IB Geography Freshwater Environments

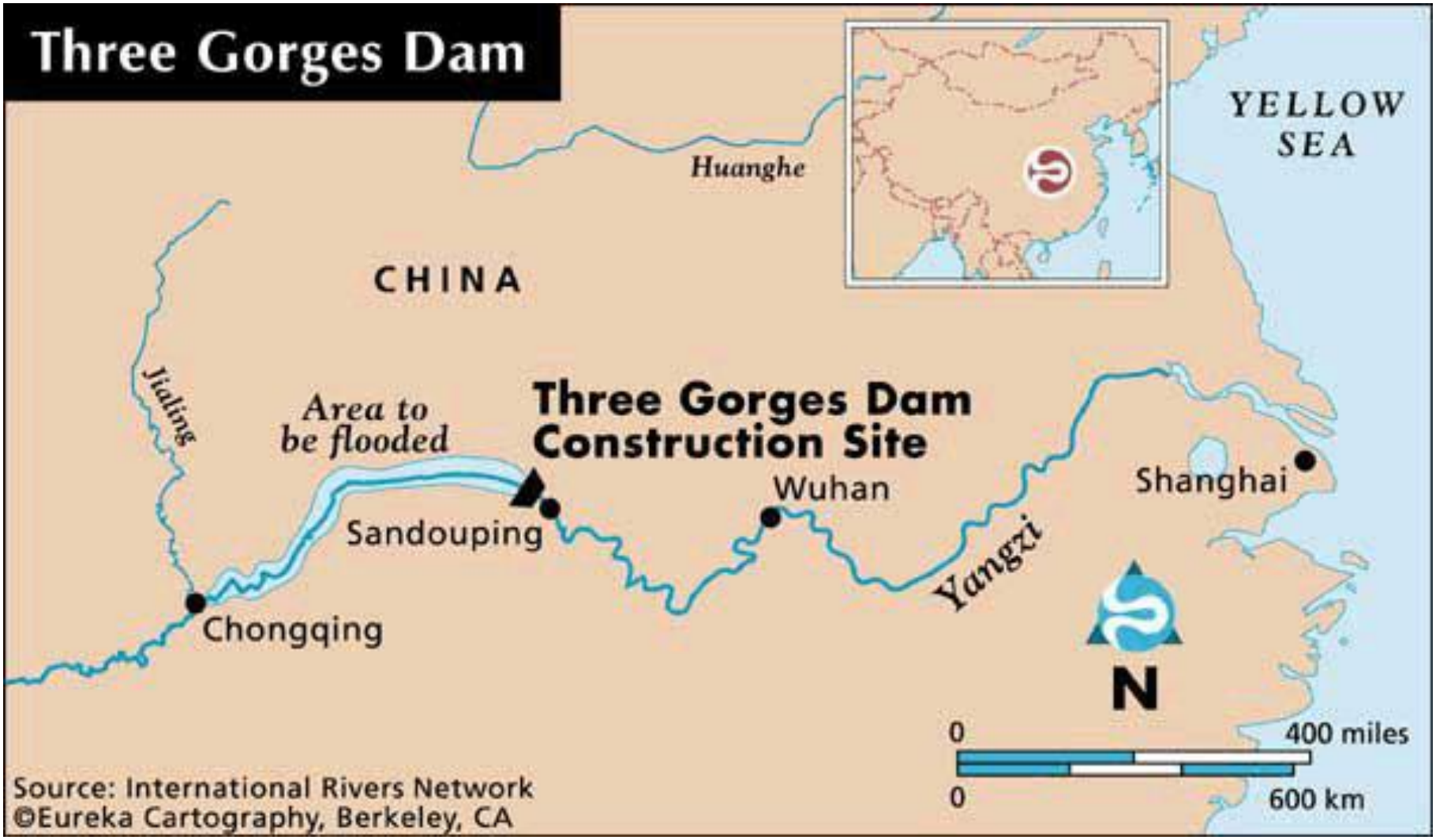
Three Gorges Dam

Learning Outcomes

- To examine the hydrological changes resulting from the construction of dams and reservoirs.
- To examine the costs and benefits of dams and reservoirs as part of multi-purpose schemes.

Starter

Where is the Three Gorges Dam?


Three Gorges Dam
YELLOW SEA
Huanghe
CHINA
Jialing
Area to be flooded
Three Gorges Dam Construction Site
Wuhan
Shanghai
Sandouping
Yangzi
Chongqing
N
0
400 miles
0
600 km
Source: International Rivers Network
©Eureka Cartography, Berkeley, CA

Statistics

- Project began 1993 – completed 2009
- Dam Length – 2.3 km
- Reservoir length – 660 km
- Reservoir width (average) – 1.1 km
- Total area flooded – 1084 km2
- Final inundation level – 175 m
- HEP production – 100 billion kWh (by 2011)

2002 - a successful river closure on the diversion channel

1997

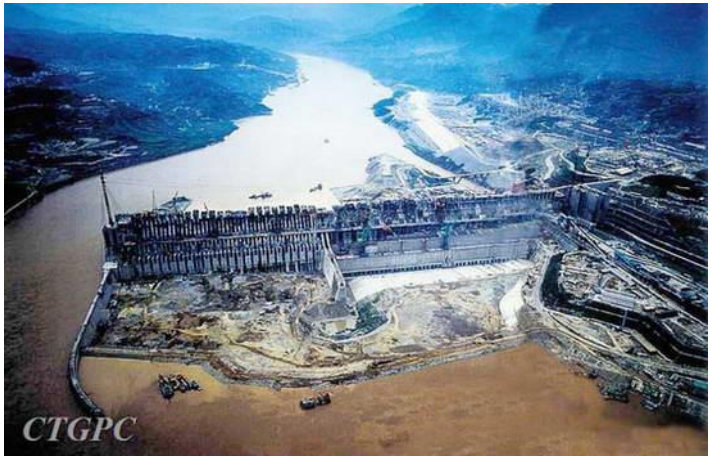
1999

2002

2003

Why was the dam needed?

What are the economic, social and environmental benefits?



1. Flood Control

Flooding on the Yangtze

Year	Loss of farmland	People affected	Deaths
1931	3.39 million ha	28.5 million	145,000
1935	1.51 million ha	10 million	142,000
1949	1.8 million ha	8.1 million	5699
1954	3.18 million ha	18.8 million	33,169
1998	239,000 ha	2.31 million	1526

2. The need for power - Hydro Electricity

The dam has 32 six turbine-generator units, each with a capacity of 700MW. The total installed capacity is 18,200 MW.

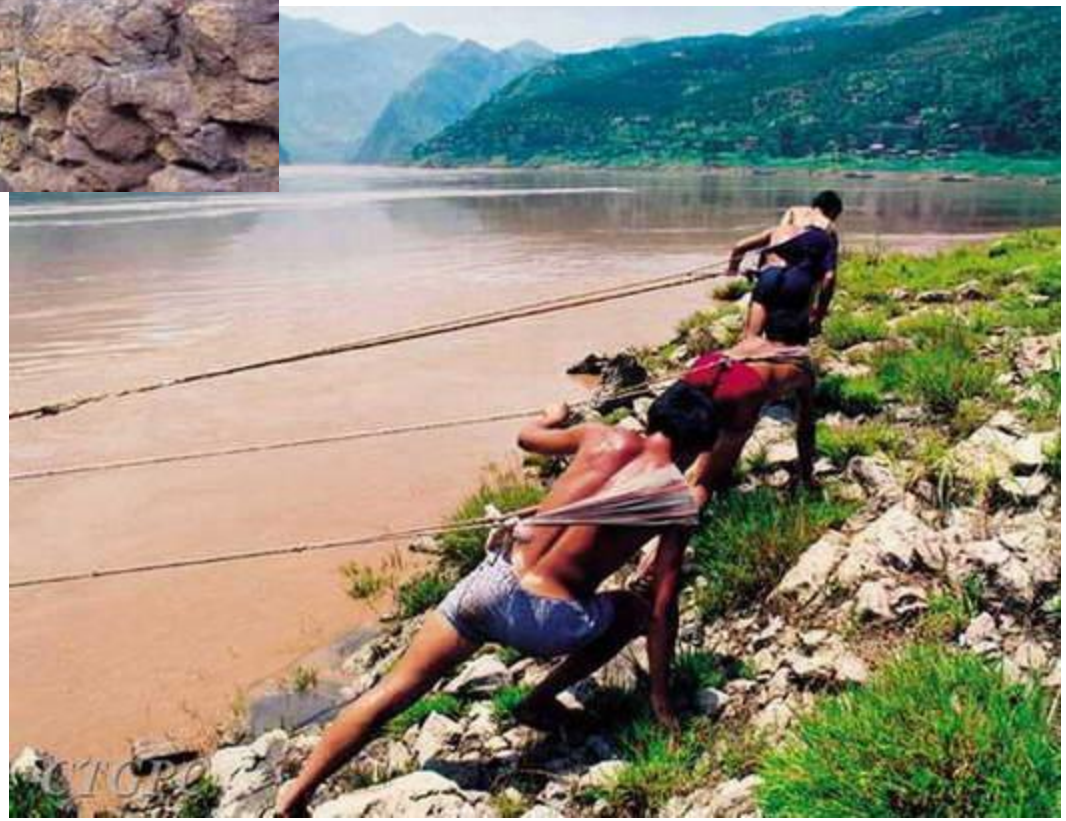
Other Benefits

This will prevent emission of ;

- 100 million tons of CO^2
- 2 million tons of SO^2
- 0.37 million tons of nitrogen oxide

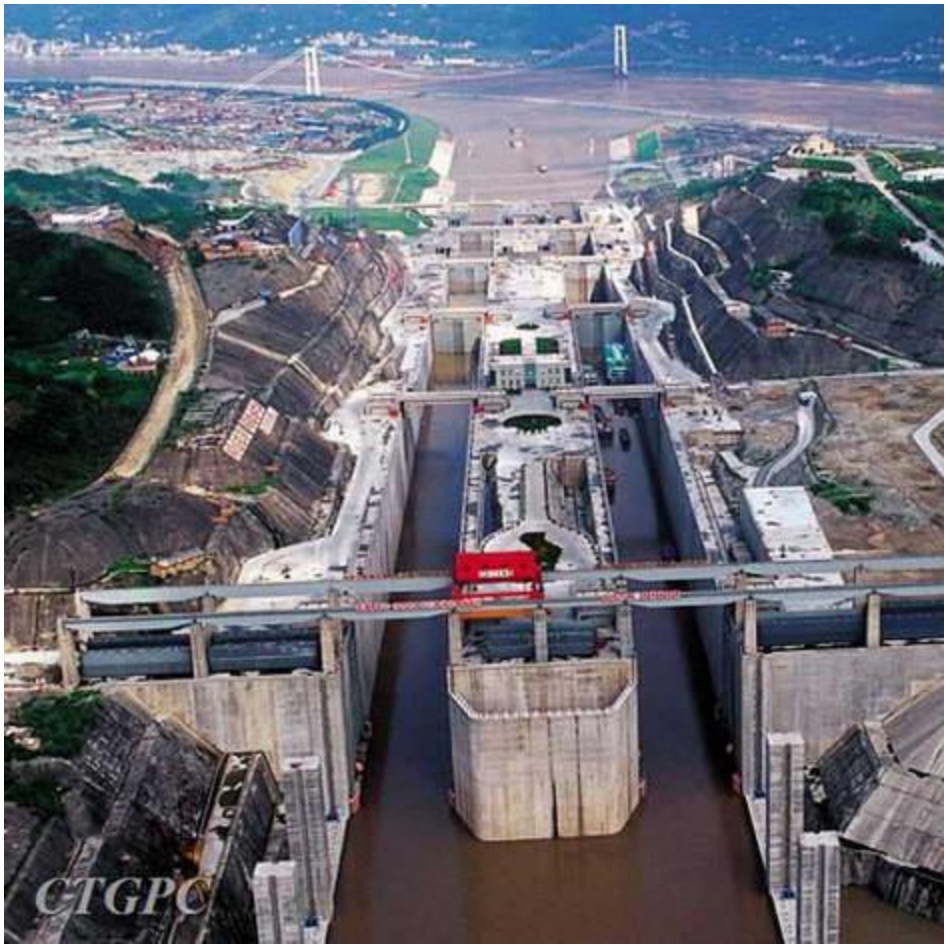
Turbines and Transformers


CHCPC



3. Improved transport and navigation

- Reservoir is now 660 km long.
- A new port is being built at Chongqing.
- 10,000 ton ships can navigate between Shanghai and Chongqing.
- The annual shipping will increase from 10 to 50 million tons.
- Shipping will also now be safer

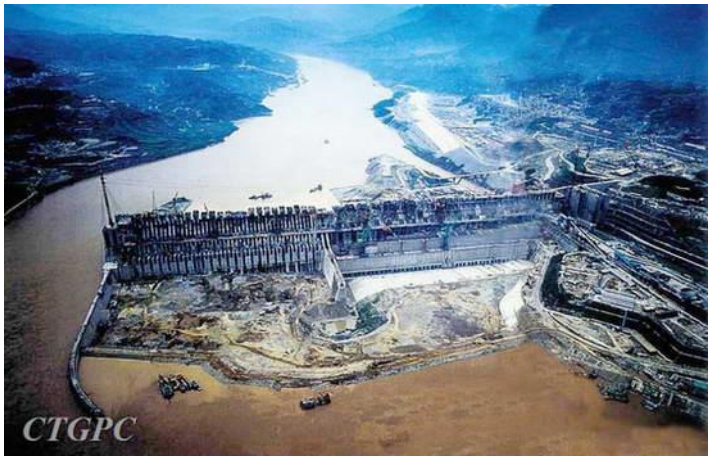


Profile chart of the double-way and five-step ship lock

4. **Tourism revenue and recreation**

What are the disadvantages?

What are the social, economic and environmental implications?



1. Resettlement

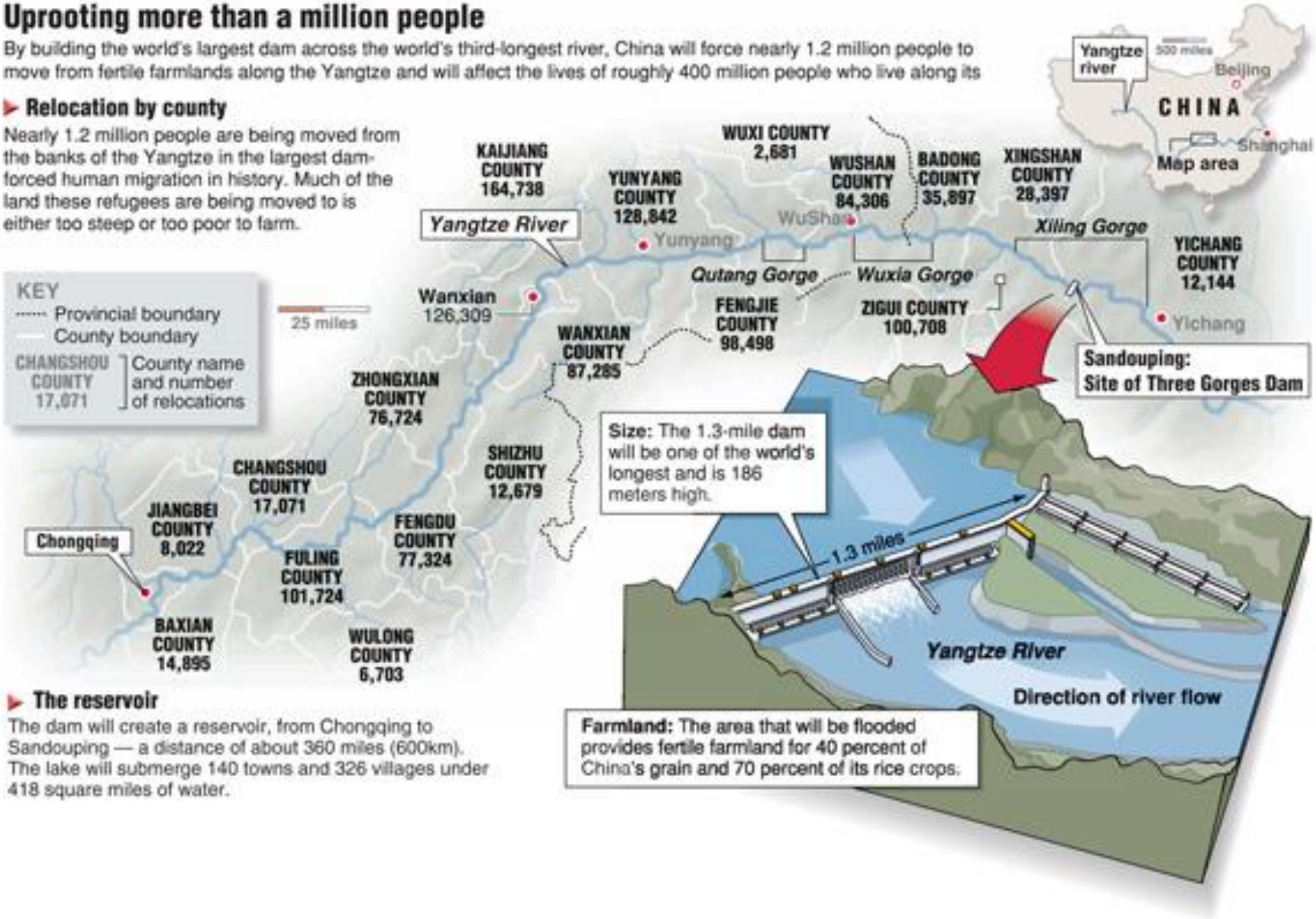
- The reservoir will inundate 632 km2 of land, including 24,500 ha of farmland .
- 1.13 million people have been relocated.

Uprooting more than a million people

By building the world's largest dam across the world's third-longest river, China will force nearly 1.2 million people to move from fertile farmlands along the Yangtze and will affect the lives of roughly 400 million people who live along its

Relocation by county

Nearly 1.2 million people are being moved from the banks of the Yangtze in the largest dam-forced human migration in history. Much of the land these refugees are being moved to is either too steep or too poor to farm.



The reservoir

The dam will create a reservoir, from Chongqing to Sandouping — a distance of about 360 miles (600km). The lake will submerge 140 towns and 326 villages under 418 square miles of water.

Resettlement issues

People may get better quality housing with modern amenitites.

Near by;

- Most good farmland was already in use
- Reports of corruption and failure to provide compensation
- New farms are smaller and on poorer land (cannot support the family)

Further away;

- Adjustment to growing new crops
- Adjusting to new local culture and languages

Salvaging building materials from demolished houses

New city with new bridge crossing and slope reinforcement

Old town . . . . .
and new town

Other disadvantages

- Loss of cultural monuments and archaeological sites
- Change in water ecosystem (change from a river to a lake)
- Dams prevent migration of fish
- Increase in geological hazards:
    - landslides (dues to rising water weakening and eroding the base of slopes)
    - earthquakes (water pressure)
- Pollution from towns discharged directly into reservoir (no longer flushes out)
- Sedimentation of the reservoir (reducing its capacity)
- River channel (bed and bank) erosion below the dam as water has more energy (carrying less sediment)
- Coastal erosion as less sediment arrives at the mouth of the river
- Reduced nutrients arrive at the sea, this reduces plankton and thus fish species

The Roles

The Task

- You will be allocated a role in the debate.
- You must research your role thoroughly, using the weblinks provided.
- How do you feel / does your organisation feel about the construction of the dam?
- What are the costs and the benefits?

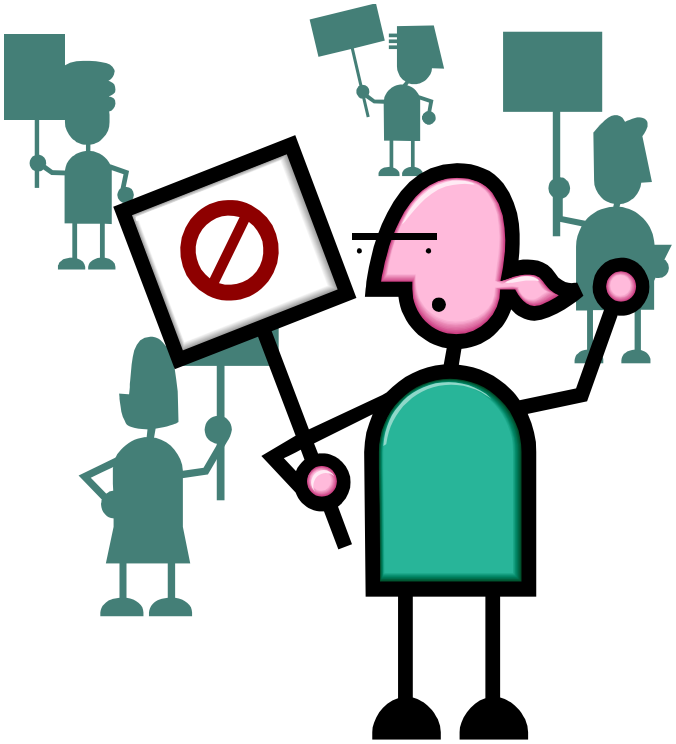
Consider the different perspectives of the following (and other) sites:

- International Rivers Network
- Chinese government
- Chinese newspapers
- China Water
- International

Chinese Government Officials

Locals in favour of the dam (e.g. local contractors)

Locals against the dam (e.g. those being displaced) (see Zich, 1997)



Environmental pressure groups

- (such as International Rivers Network, Probe International and Greenpeace).

International banks and companies boycotting the project

- (including the World Bank)

International banks/investment consortiums funding project, and international companies supplying project

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