Flood Warning System as a Sector of Integrated Flood Action Plan in Imamzade Davood Basin, Tehran Province

By: Jabbar Vatanfada - Fariba Avarideh – Alireza Najafi
e-mail:vatanfada@iranrivers.com, avarideh@iranrivers.com, a_najafi1973@yahoo.com
Ministry of Energy, Islamic Republic of Iran

1. Background

Floods are frequent natural disasters in Iran. They occur on the yearly basis and cause substantial damages to assets and losses of lives (approximately USD 132 millions during 1991-2000 (Figure 1)). There are a number of factors that contribute to the frequency and intensity of flooding in the country. these include natural and man-induce factors, the former are scarce but high intensity rainfall, lack of vegetation and soil cover for water retention, and steep mountainous areas generating large surface runoff and the latter are land use changes, flood plain encroachment, deforestation, gravel mining, improper design and operation of hydraulic structures such as dams and bridges, unplanned drainage networks in urban areas, lack of public awareness and specially lack of proper Early Warning Systems (Reference: www.iranrivers.com).

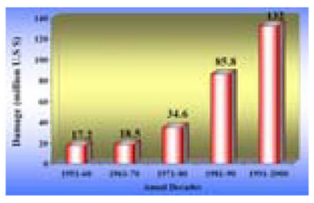

Figure 1: Mean Annual Amount of Flood Damage in Iran (million U.S.D)

Floods in Iran

1.1 Flood Management in Iran

Iranian Government had only used of flood control structural methods for reducing flood damages in previous years. In Addition to high costs, these methods were not effective in diminishing human losses. After Golestan province flood in 2001, government has paid more attention to non-structural methods in recent years. The four most important steps of the Iranian government`s approaches are: preparation of flood risk maps, establishment of early warning systems, development and implementation of local Action Plans and public training.

1.2 Early Warning System (EWS) in Iran

In 1990, an initiative was launched by the Iranian government to conduct comprehensive flood studies for large Iranian rivers. The ultimate goal has been to develop flood warning systems for these rivers. It has recently been focused on Karkhe river basin flood warning system, which is almost 80% of project completed. This project will act as a pilot for other similar large basins, however the main objectives of this was installation of some instruments and gauges for data collection. Due to interbasin coordination and management, the project has not been completed asplanned.

1.3 Recent Experiences of Flood Forecasting, Warning and Management in Khoozestan Province

During last March (2005), due to snow melt and heavy rainfall, a flood was occurred, which affected most of Khoozestan province. At that time, special Committee was appointed by representatives of different organization like Ministry of Energy and National Meteorological Organization to manage emergency conditions and prevention of any damages and human losses. The process of flood management was conducted simultaneously in Dez, Karkhe, and Karoon(I) dams and flood level in Karoon River through Ahvaz City and other cities of Khoozestan province regulated for safe condition.

Investigation of previous flood management experiences shows that although flood warning process and evacuation in large basins has been successful, however, in small basins it has not been as much successful. This project is arranged and suggested for this purpose.

1.4 Reasons for the case study Selection

For this case study, Imamzade Davood was selectedin Tehran province, the Capital of Iran. As it has tourist attraction and also is a holy place for Moslems (i.e. Shrine). Kan River is the main river of this basin which several branches are discharged in to it; there are 8 villages, an important industrial zone, 3 bridges and 3 highways crosses this river. Due to mountainous and snowy condition in the autumn and winter, local residents are more than 5000 people, however, its tourist attraction and religious conditions have caused a great change in the rate of population, this appear to vary from15000 to 60000 in spring and summer, respectively. There is a rural road in this basin, which its length from Tehran to Imamzadeh Davood village is 36 km with heavy traffic jam in high seasons. With regards to high magnitude flood and road interceptions, it is necessary to construct a new road as well as few helicopter pads for emergency landing. Two heavy floods have occurred in this basin in the last 40 years by which led to over 3000 people human lives in law and more than 30 millions USD damages. Following map show selected basin details (Figure 2).

Figure 2: Imamzade Davood Basin Map

The Imamzade Davood basin was ultimately selected due to the following reasons:

a) Imamzade Davood is located in the south side of the Alborz Mountain and has an upland ecosystem. Owing to massive deforestation, the river basin has been through a great change of ecosystem leading to unprecedented large floods.

b) One of the significant of this case study is the variety of life style in the area; this is highlighted by two different urban and rural components of life style. The lessons to be learned from this project will have a satisfactory flood management plan including flood warning system. To be applied in other basins in the I.R.I., as there are more than 500 small basins countrywide with the same socials problems.

c) This watershed is situated only in one province and in terms of management is easier for the implementation of flood management plans and policies. As a very important and specific pilot project, there is a good level of cooperation among various government organizations. Furthermore local authorities have promised full cooperation with this project and similar conditions.

d) There is no flood warning system in this basin. This makes a rather typical case since most basins in Iran lack such a system.

e) Another advantage of this watershed is the possibility of termination of the project in the medium term (1-2 years) and with a resalable budget (this dose not necessarily include other basins)

f) The number of hydrometric and climatologic stations is relatively adequate (useful for calibration of flood models).

g) The residents in the basin have shown to be relatively highly educated with a desirable spirit of cooperation with authority.

2. *OBJECTIVES*

- Study to recognize and efficient flood warning and forecasting system
- Providing and establishment of Flood Emergency Action Plan in Imamzade Davood basin for applying in other similar small basins (more than 500 basins)

3. *Expected Outcomes*

1- Flood forecasting system

With regards to the scale of the basin, an appropriate forecasting system should be selected so that it could be implemented in similar basins. Therefore it should be affordable by the authority.

2- Warning process

Warning process should be defined from forecasting resource to end users.

3- Compiling Flood Emergency Strategy and Recipes

These recipes will be compiled based on project studies and priorities frequently. They contain of activities recipes before, during and after flood events for various responses such as Ministries of Interior, Energy, Roads and Transportation, Meteorological organization, Red Crescent and residents as well as tourists.

4. *PLANNED ACTIVITIES*

Widespread studies for identification of present and desirable conditions and priorities:

1- Technical and basic studies

2- Studies of required flood forecasting and warning system

3- Preparing flood vulnerable area of the basin

4- Collecting views opinion of the responses managers and their suggestions according to their functions

5- Recognizing basic weakness and strength of current flood management system

6-Investigation of available instrumentation and works (experts) for flood crisis management

7- Providing rational flood action plan for the basin including specific maps, recipes …

5. *IMPLEMENTING AGANCIES*

Ministry of Interior (Task Force for Natural Disaster Reduction), Ministry of Energy, Ministry of Roads and Transportation, National Meteorological Organization, Red Crescent

6. *BUDGET AND TIME*

Total cost for the project is estimated to be 100000 USD. Details are available on request. Suggested time for conducting the project is 18 months.

7. *Reference*

- Ministry of Jihad & Agriculture, 1990, Watershed Studies of Imamzade Davood Basin, (Persian)

-Ministry of Interior, 1986, Integrated Development Plan of Imamzade Davood Village, (Persian)

- UNDP & Ministry of Interior, 2001, Flood Management In Iran, (Persian)

- WWW.Iranrivers.com