

Flood Hazard Mapping and its Utilization for Flood Disaster Mitigation

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> Floods in Japan

> Flood hazard map and its effects

> New training course on flood hazard mapping

Planning to establish a new center on waterrelated hazards



Public Works Research Institute (PWRI)

 History 1922: Established 1979: Relocated to Tsukuba 2001: Re-organized into two institutes (PWRI and NILIM)

- Staff : 219 (including 151 researchers)
- Land area: about 560,000m2
- Number of research topics: 200
- Budget (FY 2004): 6 bil. JPY (55 mil. US\$)









Recent extreme floods - Tokai heavy rain (2000) -





Before flood

During flood

Affecting 580,000 people, and economic loss: US\$ 8 billion





Floods in Japan this year - Niigata Fukushima Rain (1) -













Floods in Japan this year - Niigata Fukushima Rain (2) -



•Before flood (An old temple in the center of the red circle) After flood(The temple was washed away)



Flood characteristics of Japan

Destructive : An old temple was washed away...

➢ Flash floods : Limited time for evacuation, therefore elderly and disabled people were drowned

Sedimentation & mud flows : Difficulty for recovery

Dense land use in flood-prone areas : Dilemma of recurrent flood disasters

Depth (m)





Velocity (m/s)



More effective flood management

Structural measures are effective, however,

- Costly in particular in developing countries
- Needing long time to produce tangible effects
- Constrained by land acquisition or available resources
- > Much more important to take non-structural measures such as:
 - Flood hazard map
 - Flood forecasting and early warning
 - Adequate land use and regulations...



Flood hazard map



- Providing inundation & evacuation information
- Easily understandable and publicized through joint efforts with communities
- Useful for local residents for early evacuation

> Effects:

- Mitigating damage by smooth evacuation
- Raising people's awareness and enhancing their capability/ resilience



Flood hazard map: Example

Making residents prepared for flood risks by showing flood risk information & evacuation guide.





Effectiveness

Evacuation Peak after Evacuation Announcement Evacuation Ratio after 6 hours of Evacuation Announcement (Kohriyama City, Fukushima Pref. August 1998) (Kohriyama City, Fukushima Pref. August 1998) 40 1 hour People who 30% 30 People who didn't see saw Hazard Evacuatiun ratio Hazard Map Map 20% 20 10 0 People who People who didn't see saw Hazard Evacuation Evacuation Hazard Map Map Announcement Order

Whether or not people saw the flood hazard map beforehand makes big differences to the way they evacuate. (Source: Assoc. Prof. Katada, Gunma University)



Flood mapping of the world

On-going flood mapping in the world: - USA: Flood Insurance Rate Map (NFIP) - Canada, UK, Sweden, Norway, Swiss... > Examples in developing countries: - South Africa, Sri Lanka, Guatemala, Venezuela, Costa Rica, Bolivia and others... > Initiatives by international organizations: - WMO/ UNESCAP Typhoon Committee - EU action plan/ flood initiative - CDERA, MRC...



Further prospects

> After the preliminary survey on the ground... - Investigating climatic-geographic conditions → Considering local conditions/ situations - Considering socio-economic development stage \rightarrow Link with development & disaster mitigation - Effective for adequate land use \rightarrow Toward improved planning & risk mitigation - Public involvement & community participation \rightarrow Develop people's/ community's self-reliance through raising awareness & enhancing capability



New training course on Flood Hazard Mapping

- Acquire professional knowledge necessary to produce flood hazard maps
- Enhance understanding of its effectiveness
- Seek application in his/her own country
 Framework
- > 5-year planning (JFY 2004-2008)
- Annually 16 trainees from 8 countries of Asia
- Date: January 25 February 19, 2005 (4 weeks)
- Place: Tsukuba, Japan (PWRI & JICA)



Curriculum:

Training course Details



Lecture on mapping process and its effects
 Introduction of good practices of the world
 Field study in a nearby flood-prone area
 Site visit to advanced areas in mapping
 Report and discussion

Professors, Researchers and Experts from the governments, institutes and private sectors...



Benefits of training course

For trainees:

- Acquisition of knowledge, experiences and skills

- Communication with other trainees



- Advocate in his/her own country
- Promoter of further actions



For trainers:

- Accumulation of information

- New indications and hints through interaction with lecturers and trainees

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- Improvement of existing practices

- Stimulate for further research

- Follow-up /continual monitoring of implementation

- Permanent networking for information exchange





Framework of the new Center

PWRI plans to contribute to mitigate water-related disasters by establishing a new center in this field.

- A global center to be established within PWRI under the auspices of UNESCO in autumn 2005
- > Theme: Water hazard and risk management
- Activities: Research, Training, Information networking
- Partnership with UNESCO-IHP Networks, UN agencies & other key organizations of the world





Pillar Activities

Research

Data/ Information

Results/ Outcomes

Participation

Information networking Knowledge

Network

Training & Capacity building

Curriculum



Training Activities - **PWRI's experiences and plans** -

Long experiences for over 35 years, including
 River & dam engineering, Sabo engineering...

- Long- & short-term training for experts/ practitioners (students & professionals exchange, internship)
- And planning a new training course on Flood Hazard Mapping







Research Activities

Scientific & academic research on water-related hazards & its risk management;

- Contribution to major global initiatives (WWAP, UNESCO/WMO joint IFI/P...)
- Hydraulic / hydrological prediction, observation, modeling and analysis (GFAS)
- Risk assessment & management technologies on water-related hazards and impacts of climate change ... and others



Information Networking

Knowledge base & information network by:

- Collecting, compiling & providing useful information

- Interacting with the UN, WWAP, IHP & other international initiatives (IFNet, JWF...)

> Synergies to research & training

- Dissemination of research outcomes, and feedbacks for further research

- Development of linkage with trainees, and recognition of local needs



Future milestones of preparatory works

Development of pilot projects

- Active participation in thematic discussions for knowledge exchange and substantial contribution
 - Dec. 2004: Int'l Conf. Water & Disasters (CANADA)
 - Jan. 2005: World Conf. Disaster Reduction (JAPAN)
 - Apr. 2005: UN CSD-13 (New York, USA)
 - And others (International & regional forums, academic & practical WS...)
- Approval at the 33rd UNESCO General Conference (Autumn 2005)



Thank you very much for your attention.

http://www.unesco.pwri.go.jp