



## Contact

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# Population displacement

## Shuikou, China

### Overview

The Shuikou hydropower project is the largest in the East China region with an installed generating capacity of 1400 MW. The project was approved in 1985, construction began in 1987 and resettlement commenced the following year.

### Scheme Specifications

#### Dam Name

#### Scheme operator

Fujian Province Electric Power Bureau

#### Size of scheme (MW)

1400 MW  
(4950 GWh average annual output)

#### Country

Fujian Province, China

#### Catchment area

52 000 km<sup>2</sup>

#### River

Min River (Minjiang)

#### Effective reservoir capacity

2.34 billion m<sup>3</sup>

#### Construction years

1987 - 1997

#### Reservoir size

Area inundated 94 km<sup>2</sup>

### Details on sustainability aspect

Planning for resettlement began in 1982/3 and would require the relocation of over 67 000 rural people as well as 17 000 from urban centres. It took place in the context of recently introduced national and provincial regulatory requirements that aimed to minimise the distances over which people had to be moved, whilst avoiding major changes to their occupation. Where possible displaced people were to be relocated in the same town or village. One of the prime objectives of the resettlement plan was to restore income levels and maintain living standards, i.e. the approach was to encourage development rather than passive compensation.

Surveys were conducted of every affected household to determine loss due to inundation. From this compensation was calculated taking into account losses in buildings, income for enterprises, and farming concerns such as trees, irrigation systems, etc. More than sixty percent of the population affected were moved over a two year period from 1991 to 1992 and the reservoir began to fill in 1993. Site selection was endorsed by villagers. Many of the villagers chose to move as whole villages and this wish was accommodated by the authorities.

At the time of planning the resettlement of people in the region of Shuikou, land in China was publicly owned, therefore land was able to be redistributed among the affected villages. Through a combination of allocating land for agriculture to three quarters of those displaced, and non-farm activities for the remainder, over 39 000 jobs were created. Not only were jobs created but per capita incomes have also progressively increased for those resettled (11.3% increase after inflation for households surveyed in 1995). The project happened to be resettling people at a time of rapid economic growth within the province. This allowed increased employment opportunities, however some changes to the implementation strategies were necessary to incorporate the greater emphasis on non-agricultural rehabilitation.

Resettlement Offices provided for the co-ordinated administration of the resettlement process, and a high level management group led by the Provincial Vice Governor was empowered to make decisions, inspect, supervise and coordinate operations. The local offices had authority to approve settlement investment to 500 000 yuan (approximately US\$70 000). This meant there was flexibility within the system to respond to the ideas and needs of the local community. For example, one town of almost 8 000 people decided to have a dike built to protect them from potential flooding and relocate 300 people rather than relocate the entire town.

The original 1984 budget in the resettlement plan was for 410 million yuan. This was adjusted to 888 million yuan in 1989, with 90% of this attributable to inflation. In 1993, it became clear that further work was required and the budget was increased again to 1 057 million yuan. In 1994 flooding caused significant damage to reservoir banks, necessitating 308 million yuan of work and improved infrastructure. In all resettlement expenditure to 2000 was approximately US\$14 000 per household.

The legal framework provided that compensation and resettlement subsidies be paid to the village collective, distributed equally among the individuals and had to be for development of new production bases or improvement of existing production capabilities. Compensation for housing provided for replacement value of equivalent size and type, with subsidised construction materials and the project- affected individuals providing the labour. Many resettlers chose to make individual contributions so that the new houses were larger and of better quality (2.1 million m<sup>2</sup> of housing was replaced with 2.7 million m<sup>2</sup>, equating to a 10 m<sup>2</sup> increase per individual to 41 m<sup>2</sup> from 31 m<sup>2</sup>).

Financing for the hydropower project infrastructure was assisted by two loans totalling \$240 million provided by the World Bank. The resettlement specialists from the Bank also provided supervision. Independent monitoring of resettlement progress with this scheme has proved to be a “Best Practice” model for the World Bank and other projects in China.

## Other Aspects

### Siting and design

The design incorporated a shiplock and a shiplift to maintain navigational capability.

### Distribution and sharing of benefits

The provincial government of Fujian established 17 preferential policies for Shuikou resettlement including: a reservoir development fund to provide low interest loans to assist economic rehabilitation efforts with revenue coming from the provincial budget and tax revenues; newly established enterprises were tax exempt for 4 to 5 years; and settlers were beneficiaries of labour hire initiatives that favoured their employment during dam construction.

In 1995 Fujian Province established a 10 year Shuikou Maintenance and Construction Fund in accordance with the 1991 national regulation. It is financed from power sales at the rate of 4 fens/kWh, which increased to 5 fens/kWh in 1996 when regulations were revised. This fund is for improvements in infrastructure and production capability. Electricity is provided at subsidised rates to affected townships and villages at the rate of 500 kWh per year per resettler.

### Seismic

An earthquake of 3.2 magnitude was recorded at Shuikou on January 12, 1994, within a year of impoundment. Initial reservoir induced seismicity was detected in July 1993. The Shuikou Hydropower Project currently has in place an on-line real-time monitoring and feedback analysis system.

## Further Information

IHA International Hydropower Association

Website: <http://www.hydropower.org/>

IHA (2003) The Role of Hydropower in Sustainable Development

[http://www.hydropower.org/Downloads/IHA%20White%20Paper\\_260203\\_LowRes.pdf](http://www.hydropower.org/Downloads/IHA%20White%20Paper_260203_LowRes.pdf)

World Bank (2000) Successful Resettlement in China

[http://www-wds.worldbank.org/servlet/WDS\\_IBank\\_Servlet?pcont=details&eid=000094946\\_00111105305362](http://www-wds.worldbank.org/servlet/WDS_IBank_Servlet?pcont=details&eid=000094946_00111105305362)

World Commission on Dams: Dams and Development Report 2000

Website: <http://www.dams.org/report/>

Seismicity

<http://scsn.seis.sc.edu/Publications/pageoph98/pageoph98.pdf>

<http://kkb.hhu.edu.cn/xb/exb20002.htm#3On-Line%20Real-Time%20Monitoring%20and%20Feedback%20Analysis%20System%20of%20Safety%20Monitoring%20for%20Shuikou%20Hydropower%20Project>