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# Resettlement for China's Three Gorges Dam: socio-economic impact and institutional tensions

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**Abstract**

Large dams have been an important component of infrastructure development in capitalist and communist countries alike. In 1998, changing world attitudes on large dams led to a two-year World Commission on Dams and new global standards may soon insist that future projects pay fair compensation so that resettlement becomes voluntary. Now, 10 years after introduction of economic reforms, China is mobilizing its resources to build the world's largest dam. This fulfils a longstanding ambition to impound the Yangtze River in Central China at the Three Gorges and use the hydropower, improved navigation and flood control to develop the economy.

This paper examines the socio-economic impact of Three Gorges Dam on over 1.3 million people to be displaced while China is in transition to a market economy. We consider resettlement in terms of the decision-making structure, property rights and incentives to move, and how the project exacerbates problems created by market reforms, especially rising unemployment and deteriorating public health. We conclude the project is boosting economic expectations while adversely affecting large sections of the population, and this could provoke widespread social unrest and eventual changes in political institutions. 

*Keywords:* China; Dams; Emerging infections; Parasitic diseases; Property rights; Public health; Resettlement; Schistosomiasis; Three Gorges; Water power; Yangtze River

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*The need of such knowledge has become more and more urgent in China because the country cannot afford to waste any more of her wealth and energy in making mistakes.*[1]

## Introduction

China, more than 10 years into economic liberalization, transiently reverted to the Maoist mode of decision-making in 1992 to approve a massive development project, the Three Gorges Dam (TGD). It will affect millions of citizens whose response will be far less compliant than for Maoist decisions in the 1950s. The mode of the decision was out of touch with 1990s social reality and may lead to conflict far greater than anticipated.

TGD is China's largest engineering and infrastructure project since Liberation. It will affect the lives, habitat or economy of at least 20 million people above the dam and another 300 million downstream. Building a 185 m high dam across the Yangtze River at Three Gorges was infeasible in the 1960s, unaffordable in the 1970s, and politically and technically opposed in the 1980s. But in the early 1990s, after the Tian'anmen demonstrations, an authoritarian decision was taken to build the dam. Relocations will not be complete until 2009, and the socio-economic impact has begun. This region has been disadvantaged for decades and remains poor and ill-prepared for economic upheaval arising from uncertain property rights, lost farmland and new health hazards.

Here we explore the human impact of relocating at least 1.3 million Three Gorges people at a time of rising national unemployment and major economic reforms. We use available data and field experience from three research trips to the Three Gorges area (1996–1999). Our analysis produces new perspectives on the socio-economic effect of large dams in a transitional economy, and we hope to stimulate mitigation programmes lacking at present for the Three Gorges project itself. Finally, we predict that the project could induce social unrest and democratic changes in national political institutions.

## Ecological and economic setting

Arable land and fresh water in China are so scarce the country is thought to be approaching the limits of an environmentally sustainable economy. It is estimated to have only 2484 $m^3$ of fresh water per person compared with 7744 $m^3$/person for the world average, and only 0.08 ha of arable land per person compared with a world average of 0.26 ha/person (Tisdell, 1997). Over the last two decades the arable land

[1] Bronislaw Malinowski, writing in 1938, quotes anthropologist Hsiao-Tung Fei in the preface to Fei's study on a Yangtze village.

per capita in China has actually decreased by 0.2% (McKinley and Li, 1992, p. 197). So caution is called for when sacrificing Chinese farmland to store water for power generation, as planned for the giant Three Gorges Dam. The 600 km long reservoir that will form behind the 185 m high dam across the Yangtze River will trade-off scarce environmental assets close to the sustainable margin.

The project is intended to promote rapid economic development of China's poor interior, but there will also be a great social cost. The dam (Fig. 1) will flood a large area of farmland and withhold fertile silt from downstream areas. Water in the reservoir may precipitate earthquakes, landslides and large surface waves, geophysical phenomena that could destroy human settlements. Below the dam the river may shift its course, some irrigation intakes will no longer function, and alluvial soils will degrade. Dykes, built up over thousands of years, will erode. The downstream effects are unpredictable for specific locations (Barber and Ryder, 1993) but it is certain that there will be less summer flooding, higher winter flows, and less silt for decades. As well, the dam will reduce damaging floods, boost national electricity output by 10% and conserve water on a grand scale that may alleviate water shortages in the North of China (China Yangtze Three Gorges Project Development Corporation, 1994; Martellaro, 1991).

## The Three Gorges Dam controversy

The Three Gorges Dam provokes awestruck interest or passionate disapproval, or both, from an increasing number of people around the world. There is a global campaign opposing the impending destruction of the fragile physical environment, the rare flora and fauna, and the precious historical relics. There is less voiced concern for the dispersion and forced resettlement of local communities whose plight is the most certain adverse outcome of the dam.

Experiences in China and elsewhere indicate that many people directly affected by the Three Gorges Dam will become worse off (Stanley and Alpers, 1975; Hunter et al., 1993; Berger, 1994; Cernea, 1997; Scudder, 1997). Some may never recover socially or economically. Displaced villages may be broken up and conflict is to be expected in communities hosting large groups of oustees. Most published information on the adverse impact of large dams is post hoc, documenting what happened after construction was well advanced or complete (Hunter et al., 1993; Cernea, 1997). Noteworthy examples include a book on India's Sadar Sarovar projects (Morse and Berger, 1992) and a world-wide review at a recent World Bank–IUCN[2] conference (Dorcey et al., 1997).

For the Three Gorges Dam, despite its scale and notoriety, information on the expected socio-economic impact is lacking. A non-government organization opposing the dam used the Freedom of Information law to force the Canadian Government

[2] International Union for Conservation of Nature and Natural Resources, also known as World Conservation Union.

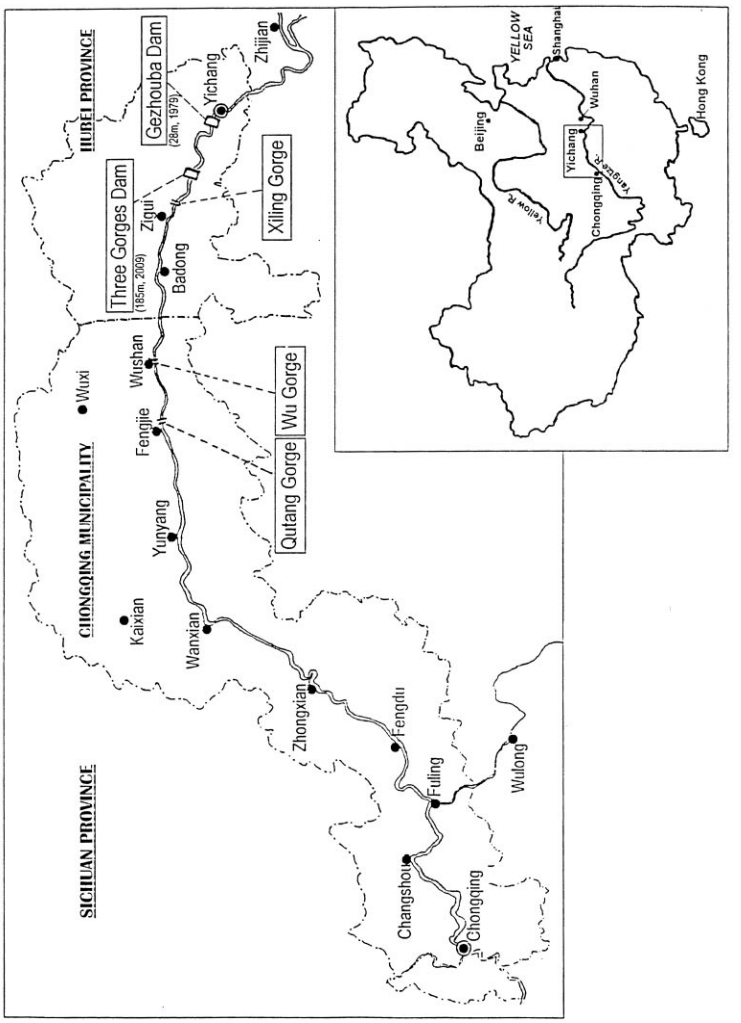


Fig. 1. Three Gorges area.

to release most of the feasibility study it had financed in the late 1980s. A scholarly analysis concluded that this seemingly biased study had overlooked the socio-economic impact of resettlement, and lacked crucial baseline information on sociology and demography (Barber and Ryder, 1993). To date, Three Gorges resettlement is managed by engineers and no baseline information on the dam-affected people has emerged in the public domain.

## Background to the Three Gorges Dam

Chinese society relies on hydraulic technology for water supply, flood control, irrigation and navigation (Needham, 1981; Martellaro, 1991). One of the earliest projects, still in sound working condition, is the Dujiang Dam built 2200 years ago, for agricultural purposes, on the upper Yangtze River in Sichuan Province. The decision to dam the Yangtze in Hubei Province at Sandouping, just below the Three Gorges, can be partly explained by the Chinese development culture for manipulating water resources. This dam arises from a long-held vision going back to Sun Yat-sen (provisional President of the Republic of China in 1912) and fits an ancient Chinese tradition of grand schemes for economic development. The dam has been planned for many years but debate about costs, feasibility and economic viability froze decision-making for decades until 1993.

The Three Gorges Dam has three main purposes. First, the benefits of flood control will go to 200 million people downstream in the middle and lower Yangtze valleys. The dam builders use Chinese records to show there were more than 200 major floods, about once every 10 years, from 185 BC to 1911 AD (O'Donnell, 1998, p. 16); the three catastrophic floods of 1931, 1935 and 1954 killed a total of more than 320,000 people. The recurring floods (including the July–September 1998 disaster claiming at least 3000 lives) and the potential of the dam to mitigate major floods provide a powerful argument for building it. The second purpose is to improve river transport, increasing ship size from 2000 ton to 10,000 ton to connect the East Coast to industrial Chongqing. The third purpose is to generate electricity from an 18,200 MW plant, whose capacity will rise to 22,400 MW when six more turbines are installed later (China Yangtze Three Gorges Project Development Corporation, 1994). As well, the dam will boost winter flows and substantially enhance electricity produced by the Gezhouba Dam located 40 km downstream, which has had an installed capacity of 2715 MW since its powerhouse was completed in 1986.

From 1970, electricity supply in China has lagged behind demand and the crisis has worsened in the past two years as industries expanded at an average annual rate of 22% (State Statistical Bureau of China, 1996, p. 204 and 403). In 1990, per capita electricity production in China was only 5% that in the USA, and 20% of the level in South Korea. China currently relies on coal for energy to the extent of coal supplying almost 80% of electricity; the alternative to hydropower and coal is nuclear power but it is the most costly to install.

Resettlement of the Three Gorges population should be nearly complete by 2003 when the dam fills to the 135 m level and begins to generate power. By 2009, when

the dam wall reaches its final height of 185 m, the reservoir will have a 5000 km margin stretching from the dam at Sandouping upstream for 600 km through the three gorges — Qutang, Wu and Xiling — to Chongqing City (Fig. 1). Based on official population estimates, adjusted for growth to 2003, at least 1.13 million people must move. Experience with other large dams suggests this number will increase substantially (Dorcey et al., 1997).

The relocation has begun in the 19 affected counties under the jurisdiction either of Hubei Province or Chongqing Municipality, an inexperienced provincial-level government created in 1997. In 2003 the dam will flood two large cities (Wanxian and Fuling), 11 county towns, 114 townships, and numerous villages and farms. Chinese authorities reported that more than 100,000 people were removed by the end of 1997 but others dispute this figure, saying that many have refused to go (Eckholm, 1998, derived from Wu Ming, 1998). Probably people will be moved in a rush as the impoundment becomes imminent in 2003, as has happened with many other large dams.

## Dam-affected people

China has a poor record in relocation of people displaced by several thousand hydrostations built since 1949. By 1996, there were 118 large and medium hydropower dams across China's seven major rivers and their tributaries. All were built at great and unmeasured social cost for an estimated total of 10.2 million displaced people (Jun Jing, 1997). The Three Gorges Dam oustees will exceed the combined total of the three largest Chinese dams: Danjiangkou in Hubei Province (380,000), Sanmenxia in Henan Province (320,000) and Xin'anjiang in Zhejiang Province (280,000) (Fearnside, 1994). Jun Jing (1997, p. 74) raises concern for the conduct of Three Gorges resettlement by pointing to past neglect, coercion and suppression accompanying construction of China's big dams when "no serious effort was made to respond to local concerns over matters of compensation, community break-up, economic recovery, or social adjustment in the new communities".

Large dams around the world have imposed heavy economic and social costs on local populations. At least 35,000 large dams exist (Dorcey et al., 1997); many are in low-income countries. An average of two million people a year are forced to move because of dams, but affected people are resisting. Vigorous opposition to the Sardar Sarova dam in India interrupted construction and the World Bank ceased funding in 1993 (Morse and Berger, 1992; Berger, 1994). Other dams attracting strong opposition are the Arun in Nepal, the Kaeng Sua Tan in Thailand, and the Bakun in Malaysia (Sleigh and Jackson, 1998).

In 1998, the World Bank and the World Conservation Union appointed an independent World Commission on Dams for a two-year inquiry to set new standards, with special emphasis on socio-economic impacts (Dorcey et al., 1997). This inquiry will herald a major shift in the policies and practices of international dam builders and financiers.

It is amidst this changing global attitude that China proceeds with the Three

Gorges Dam. Also, within China massive urban dislocations are occurring owing to economic reforms in state enterprises (Jackson 1986, 1992). Anyone evicted by the Three Gorges Dam and not given land will compete with millions of other unemployed people for scarce work opportunities. This situation is especially serious in Chongqing, the mega-city that would be most likely to absorb displaced Three Gorges labour.

The scale of resettlement for the Three Gorges Dam is unprecedented. An official survey of unknown accuracy in 1992 revealed that 846,500 residents must relocate (Zhu Nong et al., 1996). After population growth is taken into account, the official estimate is 1.13 million to 1.6 million (Qi Ren, 1998) which could grow eventually to more than 2 million. The overall distribution of the displaced persons is indicated in Table 1. So far there has been no open discussion about the problems of the displaced.

## Incentives and constraints to voluntary resettlement

Large dams in China and other places flooded homes and land, and resettlement has typically been involuntary. From an ethical perspective, involuntary resettlement is a most serious issue because people should matter the most in any infrastructure development. But promised compensation for the loss of homes and livelihoods is usually inadequate for dam projects of low-income countries. Enormous costs are forced upon oustees, imposing sacrifices for the community good on people to be relegated to a life of extreme hardship and poverty that may persist for generations. Already, critics of the Three Gorges resettlement programme are describing how communities are being broken up. They report that oustees are forced to migrate to inhospitable localities or to live amongst hostile host populations, with coercive eviction and variable compensation causing widespread resentment and intense

Table 1
Displaced population in Three Gorges Dam area[a]

| Administrative unit (number of affected counties) | Total population | No. of displaced persons (% of total) |
|---|---|---|
| Chongqing City (3)[b] | 3,270,000 | 13,500(<1%) |
| Fuling Prefecture (3)[b] | 2,240,000 | 126,700(6%) |
| Qianjiang Prefecture (1)[b] | 470,000 | 8400(2%) |
| Wanxian Prefecture (8)[b] (Wanzhou Development Zone) | 7,290,000 | 571,000(8%) |
| Hubei Province (4) | 1,730,000 | 126,900(7%) |
| All 19 counties | 15,000,000[c] | 846,478(6%)[c] |

[a] Source: compiled from Zhu Nong et al. (1996).
[b] Formerly under Sichuan province, now under Chongqing Municipality.
[c] Baseline population in 1994. By 2003 the total population in the affected counties will grow to 19 million and the displaced total will reach at least 1.13 million.

opposition (Wu Ming, 1998). These reports are unverified but are not surprising, based on experience elsewhere.

Incentives and compensation constitute the major problem in resettlement. The construction of dams breeds untold social discontent and despair when developers absolve themselves from the duty of care to see that displaced people are not worse off. However, some critics even think that the Pareto welfare optimum of economists that "no one should be worse off" is not sufficient because it implies economic paralysis (Goodland, 1997). Indeed, the beneficiaries of dam development should also include the displaced and host populations. International support for future large dams will have to focus on just and fair compensation so that resettlement actually becomes voluntary for most people displaced.

In general, there is a right price for voluntary resettlement; voluntarism is attainable when compensations make people better off. As shown in Fig. 2, the price should be negotiated at above the compensation payment $P_2$, the point at which the oustees are indifferent to staying or leaving their habitats and livelihoods. The model suggests that an individual will definitely stay at $P_1$, will be indifferent to whether to move or to stay at $P_2$, and will have the economic incentive to move at $P_3$. Payment at $P_1$ under-compensates. To induce voluntary resettlement, compensation payment should be offered above "indifference" payment $P_2$ but below $P_3$ (that is, within the $P_3-P_2$ zone of negotiation). This will match the aspirations of individuals to become better off. However, these points will be based on average values for groups and we would expect considerable variation in the point of indifference for individuals, even within the same household. Some will never want to move. Of course, such "willingness to move" analysis over-simplifies by monetarizing the entire basis of choice, and we have ignored the possibility of inflated $P_2$ levels as part of a self-interested "game" strategy that may be played if peasants expect to be under-compensated.

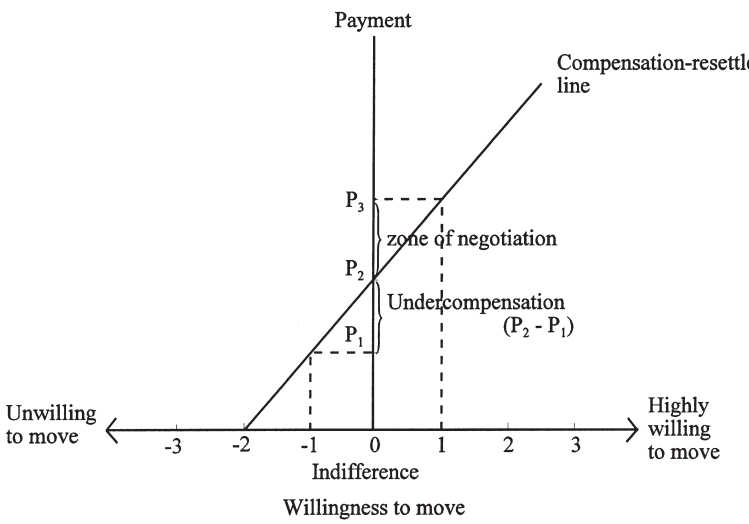


Fig. 2. Levels of compensation payments for voluntary resettlement.

Also, we are aware that some factors considered by resettlers have no monetary value.

According to a newspaper report on the Three Gorges Dam project, government documents promise the peasants in Yun Yang County a sum of 20,000 yuan for every relocatee but local officials offer 10,800 yuan. Township and county governments devise their own separate schemes for compensation (*South China Morning Post*, 1999a).

Apart from fair compensation, another issue is that government investment in regions to be flooded by dams may decline for many years before construction. This means that residents have a much lower standard of living when compensation is calculated than they would have if the dam had not been planned at all. Such withholding of investment has indeed been reported for the Three Gorges area. In Wanxian (renamed Wanzhou), the prefecture most affected by the dam, the government invested only US$72 million since 1949 because it was known that this area would be flooded, making it one of the 18 poorest regions in China today (*China Daily*, 1998a). As well, Sichuan Province had under-invested in the Three Gorges prefectures for many years because of plans to remove those areas from Sichuan, as happened eventually in 1997.

Even the best intentions cannot materialize into satisfactory resettlement if funds are insufficient, as they are for the Three Gorges Dam. Despite the completion of the cofferdam in 1997, and awarding of the first turbine contracts, the construction of the dam could be slowed down or even halted because of financial difficulties. A recent estimate put the total cost of the dam project at 200–240 billion yuan (at least US$24.1 billion) (*China Daily*, 1998b). The crucial problem is finance for the first 11 years of construction amounting to 65 billion yuan (at 1993 prices), before it begins to earn electricity revenue in 2003. The funding shortfall is exacerbated by non-participation of the World Bank, the US Export–Import Bank and several other finance agencies normally helpful for large dam projects.

Officials expect the resettlement budget to be over 100 billion yuan (US$11.76 billion) by 2003, the first stage of inundation. The budget will cover compensation for lost homes and farms, as well as for new roads and bridges, water and power supplies and other infrastructure and moving expenses. But the amount actually being disbursed for resettlement is not known. Expected cost inflation for building the dam will probably reduce resettlement allocations.

The World Bank is not involved in funding the dam although it is assisting other large dam projects in China. The Three Gorges financing comes today from three sources. First, since 1992, a Three Gorges Dam Construction Fund has collected a nationwide levy of 0.015 yuan/kW of electricity sold annually. This will raise a total of 30 billion yuan for the first 11 years (China Yangtze Three Gorges Project Development Corporation, 1994). The second source is revenue from the Gezhouba Hydro-Dam situated 40 km downstream from the Three Gorges. The initially low price of Gezhouba electricity was raised progressively during 1993–1996. Third, domestic loans were obtained mainly from the China Construction Bank, and partly from bonds and shares in Three Gorges Project and the Gezhouba Co. Ltd. (*China Daily*, 1997).

## Loss of farmlands

The immediate impact of any large dam construction on local communities is the loss of livelihood and habitat. Three Gorges Dam will flood nearly 34,000 ha of agricultural land. Fifty percent is rice fields, 22% garden plots, 1% fishponds and 10% forests (Zhu Nong et al., 1996). The economic cost of submerging farming land is high in China. There, 25% of the world population has access to only 7% of the world's arable land, with implications for an extremely high opportunity cost of good farming land.

The average population density of the Three Gorges Dam region is 197 per $km^2$ compared with the national average of 109 per $km^2$ (Chen et al., 1990). Food importation into the area will be necessary to make up for the losses of food production from 25,000–28,000 ha of rice fields, garden plots and orchards. The official prediction for the Three Gorges area is a grain shortage of 120–150 thousand tons each year (China Yangtze Three Gorges Project Development Corporation, 1994).

Dam builders have argued for constructing a large dam in order to gain economies of scale. For every billion kW h in annual electricity output, inundation of 28.35 ha of land was necessary for the Three Gorges Dam compared with an average of 900 ha for the other 31 large and medium-sized dams currently under construction (Zhu Nong et al., 1996). This engineering viewpoint is economically miscalculated if the scarce and fertile farmlands to be flooded are more valuable than the electricity generated; the total welfare loss to the whole society might be minimized if the economic cost of inundated farmlands was more widely dispersed instead of concentrated in one area. The fertile farmlands to be flooded by Three Gorges Dam are located in a mountainous zone where arable land is scarcer and the population more dense than most areas in China.

Furthermore, Premier Zhu has banned clearing of virgin forest for resettlement because of the risk of soil erosion, and has also banned terracing on slopes exceeding 25° (*South China Morning Post*, 1999b). These new regulations will exacerbate the land shortage. Claims that rural relocation was feasible for 60% of displaced farmers were surely exaggerated.

## Inadequate property rights

When infrastructure development entails loss of human habitats in a market economy, fairness and equity are upheld by paying compensation equivalent to market prices, at least. A property market has developed in some urban areas in China but it is still unclear if individual home buyers have full rights to sell as they wish (*China Daily*, 1998c). In 1998, the government announced it would end socialist distribution of welfare housing with a nationwide plan to build affordable housing for families. The implication was that a property rights reform was forthcoming in the real estate sector of many cities. However, such conduct has not yet reached rural China. Farmland acquired by the State cannot be valued by a prevailing market price because there is no market for rural land.

Economists (who support the school of New Institutional Economics) note that imperfect market information and transaction secrecy will prevent Pareto-optimal welfare (Bates, 1997) and this is true for compensation for infrastructure-induced losses. Bates also notes the over-riding importance of proximal non-market institutions, especially the local political and cultural setting, and political power. In China, individual peasants have little or no formal political power, a land market is virtually absent, and compensation for resettlement is usually secret. So dam developers would be expected to make inadequate compensation to rural resettlers. Host communities may receive little or nothing at all.

Private land in China was confiscated 40 years ago. Agricultural reforms abolished collective farming and the commune system 20 years ago but agricultural land is still collectively owned. Reforms of all property rights have been singularly slow (Yang Xiaokai, 1993) and the state still retains ultimate ownership of farmland.

Under the household responsibility system farmers have had partial usufruct rights (to use and enjoy the fruits, but with constrained choices for crops and animal husbandry) since 1979 (Yang Tao D, 1997). They lease land on individual household contracts for 5–30 years (Rozelle, 1994; Kung and Liu, 1997; Smyth, 1998), and short lease periods are typical (80%). In some places the partial usufruct rights can be inherited or sold. More often the land-use right may be rented to others temporarily since peasant families rarely wish to abandon their rural holdings. When they leave permanently the land reverts to the village administration, and the future stream of earnings is forfeited without compensation (Yang Tao D, 1997).

The right to property ownership, the right to claim ownership, the *ius utendi et abutendi* (right to use and dispose), and the right to usufruct can be distinguished. These rights vary for different property and kinship categories, and need to be understood before analysing economic development in any setting. The "old" property rights prevalent in Yangtze farming villages were extremely complex and variable from one place to another (Fei Hsiao-Tung, 1939). Aspects of these rights probably persist in various forms in traditional Three Gorges communities and would be expected to influence compensation expectations profoundly.

Compensation for loss of farm habitats will be inadequate unless property rights are restored and connected to local aspirations. The dilemma for China, in a transition economy, is that restoration of full property rights on rural land can be a socially backward step, leading to re-emergence of powerful landowners and more impoverished peasants.

## Loss of employment for displaced population

Despite the intense propaganda on the good intentions of the Three Gorges Dam policy, the prospects for socio-economic outcomes in the affected region do not seem to differ from that in other large dam projects, in particular the loss of current employment. The complexity of restoring livelihoods should not be underestimated. Unlike farming, urban jobs cannot be passed from one generation to the next.

Forty percent of displaced persons are farmers but only 60% of them will get

land-for-land enabling resumption of former occupations. About 45,000 ha of "unused land" in the resettlement areas will be developed. Even if given larger plots, which is unlikely, many farmers will not regain former income levels. The available uninhabited land around the Three Gorges is steep and all fertile land is already farmed. The new lands may not be suitable as their productivity has yet to be proved. The uplands, only suited to citrus, tea and other cash crops, present new environments to farmers. Crops and farming practices must change, but this takes time and incurs loss of income. Many resettlement areas will be high and too frost-prone for citrus production (Zhai Yushun et al., 1997). Steep slopes in the Three Gorges area are already at high risk for landslides. This risk is made worse by farming, especially when water tables rise after filling the lake.

The 40% of farmers without land-for-land will lose their existing employment. Those unable to find employment at the dam site and related infrastucture works will have to migrate to urban areas to seek new livelihoods. Rural migrants to cities are officially classified as temporary residents and are normally not allowed to settle permanently under the resident registration system. Therefore many of the farmers displaced by the Three Gorges Dam, especially the young, would welcome the rare opportunity to change status to permanent urban residents. However, urban unemployment has been increasing rapidly since 1998 as a result of the reforms to close unprofitable state-owned enterprises. Poorly educated peasants are at a disadvantage compared with the urban unemployed in competing for scarce jobs. Another group at high risk is the 10–30% of Three Gorges urban dwellers without official residency permits (Fearnside, 1994). They will probably not be compensated at all, and may not have been counted in baseline population estimates.

## Uncertain outcomes of relocation policies

Scudder (1997) characterizes involuntary resettlement in four stages. The first stage is relocation; the second is adjustment to new situations and occupations. Along with the emotional and economic stress of readjustment, many endure a sharp fall in income and standard of living. Also, because most people stop investing once they know they must move, income and assets at the time of relocation are lower than normal. Resettlement enters the third stage if economic development and community formation occur. The fourth stage consolidates. Scudder notes that most cases do not reach the third stage.

A job-creation policy for the Three Gorges area seemed to be in place with the announcement in 1994 that an Economic Development Zone would be set up there with the same preferential business incentives as the coastal economic zones. "Open city" status equivalent to that of coastal cities was granted to Yichang, Wanxian and Fuling. But so far there is little development activity except in Yichang, location of the administration headquarters for the dam construction. The Asian financial crisis and slowing of the Chinese economy in 1998 and 1999 could impede progress in these Economic Development Zones.

There are also plans to relocate 180 factories to Chongqing and resettle 67,000

displaced people there, but it is not clear how many are landless peasants. These plans pre-date the new state enterprise reforms and are now in jeopardy. Many of the labour-intensive state industries cannot absorb Chongqing's own 108,500 registered unemployed (Chongqing Statistical Bureau, 1998, p. 84), much less create new jobs for displaced persons from the Three Gorges area. As half of the local state enterprises made losses in 1998, they are likely to dismiss their workers while the private sector is expected to absorb additional labour; private firms in Chongqing employed only an estimated 1.5 million workers out of about 17 million in 1997 (Chongqing Statistical Bureau, 1998, p. 75; *China Daily*, 1998d). The employment situation will worsen over the next few years.

Five years after the bulldozers set upon Sandouping, there is little evidence that displaced people are better off. Without independent monitors, such evidence will not be forthcoming even if it exists. However, it should not take massive resources to raise living standards because they are among the poorest in Central China. This is illustrated by the per capita GNP in the Three Gorges area, compared with Chongqing and Chengdu, the capital of Sichuan Province (Table 2).

Two international organizations, known to be opposed to the dam, have already released an unfavourable report on resettlement. The report is a result of an investigation in five counties by a Chinese sociologist with a pseudonym of Wu Ming (1998). Wu wrote of widespread corruption among local resettlement officials including bribes for construction contracts and bureaucratic mismanagement of resettlement funds. These allegations were supported by visual evidence revealed in a documentary film entitled 'The Dammed', produced by BRTN-TV and directed by Leo de Bock (1998). A book compiled by Dai Qing and sponsored by environmental advocates (Probe International and International Rivers Network) was published recently (Thibodeau and Williams, 1998). It contains several chapters pointing to grave problems with resettlement, especially the lack of land suitable for farming.

It is not possible to confirm that any of these reports are representative of the

Table 2
GNP in yuan[a] for the Three Gorges area, Chongqing and Chengdu, 1995[b]

| County name | Per capita GNP | County name | Per capita GNP |
|---|---|---|---|
| Jiang Bei District (part of Chongqing) | 8141 | Wu Shan County | 1382 |
| Ba Nan District (part of Chongqing) | 3329 | Wu Xi County | 1087 |
| Changshou County | 3492 | Fu Ling City | 3639 |
| Wanxian City | 2489 | Wu Long County | 1766 |
| Kai County | 2093 | Feng Du County | 1884 |
| Zhong County | 1683 | Shi Zhu County | 1871 |
| Yun Yang County | 1381 | Chongqing City (for comparison) | 4897 |
| Feng Jie County | 1762 | Chengdu City (for comparison) | 7388 |

[a] Note: US$1=approximately 8.5 yuan in 1999.
[b] Source: Sichuan Statistical Bureau (1996, pp. 25, 205–208).

overall situation, but China's corruption problem (see Ting Gong, 1997), as well as mismanagement and seriously inadequate resettlement, have been features of many other large dam projects. Three articles by Jasper Becker, in a Sunday edition of Hong Kong's *South China Morning Post* (South China Morning Post, 1999a,b,c) specifically reported embezzlement, corruption, bribery, shoddy contracting and systematic under-compensation in relation to Three Gorges resettlement. Becker also notes there is already social unrest and over 10,000 angry peasants of Yunyang county, one of the poorest areas affected, have filed three petitions to complain to the central government. Premier Zhu Rongi is reported to have appointed 200 extra inspectors and outside consultants to oversee resettlement.

## Disease risks

Dams in developing countries pose health hazards to the displaced populations due to impoverishment, malnutrition and lack of medical services (Hunter et al., 1993; Bradley, 1994). There are many specific health concerns for the Three Gorges project. For example, people in the reservoir area may acquire parasitic diseases due to ecological changes. Inundation will create environments favourable for a number of parasitic diseases, such as paragonimus and malaria. Already there has been an epidemic of locally transmitted malaria among residents at the dam site in 1996, and this could recur and spread.

One disease in particular, schistosomiasis or snail fever, is causing great concern among public health workers, although the Three Gorges area is free of it for the moment. This snail-transmitted water-based parasite causes chronic diarrhoea, intestinal haemorrhage, liver damage, decreased work capacity, and death. Despite 40 years of control efforts it still remains in the Sichuan area only 500 km above Chongqing and in the Hubei marshland below the dam site (Ministry of Public Health, 1993). New marshlands around the Three Gorges reservoir will provide an environment suitable for schistosomiasis; once established in the area schistosomiasis will be difficult to control (Sleigh and Jackson, 1998).

Disease due to the dam is a negative externality that will undermine economic development in resettlement areas. Disease control and surveillance incur financial costs that should be borne by the creators of the externalities, not by the at-risk residents. The Chinese authorities are already implementing, with varying success, environmental protection policies (Jahiel, 1997). Like the environmental tax in some Western countries (for example, the carbon tax in Sweden), it would be possible to levy a "public health tax" on shipping through the Three Gorges area, similar to the highway tolls found throughout China. The more shipping and commerce, the higher the disease risk. Government intervention by such a tax is appropriate when there are many producers and many stakeholders (Coase, 1960).

## The dam as an instrument of institutional changes

New Institutional Economists consider two types of institution — informal and formal. Informal institutions include the attitudes, behaviour, expectations and values, evolved through time, of the whole community. Formal institutions are the rules and regulations made by the government. In the process of development, informal local institutions either facilitate or impede changes in the formal rules and regulations enacted by national politics (North, 1995). During its relatively long construction period of 17 years the Three Gorges Dam could become a catalyst for institutional changes, both informal and formal, for breaking the ice of political conservatism.

Two decades after China opened to the outside world and began economic liberalization, the high speed of modernization and technological change ensures global access to Chinese news and information. Also, it is no longer possible to censor incoming information and knowledge flowing into the Three Gorges area. This could empower the local population in their quest for fairer terms and compensation compatible with a modern market economy, even one with "Chinese characteristics". If people find a venue to articulate their concerns, this would create an opportunity for political reform.

It seemed that the decision to build the dam arose from the consequences of the 1989 Tian'anmen demonstration, which for a while left China isolated economically, and universally condemned. On 16 March 1992, when the proposal was submitted to the Fifth Session of the Seventh National Congress, it was approved by only two-thirds of the delegates, which in the Chinese context is the slimmest of margins. The evident concern was ignored and decision-making reverted to the autocratic style typical of centralized planning in previous decades.

The paradox is that if the decision-makers persist with authoritarian measures, they could unleash such large-scale unrest that political reforms could result. The Three Gorges Dam has great potential for provoking institutional changes for several reasons. First, the dam is under the control of (and therefore close to) the highest and most powerful political forces in China. A supreme policy-making body, the "Three Gorges Project Construction Committee", is led by the Premier of the State Council; the other members are heads of relevant ministries. Under the direct supervision of the Committee is the "Three Gorges Resettlement Bureau", responsible for the planning and supervision of population resettlement. Policy-makers are in a position to obtain immediate feedback and have the power to respond quickly to disgruntled communities in the Three Gorges locality.

The authorities must listen to any feedback even if it is only because of the huge numbers displaced, the strategic nature of the project, and the fact that the area attracts millions of visitors, domestic and foreign; for 1997, the estimate was 260,000 foreign tourists in the Chongqing Municipality (Chongqing Statistical Bureau, 1998, p. 262). As the Three Gorges project is the largest resettlement operation ever undertaken in modern China, social and political discontent could have explosive consequences. Recently, an institutional reform of village government was implemented in China, including the Three Gorges area. Regarded as an experiment, most of

China's 900 million farmers in 930,000 villages are now able to choose local leaders by direct election (*China Daily*, 1998e). If the new system works, then local village committees will exercise more power and be more democratic. The village elections should allow the voice of displaced people to be heard for the first time.

Economic liberalization tends to enhance expectations of corresponding political evolution. This will happen together with the rise of China's international status as a trading nation. Growing reliance on foreign trade and direct foreign investment will open the country more than ever before to scrutiny on human rights by the global community. China's outstanding economic achievements (especially when compared with the former USSR) will contribute to changes in people's attitudes, expectations and values in economic and political terms. These should flow on to aspirations for political reforms, nowhere more so than in an area subject to such massive socio-economic change as that underway at Three Gorges.

## Concluding remarks

We have reviewed the resettlement issues arising from the Three Gorges Dam and placed these in the context of China's property rights and its transition to market socialism with political reforms and more institutional transparency. The dam will have adverse social and health impacts on more people than any other ever built. Experience with resettlement for large dams points to the complex procedures needed to mitigate adverse effects. The international finance "embargo" on the Three Gorges Dam ensures that voluntary resettlement cannot be afforded even if the government was willing and capable. Studies of the baseline economy, demography and sociology are lacking. Measuring and interpreting social outcomes require international inputs that are not present.

Two important factors could turn this ominous situation around. First, the international organization with the most knowledge, experience and expertise in resettlement — the World Bank — is prepared to change its social impact practices. The new World Commission on Dams (WCD) certainly will set high standards when it reports in May 2000. These standards may insist that large dam projects ensure dam-affected people are better off, and most resettlement is voluntary. Second, the institutional feedback of the affected Three Gorges population is so direct, and so strategic geographically and politically, it could lead to a major change of resettlement policy within China.

China and international agencies such as the World Bank could seize the chance to test some of the new WCD approaches immediately. Then the benefits of water conservancy and power generation could be shared well and the development outcome would match the massive investment in the dam. Otherwise, the ill-timed authoritarian decision in 1992 to build the dam will adversely affect millions of China's citizens for decades. Many will be inclined to react politically and become more wary of centralized decision-making, pushing for comprehensive political reforms.

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