

# FLOOD PLAIN DAM RISK MANAGEMENT DOWNSTREAM DAMS. A RESEARCH PROJECT AND A CASE STUDY.

A. Betâmio de Almeida

*Technical University of Lisbon (IST), Lisbon, Portugal. Director of NATO FLOODRISK PROJECT.*

*Keywords: Dam, valley, risk management, emergency planning, public perception, vulnerability.*

Contemporary dam safety regulations include risk assessment at downstream flood plains and consideration of potential damages due to dam rupture, regardless of the expected probability of occurrence of such event. The aim of these kind of procedures is to increase the safety level along the valley against abnormal floods caused by dam accidents. For this objective to be attained, the potential damages induced by dams along the valleys should be considered by dam owners or exploitants in what concerns, among others, the following items:

- dam risk classification;
- design flood selection criteria;
- inundation maps and zoning;
- valley vulnerability to floods.

Emergency plans for downstream flood plains, including zoning, warning and evacuation plans, are being developed as special risk mitigation procedures. In modern open societies these plans should include public information and training. All these valley actions will be justified in order that the global safety level be increased, not only in objective terms by increasing the survival probability, but also in subjective terms. In fact, public risk perception is a very important dimension in any risk management methodology. For dam and valley safety policy, public participation and perception becomes more and more a very important issue.

To study, develop and improve an integrated methodology for dams and valley risk management in Portugal, a special project is under development, since 1994. This project is sponsored by NATO, through its Science for Stability Program. This project involves two research organisations (Civil Engineering National Laboratory and Technical University of Lisbon), as well as the Portuguese Water Authority Service ("Instituto da Água") and the main Portuguese Electricity Company ("EDP").

The project includes different research areas: hydrodynamics and downstream risk evaluation, dam safety regulations, applied social sciences, decision support systems and field studies. The project has been applied to a real valley (Arade valley at South of Portugal) where two cities are located at downstream of two dams.

The author presents some results obtained and discuss with detail the concept of valley vulnerability including the description of a proposal of methodology to quantify a vulnerability index.