

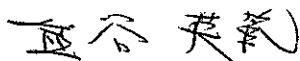
MINUTES OF MEETING
BETWEEN
THE JAPANESE TERMINAL EVALUATION TEAM
AND
THE PAKISTANI TERMINAL EVALUATION TEAM
ON
THE JAPANESE TECHNICAL COOPERATION
FOR
THE PROJECT ON STRENGTHENING FLOOD RISK
MANAGEMENT IN LAI NULLAH BASIN

The Japanese Terminal Evaluation Team organized by the Japan International Cooperation Agency (hereinafter referred to as "JICA"), headed by Mr. Hidenori KUMAGAI, visited the Islamic Republic of Pakistan from 28 October to 6 November, 2009, for the purpose of conducting the joint terminal evaluation of the Project on Strengthening Flood Risk Management in LAI NULLAH Basin in the Islamic Republic Pakistan (hereinafter referred to as "the Project") on the basis of the Record of Discussions signed on 19 October 2007.

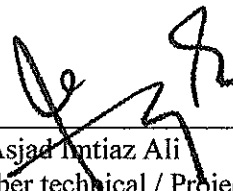
The Japanese Terminal Evaluation Team and Pakistani Evaluation Team formulated the Joint Evaluation Team (hereinafter referred to as "Team") and exchanged the views and had a series of discussions. The attendants list of the discussions is attached as ATTACHMENT 1.

As a result of review and analysis of the activities and achievements of the Project, followed by a series of discussions, both parties agreed upon the descriptions of the joint terminal evaluation report as ATTACHMENT 2 to respective Governments.

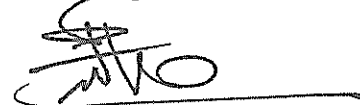
Islamabad, 5 November 2009



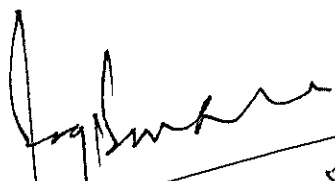
Mr. Hidenori Kumagai
 Leader,
 Terminal evaluation Team
 Japan International Cooperation Agency
 Japan




Mr. Asjad Intiaz Ali
 Member technical / Project Director
 Federal Flood Commission
 Ministry of Water and Power
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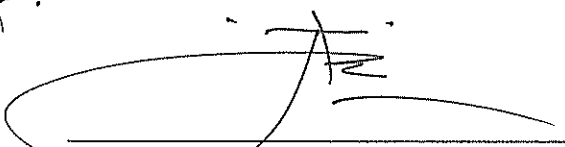
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 Ministry of Economic Affairs and Statistics
 Islamic Republic of Pakistan




Mr. Imdad Ullah Bosal
District Coordination Officer,
City District Government Rawalpindi
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Director, Regional Planning,
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Mr. Aadil Rafee Siddiqui
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Mr. Syed Nasir Ali Shah
Tehsil Municipal Officer,
Tehsil Municipal Administration Rawal
Town, Rawalpindi
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Lt. Co (Rtd) Islam-Ul-Haq
Managing Director,
Water And Sanitation Agency, Rawalpindi
Islamic Republic of Pakistan



Dr. Abdul Rahman
District Emergency Officer,
Punjab Emergency Service, Rescue1122
Islamic Republic of Pakistan

APPENDIX

Both sides agreed on contents of the joint evaluation report. It's noteworthy recommendations as follows.

To FFC;

- **Regular meeting:** During the Project implementation, the monthly meeting has been offer in a good avenue for the organizations to arrive at a mutual understanding and to address problems in a collective manner. Therefore, this should be continued among relevant organizations including Task Force after the Project completion, for example a steering committee held in a quarterly basis or pre-monsoon and post-monsoon season. It is recommended that the minutes of meeting should be summarized and distributed to the relevant organizations, JICA and also Embassy of Japan (hereinafter referred as 'EOJ').
- **PR of Task Force activities:** Since the education on flood disaster awareness are necessary for the general public to evacuate in a safe and proper manner in the event of floods, Task Force plays an important role in the community based disaster risk management. Regarding public relations activities, it is recommended that report on awareness activities done by Task Force should be introduced to the JICA, EOJ, the general public, NGOs, media and relevant organizations in the nationwide.

To PMD;

- **Revision of the warning code:** In order to broadcast accurate and reliable flood forecast, the warning code should be reviewed and modified based on the updated hydrological data. Moreover, knowledge sharing and internal training on the hydrology and the MIKE 11 should be continuing for technical sustainability of PMD.
- **Operation and Maintenance for FFWS equipment:** Operation and Maintenance manual should be in use and revised as necessary so that all staff members will be properly guided. In accordance with the Manual, record of maintenance and trouble-shooting on FFWS should be kept properly. Moreover, technical guidance on equipment and machinery should be provided to the relevant agencies, such as Rescue 1122, TMA and FFC, based on the agreement on 'Responsibility of Maintenance Work' approved at the CP meeting in July 2009.

To Rescue 1122;

- **Operation and Maintenance for DPCC equipment:** Knowledge sharing and internal training on the Operation and Maintenance equipment are recommended to be continuing for the proper use of the Control Center and the Warning Post. Based on the agreement on 'Responsibility of Maintenance Work' approved at the CP meeting in July 2009, trouble and failure on these DPCC equipments should be reported immediately to CDGR and PMD.

To CDGR;

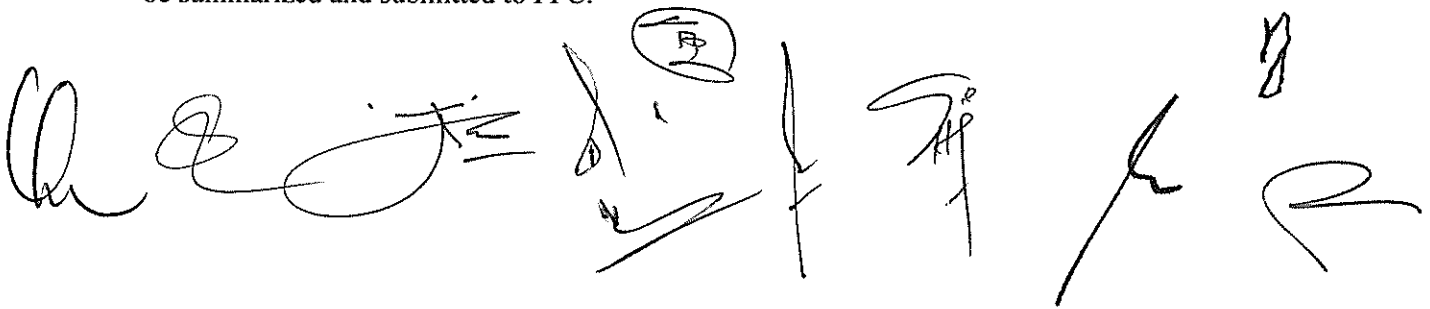
- **Assistance for Task Force activities:** Awareness activities and evacuation drills have been initiated by mainly the Project and at present, it is uncertain how Task Force can continue implementing them in future. Therefore, a focal person should be identified to take lead those activities after the Project termination. Moreover, financial arrangement regarding Task Force activities should be executed as approved to disburse payment for the awareness activities by DCO.

The bottom of the page contains several handwritten signatures and initials in black ink. From left to right, there is a large, stylized signature, a signature with a horizontal line underneath, a signature with a circled 'R' above it, a signature with a vertical line to its left, a signature with a horizontal line underneath, and a large, sweeping signature on the far right.

- **Operation and Maintenance for DPCC equipment:** Based on the agreement on 'Responsibility of Maintenance Work' approved at the CP meeting in July 2009, smooth allocation and release of budget for the maintenance of the provided equipment should be executed.

To Task Force;

- **User-friendly Flood Hazard Map:** Flood hazard map should be revised more user-friendly so that people living in the target area raise awareness for the flood preparedness.
- **Annual Report of Task Force activities:** Since the education on flood disaster awareness are necessary for the general public to evacuate in a safe and proper manner in the event of floods, Task Force plays an important role in the disaster mitigation. Regarding public relations activities, it is recommended that the annual report on awareness activities should be summarized and submitted to FFC.

A series of handwritten signatures and initials in black ink, arranged horizontally across the page. From left to right, there are approximately seven distinct marks, including cursive signatures and some initials like 'FE' and 'HP'.

ATTACHMENT 1

ATTENDANT LIST

(1) The Japanese side

- | | | |
|---|---------------------|--|
| 1 | Mr. Kaku Shuji | Leader/Early Warning and Evacuation Planning |
| 2 | Mr. Hamada Yuichiro | Community-Based Disaster Management |

(2) The Pakistani side

FFC	Mr. Asjad Imtiaz Ali	Project Director/Member Technical, FFC
	Mr. Ahmed Kamal	Chief Engineer (flood), FFC
	Mr. Qazi Tallat Mahmood Saddiqi	Senior Engineer (floods), FFC
PMD	Dr. Qamar-Uz-Zaman Chaudary	Director General, PMD
	Mr. Arif Mahmood	Chief Meteorologist, PMD
	Mr. Akram Anjum	Director, PMD
	Mr. Muhammad Aleem ul Hassan	Meteorologist, PMD
	Mr. Farhan khaliq	Sub-Engineer, PMD
	Mr. Imran Aslam	Assistant Electric Engineer, PMD
CDGR	Mr. Imdad Ullah Bosal	Project Manager/ District Coordination Officer, City District Government, Rawalpindi
	Ms. SherinNaz	Deputy District Officer, City District Government, Rawalpindi
	Mr. Muhammad Zubair Khan	Executive District Officer (Revenue), City District Government, Rawalpindi
	Mr. Tayamman Raza	District Officer (Civil Defence), City District Government, Rawalpindi
Rescue1122	Mr. Sajid Minhas	Senior Instructor(Civil Defence)
	Dr. Abdur Rahman	District Emergency Officer
	Mr. Ali Hussain	Emergency Officer (Operator)
	Mr. Ahmed Tahir Chohaun	Computer Telephone Wireless Operator
	Mr. Sohaib Raiz Gill	Control Room In-charge
WASA	Mr. Hajid Ahmed	Computer Telephone Wireless Operator
	Lt. Col. (Retd) Islam-ul-Haq Mr. Ch.Naseer Ahamed	Managing Director, WASA, Civil Engineer, WASA

Attachment 2

JOINT TERMINAL EVALUATION REPORT
THE JAPANESE TECHNICAL COOPERATION
THE PROJECT FOR STRENGTHENING FLOOD RISK
MANAGEMENT IN LAI NULLAH BASIN

Japan International Cooperation Agency
and
Authorities Concerned of the Government
of Islamic Republic of Pakistan

November, 2009



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ANNEXES

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Annex-2 List of the Personnel Interviewed

Annex-3 Evaluation Grid

Annex-4 Project Design Matrix (ver.0 and ver.1)

Annex-5 Plan of Operations (PO)

Annex-6 List of Japanese Experts

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Annex-9 Local Expenses Covered by Japanese Side

Annex-10 List of Pakistani Counterparts

Annex-11 Achievement of the Project Activities

Annex-12 Agreement on 'Responsibility of Maintenance Work'

Annex-13 List of Products



ABBREVIATIONS

CDA	Capital Development Authority
CDGR	City District Government of Rawalpindi
CP	(Pakistani) Counterpart
DCO	District Coordination Officer
DPCC	Disaster Prevention Control Cener
FFC	Federal Flood Commission
FFWS	Flood Forecast and Warning System
FRC	Flood Relief Committee
JICA	Japan International Cooperation Agency
OJT	On the Job Training
O/M	Operation and Maintenance
PDM	Project Design Matrix
PMD	Pakistan Meteorological Department
PO	Plan of Operation
RCB	Rawalpindi Cantonment Board
UC	Union Council
TMA	Thesil Municipal Administration Rawalpindi
WASA	Water and Sanitation Agency



1. Purpose of the Evaluation

1.1 Objective of the Evaluation

Japan International Cooperation Agency (hereinafter referred to as "JICA") has collaborated with FFC, PMD, CDGR, and Rescue1122 in implementing the Project for Strengthening Flood Risk Management in Lai Nullah Basin (hereinafter referred to as "the Project") for Islamic Republic of Pakistan (hereinafter referred to as "Pakistan"). The Project was launched on December in 2007, and will be completed in December 2009.

JICA dispatched an evaluation mission to Pakistan from 17th of October 2009 to 6th of November 2009 to conduct a Terminal Evaluation. The entire process was a joint undertaking by the Pakistan and the Japanese sides, with full cooperation from FFC, PMD, CDGR, Rescue 1122 and other relevant authorities.

The objectives of the evaluation mission were as follows:

1. To review the past inputs, activities, and outputs of the Project;
2. To evaluate the overall achievement of the Project since its commencement in 2008, using JICA's standard project evaluation criteria of relevance, effectiveness, efficiency, impact and sustainability;
3. To discuss the Project implementation and highlight constraints if any;
4. To summarize recommendations for the remaining period of the Project, and to draw lessons learned for the benefit of both Pakistan and Japanese Governments.

1.2 Members of the Joint Evaluation Team

The evaluation and the recommendations on the Project were made by the following members of the Joint Evaluation Team (hereinafter referred to as "the Team").

【Pakistan Side】

1	Mr. Asjad Imtaiz Ali Member Technical / Project Director, Federal Flood Commission M/o Water and Power, Islamabad	2	Mr. Imdad Ullah Bosal District Coordination Officer City District Government, Rawalpindi
3	Mr. Zafar Hasan Raza Joint Secretary (ADB/ Japan) Economic Affairs Division M/o Economic Affairs and Statistics, Islamabad	4	Dr. Qamar-Uz-Zaman Chaudhry Director General Pakistan Meteorological Department, Islamabad

5	Mr. Ashiq Ali Ghori Director, Regional Planning, Capital Development Authority, Islamabad	6	Lt. Col. (Rtd) Islam Ul Haq Managing Director Water And Sanitation Agency (WASA), Rawalpindi
7	Mr. Syed Nasir Ali Shah Tehsil Municipal Officer, Tehsil Municipal Administration Rawal Town, Rawalpindi	8	Mr. Aadil Rafee Siddiqui Cantonment Executive Officer, Rawalpindi Cantonment Board, Rawalpindi
9	Dr. Abdur Rahman District Emergency Officer Punjab Emergency Service (Rescue 1122)		

【Japanese side】

Name	Designation	Position, Organization
Mr. Hidenori KUMAGAI	Leader	Director, Disaster Management Division 1, Water Resources and Disaster Management Group, Global Environment Department, JICA
Ms. Mamiko TANAKA	Evaluation Planning	Disaster Management Division 1, Water Resources and Disaster Management Group, Global Environment Department, JICA
Ms. Yukiko SUEYOSHI	Evaluation and Analysis	Researcher, Social Development Department, Global Link Management, Inc.

1.3 Mission Schedule

The Joint Evaluation was conducted from 17th of October 2009 to 6th of November 2009 and the schedule is attached as **Annex1**.

1.4 Stakeholders Consulted/Interviewed

The participants who were consulted or interviewed for the evaluation consisted of the following.

- Main CPs of the Project(FFC,PMD,CDGR ,Rescue 1122)
- Japanese Experts assigned to the Project
- Relevant local administrative officers

The detailed list of the parties consulted by the evaluation teams is included in **Annex 2**.

2. Methodology of the Evaluation

In accordance with the JICA Project Evaluation Guidelines of January 2004, the Evaluation of the Project was conducted using the following process.

- Step 1: The Project Design Matrix (PDM) was adopted as the framework of the evaluation exercise, and the Project achievements were assessed vis-à-vis the benchmarked levels of respective Objectively Verifiable Indicators.
- Step 2: Analysis was conducted on the underlying causes that promoted or inhibited the levels of achievement including both project design and project implementation processes. Attention was given to discover whether the Project-relevant interventions are attributable to the current situation.
- Step 3: Assessment of the Project was conducted based on five evaluation criteria: "Relevance," "Effectiveness," "Efficiency," "Impact," and "Sustainability," the descriptions of which are stated below.
- Step 4: Recommendations for the Project stakeholders for the remaining implementation period were formulated for future projects to be implemented by both Pakistan and Japanese Governments.

Definition of the five evaluation criteria that were applied in the analysis for the Terminal evaluation is given in Table 1-1 below.

Table1-1: Definition of the Five Evaluation Criteria

Five Evaluation Criteria		Definitions as per the JICA Evaluation Guideline
1.	Relevance	Relevance of the Project is reviewed by the validity of the Project Purpose and Overall Goal in connection with the Pakistani Government's Policy and the needs of the target group and/or ultimate beneficiaries in Pakistan.
2.	Effectiveness	Effectiveness is assessed to what extent the Project has achieved its Project Purpose, clarifying the relationship between the Project Purpose and Outputs.
3.	Efficiency	Efficiency of the Project implementation is analysed with emphasis on the relationship between Outputs and Inputs in terms of timing, quality and quantity.
4.	Impact	Impact of the Project is assessed in terms of positive/negative, and intended/unintended influence caused by the Project.
5.	Sustainability	Sustainability of the Project is assessed in terms of institutional, financial and technical aspects by examining the extent to which the achievements of the Project will be sustained after the Project is completed.

Source: JICA Project Evaluation Guideline (revised: January 2004)

Both quantitative and qualitative data were gathered and utilized for analysis based on an Evaluation Grid. The evaluation grid is shown in **Annex 3**. Data

collection methods used for the evaluation were as follows:

- Literature/Documentation Review
- Questionnaires (Pakistani CPs, Japanese Experts)
- Key Informant Interviews (Pakistani CPs, Japanese Experts, etc)
- Direct Observation(pilot area, etc)

(PK)



2. Background and Summary of the Project

2.1 Background of the Project

The Lai Nullah Basin has a catchment area of 234.8 km², extending to the twin cities of Islamabad and Rawalpindi. The Lai Nullah Basin receives heavy rainfall averaging 500 mm in the monsoon season (July September) every year, which normally leads to heavy flood discharge. During the last 60 years (1944 - 2004) a total of 19 flood events had occurred. In other words enormous flood damage broke out almost once in every three years.

On July 23, 2001, an unprecedented rainfall occurred over Islamabad Rawalpindi resulting in 620 mm of rain in a span of about 10 hours. The flood had caused the worst damage in the basin including death of 74 people and the complete or partial destruction of about 3,000 houses.

The Study on Comprehensive Flood Mitigation and Environmental Improvement Plan for the Lai Nullah Basin (the Master Plan Study) was undertaken by the Federal Flood Commission (FFC) of the Ministry of Water & Power (MWP), through a technical cooperation provided by the Japan International Cooperation Agency (JICA) during the period May 2002 to September 2003.

Based on the Master Plan, the Government of Pakistan requested the Government of Japan to provide assistance through Japanese Grant Aid for the installation of equipment and facilities for the Lai Nullah Flood Forecasting and Warning System (FFWS) as one of urgent projects on Lai Nullah Basin in August 2003. The Project for FFWS was completed on March 2007. During the operation and maintenance stage of FFWS, there were some technical difficulties observed.

In response to the request from the Government of the Islamic Republic of Pakistan, the Preparatory Study Team (hereinafter referred to as "the Team") organized by Japan International Cooperation Agency (hereinafter referred to as "JICA"), conducted the preparatory study from 13 August to 1 September, 2007, for the purpose of working out the details of the technical cooperation program concerning the Project for Strengthening of Flood Risk Management in Lai Nullah Basin (hereinafter referred to as the 'Project'), in the Islamic Republic of Pakistan. During the study, the Team exchanged views and had a series of discussions with the Pakistani authorities concerned with respect to desirable measures to be taken by JICA and the Government of the Islamic Republic of Pakistan represented by Federal Flood Commission (hereinafter referred to as



'FFC'), City District Government of Rawalpindi (hereinafter referred to as 'CDG'), Pakistan Meteorological Department (hereinafter referred to as 'PMD') and other organizations concerned, for the successful implementation of the above-mentioned Project. As a result of the discussions, the Team and the Pakistani authorities concerned agreed to recommend to their respective Governments the matters. Minutes of Meeting was signed on 19 October 2007.

2.2 Summary of the Project

Project Name	The Project for Strengthening Flood Risk Management in Lai Nullah Basin
Implementing Agencies	FFC,PMD,CDGR , Rescue 1122
Related Organizations	TMA,CDA,RCB,WASA
Target Area	Lai Nullah Basin where a serious flood was occurred in 2001 (Zone 1-8)
Pilot Project Area	Zone 3 (UC-36,39,40,41,46)
Target Groups	Staffs in related organizations People living in the target area
Date of Signing (R/D)	19 October, 2007
Cooperation Period	December 2007-December 2009
Cooperation Scheme	Technical Cooperation Project

Overall Goal

Flood damage and victims are mitigated in the target area

Project Purpose

System and structure which enables mass evacuation at the event of floods is established in the target area

Outputs

1. Capacity of PMD is strengthened enough to utilize flood forecasting system effectively and issue warning properly to concerned agencies.
2. Capacity of CDGR (Rescue 1122) is strengthened enough to utilize flood early warning system effectively and issue warning properly to residents.
3. Capacity of local authorities is developed enough to promote people's awareness and preparedness for the floods.
4. Capacity of related organizations is strengthened enough to mitigate the

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damage of flood.

The PDM (Ver.0) was modified based on the state of achievement, and approved at JCC meeting on January 2009. Both PDM (Ver.0 and 1) are attached as **Annex 4**, and the Plan of Operation and Implemented Activities are shown in **Annex5**.

(R)



3. Achievement of the Project

3-1 Inputs

3-1-1 Japanese side

a) Dispatch of JICA Experts

A total of 8 Experts in 6 areas of expertise were assigned for a total of 37.50 months by end of November 2009. These Experts were dispatched in the areas of (1) Leader/ Early Warning and Evacuation Planning; (2) Flood Disaster Management Planning; (3) Community-Based Disaster Management; (4) Flood Forecasting and Warning System; (5) Hydrology; (6) Coordinator. The detailed list of Japanese Experts is shown in **Annex 6**.

b) Training of C/Ps Personnel in Japan

As of November 2009, a total of 13 C/Ps received training in Japan in the field of (1) Flood Risk Management Administration; (2) Flood Risk Management Practical for Local Government; (3) Operation & Maintenance for FFWS and so on. The detailed list of trainees and training period is shown in **Annex 7**.

c) Equipment Provided

Machinery and equipment worth a total of 1,147,000 JPY (equivalent worth 1,020,830 PKR¹) were provided by the Japanese side as of November 2009. The detail of the provided equipment is shown in **Annex 8**.

c) Operational Expenses

As of November 2009, a total of 13,110,000 JPY (equivalent worth 11,667,900 PKR) was allocated for Project operational expenses by the Japanese side. The detail of the operational expenses is shown in **Annex 9**.

3-1-2 Pakistani side

a) Appointment of CP

As of November 2009, a total of 17 persons were assigned to the Project. The detailed list of the CPs is shown in **Annex 10**.

b) Provision of facilities, support staff, and other operational expenditure.

¹ Exchange rate 1JPY=0.89PKR



The necessary facilities for the Project activities, including a Project office, lecture rooms and meeting spaces have been provided appropriately.

c) Cost-sharing of Operational Expenses

Operational cost-sharing with Pakistani side has been promoted from the beginning of the Project as direct operational costs such as CPs salary, electricity and water bills of the Project office and repair expenses of equipment etc. However, the delay in budget release for the awareness activities and the Disaster Prevention Control Center (hereinafter referred as 'DPCC') are likely to negatively affect the implementation of activities within the Project period.

3-2 Activities Implemented

Most of the Project's activities, as specified under the PDM, have been implemented as planned, even some of activities in the pilot area have faced a security problem. The achievements for each of the activities are summarized in **Annex 11**.

3-3 Achievement of Output

Output 1: Capacity of PMD is strengthened enough to utilize flood forecasting system effectively and issue warning properly to concerned agencies.

Output 1 intends to focus on capacity development for mainly PMD staff dealing with flood forecasting system which was supplied under the Japan's Grant Aid. CPs received series of hydrology lectures and flood simulation model practice from Japanese Expert, and obtained basic technical knowledge and skills to perform the duties at satisfactory level. However, technical advisory and training are still necessary for PMD staff to enhance accuracy of the flood simulation model based on the updated hydrological data. Regarding O&M of FFWS, strong intensions were expressed from CPs that more advanced trainings regarding trouble-shooting and repair of FFWS should be given to PMD engineers in order to utilize the FFWS properly. Furthermore, training in the field of hydrology is required for PMD meteorologists for the modification of the parameters of existing flood simulation system.

- 1-1 Upgrading more than 3 staff into a teaching level in PMD who understand of runoff mechanism

Lectures and practical trainings had been conducted in order to obtain

knowledge on the basic runoff mechanism for the engineers in PMD. According to the results from examination and assessment conducted by the Japanese Expert, mainly five (5) engineers were acquired enough knowledge to teach other staff member. CPs were actively participating in the Project activities because its contents met with their technical needs. Regarding the attendance rate in the second year, seven (7) trainees out of nine (9) had been participated more than 90% of the trainings.

- 1-2 Exercise of flood simulation model at least once a week as based on the training schedule

Exercises of flood simulation model were conducted almost every morning except Friday and Sunday during Expert's stay in Pakistan, and its attendance rate was 70% in the second year. When the Expert left for Japan, he assigned some work to trainees, and almost all trainees submitted their assignment directly to the Expert or by e-mail. Accordingly, Evaluation Team confirmed that PMD CPs have currently been undertaking training for junior engineers and meteorologists to share knowledge on hydrology and MIKE 11. Such internal training activities would enhance the sustainability of PMD.

- 1-3 Upgrading more than 3 staff into a teaching level in PMD who can utilize of flood simulation model

Lectures and practical trainings had been conducted to obtain skill on the flood simulation model by using MIKE 11 software. According to the results from examination and assessment conducted by the Japanese Expert, mainly four (4) engineers were mastered enough skill to teach other staff member in PMD. However, interviews undertaken during the terminal evaluation confirmed that technical advisory and training are still necessary for PMD staff to improve accuracy of the flood simulation model based on the updated hydrological data.

- 1-4 Revised criteria for the flood warning code

Though PMD faced challenge on the lack of sufficient hydrological data in the early stage of the Project, the criteria for the flood warning code consists of pre-alert, alert and evacuation has been revised by using rainfall analysis data and MIKE 11 simulation results. It had been adopted in their flood



warning operation, however, continuous modification based on the updated hydrology data should be done by the PMD each year. Revised warning code in 2008 and 2009 is shown in table 3-1.

Table3-1: Revised warning code

	Code	Pre-Alert		Alert		Evacuation	
		Katt	Gawal	Katt	Gawal	Katt	Gawal
2007	WL	-	-	496.5	489.8	499.6	493.6
	Rain	50mm/180min		50mm/60min or130mm/180min		-	
	Comb.	-	-	-	-	W.L.Alert and Rain Alert	

↓ Revised on Jun 2008

2008	WL	496.5	489.8	498.4	491.7	499.6	493.6
	Rain	50mm/180min	30mm/60min or70mm/180min	-	-	-	-
	Comb.	-	-	-	-	W.L.Pre-Alert and Rain Alert	

↓ Revised on Jun.2009

2009	WL	497.0	490.0	498.3	491.8	499.6	493.6
	Rain	50mm/180min	35mm/60min or85mm/180min	-	-	-	-
	Comb.	-	-	-	-	W.L.Pre-Alert and Rain Alert	

Source: Project Document

Katt:Kattarian bridge, Gawal: Gawalmandi bridge, WL:Water Level, Comb:Combination

- 1-5 Conduct of operation and maintenance of the system based on the O/M Manual properly

To improve knowledge and technical level regarding FFWS (Master Control Center, Rainfall Gauging Station, Water level gauging Station, Repeater Station) maintenance, the O&M manual have been prepared, and lectures and practical trainings on system configurations and troubleshooting procedures have also been conducted. Through their efforts, the FFWS has been well maintained by PMD staff. It also pointed out from CPs that the engineers have fully recognized the importance of operation and maintenance works as a result of the O&M training in Japan. However, CP's effort to conduct daily maintenance is commendable but not yet reached sufficient level for the trouble-shooting.



Output 2: Capacity of CDGR (Rescue 1122) is strengthened enough to utilize flood early warning system effectively and issue warning properly to residents.

Output 2, targeting mainly Rescue 1122 staff, intends to improve operation and maintenance of the early warning system, and issuance of flood warning properly. CPs received series of training for operation and maintenance equipment from Japanese Expert, and obtained basic technical knowledge and skills to perform the duties at satisfactory level. However, an insufficient budget may hinder the proper use of the early warning system such as the Flood Warning Control Center and the Flood Warning Post. In order to improve communication order in the case of flood disaster, more training and practical experiences are required for Rescue 1122 to enable them to broadcast warning siren timely and accurately based on the given warning code.

■ 2-1. Review criteria for the flood warning code

As indicated in indicator 1-4, coordinated efforts were made by CPs and Japanese Experts to review the criteria of the flood warning code. The revised code was updated several times, last time- in June 2009, and adopted into their operation. For further reliable insurance of warning, the code should be reviewed annually based on the updated hydrological data.

■ 2-2. Conduct of operation and maintenance of the system based on the O/M Manual properly

OJT on the operation of warning control equipment have been conducted to the operators of Rescue 1122. As a result from introducing the O/M manual and participation of the training in Japan, the Rescue 1122 staff have fully recognized the importance of operation and maintenance in their daily works. Compared with the Warning Posts at the time when the Project commenced, those has been properly operated and maintained by the Rescue 1122 and the local organization. However, an insufficient budget may hinder the proper use of the early warning system such as the Flood Warning Control Center and the Flood Warning Post. Accordingly, 'Responsibility of Maintenance Work' for the FFWS and DPCC was agreed at the CP meeting in order to clarify their role and responsibility.

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- 2-3. Conduct of operational drill for warning system at least once for each duty group

A total of three (3) operational drills for warning system were conducted. Record of flood warning dissemination in the following table shows that 'Alert' warnings by siren were not issued three (3) out of five (6) times. The reason they didn't issued warnings by siren was that the water level was decreased within several minutes after they received 'Alert FAX' from PMD. For further improvement on the communication order in the case of flood disaster, more training and practical experiences are required for Rescue 1122 to enable them to broadcast warning siren timely and accurately based on the given manual.

Table 3-2: Record of Flood Warning Dissemination

	Apr. 2008– July. 2009			
	Per-alert	Alert	Evacuation	All clear
Automatic flood alert detection by FFWS	10	6	1	-
Flood information transmission from PMD	8*	6	1	8
Flood warning dissemination by TMA(Control center)	-	6 (2 siren)	1 (1 siren)	-

Source: Project Document

*Data transmission effort from FFWS

Output 3: Capacity of local authorities is developed enough to promote people's awareness and preparedness for the floods.

In the target area, the general public knowledge on flood risk management was insufficient due to lack of opportunity to gain such information. To improve people's knowledge, awareness activities in the pilot area have periodically conducted by Task Force which was newly established under the Project. Although it was a first experience for CPs to conduct workshops to the general public, these activities have been done successfully owing to strong ownership and good collaboration among Pakistani stakeholders. However, the delay in budget release for awareness activities may hinder the effective implementation in promoting raising awareness for the disaster preparedness in the whole target area in the future.



■ 3-1. Hazard maps prepared

Based on the geographical information gained by local consultants, flood hazard maps at target area and each zone levels were developed through a joint effort by Task Force member and the Japanese Experts. The main purpose of the Map is to evacuate local residents in a safe and proper manner in the event of floods, so that those describes the estimated inundation area, evacuation center, evacuation routes, contact point for water information, siren pattern and belongings for the evacuation etc. In total fifty (50) posters and ten (10) billboards have been displayed at the public space, and leaflets of flood hazard map also have been prepared for Zone 3, 4 and 5. For further improvement of flood hazard maps, Task Force have better develop more user-friendly materials for such as illiterates.

■ 3-2. Guideline for Disaster Awareness Activities prepared

To conduct the Disaster Awareness Activities properly, ' Guideline for Disaster Awareness Activities ' was developed as originally planned. Based on the guideline, all Task Force members were explained about their main responsibilities on the awareness programmes, and provided an introductory training before the seminars were commenced in the pilot area. At the point of Terminal Evaluation, the guideline has currently been revised based on the experience and comments from Task Force member.

■ 3-3. Trainings and workshops on how to facilitate awareness activities for counterpart

CPs were given OJT on contents and procedure of awareness activities directly by the Japanese Experts at the beginning of the Project. To maintain the sustainability of disaster awareness activities, Task Force composed of the CDGR (Revenue, Civil Defence), Rescue 1122 and PMD was set up in the second year. As a result of fifteen (15) lectures and trainings, Task Force member obtained a sufficient level of knowledge and skill to conduct awareness programme by them. 'Number of Training on the awareness programme' is given in table 3-3.



Table 3-3: Number of Training on the awareness programme

No.	Date	Target	Number of Participants
1	May8,2008	CP	16
2	Feb 19,2009	Task Force	10
3	Feb 24, 2009	Task Force	9
4	Mar 3, 2009	Task Force	7
5	Mar 11, 2009	Task Force	7
6	Mar 24, 2009	Task Force	10
7	Mar 27,2009	Task Force	9
8	Apr 14, 2009	Task Force	6
9	May 29, 2009	Task Force	6
10	Jun 2,2009	Task Force	7
11	Jun 5,2009	Task Force	5
12	Jul 1, 2009	Task Force	6
13	Jul 6, 2009	Task Force	11
14	Jul 22, 2009	Task Force	8
15	Jul 30, 2009	Task Force	8

Source: Project Document

■ 3-4. Conduct of awareness activity at least once in each zone

Action Plan for awareness programme was prepared by Task Force and Japanese Experts. Based on the Action Plan, total of seventeen (17) awareness programmes, two (2) evacuation drills and three (3) map exercises have been undertaken in order to provide necessary information on flood disaster preparedness for the general public. As shown in the following table, since awareness programme have been conducted giving more priority to the flood-prone areas, those activities were not conducted in zone 2 and 8 those with lower risk areas than others. 'Record of awareness programme' is summarised in table 3-4.

Table 3-4: Number of Awareness programmes

No.	Date	Target	Zone	No. of Participants	A.P.	E.D.	M.E.
1	Jun 20,2008	Zone 3(UC-46)	3	113	■	■	
2	Jun 30,2008	Zone 3(UC-46)	3	28			■
3	Jul 4, 2008	Zone 3(UC-36)	3	134	■		
4	Jul 11, 2008	Zone 3(UC-36)	3	37			■
5	Jul 25, 2008	Civil Defence,Volunteer	3	109	■		
6	Jul 25, 2008	Zone 3(UC-42)	3	109	■		
7	Mar 6, 2009	Teachres in Rawalpindi	*	15	■		
8	Mar 25, 2009	Civil Defence, Volunteer	4	44	■		■
9	Apr 15, 2009	Teachers&Student	6	50	■		
10	Apr 18, 2009	Teachers&Student	7	345	■		
11	Apr 25, 2009	Chamber of Commers&Business	*	35	■		
12	Apr 28, 2009	Teachers&Student	1	75	■		
13	May 8, 2009	Teachers&Student	4	125	■		

14	May 21, 2009	Teachers&Student	3	60	■		
15	May 30, 2009	Teachers&Student	1	161	■		
16	Jun 13, 2009	Civil Defence, Volunteer, Residence	4	50	■	■	
17	Jun 14, 2009	Mosque community	5	250	■		
18	Jul 20, 2009	Mosque community	3	100	■		
19	Aug 1, 2009	NGOs	*	26	■		

Awareness Programme:A.P. Evacuation Drill:E.D. Map Exercise :M.E

*targeting teachers chamber of comers, NGOs in Rawalpindi not residence in the target area

Source: Project Document

Output 4: Capacity of related organizations is strengthened enough to mitigate the damage of flood.

The activities under this Output aim at establishment of the collaboration system among relevant organizations to implement flood forecasting, warning and evacuation in Lai Nullah Basin. Through the activities, 'Flood Relief Plan' (hereinafter referred to as "FRP") was revised, and the roles and responsibilities of each organization were clarified and confirmed. However, there are still some issues to be addressed toward the enhancement of communication order in the case of flood disaster, therefore the communication drill among the Flood Relief Committee(hereinafter referred to as 'FRC') members should be carried out regularly at least once before monsoon season.

■ 4-1. Revised flood relief plan for each year

FRP has been issued annually since 2004 by District Flood Control Center (Revenue). FRP has been revised twice in 2008 and 2009, focused on the clarification of following aspects such as (i) Command structure, (ii) Communication system, (iii) Roles of relevant organizations.

Table 3-5: main revised items under the Project

FRP 2008	⇒	FRP 2009
<ul style="list-style-type: none"> ■ Role of rescue 1122 was newly added ■ Command structure and roles of related agencies was revised ■ Siren Pattern was newly described ■ Member of Flood Relief Committee was revised ■ A figure of command structure and activities was newly added. 		<ul style="list-style-type: none"> ■ Flood Warning Code was added ■ Description of Awareness Activities was newly added ■ Hazard map was newly added ■ Command structure and roles of related agencies was revised ■ A figure of command structure and activities was revised.

Source: Project Document

■ 4-2. Method for information sharing

The Project has effectively been working for development of partnerships among those relevant organizations. It was facilitated by following method such as CPs meeting, JCC meeting, Task Force meeting and web-site. Interviews with CPs confirmed that FFC as a coordinating agency should continue to seek the collaboration with all stakeholders for the effective disaster management after the Project completion. 'Method for information sharing' under the Project is given in table 3-6.

Table3-6: Method for information sharing

Method	Objective/Responsibility	Member
CP Meeting (Monthly)	<ul style="list-style-type: none"> ■ Monitoring activities under the Project ■ Reporting progress of the activities to JCC 	FFC, CDGR, PMD, Rescue 1122, WASA, TMA,CDA
JCC Meeting	<ul style="list-style-type: none"> ■ Confirmation and approval on the achievement of the Project ■ Trouble shooting during the Project implementation 	FFC, CDGR, PMD, Rescue 1122, WASA, TMA,CDA
Task Force Meeting	<ul style="list-style-type: none"> ■ Execution of the disaster awareness programme ■ Revision of flood hazard maps 	CDGR(Revenue, Civil Defence), Rescue 1122;
Map Exercises (May 8,2008 Jun 26, 2008)	<ul style="list-style-type: none"> ■ To confirm command procedure among agencies in the case of flood 	CDGR(Revenue, Civil Defence), CDA, Rescue 1122
Work shop (Apr 7, 2009)	<ul style="list-style-type: none"> ■ Sharing knowledge of Flood Risk Management among relevant agencies ■ Improvement of Flood Risk Management activities 	CDGR, Fire Fighting, Civil Defence, WASA, TMA,FFC, PMD,Rescue1122 etc
Web-site (Since May 2009)	<ul style="list-style-type: none"> ■ Provision of hydrological data and information ■ Introduce the Project activities to the public 	PMD FFC

Source: Project Document

3-4 Achievement of the Project Purpose

Project Purpose
System and structure which enables mass evacuation at the event of floods is established in the target area

As of November 2009, the evaluation team conclude that the Project Purpose has been achieved to a 'Satisfactory' level.

Capacity of the flood risk management among relevant organizations has shown improvement and the Team attributes it to; (i) introduced knowledge and skills from Japanese Experts have been effectively utilized to enhance their functions, (ii) almost all activities have been carried out with close collaboration among stakeholders; and (iii) Task Force having acquired capacities to conduct awareness activities with developed manuals. However, the application of improved knowledge and skills in disaster management is still at an early stage, and there remain some rooms for improvement not only the flood risk administration but also the disaster preparedness education to the general public. Accordingly, based on the assessment of indicators, low level of understanding on flood hazard maps of the general public may hinder the achievement of the Project Purpose.

■ Revised flood relief plan is authorized

Under the activities of Output4, the Japanese Expert provided necessary guidance on the FRP revision to clarify roles and responsibility of each organization. Those were authorized by the District Coordination Officer respectively.

■ Flood relief plan is used by related organizations Flood Relief Committee

Authorised Flood Relief Plan had been distributed to the relevant organizations by the Offices of the District Coordination Officer in every June. To share the contents of Flood Relief Plan, meetings and communication drill were carried out among FRC members. The result of the communication drill shows that further exercise should be carried out continuously in order to tackle an inadequate communication and reporting function among various stakeholders. 'Meeting record regarding FRP' is given in table 3-7.

Table 3-7: Record of meeting regarding FRP

Means	Date	Main Purpose	Participants
FRC meeting	Jun 20, 2008 Jun 23, 2008 Jun 4, 2009	Drafting and Confirmation of revised FRP	CP member FRC member
DCO-CDGR meeting	Jun 3, 2009 Jun 17, 2009 Jul 27, 2009	Sharing Information of modification on FRP	CP member Task Force FRC member
Communication Drill	Jul 8, 2009	Determination of understandings on Role and responsibility of each organizations	FRC member

Source: Project Document

■ Hazard map and evacuation places are known among people

Two impact surveys on awareness activities were conducted by Japanese Expert and Task Force, those results are given in table 3-8 and 3-9. In July 2009, first survey on the flood hazard map was conducted in the pilot area, and 455 people were selected randomly. The results of the survey show that over 50% of people unable to understand the flood hazard map at all. It is commented that this may be either the flood hazard maps were too complicated for them to understand or the information displayed was above the level of understanding of common people of the locality.

Table 3-8: Impact survey on the flood hazard map

	Very well	Good	Fair	Poor	Not at all
Do you understand meaning of poster/billboard?	3.0%	10.3%	16.7%	15.6%	52.0%
Do you understand hazard map?	4.4%	13.6%	16.9%	10.7%	52.0%
Have you ever seen the poster/billboard?	Yes 85.0%		No 12.7%		

Source: Survey of Community at the location of Billboards/Posters

In September 2009, another impact survey was undertaken by Task Force, targeting 354 people who were participated in awareness activity. The results of the census show that even 33% of the participants are not able to understand how to use the flood hazard map, and 85 % people hope to conduct such an educational activity by Task Force.

Table 3-9: Impact survey on the awareness activities

	Very well	Fairly	Not at all	No answer
Do you know how to use Hazard Map?	28.5%	37.3%	33.1%	1.1%
Do you understand the Siren Patterns?	47.7%	32.8%	18.4%	1.1%
Did you talk the flood risk management to the other?	30.2%	50.3%	15.0%	4.5%
Do you wish to have more information?	Yes 85.0%		No 12.7%	

Source: Results of Questionnaire by Task Force

■ Continuity of evacuation drills with initiative of Pakistani side

Evacuation drills were conducted twice during the Project period. Since a participatory approach was adopted in the planning and implementation process of the awareness programme, Task Force members have gained the knowledge and skills to conduct evacuation drill even it was first experience for them. Although CPs members recognised the importance of the evacuation drill on a regular base, there is no concrete plan to revise the

Action Plan for the next year due to delay of the budget release which was already approved by DCO.

3-5 Issues Concerning Project Implementation Process

- *Project management:* Communication between the Japanese Experts and the Pakistani CPs has been smooth, and as a result, CPs have been able to actively participate in the Project activities. CPs have been closely working together with the Experts and have well discussed the technical challenges and problems in the daily operation with them. In order to monitor the progress, they have had monthly project team meetings, called 'CP meeting'. Moreover, JCC meetings have been conducted to confirm the progress, to modify PDM and solve the problem issues.
- *Ownership:* According to the questionnaire survey with CPs, almost all CPs answered that Pakistani CPs showed a high level of ownership of the Project due to transferred skills and knowledge from Japanese Experts have been appropriate and have met their technical needs. It is also worth mentioning that attendance record of meetings and other activities have been reported regularly at the CPs meeting with aim to raise their motivation to join the Project activities.
- *Capacity Assessment:* The ambiguity on the Project Purpose, especially with its reference to the 'system and structure' or 'capacity', often invited uncertainty in terms of what the intended outcomes of the Project should be. Accordingly, self-evaluations by CPs have been carried out twice based on the indicator jointly set by both CPs and Japanese Expert. It is considered that these self evaluation exercises promote CPs to recognise which specific capacities should be developed and what outputs would be expected.



4. Evaluation Results by the Five Evaluation Criteria

4.1 Relevance

The Project's relevance is high vis-à-vis the Pakistani national policies of disaster management, the Japanese assistance policy, and the needs of the target group.

The Project Purpose of 'System and structure which enables mass evacuation at the event of floods is established in the target area' is consistent with the 'National Flood Mitigation Plan IV', one of the national disaster management policies of Pakistan which aimed at; (1) Reduction of flood losses in an economically sound manner, (2) Exploring the possible use of existing flood control facilities and (3) Creating flood awareness and adaptability in the River basin. As for Japanese policy, Project's contents are coherent with the JICA's assistance policy², in which a focus is placed on disaster preparedness assistance.

Moreover, The Project was aimed to respond to the needs of the flood risk management administrations by identifying its staff as the main target group. The selection of the target group was appropriate because the improvement of the flood risk management would not have been possible if their administration system had not been upgraded considerably. As for the needs of the People living in the target area, the Project strived to strengthen the administrative function so that they in turn would be able to effectively address the needs of the people living in flood-prone area.

4.2 Effectiveness

The effectiveness of the Project is satisfactory level. Capacity of the flood risk management among relevant organizations has shown improvement verified with achievements of each Outputs. However, the application of improved knowledge and skills in flood risk management is still at an early stage, and there remain some rooms for improvement not only the flood risk administration but also the public awareness on the disaster preparedness.

²Japan's ODA: Rolling Plan for Pakistan (July,2009)
http://www.mofa.go.jp/policy/oda/rolling_plans/region.html#r2



Promoting factors which contributed to the achievement of the Project Purpose in such a short period were the strong partnership forged between the CPs organizations and the Japanese Experts in implementing the Project. Their collective commitment and support to the achievement of the Project Purpose enabled them to embark on new initiatives and completed necessary activities on time, despite the numerous obstacles. Some of the inhibiting factors which may have undermined the achievement of the Project Purpose were; (i) security instability in the target area, (ii) high turnover rate of CPs member.

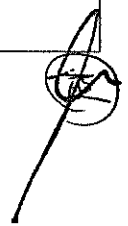
4.3 Efficiency

The Project's Efficiency is also satisfactory considering the conducted activities of each Output and the planned inputs. In general, the Japanese inputs were considered to be appropriate in quality, quantity and timelines. A transfer of technology has been utilized considerably through the day-to-day activities and various training. However, according to CPs' response during the interview survey, the assignment period of Japanese Experts was considered inadequate especially in the 'Flood Forecasting and Warning System' and 'Hydrology'.

Regarding Pakistani input, personnel of counterpart, working space and salary of CPs which were indicated in PDM have been provided from the beginning the Project. Though, all the implementation and management responsibilities of the awareness activities have been transferred to Task Force, necessary budget have not yet been procured to conduct awareness activities and to print flood hazard maps. The Project's effort to secure the revenue to secure sustainability of their activities is commendable but not yet reached sufficient level. Major external factor which may be constrained the Project activities was a high turnover rate, especially CDGR staff. Since handing-over of responsibilities have not yet been institutionalized in the organizations, the Project efficiency have been negatively affected.

4.4 Impact

Overall Goal
Flood damage and victims are mitigated in the target area



The Impact of the project is also satisfactory level. Interview undertaken with counterparts confirmed that the Project is on the right track to achieve its Overall Goal owing to the administration system among the relevant organizations has been enhanced through the various collaborative activities under the Project. However, strong intensions were expressed from CPs that continuity of educational activities focusing on flood disaster awareness are necessary for the general public to evacuate in a safe and proper manner in the event of floods. Moreover, especially the structural measure is also essential component in order to mitigate flood damage fundamentally.

At the time of terminal evaluation, it is difficult to measure the likelihood of the Overall Goal achievement by the indicator 'Number of human victims at the event of the flood' because no serious flood has been occurred during the Project period.

Table3-10: Losses/Damages due to Rainfall/Flood in Rawalpindi District*

	Village Affected	Persons Affected	Cropped Affected	House Damaged	Persons Died	Persons Injured
2006	-	219	114	16	16	219
2007	-	-	-	-	-	-
2008	-	-	-	-	6	-
2009	-	-	-	-	-	-

Source: PMD Hydro Meteorological Report

*the data covers whole Rawalpindi District not only Lai Nullah also other river basin

Some positive impacts were reported during the interview survey by the Evaluation Team. 'District Disaster Management Plan 2009 Rawalpindi' was prepared by CDGR counterparts, and approved by DCO in August 2009. This is the first manual covered all kind of disasters at the district level. This is a result of the counterpart training in Japan which enables to gain knowledge on comprehensive administration system for disaster preparedness in Japan. In addition, some of PMD CPs have currently been undertaking training for junior engineers and meteorologists to share knowledge on hydrology and MIKE 11. Such internal training activities would enhance the sustainability of PMD. Further, other positive impact at the community level has been reported. Owing to the awareness activities done by the Task Force, community volunteers have been recognized the important function of the warning post, then contributed for the daily maintenance.

There was no negative impact reported at the point of the evaluation.

4.5 Sustainability

Sustainability of the Project after the completion of the Project is fair based on the assessment from (i) the policy aspect, (ii) the organizational and financial aspect and (iii) the technical aspect.

- *Policy Aspect:* According to the 'National Flood Mitigation Plan IV (2007-2016)' prepared by FFC in November 2006, Federal government has focused on the Reduction of flood losses, exploring the possible use of existing flood control facilities and Creating flood awareness and adaptability in the River basin areas in Pakistan. The Team concluded that political support and commitment in flood risk management is high.
- *Organizational and Financial Aspect:* The Project has been implementing mainly FFC, PMD, CDGR (Revenue and Civil Defense) and Rescue 1122 with the mandate to tackle the flood damage to the lives and property of the people living on the basin of the Lai Nullah. It is therefore highly likely that those organizations will continue to fulfill their function for the flood risk management in collaboration with other stakeholder. However, when it comes to Task Force activities, some negative comments are reported from the CPs and Japanese Experts. It was observed that Task Force has a number of committed, competent and experienced staff, however, may likely to have difficulties in continuing public awareness activities unless there is financial and institutional support from other agencies especially FFC and CDGR.
- *Technical Aspect:* Overall, the Project CPs and other engineers have been applying the introduced skills and knowledge in the daily operation since those skills and knowledge meet their needs to fulfil their functions. Further, some of PMD staff have been conducting training for junior engineers and meteorologists to share technical expertise. Such internal human development activities would enhance the sustainability in PMD. Moreover, owing to series of awareness activities in the target area, Task Force member obtained a sufficient level of knowledge and skill to conduct awareness programme by them. As for technical aspect on equipment maintenance, FFWS have been maintained and used by the engineers with

responsibility on their duties, and are expected to remain the same in the future. However, for further application of the technical knowledge and skills in trouble-shooting of the equipment, they still need to have supervision, on-and-off technical guidance from Japanese Expert.

4.6 Conclusion of Evaluation

Overall, the Project activities have been working effectively towards the enhancement of the administration system on flood risk management, and made contributions to the strengthening of the linkages among these stakeholders through the efforts to carry out the collaborating activities as planned. There is, however, room for improvement to mitigate flood damage in Rawalpindi District. Accordingly, it is very necessary for the local residents to be aware of the importance of flood preparedness to save their lives and property.

Regarding the evaluation by 5 criteria, the relevance of the Project in the overall context of the flood risk management in Rawalpindi is high. In terms of the effectiveness, the Project is on the right track to achieve its Purpose of the strengthening the administration duties on flood forecast, warning and evacuation. It was observed that the Project input have been utilized to conduct each activity properly even a high turnover rate of Pakistani CPs. There also continues to be some concern on technical and financial sustainability in the awareness activities and the O& M equipment.

Specific recommendations are presented in the chapter 5.



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5. Recommendations

Although the flood risk management in Lai Nullah Basin has shown improvement during the Project implementation, the following recommendations should be considered in order to secure the sustainability.

To FFC;

- **Regular meeting:** During the Project implementation, the monthly meeting has been offer in a good avenue for the organizations to arrive at a mutual understanding and to address problems in a collective manner. Therefore, this should be continued among relevant organizations including Task Force after the Project completion, for example a steering committee held in a quarterly basis or pre-monsoon and post-monsoon season. It is recommended that the minutes of meeting should be summarized and distributed to the relevant organizations, JICA and also Embassy of Japan (hereinafter referred as 'EOJ').
- **Communication drill:** Communication drill for FFWS should be carried out regularly in order to improve communication order among various stakeholders at least once before monsoon season.
- **Comprehensive measures to tackle flood damage:** In 2002, FFC undertook a comprehensive Master Plan Study with a view to tackle flood and environment related issues of Lai Nullah through JICA's technical cooperation. Based on the study results, the Project with an aim to strengthen of flood risk management in Lai Nullah Basin has been undertaken as one of a non-structural measures. Accordingly, the countermeasures³ such as (i) Dredging and de-silting work, (ii) Flood Diversion Channel, (iii) Supplementary River Channel Control of encroachments, (iv) Solid Waste Disposal and (v) Drainage & Sewerage are also essential component to mitigate flood damage in the future. These issues should be discussed among relevant organizations in regular bases.
- **PR of Task Force activities:** Since the education on flood disaster awareness are necessary for the general public to evacuate in a safe and proper manner in the event of floods, Task Force plays an important role in the community based disaster risk management. Regarding public relations

³ Source: 'Study on Comprehensive Flood Mitigation and Environmental Improvement Plan of Lai Nullah'



activities, it is recommended that report on awareness activities done by Task Force should be introduced to the JICA, EOJ, the general public, NGOs, media and relevant organizations in the nationwide.

- **Replication of awareness activities to the other area;** Lai Nullah flood risk management activities and the awareness programme should be replicated within the Lai Nullah vicinity as well as to the other disaster-prone areas in Pakistan.

To PMD;

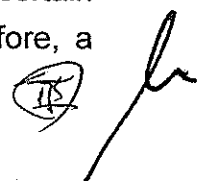
- **Revision of the warning code:** In order to broadcast accurate and reliable flood forecast, the warning code should be reviewed and modified based on the updated hydrological data. Moreover, knowledge sharing and internal training on the hydrology and the MIKE 11 should be continuing for technical sustainability of PMD.
- **Operation and Maintenance for FFWS equipment:** Operation and Maintenance manual should be in use and revised as necessary so that all staff members will be properly guided. In accordance with the Manual, record of maintenance and trouble-shooting on FFWS should be kept properly. Moreover, technical guidance on equipment and machinery should be provided to the relevant agencies, such as Rescue 1122, TMA and FFC, based on the agreement on 'Responsibility of Maintenance Work' approved at the CP meeting in July 2009. The agreement is attached as **ANNEX12**.

To Rescue 1122;

- **Operation and Maintenance for DPCC equipment:** Knowledge sharing and internal training on the Operation and Maintenance equipment are recommended to be continuing for the proper use of the Control Center and the Warning Post. Based on the agreement on 'Responsibility of Maintenance Work' approved at the CP meeting in July 2009, trouble and failure on these DPCC equipments should be reported immediately to CDGR and PMD.

To CDGR;

- **Assistance for Task Force activities:** Awareness activities and evacuation drills have been initiated by mainly the Project and at present, it is uncertain how Task Force can continue implementing them in future. Therefore, a

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focal person should be identified to take lead those activities after the Project termination. Moreover, financial arrangement regarding Task Force activities should be executed as approved to disburse payment for the awareness activities by DCO.

- **Operation and Maintenance for DPCC equipment:** Based on the agreement on 'Responsibility of Maintenance Work' approved at the CP meeting in July 2009, smooth allocation and release of budget for the maintenance of the provided equipment should be executed.
- **Communication drill :**Communication drill among the FRC members should be carried out regularly in order to improve communication order among various stakeholders at least once before monsoon season.
- **Evacuation centers:** According to the inspection survey on evacuation centers done by the Project in July 2009, it was reported 6 out of 11 evacuation centers were not safety for evacuation because of water immersion and ageing buildings. Those should be re-examined and repaired properly so that the general public can evacuate in a safe manner.

To Task Force;

- **Action Plan of awareness programme:** Annual Action Plan of awareness programme should be renewed based on the approval budget by DCO for the continuity of educational program to the general public.
- **Awareness programme guideline:** Awareness programme guideline should be in use and revised as necessary so that all staff members should be properly guided.
- **User-friendly Flood Hazard Map:** Flood hazard map should be revised more user-friendly so that people living in the target area raise awareness for the flood preparedness.
- **Annual Report of Task Force activities:** Since the education on flood disaster awareness are necessary for the general public to evacuate in a safe and proper manner in the event of floods, Task Force plays an important role in the disaster mitigation. Regarding public relations activities, it is recommended that the annual report on awareness activities should be summarized and submitted to FFC.

To JICA;

- **Follow-up activities:** It is recommended to JICA that more trainings

regarding trouble-shooting and repair of FFWS and DPCC are given to PMD staff for the sustainable use of these equipment. In addition, training in the field of hydrology is required for PMD meteorologists for the modification of the parameters of existing flood simulation system in the changing topography due to increase in population and urbanization scenarios.



6. Lesson learned

For those projects in which the operation and maintenance of equipment plays an important role, the preparatory survey with regard to the assignment period of Japanese Expert and CPs technical skill should be undertaken with much caution and time before the project implementation.

For those projects in which multi-organization takes part in the project activities, focal administrative person/organization should be designated at an early stage of the project implementation.

For those projects in which the community-based activities are implemented, the base-line survey should be undertaken in order to set benchmarks of the people's behaviour and the awareness at the onset of the project implementation so that comparative analysis can be undertaken at the Project termination.



ANNEXES

Annex-1 Mission Schedule

Annex-2 List of the Personnel Interviewed

Annex-3 Evaluation Grid

Annex-4 Project Design Matrix (ver.0 and ver.1)

Annex-5 Plan of Operations (PO)

Annex-6 List of Japanese Experts

Annex-7 Training of CP Personnel in Japan

Annex-8 List of Equipment provided under the Project

Annex-9 Local Expenses Covered by Japanese Side

Annex-10 List of Pakistani Counterparts

Annex-11 Achievement of the Project Activities

Annex-12 Agreement on 'Responsibility of Maintenance Work'

Annex-13 List of Products



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Annex-1 Mission Schedule (tentative)

Date	Day	Time	Schedule	Remarks	Accommodation
Oct. 16	Fri	23:25	【Ms.Sueyoshi】 Tokyo→Bangkok→Islamabad(TG349)		Islamabad
17	Sat	9:00 12:00	Interview with Mr.Kamal, FFC Interview with Ms.Sherin, CDGR		Islamabad
18	Sun		Preparation of the Evaluation Report	Holiday	Islamabad
19	Mon	10:00 13:00	Interview with Mr.Raza & Mr.Sajid, CDGR-CD Interview with Mr.Imran & Mr.Farhan, PMD		Islamabad
20	Tue	10:00 12:00	Interview with Mr.Qazi,FFC Interview with Mr.Akram & Aleem, PMD		Islamabad
21	Wed	10:00	Interview with Mr.Sohaib, Mr.Chohaun & Mr.Majid, Rescue1122		Islamabad
22	Thu	10:00	TV Meeting with JICA HDQ		Islamabad
23	Fri		Preparation of the Evaluation Report		Islamabad
24	Sat	10:00 15:30	Interview with Mr.Ali, Rescue1122 Interview with Mr.Muhammad Zubair Khan, CDGR-EDO(Rawalpindi)		Islamabad
25	Sun		Preparation of the Evaluation	Holiday	Islamabad
26	Mon		Preparation of the Evaluation Report Site visit		Islamabad
27	Tue	10:30 12:30	Site visit WASA at Rawalphindi Interview with Mr.Abdul, Rescue1122 at Rawalphindi		Islamabad
28	Wed	23:25	【Mr.Kumagai & Ms.Tanaka】 Tokyo→Bangkok→Islamabad(TG349)		Islamabad
29	Thu	09:30 10:50 14:00 15:00	JICA Office Meeting among Mission team Embassy of Japan Meeting among Mission team		Islamabad
30	Fri	09:30 10:30 12:30 15:00	Meeting on the Results of Evaluation with Mr.Kamar, FFC Meeting on the Results of Evaluation with Mr.Ali, FFC-DG Site Visit (Bokra, Kattarian Bridge, RAMC) Preparation of Document		Islamabad
31	Sat	09:50	Meeting on the Results of Evaluation		Islamabad

		10:30	with Dr.Qamar-Uz-Zaman Chaudhry, PMD-DG Site Visit (PMD)		
Nov.1	Sun		Preparation of Documents	Holiday	Islamabad
2	Mon	09:30 AM 13:30	Meeting on the Results of Evaluation with Mr.Kamar, FFC Meeting on the Results of Evaluation with Rescue1122 Meeting on the Results of Evaluation with Imdadullah Bosal, CDGR-DCO		Islamabad
3	Tue	09:30	Seminar		Islamabad
4	Wed		Preparation of Joint Coordination committee		Islamabad
5	Thu	AM	Joint Coordination committee Signing of M/M		Islamabad
6	Fri	PM 23:35	JICA Office Islamabad→Bangkok(TG350)→		Islamabad
7	Sat		→ Tokyo		—




Annex-2 List of the Personnel Interviewed

(1) The Japanese side

- | | | |
|---|---------------------|--|
| 1 | Mr.Kaku Shuji | Leader/Early Warning and Evacuation Planning |
| 2 | Mr. HAMADA Yuichiro | Community-Based Disaster Management |

(2) The Pakistani side

FFC	Mr. Asjad Imtiaz Ali	Project Director/Member Technical, FFC
	Mr. Ahmed Kamal	Chief Engineer (Flood), FFC
	Mr. Qazi Tallat Mahmood Saddiqi	Senior Engineer (floods), FFC
PMD	Dr.Qamar-Uz-Zaman Chaudary	Director General, PMD
	Mr.Arif Mahmood	Chief Meteorologist, PMD
	Mr. Akram Anjum	Director, PMD
	Mr. Muhammad Aleem ul Hassan	Meteorologist, PMD
	Mr. Farhan khaliq	Sub-Engineer, PMD
	Mr. Imran Aslam	Assistant Electric Engineer, PMD
CDGR	Mr. Imdad Ullah Bosal	Project Manager/ District Coordination Officer, City District Government, Rawalpindi
	Ms. SherinNaz	Deputy District Officer, City District Government, Rawalpindi
	Mr. Muhammad Zubair Khan	Executive District Officer (Revenue), City District Government, Rawalpindi
	Mr. Tayamman Raza	District Officer (Civil Defence), City District Government, Rawalpindi
	Mr. Sajid Minhas	Senior Instructor(Civil Defence)
Rescue1122	Dr. Abdur Rahman	District Emergency Officer
	Mr. Ali Hussain	Emergency Officer (Operator)
	Mr.Ahmed Tahir Chohaun	Computer Telephone Wireless Operator
	Mr. Sohaib Raiz Gill	Control Room In-charge
	Mr.Hajid Ahmed	Computer Telephone Wireless Operator
WASA	Lt. Col. (Retd) Islam-ul-Haq	Managing Director, WASA,
	Mr.Ch.Naseer Ahamed	Civil Engineer, WASA




Annex-3 Evaluation Grid

The Project for Strengthening Flood Risk Management in Lai Nullah Basin: Evaluation Grid

1. ACHIEVEMENT

Topics	Main-question	Sub-Questions	Information/data to be collected	Data Source	Means
Degree of achievement of the Project Purposes	Overall Goal: Flood damage and victims are mitigated in the target area.	Are there any negative influences on the achievement of the Overall Goal?	Degree of achievement of the Project Purposes	*Experts, CPs	*Questionnaire, Interview
	Project Purpose: System and structure which enables mass evacuation at the event of floods is established in the target area.	<p>Are there any negative influences on the achievement of the Overall Goal?</p> <p>Project Purpose: System and structure which enables mass evacuation at the event of floods is established in the target area.</p>	<p>Effect of Important Assumptions, contributing and impeding factors</p> <p>[Indicators] 1.Revised flood relief plan is authorized 2.Flood relief plan is used by related organizations 3.Hazard map and evacuation places are known among people 4.Continuity of evacuation drills with initiative of Pakistani side</p>	*Experts, CPs	*Questionnaire, Interview
Achievement of the Project Purposes	Output 1 : Capacity of PMD is strengthened enough to utilize flood forecasting system effectively and issue warning properly concerned agencies.		<p>[Indicators] 1-1 Upgrading more than 3 staff into a teaching level in PMD who understand of runoff mechanism 1-2 Exercise of flood simulation model at least once a week as based on the training schedule 1-3 Upgrading more than 3 staff in to a teaching level in PMD who can utilize of flood simulation model 1-4 Revised criteria for the flood warning code 1-5 Conduct of operation and maintenance of the system based on the O/M manual properly</p>	*Project document *Experts *Resident in Pilot area	*Document review *Questionnaire, Interview
				*Project document *Experts *CDGR (Rescue 1122)	*Document review *Questionnaire, Interview
Achievement of the Output	Output 2 : Capacity of CDGR (Rescue 1122) is strengthened enough to utilize flood early warning system effectively and issue warning properly to residents.		<p>[Indicators] 2-1 Review criteria for the flood warning code 2-2 Conduct of operation and maintenance of the system based on the O/M manual properly 2-3 Conduct of operational drill for warning system at least once for each duty group</p>	*Project document *Experts *CDGR (Rescue 1122)	*Document review *Questionnaire, Interview
. ACHIEVEMENT					



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	Output3: Capacity of local authorities is developed enough to promote people's awareness and preparedness for the floods.	[Indicators] 3-1 Hazard maps prepared 3-2 Guideline for Disaster Awareness Activities prepared 3-3 Trainings and workshops on how to facilitate awareness activities for counterpart 3-4 Conduct of awareness activity at least once in each zone	*Project document *Experts *FFC, TF member	*Document review *Questionnaire, Interview
	Output4: Capacity of related organizations is strengthened enough to mitigate the damage of flood.	[Indicators] 4-1 Revised flood relief plan for each year 4-2 Method for information sharing	*Project document *Experts *FRC	*Document review *Questionnaire, Interview
Achievement of the 'Input'	Have the Japanese experts, the equipment and supplies and the training activities in Japan which provided by JICA Project been carried out as planned?	Input record	*Experts, CPs	*Questionnaire, Interview
	Have the assignment of personnel, buildings, facilities and expenses which provided by the Pakistani side been carried out as planned?	Input record	*Experts, CPs	*Questionnaire, Interview

2. IMPLEMENTATION PROCESS

Topics	Main-question	Sub-Questions	Information/data to be collected	Data Source	Means
Activities	Have the "Activities" of the Project been implemented as planned throughout the Project period? How has problem been solved in the Project activities?	Progress of the "Activities" contributing and impeding factors Trouble shooting mechanism and its function	Progress of the "Activities" contributing and impeding factors Trouble shooting mechanism and its function	*Project document *Experts, CPs	*Document review * Interview
				*Project document **Experts, CPs	*Document review **Questionnaire, Interview
Project Management	How did cope with challenges in project management?	Monitoring system, process of decision making, challenges in project management and its means of resolution	Monitoring system, process of decision making, challenges in project management and its means of resolution	*Project document **Experts, CPs	*Document review **Questionnaire, Interview
Transfer of Technology	Was there any problem in the process of transfer of technology from the Japanese experts? Extent of ownership	Process and contents of transferred technology, communication between Experts and CPs	Process and contents of transferred technology, communication between Experts and CPs	*Experts, CPs	*Questionnaire, Interview
Ownership	How has the related agencies and community participated in the Project activities?	CPs' Contribution, Degree of Participation and Trend of behaviour	CPs' Contribution, Degree of Participation and Trend of behaviour	*Experts, CPs	*Questionnaire, Interview
Relationship among stakeholders		Relationship among Related agencies, Villagers in pilot community	Relationship among Related agencies, Villagers in pilot community	*Experts, CPs *Resident in Pilot area	*Questionnaire, Interview

3. RELEVANCE




Topics	Main-question	Sub-Questions	Information/data to be collected	Data Source	Means
RELEVANCE	Needs	Do the Project objectives match the needs of target areas or society?	Needs of Disaster prevention sector	*Project document *CP	*Document review * Interview
		Do the Project objectives match the needs of target group?	Needs of the target group	*Project document *CP	*Document review * Interview
	Priority	Is the Project relevant with the development policy of the Pakistani government?	Development policy/plan on disaster management of the Pakistani government	*NFMP, Flood Relief Plan	*Document review
		Is the Project relevant to the Japan's country assistance policy for the Pakistani government?	Japan's assistance policy	*Document of MOFA, JICA	*Document review
Relevance as a Means	Was the selection of the Pakistani target groups right?	Selection process of the target groups	*Project document *Experts, CPs	*Document review *Questionnaire, Interview	
	Was the selection of the Pakistani implementation agency right?	Selection process of the implementation agency	*Project document *Experts	*Document review *Questionnaire, Interview	

4. EFFECTIVENESS

Topics	Main-question	Sub-Questions	Information/data to be collected	Data Source	Means
EFFECTIVENESS	Achievement of the Project Purpose	Is the "Project Purposes" achieved by the end of the Project?	Degree of achievement of the Project Purposes	*Project document *Experts, CPs *Relevant agencies	*Document review *Interview
		Will the achievement of the project purpose based on the inputs, outputs and the progress of the activities?	Relationship between the Project purposes and Output	*Experts, CPs	*Questionnaire, Interview
	Causality	Is there any influence of important assumptions observed on the attainment of the project purpose?	Important Assumptions / Another Influence	*Experts, CPs	*Questionnaire, Interview
Are there any hindering/contributing factors for achievement of Project purposes?		Views on the hindering/contributing factors in attaining results.	*Experts, CPs	*Questionnaire, Interview	

5. EFFICIENCY



Topics	Main-question	Sub-Questions	Information/data to be collected	Data Source	Means
EFFICIENCY	Achievement of Output	Were the five Outputs achieved appropriate?	Degree of achievement of the output	*Project document *Experts, CPs	*Document review *Questionnaire, Interview
		Are there any hindering/contributing factors for achievement of output?	Degree of achievement of the output	*Experts, CPs	*Questionnaire, Interview
	Causality	Were the "Activities" adequate for the achievement the "Outputs"?	Record of Activities and achievement of the Outputs, Input record, influence of Important assumption	*Experts, CPs	*Questionnaire, Interview
		Were the "inputs" adequate for the achievement the "Outputs"?	Record of Activities and achievement of the Outputs, Input record, influence of Important assumption	*Experts, CPs	*Questionnaire, Interview
Timing	Is there any influence of important assumptions observed on the attainment of the output?	Input record, Record of Activities	*Project document *Experts, CPs	*Document review *Questionnaire, Interview	

6. IMPACT

Topics	Main-question	Sub-Questions	Information/data to be collected	Data Source	Means
IMPACT	Likelihood of the achievement of the Project Purposes	Will the Overall Goal be achieved?	Project achievement	*Experts, CPs	*Questionnaire, Interview
		Would the achievement of the overall goal result from the project purpose?	Achievement, Effect of Important Assumptions, contributing and impeding factors	*Experts, CPs	*Questionnaire, Interview
	Causality	Are there any positive and negative impacts except for the Overall Goals?	Examples	*Experts, CPs	*Questionnaire, Interview
		Are there any positive and negative impacts?	Examples	*Experts, CPs	*Questionnaire, Interview

7. SUSTAINABILITY

Topics	Main-question	Sub-Questions	Information/data to be collected	Data Source	Means
SUSTAINABILITY	Policy/Institution Political and institutional aspects Organizational aspects	Will the political support by the Pakistani government for flood risk management continue after the end of the Project?	Policy and strategy of the Pakistani government	*Pakistani policy	*Document review
		Does the coordination system is appropriate to continue its activities after the Project?	duties and manpower of relevant agencies (FFC,PMD,CDGR-Rescue 122,Civil Defence)	*Experts, CPs	*Questionnaire, Interview



Financial aspects	<p>Will sufficient budget measures be taken by the Pakistani Government to continue development of?</p> <p>Is the technical level of relevant agencies sufficient to continue its activities after the Project?</p> <p>Are the equipment provided by the Project actively utilized and maintained?</p> <p>Are there any negative influences on sustainability?</p>	Budget for TF	*Experts, CPs	*Questionnaire, Interview
Technical aspects	<p>the level of understanding of procedure on flood warning system</p> <p>Utilization status and maintenance of the equipment</p>	*Experts, CPs	*Document review	*Questionnaire, Interview
Others	Examples	*Experts, CPs	*Document review	*Questionnaire, Interview





Annex-4 Project Design Matrix (PDM ver.0)

Project Title: The project for Strengthening of Flood Risk Management in Lai Nullah Basin Period: 2008.1. ~2009.12(2years)
 Implementing Organizations: FFC, PMD, CDGR, RESCUE1122 Related Organizations: TMA, CDA, RCB, WASA
 Target Group: Staffs in related organizations, people living in the target area

Project Design Matrix (Original)

Narrative summary	Objectively Verifiable Indicators	Mean of Verification	Important Assumption
Overall Goal Flood damage and victims are mitigated in the target area.	- Number of human victims at the event of the flood	1. Report of FFC 2. Report of National Disaster Management Authority	
Project Purpose System and structure which enables mass evacuation at the event of floods is established in the target area.	1. Revised flood relief plan is authorized 2. Flood relief plan is used by related organizations 3. Hazard map and evacuation places are people among people 4. Continuity of evacuation drills with initiative of Pakistani side	1. Minutes of meetings of JCC 2. Questionnaire to the people 3. Hearing to the people in the pilot area	1. Flood situation in the target area will not get drastically worse.
Outputs 1. Capacity of PMD and CDG is strengthened enough to utilize flood early warning system effectively and issue warning properly. 2. Capacity of local authorities is developed enough to promote people's awareness and preparedness for the floods. 3. Capacity of related organizations is strengthened enough to mitigate the damage offload.	Indicators 1-1. Number of staff who understand runoff mechanism 1-2. Number of exercises conducted 1-3. Number of staff who can utilize flood simulation model 1-4. Revised criteria for the warning 2-1. Hazard maps prepared 2-2. Manual for evacuation drill prepared 2-3. Number of workshops and drills held 2-4. Number of people who participate in workshops and drills. 3-1. Revised flood relief plan for each year 3-2. Number of meetings held among flood relief committee	1-1. Record of the system operation 1-2. Report on the exercises 2-1. Progress Report of the Project 2-2. Report on workshops and drills 3-1. Progress report of the Project	1. Institutional and financial arrangements of the organizations concerned will be done as planned. 2. Mandate of each organization will not be changed.

Narrative summary	Objectively Verifiable Indicators	Mean of Verification	Important Assumption
<p>Activities</p> <p>1-1. Holding lectures on basic knowledge of runoff mechanism to engineers.</p> <p>1-2. Conducting exercises on operation of flood simulation model.</p> <p>1-3. Improving parameters of the flood simulation model.</p> <p>1-4. Accumulation of meteorological/hydrological data obtained from the warning system.</p> <p>1-5. Reviewing criteria for the warning.</p> <p>2-1. Conducting social survey.</p> <p>2-2. Preparing hazard maps.</p> <p>2-3. Select pilot areas.</p> <p>2-4. Developing manual for evacuation drill.</p> <p>2-5. Conducting awareness programs and evacuation drills in the pilot areas.</p> <p>2-6. Reflecting lessons learnt from activities in the pilot areas to the manual and plan.</p> <p>2-7. Holding workshops on how to facilitate awareness programs and drills for counterpart agencies</p> <p>2-8. Conducting trainings on how to facilitate awareness programs and drills for counterpart agencies.</p> <p>2-9. Conducting awareness programs and evacuation drills in other areas.</p> <p>2-10. Reflecting lessons learnt from activities in other areas to the manual and plan.</p> <p>3-1. Reviewing institutional structure of flood relief committee.</p> <p>3-2. Revising flood relief plan through flood relief committee.</p> <p>3-3. Conducting operational drills among related organizations based on the flood relief plan.</p> <p>3-4. Monitoring operation of related organizations during monsoon season.</p> <p>3-5. Reviewing response of related organizations to floods after monsoon season through flood relief committee.</p>	<p>Inputs</p> <p>Pakistani Side</p> <ol style="list-style-type: none"> 1. Personnel <ol style="list-style-type: none"> (1) Project Director from FFC (2) Project Manager from CDG (3) Flood Management Planner from FFC (4) Flood Management Planner from CDG (5) Flood Management Planner from PMD. (6) Community mobilizer from CDG (Civil Defence) (7) Community mobilizer from CDG (Rescue 1122) , (8) Hydrologist from FFC (9) Hydrologist from PMD (10) Meteorologist from PMD (11) Assistants/ Supporting Staffs (12) Other personnel mutually agreed upon if necessary 2. Provision of office spaces with basic office equipment 3. Exemption from taxes and other charges for machinery, equipment and other materials supplied by JICA 4. Budget for the workshops and drills for second year 5. Salaries of counterparts 	<p>Japanese Side</p> <ol style="list-style-type: none"> 2. Experts <ol style="list-style-type: none"> (1) Leader/ Early Warning and Evacuation planner. (2) Flood forecasting and warning system. (3) Hydrologist (4) Community-based Disaster Management Planner. (5) Others if necessary 3. Trainings for counterpart personnel in Japan and/or third countries 4. Budget for hazard maps 5. Budget for the workshops and drills in the first year 	<ol style="list-style-type: none"> 1. Institutional and financial arrangements of the organizations concerned will be done as planned. 2. Mandate of each organization will not be changed. <p style="text-align: center;">Preconditions</p> <ol style="list-style-type: none"> 1. Security situation will not get worse. 2. Equipments on the early warning system will be properly maintained and utilized

Annex-4 Project Design Matrix (PDM ver.1)

Project Title: The project for Strengthening of Flood Risk Management in Lai Nullah Basin Period: 2008.1. ~ 2009.12(2years)
 Implementing Organizations: FFC, PMD, CDGR, RESCUE1122 Related Organizations: TMA, CDA, RCB, WASA
 Target Group: Staffs in related organizations, people living in the target area

Project Design Matrix (Version 1)

Narrative summary	Objectively Verifiable Indicators	Mean of Verification	Important Assumption
<p>Overall Goal Flood damage and victims are mitigated in the target area.</p>	<p>- Number of human victims at the event of the flood</p>	<p>1. Report of FFC 2. Report of National Disaster Management Authority</p>	
<p>Project Purpose System and structure which enables mass evacuation at the event of floods is established in the target area.</p>	<p>1. Revised flood relief plan is authorized 2. Flood relief plan is used by related organizations 3. Hazard map and evacuation places are known among people 4. Continuity of evacuation drills with initiative of Pakistani side</p>	<p>1. Minutes of meetings of JCC 2. Questionnaire to the people 3. Hearing to the people in the pilot area</p>	<p>1. Flood situation in the target area will not get drastically worse.</p>
<p>Outputs 1. Capacity of PMD is strengthened enough to utilize flood forecasting system effectively and issue warning properly to concerned agencies. 2. Capacity of CDGR (Rescue1122) is strengthened enough to utilize flood early warning system effectively and issue warning properly to residents. 3. Capacity of local authorities is developed enough to promote people's awareness and preparedness for the floods. 4. Capacity of related organizations is strengthened enough to mitigate the damage of flood</p>	<p>Indicators 1-1. Upgrading more than 3 staff into a teaching level in PMD who understand of runoff mechanism 1-2. Exercise of flood simulation model at least once a week as based on the training schedule 1-3. Upgrading more than 3 staff into a teaching level in PMD who can utilize of flood simulation model 1-4. Revised criteria for the flood warning code 1-5. Conduct of operation and maintenance of the system based on the O/M Manual properly 2-1. Review criteria for the flood warning code 2-2. Conduct of operation and maintenance of the system</p>	<p>1-1. Result of the examination by Expert. 1-2. Final Report of the Project 1-3. Result of the examination by Expert. 1-4. Progress Report of the Project 1-5. Final Report of the Project 2-1. Final Report of the Project 2-2. Final Report of the Project 2-3. Final Report of the Project 3-1. Progress Report of the Project</p>	<p>1. Institutional and financial arrangements of the organizations concerned will be done as planned. 2. Mandate of each organization will not be changed.</p>

	<p>based on the O/M Manual properly</p> <p>2-3. Conduct of operational drill for warning system at least once for each duty group</p> <p>3-1. Hazard maps prepared</p> <p>3-2. Guideline for Disaster Awareness Activities prepared</p> <p>3-3. Trainings and workshops on how to facilitate awareness activities for counterpart</p> <p>3-4. Conduct of awareness activity at least once in each zone</p> <p>4-1. Revised flood relief plan for each year</p> <p>4-2. Method for information sharing</p>	<p>3-2. Guidelines for Disaster Awareness Activities</p> <p>3-3. Progress Report of the Project</p> <p>3-4. Final Report of the Project</p> <p>4-1. Revised Flood Relief Plan</p> <p>4-2. Progress Report of the Project</p>	
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<p>Activities</p> <p>1-1. Holding lectures on basic knowledge of runoff mechanism to engineers. 1-2. Conducting exercises on operation of flood simulation model. 1-3. Improving parameters of the flood simulation model. 1-4. Accumulation of meteorological/hydrological data obtained from the observation system. 1-5. Reviewing criteria for the flood warning code. 1-6. Managing operation and maintenance of forecasting system. 2-1. Reviewing of flood warning code. 2-2. Managing operation and maintenance of warning system. 2-3. Conducting operational drill for warning system. 3-1. Conducting social survey. 3-2. Preparing hazard maps. 3-3. Select pilot areas. 3-4. Developing guideline for disaster awareness activity. 3-5. Conducting awareness programs and evacuation drills in the pilot areas. 3-6. Reflecting lessons learnt from activities in the pilot areas to the manual and plan. 3-7. Holding workshops on how to facilitate awareness programs and drills for counterpart agencies 3-8. Conducting trainings on how to facilitate awareness programs and drills for counterpart agencies. 3-9. Conducting awareness programs and evacuation drills in other areas. 3-10. Reflecting lessons learnt from activities in other areas to the manual and plan. 4-1. Reviewing institutional structure of flood relief committee. 4-2. Revising flood relief plan through the secretariat of flood relief committee. 4-3. Conducting operational drills. 4-4. Monitoring operation of related organizations during monsoon season. 4-5. Create a shared method of flood risk management among related organizations through the counterpart agency meetings, a workshop and a seminar.</p>	<p>Inputs</p> <p><u>Pakistani Side</u></p> <ol style="list-style-type: none"> Personnel <ol style="list-style-type: none"> Project Director from FFC Project Manager from CDGR Flood Management Planner from FFC Flood Management Planner from CDGR Flood Management Planner from PMD. Community mobilizer from CDGR (Civil Defence) Community mobilizer from CDGR (Rescue 1122), Hydrologist from FFC Hydrologist from PMD Meteorologist from PMD Assistants/ Supporting Staffs Other personnel mutually agreed upon if necessary Provision of office spaces with basic office equipment Exemption from taxes and other charges for machinery, equipment and other materials supplied by JICA Budget for the workshops and drills for second year Salaries of counterparts 	<p><u>Japanese Side</u></p> <ol style="list-style-type: none"> Experts <ol style="list-style-type: none"> Leader/ Early Warning and Evacuation planner. Flood forecasting and warning system. Hydrologist Community-based Disaster Management Planner. Others if necessary Trainings for counterpart personnel in Japan and/or third countries Budget for hazard maps Budget for the workshops and drills in the first year 	<p>1. Institutional and financial arrangements of the organizations concerned will be done as planned. 2. Mandate of each organization will not be changed.</p> <p><u>Preconditions</u></p> <ol style="list-style-type: none"> Security situation will not get worse. Equipments on the early warning system will be properly maintained and utilized
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Annex-5 Plan of Operations (PO)
 <December 2007- October 2008>

Year	2007	2008											
Phase	Phase I												
Month	12	1	2	3	4	5	6	7	8	9	10		
Monthly	1	2	3	4	5	6	7	8	9	10	11		
	1st Home Work	[A] 1st Field Work in Pakistan					2nd Home Work	[B] 2nd Field Work in Pakistan					3rd Home Work in Japan
Output 1: Capacity of PMD is strengthened enough to utilize flood early warning system effectively and issue warning properly.			[A-2] Identified PMD Problem and Planning Training Schedule									[B-5] Monitoring on Flood Disaster Prevention Action on PMD during Monsoon Season and sort out of Problems	
			[A-0] Evaluation of Present Condition for Flood Forecasting and Warning System (FFWS) (pre-conditions)		[A-3-1] Analysis on Meteorology/ Hydrology Data							[B-3] Implementation of Training for Personnel in PMD (continuation)	
					[A-3-2] Implementation to Practises of Flood Simulation							[B-4] Implementation of Practice on Flood Simulation Model (continuation)	
												[B-2] Lecture on OM of Forecast and Warning System	
Output 2: Capacity Improvement of Evacuation Activity				[A-4] Conducting Social Survey								[B-7] Monitoring on Flood Disaster Prevention Action of Inhabitant in Pilot Areas and Sort out Problems	
					[A-7] Selection of Pilot Areas								
				[A-5] Collection of the Data for Hazard Maps and Evacuation Plan								[B-6] Implementing Awareness Program and Evacuation Drills in Pilot Areas	
					[A-6] Drawing up Draft Hazard Maps								
Output 3: Capacity Improvement of Flood Risk Management for Related Organizations												[B-9] Monitoring on Flood Disaster Prevention Action on Related Organizations and Sort out Problems	
Report	[A-1] Inception Report											[B-1] Progress Report (1)	
JCC	⊙											⊙	
FRC			✦			✦		✦				✦	
Seminar/ Workshop													
C/P Training							C/P training					C/P Training	
Evaluation													

Mainly conduct by C/P with assist of Expert
 C/P and Expert will conduct together
 Mainly conduct by Expert

<December,2008---November,2009>

Year	2008	2009													
Phase	Phase II														
Month	12	1	2	3	4	5	6	7	8	9	10	11	12		
Monthly	13	14	15	16	17	18	19	20	21	22	23	24	25		
JICA Expert Schedule	[C] 3rd Field Work in Pakistan						4th Home Work in Japan	[D] 4th Field Work in Pakistan					5th Home Work in Japan	[E] 5th Field Work in Pakistan	6th Home Work in Japan
OUTPUTS	<p>Output 1: Capacity of PMD is strengthened enough to utilize flood early warning system effectively and issue warning properly.</p> <p>Output 2: Capacity of CDGR(Rescue1122) is strengthened enough to utilize flood early warning system effectively and issue warning properly.</p> <p>Output 3: Capacity Improvement of Evacuation Activity</p> <p>Output 4: Capacity Improvement of Flood Risk Management for Related Organizations</p>														
Report	[C-1] Interim Report					[D-1] Progress Report					[E-1] Draft Final Report				
JCC	◎ ◎					◎					◎				
Seminar/ Workshop				☆								☆			
C/P Training						C/P Training									
Evaluation															
Submission of the Report							△ PR2				△ DFR	△ FR			

 Mainly conduct by C/P with assist of Expert
 C/P and Expert will conduct together
 Mainly conduct by Expert

PR2 Progress Report 2

DFR Draft Final Report
 FR Final Report



Annex-6 List of Japanese Experts

Name	Person in charge
Mr. KAKU Shuji	Leader/Early Warning and Evacuation Planning
Mr. SUGIURA Tomonobu (1 st year) Mr. SAKURAI Toshiyuki (2 nd year)	Flood Disaster Management Planning
Mr. HAMADA Yuichiro	Community-Based Disaster Management
Mr. SASAHARA Takeshi	Flood Forecasting and Warning System
Mr. MITSUKURA Makoto	Hydrology
Mr. ONUMA Takashi/Mr. FONG Wee Kean	Coordinator

Year	2007	2008										
Phase	Phase I											
Month	12	1	2	3	4	5	6	7	8	9	10	
Monthly	1	2	3	4	5	6	7	8	9	10	11	
	1st Home Work in	[A] 1st Field Work in Pakistan					2nd Home	[B] 2nd Field Work in				3rd Home Work in Japan
Leader/Early Warning and Evacuation Planning												
Flood Disaster Management Planning												
Community-Based Disaster Management												
Flood Forecasting and Warning System												
Hydrology												
Coordinator												

Year	2008	2009											
Phase	Phase II												
Month	12	1	2	3	4	5	6	7	8	9	10	11	12
Monthly	13	14	15	16	17	18	19	20	21	22	23	24	25
JICA Expert Schedule	[C] 3rd Field Work in Pakistan					4th Home Work	[D] 4th Field Work in Pakistan				5th Home Work in	[E] 5th	6th Home Work
Leader/Early Warning and Evacuation Planning													
Flood Disaster Management Planning													
Community-Based Disaster Management													
Flood Forecasting and Warning System													
Hydrology													

(15)

Annex-7 Training of CP Personnel in Japan

Field	Period	Name	Position when accepted	Present position
Flood Risk Management Administration	2008.05.13-05.28	Mr. ANJUM Muhammad Akram	Director, Pakistan Meteorological Department	Director, Pakistan Meteorological Department
		Mr. BABAR Zaheer Ahmad	Senior Meteorologist, Deputy Director, Pakistan Meteorological Department	Senior Meteorologist, Deputy Director, Pakistan Meteorological Department
		Mr. QURESHI Muhammad Asif	District Officer (Revenue), City District Government Rawalpindi	District Coordination Officer, Bahkar
		Mr. AKHTAR Tanveer	District Emergency Officer, Punjab Emergency Service, Rescue 1122	Resigned from Service
		Mr. HUSSAIN Ali	Emergency Officer, Rescue 1122 Central Station	Emergency Officer, Rescue 1122 Beheria Town Station
Flood Risk Management Administration	2009.05.23-05.15	Mr. ALI Asjid Imtiaz	Member Technical, Federal Flood Commission	Member Technical
		Mr. KAMAL Ahmed	Chief Engineer (Flood), Federal Flood Commission	Chief Engineer (Flood)
Flood Risk Management Practical for Local Government	2009.05.15-05.26	Miss NAZ Sherin	Deputy District Officer (Coordination), City District Government Rawalpindi	Deputy District Officer (Revenue) Kahuta, City District Government Rawalpindi
		Mr. MINHAS Sajid	Senior Instructor (Civil Defense), City District Government Rawalpindi	Senior Instructor

Operation & Maintenance for FFWS	2009.05.15-05.26	Mr. BUTT Imran Aslam	Assistant Electronic Engineer, Pakistan Meteorological Department, Islamabad	Assistant Electronic Engineer
		Mr. KHALLIQ Farhan	Sub Engineer, Pakistan Meteorological Department, Islamabad	Sub Engineer
		Mr. GILL Sohaib Raiz	Control Room In charge(CRI), Punjab Emergency Service, Rescue 1122	Control Room In charge(CRI)
		Mr. CHOHAUN Ahmed Tahir	Computer Telephone Wireless Operator(CTWO), Punjab Emergency Service, Rescue 1122	Computer Telephone Wireless Operator(CTWO)

Annex-8 List of Equipment provided under the Project

Item	Quantity	Unit	Specification
Provide for the Project			
- Digital Camera	2	Pc	Olympus (u795SW)
- Personal Computer	2	pc	Acer Veriton 1000/1GB Memory, 160GB HD, 17inch LCD, Acer Veriton M464/2GB Memory, 160GB HD, 17inch LCD
- Software	1	Pc	Adobe Illustrator CS3
- Color Printer A4	1	Pc	HP 2820/A4 (printer, scan, copy) with stabilizer & hub
- Color Printer A3	1	Pc	HP pro k850/A3 inkjet
Carry from Japan for the Project			
- Microphone	15	Pc	Noboru Electric Company
- Fax Machine	1	Pc	KXFL 402C/Laser fax




Annex-9 Local Expenses Covered by Japanese Side

Fiscal Year*	-JFY 2007	-JFY 2008	-JFY 2009	Total
Counterpart Training in Japan	-	7 persons	8 persons	15 persons
Equipments	1,027,000 yen (914,030 PKR)	-	120,000 yen (106,800 PKR)	1,147,000 yen (1,020,830 PKR)
Poster, Pamphlet, Billboard and other awareness materials	-	1,287,000 yen (1,145,430 PKR)	810,000 yen (720,900 PKR)	2,097,000 yen (1,866,330 PKR)
Workshop and Seminar	-	120,000 yen (106,800 PKR)	783,000 yen (696,870 PKR)	903,000 yen (803,670 PKR)
Re-commission with local consultants	-	6,568,000 yen (5,845,520 PKR)	1,034,000 yen (920,260 PKR)	7,602,000 yen (6,765,780 PKR)
Hazard Map	-	823,000 yen (732,470 PKR)	538,000 yen (478,820 PKR)	1,361,000 yen (1,211,290 PKR)


Note: Fiscal year in Japan is from April to March.

Exchange rate 1 yen = 0.89 PKR




Annex-10 List of Pakistani Counterparts

Name	Designation
1. Project Director- Chief Engineer (flood) from FFC	
Mr. Asjad Imtiaz Ali	Member Technical, FFC
2. Project Manager- District Coordination Officer from CDGR	
Mr. Imdad Ullah Bosal	District Coordination Officer, City District Government, Rawalpindi
3. Flood Risk Management Planner- Chief Engineer (Dam Safety Council) from FFC	
Mr. Ahmed Kamal	Chief Engineer (Flood), FFC
4. Flood Risk Management Planner- District Officer (Revenue) from CDGR	
Mr. Muhammad Zubair Khan	Executive District Officer (Revenue), City District Government, Rawalpindi
5. Flood Risk Management Planner- Director Forecasting from PMD	
Mr. Akram Anjum	Director, PMD
6. Community Mobilizer- District Emergency Officer Rawalpindi from the Punjab Emergency Service, Rescue 1122 (Rescue 1122), CDGR	
Dr. Abdur Rahman	District Emergency Officer
7. Community Mobilizer- District Officer (Civil Defense) from CDGR	
Mr. Tayamman Raza	District Officer (Civil Defense), City District Government, Rawalpindi
8. Hydrologist- Senior Engineer (floods) from FFC	
Mr. Qazi Tallat Mahmood Saddiqi	Senior Engineer (floods), FFC
9. Hydrologist- Deputy Director from PMD	
Mr. Muhammad Aleem ul Hassan	Meteorologist
10. Meteorologist- Deputy Director from PMD	
Mr. Zaheer A. Babar	Deputy Director




11. Operation and Maintenance Staff- Electronic Engineer from PMD	
Mr. Imran Aslam	Assistant Electric Engineer
12. Assistant Project Manager- Executive District Officer (Finance and Planning) from CDGR	
Mr. Saqib Manan	Executive District Officer (Finance & Planning), City District Government, Rawalpindi.
13. Operation and Maintenance Staff- Emergency Officer (Operation) Rawalpindi from the Rescue 1122, CDGR	
Mr. Ali Hussain	Emergency Officer (Operator)
14. Flood Risk Management Planner- Managing Director from Water and Sanitation Agency Rawalpindi (WASA)	
Lt. Col. (Retd) Islam-ul-Haq	Managing Director, WASA, Rawalpindi
15 Community Mobilizer- Teshil Nazim from Teshil Municipal Administration (TMA) Rawal Town	
Mr. Syed Nasir Ali Shah	Teshil Municipal Officer, TMA, Rawal Town
16. CDA	
Mr. Khaliq ur Rehman	Director (Regional Planning),Capital Development Authority, Islamabad
Mr. Mansoor Ahmed Khan	Director Municipal Administration, CDA

Annex-11 Achievement of the Project Activities

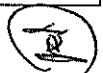
Activities	Achievement	Status
1.1 Holding lectures on basic knowledge of runoff mechanism to engineers.	Training material on hydrology was prepared by Japanese Expert, composed of; 1)Hydrology, 2)Discharge Measurement, 3)Lai Nullah Model, 4)Outline of MIKE 11, 5)Re-setting of Flood Warning Code due to Aggradations of Riverbed, 6)Flood Forecasting, 7)Setting of Flood Warning Code, 8)Procedures. In the first year, total of 4 meetings, 14 indoor-lectures, 5 practices and 4 field training were conducted targeting PMD and Rescue 1122 by Japanese Expert. In the second year, total of 2 meetings, 8 indoor-lectures, 11 MIKE 11 practices, 7 indoor-practice, 1 field trainings and Examination were also conducted to measure the level of understand.	Completed
1.2 Conducting exercises on operation of flood simulation model.		Completed
1.3 Improving parameters of the flood simulation model.		Completed
1.4 Accumulation of meteorological/ hydrological data obtained from the observation system.	PMD staff understood the method of checking the rainfall data and detecting error by field survey and evaluation activities.	Completed
1.5 Reviewing criteria for the flood warning code.	'Manual on flood forecasting procedure' was prepared by Japanese Expert. Relevant agencies such as FFC, PMD, and Rescue 1122 could clarify their responsibility through discussion on procedures in the flood case.	Completed
1.6 Managing operation and maintenance of forecasting system.	O/M training for technical officers was conducted to improve the quality of regular maintenance work. An agreement of OM between PMD, CDGR and Rescue 1122 was approved officially in C/P Meeting, <u>It is recommended that more trainings regarding trouble-shooting and repair of FFWS are given to PMD staff in order to utilize the FFWS properly.</u>	Completed
2.1 Reviewing of flood warning code.	Flood warning code was reviewed and modified based on the existing hydrological data. It was explained to CDGR and Rescue 1122 in order to be utilised in their daily operation.	Completed




2.2 Managing operation and maintenance of warning system.	O/M Manual was developed in 2008 and revised in 2009. Lectures were conducted by using the manual to operators in mainly Rescue 1122. In addition, site inspections were done for trouble shooting of equipments and facilities such as warning posts.	Completed
2.3 Conducting operational drill for warning system.	A Communication drill was conducted between PMD and DPCC to understand appropriate procedure of warning system. <u>At the point of Terminal Evaluation, maintenance & trouble-shooting report has not been submitted to CDGR in regular bases.</u>	Completed
3.1 Conducting social survey.	A social survey was conducted to clarify peoples' risk management in Feb 2008. Results of the survey were utilized into awareness program.	Completed
3.2 Preparing hazard maps.	Flood hazard maps in Urdu for each targeted zone (zone 1 to 8) were prepared by Task Force, and it was revised by using upgraded base-map and updated information such as increased evacuation centers.	Completed
3.3 Select pilot areas.	Zone 3 was selected as a pilot site based on the criteria ; (1)frequent flood damaged area, (2)cooperation from NGO and civil volunteers	Completed
3.4 Developing guideline for disaster awareness activity.	A guideline for awareness activities was developed. Lecture was conducted to Task Force members to understand the contents and procedure of awareness activities.	Completed
3.5 Conducting awareness programs and evacuation drills in the pilot areas.	A total of 17 awareness program and 2 evacuation drills were conducted by Task Force at schools and mosques in the pilot area. Task Force member understood all procedure of awareness program.	Completed
3.6 Reflecting lessons learnt from activities in the pilot areas to the manual and plan.	The guideline of awareness programme and the flood hazard maps was revised by reflecting lessons learnt gained from activities in the pilot areas, and it was submitted to JCC.	Completed
3.7 Holding workshops on how to facilitate awareness programs and drills for counterpart agencies.	Workshops and trainings on awareness program for Task Force were conducted by Japanese Expert. As a result of the trainings, Task Force are able to manage evacuation drill and awareness activities by themselves. In addition, 'Action Plan 2009' for the	Completed




3.8 Conducting trainings on how to facilitate awareness programs and drills for counterpart agencies.	awareness program was formulated by themselves <u>At the point of evaluation, Annual Action Plan for 2010 have not been panned to revise because of budget constrain.</u>	Completed
3.9 Conducting awareness programs and evacuation drills in other areas.	Task Force have been conducting awareness program at each zone, also they arranged its programme for school, masque, NGO and volunteer. Leaflet and billboard were also developed for awareness activities.	Completed
3.10 Reflecting lessons learnt from activities in other areas to the manual and plan.	The awareness activities were expanded from school to mosque in other zones. The billboards were also set up in the public space in each target zone. <u>At the point of evaluation, the guideline of awareness activities have been reviewing based on the experience of Task Force members.</u>	Completed
4.1 Reviewing institutional structure of flood relief committee.	Flood Relief Plan (FRP) 2008 and 2009 were revised through the discussion between Japanese Experts and Flood Relief Committee members. FRP has been revised focused on the clarification of following aspects such as (1) Command structure, (2) Communication system, (3) Roles of relevant organizations.	Completed
4.2 Revising flood relief plan through the secretariat of flood relief committee.		Completed
4.3 Conducting operational drills.	A communication drill in CDGR was conducted based on FRP2009. <u>It should be carried out regularly in order to improve communication order among various stakeholders at least once before monsoon season.</u>	Completed
4.4 Monitoring operation of related organizations during monsoon season.	Monitoring of flood prevention action of CPs during monsoon season was conducted by questionnaire and interview survey in twice in 2008. However, no heavy rain case has been reported in 2009.	Completed
4.5 Create a shared method of flood risk management among related organizations through the counterpart agency meeting, a workshop and a seminar.	Frequent information sharing was carried out through monthly CPs meetings and JCC Meetings. In addition, web site in PMD and FFC was updated to deliver real data and information.	Completed




Annex-12 Agreement on 'Responsibility of Maintenance Work'

Office/System	Normal Operation	Trouble shooting	Repair	Replace
PMD •Flood Forecasting System •Data Communication system	•Regular operation and checking •Record on the work	•Identified cause of trouble and examine the countermeasure for recover the system and equipment	•If possible for repair by PMD Repair it and recheck the system and leave it in Record. •If can not repair by PMD Contract to supply company	•Contact to Supply Company •Inspect the repair works
Rescue1122 • Warning system • Communication system	•Regular operation and checking •Record on the work	• Check the trouble shooting point and indentified the problem. • Report to PMD for examines the causes and recommendation for the repair work. • Report to CDGR about trouble shooting	Structure/Facilities/Security Problem • Coordinate with CDGR for repair_ System Problems • If possible for repair by PMD Technical support by PMD, actual repair cost will be paid by CDGR under the inspection of Rescue1122. • If can not repair by PMD Contact to supply company by Rescue1122. • Arrange and purchase the necessary supply and contact PMD for further guidance.	• Contact to supply company with concurred by PMD. • Inspect the repair works. • Submit Repair Report to CDGR and PMD
CDGR	•Prepare for Annual Budget	•Received Trouble Report from Rescue1122 and confirm for repair procedure.	•Repair the Structure/Facilities/Security problem with inspection by Rescue1122. • Prepare the Budget for repair the system.	•Received Repair report from Rescue1122

Source: Minutes of CP meeting, NO.FC-5(34) Lai.Tech.Cop/2009-IV

Islamabad July 23, 2009

Annex-13 List of Products

1. Operation and Maintenance Manual (English)
2. Lecture Material on Hydrology (English)
3. Revised Warning Code (English)
4. Flood Hazard Map (whole zone, each zone 1-8) (English, Urdu)
5. Poster of Flood Hazard Map (English, Urdu)
6. Billboards of Flood Hazard Map (Urdu)
7. Guidance for Flood Hazard Map (English)
8. Pamphlets for the Project activity (English, Urdu)
9. Leaflet for Disaster Awareness Activities and Flood Hazard Map (Urdu)
10. Guidelines for Disaster Awareness Programme Activities (English)
11. Action Plan for Awareness Activities (English)
12. Revised Flood Relief Plan (English)



A handwritten signature in black ink, appearing to be a stylized 'G' or similar character.

パキスタン共和国ライヌラー川洪水危機管理強化プロジェクト終了時評価：評価グリッド

1. 実績の検証 (ACHIEVEMENT)

調査小項目	調査の視点/調査事項	必要なデータ	情報源	調査手法
上位目標の達成見込み	<p>プロジェクトの実施により、対象地域*の洪水被害が軽減される見込みはあるか？</p> <p>*ライヌラー流域のうち 2001 年 7 月の洪水によって浸水した地域 (9 ユニオンカウンシル、人口約20万人)</p> <p>上位目標の達成を阻害する要因はあるか？</p>	<p>ラウルペンディ市の洪水被害状況に関するデータ</p>	<p>*専門家、CP</p>	<p>*質問票、聞き取り</p>
プロジェクト目標の達成状況	<p>対象地域において、洪水時に住民が適切に避難できるような体制を構築する。</p>	<p>外部条件 (自然環境・気候・洪水状況の大幅な変化) の確認、貢献/阻害要因の確認</p> <p>1. Revised flood relief plan is authorized 2. Flood relief plan is used by related organizations → Flood relief plan の認知度・活用状況 3. Hazard map and evacuation places are known among people → ハザードマップ・避難所の認知度・活用状況 4. Continuity of evacuation drills with initiative of Pakistani side → 避難訓練の実施計画</p>	<p>*プロジェクト資料 *専門家、CP *パイロットサイト 住民</p>	<p>*質問票、聞き取り *資料レビュー *質問票、聞き取り *現地視察</p>
アウトプットの達成状況	<p>アウトプット1: 洪水警報システムをより有効に活用し、関係機関に適切な警報を発生するための PDM の能力が向上する。</p> <p>Capacity of PMD is strengthened enough to utilize flood forecasting system effectively and issue warning property concerned agencies.</p> <p>アウトプット2: 洪水警報システムをより有効に活用し、関係機関に適切な警報を発生するための CDGR (Rescue 1122) 能力が向上する。</p> <p>Capacity of CDGR (Rescue 1122) is strengthened enough to utilize flood early warning system effectively and issue warning property to residents.</p>	<p>【指標】 1-1 Upgrading more than 3 staff into a teaching level in PMD who understand of runoff mechanism 1-2 Exercise of flood simulation model at least once a week as based on the training schedule 1-3 Upgrading more than 3 staff in a teaching level in PMD who can utilize of flood simulation model 1-4 Revised criteria for the flood warning code 1-5 Conduct of operation and maintenance of the system based on the O/M manual properly</p> <p>【指標】 2-1 Review criteria for the flood warning code 2-2 Conduct of operation and maintenance of the system based on the O/M manual properly 2-3 Conduct of operational drill for warning system at least once for each duty group</p>	<p>*プロジェクト資料 *専門家 *PMD</p>	<p>*資料レビュー *質問票、聞き取り</p>

実績の検証

添付資料2 評価グリッド

【指標】	3-1 Hazard maps prepared	3-2 Guideline for Disaster Awareness Activities prepared	3-3 Trainings and workshops on how to facilitate awareness activities for counterpart	3-4 Conduct of awareness activity at least once in each zone
アウトプット3: 住民の意識を向上させるための地方関係機関の能力が向上する Capacity of local authorities is developed enough to promote people's awareness and preparedness for the floods.				
アウトプット4: 洪水被害を軽減するための関係機関の能力が向上する Capacity of related organizations is strengthened enough to mitigate the damage of flood.				
投入の実施状況	日本側投入(①長期/短期専門家、②機材供与、③カウンターパート研修)は計画通り実施されたか？ パキスタン側投入(①設備、②人員、③予算)は計画通り実施されたか？	投入実績	投入実績	投入実績

2. 実施プロセス (IMPLEMENTATION PROCESS)

調査小項目	調査の視点/調査事項	必要なデータ	情報源	調査手法
活動の実績	活動は計画通り実施されたか？ 問題発生時にどのように対処したか？	プロジェクトの進捗状況やその進捗に影響を与えた要因 問題解決の仕組みとその有効性	プロジェクト資料 *専門家、CP	*資料レビュー *聞き取り
プロジェクトのマネジメント体制	プロジェクトの運営・実施体制に問題はないか？	モニタリングの体制、意思決定プロセス、プロジェクト運営上の課題とその対処方法	プロジェクト資料 *専門家、CP	*資料レビュー *質問票、聞き取り
技術移転	日本人専門家による技術移転のプロセスに問題はないか？	技術移転の方法、内容、CPと専門家のコミュニケーションの状況	*CP、専門家	*質問票、聞き取り
オーナーシップ	パキスタン側CPのオーナーシップはどの程度醸成されたか？	CPの貢献/参加意欲の度合い/会議への出席率	*CP、専門家、	*質問票、聞き取り
その他関係機関との連携	防災関連機関及び地域住民との連携活動は順調であったか？	防災関連機関、パイロットサイトの住民の連携状況	*CP、専門家 *対象地域住民	*質問票、聞き取り

実施プロセス

3. 妥当性 (RELEVANCE) プロジェクトの実施は妥当であるか？

調査小項目	調査の視点/調査事項	必要なデータ	情報源	調査手法
必要性	プロジェクトの目的は、パキスタン対象地域・社会のニーズに合致しているか？	パキスタン国の洪水対策に関する計画・政策	NFPP IV	*資料レビュー *聞き取り
	プロジェクトの目的は、対象者のニーズに合致しているか？	ターゲットグループ(洪水関係機関、地域住民)のニーズ	*プロジェクト資料 *CP	*資料レビュー *聞き取り
優先度	パキスタン国の開発政策との整合性はあるか？	パキスタン国の防災に関する政策	*NFPP IV Flood Relief Plan	*資料レビュー
	日本の援助政策との整合性はあるか？	日本の援助政策	*JICA 国別援助実施方針	*資料レビュー
手段の適正性	対象者の選定は適切か？	対象者選定の背景	*プロジェクト資料 *CP、専門家	*資料レビュー *質問票、聞き取り
	事業実施機関の選定は適切か？	実施機関の選定の背景	*プロジェクト資料 *専門家	*資料レビュー *質問票、聞き取り

4. 有効性 (EFFECTIVENESS) プロジェクトの実施により、期待されていた効果は発現するか？

調査小項目	調査の視点/調査事項	必要なデータ	情報源	調査手法
有効性	プロジェクト目標の達成度	プロジェクトの実績検証結果	*プロジェクト資料 *専門家、CP *その他関連機関	*資料レビュー *聞き取り
	アウトプット目標の達成は、アウトプット実施による結果ともたらされているか？	プロジェクト目標とアウトプットの間連	*専門家、CP	*質問票、聞き取り
	因果関係	外部条件/その他の影響	*専門家、CP	*質問票、聞き取り
		阻害・貢献要因の事例	*専門家、CP	*質問票、聞き取り

5. 効率性 (EFFICIENCY) プロジェクトは効率的に実施されたか？

調査小項目	調査の視点/調査事項	必要なデータ	情報源	調査手法
効率性	アウトプットの達成度	プロジェクトの実績検証結果	*プロジェクト資料 *専門家、CP	*資料レビュー *聞き取り、質問票
	アウトプット達成を促進/阻害している要因はあるか？ 外部条件による影響はないか？	アウトプットの達成状況	*専門家、CP	*質問票、聞き取り
	アウトプットを産出するために十分な活動であったか？	活動実績、アウトプットの達成状況	*専門家、CP	*聞き取り、質問票
	アウトプットを産出するために十分な投入であったか？	投入実績、アウトプットの達成状況	*専門家、CP	*聞き取り、質問票
タイミング	計画に沿って活動を行うために、過不足ない量・質の投入がタイミングよく実施されたか？	投入実績 プロジェクトの実施状況	*プロジェクト資料 *専門家、CP	*資料レビュー *質問票、聞き取り

6.インパクト (IMPACT) プロジェクト実施による波及効果はあるか？

調査小項目	調査の視点/調査事項	必要なデータ	情報源	調査手法
インパクト	上位目標の達成見込み	上位目標は達成される見込みか？		
		上位目標の達成を促進/阻害している要因はあるか？外部条件による影響はないか？	プロジェクトの実績検証結果 上位目標の達成見込み	*専門家、CP *専門家、CP
	因果関係	上位目標は、プロジェクト目標の達成に基づいて達成されるか？	実績、外部条件の影響確認、貢献・阻害要因の確認	*専門家、CP
	波及効果	想定されていないなかったプラスの影響はあるか？ 想定されていないなかったマイナスの影響はあるか？	該当する事例の確認 該当する事例の確認	*専門家、CP *専門家、CP

7.自立発展性 (SUSTAINABILITY) プロジェクトの効果は、プロジェクト終了後も継続・発展していくか？

調査小項目	調査の視点/調査事項	必要なデータ	情報源	調査手法
自立発展性	政策・制度面	ライスラー川洪水危機管理体制の強化に対する政策は協力終了後も継続するか？	当該事業における政策の継続の見込み	*NPFF,FRP
	組織/体制面	ライスラー川における洪水予警報を的確に行うために、連携機関の連携体制は十分か？	関連機関(主に FFC,PMD,CDGR-Rescue1122,Civil Defense)の業務分掌、人員体制、FRP の認知度・理解度 タスクフォースの業務分掌	*専門家、CP
	財政面	協力終了後も効果を持続させる上で、関連機関の予算の確保は十分か？(機材の維持管理費も含む)	予警報システムの維持管理費 (CDGR ,PMD) 啓発活動・避難訓練等の活動予算(タスクフォースの予算)	*専門家、CP
	技術面	協力終了後も効果を持続させる上で、関連機関の技術レベルは十分か？	洪水予報に必要な技術の習得度 (PDM) 警報発令手順の理解度(主に FFC,PMD,CDGR-Rescue1122, Civil Defense) 啓発活動の手順、ハザードマップ作製に関する技術(タスクフォース)	*専門家、CP
		資機材の維持管理は適切におこなわれているか？	供与された機材の整備状況 (Rescue 1122, PMD)	*専門家、CP
	その他	自立発展性に影響を与える阻害・促進要因はあるか？	該当する事例の確認	*専門家、CP

パキスタン共和国ライヌラー川洪水危機管理強化プロジェクト終了時評価: 評価グリッド(結果)

1. 実績の検証 (ACHIEVEMENT)

実績の検証	調査小項目	結果
	<p>上位目標の達成見込み</p>	<p>本プロジェクトは上位目標の達成に向けて着実に進捗している。上位目標は「対象地域における洪水時の被害者数の減少」であるが、本プロジェクト期間中には大規模な洪水は起きていないため、指標に基づき上位目標の達成見込みの検証は困難であった。ラワルピンディ県の降雨・洪水被害状況については、洪水発生回数は 2008 年に 1 件、2009 年では 0 件であった。</p> <p>住民に対する洪水危機管理に係る啓発活動を継続し、住民自らが正しく安全な避難方法を知ることが、上位目標の達成に不可欠である。さらに、本プロジェクトのような非構造物対策に加え、長期的な観点から根本的に洪水被害を軽減するためには、構造物対策も重要な要素といえる。</p>
<p>プロジェクト目標の達成状況</p>	<p>以下、指標の達成状況である。</p> <ul style="list-style-type: none"> ■ Revised flood relief plan is authorized アウトプット4の活動で、関連機関の①指揮・命令系統、②情報伝達システム、③役割の明確化や情報伝達の効率化に焦点を置き、2008年、2009年のFRPの改訂作業の際に技術的なアドバイスをを行った。それぞれのFRPはDCOの承認を得た。 ■ Flood relief plan is used by related organizations DCOの承認を受けたFRPは、GDGRを通じて雨季前に関係機関に配布された。FRPは「本文 第3章 表3-7」に示す情報共有の場を通じて、関係機関と共有されている。さらに、日本人専門家の発案により、FRCの有効活用を目的に、FRCメンバーによるコミュニケーション訓練が実施された。その結果、いくつかの機関の間で十分なコミュニケーションや意思伝達がなされていないことが判明し、DCOからは2度目の実施をするよう指示があったが、その後実施されていない。 ■ Hazard map and evacuation places are known among people 2種類の啓発活動に係るインパクト調査が日本人専門家とタスクフォースによって実施された。第一回目のインパクト調査は、2009年7月、ハザードマップの認知度に関し、パイロット地域の住民455名をランダムに選定して実施された。その結果によると、50%以上の住民がハザードマップを全く理解していないことが判明した。この調査の分析コメントの中には、ハザードマップの記載内容が地域住民の理解度を超えた複雑な内容になっているという指摘がされている。2回目のインパクト調査は、タスクフォースによって、2009年9月、啓発活動の参加者354名を対象に実施された。その結果によると、約66%がハザードマップの活用を理解しているものの、依然として33%の参加者は全く理解していないという回答が出ている。さらに、85%の参加者がタスクフォースによる啓発活動の実施を希望していることも判明した。 ■ Continuity of evacuation drills with initiative of Pakistani side プロジェクト期間中、避難訓練は2回実施された。タスクフォース・メンバーにとって避難訓練の実施は初めての経験であったが、積極的な研修等への参加により、啓発活動の実施に必要な基本的な知識・技術を習得した。しかし、カウンタートパートは避難訓練の定期的な実施の重要性を認識しているものの、DCOから承認された予算の支出の遅延により、現時点では次年度の避難訓練を含む啓発プログラムの活動計画の改訂は行われていない。 	

	<p>アウトプット 1</p> <ul style="list-style-type: none"> ■ 1-1. Upgrading more than 3 staff into a teaching level in PMD who understand of runoff mechanism PMDの職員は気象学の専門家が殆どであり、水文学のバックグラウンドをもつ者は少ない。このような背景から、洪水予測・警報に関わるPMD職員が、流出メカニズムに関する基礎的な水文知識を習得することを目的とし、日本人専門家による講義・演習が実施された。受講者に対する聞き取り調査では、研修の内容は、彼らの技術ニーズに合致しており有益であったとの回答を得た。参考までに、2年次の出席率をみると、9名の受講者のうち7名は90%以上の研修に参加しており、関心の高さがうかがえる。一連の研修・演習の後、受講生の理解度を測定するために、日本人専門家による試験と個別面談が実施された。その結果、本試験を受講した7名のうち、5名が他の職員に教えることができるレベルに達していることが確認された。 ■ 1-2. Exercise of flood simulation model at least once a week as based on the training schedule 洪水発生予測モデルの水文研修・演習は、日本人専門家の滞在中は金曜日と日曜日を除き、毎日午前中に実施された。PMD職員によると、日本人専門家が不在の場合は、受講生は専門家から与えられた課題をこなし、メールなどで専門家に提出し、自己学習をしていたとのことである。終了時評価時点で日本人専門家の派遣期間は終了していたが、研修を受講したPMD職員は、若手の技術者や気象学者に対して、水文学やMIKE11に関する勉強会を行っていることを確認した。このような組織内での勉強会は、PMD職員の技術面の持続性に貢献すると考える。 ■ 1-3. Upgrading more than 3 staff into a teaching level in PMD who can utilize of flood simulation model より信頼性の高い警報基準を設定する上で必要となる、MIKE11ソフトウェアを用いた洪水発生予測モデルの演習が実施された。日本人専門家による試験・面談の結果によると、4名のPMD職員が他の職員に教えることができるレベルに達している。 ■ 1-4. Revised criteria for the flood warning code プロジェクト開始時は水文データの不足という問題に直面したものの、入手可能な降雨データやMIKE11によるモデル・シミュレーションに基づき、洪水警報基準の改訂が行われた。警報基準には、「Pre-alert」「Alert」「Evacuation」という3つのレベルがある。本プロジェクト期間中、2008年と2009年の雨季前に2回改訂が行われた。 ■ 1-5. Conduct of operation and maintenance of the system based on the O/M Manual properly 2005-2007年度の無償資金協力によって設置されたFFWS機材の適切な維持管理に必要知識や技術を習得するため、O/Mマニュアルが作成され、それに関する講義・演習が実施された。終了時評価調査団は、聞き取り調査やサイト訪問を通じて、PMD職員の努力により、それらの機材は概ね良好に維持管理されていることを確認した。 <p>アウトプット 2</p> <ul style="list-style-type: none"> ■ 2-1. Review criteria for the flood warning code 指標1-4で言及したとおり、カウンタパートと日本人専門家により警報基準の改訂が行われた。本プロジェクト実施期間中、警報基準は2回改訂され、最新のものは2009年6月の雨季前に見直され、実際の予報発出の業務に導入された。より信頼性の高い警報発出を行うためには、最新の気象・水文データに基づき警報基準の定期的な見直しを行うことが重要である。 ■ 2-2. Conduct of operation and maintenance of the system based on the O/M Manual properly レスキュー1122のカウンタパートに対し、警報発出に係る機材運用に係るOJTが実施された。O/Mマニュアルに基づいた研修、本邦研修への参加を通じて、日常的に機材を維持管理する重要性を学び、実際の業務に活かしていることを確認した。本調査では一部の警報局の視察を行った。プロジェクト当初は破損・盗難・ゴミの投棄などが深刻な問題として報告されていたが、現在は破損・盗難防止用のフェンスと注意書きを設置、定期的な清掃が行われており、大幅に改善されたことを確認した。しかし、予算面では課題が報告されている。特にDPCCの電気・通信料金はCDGRから支出されることになっているが、終了時調査実施時点では適切に支出されておらず、阻害要因となっ
アウトプットの達成状況	

<p>ている。この点に関しては、機材の維持管理における技術面・予算面の責任所在の明確化を図るべく「Responsibility of Maintenance Work」という文書がカウンタートパート会議で合意され、レスキュー1122はCDGRへ速やかな予算の執行を要請している。</p> <ul style="list-style-type: none"> ■ 2-3. Conduct of operational drill for warning system at least once for each duty group プロジェクト実施期間中、レスキュー1122の警報発出を担当する全てのオペレーターを対象に、警報発出に係る訓練が合計3回行われた。2008年4月から2009年7月までの洪水警報発出によると、PMDから送信された6件の「Alert」情報と1件の「Evacuation」情報に対し、レスキュー1122はそれぞれの情報に基づき警報発出を行っていることが分かる。しかしながら、マニュアルに従うならば、本来、警報発出に関しては6回のサイレンを鳴らさなければならなかったところ、2回しかサイレンを鳴らしておらず、その他は放送による呼びかけのみであった。サイレンを鳴らさなかった理由について確認したところ、PMDからの警報情報を受け取った数分後、水位が下がりはじめたため、放送による呼びかけにとどめたとの事であった。このように、一部においては依然として目視や個人の判断に依存している部分もあることから、より信頼性の高い洪水警報の発出のため、より実用性の高いマニュアル改訂などを通じて、情報伝達や警報発出における統一した基準が設けられるべきである。 	<p>アウトプット 3</p> <ul style="list-style-type: none"> ■ 3-1. Hazard maps prepared 本プロジェクトでの再委託先より入手された航空地図に基づき、日本人専門家の指導の下、タスクフォースのメンバーは、洪水ハザードマップを作成した。このハザードマップは、全対象地域(ゾーン1-8)版と各ゾーン版がある。洪水ハザードマップは、地域住民が洪水時に適切に避難できるよう、冠水地域、避難所、避難経路、連絡先、サイレン・パターン、避難時の持ち物などが明記されている。洪水ハザードマップをより多くの人々に周知するために、対象地域の公共の場に合計50のポスター(室内)、10か所にビルボード(屋外)を設置した。加えて、ゾーン3, 4, 5のハザードマップのパンフレットを作成し、啓発活動等で配布した。対象地域は識字率の低い貧困層が居住する地域でもあるので、そのような人々にも理解してもらえようという簡易なハザードマップの作成が今後の課題となっている。 ■ 3-2. Guideline for Disaster Awareness Activities prepared タスクフォースが啓発活動を適切に実施するために、「災害啓発活動ガイドライン」が作成された。タスクフォースは対象地域での啓発活動の実施前に、このガイドラインに基づく研修を受講した。このガイドラインには、タスクフォース・メンバーの構成や設立の目的、また啓発活動の実施手順などが明記されている。終了時評価時点では、このガイドラインはドラフトの段階であるが、タスクフォース・メンバーの現場での経験等を踏まえて、プロジェクト終了までに最終化される予定である。 ■ 3-3. Trainings and workshops on how to facilitate awareness activities for counterpart カウンタートパート(2年次)からはタスクフォースを対象に啓発活動の内容や手順に関するOJTを受講した。合計、15回の講義や訓練が実施された結果、タスクフォース・メンバーは啓発活動を実施するに必要な知識・技術を習得し、自らプログラムを進捗できるようになった。 ■ 3-4. Conduct of awareness activity at least once in each zone タスクフォースの設立後、啓発活動の年間活動計画が作成された。活動計画に基づき、合計17回の啓発プログラム、2回の避難訓練、3回の図上訓練が実施された。これらの活動を通じ、合計約2000人の対象地域の住民が啓発プログラムに参加したが、これは対象地域に住む20万人の約1%に相当する。しかし、学校を中心に活動が行われていることにより、教育関係者間、生徒を通じて、他の学生や家族・友人への波及効果が見込まれる。なお、啓発活動は洪水常襲地域であるゾーンを優先的に選定したため、比較的被害の少ないゾーン2と8では実施されていない。
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	<p>アウトプット 4</p> <ul style="list-style-type: none"> ■ 4-1. Revised flood relief plan for each year 本プロジェクトでは、関連機関の①指揮・命令系統、②情報伝達システム、③役割の明確化や情報伝達の効率化に焦点を置き、2008年、2009年のFRPの改訂作業の際に技術的なアドバイスを行った。上記の他、FRPの改訂過程で、本プロジェクトにより新たに導入・改訂されたハザードマップ、啓発活動、警報基準、サイレン・パターン等も追記された。 ■ 4-2. Method for information sharing プロジェクトは情報共有の改善を通じ、関連機関のパートナーシップの強化に貢献したと言える。具体的な手段としては、プロジェクト目標の達成という共通の目標を掲げ、月例カウンターパーティ会議、JCC会議、タスクフォース会議などの情報共有の場を定期的かつ密に提供してきた。カウンターパーティに対する聞き取り調査を通じて、プロジェクト終了後もFFCは調整機関としての役割を継続し、ライズスラ一流域の洪水危機管理体制の改善に向けた関連機関の連携を強めていくべきであるとの意見が多数表明されており、また、FFC自身からもそうしているとの発言が聞かれている。現在、FFCは関連機関の代表者を召集し、より包括的な洪水対策を協議する場として、ステアリング・コミッティの設立を検討中である。
<p>投入の実施状況</p>	<p>プロジェクトの実施期間中、日本側とパキスタン側の投入は概ね計画とおりに実施されたことが確認された。</p> <p>投入実績で報告された問題点:カウンターパーティの質問票及び聞き取り調査の結果によると、機材の維持管理、水文学の分野で、専門家の滞在期間が十分ではなかったとの意見が多く寄せられた。また、パキスタン側の投入に関しては、PDMでは、プロジェクトにおいて実施する啓発活動及び避難訓練の費用は2年目からはパキスタン側が負担すると明記されると明記されており、啓発活動に係る管理責任や実施技術はタスクフォースに移転されたものの、円滑な活動の実施に不可欠な予算執行については終了時評価調査実施中は確認できず、今後とも関係機関のフォローが必要である。</p>

2. 実施プロセス (IMPLEMENTATION PROCESS)

調査小項目	結果
活動の実績	<p>全て完了した。プロジェクト実施期間中、カウンターパーティの頻繁な異動や治安の悪化などの外部要因の影響を受けたが、PDMで計画された25つの活動はプロジェクト期間内に全て完了した。しかし、機材の維持管理、啓発活動の継続、ハザードマップの改良等、引き続きパキスタン側により継続され、改善されるべき点も残っている。</p>
実施プロセス プロジェクトのマネジメント体制	<p>阻害要因はカウンターパーティの異動、治安の悪化である。</p> <p>良好であった。良好なプロジェクト・マネジメントの下、カウンターパーティは日常業務の技術的な問題・課題を日本人専門家と十分に協議する機会を得て、プロジェクトの活動に積極的に参加できる環境が整っていた。</p>
技術移転	<p>良好であった。ほとんど全てのカウンターパーティは日本人専門家による技術移転の内容は彼らの技術ニーズと合致しており適切であったと明言している。それゆえ、高いオーナーシップを持ってプロジェクトに参加することができた。</p>
オーナーシップ	<p>概ね良好であった。プロジェクト参加へのモチベーションを高める手段として、会議や研修への出席率をCP会議などの場で公表すると言った工夫も行われている。</p>
その他関係機関との連携	<p>概ね良好であった。プロジェクトは情報共有の改善を通じ、関連機関のパートナーシップの強化に貢献したと言える。具体的な手段としては、プロジェクト目標の達成という共通の目標を掲げ、月例カウンターパーティ会議、JCC会議、タスクフォース会議などの情報共有の場を定期的かつ密に提供した。</p>

3. 妥当性 (RELEVANCE) プロジェクトの実施は妥当であるか？

調査小項目		結果
優先度・必要性	妥当性	ライズラー川はパキスタンの首都圏に位置するイスラマバード市とワルプルペンディ市といったパキスタン国内でも人口密度の高い地域を流れる中小規模の河川であり、過去の災害データによると3年に1回の頻度で洪水が生じている。このような背景からも本プロジェクト実施の必要性・優先度は高い。
手段の適正性		実施機関・ターゲットグループ選定は適切であった：洪水対策に関わる行政機関の職員を主要なターゲットグループとしている。国家としての洪水リスクマネジメントの改善のためには、洪水対策に関わる行政機関の体制が適切に整うことが必要であることから、第一義的なターゲットグループとして適切な選択であったといえる。第二のターゲットグループはプロジェクト対象地域の住民である。本プロジェクトでは洪水対策に関わる行政機関の強化を目指しているが、中央関連省庁のみならず地方行政組織である県庁とも密な連携を図っており、結果的には洪水常襲地域に住む人々に裨益することが期待できる。

4. 有効性 (EFFECTIVENESS) プロジェクトの実施により、期待されていた効果は発現するか？

調査小項目		結果
プロジェクト目標の達成度	有効性	上記、実績で記載したとおり、それぞれのアウトプットの達成状況から鑑み、本プロジェクトを通じて、関連機関の洪水危機管理能力は強化されたといえる。
因果関係		アウトプットの達成によりプロジェクト目標の達成はもたらされている。 なお、他ドナーによる類似案件等は報告されていない。 促進要因：長期間にわたる日本の支援によって築かれた信頼関係 阻害要因：カウンタートパートの異動、治安の悪化

5. 効率性 (EFFICIENCY) プロジェクトは効率的に実施されたか？

調査小項目		結果
アウトプットの達成度	効率性	上記実績で記載したとおり。
因果関係		特に問題はない。
		日本側の投入に関しては、投入量、質、タイミングの面で総じて適切であったと判断した。日々の活動や研修等を通じて移転された技術も適切に活用されていることが確認された。プロジェクトにおいて実施する啓発活動及び避難訓練の費用は2年目からはパキスタン側が負担すると明記している。啓発活動に係る管理責任や実施技術はタスクフォースに移転されたが、円滑な活動の実施に不可欠な予算は終了時評価調査実施時点では支出されていなかった。この点について日本側の評価調査団は、CDGR関係者とともに予算執行の支障対応に関する打合せを行い、その場にて必要な書類手続きの確認を行った。その他、プロジェクト活動の効率性に影響を与えている外部要因として、CDGR職員の高い離職率が挙げられる。パキスタンでは、人事異動は突然行われ、後任者への引き継ぎが行われず、後任者への引き継ぎが与えられたことにより、プロジェクト活動の効率性にマイナスの影響を与えたと述べている。

6.インパクト (IMPACT) プロジェクト実施による波及効果はあるか?

調査小項目		結果
上位目標の達成見込み		上記実績で記載したとおり。
因果関係		本プロジェクトのような非構造物対策に加え、対象地域において長期的な観点から根本的に洪水被害を軽減するためには、構造物対策も重要な要素であり、パキスタン側で引き続き検討すべきである。
波及効果		政策レベルのインパクト: 'District Disaster Management Plan 2009 Rawalpindi' が CDGR のカウンターパートにより作成され、2009 年 8 月に DCO (県補佐役) に承認された。 草の根レベルのインパクトとしては、地域住民はそれまで警報局の機能を理解していなかったが、啓発活動に参加し、その機材が自らの生命や財産を守る上で重要な機能を果たしていることを理解した。それ以来、警報局で何らかの異常を発見すると自発的にレスキュー1122 に通報するようになったという事例が報告されている。

7.自立発展性 (SUSTAINABILITY) プロジェクト終了後も継続・発展していくか?

調査小項目		結果
政策・制度面		FFC によって作成された「国家洪水防御計画 IV」(2007-2016)によるとパキスタン政府は、洪水被害軽減に焦点を置き、① 費用対効果の高い洪水対策、② 既存の洪水制御システムの有効活用、③ 河川流域における洪水に対する啓発の促進と適応等を掲げていることから、政策面からの支援の持続性は担保されている。
組織/体制面・財政面		タスクフォースの組織的な継続性という観点からは、啓発活動実施に必要な能力のある人員が配置されているものの、FFC や DCGR から制度・組織的なサポートと円滑な予算執行が行われない限り、タスクフォースの活動の継続は困難である。
技術面		FFWS や DPCC の技術アドバイザーを行う任務にある PMD 職員は、機材の修理技術という点からは未だ十分なレベルにあるとは言いがたく、同分野に対するフォロワーが必要である。
その他		JICA によるフォローアップの必要性: 無償資金協力により供与された FFWS や DPCC 機材の故障対応・修理に関する PMD 職員を対象とした研修を提案する。加えて、PMD 職員が、将来的に人口動態や都市化等の流域環境の変化を踏まえ、既存の洪水シミュレーションモデルのパラメータを改良することができるよう、長期的な観点から洪水予測の正確性を担保するための技術的な支援が必要である。