CONCLUDING REPORT

Action Plan toward Effective Flood Hazard Mapping

in the

PILIPPINES

JICA-REGION FOCUSED TRAINING COURSE
IN
FLOOD HAZARD MAPPING

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A. Role of Flood Hazard Map to mitigate flood damages in my country

A.1 Flood Status

The country owing to its geographical location and physical environment make it vulnerable to natural hazards such as tropical cyclones, floods, extreme rainfall, thunderstorms, storm surges, strong winds, tornado and others. It is one of the most disaster-prone areas in the world. Being situated along the path of average twenty tropical cyclones annually, where nine, of which directly affect the mainland. Every year these hazards bring destruction to life and property. Seriously disrupting the agricultural based economy and agitates the lives of millions of families. Statistics shows that flood damage from 1980 to 2003 has accumulated to billions of financial loss to government installations and infrastructures.

Table A.1.1 Tropical Disturbances and Corresponding Casualties, 1990-2003

Tropical Disturbance	Date of Occurrence	Casualties		
		Dead	Missing	Injured
Ruping	Nov. 10-14, 1990	508	246	
Uring	Nov. 2-6, 1991	5,101	1256	292
Ditang	July 17-21, 1992	36	77	
Kadiang	Sept. 30-Oct. 7, 1993	126	26	37
Monang	Dec. 3-4, 1993	273	90	607
Puring	Dec 24-29, 1993	187	52	280
Mameng	Sep27-Oct 1, 1995	116	126	49
Pepang	Oct. 26-30, 1995	265	67	323
Rosing	Oct. 3l-Nov. 3, 1995	936	316	4152
Emang & Gading	Sept. 16-21, 1998	108	20	
Loleng	Oct. 15-23, 1998	303	29	751
Reming	Oct. 26-Nov. 1, 2000	114	10	
Feria	July 2-6, 2001	188	44	241
Nanang	Nov. 6-10, 2001	236	88	169
Florita, Gloria				
Hambalus, Inday	June 28-July 14, 2002	85	4	45
Harurut	July 19-21, 2003	64	2	154

Source: Office of the Civil Defense

Table A.1.2 Recorded Annual Flood Damages, 1980-2003

Year	Population Affected		Casualties			House Damaged		Damaged Value (million peso)
	Families	Persons	Dead	Missing	Injured	Totally	Partially	
1980	248,164	1,666,498	36	4	55	16,510	51,101	**1,472**
1981	250,325	1,472,417	484	264	1,922	44,994	159,251	**1,273**
1982	266,476	1,569,017	337	223	347	84,027	97,485	**1,754**
1983	140,604	747,155	126	168	28	29,892	85,072	**523**
1984	741,510	4,048,805	1,979	4,426	732	310,646	313,319	**416**
1985	318,106	1,643,142	211	300	17	8,204	211,151	**3**
1986	287,240	1,524,301	171	43	155	3,162	14,595	**1,838**
1987	464,162	2,591,914	1,020	213	1455	180,550	344,416	**8,763**
1988	1,173,994	6,081,572	429	195	468	134,344	585,732	**8,675**
1989	501,682	2,582,822	382	89	1088	56,473	184,584	**4,494**
1990	1,265,652	6,661,474	676	262	1392	223,535	636,742	**11,713**
1991	150,894	759,335	5,201	4,278	357	15,458	83,664	**74**
1992	418,964	2,097,693	145	95	51	3,472	8,342	**7,359**
1993	1,523,250	8,202,118	814	214	1637	166,004	456,773	**25,038**
1994	670,078	3,306,783	266	54	260	58,869	226,291	**3,401**
1995	1,710,619	8,567,666	1,255	669	3027	294,654	720,502	**57,781**
1996	260,581	1,254,989	124	49	97	2,690	17,557	**10,109**
1997	777,997	3,954,175	199	28	66	13,225	53,980	**4,842**
1998	1,590,905	7,197,953	498	116	873	137,020	406,438	**17,823**
1999	270,424	1,281,194	56	3	25	144	687	**1,555**
2000	1,426,965	6,852,826	338	59	370	24,573	195,537	**7,217**
2001	756,938	3,629,295	431	134	418	14,899	54,422	**6,924**
2002	538,600	3,546,469	169	33	71	2,980	15,947	**829**
2003	702,223	3,362,991	139	28	182	12,306	51,579	**4,567**
Total	16,456,353	8,4602,604	15,486	11,947	15093	1,838,631	5,975,238	**188,443**

Source: Office of the Civil Defense

A.2 Outline of the present countermeasures for mitigating flood damages

Floods have a tremendous effect on the economy and the population of the country. Its main effect is to retard development. Restoration can take time on a flood stricken area. It must first be restored to normal before any development can be carried out.

To help the communities cope with flood disaster and mitigate flood damages the government is instituting structural and non-structural measures.

A.2.1 Structural Measures

The Department of Public Works and Highways (DPWH) created under Executive Order 124 on January 30, 1987) has been implementing efficient engineering structures to mitigate the negative effects of floods. Being the country's engineering and construction arm the DPWH has designed and constructed flood control countermeasures to preserve and enhance the retention and detention capabilities of river systems to withstand flooding of a pre-determined magnitude which is usually decided based on the degree of importance of the target area.

Hereunder are the majority of these structural measures implemented against floods in the Philippines:

- To increase the discharge capacity of the waterway
  1. Dikes
  2. Widening of width waterway opening

- To reduce/control the peak discharge of flood
  1. Dams
  2. Retarding basins

- To prevent inland flooding
  1. Improvement of laterals or tributaries
  2. Pumping stations

- To prevent bank collapse
  1. Revetments
  2. Spurdikes
  3. Cut-off channels

- To prevent scouring of riverbed
  1. Groundsill
  2. Sabo dams

- To prevent obstruction of river flow and/or maintain the good condition of the river/waterway

  1. Conduct regular maintenance

A.2.2 Non-structural Measures

Structures mentioned above can only do so much in flood management/mitigation, since they also have their design limitations. At present, the Philippines concentrated mostly its efforts on the evacuation, relief operations, damaged assessments and rehabilitation works when dealing with flood disaster.

The National Disaster Coordinating Council (NDCC) created under Presidential Decree No. 1566 in June 1978 is the highest policy making, coordinating and supervising body at the national level for disaster management in the country. Its members are the secretaries of the main departments, and the chairman is the secretary of national defense. The NDCC advises the president on the status of national disaster preparedness and management plans. The Office of the Civil Defense (OCD) is the operating arm and secretariat of NDCC. Various national level agencies composed the NDCC. These agencies have their different functions.

1. Department of National Defense (DND)
   - Chairs the NDCC, convenes members and calls on government and private sector when need arises

2. Department of Public Works and Highways (DPWH)
   - Restores destroyed public structures, such as water networks, roads and bridges. Provides equipment for rescue, relief and recovery

3. Department of Interior and Local Government (DILG)
   - Oversees the local disaster coordinating councils, establishment of disaster operations center of all local governments

4. Department of Transportation and Communication (DOTC)
   - Restores destroyed communications and transportation facilities such as railroads and vertical structures, organizes national transport services

5. Philippine Atmospheric, Geophysical and Astronomical Administration (PAGASA)
   - Watches on environmental conditions to prepare daily forecasts, typhoon watches and flood outlook

6. Philippine Institute of Volcanology and Seismology (PHIVOLCS)
   - Issues advisories on earthquakes, volcanic activity and tsunamis; identify appropriate evacuation sites and disaster response groups

7. Philippine Nuclear Research Institute
   - Issues advisories on radioactive fallout, contamination and radiation incidents; organizes disaster control groups and reaction teams

8. Department of Social Welfare and Development (DSWD)
    - Extends relief assistance and social services to victims and provides rehabilitation

9. Department of Agriculture (DA)
    - Undertakes surveys in disaster prone areas and disaster areas to determine extent of damage of agricultural crops, livestocks and fisheries; technical assistance to disaster victims

10. Department of Education (DepEd)
    - Provides assistance in public education and campaigns regarding disaster preparedness, prevention and mitigation through integration of relevant subjects in school curriculum; make school buildings available as evacuation centers; trains teachers in disaster preparedness

11. Department of Finance (DoF)
    - Issues rules and regulations regarding funding by local governments of disaster coordinating council requirements; issues rules and regulations on preparation of local government budgets and the utilization of 5% reserve for disaster operations

12. Department of Labor and Employment (DOLE)
    - Organizes and trains Disaster Control Groups in factories and industrial complexes; provides emergency employment opportunities to disaster victims and implements industrial civil defense programs and measures

13. Department of Trade and Industry (DTI)
    - Maintains level of commodity prices during emergencies and organize disaster response teams in large commercial and recreational premises

14. Department of Health (DoH)
    - Provides health services during emergencies and organize response teams; also issues public health warning notices

15. Department of Environment and Natural Resources (DENR)
    - Responsible for reforestation and control of areas prone to flood, landslide, mudflow and ground subsidence

16. Department of Tourism (DoT)
    - Organizes and trains disaster management teams in hotels, pension houses, restaurants and other tourist- oriented facilities

17. Department of Budget and Management (DBM)
    - Release funds required by the departments for disaster operations

18. Philippine Information Agency (PIA)
    - Provides public information service through dissemination of mitigation and preparedness measures

19. Philippine National Red Cross (PNRC)
    - Conducts disaster leadership training courses, assist in disaster coordinating council training at all levels; help with emergency relief

20. National Housing Authority (NHA)
    - Assessments of housing requirements of displaced persons; provision of temporary housing and rebuilding of destroyed areas

21. Armed Forces of the Philippines (AFP)
    - Responsible for provision of security in disaster areas and assistance in reconstruction; provides transportation for relief supplies and personnel

22. National Economic Development Authority (NEDA)
    - Responsible for determination and analysis of effects of disaters on socio-economic programs, and the development of damage assessment schemes

23. Office of the Civil Defense (OCD)
    - Coordinates all NDCC member agencies activities, act as secretariat to the NDCC

A.3 Why Flood Hazard Map will be useful in my country?

Reasons:

1. The Philippines is in a volcanic/earthquake-prone region, hence volcanic eruptions and eruptions have an impact on our river system.

2. Urban development within the confines of river waterway and flood plain.

3. Deforestation resulting in increased sediment run-off into river systems.

4. Compared to other infrastructure sectors such as roads, bridges, flood control sectors are a much lower priority, resulting in less allocation than necessary, thus, implementation occurs in stages.

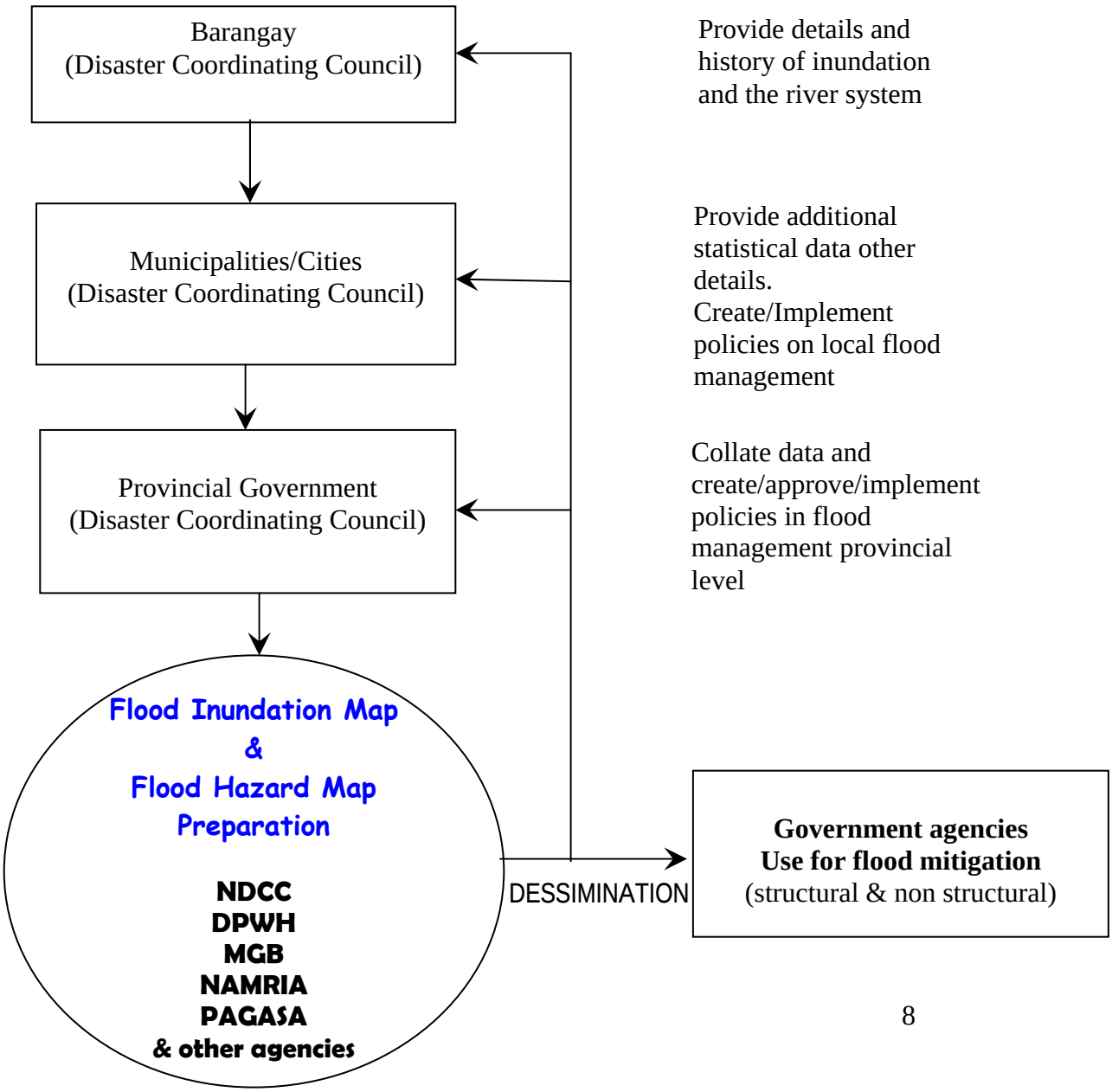
5. Major flood control projects require large amount of resources to implement and the government rely on foreign assistance.

6. The emphasis of non-structural flood mitigation programs of the government is more on reactive response instead of proactive response.

B. Allocation of roles in making Flood Hazard Map in my country

The **National Disaster Coordinating Council (NDCC),** duly supported by **Department of Public Works and Highways, Mines and Geosciences Bureau (MGB)** and **National Mapping and Resource Information Authority (NAMRIA)** of the Department of Environment and Natural Resources, **Philippine Atmospheric, Geophysical and Astronomical Administration (PAGASA)**, other agencies and local government units should be given the role in the preparation of inundation map and making flood hazard map.

Scheme:



C. ACTION PLAN on making Flood Hazard Map in my country

C.1 Target Area:

Mindanao River Basin

Background:

Mindanao River is the second largest major in the Philippines. It is the primary drainage way of Mindanao River Basin. It originates in the in the slopes of Central Cordillera range and flows down to the confluence of various tributaries in the vicinities of the Municipalities of Pagalungan, Pikit and Datu Piang in the Province of Maquindanao and discharges towards Illanah Bay. The principal tributaries of Mindanao River include the Pulangi and Libungan Rivers in the north and Allah and Buluan Rivers in the south. The Liguasan Marsh located in the Provinces of North Cotabato, Sultan Kudarat and Maquindanao was formed by the overflow of Mindanao River and its principal tributaries. Flooding is experience in parts of Cotabato City at the lower reach of Mindanao River when the said river overflows.

C.2.1 Prerequisites in making Flood Hazard Map for my target area

1. Determination of inundation depth and extent of flooding cause by the swelling of Mindanao River.

2. Identification of location and number of possible evacuation centers.

3. Identification of prevention disaster groups, government and non government organizations (NGOs).

4. Identification of possible evacuation routes.

5. Identification of the geologic features of the area.

6. Coordination with the local government units and their participation in the undertaking.

7. Field investigation (town watching).

C.2.2 Data, maps and allocation of budget necessary for making Flood Hazard Map

- Studies containing various aspects in the preparation of structural flood mitigation countermeasures in the area conducted by foreign consultants and submitted to the DPWH for its structural integrity and NEDA for its economic viability for approval can be verified and updated if necessary.

    1. Study on Nationwide Dredging of Major Rivers

    2. The Study on the Nationwide Flood Risk Assessment and Flood Mitigation Plan for the Selected Areas in the Republic of the Philippines

- Base Maps are to be provided by the NAMRIA, the authority in the preparation of different kinds of maps in the country.

- The National Calamity Fund and Local Calamity Fund can be tap for this undertaking

    The National Calamity Fund is the (NCF) is the primary fund used for responding to disasters. It is intended to supplement local calamity funds (5% of the local government's fund).

C.3 Proposed ACTION PLAN within five (5) years

A month after arrival

1. Coordinate with previous Philippine participants for nationwide campaign on Flood Hazard Map Awareness.

2. Recommend to the next level of leadership in my department the necessity of preparing flood hazard maps in flood prone areas.

3. Recommend to the Human Resources Development Division of the department to conduct Flood Hazard Mapping Seminar to be attended by the following:

    - District Engineers of the department
    - Provincial Engineers
    - City Engineers
    - Municipal Engineers

Within two (2) years

1. Gathering /compilation and updating of available data

    - Coordinate with concerned government agencies and concerned local government units for accurate data/information needed
    - Conduct actual survey of the pilot area
    - Consultation with local residents

Within the next two (2) years

1. Preparation and production of flood hazard map

Within 1- 2 years after the three previous years

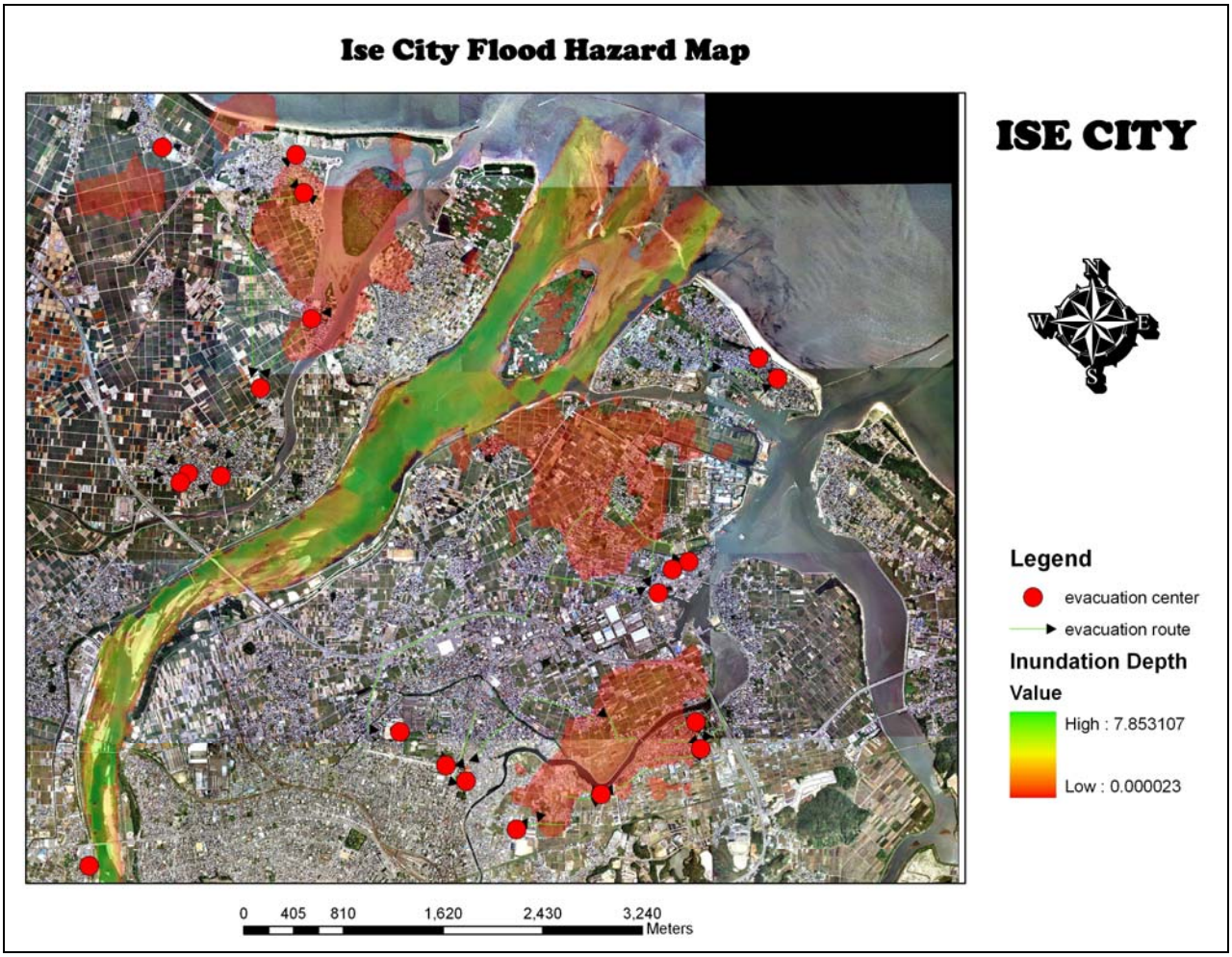
1. Dissemination of flood hazard map

    - Public Awareness Program
    - Training on evacuation plans

C.4 Problem in making Flood Hazard Map in my country

The allocated funds of National Calamity Fund are mostly used for post-disaster activities, rather than risk reduction activities.

D. My own Flood Hazard Map of Ise City



D.1 Available information for Ise City Flood Hazard Map

The additional information for Ise City Flood Hazard Map based on my flood hazard map of the city is the evacuation route going to designated evacuation centers that the residents may take superimposed on an aerial photo map.

DOMO ARIGATO GOZAIMASU ! ! !