Geophysical Research Abstracts,
Vol. 11, EGU2009-13193, 2009
EGU General Assembly 2009

A Methodology to Support Decision Making in Flood Plan Mitigation

C. Biscarini (1), S. Di Francesco (2), and P. Manciola (2)

(1) University For Foreigners, Perugia, Warredoc, Water Resources Research And Documentation Centre, Colombella, Perugia, Italy (biscarini.chiara@unistrapg.it), (2) Department of Civil and Environmental Engineering - University of Perugia, Italy

The focus of the present document is on specific decision-making aspects of flood risk analysis.
A flood is the result of runoff from rainfall in quantities too great to be confined in the low-water channels of streams. Little can be done to prevent a major flood, but we may be able to minimize damage within the flood plain of the river. This broad definition encompasses many possible mitigation measures.
Floodplain management considers the integrated view of all engineering, nonstructural, and administrative measures for managing (minimizing) losses due to flooding on a comprehensive scale.
The structural measures are the flood-control facilities designed according to flood characteristics and they include reservoirs, diversions, levees or dikes, and channel modifications. Flood-control measures that modify the damage susceptibility of floodplains are usually referred to as nonstructural measures and may require minor engineering works. On the other hand, those measures designed to modify the damage potential of permanent facilities are called non-structural and allow reducing potential damage during a flood event.
Technical information is required to support the tasks of problem definition, plan formulation, and plan evaluation. The specific information needed and the related level of detail are dependent on the nature of the problem, the potential solutions, and the sensitivity of the findings to the basic information. Actions performed to set up and lay out the study are preliminary to the detailed analysis. They include: defining the study scope and detail, the field data collection, a review of previous studies and reports, and the assembly of needed maps and surveys.
Risk analysis can be viewed as having many components: risk assessment, risk communication and risk management. Risk assessment comprises an analysis of the technical aspects of the problem, risk communication deals with conveying the information and risk management involves the decision process.
In the present paper we propose a novel methodology for supporting the priority setting in the assessment of such issues, beyond the typical “expected value” approach.
Scientific contribution and management aspects are merged to create a simplified method for plan basin implementation, based on risk and economic analyses. However, the economic evaluation is not the sole criterion for flood-damage reduction plan selection. Among the different criteria that are relevant to the decision process, safety and quality of human life, economic damage, expenses related with the chosen measures and environmental issues should play a fundamental role on the decisions made by the authorities. Some numerical indices, taking in account administrative, technical, economical and risk aspects, are defined and are combined together in a mathematical formula that defines a Priority Index (PI). In particular, the priority index defines a ranking of priority interventions, thus allowing the formulation of the investment plan.
The research is mainly focused on the technical factors of risk assessment, providing quantitative and qualitative estimates of possible alternatives, containing measures of the risk associated with those alternatives. Moreover, the issues of risk management are analyzed, in particular with respect to the role of decision making in the presence of risk information. However, a great effort is devoted to make this index easy to be formulated and effective to allow a clear and transparent comparison between the alternatives.
Summarizing this document describes a major- steps for incorporation of risk analysis into the decision making process: framing of the problem in terms of risk analysis, application of appropriate tools and techniques to obtain quantified results, use of the quantified results in the choice of structural and non-structural measures.
In order to prove the reliability of the proposed methodology and to show how risk-based information can be incorporated into a flood analysis process, its application to some middle italy river basins is presented. The methodology assessment is performed by comparing different scenarios and showing that the optimal decision stems from

a feasibility evaluation.