrusted the study to the Japan International Cooperation Agency (hereinafter referred to as "JICA").

JICA sent to the Philippines the Basic Design Study Team (hereinafter referred to as "the Team"), which is headed by Mr. Masayuki WATANABE, Senior Development Specialist, Institute for International Cooperation, JICA, and is scheduled to stay in the country from 21st of October to 31st of October, 1997.

The Team held a series of discussions with the relevant officials of the Government of the Philippines and conducted a field survey at the study area.

In the course of discussions and field survey, both sides have confirmed the main items described on the attached sheets. The Team will proceed to further works and prepare the Basic Design Study Report.

Manila, October 29, 1997

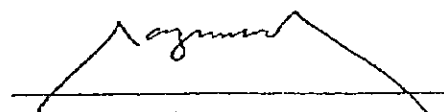


Masayuki WATANABE

Leader

Basic Design Study Team

Japan International Cooperation Agency



Raymundo S. Punongbayan

Director

Philippine Institute of

Volcanology and Seismology

## ATTACHMENT

### 1. OBJECTIVE

The objectives of the Project are to improve the Earthquake and Volcano monitoring networks of the Philippine Institute of Volcanology and Seismology (hereinafter referred to as "PHIVOLCS").

The objective of the Project is to contribute to the:

- i) reduction of natural disasters resulting from earthquakes, tsunamis and volcanic eruptions.
- ii) prompt and necessary action of civil defence and relief for minimizing extensive loss and damage which are the determining factor for significant set-back of national economy and development activities of the Philippines.
- iii) improvement of safety of the aviation operation and of people's life & property by providing more accurate information for the general public around the clock.
- iv) preparation and enforcement of standard, regulation and other necessary rules on structure, civil defence, relief action, operation of transports, etc. for appropriate and efficient development of the Philippines.

### 2. PROJECT SITES

The proposed Project sites are as described in the "Project Site Location Map" attached hereunder.

### 3. EXECUTING AGENCY

PHIVOLCS is responsible for the administration and execution of the Project.

### 4. ITEMS REQUESTED BY THE GOVERNMENT OF THE PHILIPPINES

As a result of the series of discussions, the following items have finally been requested by the Government of the Philippines:

- (1) Replacement of the existing seismographs and installation of data transmission equipment at the existing field stations (seismic stations and volcano observatories).
- (2) Installation of earthquake and tsunami information system at the head office of PHIVOLCS for provision of necessary information to concerned agencies for reduction of natural disasters and civil defence & relief.
- (3) Installation of volcano monitoring system at PHIVOLCS for reduction of natural disasters and civil defence & relief including the safe operation of civil aviation.
- (4) Supply of mobile earthquake observation equipment.

However, the final components of the Project will be decided after further discussion and field survey in the Philippines and detailed analysis in Japan.

Above components are shown as " Project Configuration " in ANNEX I.

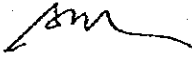
## 5. JAPAN'S GRANT AID SYSTEM

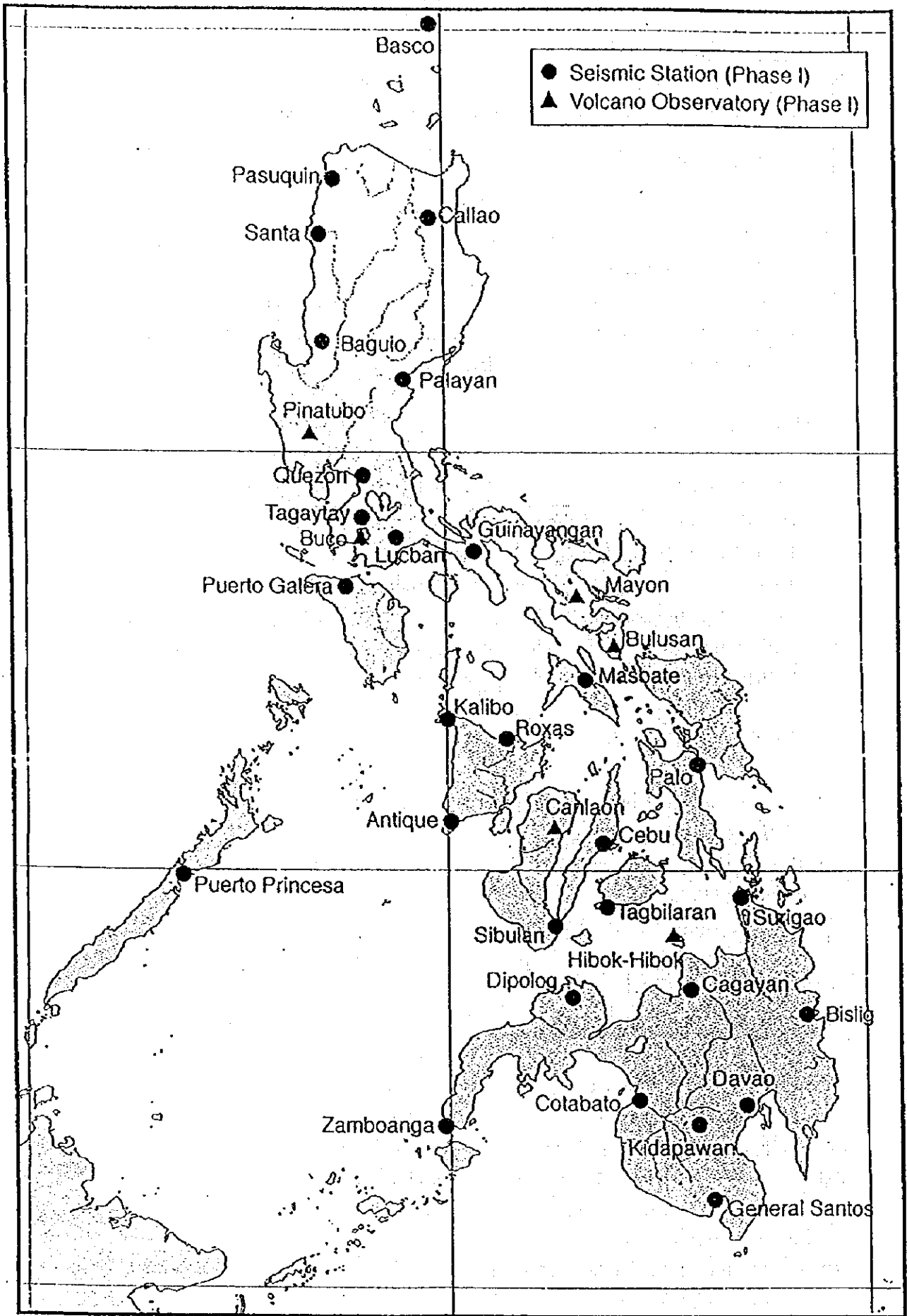
- (1) The Government of the Philippines has understood the system of Japan's Grant Aid explained in ANNEX II.
- (2) The Government of the Philippines will take necessary measures described in Annex III for smooth implementation of the Project on condition that the Grant Aid Assistance by the Government of Japan is extended to the Project.

## 6. SCHEDULE OF THE STUDY

- (1) The Team will continue further studies in the Philippines until November 23, 1997.
- (2) Based on the results of the study in the Philippines and Japan, JICA will prepare the Draft Basic Design Report in English and dispatch a team toward the end of January, 1998 in order to explain and confirm the contents.
- (3) In case that the contents of the report is accepted in principle by the Government of the Philippines, JICA will complete the final version of Basic Design Report and forward it to the Philippine side by the middle of March, 1998.

## 7. OTHER RELEVANT ISSUES

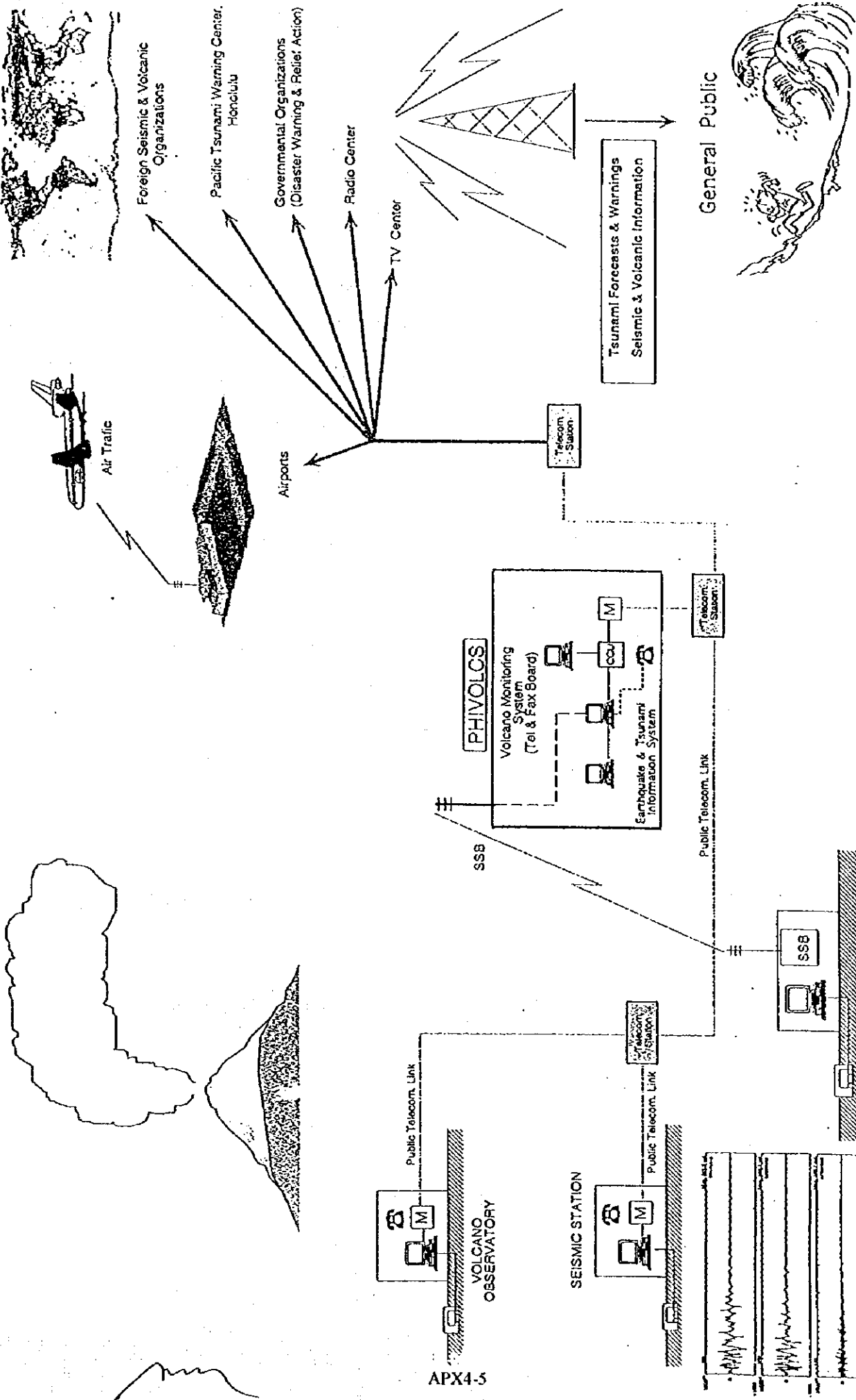
- (1) The Government of the Philippines shall provide all necessary information and data when requested by the Basic Design Team.
- (2) The Philippine side will take all possible measures to secure the safety of the Team during the field survey.
- (3) The government of the Philippines shall promptly proceed with all necessary internal procedures and also shall appropriately coordinate the organizations concerned for smooth implementation of the Project.
- (4) The Government of the Philippines has recognized the necessity for relevant training related to the Project under JICA's technical cooperation.
- (5) The Government of the Philippines shall take necessary financial measures for appropriate operation & maintenance and also procurement of spare parts & consumables for the whole equipment and systems to be supplied under the Project.
- (6) GTS link at PHIVOLCS central office will be established by PHIVOLCS in the future.
- (7) Operations or accomplishment report shall be submitted by PHIVOLCS to JICA after Phase-I is completed.
- (8) The Philippine side stated that quality of manuals and availability of spare parts be given consideration. 



Project Site Location Map

JK

ANNEX I



Project Configuration

APX4-5

1/2

Japan's Grant Aid Scheme

I. Grant Aid procedures

1) Japan's Grant Aid Program is executed through the following procedures.

- Application (Request made by a recipient country)
- Study (Basic Design Study conducted by JICA)
- Appraisal&Approval (Appraisal by the Government of Japan and Approval by Cabinet)
- Determination of Implementation (The Notes exchanged between the Governments of Japan and the recipient country)

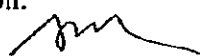
2) Firstly, the application or request for a Grant Aid project submitted by a recipient country is examined by the Government of Japan (the Ministry of Foreign Affairs) to determine whether or not it is eligible for Grant Aid. If the request is deemed appropriate, the Government of Japan assigns JICA (Japan International Cooperation Agency) to conduct a study on the request.

Secondly, JICA conducts the study (Basic Design Study), using (a) Japanese consulting firm(s).

Thirdly, the Government of Japan appraises the project to see whether or not it is suitable for Japan's Grant Aid Program, based on the Basic Design Study report prepared by JICA, and the results are then submitted to the Cabinet for approval.

Fourthly, the project, once approved by the Cabinet, becomes official with the Exchange of Notes signed by the Government of Japan and the recipient country.

Finally, for the implementation of the project, JICA assists the recipient country in such matters as preparing tenders, contracts and so on.



12

9) Banking Arrangements (B/A)

a) The Government of the recipient country or its designated authority should open an account in the name of the Government of the recipient country in an authorized foreign exchange bank in Japan (hereinafter referred to as "the Bank"). The Government of Japan will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the Verified Contracts.

b) The payment will be made when payment requests are presented by the Bank to the Government of Japan under an authorization to pay issued by the Government of the recipient country or its designated authority.





5) Necessity of "Verification"

The Government of recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by the Government of Japan. This "Verification" is deemed necessary to secure accountability to Japanese taxpayers.

6) Undertakings required of the Government of the Recipient Country

In the implementation of the Grant Aid project, the recipient country is required to undertake such necessary measures as the following:

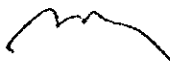
- (1) To secure land necessary for the sites of the Project and to clear, level and reclaim the land prior to commencement of the construction.
- (2) To provide facilities for the distribution of electricity, water supply and drainage and other incidental facilities in and around the sites as necessary.
- (3) To secure buildings prior to the procurement in case the installation of the equipment.
- (4) To ensure all the expenses and prompt execution for unloading, customs clearance at the port of disembarkation and internal transportation of the products purchased under the Grant Aid.
- (5) To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which will be imposed in the recipient country with respect to the supply of the products and services under the Verified Contracts.
- (6) To accord Japanese nationals whose services may be required in connection with the supply of the products and services under the Verified Contracts, such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work.

7) "Proper Use"

The recipient country is required to maintain and use the facilities constructed and equipment purchased under the Grant Aid properly and effectively and to assign staff necessary for this operation and maintenance as well as to bear all the expenses other than those covered by the Grant Aid.

8) "Re-export"

The products purchased under the Grant Aid should not be re-exported from the recipient country.



The consulting firm(s) used for the Study is (are) recommended by JICA to the recipient country to also work on the Project's implementation after the Exchange of Notes, in order to maintain technical consistency and also to avoid any undue delay in implementation should the selection process be repeated.

### 3. Japan's Grant Aid Scheme

#### 1) What is Grant Aid?

The Grant Aid Program provides a recipient country with non-reimbursable funds to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for economic and social development of the country under principles in accordance with the relevant laws and regulations of Japan. Grant Aid is not supplied through the donation of materials as such.

#### 2) Exchange of Notes (E/N)

Japan's Grant Aid is extended in accordance with the Notes exchanged by the two Governments concerned, in which the objectives of the Project, period of execution, conditions and amount of the Grant Aid, etc., are confirmed.

#### 3) "The period of the Grant Aid" means the one fiscal year which the Cabinet approves the Project for. Within the fiscal year, all procedures such as exchanging of the Notes, concluding contracts with (a) consultant firm(s) and (a) contractor(s) and final payment to them must be completed.

However in case of delays in delivery, installation or construction due to unforeseen factors such as weather, the period of the Grant Aid can be further extended for a maximum of one fiscal year at most by mutual agreement between the two Governments.

#### 4) Under the Grant Aid, in principle, Japanese products and services including transport or those of the recipient country are to be purchased.

When the two Governments deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country.

However the prime contractors, namely, consulting, contracting and procurement firms, are limited to "Japanese nationals". (The term "Japanese nationals" means persons of Japanese nationality or Japanese corporations controlled by persons of Japanese nationality.)

## 2. Basic Design Study

### 1) Contents of the Study

The aim of the Basic Design Study (hereinafter referred to as "the Study"), conducted by JICA on a requested project (hereinafter referred to as "the Project") is to provide a basic document necessary for the appraisal of the Project by the Japanese Government. The contents of the Study are as follows:

- a) Confirmation of the background, objectives, and benefits of the requested project and also institutional capacity of agencies concerned of the recipient country necessary for the Project's implementation.
- b) Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a technical, social and economic point of view.
- c) Confirmation of items agreed on by both parties concerning the basic concept of the Project.
- d) Preparation of a basic design of the Project
- e) Estimation of costs of the Project

The contents of the original request are not necessarily approved in their initial form as the contents of the Grant Aid Project. The Basic Design of the Project is confirmed considering the guidelines of Japan's Grant Aid Scheme.

The Government of Japan requests the Government of the recipient country to take whatever measures are necessary to ensure its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization in the recipient country actually implementing the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country through the Minutes of Discussions.

### 2) Selection of Consultants

For smooth implementation of the Study, JICA uses (a) registered consultant firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms. The firm(s) selected carry (ies) out a Basic Design Study and write(s) a report, based upon terms of reference set by JICA.

ANNEX III

Necessary measures to be taken by the Government of the Philippines  
in case Japan's Grant Aid is executed

1. To secure the sites for the Project.
2. To clear, level and reclaim the site prior to commencement of the construction.
3. To undertake incidental outdoor works such as gardening, fencing, gates and exterior lighting in and around the site.
4. To construct the access road to the site prior to commencement of the construction.
5. To provide facilities for distribution of electricity, water supply, telephone, drainage, sewage and other incidental facilities to the Project site.
  - 1) Electricity distributing line to the site
  - 2) City water distribution main to the site
  - 3) Drainage city main to the site
  - 4) Telephone trunk line and the main distribution panel of building
  - 5) General furniture such as carpets, curtains, tables, chairs and others
6. To bear commissions to the Japanese foreign exchange bank for the banking services based upon Banking Arrangement.
7. To exempt taxes and to take necessary measures for customs clearance of the materials and equipment brought for the project at the port of disembarkation.
8. To accord Japanese nationals whose services may require in connection with the supply of products and the services under the verified contract such facilities as may be necessary for their entry into the Philippines and stay therein for the performance of their work.
9. To take necessary measures on security to Japanese nationals as described above to perform their obligations under the verified contract against any force measures.
10. To maintain and use properly and effectively that the facilities constructed and equipment purchased under the Grant.
11. To bear all the expenses other than those to be borne by the Grant, necessary for construction of the facilities as well as for the transportation and the installation of the equipment.
12. To secure effective spaces at the existing facilities for installation of the equipment to be supplied.
13. To shift or remove the existing equipment and facilities for installation of the equipment to be supplied, if required.
14. To take appropriate measures for the equipment to be supplied against any damage and disappearance.

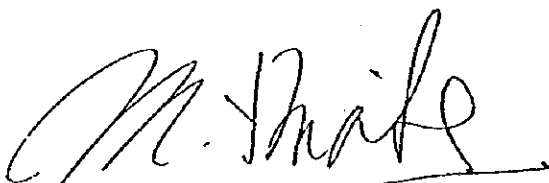
MINUTES OF DISCUSSIONS  
BASIC DESIGN STUDY ON THE PROJECT  
FOR  
EARTHQUAKE AND VOLCANO MONITORING IMPROVEMENT PROGRAM  
IN  
THE REPUBLIC OF THE PHILIPPINES  
  
(CONSULTATION ON DRAFT REPORT)

In October 1997, the Japan International Cooperation Agency (JICA) dispatched the Basic Design Study Team on the Project for Earthquake and Volcano Monitoring Improvement Program in the Republic of the Philippines (hereinafter referred to as "the Project") to the Republic of the Philippines. After the assessment of the data and information obtained through the study, JICA has prepared the Draft Basic Design on the Project.

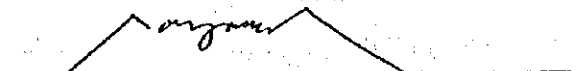
In order to explain and consult with the officials concerned of the Government of the Republic of the Philippines on the components of the Draft Basic Design, JICA sent to the Republic of the Philippines a study team (hereinafter referred to as "the Team") headed by Mr. Masayuki WATANABE, Senior Development Specialist, Institute for International Cooperation, JICA, which is scheduled to stay in the country from January 15 to 22, 1998.

As a result of the discussions held between the Team and the officials concerned of the Government of the Republic of the Philippines, both parties have confirmed the main items described on the attached sheets.

January 21, 1998



Mr. Masayuki WATANABE  
Leader,  
Draft Report Explanation Team,  
JICA



Dr. Raymundo S. PUNONGBAYAN  
Director,  
Philippine Institute of  
Volcanology and Seismology,  
The Republic of the Philippines

## ATTACHMENT

### 1. Components of the Draft Basic Design

The Government of the Republic of the Philippines has agreed and accepted in principle the components of the Draft Basic Design proposed by the Team.

### 2. Japan's Grant Aid System

- (1) The Government of the Republic of the Philippines has understood the Japan's Grant Aid system as described in ANNEX-I through the explanation by the Team.
- (2) The Government of the Republic of the Philippines will take the necessary measures described in ANNEX- II for the smooth implementation of the Project, on condition that the Japan's Grant Aid is extended to the Project.

### 3. Schedule of the Study

JICA will complete the final report in accordance with the confirmed items, and send it to the Government of the Republic of the Philippines by April 1998.

### 4. Scope of the Project

- (1) This Project is to be divided into two phases as follows:

Phase- I : procurement and installation of the equipment for improvement of the existing seismic stations & volcano observatories

Phase- II : acquisition of additional equipment for the stations and observatories not included in Phase- I , new telemetered volcano and seismic stations/observation points, and related radio relay points

In addition to the above, Philippine side requested several new telemetered stations/observation points to be established under the Project.

Based on the attached equipment list, location map and request letter, the exact components of the Project will be finalized after further study by the Team on some issues, such as procurement conditions.

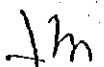
- (2) Remaining components of the Project, such as improvement of earthquake detection and location capability, may be implemented as Phase- III upon request as another individual Grant Aid project if the preceding phases of the Project are proved to be effectively operated and maintained. The Team understood the strong desire of the Philippine side for the necessity of earlier completion of

the whole project (Phase- I , II & III).

- (3) The existing seismic stations & volcano observatories shall be reconstructed or renovated by the Philippine side, if necessary.

#### 5. Other Relevant Issues

- (1) The Government of the Republic of the Philippines shall take necessary financial measures to ensure continuous operation & maintenance of the facilities and equipment to be supplied under the Project.
- (2) Both parties recognized that, for the success of the Project, certain technical cooperation in the fields of seismology, volcanology or operation and maintenance of the system to be established under the Project should be continued by dispatching long-term experts and training of counterparts.
- (3) Several new telemetered stations/observation points and vehicles were additionally requested by the Philippine side as described in attached request letter.
- (4) The Japanese side will decide the final components of the Project after conducting further study in Japan.



## Japan's Grant Aid Scheme

## I. Grant Aid procedures

1) Japan's Grant Aid Program is executed through the following procedures.

Application	(Request made by a recipient country)
Study	(Basic Design Study conducted by JICA)
Appraisal&Approval	(Appraisal by the Government of Japan and Approval by Cabinet)
Determination of Implementation	(The Notes exchanged between the Governments of Japan and the recipient country)

2) Firstly, the application or request for a Grant Aid project submitted by a recipient country is examined by the Government of Japan (the Ministry of Foreign Affairs) to determine whether or not it is eligible for Grant Aid. If the request is deemed appropriate, the Government of Japan assigns JICA (Japan International Cooperation Agency) to conduct a study on the request.

Secondly, JICA conducts the study (Basic Design Study), using (a) Japanese consulting firm(s).

Thirdly, the Government of Japan appraises the project to see whether or not it is suitable for Japan's Grant Aid Program, based on the Basic Design Study report prepared by JICA, and the results are then submitted to the Cabinet for approval.

Fourthly, the project, once approved by the Cabinet, becomes official with the Exchange of Notes signed by the Government of Japan and the recipient country.

Finally, for the implementation of the project, JICA assists the recipient country in such matters as preparing tenders, contracts and so on.



## 2. Basic Design Study

### 1) Contents of the Study

The aim of the Basic Design Study (hereinafter referred to as "the Study"), conducted by JICA on a requested project (hereinafter referred to as "the Project") is to provide a basic document necessary for the appraisal of the Project by the Japanese Government. The contents of the Study are as follows:

- a) Confirmation of the background, objectives, and benefits of the requested project and also institutional capacity of agencies concerned of the recipient country necessary for the Project's implementation.
- b) Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a technical, social and economic point of view.
- c) Confirmation of items agreed on by both parties concerning the basic concept of the Project.
- d) Preparation of a basic design of the Project
- e) Estimation of costs of the Project

The contents of the original request are not necessarily approved in their initial form as the contents of the Grant Aid Project. The Basic Design of the Project is confirmed considering the guidelines of Japan's Grant Aid Scheme.

The Government of Japan requests the Government of the recipient country to take whatever measures are necessary to ensure its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization in the recipient country actually implementing the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country through the Minutes of Discussions.

### 2) Selection of Consultants

For smooth implementation of the Study, JICA uses (a) registered consultant firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms. The firm(s) selected carry (ies) out a Basic Design Study and write(s) a report, based upon terms of reference set by JICA.

The consulting firm(s) used for the Study is (are) recommended by JICA to the recipient country to also work on the Project's implementation after the Exchange of Notes, in order to maintain technical consistency and also to avoid any undue delay in implementation should the selection process be repeated.

### 3. Japan's Grant Aid Scheme

#### 1) What is Grant Aid?

The Grant Aid Program provides a recipient country with non-reimbursable funds to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for economic and social development of the country under principles in accordance with the relevant laws and regulations of Japan. Grant Aid is not supplied through the donation of materials as such.

#### 2) Exchange of Notes (E/N)

Japan's Grant Aid is extended in accordance with the Notes exchanged by the two Governments concerned, in which the objectives of the Project, period of execution, conditions and amount of the Grant Aid, etc., are confirmed.

#### 3) "The period of the Grant Aid" means the one fiscal year which the Cabinet approves the Project for. Within the fiscal year, all procedures such as exchanging of the Notes, concluding contracts with (a) consultant firm(s) and (a) contractor(s) and final payment to them must be completed.

However in case of delays in delivery, installation or construction due to unforeseen factors such as weather, the period of the Grant Aid can be further extended for a maximum of one fiscal year at most by mutual agreement between the two Governments.

#### 4) Under the Grant Aid, in principle, Japanese products and services including transport or those of the recipient country are to be purchased.

When the two Governments deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country.

However the prime contractors, namely, consulting, contracting and procurement firms, are limited to "Japanese nationals". (The term "Japanese nationals" means persons of Japanese nationality or Japanese corporations controlled by persons of Japanese nationality.)

5) Necessity of "Verification"

The Government of recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by the Government of Japan. This "Verification" is deemed necessary to secure accountability to Japanese taxpayers.

6) Undertakings required of the Government of the Recipient Country

In the implementation of the Grant Aid project, the recipient country is required to undertake such necessary measures as the following:


- (1) To secure land necessary for the sites of the Project and to clear, level and reclaim the land prior to commencement of the construction.
- (2) To provide facilities for the distribution of electricity, water supply and drainage and other incidental facilities in and around the sites as necessary.
- (3) To secure buildings prior to the procurement in case the installation of the equipment.
- (4) To ensure all the expenses and prompt execution for unloading, customs clearance at the port of disembarkation and internal transportation of the products purchased under the Grant Aid.
- (5) To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which will be imposed in the recipient country with respect to the supply of the products and services under the Verified Contracts.
- (6) To accord Japanese nationals whose services may be required in connection with the supply of the products and services under the Verified Contracts, such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work.

7) "Proper Use"

The recipient country is required to maintain and use the facilities constructed and equipment purchased under the Grant Aid properly and effectively and to assign staff necessary for this operation and maintenance as well as to bear all the expenses other than those covered by the Grant Aid.

8) "Re-export"

The products purchased under the Grant Aid should not be re-exported from the recipient country.



9) Banking Arrangements (B/A)

- a) The Government of the recipient country or its designated authority should open an account in the name of the Government of the recipient country in an authorized foreign exchange bank in Japan (hereinafter referred to as "the Bank"). The Government of Japan will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the Verified Contracts.
- b) The payment will be made when payment requests are presented by the Bank to the Government of Japan under an authorization to pay issued by the Government of the recipient country or its designated authority.

Necessary measures to be taken by the Government of the Philippines  
in case Japan's Grant Aid is executed

1. To secure the sites for the Project.
2. To clear, level and reclaim the site prior to commencement of the construction.
3. To undertake incidental outdoor works such as gardening, fencing, gates and exterior lighting in and around the site.
4. To construct the access road to the site prior to commencement of the construction.
5. To provide facilities for distribution of electricity, water supply, telephone, drainage, sewage and other incidental facilities to the Project site.
  - 1) Electricity distributing line to the site
  - 2) City water distribution main to the site
  - 3) Drainage city main to the site
  - 4) Telephone trunk line and the main distribution panel of building
  - 5) General furniture such as carpets, curtains, tables, chairs and others
6. To bear commissions to the Japanese foreign exchange bank for the banking services based upon Banking Arrangement.
7. To exempt taxes and to take necessary measures for customs clearance of the materials and equipment brought for the project at the port of disembarkation.
8. To accord Japanese nationals whose services may require in connection with the supply of products and the services under the verified contract such facilities as may be necessary for their entry into the Philippines and stay therein for the performance of their work.
9. To take necessary measures on security to Japanese nationals as described above to perform their obligations under the verified contract against any force measures.
10. To maintain and use properly and effectively that the facilities constructed and equipment purchased under the Grant.
11. To bear all the expenses other than those to be borne by the Grant, necessary for construction of the facilities as well as for the transportation and the installation of the equipment.
12. To secure effective spaces at the existing facilities for installation of the equipment to be supplied.
13. To shift or remove the existing equipment and facilities for installation of the equipment to be supplied, if required.
14. To take appropriate measures for the equipment to be supplied against any damage and disappearance.





## **Appendix. 5. Cost Estimation Borne by the Recipient Country**

The following major undertakings to be borne by the Philippines side (PHIVOLCS) are necessary for the implementation under Japan's Grant Aid Assistance.

### **PHASE-I**

Not available

### **PHASE-II**

- Prior to commencement of the Project
  - 1) Cost for securing all necessary lands for the sites of the Project including clearing, leveling and reclaiming the lands
  - 2) Cost for making the access roads and/or paths to the sites
  - 3) Commission for obtaining appropriate frequencies for telemeter systems
- During or after completion of the Project
  - 4) Fencing for protection of the equipment and systems at the unmanned Project sites

However, due to the regulation, expected commissions to the Japanese foreign exchange bank to be borne by the Government of the Philippines for the banking services based upon Banking Arrangement may be 0.02% of the total project cost and it shall additionally be borne by the Government of the Philippines.





## Appendix 6.      References

1. Philippine Public Fiscal Administration  
Fiscal Administration Foundation, Inc., 1996
2. Philippine Environmental Quality Report, 1990-1995  
Environmental Management Bureau, 1996
3. A Filipino Vision of Development  
Foundation for Nationalist Studies
4. Volcanoes of the Philippines  
Philippine Institute of Volcanology and Seismology, 1995
5. Earthquake and Tsunami  
Philippine Institute of Volcanology and Seismology, 1990
6. PHIVOLCS, Philippine Institute of Volcanology and Seismology, 1995
7. A Technical Primer on Pinatubo Lahars  
Philippine Institute of Volcanology and Seismology, 1992
8. Women in S & T and Disaster Management, Proceedings of the Symposium on Women in  
S & T and Disaster Management Held at Sulo Hotel, Quezon City 31 August 1994  
Philippine Institute of Volcanology and Seismology, 1994
9. Geologic Hazards and Preparedness System  
Philippine Institute of Volcanology and Seismology, 1987
10. Pinatubo Lahars  
Philippine Institute of Volcanology and Seismology, 1993
11. Disaster Prevention and Mitigation in Metropolitan Manila Area  
Philippine Institute of Volcanology and Seismology, 1993
12. 15 November 1994 Mindoro Earthquake : Preliminary Report of Investigation, PHIVOLCS  
Special Report No.2  
Philippine Institute of Volcanology and Seismology Quick Response Team, 1994
13. Annual Report '92  
Philippine Institute of Volcanology and Seismology, 1993

14. Annual Report '95  
Philippine Institute of Volcanology and Seismology, 1996
15. Disaster Preparedness by F. M. Dejoras, 1996
16. The Facts of Civil Defense, Office of Civil Defense
17. Calamities and Disaster Preparedness Plan  
National Disaster Coordinating Council, 1988
18. Calamities and Disaster Preparedness Plan (Draft)  
National Disaster Coordinating Council, 1997
19. The Role of PNRC and Non-Government Organization in Disaster Management  
The Philippine National Red Cross
20. The National Building Code  
Philippine Law Gazette, 1997
21. The National Accounts of the Philippines (1995-1997)  
National Statistic Coordination Board, Economic and Social Statistic Office
22. Circular No.1389  
Central Bank of the Philippines
23. Philippine Development Issues: An Inquiry
24. Mt. Pinatubo, 500 Years After
25. Development Diplomacy, Foreign Policy and Technology Transfer  
Asian Center, University of the Philippines, 1994
26. 1995 Philippine Yearbook, National Statistics Office
27. 1993 Philippine Statistical Yearbook, National Statistics Office
28. Philippine Development Magazine, Mar-Apr, 1996, NEDA Publication Board
29. 1997 Philippine Government Directory, The Diplomatic Post Publishing Corp.
30. Fact Facts about Philippine Provinces, 1995

31. **Philippine Agenda 21, A national Agenda for Sustainable Development for the 21st Century**  
Philippine Council for Sustainable Development
32. **Updated Medium-Term Philippine Development Plan, 1996-1998**, NEDA Publication Board
33. **Development Diplomacy, Foreign Policy and Technology Transfer**  
Asian Center, University of the Philippines, 1994
34. **Disaster Management, A Disaster Manager's Handbook**, Asian Development Bank, 1991
35. **Disaster Mitigation in Asia and the Pacific**, Asian Development Bank, 1991
36. **Mt. Pinatubo Emergency Solution Report**











WILCO