



## The Yangtze-Project

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As an important element in Chinese politics for the development of the Western parts of the country, a large hydraulic engineering project – the Three Gorges Dam – has been set up in order to dam the Yangtze River for a length of over 600 km with an average width of about 1,100 m. It is expected that this results in ecological, technical and social problems of a magnitude hardly dealt with before.

With this gigantic project, the national executive is pursuing the aims of

- preventing flooding
- safeguarding the water supply
- encouraging navigation and
- generating electric energy.

In future, fluctuations of the water level of up to 30 metres will be deliberately applied in the dammed-up section of the river while retaining the flow character of the seasonal variation.

The pollution of the Yangtze with a wide range of problem substances is frequently underestimated since in many cases attention is only paid to the low measured concentrations. However, the large volumes of water lead to appreciable loads and thus the danger of an accumulation of pollutants even reaching the human food chain. It should also not be forgotten that the Yangtze represents the major, and in some cases indeed the only, source of drinking and domestic water for the population.

A consideration of the water level in the impoundment that will in future arise from management of the reservoir reveals the dramatic change in contrast to the natural inundation regime. In the past, the flood events on the banks of the Yangtze and its tributaries occurred in the summer months. The plants in the riparian zone (water fluctuation zone = WFZ) were previously inundated during the warmer time of year (28 ° July/August) and the terrestrial phase of the WFZ was characterized by cool temperatures (3-5 °C January) that permitted little plant activity. In future, the highest water levels will occur in winter above the dam on the Yangtze and also on the tributaries flowing into it. The plants in the WFZ will then encounter considerably improved climatic conditions with higher temperatures during their physiologically active season in the summer months. This reversal of the flood pulse in the course of the year will exert an enormous influence on the fauna and flora and the associated processes.

Other parameters resulting from the management of the reservoir are the sediment deposits and their varying extents in the different zones of the WFZ. For example, the different degrees of compaction of the sediment of the river bank will largely determine the exchange of oxygen, nutrients and metabolites between the plants and the water body and thus the major ecosystem functions. The locally different thicknesses of the sediment body will be decisive for the emergence of plant shoots through the sediment. In areas of high flow rates, in contrast, habitats will be established that are strongly characterized by the dynamics of the pebbles and boulders. The Three Gorges Project will thus bring about a significant change in habitat conditions for vegetation in the WFZ whose consequences cannot yet be predicted with any certainty. This also concerns the potential and long-term impacts of changed vegetation on the local population, who exploit the plant resources, and also on tourism and on the hydroregime and the sedimentation regime in the reservoir.

Landslides and rock falls are the major geological events in the Three Gorges region. The mud and debris avalanches formed during such landslips represent a danger both for areas of settlement and also for land used industrially and agriculturally, as well as for infrastructure facilities, and may also considerably obstruct navigation. Furthermore, the analogous mass movements are one of the reasons for the silting up of the Yangtze and many of its tributaries.

The region of the Three Gorges contains rapidly growing urban centres that will receive further impulses for growth from the dam project. The fact that the Chongqing conurbation, with more than 30 million inhabitants the "largest city in the world", is directly under the authority of the Chinese central government illustrates the significance that the administration attaches to the development of this part of the country. In this project area, it is planned to determine the input of nitrates and sulphates into the soils and waters in the region of the Three Gorges Dam with the greatest possible accuracy. It is envisaged that for selected, especially critical regions the deposition will be calculated with a particularly high spatial resolution.

As a result of intensive exchange of ideas between Chinese and German scientists, four project areas were jointly defined for collaboration

- interactions in the pollutant/water/sediment system
- vegetation
- changing land use / erosion / mass movements
- atmosphere

The scientific partners involved on the Chinese and the German side are universities, national research institutes, institutes of the Chinese Academy of Sciences, scientific divisions of government agencies and private companies.

Research Centre Jülich from Germany and the "State Council Three Gorges Project Construction Committee" in China are coordinating this cooperation of numerous partners in both countries, the "Yangtze Project".