NATURAL FEATURE AND USEABLE FEASIBILITY ANALYSIS OF FLOODWATER RESOURCES

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As the development of society and economy, the water demand increases rapidly. However, the amount of useable water resources is limited in a certain area. Unusual water resources development measures should be taken into account. For the rivers in monsoon precipitation zones, flow changes very much in a year time. By taking Songhua River as an example, the paper discusses the problems concerned with the use of floodwater resources.

Flood is usually related to an overflowing of water onto land that is normally dry. During a flood in a river, floodwater is almost full of river channel, or occasionally flows over or break banks causing serious flooding disasters. Consequently, for a longtime, flood is only regarded as a kind of heavy natural disasters. This idea leads to a flood control police that drain all water out as soon as possible for safety.

Asymmetrical flow distribution easily causes heavy flood disasters in rain seasons while a small flow in dry seasons. This situation is quite evident in the Northeast of China where monsoon precipitation zone is. In the light of using floodwater as a kind of useful water resources, some general features of floodwater can be summarized as follows: (1) the precipitation and flow are concentrated in shot time. For example, at Harbin station, the average flow in rain season (from June to September) is 3 times of that in dry season and 2 times of annual average flow. (2) The flow process change very much in a year. Same at Harbin station, the maximum flow is about 10～30 times of minimum flow. This extreme difference feature makes flood control and water supply more difficult. (3) The flow process in down stream is flatter than that in up stream with smaller peak flow, larger volume and longer standing time.

From the feature analysis of the river flow in Songhua River, it can be known that flood control is a very serious task. Floods happen frequently in the Songhua River Basin. Especially, the catastrophic flood in 1998 broke the historical record on several aspects. The return period in some river sections is more than 300 years. The Flood broke dikes in many places. The direct loss is about 48 billion Yuan. Following the disastrous flood, the Central Government of China initiated a program to increase the standard of flood control in the Songhua River and other major river basins. The program takes master natural resources management as a long-term solution to reduce flood damage and improve overall water management. As a consequence, Songliao Water Resource Commission has planed two potential flood detentions in lower reaches of the Nen River. It is also encouraged to divert more floodwater on upstream.

As the society and economy develop, the water demands in city and countryside increase continuously. When the amount of water supply increases to a level more than common basic flow, floodwater should be used in dry season. Fig.1 shows an image to

redistribute water in a year, that is, more and more floodwater is used to fill the gap between river flow and water demand. On the other hand, Water demand of ecosystem becomes one of main items to be met in the comprehensive water resources plan. There exist the most of inland wetlands of China in the northeast, where is of special importance to migratory birds because the wetlands provide breeding sites and migratory staging sites for a large number of birds. As know, water is very important for keeping wetlands in a good ecological condition. The floodwater should be used to reserve and restore wetlands actively.

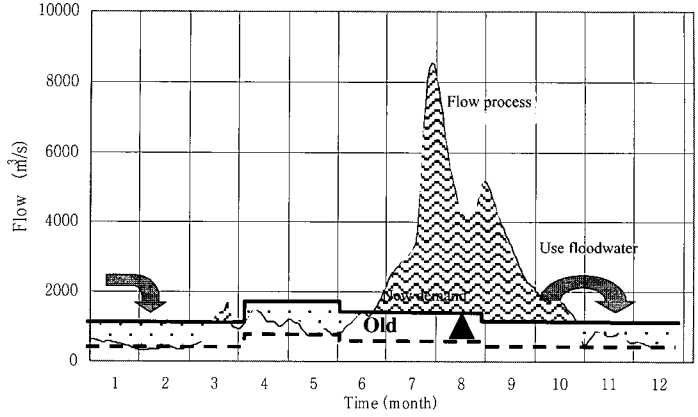

Fig. 1 Redistribution of water as water demand increases

Because floods have the features of disaster and resources, there are a lot of theoretical and practical subjects to be studied for floodwater resources development. Commonly, floodwater can be regulated by use of water storing projects, such as reservoirs or pools. Dams are usually built on upstream of rivers. On downstream, floodwater can be transferred into wetlands or lowlands by use of diverting water gates and channels. For making a development plan of floodwater resources, a structural analysis method of river water has been presented. Using floodwater resources really face a lot of risks. Risk analysis will be one of basic tasks of floodwater resources development and running operation. Owing to the dynamic characteristics of flood processes, modern 3S techniques and other advanced information and control measures should be employed in the practical control and management of using floodwater resources.

In the monsoon precipitation zones, such as the northeast of China, the floodwater concentrates the most of annual flow and becomes one kind of important water resources. The measures to develop floodwater resources include structural measures and nonstructural measures. Modern techniques will also support the control and management of using floodwater resources.

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