# Flood Hazard Mapping and its Utilization for Flood Disaster Mitigation

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# 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) -

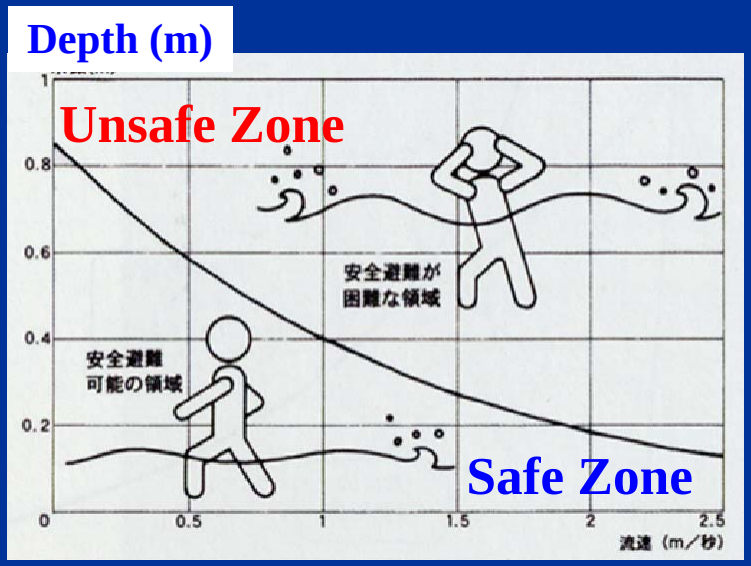
# Floods in Japan this year
# - Niigata Fukushima Rain (2) -

•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



# More effective flood management

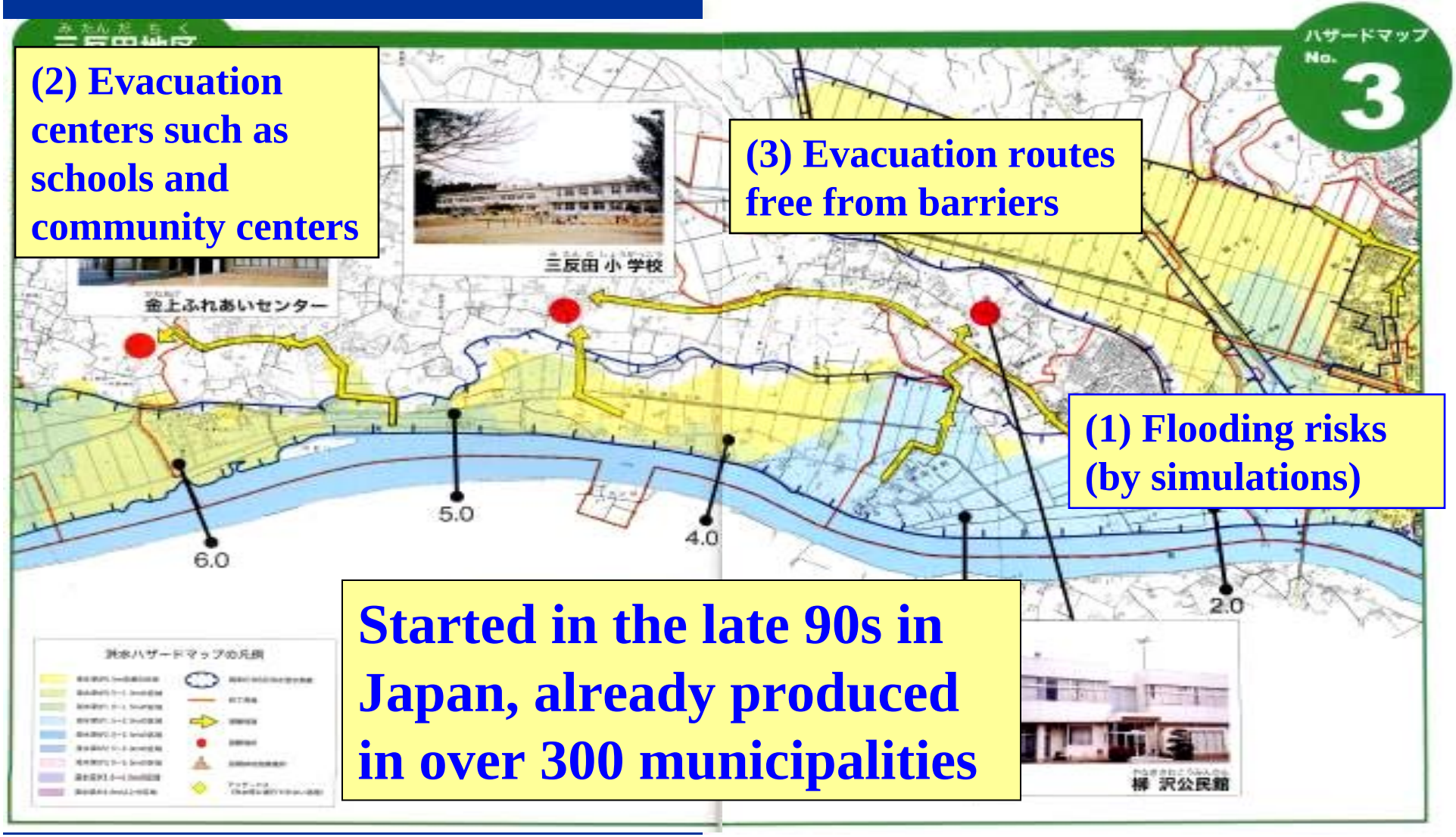
- **Structural measures are effective, however,**
  - **Costly in particular in developing countries**
  - **Needing long time to produce tangible effects**
  - **Constrained by land acquisition or available resources**
- **Much more important to take non-structural measures such as:**
  - **Flood hazard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

# Flood hazard map

- **Functions:**
  - **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.**




(2) Evacuation centers such as schools and community centers

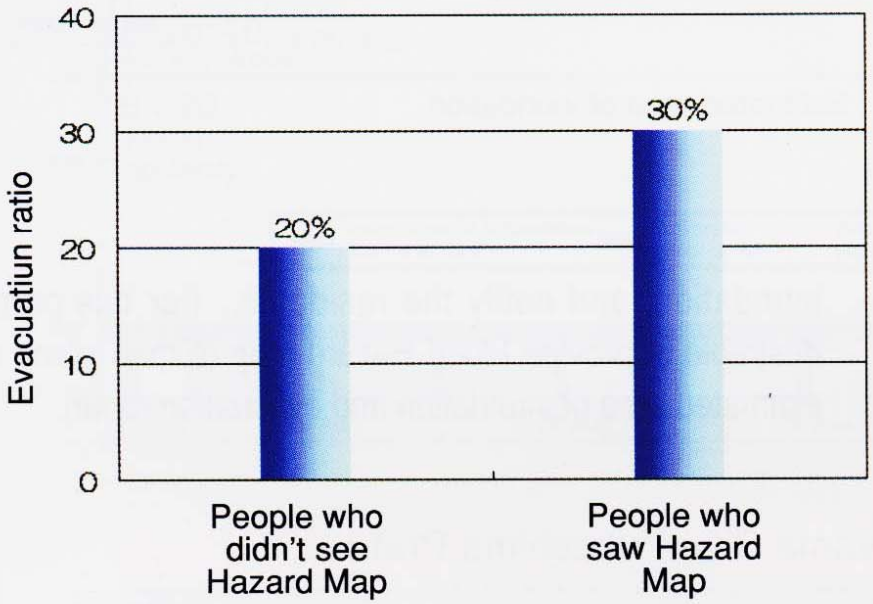
(3) Evacuation routes free from barriers

(1) Flooding risks (by simulations)

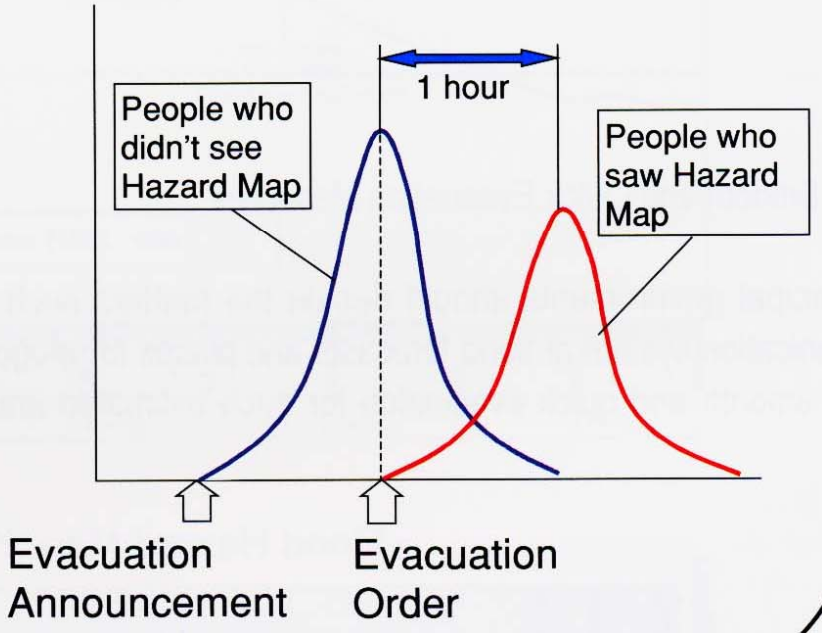
**Started in the late 90s in Japan, already produced in over 300 municipalities**

# Effectiveness

Evacuation Ratio after 6 hours of Evacuation Announcement
(Kohriyama City, Fukushima Pref. August 1998)




Evacuation Peak after Evacuation Announcement
(Kohriyama City, Fukushima Pref. August 1998)




**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
    → Link with development & disaster mitigation
  - Effective for adequate land use
    → Toward improved planning & risk mitigation
  - Public involvement & community participation
    → Develop people's/ community's self-reliance through raising awareness & enhancing capability

# New training course on Flood Hazard Mapping

## Objective

- 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)

# Training course Details

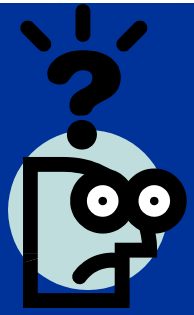
## Curriculum:

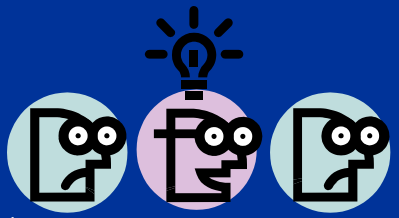
- Lecture on mapping process and its effects
- Introduction of good practices of the world
- Field study in a nearby flood-prone area
- Site visit to advanced areas in mapping
- Report and discussion

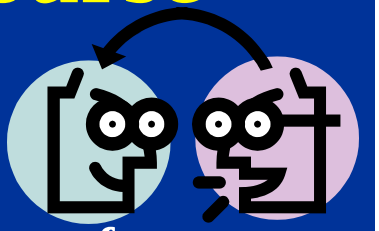
## Lecturers:

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

# Benefits of training course

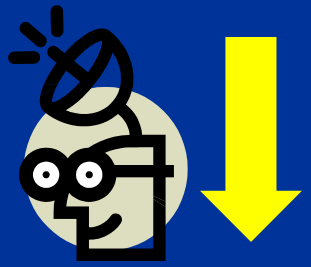




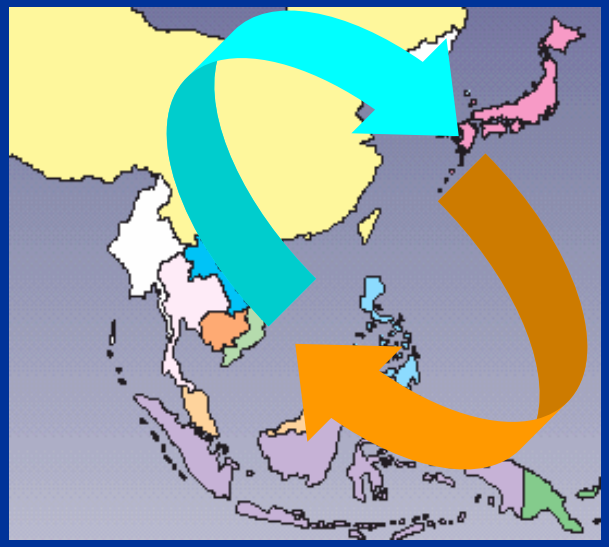


**For trainees:**

- Acquisition of knowledge, experiences and skills
- Communication with other trainees



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

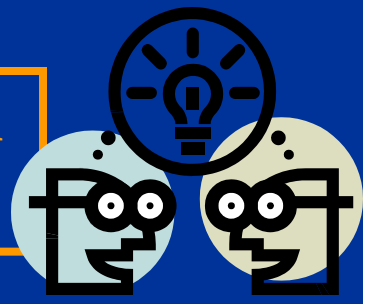


**For trainers:**

- Accumulation of information
- New indications and hints through interaction with lecturers and trainees

- Improvement of existing practices
- Stimulate for further research

- Follow-up /continual monitoring of implementation
- Permanent networking for information exchange

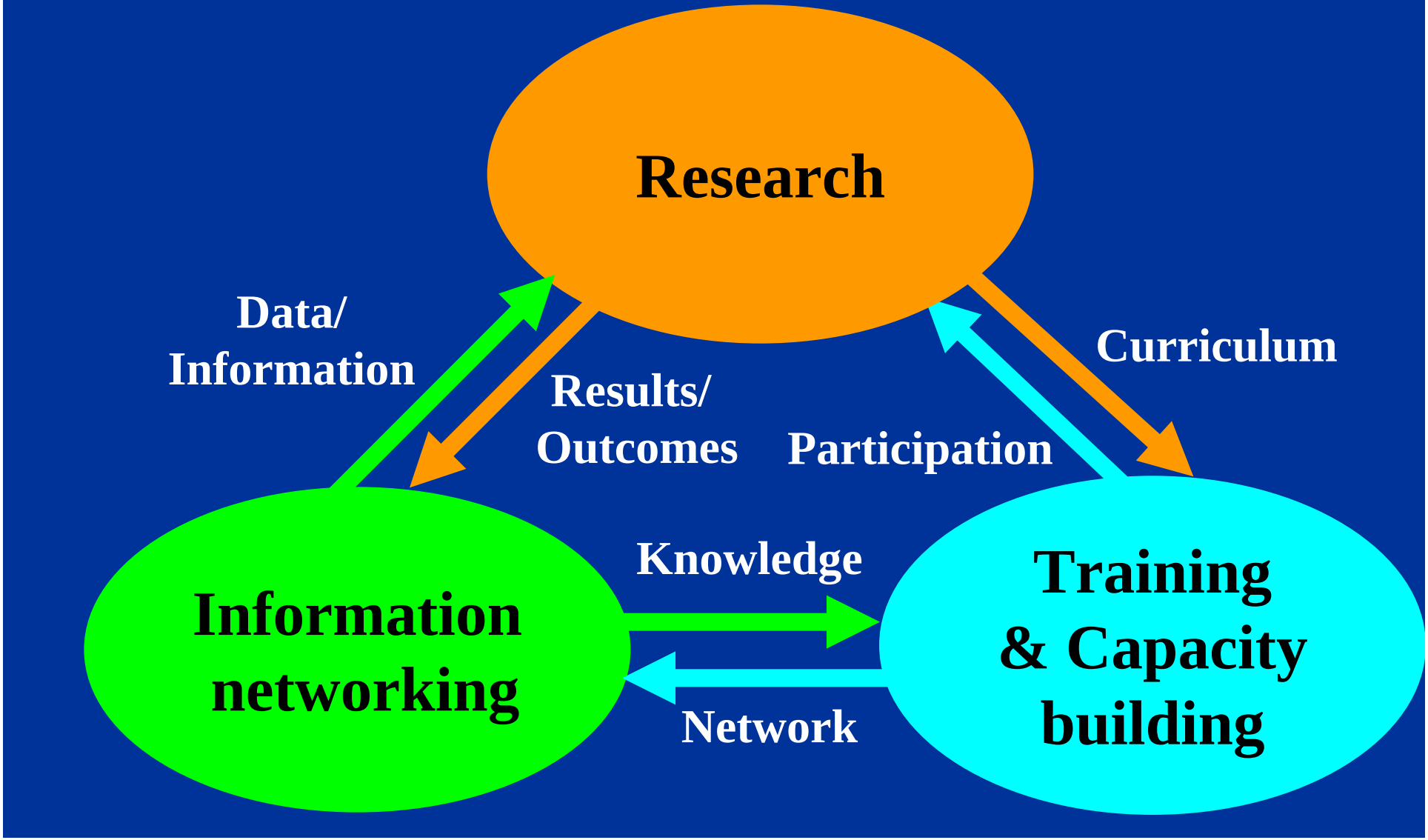


# Framework of the new Center

**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

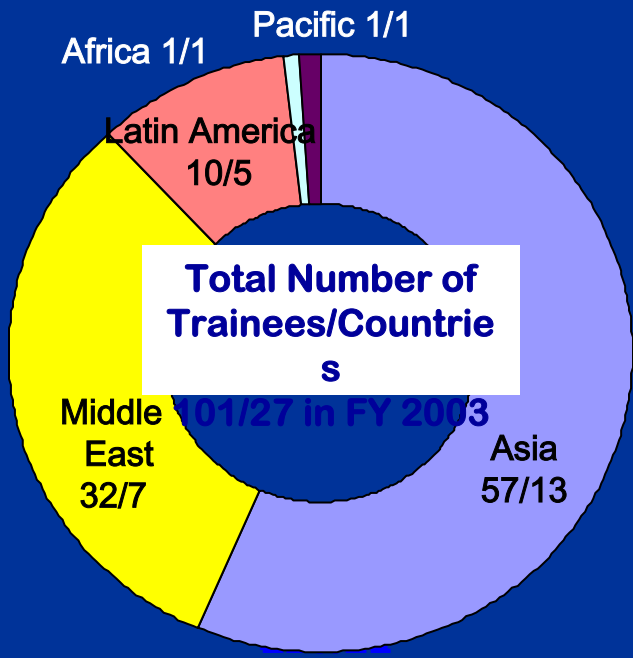
# Pillar Activities



# 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**