Dam safety

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The full analysis of the safety of a dam should consider the consequences of its possible failure. The United States National Weather Service has developed two computer programs for simulating the movement of a flood wave following the failure of a dam. The program BREACH calculates the flow through a breach in an earth or rockfill dam and the consequent widening of the breach by erosion. It provides input to the second program, DAMBRK, that calculates the passage of the flood wave down the valley. These two programs can give valuable information on the extent of flooding and the properties and lives at risk should the dam fail. The programs have been used in many parts of the world and can be obtained through HOMS, the WMO system for technology transfer in operational hydrology.

The problem of dam safety is a difficult one and requires the careful balancing of project benefits, construction costs, social costs and public safety. The current state of knowledge does not permit the balancing of all these factors with full confidence. At the design stage a careful hydrological and economic analysis of the project is needed, which may well lead to the abandonment of the project if safety requirements cannot be met. Countries should develop national guidelines so as to ensure consistent decisions on dam safety. During the life of a dam, which can be long, the safety of the dam and developments downstream that could alter its hazard rating need to be monitored regularly. As a result of this monitoring the dam owner may have to face, at longer or shorter intervals, further expenditure to maintain safety levels. The publication of the United Kingdom guidelines led to enlarged spillways being built on a number of dams.

A number of developing countries face particular problems of dam safety. Many have built dams in recent years for irrigation or hydropower to further their development. These have been funded by different aid donors and in the absence of national standards the donor has usually applied his own country's standards. The inconsistency of standards that results has caused concern in some tropical countries in recent years.