

Czech University of Life Sciences Prague

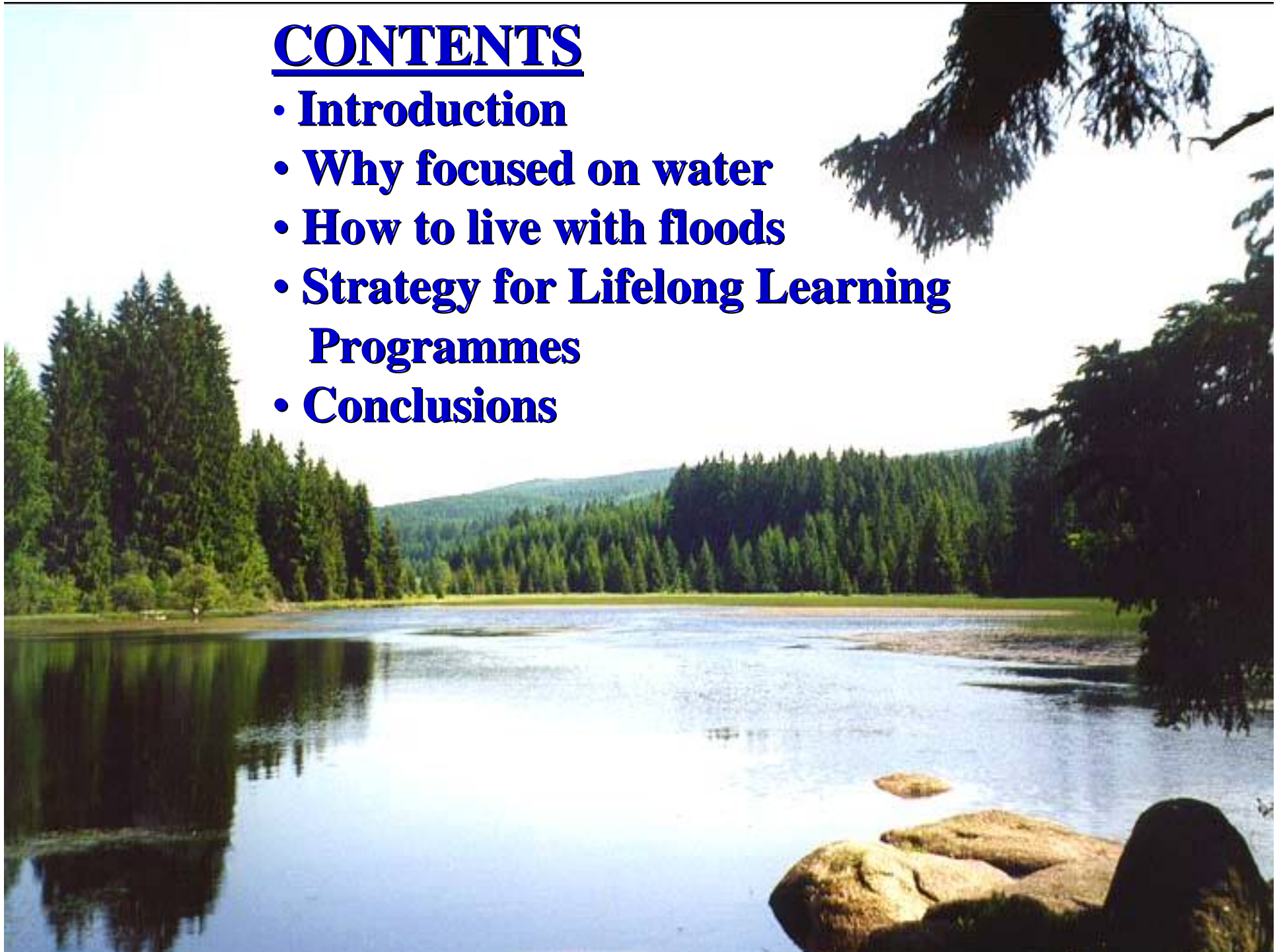


**SUCCESSFUL COOPERATION OF
STAKEHOLDERS IN THE LIFELONG
LEARNING MODEL FOCUSING
ON WATER DISASTERS**

**Pavel KOVAR, CULS Prague
ICA-CEDIA Conference Leuven, June 11 - 13, 2009**

CONTENTS

- **Introduction**
- **Why focused on water**
- **How to live with floods**
- **Strategy for Lifelong Learning Programmes**
- **Conclusions**



MILESTONES AT THE CULS PRAGUE

- **1709 Establishment of the Prague Polytechnics (included Civil Engineering faculty)**
- **1906: Agricultural and Forestry faculties on the Prague Polytechnics**
- **1960: First study programmes on Water Reclamation (mostly Irrigation and Drainage)**
- **1990- 2002: Two-month Hydrology courses (continuing education)**
- **since 1999 Bologna Process (restructuring system of HEIs)**
- **since 2003 Two-week Natural Disaster Prevention Workshops**

WHY TO FOCUS ON WATER?

WATER AS VULNERABLE AND EXHAUSTIBLE RESOURCE

Principal global issues of 21th century:

- **FOOD QUALITY AND SECURITY**
- **ENVIRONMENT QUALITY**
(both dependant on water quality and quantity)

WATER SCARCITY: 20% of world population
(50% has no sewerage system)
70% of world water for irrigation

POSSIBLE FUTURE CONFLICTS:

- **lack of water**
- **non-effective irrigation systems**
- **downstream and upstream conflicts**
- **eco-systems degradation (contaminatin, salinity, etc.)**

STATUS OF WORLD FRESH WATER AVAILABILITY

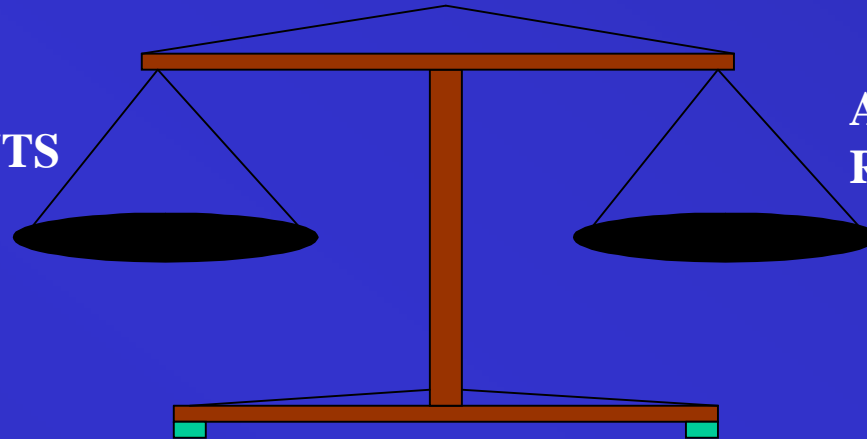
| PARAMETER | STATUS | |
|---|--------|------|
| | 2003 | 2050 |
| POPULATION* (in billions) | 6.1 | 9.8 |
| POPULATION AFFECTED BY WATER SCARCITY (in millions) | 180 | 1700 |
| COUNTRIES AFFECTED BY WATER SCARCITY | 20 | 39 |

*Average population projection

Source: Gardner and Engelman, 2003

WATER RESOURCES MANAGEMENT

WATER
REQUIREMENTS



AVAILABLE
RESOURCES

PROTECTION OF WATER RESOURCES
PROTECTION OF SOCIETY AGAINST WATER EXTREMES

INTEGRATED WATER RESOURCES MANAGEMENT:

- FRESH WATER IS EXHAUSTIBLE AND VULNERABLE RESOURCE
- PARTICIPATION OF ALL
- WATER AS AN ASSET
- EU WATER FRAMEWORK DIRECTIVE

EU WATER FRAMEWORK DIRECTIVE

(EU legislative basis of IWRM: WF Directive 2000/60 EC)

A. Sustainable use of waters (long-term accessible sources)

B. Protection of water quality

C. Water requirements (incl. ecosystems)

D. Care for groundwater resources

E. Mitigation of harmful impacts of floods and droughts

F. Achievement and maintenance of "good status" of all waters

HOW TO LIVE WITH FLOODS

PRAGUE, August 2002



REAL FLOODS

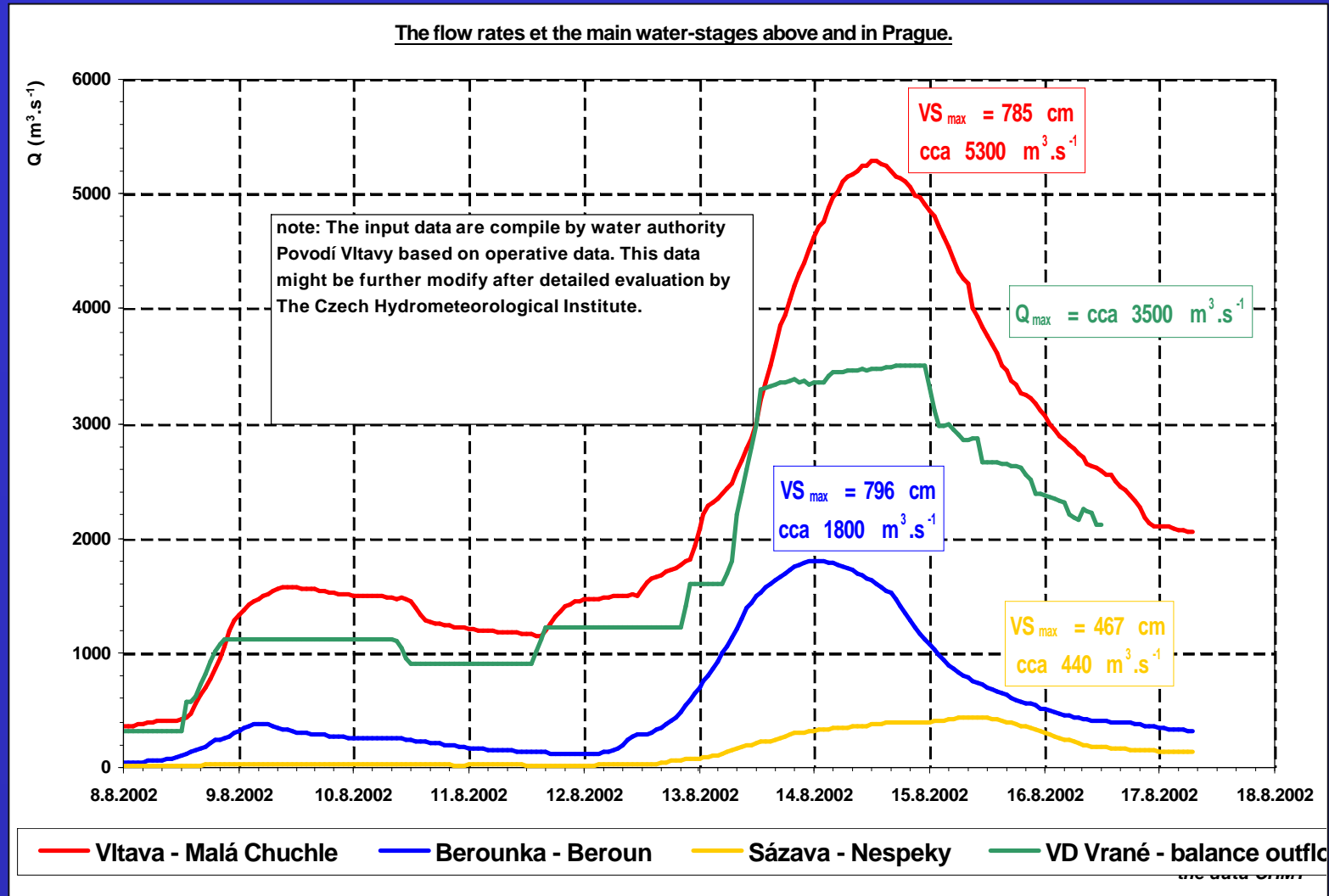
(rainfall, surface runoff)



Trója - Císařský ostrov - ÚČOV

REAL FLOODS

(rainfall, surface runoff)



PREPARATION OF FLOOD PREVENTION



Smetanovo nábřeží

FLOOD PREVENTION EFFECTIVENESS



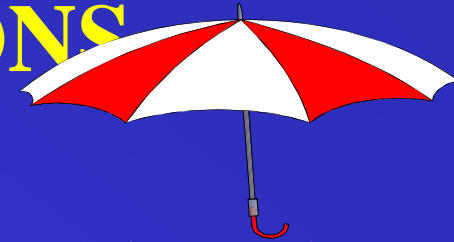
Smetanovo nábreží








LESSONS AND CONCLUSIONS



WHAT TO DO?

- Better understanding of natural processes (channel and inundation, urbanization principles, proper land use, good management practices...)
- Better forecasting and warning systems, use of mathematical models for simulation and forecast
- Consolidation of the integrated flood control system (firemen, police, health personnel, civil service)
- Protection of the urbanised areas: including mobile gates (example: in Prague - both Vltava river-banks)

REDUCING HARMFUL IMPACTS OF FLOODS (IMPACT OF CATCHMENT MANAGEMENT)

- LAND USE AND LANDSCAPE STRUCTURE, MOSAIC DISPLACEMENT
ROADS NETWORK - DRAINAGE
NATURAL RETENTION
 - NATURAL HYDROGRAPHICAL NETWORK: GEOMORPHOLOGICAL
DIVERSITY, CONVEYANCE OF DISCHARGES
CHANNEL *versus* INUNDATION
 - WATER CONTROL MEASURES: DEPRESSIONS, RIVER PLANES,
TERRACES, TORRENT CONTROL
 - SMALL RESERVOIRS, PONDS, RETENTION BARRIERS, WETLANDS
 - DIKES AND POLDERS
 - WEIRS AND DAMS
- 

STRATEGY FOR LIFELONG LEARNING PROGRAMME

Education and training in Water Resources within LLP with a particular reference to the following groups:

- **Practicioners:** consulting engineers, investors, building companies, civil service personnel, local management, data producers, NGOs, etc.
- **University staff:** Professor assistants, technicians and other personnel. Three universities at Prague:
 - Life Sciences (Faculty of Envi Sciences)
 - Technology (Faculty of Civil Engineering)
 - Charles (Faculty of Sciences)
- **Municipalities :** Prague Metropolitan Authorities (decision makers), personnel of environmental departments

TWO MAJOR QUESTIONS:

- **Where to get a financial support from?**
 - International organizations (UNESCO, WMO, FAO?)
 - Civil Service?
 - Building/water companies?
 - Water Boards?
 - Sector of education (Ministry)?
- **What will be the best form of education and training ?**
- **Long-term education** (Distant learning): 1990 to 2002 annually two-month Hydrology Course „Hydrological Data for Water Resources Planning“
- **Short-term training:** since 2003 annually two-week Course on Natural Disaster Prevention (focused on Floods and Droughts)

INTERNATIONAL
POSTGRADUATE
TRAINING COURSES IN
HYDROLOGY

HYDROLOGICAL DATA FOR WATER RESOURCES PLANNING

GENERAL INFORMATION

2002 Session



SPONSORS:
CZECH REPUBLIC
UNESCO WMO

Tab.1

THE COURSE CURRICULUM 2002 (18th SESSION)

| Subject, Part | Number of contact hours |
|---|-------------------------|
| Part I.:Basic knowledge | 84 |
| 1. Elements of Hydrology and Hydraulics | 20 |
| 2. Use of Statistical Mathematics in Hydrology | 12 |
| 3. Elements of Meteorology and Hydrometeorology | 10 |
| 4. Hydrometeorological Instruments and Networks | 10 |
| 5. Elements of Hydropedology and Hydrogeology | 18 |
| 6. Evapotranspiration | 8 |
| 7. Hydrological Maps and use of GIS | 6 |
| Part II.: Topical Group Works (incl. GW1,2,3) | 74 |
| GW 1 : River Hydrology, Floods and their Forecasting | 26 |
| 1. Flood Hydrographs and Routing | 6 |
| 2. Rainfall-Runoff and Routing Models | 8 |
| 3. Reservoirs and Water Management | 6 |
| 4. Forecasting and Warning Systems | 6 |
| GW 2 : Environmental and Landscape Hydrology | 24 |
| 1. Modelling of Hydrological Processes | 10 |
| 2. Water Balance Catchment Models | 4 |
| 3. Environmental Impact on Water Management | 6 |
| 4. Climate Change and Water Resources | 4 |
| GW3 : Use of Hydroinformatics and Data Collection and Processing | 24 |
| 1. Hydroinformatics | 8 |
| 2. Application of Remote Sensing and Telecommunication Systems | 6 |
| 3. Computerized Data Processing | 6 |
| 4. Use of Isotopes in Hydrology | 4 |
| Part III | |
| Visits, Study Tours, Exams | 30 |



CZECH UNIVERSITY OF LIFE SCIENCES PRAGUE

**EUROPEAN WORKSHOP
ON NATURAL DISASTER PREVENTION
focused on floods and droughts**

Prague, June 2008

INTERNATIONAL NDP WOKSHOP CURRICULUM

- **FLOOD AND DROUGHT HAZARD ASSESSMENT**
- **VULNERABILITY ANALYSIS**
- **OPTIONS FOR RISK REDUCTION**
- **EARLY WARNING**
- **FLASH FLOOD FORECASTING IMPLEMENTATION**
- **MITIGATION AND RECOVERY**
- **PRACTICAL TRAINING**

WORKSHOP CURRICULUM

- continued

- **EXAMPLES OF CASE STUDIES**
- **FIELD TRIP JIZERSKE MOUNTAINS**
 - **Experimental catchments**
 - **Disaster of the Dam on Bila Desna in 1916**
 - **Transformation of “Black triangle” to “Green triangle”**

BASIC OUTLINES OF EARLY WARNING

- **FORECAST AND PREDICTION**
 - Forecast of extreme events
- **WARNING**
 - Information of possible impacts on people and infrastructure
 - Involvement of recommendations
- **REACTION**
 - Ensurance that information is correctly understood

MAJOR STAKEHOLDERS OF THE NATURAL DISASTER PREVENTION PROJECT:

- THREE UNIVERSITIES (CULS, TU, ChU, all at Prague)
- PRAGUE MUNICIPALITY (PM)
- VLTAVA RIVER WATER BOARD (VRWB)
- CZECH HYDROMETEOROLOGICAL INSTITUTE (CHMI)

COST BENEFIT ANALYSIS

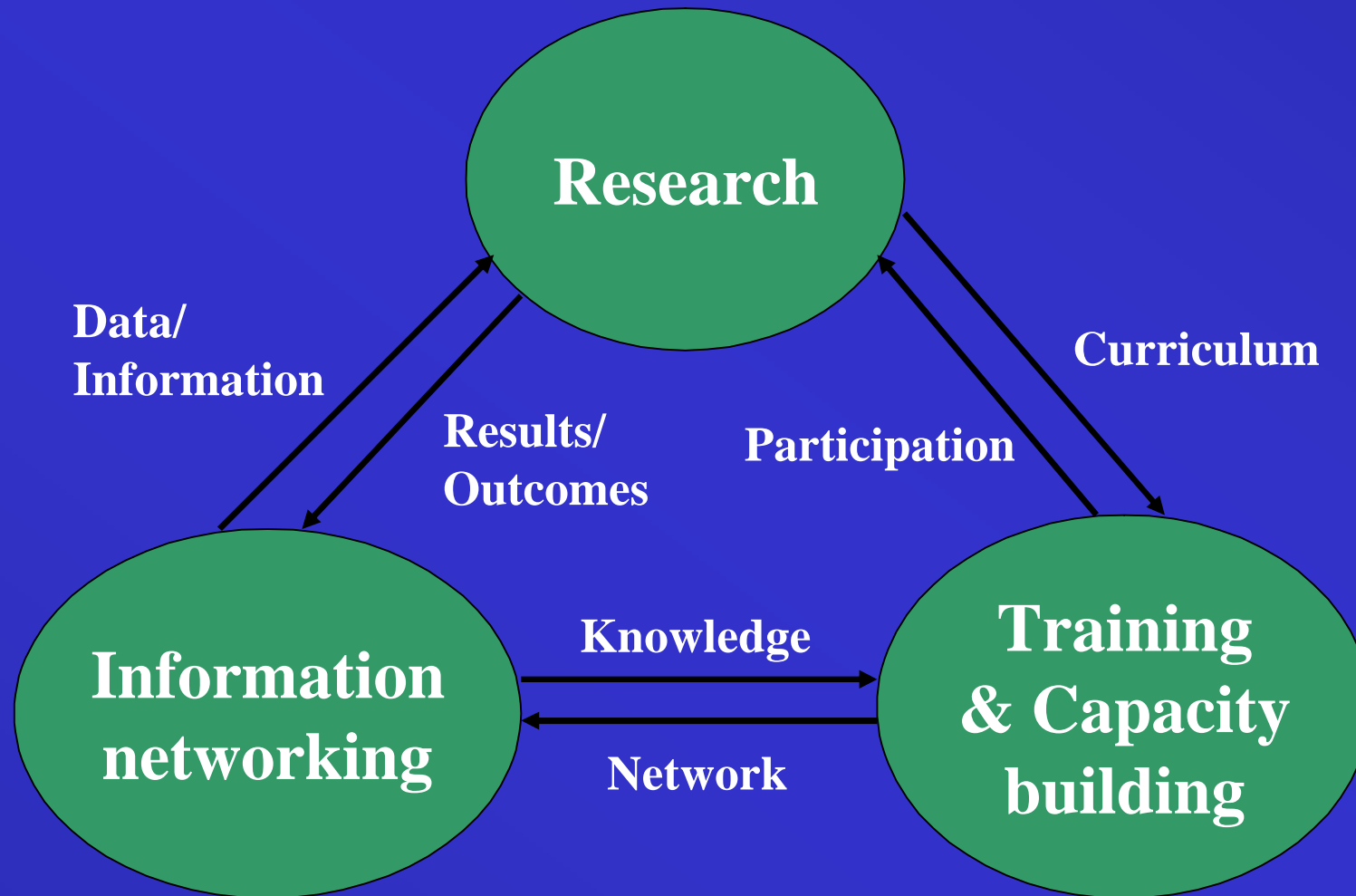
Total budget about EUR 15,000 annually.

Registration fee EUR 50 each participant (25 to 30 persons)

CULS contributions: subsidised accommodation + food

Other subsidy: Ministry of Education + Prague Municipality

Municipality-University Centre and its Pillar Flood Control Activities



COMBINATION OF TECHNICAL AND SOCIAL ASPECTS OF THE PROGRAMME

Contact to people in disaster regions:

- Zoning of flood areas
- Contact to Civil Service (Municipality)
- Role of insurance companies
- Information on Integrated Rescue System

CONCLUSIONS

- **Flexibility of study programmes and their reflection on recent development in water sciences.**
- **Collaboration of Universities with Civil Service, Municipality, Water Board and Hydromet Institute.**
- **Integrated water resources management in Europe.**
- **Cooperation between European universities.**
- **Best practices Project development (for subsidy).**
- **Extra income from multiple sources.**

Workshop on Natural Disaster Prevention

