No.

JAPAN INTERNATIONAL COOPERATION AGENCY

DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
THE REPUBLIC OF THE PHILIPPINES

THE STUDY
ON
COMPREHENSIVE DISASTER PREVENTION
AROUND MAYON VOLCANO
IN
THE REPUBLIC OF THE PHILIPPINES

TECHNOLOGY TRANSFER ACHIEVEMENT REPORT

October 2000

NIPPON KOEI CO., LTD.

KRI INTERNATIONAL CORPORATION

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Technology Transfer Achievement Report

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1. TECHNOLOGY TRANSFER PLAN

1.1 Introduction

Transfer Technology will be conducted as one of the Study objectives during the course of Study period. The Plan of Operation for Technology Transfer was prepared with a view to ensure more efficient transfer of technology to the counterpart personnel of the Government of the Philippines (GOP) in the course of the Study period, especially during field works in the Philippines. All of the field works are to be carried out in close cooperation and joint-work with the counterpart personnel consisting of engineers and officers at Central and Local Government levels. As to the work schedule, assignment schedule of JICA Study Team and list of the counterpart personnel, refer to Chart-1, Chart-2 and Chart-3.

1.2 Methods of Technology Transfer

The transfer of technology will be done mainly by the "Learn-by Doing" method throughout the Study period. The transfer of technology will be facilitated with the Weekly Meeting on the progress of the week, and through the workshops and seminars for staffs of the authorities concerned and interested people.

The methods to be adopted in this Study are categorized as follows.

(1) On-the-Job Training for counterpart personnel on study and planning methods
- Special lectures by Study team members on analytical and planning methods
- Technology on sustainable hazard mitigation methods used in the master planning and feasibility study
- Others

(2) Technical Transfer Seminars (two times)
- PCM (Project Cycle Management) methods
- Mechanism of sediment disaster
- Debris flow forecasting methods

- Socio-economy framework
- Others

(3) Transfer of technology through five workshops

- Main issues on disaster prevention around Mayon Volcano
- Briefing on priority projects and programs
- Validation of the results of people's intention survey
- Implementation and assessment of the pilot project
- Others

1.3 Schedule of Technology Transfer

The work schedule and main items to be surveyed and studied during the field works are as described in the Main Report in detail. The schedule of major technology transfer scheme is as summarized below.

Phase I (October 1998 – March 1999)		**Phase II** (August1999 – June 2000)		
1st and 2nd Field Works in the Philippines (1) & (2)	**Work in Japan**	**2nd Field Work in the Philippines (3)**	**Work in Japan**	**3rd Field Work in Philippines (4)**
OJT Training				
Seminar				
		1st Seminar		2nd Seminar
Workshop				
1st Workshop		2nd Workshop 3rd & 4th Workshops		5th Workshop

Note : A portion of the Home Work was transferred to the Field Work for the technology Transfer of the Master Planning

The outlines of the major technology transfer seminars and workshops are indicated in Chart-4.

1.4 Counterpart Personnel

Upon request of JICA Study Team, the GOP assigned counterpart personnel on man-to-man basis to the respective JICA experts at both central and local government levels. The list of each Study Team Expert and his/her GOP counterpart personnel assigned by GOP to the Study Team during the Study period, as well as major priority subjects for on-the-job training, are indicated in Chart-3.

1.5 Major Components of Technology Transfer

(1) On-the-Job Training

Each expert will work, in the course of the Study, very closely with his/her GOP counterpart, as far as possible, jointly going through survey planning, and data collection and analyses. When necessary, the JICA Study Team Expert will prepare materials, in his/her own expertise, for GOP counterpart personnel to learn skills and technical know-how required for discharging their duties.

Each JICA Expert will prepare a questionnaire for his/her respective counterpart staff, to assess the level of each counterpart's knowledge of the areas of specialization. The counterpart staff will be requested to fill in the questionnaire at the outset, as well as the medium and last stages of the Study, to qualitatively assess the progress made in technological transfer through on-the-job-training.

(2) Technology Transfer Seminars

During the Study period, two (2) Technology Transfer Seminars are scheduled to be held. The 1st one will be held at the beginning of the 2nd Field Work in August 1999. The main objective of this Seminar is to disseminate the results of the Master Plan Study or outcomes of the 1st Field Work in the Philippines. The 2nd Technology Transfer Seminar will be held at the beginning of the 3rd Field Work in May 2000, with a view to disseminating the study results, and providing a forum for officials of the concerned agencies and interested participants, to deliberate on how to implement the proposed projects and programs.

The following are the potential subjects to be taken up for this purpose.

- Macro-economic framework
- Socio-economic analysis
- Meteoro-hydrology
- Topography and geology

- Disaster and hazard mapping
- Flood and debris flow damages
- Land use regulation and planning
- River Training
- Sabo Works
- Disaster prevention facilities
- Operation and maintenance of the facilities
- Forecasting, warning and evacuation
- Disaster management strategies
- Relocation and resettlement
- Institutional and legal arrangements
- Disaster prevention and regional development
- Analysis results of the questionnaire surveys to the people

(3) PCM and Training Workshops

In total, five (5) workshops are to be held as indicated in Chart-4. Out of five, three workshops will be directly concerned with technology transfer to the GOP counterpart personnel.

Each workshop is designed to enable all participants to decide on the future orientation and scope of works, using the PCM planning method or others.

In the same way as the case of on-the-job training for counterpart personnel, "questionnaire investigation" is schemed so as to evaluate the improvement levels of their comprehension on disaster management and to monitor its technology transfer process.

Likewise, the seminars and workshops organized by JICA Study Team will be evaluated by the Philippine side, especially participants including counterpart personnel. They are requested to fill up a "evaluation sheet" prepared for this respect. These are intended to undertake qualitative assessments of the technology transfer attained.

Lastly, at the final stage of the Study (3rd Field Work in May 2000), all results of the achievements in technology transfer throughout the Study period will be reviewed based on the accumulated evaluation results. The lessons learnt from this Study will be recapitulated with a view to furnishing the other study and/or project teams with useful references with respect to technology transfer in the Philippines.

1.6 Work Items for Technology Transfer

In principle, the technical guidance to the respective counterpart personnel and local staffs involved will be carried out by transferring knowledge and know-how of each JICA Expert. In view of their overall supervision and responsibility of the Study, the work items for both Team Leader and Deputy Leader are excluded from the attached list. The work items for the technology transfer in each specific field (through data collection and their analyses) are as summarized in Chart-5.

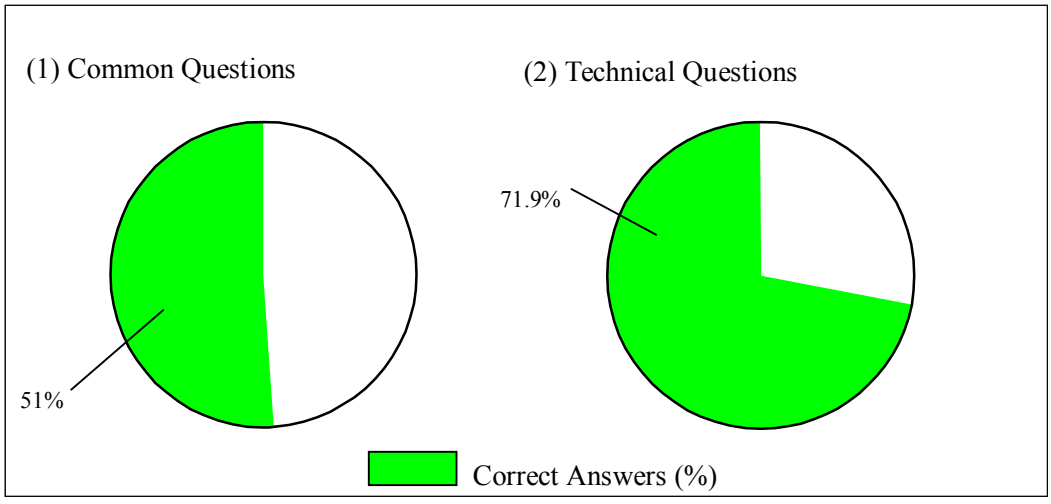
2. ACCOMPLISHMENTS OF TECHNOLOGY TRANSFER

2.1 Capability Assessment of the Counterpart Personnel

At the first stage of the Field Study (from October to November 1998), each JICA Expert prepared a questionnaire for his/her respective counterpart staffs, to assess the levels of the respective counterpart's interests, common knowledge and areas of specialization. In the same time, the both sides exchanged views to identify specific areas of interest and prepare a program for joint work items.

The results of questionnaires to the 13 counterpart personnel were as follows:

Average Scores in the Questionnaire Assessments



Note: Average score rate of 13 counerpart personnel

The common questions were consisted of those related to the JICA Study and disaster management in the Philippines, while the technical questions concerned a wide range of specialties corresponding to such spheres of JICA Experts as

hydrology/hydraulics, sabo planning, facility design, land use, surveying, evacuation, institutions, accounting & logistics and so on.

The above results revealed the fact that the counterpart personnel possess a relatively higher level of capabilities in the respective specialties. Considering the limited field work period of JICA Study and professional background of each counterpart, the technology transfer plan was duly prepared.

2.2 Outline of Technology Transfer Activities

On October 30, 1998, the Technology Transfer Plan for the Study on Comprehensive Disaster Prevention around Mayon Volcano was signed by the both parties: DPWH and JICA Study Team, and officially took effect. This Plan of Operation for Technology Transfer was prepared with a view to ensure more efficient transfer of technology to the counterpart personnel from the Government of the Philippines (GOP) in the course of the Study period, especially during field works of Phases I and II.

The field works have been carried out in close cooperation and joint-work with the counterpart personnel consisting of engineers and officers at Central and Local Government levels. The transfer of technology has been done mainly by the "Learn-by Doing" and this was activated with several workshops and seminars which were organized for explanations and discussions on the major issues, outcomes and events in the Study.

As mentioned in the Technology Transfer Plan, the methods to be adopted in this Study are categorized as follows:

1) On-the-Job Training for counterpart personnel on study and planning methods,
2) Technical Transfer Seminars (two times), and
3) Transfer of technology through five workshops by PCM method.

Upon request of JICA Study Team, the GOP assigned counterpart personnel on man-to-man basis to the respective JICA experts at both central and local government levels. Chart-4 indicates the list of each Study Team Expert and his/her GOP counterpart personnel assigned by GOP during the Study period.

The major technology transfer programs granted during the JICA Study period were the following.

1) 1st PCM Workshop (October 15-16, 1998)
2) Seminar on the Remote Sensing & GIS Technology and its Application to the Study on Comprehensive Disaster Prevention around Mayon Volcano (February 11, 1999)
3) Seminar on Disaster Prevention around Mayon Volcano (March 3-5, 1999)
4) Seminars on Trench Excavation Works at the Sites of Cagsawa and Sto. Domingo (March 10-12, 1999)
5) 1st Technology Transfer Seminar (August 25, 1999)
6) 2nd PCM Workshop on Validation of the Results of People's Intention Survey among Resettlers and Potential Resettlers (October 26-27, 1999)
7) 3rd Workshop on Proceedings of the Pilot Project (November 24, 1999)
8) Implementation of the Pilot Project (November 27, 1999)
9) 4th Workshop on Assessment of the Implemented Pilot Project (December 2nd, 1999)
10) 2nd Technology Transfer Seminar (May 30, 2000)
11) 5th Workshop on Operation and Maintenance of the Forecasting and Warning Equipment (June 9, 2000)

2.3 Major Achievements of the Technology Transfer in the Study

(1) 1st PCM Workshop (October 15-16, 1998)

The 1st PCM (Project Cycle Management) Workshop was held on October 15-16, 1998, in Legazpi city. There were 32 Philippine participants from the following organizations:

- Government Agencies (9 GAs with 16 participants)
- Local Government Units (11 LGUs with 14 participants)
- Non-Government Organizations (2 NGOs with 2 participants)

At the beginning of the Workshop, the following objectives were shared with the participants:

- To come up with a common understanding of problems regarding disaster prevention around Mayon Volcano; and
- To understand the PCM Methodology and its processes as part of technology transfer component of the Study. *(Refer to AT-1)*

(2) Seminar on the Remote Sensing & GIS Technology and its Application to the Study on Comprehensive Disaster Prevention around Mayon Volcano (February 11, 1999)

On February 11, 1999, the Seminar was organized by JICA Study Team and AIT Experts engaging in analysis of satellite images and GIS lectured on their progress and results obtained (5 counterparts attended this Seminar). The objective of the Seminar was to understand overview of remote sensing and GIS technology and its application to the master planning. The program consisted of four (4) parts.

- Principle of remote sensing
- Optical remote sensing at Mayon
- Radar remote sensing
- GIS

Regarding the optical remote sensing, the topics explained and demonstrated to the participants concerned true & false color composite for visualization, relationship between color and land cover, vegetation index calculation and visualization and others. As for GIS technology, the examples of GIS coverages/layers around Mayon Volcano were demonstrated using "Arcview" software, specially explaining the contour line/elevation, river & road networks and land use types. *(Refer to AT-2)*

(3) Seminar on Disaster Prevention around Mayon Volcano (March 3-5, 1999)

From 3 to 5 March 1999 (for three consecutive days with the same program), the Seminar on Disaster Prevention around Mayon Volcano was organized by the JICA –DPWH Expert (Mr. Sakatani). During this seminar, the demonstration using the hydrological model was carried out with a view to elucidating the flooding and mudflow mechanism to the LGU personnel concerned. *(Refer to AT-3)*

(4) Seminars on Trench Excavation Works at the Sites of Cagsawa and Sto. Domingo (March 10-12, 1999)

Taking the occasion of the trench excavation works executed by the Study Team at two sites : Cagsawa and Sto. Domingo, the Seminars on the volcanic geology were held from 10 to 12 March 1999 to explain the historical formation of the strata (or land) to the local (municipal & barangay) officials concerned and interested people living nearby. In total, about 85 persons participated in these seminars held at the above two sites. *(Refer to AT-4)*

(5) 1st Technology Transfer Seminar (August 25, 1999)

The 1st Technology Transfer Seminar was held on August 25, 1999 at Convention Hall of Casablanca Hotel (Legazpi City).

There were 53 Philippine participants from the following organizations:

- Government Agencies (10 GAs with 37 participants)
- Local Government Units (10 LGUs with 14 participants)
- Non-Government Organizations (1 NGOs with 2 participants)

After opening remarks given by the Regional Director of DPWH Region-V and Team Leader of JICA Study Team, seven resource persons made presentations on the following subjects:

- Briefing of Interim Report (Master Plan)
- Introduction of the Historical Eruption Records of Mayon Volcano and Its Observation System
- Disaster/Hazard Mapping and Sabo Planning
- Mechanism of Sediment Disaster (Hydrological Model Test)
- Socio-economy Framework (Population & GRDP)
- Results of the Questionnaire Surveys to the People around Mayon Volcano
- Community Empowerment

Upon the above presentations, active discussions were carried out at open fora held twice at every end of the sessions (a.m. & p.m.) to exchange views.*(Refer to AT-5)*

(6) 2nd PCM Workshop on Validation of the Results of People's Intention Survey among Resettlers and Potential Resettlers (October 26-27, 1999)

The 2nd PCM (Project Cycle Management) Workshop was held on October 26-27, 1999, at the Center for Women and Youth Development, Bicol Small Business Institute Foundation, Inc., Bicol University, Legazpi City, with a view to exchanging views on the resettlement and livelihood development among the competent officials and interested people. There were 105 Philippine participants from the following organizations:

- Government Agencies (6 GAs with 14 participants)
- Local Government Units (11 LGUs with 18 participants)
- Non-Government Organizations (2 NGOs with 5 participants)
- Resettlers and possible resettlers (24 from Banquerohan/37 from Budiao)

After the opening remarks from the JICA Team and the Assistant Director of the DPWH Region-V, the results of the "People's Intention Survey" were explained by JICA Expert to the participants. In the Open Forum, active discussions were made among the participants.

SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis was used. The first to be given focus on the workshop was "livelihood", under which, 4 items were to be considered: (a) crops, (b) livestock, (c) services, and (d) sand and gravel. In the workshop, the participants from Banquerohan and Budiao were evenly distributed in the different groups to discuss the proposed livelihood projects.

On the second day of the workshop, the following topics were discussed: Problem Analysis --- Strategic Development Intervention --- Responsibility Centers. *(Refer to AT-6)*

(7) 3rd Workshop on Proceedings of the Pilot Project (November 24, 1999) (November 24, 1999)

The 3rd Workshop was held on November 24, 1999, at the Mabinit Barangay Chapel (Legazpi City), with a view to elucidate the people in Barangay Mabinit about the mechanism of mud and debris disaster, and evacuation system proposed in the JICA Master Plan. There were 121 Philippine participants from the following organizations:

- Government Agencies (2 GAs with 4 participants)
- Local Government Units (5 LGUs with 46 participants)
- Non-Government Organizations (2 NGOs with 8 participants)
- Barangay Mabinit (with 63 participants)

(Refer to AT-7)

(8) Implementation of the Pilot Project (November 27, 1999)

The Pilot Project for testing the forecasting & warning and evacuation systems was implemented on November 27, 1999 in close tie-up with the Community (Barangay Mabinit), LGU (Legazpi City), NGOs, line agencies concerned like DPWH, OCD, PHIVOLCS and others. Based on the lessons learnt through this project, the forecasting, warning and evacuation system proposed in Master Plan will be reviewed. *(Refer to AT-8)*

(9) 4th Workshop for Pilot Project Implementation (December 2nd , 1999)

The 4th Workshop was held on December 2nd, 1999, at the Center for Women and Youth Development, Bicol Small Business Institute Foundation, Inc., Bicol University Compound, Legazpi City, subsequent to implementation of the Pilot Project on November 27, 1999. This Workshop was intended to assess the results of the implemented Pilot Project and upgrade the disaster coping capacity of the community and its people, as well. There were 14 Philippine participants from the following organizations:

- Government Agencies (2 GAs with 2 participants)
- Local Government Units (5 LGUs with 9 participants)
- Non-Government Organizations (2 NGOs with 3 participants)

(Refer to AT-9)

(10) 2nd Technology Transfer Seminar (May 30, 2000)

The 2nd Technology Transfer Seminar was held on May 30, 2000 at Convention Hall of Casablanca Hotel (Legazpi City).

In addition to seven Japanese There were 56 Philippine participants from the following organizations:

- Government Agencies (8 GAs with 38 participants)
- Local Government Units (11 LGUs with 15 participants)
- Non-Government Organizations (2 NGOs with 3 participants)

After opening remarks given by the Regional Director of DPWH Region-V and Team Leader of JICA Study Team, eight resource persons made presentations on the following subjects:

- Basic Concept of Disaster Prevention
- Briefing of the Draft Final Report
- Sabo Planning focusing on Design Debris Flow
- Planning of Forecasting & Warning System
- Issues on Countermeasures against Sediment Disasters
- Community Empowerment (Version 2)
- Present Conditions of Mayon Sabo Projects
- Review of Technology Transfer

Upon the above presentations, active discussions were carried out at open fora held twice at every end of the sessions (a.m. & p.m.) to exchange views.

(Refer to AT-10)

(11) Workshops for the Second Pilot Project

In order to carry out the second Pilot Project, the Study Team conducted workshops for three times. The workshops incidentally contributed much to transfer knowledge. The outline of each workshop is briefed as follows:

- 1st workshop
  The first workshop was conducted at the conference room of the DPWH Region V on June 5, 2000. The main subjects of the discussion were:
  - Theory adopted to the system planning to secure necessary accuracy and reliability in the monitoring rainfall, and
  - Theory adopted to the installed data processing software to identify the parameters to be modified to calibrate the system.

  The attendees are listed in Attachment AT-11(A).

- 2nd workshop
  The second workshop was held at the conference room of the DPWH Region V on June 9, 2000. The main subjects of the discussion were:
  - The plan of operation of the pilot project and
  - The confirmation of role of each participant.

  The proposed plan of operation discussed in the meeting is presented in Attachment AT-11(B). The discussion material on the role of each organization used in the workshop is given in Attachment AT-11(C).

- 3rd workshop
  The third workshop was held at the conference room of the DPWH Region V on June 13, 2000. The main subject was related to the assessment of the conducted Pilot Project to make the forecasting, warning and emergency response effective. The discussion clarified the method to improve each activity as follows:
  - The necessary improvements in monitoring works,
  - The necessary improvements in inspection works,
  - The necessary improvements in technical planning, and
  - The necessary improvements in emergency repair.

3. REVIEWS OF THE TECHNOLOGY TRANSFER

As stated definitely in Section 1.2: "Objectives of the Study" in the Main Report (Volume II), the technology transfer to the counterpart personnel is one of the three objectives of the JICA Study. To perform this, several seminars and workshops were held during the Field Work period of the Study in addition to the on-the-job training.

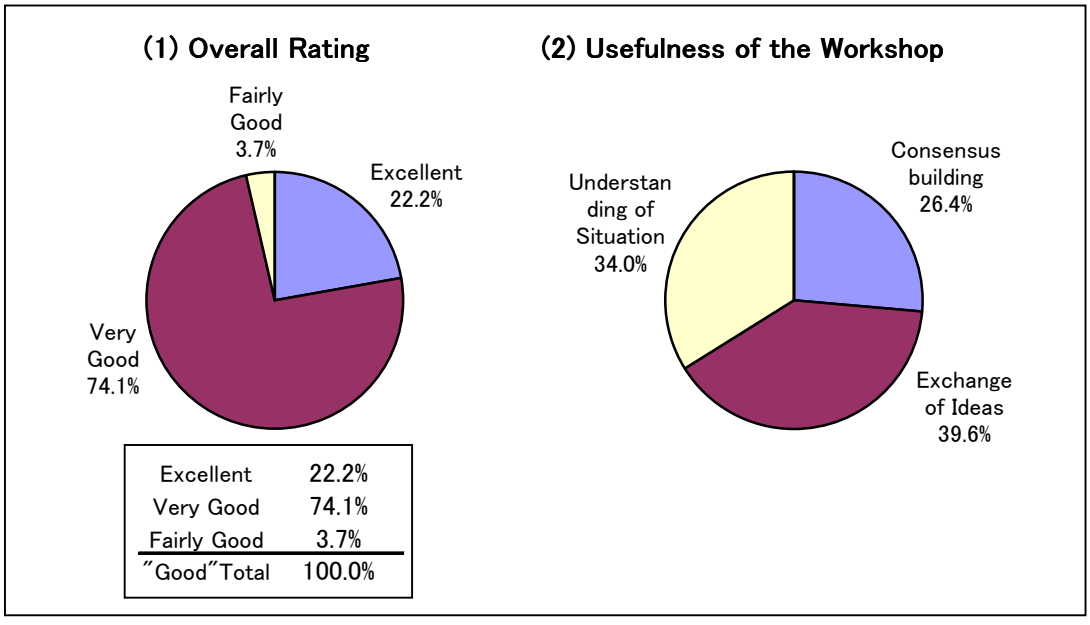
It might be proper to stress on such point that the beneficiaries of these events were not only the central government's staff, but also those of local governments, communities (or the people) and the private sector including NGOs.

At the final stage of the Study, the results of the achievements in technology transfer throughout the Study period are to be carefully reviewed, in order to derive lessons to be learnt for future similar technology transfer efforts in the Philippines.

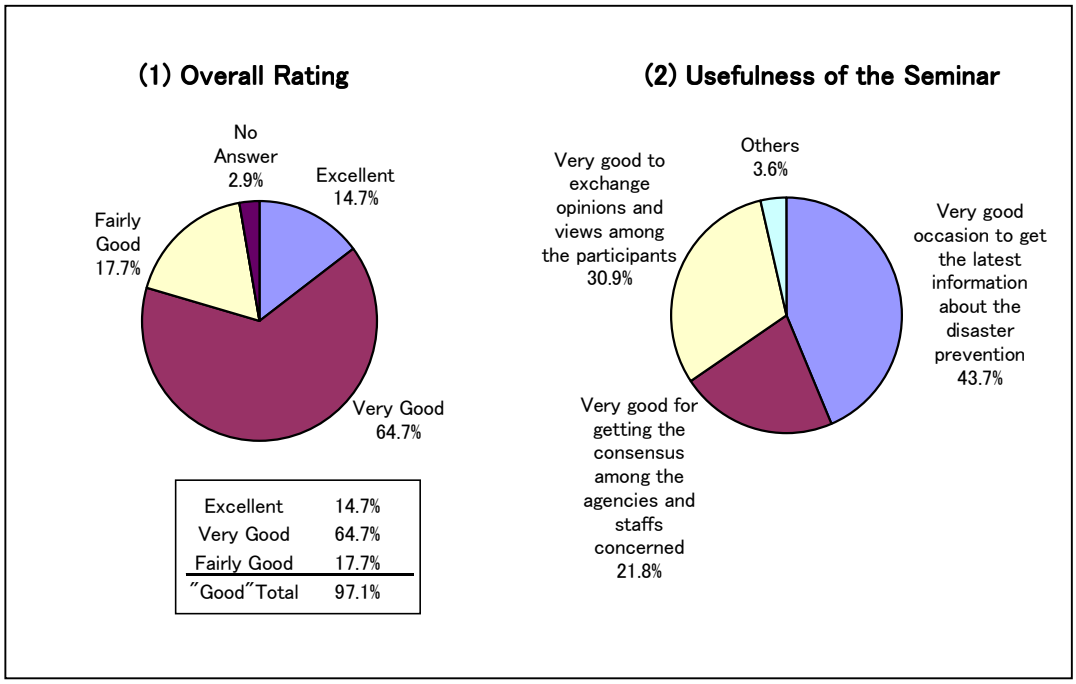
3.1 Recapitulation

With a view to assessing the results of technology transfer, the JICA Study Team distributed to every Philippine participant to fill up an "evaluation sheet" at most of the major seminars and workshops organized by the Study Team. The results of general ratings and findings of the participants on the major seminars and workshops are summarized below:

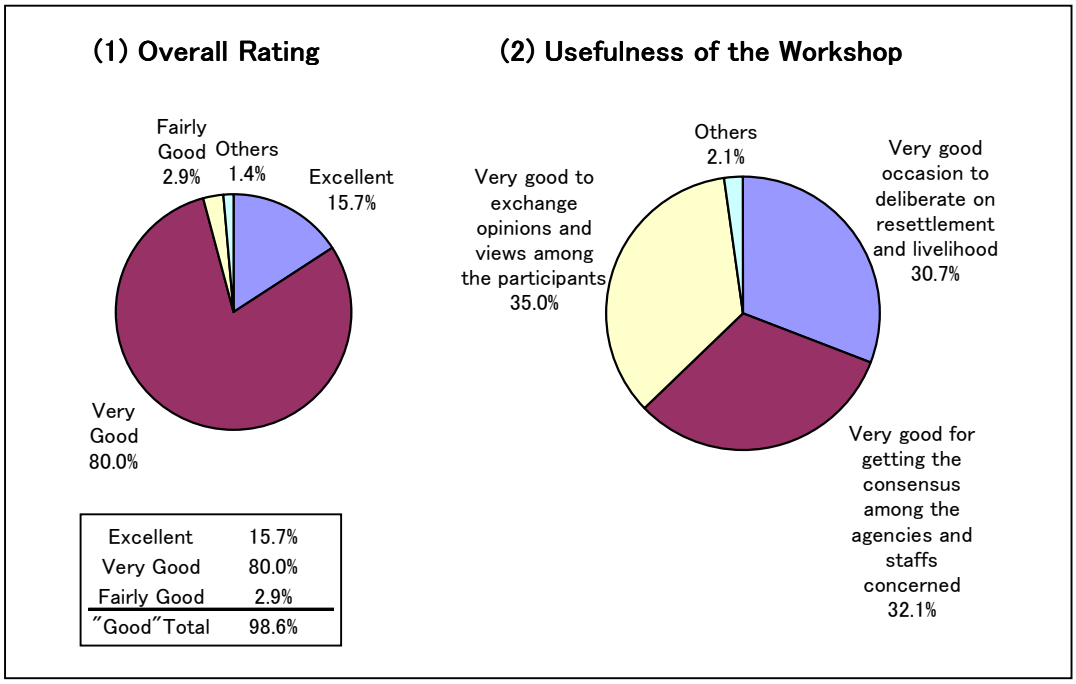
(1) Evaluation Results of the1st PCM Workshop (October 15-16,1998)



(2) Evaluation Results of the 1st Technology Transfer Seminar (August 25, 1999)

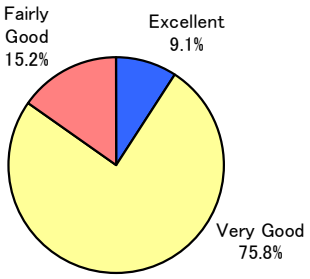


(3) Evaluation Results of the 2nd Workshop for Validation of the Results of People's Intention Survey (October 26-37, 1999)



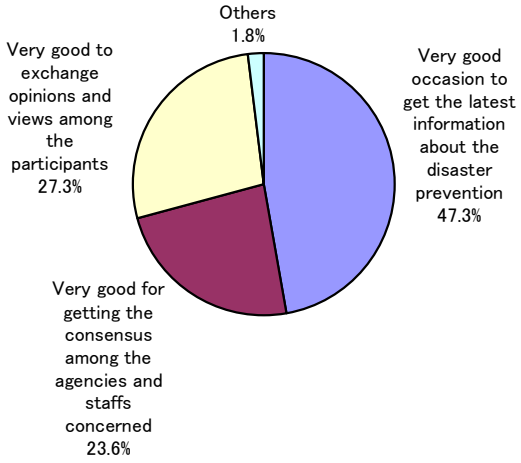
(4) Evaluation Results of the 2nd Technology Transfer Seminar (May 30, 2000)

(1) Overall Rating



Excellent	9.1%
Very Good	75.8%
Fairly Good	15.2%
"Good" Total	100.0%

(2) Usefulness of the Seminar



As seen in the above results of the major seminars and workshops, 97% to 100% of the respective participants appreciated them by giving the higher ratings consisting of "excellent", "very good" and "good". Judging from their favourable assessments, it is not too much to say that a series of seminars and workshops organized by the JICA Study Team could satisfy expectations of almost all the participants. As to the usefulness of the events, the majority of them cited the "grasp of the latest information", "exchange of ideas" and "consensus building".

In view of the fact that most of the participants gave the answer that they "learnt something new or useful for their works", it is reasonable to conclude that the technology transfer plan made for this Study was successfully carried out and came up to its expectations. In reality, there were some cases at the beginning of a series of workshops and seminars in which they could not start on time because of the delayed arrival of some participants. Excepting such incident, every workshop and seminar was a great success and active debates took place in each of the gatherings.

3.2 Conclusions and Recommendations

It should be noticed that there was a "time restriction" for the counterpart side in spite of their zeal for the joint work, since every counterpart personnel assigned to the JICA Study was assuming the important duties and functions in each belonging place of work. As the technology is progressive and human resources development basically requires long-term efforts, it is strongly recommended for the Government of the Philippines to continue and promote the on-going training programs.

To ensure the smooth implementation of the priority projects and programs, the training programs should be duly carried out for the both administrative and technical personnel, particularly for the staffs in charge of disaster prevention who undertake the operations & maintenance of the physical structures as well as forecasting, warning and evacuation system. The training programs should be designed to strengthen the coping capacity of the communities and the people. In addition , it is essential to provide training seminars and workshops to disseminate all disaster prevention information to the interested people.

The following are the major requirements and some suggestions obtained for coping with disaster in the course of the Study period, especially in terms of information dissemination and training needs:

1) In sum, the simple philosophy for coping with disaster is one of government and people working together in a co-ordinated way, by means of a coherent disaster management system.

2) Since there are many examples to serve as reminders of the dangers arising from inadequate knowledge and training, it is essential to train the personnel who constitutes a key component in effective disaster management.

3) As most of the disaster-related skills exist within various organizations and the communities, they are not in sufficient strength and numbers to cope with disaster, especially disaster on a large scale. This may apply to the following:
   - Search and rescue,
   - Survey, assessment and reporting,
   - First aid,
   - Mobile medical teams,
   - Evacuation,

- Emergency welfare (e.g. mass feeding programs),
- Emergency shelter (e.g. erection of tents, emergency building repairs)
- Emergency logistics,
- Staffing of emergency operations centers (EOCs), including mobile ones, and
- Information management.

4) To establish training policies and programs, it is important to identify clearly the scope of training activity required by close examination of disaster management policy, overall disaster management structure, all relevant plans, requirements for public education and awareness and other relevant sources of information (e.g. comparison with overseas training programs).

5) Since the training for comprehensive disaster prevention is a dynamic activity which is susceptible to changing requirements, it is appropriate to implement training on a two-fold basis: in-country training and international training.

- In-country training programs
  The in-country training programs will be provided in the Flood Control and Sabo Engineering Center and/or Asia Pacific Disaster Management Center.
  - Individual training: skills training in categories such as rescue and first aid
  - Collective training: seminars and workshops (e.g. annual preparedness seminar, post-disaster review workshop) and training modules (e.g. in general disaster management response operations)
  - Collective exercises: simulation exercises (indoor), skeleton exercises (outdoor), unit (single agency, full scale), combined

- International training assistance program
  International training is usually designed to broaden the knowledge of key disaster management officials, mainly through the interchange of views, ideas and experience which it provides. The following are the possible organizations for international training assistance:
  - Agencies such as USAID, AIDAB, Red Cross, World Meteorological Organization, WHO, UNDRO and so on have

sponsored seminars and workshops on various aspects of disaster management.

- AODRO (the Australian Overseas Disaster Response Organization) has specialized in assisting non-government organizations, primarily in the South Pacific region.
- The Pacific Islands Development Program has included training assistance in its general disaster management support for the Pacific region.
- The Asian Disaster Preparedness Center of the Asian Institute of Technology (Bangkok) provides in-country support on various aspects requested by countries.
- Countries such as United States, Japan, United Kingdom, Australia and so on have contributed in various ways to in-country training initiatives.

6) As disaster management is currently developing, it covers a wide range of functions and skills. They include planning, organization, day-to-day management activities, counter-disaster operations, crisis management activities, logistic functions, recovery management, participation in major programs (e.g. national development, prevention and mitigation), specialist skills applicable to rescue, first aid, assessment, emergency relief and welfare, communications, information management and so on.

7) This being so, the broad types of training need to be undertaken and the categories of people need to be trained. These are to comprise:

- Disaster management training
  Training for existing or potential managers (e.g. government officials and senior persons in non-governmental organizations) in order to equip them for specialist disaster-related tasks, and to orient them to various aspects of crisis management.

- Skills training
  Training for those who are required to undergo duties in emergency operations center, rescue, first aid, emergency feeding and welfare, communications, and needs and damage assessment. Such persons include members of government agencies, non-government organizations and community volunteers.

- Co-ordination training
  Training for co-ordinated disaster management action is likely to be required for all key persons in standard emergency services, government departments and agencies, non-government organizations and community/private sector groups.
- Specialized training
  Training, often by means of workshops or seminars, to cover specialized subjects such as mitigation measures, special briefings and annual preparedness reviews.

8) The aim of public awareness programs is to promote an informed, alert and self-reliant community, capable of playing its full part in support of and in cooperation with government, in all relevant disaster management matters. The community is required to have at least a broad understanding of the scope and limitations of government responsibility and also be able to implement certain measures of self-preparedness when required to do so.

9) From a disaster management viewpoint, there is benefit in contributing to public education in support of training programs. It is suggested, therefore, that government agencies should take advantage of media and other opportunities to apprise the public of current and proposed disaster-related activities. Assistance in educating the public to understand the benefits of long-term mitigation should be regarded as a valid and productive objective for disaster management.

10) The community and the government are interdependent in coping with disaster. They must work together to overcome the problems which arise and to restore things to normal. For such joint work, it is indispensable to communicate timely with accurate information. Besides, it is important to check the effectiveness of public awareness programs and the maintenance of adequate awareness levels needs to be continuously monitored in order to avoid the case that programs will become stale and public interest will fade.

11) Lastly, it is proposed to follow, where possible and step by step, the recommendations described in Section 15.2 “Immediate Execution of the Practicable Matters using the Available Resources”(Volume II: Main Report). Regarding the accuracy of information, emphasis should be placed on the “collection and preparation of the basic data” so as to upgrade the

communication reliability, which is also essential for technology transfer or human resources development.