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**SUCCESSFUL RESERVOIR  
RESETTLEMENT IN CHINA**

**SHUIKOU HYDROELECTRIC  
PROJECT**

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Map: IBRD 29025

## FOREWORD

Large-scale resettlement for dam and reservoir construction is a difficult business. Thus examples where resettlement has been successfully carried out, and where this claim can be backed up quantitatively, are relatively rare. The Shuikou project is one such example, partly due to the extensive documentation available, including the reports of an independent evaluation instituted early in the implementation phase and carried through to completion.

This report attempts to record the resettlement process at Shuikou through planning, design, implementation and post-construction phases. A detailed review of outcomes is followed by an attempt to explain the reasons for its success. These are evidently many and varied, ranging from responsible policies from central and provincial governments to a strong resettlement organization and not least to a constructive attitude by individual affected families. Clearly, a number of things fell into place at the right time, underscoring the point that successful resettlement requires a complex, varied set of actions and responses, and sensitivity to broader economic trends.

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## ABSTRACT

This paper records the involuntary resettlement experience associated with the construction of the Shuikou Dam and Reservoir Project in Fujian Province. The project used two World Bank loans: the first, for \$140 million, was approved in 1987; the second, for \$100 million, was approved in 1992. The reservoir created by the project has an area of 94 square kilometers, caused the relocation of 67,239 persons in rural areas and 17,215 persons in Nanping City. The physical relocation was carried out between 1988 and 1993. The economic rehabilitation of the affected households took another five years. By the end of 1997, 38,439 jobs had been created for the rural population, while for Nanping, no job creation was required, as people were able to continue their old jobs after relocation. Of the rural jobs, 52 percent involved nonfarm or nonland-based activities. The resettlement was instrumental in speeding up a transition out of traditional agriculture. The resettlement expenditures, at \$14,000 per household, are among the highest recorded in China for a project of this type, a major factor in its success.

Other success factors detailed in this report include the responsive policies of the central and provincial governments; a comprehensive institutional framework for the planning and implementation of the resettlement; the involvement of the affected village populations in identifying economic opportunities and implementing these; the willingness of the affected households to take the opportunity to supplement compensation for housing with additional investments to construct houses far superior to those replaced; the sensitivity of the implementation approach, which allowed for changes as circumstances warranted; and the independent evaluation of resettlement.

Early on in project supervision, the World Bank initiated an Independent Evaluation of Resettlement. This evaluation, carried out by the East China Investigation and Design Institute (the design institute that also prepared the original resettlement plan in 1983), took place annually over a five-year period (1992 to 1996) and involved samples of 524 households and 35 villages. The annual reports of the evaluation proved particularly valuable in providing the Fujian Provincial Electric Power Bureau, the Shuikou Reservoir Resettlement Office and the World Bank with regular feedback as to achievements and outstanding problems. The evaluation was the first of its kind in China, and has since been replicated elsewhere.

The resettlement was subsequently assessed by the Bank's Operations Evaluation Department that concluded in 1998: "The Shuikou resettlement has generally been successful in generating sufficient employment and restoring the incomes and livelihoods of resettlers." Nonetheless, this report also records how the resettlement could have been planned and implemented better.

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## ABBREVIATIONS AND ACRONYMS

ECIDI	East China Investigation and Design Institute
FPEPB	Fujian Provincial Electric Power Bureau
FPG	Fujian Provincial Government
ha	Hectare
IER	Independent Evaluation of Resettlement
km	Kilometer
km <sup>2</sup>	Square kilometer
kW	Kilowatt
m	Meter
m <sup>2</sup>	Square meter
MWR	Ministry of Water Resources
MWREP	Ministry of Water Resources and Electric Power
OED	Operations Evaluation Department
SPC	State Planning Commission
SRRO	Shuikou Reservoir Resettlement Office
TVE	Township and Village Enterprise



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## 1. INTRODUCTION

### Background

In the 1994 Bankwide review of projects involving involuntary resettlement<sup>1</sup> the Shuikou Hydroelectric Power Project in China is cited as a good example of providing adequate compensation and rehabilitation for project-affected people. However, there has been little published in relation to Shuikou resettlement, nor for that matter the detailed process of reservoir resettlement in China.<sup>2</sup> This report, prepared in conjunction with the overall Implementation Completion Report for the project, aims to overcome that deficiency by providing a detailed account of the Shuikou resettlement planning and implementation within the context of the Chinese legal, regulatory and institutional framework. The report is informational rather than analytical and is complemented by a recently issued Operations Evaluation Department (OED) report containing a case study on Shuikou, which has an analytical orientation.<sup>3</sup>

The Bank helped finance the construction of the Shuikou dam and power plant through two project loans,<sup>4</sup> which extended over the full construction period 1987 to 1997. The report was drafted by the team responsible for appraisal and supervision of the second project,<sup>5</sup> primarily based on information collected during resettlement supervision missions since 1992, World Bank documents such as the staff appraisal reports for the two projects<sup>6</sup> and documents prepared by the responsible local agencies.<sup>7</sup> These were Fujian Provincial Electric Power Bureau (FPEPB), the project owner and executing

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<sup>1</sup> The World Bank, 1994, *Resettlement and Development: The Bankwide Review of Projects Involving Resettlement 1986-93*.

<sup>2</sup> A comprehensive overview of Chinese resettlement, rural and urban, was provided in "China Involuntary Resettlement," World Bank Report No. 11641-CHA, 1993.

<sup>3</sup> The World Bank, 1998, Operations Evaluations Department (OED), *Early Experience with Involuntary Resettlement: A Follow-up*.

<sup>4</sup> IBRD No. 2775-CHA (\$140 million) and IBRD No. 3515-CHA (\$100 million).

<sup>5</sup> Youxuan Zhu and Martin ter Woort (resettlement consultants) and Barry Trembath, Task Manager.

<sup>6</sup> The World Bank, 1986, Staff Appraisal Report: "China: Shuikou Hydroelectric Project" (Report No. 6189-CHA), and The World Bank, 1992, Staff Appraisal Report: "China: Second Shuikou Hydroelectric Project" (Report No. 10610-CHA).

<sup>7</sup> Fujian Provincial Shuikou Hydroelectric Power Project Resettlement Planning Team, 1983 (Shuikou Planning Team), "Shuikou Reservoir Resettlement Plan." Shuikou Reservoir Resettlement Office (SRRO), 1994, 1995, 1997, "Comprehensive Report on Shuikou Reservoir Resettlement (1987-93), (1987-95) and (1987-96)," and East China Investigation and Design Institute (ECIDI), 1993-97, "Independent Resettlement Evaluation for Shuikou Reservoir" (Reports No. 1-9).

agency, the Shuikou Reservoir Resettlement Office (SRRO), responsible for resettlement implementation, and the East China Investigation and Design Institute (ECIDI), involved with the project design, resettlement planning and independent evaluation of Shuikou resettlement implementation.

### **Project Description**

The Shuikou dam and hydroelectric power plant is located in Minqing County, Fujian Province, in the middle reaches of the Min River (Minjiang). The project site is 94 kilometers (km) downstream from Nanping City and 84 km upstream of Fuzhou, the provincial capital. The reservoir catchment area exceeds 52,000 square kilometers (km<sup>2</sup>) or 86 percent of that of the Minjiang basin. The effective reservoir capacity is 2.34 billion cubic meters (m<sup>3</sup>) at the normal full supply level of El. 65 meters (m).

The main purpose of the Shuikou project is power generation. The total installed capacity is 1,400 megawatts (MW) (in seven generating units), making it the largest hydroelectric plant in the East China Region. The average annual energy generated is 4,950 gigawatt-hours (GWh). In addition to power generation, the project also includes a shiplock and shiplift to maintain navigational capability through the dam site area and to capitalize on the improved navigational potential created by the reservoir and the regulated river downstream of the dam.

The Shuikou project was approved by the State Planning Commission (SPC) in 1985 and construction started in March 1987. The impoundment of the reservoir took place six years later, in March 1993. The first generating unit was commissioned in July 1993 and all seven units were in operation by December 1996.

### **Scope of Resettlement Impacts**

The Shuikou reservoir, with 94 km<sup>2</sup> of water surface and a length of 96 km, inundates about 44,000 mu<sup>8</sup> of farmland, some 25,000 mu of forest, and about 2.8 million square meters (m<sup>2</sup>) of housing. Some 67,000 persons were displaced, involving 3 counties (Gutian, Youxi and Minqing), 1 city (Nanping), 16 towns or townships, 89 administrative villages and 147 village groups. In addition, some 7,000 mu of farmland were acquired around the reservoir for resettling displaced people. The reservoir also inundated a range of infrastructure facilities in the region, including 448 km of county roads and 65 km of railway. Table 1 provides the inundation figures for the whole reservoir area. These figures do not include earlier resettlement at the dam site and access roads, which required 253 ha of land acquisition and resettlement of 187 households. A map (IBRD 29025) showing the reservoir area is annexed to this report.

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<sup>8</sup> 15 mu = 1 hectare (ha).

**Table 1: Overall Inundation Impacts**

Items	Unit	Nanping	Gutian	Youxi	Minqing	Total
Townships		8	2	2	4	16
Towns		3	2	2	1	8
Villages		51	18	9	11	89
Groups		74	45	15	13	147
Persons		39,960	19,806	6,375	1,598	67,239
Orchard and Forest	mu	5,090	12,902	2,206	3,485	23,683
Farmland	mu	23,770	13,541	4,358	1,172	42,841
Housing	1,000 m <sup>2</sup>	1,470	360	360	80	2,770
County Roads	km	228	145	51	24	448
Land for Resettlement	mu	4,145	2,003	661	166	6,975

Excludes Nanping Urban Renewal Project.

Source: Shuikou Reservoir Resettlement Office (SRRO): "A Comprehensive Report on Resettlement of Shuikou Reservoir Area (1987-95)", p. 8.

In addition to the above, there was substantial urban resettlement in Nanping City necessitated by the decision to improve the flood protection security of Nanping City by building a 7.7 km-long dike along the riverfront. While this decision was precipitated by the fact that the Shuikou reservoir backwater would exacerbate an already unacceptable risk of flooding along the waterfront, the solution that evolved went beyond simple flood protection to include major urban renewal. The renewal project involved resettlement of some 17,000 urban residents.

### Overview of Resettlement Planning and Implementation

Initial resettlement planning was carried out in the period 1982-83 in the context of an emerging legal and regulatory framework, with major national regulations being issued in 1982 and provincial regulations in 1984. Based on these regulations, a set of principles was developed that defined the strategy of Shuikou resettlement. The main features of this strategy included minimizing moving distance, so that displaced people could be resettled within the same village or township; avoiding major changes of their current occupations after relocation; and maintaining as far as possible the existing social fabric within the villages. The detailed resettlement plan, developed within these principles, focused on restoration of income level and living standard and was very much oriented to agriculture-based rehabilitation. Some three quarters of those displaced were to be offered land-based resettlement, with activities ranging from growing grain and vegetables, to planting and managing fruit trees and timber trees. Nonfarm activities were planned for one quarter of those affected.

Implementation commenced in 1987 and coincided with a period of rapid regional economic development in Fujian Province, largely attributable to its coastal location and close ties to foreign and Taiwanese investors. Between 1987 and 1997, gross domestic product grew at an average rate of 15.9 percent in real terms. Net rural incomes also increased at an average rate of 8.1 percent after deducting an inflation rate averaging 10.2 percent a year. The initial effects of this rapidly expanding inflationary environment were

negative in that resettlement budgets were quickly rendered inadequate through inflation. However, eventually the rapid economic growth and associated increased employment opportunities greatly facilitated the economic rehabilitation for Shuikou reservoir resettlers.

The early focus of implementation was on physical relocation. Most of the relocation took place in 1991 and 1992, with more than 60 percent of the people being moved in these two years. By the summer of 1993 when the reservoir began filling, most physical relocation activities were completed. Economic rehabilitation gained momentum over the later years, such that by the end of 1993 almost 30,000 jobs had been created, accounting for 88 percent of those required. However, during implementation the strategy of mainly agricultural-based rehabilitation was modified considerably in response to changing circumstances. Of the 38,439 jobs created by the end of June 1997, some 52 percent of them involved nonfarm or nonland-based activities. By the end of 1994, the average income level of the resettlers, after allowing for inflation, had already exceeded the before-moving level by 3.8 percent; and by the end of 1995, the last year of detailed surveys, by 14.5 percent. Less detailed "village-level" surveys indicated a further increase of 26.6 percent in 1996.

The following sections of the report will elaborate on the resettlement process, commencing with a description of the legal and regulatory framework, progressing through the planning and implementation processes to a detailed presentation of outcomes.

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## 2. LEGAL AND RESETTLEMENT POLICIES FRAMEWORK

### Legal Framework

Shuikou resettlement planning was carried out in the period 1982 and 1983 in the context of an emerging legal and regulatory framework for land requisition and resettlement in China. Over this period developments included adoption of a new constitution redefining land ownership, issue of national and provincial regulations concerning land requisition, issue of draft supplementary provisions on land acquisition and resettlement for water resource development projects, and issue of draft specifications detailing the design and implementation of resettlement programs for water conservation and hydropower projects.

**Land Tenure (Ownership).** In accordance with the 1982 constitution, China is a country operating under the socialist economic system on the basis of public ownership: “the ownership by the whole people” and “collective ownership by the working people” (Article 6). According to the constitution, urban land<sup>9</sup> belongs to the State (whole people), while rural land is owned by collectives,<sup>10</sup> except those areas stipulated by law as State land (Article 10). These provisions formed the basis of the 1986 Land Administration Law,<sup>11</sup> which also included detailed provisions on land usage. Under these provisions both State- and collective-owned land may be allocated to be used by individuals for their own use. The use and management of rural land may also be contracted to collectives or individuals. In both cases, individuals and collectives have the responsibility for protecting and managing the land and making rational use of it in accordance with the terms of the allocation or contract. Because of the nature of collective ownership, a village losing some land through State requisition is able to redistribute its remaining landholdings among village members so that none will be left

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<sup>9</sup> Land in built-up areas and areas zoned for urban development except those for agriculture purposes within the area concerned.

<sup>10</sup> Under the Chinese administrative system, governments down to county level are considered to be part of the Chinese government. Below the national level are those at the provincial level (and autonomous regions and large municipalities such as Beijing and Shanghai). Below the provincial level are municipalities that are further divided into counties in rural areas and districts in urban areas. Below the county level, governments are considered to be representatives of collectives, which formerly were organized into communes, now referred to as “townships” and brigades, which are now referred to as administrative “villages,” which may in turn be made up of a number of natural villages, referred to in this paper as “groups.”

<sup>11</sup> Land Administration Law of the People’s Republic of China (promulgated June 25, 1986, effective January 1, 1987). Although this law postdates Shuikou resettlement planning (but not implementation), it formalizes the situation with respect to land usage that existed during the planning period, generally referred to as the “contract responsibility system.”

without land to farm. The ability to redistribute remaining land resources among villages greatly facilitates the resettlement process in China.

**Land Acquisition.** National land requisition regulations were also issued in 1982.<sup>12</sup> These regulations affirm the right of the State to requisition land from collectives for construction, and define the procedures for land requisition and resettlement and the responsibilities of the parties. *Compensation rates* for cultivated land are specified to be within the range of three to six times the average annual output value in the past three years. Provincial governments have the responsibility to stipulate standards of compensation for other types of land with reference to the standard for cultivated land. In addition to land compensation, the regulations provided for a *resettlement subsidy* to finance provisions for restoration of production. This subsidy is paid on a per capita basis based on the "agricultural population to be resettled." This is calculated by dividing the area of cultivated land requisitioned by the average amount of cultivated land per person of the collective, before land requisition.<sup>13</sup> The resettlement subsidy shall normally be in the range of two to three times the average annual output value in the past three years, and shall not exceed ten times the average annual output. The explanatory notes accompanying the regulations<sup>14</sup> provide examples of the calculation of this subsidy, demonstrating that the subsidy per capita is actually two to three times the output value of *one mu* of land (one mu of cultivated land per capita was a common target value at the time). Thus if the per capita area of cultivated land prior to resettlement is 0.5 mu, the subsidy becomes four to six times the output value per mu of the land requisitioned. If it is 0.25 mu, the subsidy is calculated as 8 to 12 times, in which case the absolute limit of ten times would apply.

The regulations further provided that if land compensation and resettlement subsidies are still insufficient to restore farmers' living standards to previous levels, the resettlement subsidy may be further increased, with the approval of the provincial government, provided that combined land compensation and resettlement subsidy shall not exceed 20 times the average annual output value of the cultivated land requisitioned. As in the case of compensation standards, provincial governments have the responsibility to stipulate standards for resettlement subsidies for other types of land (orchards, fishponds, pasture lands, and so on) with reference to the standard for cultivated land.

Under the regulations, all compensation and resettlement subsidies, except for compensation for individually owned property on the land and unharvested crops from land being contracted to an individual, are to be paid to the collective to finance the development of new production base, to find jobs for surplus labors, and to provide subsidies for those who cannot be employed. Funds shall not, in any circumstances, be

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<sup>12</sup> Land Requisition Regulation for State Construction (LRRSC), May 14, 1982. These provisions were generally carried forward into the 1986 Land Administration Law cited above.

<sup>13</sup> It is recognized that this is not necessarily equivalent to the number of project-affected persons. It is simply a statistical number for determining resettlement subsidy to be paid to the collective.

<sup>14</sup> Explanation of various problems about "Land Requisition Regulations for State Construction."



diverted for other purposes. The Land Administration Law further specifies that compensation funds received are shared equally by all village members and may be used individually or collectively to either develop new production bases or improve existing production capabilities.

**Responsibilities for Resettlement.** Responsibility for organizing resettlement is placed with land administration units at or above the county level. They are charged with coordinating efforts of local governments in the affected areas and the unit requisitioning the land by developing agricultural and sideline activities and setting up township or village enterprises. If there are still people who cannot be resettled, qualified individuals may be employed by the units requisitioning the land or other State- or collective-owned units, with the resettlement subsidy transferred to these units.

**Provincial Regulations.** The national land requisition regulations delegated specification of detailed measures in several areas to provincial governments. Accordingly, detailed implementing regulations were issued by the Fujian Provincial Government (FPG).<sup>15</sup> These included specific compensation and resettlement subsidy multipliers for cultivated and other categories of land. For cultivated land the compensation multiplier was set at five times the annual output value (within the range of three to six times set by the national regulations). The resettlement subsidy was set at two to three times (as for the national regulations), with the higher limit pertaining to area in the purview of city plans of the ten provincial cities and the lower limit applying elsewhere.

**Large- or Medium-Size Water Conservation and Hydroelectric Projects.** The land requisition regulations provided that methods for relocating and resettling people in these projects would be stipulated separately by relevant national agencies. While these regulations were not issued until 1991, the first draft was available during the planning period for Shuikou resettlement.<sup>16</sup>

These supplementary regulations lay down the basic principles for reservoir resettlement:

- The Government advocates and supports resettlement with development and adopts the approach of giving compensation in the early stages of resettlement and providing rehabilitation assistance after displacement.
- Benefits to the nation, communities and individuals should be considered in an integrated manner.
- Resettlement shall be synchronized with resource development, soil and water conservation and economic development in the reservoir area.

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<sup>15</sup> Method for implementing "Land Requisition Regulation for State Construction in Fujian Province, 1984."

<sup>16</sup> China State Council, 1991, "Regulations for Land Acquisition and Resettlement for the Construction of Large- and Medium-Sized Water Conservancy Projects."

- All displaced persons shall be assisted to improve or at least restore their former living standard in steps.
- Resettlement should be planned taking full consideration of local conditions and available resources.
- If conditions allow, displaced people should be resettled as near as possible.<sup>17</sup> Otherwise alternatives such as reclamation of wasteland, land reconsolidation and moving to other areas should be considered.

More specific compensation and resettlement subsidy standards are also specified within the ranges laid down in the general land requisition regulations. However, they do provide that for large-scale flood control, irrigation or drainage projects (not hydropower), land compensation standards could be reduced, with detailed standards negotiated between the Ministry of Water Resources (MWR) and concerned departments.

Supplementary benefits to resettlers, beyond compensation and resettlement subsidies, are also stipulated:

- Government to establish a reservoir construction fund to finance resettlement site maintenance and production development.
- Communities affected by hydropower plant construction to be electrified, with preferential tariffs for irrigation and drainage.
- Priority to be given for displaced persons to use water surface and reservoir drawdown areas.
- Priority to be given to resettlement communities in government budgetary support for agriculture, communications, culture, education and health care, and to employment in government construction projects.
- Government support to economic rehabilitation efforts to extend for five to ten years after displacement.

The resettlement planning report also refers to provisional provincial regulations<sup>18</sup> relating to water conservation and hydropower projects but a copy of these regulations is not available.

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<sup>17</sup> Article 12 elaborates: "within their original township or county, or within the area benefited by the project."

<sup>18</sup> "Fujian Provisional Requirements on Reservoir Resettlement Due to Large- and Medium-Scale Hydroelectric Projects" (draft) (1983).

**Design Standards.** In 1985, the Ministry of Water Resources and Electric Power (MWREP) issued detailed specifications on methods for dealing with reservoir inundation.<sup>19</sup> These standards deal with the following topics:

- Determination of the area affected by reservoir inundation, taking into account, inter alia: flood protection standards for various categories of land and occupation thereof; the effect of backwater at the tail end of the reservoir; runup of waves on reservoir shores; raising of groundwater levels, rendering land unsuitable for agriculture or occupation; slumping of peripheral land areas into the reservoir; and effects on production and daily life of communities.
- Detailed provisions for design work in relation to reservoir inundation, to be carried out in two phases: preliminary design phase and technical construction.<sup>20</sup> The first phase includes: topographical mapping; affected area delineation, geological and hydrological surveys; inundation inventory (land of various categories, population and housing, mines, infrastructure, and so on) based on statistical surveys; economic data and projected impacts; definition of criteria for moving and compensation standards; resettlement plans for displaced persons; proposals for relocation or protection of cities, towns and major infrastructure; and a planning report detailing the above together with a cost estimate. Proceeding to the second stage requires approval of the preliminary design of the associated water resource development project and agreement with local governments on the preliminary design of the resettlement. The second stage entails: marking out of reservoir boundaries; detailed inundation inventory; and more detailed resettlement and rehabilitation planning.
- Detailed guidelines to be adopted in resettlement planning elaborating on the principles laid down in the national regulations.
- Requirements for preparation of overall reservoir area development plans, upon filling of the reservoir.
- Detailed guidelines for preparing cost estimates, which among other things, extends the discussion of compensation to fixed assets other than land.

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<sup>19</sup> Ministry of Water Resources and Electric Power (MWREP), 1985. "Design Standard for dealing with Reservoir Inundation by Water Conservancy and Hydroelectric Power Project Reservoirs" (SD130-84). While these standards were not issued until 1985, a 1983 first draft was available to the Shuikou resettlement planners.

<sup>20</sup> These phases correspond to the phases of engineering design of the water resources or hydropower project. The latter phase is concluded before commencement of construction.

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### 3. RESETTLEMENT PLANNING<sup>21</sup>

#### Organization

Initial resettlement planning work was carried out during the 1970s, when ECIDI undertook the preliminary investigation and design of the project. During the preliminary design phase, the power plant size and reservoir water level were determined, and an initial reservoir inundation survey and preliminary resettlement planning were undertaken. In its approval of the preliminary design in 1982, MWREP requested FPG to develop a detailed resettlement plan for the displaced people in compliance with national regulations on resettlement, and meeting the requirements set forth by SPC and the World Bank.

A temporary organization referred to as "Fujian Shuikou Resettlement Planning Team" (the planning team) was set up by FPG in October 1982 to carry out the resettlement planning work for the project. The planning team, directly under the provincial government, consisted of 63 staff from relevant provincial departments, such as FPEPB, the Land Administration Bureau, and the Agriculture Department. In addition, subteams were established in the three affected counties and Nanping City. The planning team, together with the four subteams, completed their task in one year, and submitted their report to FPG in October 1983, after which it was submitted to the central government. The Shuikou resettlement plan was approved by MWREP in 1984.

#### Basic Principles and Compensation Standards for the Shuikou Project

Based on the national and provincial regulations referred to above, the following basic principles and standards were derived for Shuikou resettlement:<sup>22</sup>

- Inundation area to be based on a flood protection standard of 1-in-20-years for structures and 1-in-2-years for agricultural land.<sup>23</sup>

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<sup>21</sup> The resettlement planning process for Shuikou reservoir took place over a long period, from the early 1980s and extending throughout the implementation period. The discussion here is focused on the planning process prior to implementation, at which point responsibilities were handed over to the SRRO. It is extracted from the Shuikou Planning Team, 1983.

<sup>22</sup> This summary of principles is extracted from Annex 17 of the Staff Appraisal Report for Loan 2775-CHA, World Bank, 1986. Virtually all have been extracted from previously cited national and provincial regulations.

<sup>23</sup> As the major crop in this area is rice, which can withstand several days of inundation, this standard is considered reasonable.

- Displaced persons and facilities to be reestablished at the nearest available sites within their respective counties and, if possible, their original townships. To the extent possible, the integrity of neighborhoods and hamlets will be maintained in the resettlement process.
- To the extent possible, resettled persons to be enabled to continue with their previous occupation.
- Resettlement to be arranged so that physical and human resources could continue to be at least as productive and living conditions at least as convenient as they were before.
- Plot size for resettled farmers to meet minimum standards so as to enable farmers to continue making a living on the land.
- During the transition period, the provincial government to supplement the agricultural production of farmers with grain, as required.
- Public facilities to be reconstructed at least to the preexisting standards.
- The supply of construction materials (steel, lumber and cement) for reconstruction of dwellings, buildings and other facilities to be given priority.
- Compensation for dwellings, house plots, lost wages and moving expenses to be paid to heads of households. Compensation for productive assets and infrastructure to be paid to the local (village) government with jurisdiction.
- Local governments to be involved in resettlement planning from its initiation, and the affected population to be informed after final project approval.<sup>24</sup>
- Resettled persons to be allowed to return to the reservoir area to plant and harvest crops and salvage materials until their lands are flooded.
- To the extent possible, individual households to be given a range of choices in regard to:
  - design of dwellings;
  - availability of construction materials at official prices;
  - opportunity to buy additional construction materials at market prices;
  - quality of dwellings;
  - building contractor; and
  - disposal of materials of old home.

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<sup>24</sup> This refers to formal notification of the affected population. In fact, the affected population was involved in the whole of the planning process, from the census survey to selection of resettlement sites and options.

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## Planning Process

According to Mr. Li Zhengliao, a key staff member of the planning team,<sup>25</sup> the key tasks of resettlement planning were: (a) a detailed survey of inundation impacts; (b) investigation of remaining land resources in the affected villages and development of a resettlement and rehabilitation plan identifying resettlement sites and modes of economic rehabilitation; (c) feasibility studies and preliminary cost estimate for special infrastructure projects; and (d) formulation of an overall resettlement budget. A planning methodology was derived with the following key elements:

- **Survey Method.** For households to be relocated, a survey would be conducted for every affected household. For land to be inundated, areas would be measured for each category of land use (such as cultivated land, forest land and so on). Fruit trees, economic trees and other individually owned property would be counted for each affected household. Inundated structures would be measured individually following provincial specifications.
- **Planning Scale.** Given the nature of the rural economy, the resettlement and rehabilitation plans would be formulated at the village level. Based on amount and type of remaining land area in each village, a set of economic rehabilitation measures would be developed by consulting with both local officials and villagers. Similarly, a preliminary site plan of each resettlement village would be prepared based on specific water supply and topographic conditions.
- **Statistics System.** Inundation statistics would be collected under eight categories: population, cultivated land, forest or woodland, economic trees, fruit trees, housing, infrastructure (roads, bridges), and the Nanping City flood control project.
- **Principles for Budget Calculation.** Detailed procedures for calculating compensation were formulated based on the adopted policies. Infrastructure cost of new resettlement sites, including road, electricity and water supply were to be based on an all-in per capita figure, following careful investigation and analysis of actual costs for specific cases. Total land area to be allowed for new villages and towns, following national and provincial standards, would be based on a standard of 70 m<sup>2</sup> of land area per person. Similar per capita cost figure would also be allowed for moving costs, loss of work time, and so on.

## Community Involvement in Planning

Affected communities were directly involved in the planning process in that officials from affected villages, townships and counties were included in planning teams and subteams. These representatives and the village and township leaders kept fellow

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<sup>25</sup> Li Zhengliao, 1991, "Main Experience of Development Resettlement in Shuikou Hydroelectric Power Plant", *Journal of Hydroelectric Engineering*, No. 4, pp. 1-9.

villagers informed about resettlement policies and compensation criteria. Since the survey of lost assets was conducted at the individual household or enterprise level, resettlers also gained firsthand knowledge of compensation they could expect.

Resettlers and the local communities were also actively involved in identifying prospective resettlement sites and "remaining resources" relating to each village, the latter providing the basis for rehabilitation planning. The planning of new town sites involved collection of a cross-section of opinions, comparison of different schemes, on-site inspections, and decision-making by key leaders in the county governments.

After the inundation survey was completed, including investigation of the remaining resources, the affected city and four counties drafted the resettlement plans for their respective jurisdictions after extensive consultation with affected villages and townships. The plans, after gaining the endorsement of all levels of local government, were submitted to the provincial government. The planning team then made adjustments regarding differing compensation standards, rehabilitation methods, etc. and compiled the individual plans into a comprehensive plan for the entire reservoir area, which was then submitted for approval of provincial and national governments.

### **Economic Rehabilitation Plan**

The economic rehabilitation plan aimed at creating new production systems for the affected people, following the principles that displaced persons should be reestablished in the nearest available sites and that as far as possible they should be enabled to continue with their previous occupations. Therefore, the overall strategy for economic rehabilitation was the development of new production bases utilizing the remaining resources of each affected village, including plowable sloped lands, hilly land suitable for fruit trees, land suitable for forestry activities, and potential fishpond areas in reservoir coves. The village-level survey of remaining land resources, also referred to as "resettlement environmental capacity investigation," identified the remaining resources set out in Table 2.

**Table 2: Remaining Resources in Affected Counties (mu)**

County	Hilly Lands Plowable Farmland	Hilly Lands Suitable for Fruit Growing	Forestry Lands Suitable for Planting Economic Trees	Hilly Lands Suitable for Forestry
Nanping	19,980	4,212	13,040	353,293
Gutian	4,879	1,425	2,822	146,546
Youxi	6,183	1,220		96,559
Minqing	4,032	705		450
<b>Total</b>	<b>35,074</b>	<b>7,562</b>	<b>15,862</b>	<b>596,848</b>

Source: World Bank, 1986.

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The environmental capacity analysis considered quality as well as quantity of available land and resources outside affected villages but within the same county, which could be transferred to affected villages. Based on this analysis of available resources within each village or township and a set of rehabilitation standards, rehabilitation options were developed. The rehabilitation standards refer to the amount of each type of resource required to enable resettlers to restore their previous income and living standards.<sup>26</sup> According to existing production yields and market prices, any of the following resource quantities (or appropriate combinations of lesser quantities) were considered to provide sufficient income for each resettler.

- 0.5 mu of high-yield paddy field;
- 0.6 to 0.8 mu of middle-yield paddy;
- 1 mu of newly developed farmland;
- 10 mu of fruit trees;
- 15 mu of young forest trees;
- 1 to 2 mu of economic trees;
- 2 to 4 mu of tea;
- 1 mu of fishpond;
- Annual wages of at least Y 1,000 for nonfarm occupations.

Based on these standards and the remaining resource inventory, a preliminary economic rehabilitation plan was developed for each village and township. Table 3 provides an aggregation of these plans by county. It shows that 56 percent of the resettled population would rely on general farming; about 23 percent on orchards, animal husbandry and fishing; and 22 percent on nonagricultural activities, such as township and village industries, and service activities.

Since most resource surveys were preliminary, the resulting rehabilitation options were also preliminary, and substantial changes took place during implementation. However, the plans provided an overall indication of how many resettlers could be rehabilitated locally through provision of land, how many through nonfarm employment, and how many would need to be converted into nonagricultural status.

### **Physical Relocation Plan**

As the economic rehabilitation plan took shape and planned areas of farmland, fruit trees, and cash crops were located, the resettlement housing sites for the relocated villages were also decided, following the principle that production sites and settlement sites should be closely situated.

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<sup>26</sup> Here, these standards reflected an average income level that resettlers in Shuikou might have had before the move. Given different yield and landholding situations among different townships and villages, the actual standard adopted for each village could vary from place to place.



**Table 3: Economic Rehabilitation Plan for Shuikou  
(Persons per Economic Activity)**

County	Total	General Farming	Fruit Trees	Forestry	Husbandry Fish	Industry	Other
Total	71,972	37,425	10,076	5,384	1,470	7,280	10,408
Percent	100	52.0	14.0	7.5	2.0	10.0	14.5
Minqing	3,127	2,924	132	40	0	31	0
Percent	100	93.5	4.2	1.3	0	1.0	0
Youxi	8,617	2,491	1,891	2,852	134	1,891	0
Percent	100	28.9	21.9	33.1	1.6	21.9	0
Gutian	10,323	3,580	1,516	431	37	145	4,614
Percent	100	34.7	14.7	4.2	0.4	1.4	44.7
Nanping	49,905	28,093	7,301	2,276	1,299	5,142	5,794
Percent	100	56.3	14.6	4.6	2.6	10.3	11.6

*Note:* The total population includes both relocatees and host population. For relocatees, the population is the forecast figure based on annual growth rate of 1.4 percent until 1990, the year of moving.

*Source:* Shuikou Planning Team.

Among 89 affected villages, 73 of them required relocation of households, for which two approaches were used: (a) consolidated resettlement, involving the building of a new village, where large numbers needed to be relocated; and (b) dispersed resettlement, involving relocation within existing villages, where numbers to be relocated were relatively small. In the plan, 46 villages (or neighborhood committees in the case of relocation of towns) belong to the first category, involving resettlement of 61,735 persons. The remaining 27 villages, involving resettlement of 5,549 people, belong to the second group (see Tables A1 and A2 in Annex A and the Map).

Among the 46 consolidated resettlement villages, 21 were consolidated into 9 towns (see Table A3 in Annex A). Advantages of this included reduced land requirements, increased efficiency in the provision of infrastructure, and facilitation of the development of service industries and associated job creation.

Initial resettlement planning was limited to identification of potential sites suitable for new towns and villages.<sup>27</sup> No detailed site plans or designs for associated infrastructure projects, such as roads, water supply and electricity, were prepared for new towns or villages. Such plans, prepared professionally by design institutes, were completed at a much later stage immediately prior to, or during, resettlement implementation. The plan did include preliminary estimates of cost of developing new settlements including land acquisition, site preparation and provision of electric power,

<sup>27</sup> In the plan, extensive description was given for proposed new sites for nine new towns. No description was given of proposed resettlement villages.

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water supply and access roads. In general, resettlers would be given serviced lots and would be responsible for building their own houses using housing compensation funds. For special cases, such as the elderly or the disabled, houses would be built by their village or township.

### Compensation Standards

Compensation and resettlement subsidies for land were calculated based on the principles laid down in the previously cited national and provincial land requisition regulations. Other compensation rates were derived and negotiated based on the principles laid down in the design standards. Adopted rates and standards are as follows:<sup>28</sup>

- **Rice Fields.** A compensation of 5.0 times<sup>29</sup> and a resettlement subsidy averaging 4.09 times the value of annual production, based on the average of official prices and surplus purchase prices.
- **Vegetable Plots.** 10 times of the value of annual production plus Y 10,000/mu for new plot construction.
- **Reclaimed Land.** Two-thirds the compensation for rice fields.
- **Timber Forest.** Compensation on the basis of production costs invested in the forest plus resettlement subsidy totaling one third the standard for rice fields.
- **Economic Forest.** Compensation on the basis of multiple of annual output plus resettlement subsidy totaling half the standard for rice fields.
- **Orchards.** Compensation on the basis of multiple of annual output plus resettlement subsidy totaling half the standard for rice fields. The resettlement subsidy only applies to collective orchards, not for trees around the house.
- **Buildings.** Compensation for all types of structures is based on replacement cost for a structure of same floor area and type with deductions for age of the building and the

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<sup>28</sup> World Bank, 1986.

<sup>29</sup> This is equal to the value specified in the provincial regulations for land requisition, but is evidently outside the range of 3 to 4 specified by the national regulations for water resources and hydropower projects as issued in 1991, but presumably conformed with draft regulations issued during the planning period.

salvage value of old materials,<sup>30</sup> plus the cost of moving the old materials to the new site. Unit costs were based on a survey of new home prices in each county.

- **Enterprises.** Compensation for moving enterprises is set on the basis of:
  - fixed assets; plus
  - Moving costs plus 20 percent of moving costs to compensate for moving losses; plus
  - One month's wages to compensate for disruption in industrial enterprises; or
  - Two months' wages to compensate for disruption in commercial enterprises; plus
  - A 70 percent reduction in taxes during shutdown.
- **Other Compensation:**
  - Y 1,000/kilowatt (kW) for mini hydro plant submersion;
  - Y 591/kW for irrigation pumping station submersion;
  - Cost of rebuilding water supply, power distribution and transport infrastructure to same scale and standard as in original resettlement;
  - An allowance of Y 30 per capita for public facilities.

For individually owned buildings, in addition to compensation based on "buildings" above, individuals received a quota of construction materials at subsidized prices.

### Cost Estimates

Resettlement cost estimates were divided into two components: (a) compensation costs received by county governments to be distributed by them to local governments and individuals; and (b) compensation for special facilities to be received by government agencies. The first component covered compensation for lost land, buildings, trees, enterprises, small infrastructure and moving allowances. These funds were to be used for establishing new villages complete with infrastructure such as access roads, water supply, electric power, community facilities, housing and economic rehabilitation measures. The total cost for this component was estimated at Y 222.23 million in 1983. For details see Table 4. Other compensation costs included agreed estimates for replacement of infrastructure including site development, roads, water supply, drainage and electricity for the new villages in accordance with the preliminary site plans, and local government-owned facilities, such as schools, clinics, township and village industries. Compensation to government agencies included items such as: Nanping City flood protection project,

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<sup>30</sup> The 1985 design standards and the 1997 revision have the same provision for building compensation: "compensation for all types of structures is based on replacement cost for a structure with the same floor area and type (*some translations indicate condition*) with deduction of salvage value of old materials." In Shuikou, a deduction was made for age of structure and value of old materials. In more recent projects, there is no such deduction. In addition, for substandard housing, a minimum replacement standard is usually specified.

relocation of broadcasting and telecommunication lines, highway relocation, compensation for navigation facilities, relocation of Dazhou lumber storage, and compensation and protection of historical sites and relics. The total cost for this component was estimated at Y 187.77 million in 1983. For details see Table 5.

**Table 4: Budget Controlled by Local Government and Individuals (1983)**

	Amount (Y million)	Per Capita Amount (Y)
Land Requisition	67.83	1,068.26
Forest, Economic Trees and Orchards	15.24	240.04
Building Items Replacement Cost	68.49	1,078.65
Enterprise Relocation Cost	17.54	276.20
Moving and Relocation	5.08	80.00
Other Compensation	44.03	693.28
Administration	4.36	68.73
<b>Total</b>	<b>222.23</b>	<b>3,503.43</b>

Source: The World Bank, 1986.

**Table 5: Budget for Items Controlled by Government Entities (1983)**

	Amount (Y million)	Government Entity
Flood Protection for Nanping City	58.34	Nanping City
Relocation of Highway	49.27	Bureau of Communication
Compensation for Dazhou lumber Storage	27.08	Bureau of Forestry
Relocation of Telecommunication Lines	13.00	Bureau of Telecommunication
Compensation for industries in Nanping	10.68	Nanping City
Compensation for forestry facilities	7.09	Bureau of Forestry
Compensation for navigation facilities	6.00	Bureau of Communication
Compensation for other facilities	16.31	Other provincial agencies
<b>Total</b>	<b>187.77</b>	

Source: The World Bank, 1986.

In order to determine the adequacy of land compensation to fund the establishment of new production facilities, preliminary analyses were carried out during the initial planning process. Table 6 illustrates such an analysis for Minqing County by comparing the compensation funds for land (source of funds) with necessary investments required for implementing planned economic rehabilitation options (use of funds).

### Implementation Schedule

The timetable for relocation of households was linked to the river diversion sequence and schedule for reservoir filling, taking into account the predicted flood levels behind the cofferdams during the various river diversion phases. The population located below the flood level associated with the first-stage cofferdam (diverting the river through a temporary diversion channel), scheduled to be constructed in October 1989, was estimated at 20,866 and the resettlement plan called for 21,014 people to be resettled by January 1, 1989. The population located below the flood level of the second-stage cofferdam (closing the temporary diversion channel and passing water through temporary

openings in the dam), to be constructed in October 1991, was estimated to be 31,785, while the resettlement schedule called for relocation of 42,014 by January 1991, and for 52,014 to be resettled by the end of 1991. The entire relocation was to be completed by the end of 1992, ready for the commencement of the reservoir filling process in the spring of 1993. The planned schedule in comparison to that actually achieved is shown in Table 7. It can be seen that a planned relocation schedule of six years was actually compressed to three years, although later and under pressure from construction progress.

**Table 6: Minqing County Revenue and Expenditure Forecast for Resettlement (Y 1,000)**

Items	Amount
<b>Anticipated Revenues from Compensation</b>	
Land compensation and resettlement subsidy	980.6
Collective forest land	1,842.8
Economic forest land	181.2
Fruit trees	1,201.2
<b>Total</b>	<b>4,205.8</b>
<b>Anticipated Expenditures for Resettlement</b>	
Rehabilitation of the productive base	
Reclaimed land (100 mu x Y 720/mu)	72.0
Cultivation of bamboo (450 mu x Y 485/mu)	210.0
Cultivation of fruit trees (750 mu x Y 500/mu)	375.0
Afforestation (4,032 mu x Y 80/mu)	322.6
Irrigation facilities	900.0
Other modes of resettlement	2,177.4
<b>Total</b>	<b>4,057.0</b>

Source: The World Bank, 1986.

**Table 7: Actual Relocation and Original Schedule**

Year	Original Schedule	Percent	Actual Schedule	Percent
1986	1,014	1.6	-	
1987	10,000	16.0	-	
1988	10,000	16.0	1,854	3
1989	11,000	17.6	2,602	4
1990	10,000	16.0	17,552	26
1991	10,500	16.8	28,332	42
1992	10,000	16.0	13,478	20
1993	-		3,421	5
<b>Total</b>	<b>62,514</b>	<b>100.0</b>	<b>67,239</b>	<b>100</b>

Note: Some 4,725 persons (7.6 percent) in excess of the original schedule were relocated.

Sources: World Bank, 1986, p.35 and SRRO.

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## 4. RESETTLEMENT IMPLEMENTATION

### Overview

Following the World Bank appraisal and approval of the first loan in 1986, construction of the Shuikou Hydroelectric Project started in 1987. By the fall of 1989, the first cofferdam was completed and the river was diverted successfully. The reservoir began filling in the spring of 1993. The first generating unit began operation in the fall of 1993. By the end of 1996, all seven units were in operation.

Relocation took place over a six-year period, starting in 1988 (see Table 7). By early 1993 when the reservoir began filling, all 67,239 persons had been relocated out of reservoir areas. By the end of 1996, over 38,400 employment opportunities were created for the resettlers. For most resettlers, their income level before the move had already been restored by the end of 1995.

### Institutional Aspects

Early in the planning stage, the decision was made that resettlement implementation would be the responsibility of FPG. In May 1986, one year before construction began, FPG issued a document<sup>31</sup> that provided for the establishment of a permanent organization, SRRO, responsible for all resettlement operations for the project. The staff of the new organization were transferred from relevant provincial departments, such as: FPEPB, Land Administration Bureau, Transportation Department, Agriculture Department and Construction Commission. Resettlement organizations were also set up in each affected county and Nanping City. (A separate office was also established in Nanping City for the flood protection project.) In addition to the resettlement offices, relevant provincial departments and bureaus such as Forestry, Communications, Navigation, Education, Public Health and Grain set up working teams to coordinate implementation.

In 1987, FPG issued another official document<sup>32</sup> under which a resettlement leading group was established. This comprised 21 persons, led by the provincial vice governor. The leading group was authorized to make decisions in relation to important issues in the resettlement work and to inspect, supervise and coordinate resettlement

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<sup>31</sup> Fujian Provincial Government, 1986, Decree No. 198, "Reinforce the Work on Shuikou Hydroelectric Power Plant Reservoir Resettlement," Selection of Working Documents for Shuikou Hydroelectric Power Plant Reservoir Resettlement (1988), p.12.

<sup>32</sup> Fujian Provincial Government, 1987, Decree No. 19, "Reinforce the Work on Shuikou Hydroelectric Power Plant Reservoir Resettlement," *ibid.* 15, p.42.

operations. The deputy governor of each affected city or county was made responsible for resettlement implementation within their respective jurisdictions.

The resettlement offices at the provincial and county levels each had four divisions: General Office, Planning and Finance, Relocation of State-Owned Enterprises, and Land Acquisition and Rural Resettlement. The provincial office was the main office for managing and organizing implementation. Main responsibilities included organizing city and county as well as other relevant departments to implement the resettlement program; disbursing, allocating and managing resettlement funds; reviewing work plans and supervising implementation progress and quality. Overall there were 200 staff in the provincial and county offices, with 100 regular staff and 100 contracted workers (Table 8).

**Table 8: Number of Staff in Resettlement Offices**

Type	Provincial Office	Nanping City	Gutian County	Youxi County	Minqing County	Total
Regular	30	30	25	9	6	100
Contracted	15	35	30	12	8	100
<b>Total</b>	<b>45</b>	<b>65</b>	<b>55</b>	<b>21</b>	<b>14</b>	<b>200</b>

Source: SRRO.

The city- and county-level resettlement offices managed resettlement implementation within their jurisdiction. Each office set up a responsibility system providing for completion of specific tasks within budget and time limits.

One important role of SRRO was the control of resettlement funds. Separate accounts were kept for different categories of funds. Thus, money earmarked for construction of resettlement villages could not be used for other purposes. Following normal practice, at the beginning of each year county/city resettlement offices would prepare an annual budget based on projects and targets proposed by affected villages in their jurisdiction, submitted through the township governments. These were submitted to SRRO for approval and, once approved, SRRO would allocate these funds to the county resettlement offices who in turn would pass them through to the townships. The townships would distribute funds to individual households (for housing compensation), villages (for rehabilitation activities), and to contractors (for site preparation and infrastructure).

Each level of resettlement office had authority for approving resettlement investment to a certain level. For projects with investments of less than Y 500,000, the county resettlement office could make the final decision. Larger projects needed to be approved by SRRO with the help of professional institutions.

In addition to the key implementation agencies, such as SRRO, FPEPB and ECIDI, other government agencies were also involved in the resettlement implementation, particularly in the process of resettlement cost readjustment. These

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included central government agencies, such as the Ministry of Electric Power (MEP), SPC, State Land Administration Bureau, State Development Bank, State Energy Investment Corporation, and General Design Institute for Hydropower. Provincial government agencies included the provincial government general office, planning commission, construction commission, land administration bureau, forest bureau and communication bureau.

Following government regulations, the resettlement budget adjustment process for large hydropower projects consists of four major steps: (1) submit application for budget readjustment by concerned provincial government; (2) obtain approval in principle of the cost readjustment from SPC and MEP; (3) commission a qualified design institute to prepare a cost readjustment report; and (4) obtain the approval from SPC and MEP on proposed cost readjustment.

During the process of resettlement implementation, regular supervision by the World Bank resettlement specialists also played an important role. In the course of resettlement implementation, a total of 11 Bank supervision missions were carried out at average intervals of eight months. The early supervision concentrated on the progress of physical relocation to ensure that all resettlers could be moved prior to the reservoir impoundment. With the completion of physical relocation in 1993, the focus of Bank supervision shifted to the restoration of income and livelihood following up Independent Evaluation of Resettlement (IER) reports and selectively visiting resettlement villages. Later, when statistics indicated full restoration of income on an average basis, emphasis shifted to individual outstanding problems.

### **Other Government Measures**

In addition to establishment of policies and standards and the institutional framework for resettlement, FPG took various other measures to facilitate economic rehabilitation, including the adoption in 1987 of 17 preferential policies for Shuikou resettlement.<sup>33</sup>

The main items included:

- The establishment of a reservoir development fund to provide low-interest loans to assist economic rehabilitation efforts in the affected counties and townships; it planned to make Y 50 million available over five years from provincial budget and tax revenues.
- Based on the landholding situation of each village, the conversion of some rural resettlers to nonagricultural status would be permitted, when the average landholding of the affected village (after inundation) was equal or less than 0.3 mu per person.

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<sup>33</sup> Fujian Provincial Government, 1987, Decree No. 186 "Issuance of Some Preferential Policies for Shuikou Hydroelectric Power Plant Reservoir Resettlement," *ibid.* p.37.



- For all affected enterprises and newly established enterprises, construction tax and income taxes would be waived for four years; for tea and fruit farms, five years; and for enterprises set up by outside investors, for three years.
- The government labor bureau would give employment priority to resettlers, including migration of labor to other provinces, and the Shuikou Hydroelectric Project would hire as many resettlers as possible during construction and operation.
- Local government would give high priority to project approval, and local banks would give priority to making loans for relocated enterprises and production development projects.

### **Physical Relocation Activities**

During the initial years of resettlement implementation, most efforts were focused on physical relocation including the building of nine new town centers, 46 new villages and the moving of the affected population. The process of physical relocation consisted of six basic steps: site selection, planning and design, site preparation (leveling), distribution of housing plots, housing construction, and relocation.

**Site Selection.** As described earlier the first step was basically completed in the planning stage with the endorsement of the concerned villages. However, in some cases, such as Xiadao Town (see box), changes were still made during the implementation stage at the request of affected communities.

**Planning and Infrastructure Design.** Detailed planning and design did not begin until the implementation phase. The responsible township governments were authorized to hire qualified design institutes to conduct planning and design for the proposed town and village settlements; while provincial and county governments were made responsible for review and approval of such plans. According to one official document from SRRO,<sup>34</sup> three deadlines (August 1987, December 1987, and April 1988) were given for completion of design and planning for the resettlement sites required for the three moving stages. This schedule gave less than one year to implement site preparation for the first-stage resettlers.

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<sup>34</sup> SRRO, 1987, "Several Opinions on Town and Village Planning for Shuikou Reservoir Resettlement," *ibid.* p.24.

### Xiadao Town Relocation

Xiadao town of Nanping City was located along the Minjiang and part of it was below the 1-in-20-year flood level of the reservoir. In the 1983 plan, the entire town of 7,764 people was to be relocated to a site about 3 km inland, where 500 mu of sloped land could be leveled and drinking water made available from the nearby Nanping Reservoir. While this plan was good from the urban planning viewpoint, it had disadvantages from the rehabilitation viewpoint since many town residents in Xiadao had traditionally supplemented their income through fishing and provision of river transportation, and this source of income would inevitably cease on relocation.

Prior to the actual move, local residents began to question the plan and suggested the construction of a dike to protect the town as an alternative to relocation. In an opinion survey conducted by the township government, about 90 percent of residents preferred the dike option. In 1990, the town government formally requested the revision of the relocation plan and after appraisal by ECIDI and approval by the provincial government, 890 m of dike were constructed involving relocation of only 300 households, rather than moving the whole town of 7,764 persons. Not only did the revised plan reduce the number of displaced people and reduce resettlement costs, it also provided an opportunity to redevelop the town center along the waterfront. This example demonstrates the flexible approach adopted during implementation, where proposed changes could be shown to reduce impacts or increase benefits.

*Source:* SRRO.

### Nanping City Flood Prevention and Waterfront Development

Nanping City is located 93 km from the dam site at the tail end of the Shuikou Reservoir. Even before the project, the flood protection standard of the waterfront areas was already below the desirable 1-in-20-year return period. While the planned reservoir full supply level would not adversely impact Nanping during periods of normal flow, the backwater effect during high flows would result in increased river levels under these conditions. Therefore, it was decided to build a 7.7 km dike along the waterfront up to the 1-in-20-year flood level. The dike crest was widened to accommodate a waterfront road and park, and on the shore side old shops and houses were demolished and replaced by a series of highrise buildings containing hotels, office space and retail outlets, thus changing the skyline and streetscape of the city. Other streets in the waterfront area were also raised and widened in order to improve traffic flow and complete the redevelopment.

This project involved relocating 17,215 persons or 3,883 households. A total of 375,200 m<sup>2</sup> of old housing was demolished and 282 enterprises were affected. As 2,100 of the relocated households lived in housing belonging to their enterprises and organizations, their employers were responsible for relocating them to new apartment buildings. The remaining 1,800 households were either tenants of public housing (owned by the city) or private house owners. The city resettlement office was responsible for their new housing. Unlike rural resettlement, where resettlers built their own houses, all the affected residents of Nanping City were relocated to new apartment buildings. Since the housing compensation (based on cost of replacing existing structures) was not sufficient to cover the new apartment cost, a 3-3-3 formula was adopted, with one third to come from resettlement compensation, one third from a city subsidy and one third from the resettlers. By the end of 1995, both the resettlement and urban renewal process had been generally completed.

*Source:* SRRO.

**Site Preparation and Infrastructure Construction.** Most site preparation and infrastructure construction were carried out by professional contractors. Delays in this phase were responsible for early delays in relocation (Table 7), such that from 1987 to 1989 only 4,456 persons, or 7 percent of the total population, were moved compared with the planned 50 percent. The infrastructure delays can be attributed to three factors. First, with no provision of price contingency in the initial budget, by the time of implementation in 1987, the budget for site preparation and infrastructure construction was inadequate. While there was a process for obtaining budget adjustments, it was time-consuming. The second factor was related to the amount of construction that had to be done in the early years. While the plan provided for resettlers to be divided into three groups based on time of moving, the settlement towns or villages into which they would move were not similarly divided. It was therefore necessary to carry out a large proportion of site preparation before commencing any relocation. Finally, by comparing site preparation area and housing floor space each year on a year-by-year basis (Table 9), it can be seen that there was a one- to two-year lag between site preparation and housing construction, which was not anticipated in the planning phase.

**Table 9: Site Leveling and House Construction of Shuikou Resettlement**

Year	Site Leveling			Housing Construction				
	Investment (Y million)	%	Quantity (‘000 m <sup>2</sup> )	%	Investment (Y million)	%	Quantity (‘000 m <sup>2</sup> )	%
1988	21.85	13	1,020.8	22	48.02	22	82.40	2
1989	39.10	24	1,259.5	27	46.50	21	217.90	6
1990	31.24	19	1,400.0	30	39.95	18	1,339.90	36
1991	19.43	12	999.9	21	58.05	27	784.00	21
1992	-	-	26.5	1	17.79	8	870.90	24
1993	-	-	-	-	-	-	391.40	11
1994	53.71	32	-	-	8.05	4	1.80	0
1995	-	-	-	-	-	-	-	-
<b>Total</b>	<b>165.33</b>	<b>100</b>	<b>4,706.7</b>	<b>100</b>	<b>218.37</b>	<b>100</b>	<b>3,688.30</b>	<b>100</b>

Source: SRRO, p. 11.

Although most housing construction was completed in 1992 and 1993, work on village infrastructure continued, particularly in relation to safety provisions at resettlement sites. A large investment (Y 53.7 million) in site preparation took place in 1994. According to ECIDI a severe rainstorm hit the reservoir area during June 1994 resulting in flash flooding and mudslides that caused substantial damage to infrastructure, and slippage of reservoir banks. Twelve sections of reservoir bank required repairs in order to ensure the safety of the villages, involving expenditure of Y 30 million in 1994 and another Y 34 million in 1996 to complete the work.

**Housing Plots Distribution and Housing Construction.** In preparation for housing construction, plans were developed for distributing plots and construction materials, and moving people and their belongings. Based on the suggestion of resettlers, a lottery system was adopted for allocating housing plots in most villages. Once site preparation was completed and individual plots demarcated, a village-wide conference was held. All people in the village participated as did officials from the related township

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and county. Each household representative came forward to pick a number and following the order of the numbers, they selected their housing plots on the site plan. The choice was then notarized by the county officials. The actual housing construction was mainly carried out by individual resettlers, with the help of relatives and friends. For those resettlers who were not able to build their own houses, the townships or villages assisted them.

### **Economic Rehabilitation Activities**

**Overview.** The Shuikou reservoir inundated 43,670 mu of farmland, including 30,000 mu of high-yield paddy fields, and 25,401 mu of fruit trees or other cash crops, constituting most of the cultivated land of the affected areas. The remaining land resources above the reservoir level were of lesser quantity and inferior quality. Therefore, in order to restore income levels and livelihoods of the affected population, the initial resettlement plan postulated a range of economic rehabilitation options including development of new cultivated land, growing of fruit trees and timber trees on sloped land, developing cage fishery and other sideline activities, setting up enterprises and promoting service activities. After about eight years of efforts, by the end of 1996, as many as 38,473 resettlers had been provided with jobs ranging from traditional agriculture (48.0 percent) and animal husbandry (5.5 percent) sectors to newly developed nonfarm sectors, such as enterprises (17.4 percent) and services (14.0 percent).<sup>35</sup>

Economic rehabilitation seems to have occurred in two fairly distinct phases. The first phase was dominated by land-based economic rehabilitation. Carried out during the first few years after relocation, the adopted measures included: (a) redistributing the remaining cultivated land among the village members; (b) allocating village-owned sloped land among resettlers for fruit tree planting and other cash crop planting; and (c) organizing resettlers and providing them financial and technical assistance in developing fruit tree and other economic crops. However, given the limited land resources in the region, these land-based economic rehabilitation measures could only provide an initial production basis or minimum food supply for most resettlers; and were far from adequate to restore the income and livelihood. Therefore, income restoration had to rely substantially on the second phase of economic rehabilitation. The second phase focused on a range of nontraditional and nonfarm income-generating activities. These activities, such as duck and pig farming and small shops, generally stemmed from individual initiatives, while the resettlement office and local governments provided necessary technical guidance and financial support. In other cases, local governments took the initiative in attracting outside investors to open up factories and businesses, which in turn provided jobs for the resettlers. As a result, over 50 percent of jobs and a much higher proportion of income came from these nontraditional and nonfarm activities.

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<sup>35</sup> ECIDI Report No. 9, p.39.

**Land-Based Rehabilitation.** The first step toward economic rehabilitation in Shuikou Reservoir resettlement was to redistribute the remaining land resources within the affected villages or village groups. Since land redistribution has been carried out in Chinese villages for many decades to address both demographic and land usage changes, it was quite natural to use a similar approach to share the remaining land resources among the resettlers. As noted above, however, remaining land resources were quite limited. Among 35 villages sampled by ECIDI, farmland was reduced from 54,874 mu before the move, to only 19,693 mu after the move, a reduction of 64 percent. On a per capita basis, farmland was reduced from 0.98 mu before the move to 0.32 mu after the move. Due to varying inundation, there is also considerable variation in average landholding among the various villages, after inundation. Based on a 17-village survey,<sup>36</sup> the per capita landholding varies significantly, from 1.04 mu per person in Xilan to as low 0.02 mu per person in Youdun village. For most villages, cultivable land areas were inadequate to provide grain for their own production, a fact that was confirmed by later surveys.

This seems to be inconsistent with the estimation of remaining land resources in the planning stage. The estimate, carried out without a rigorous survey of soil composition, topographic condition and irrigation potential, seems to have been overly optimistic. Most land identified as suitable for agricultural purpose was actually sloped land and some was too remote from affected villages. Most available land was used for fruit tree planting, while the amount that could be converted into paddy field was very limited.

**Fruit Tree Planting.** In view of the low ratio of cultivable land area per person, a major component of the economic rehabilitation strategy was the planting of fruit trees and other economic crops to compensate for the loss of paddy land. SRRO even summarized this rehabilitation strategy in a slogan, which was “to plant one mu of fruit trees for every mu of lost paddy.” In the resettlement planning stage, large areas of sloped land were identified in all counties, and divided into four categories: plowable farmland: 35,074 mu; hilly lands suitable for fruit growing: 7,562 mu; forestry lands suitable for planting economic trees: 15,862 mu; and hilly lands suitable for forestry: 596,848 mu. During implementation, however, only 1,212 mu of new cultivated land were created, and most of the hilly land, including that initially identified as plowable, was used for planting of fruit and other economic trees.<sup>37</sup> The relatively favorable price of fruit in comparison with grain at the time contributed to the change in strategy. By the end of 1996, a total of 45,386 mu of fruit trees, 10,742 mu of tea, 33,837 mu of bamboo and 224,873 mu of forest had been planted under the resettlement program (Table 10).

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<sup>36</sup> The 17-village survey was conducted by Youxuan Zhu (co-author), and local counterparts for the OED study, World Bank, 1998.

<sup>37</sup> Although about 7,857 mu of vegetable land have been developed, most of this was converted from existing paddy fields.

**Table 10: Fruit Trees and Economic Trees in Shuikou Reservoir (1987-95) (mu)**

Year	Fruit Tree	Tea	Bamboo	Forest	Vegetable Land
1987	8,284	122	178	13,881	896
1988	9,867	588	605	9,768	338
1989	6,060	599	389	22,319	389
1990	5,180	522	4,856	40,735	620
1991	6,926	1,345	2,984	63,901	1,322
1992	8,581	2,912	2,419	25,564	571
1993	4,812	2,870	302	15,730	1,041
1994	1,625	948	6,683	9,158	1,185
1995	2,403	885	6,751	12,185	1,471
1996	469	45	14,062	14,977	1,888
<b>Total</b>	<b>45,386</b>	<b>10,742</b>	<b>44,837</b>	<b>224,837</b>	<b>7,857</b>

<sup>/a</sup> The figures provided by SRRO did not add up to the totals. The difference could be the result of different definitions or changing tree types after planting.

Source: SRRO, pp 23-28.

From Table 10 it is evident that fruit tree planting was carried out mostly in the early years of the resettlement program. In some counties, such as Nanping and Youxi, based on county government initiatives, the process began in 1987 before the start of relocation, while in others it did not start until after relocation. Although there were variations between villages in organizational arrangements for planting fruit trees, they generally followed a similar process. First, the village conducted a participatory planning exercise to determine how to allocate the available sloped land, leading to designation of areas to be reserved for village-managed orchards and those to be allocated to individual village members. The second step was to allocate land parcels to those households that wished to plant fruit trees. Since there was no shortage of vacant sloped land, no restriction was placed on the land area that a household could use. Therefore the limitation was usually the area of land that the household could manage. The third step was for individual households to prepare the land and plant fruit trees on their own,<sup>38</sup> with technical support of the village and township governments. These governments also provided financial support in the form of matching funds, low interest loans, or tree seedlings. In most cases, such financial support, ranging from Y 200 to Y 300 per mu, was not released until the fruit trees had been planted by the resettlers.

The outcome of these organized efforts varied among villages. In some villages, particularly in Mingqing and Youxi counties, fruit tree planting was relatively successful, averaging 1.3 mu per resettler for Youxi and 1.68 mu per resettler for Mingqing, while in Nanping and Gutian, comparable figures were 0.86 mu and 0.38 mu. There was also a difference in quality of fruit production. Due to poor seedlings and lack of maintenance, many fruit trees in Nanping have not grown very well.

<sup>38</sup> For village-owned fruit trees, the site preparation and plantings were often carried out by resettlers hired by the village collectives.

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The success of fruit tree development seems to have been very dependent on adequate capital, careful selection of seedlings based on market considerations, adequate maintenance of trees during immature years and skill of the growers. The most successful examples are from villages where fruit growing was an individual rather than village-organized activity, where certain households were able to mobilize the necessary resources, skills and effort. In these areas, however, this process led to a very unequal distribution of fruit trees. In Sanlian village, where per capita orchard area reached 1.4 mu, only 40 of the 183 households in the village grew fruit trees, averaging 20 mu per household. In Youdun village, apart from 1,175 mu of village-managed fruit trees, only 25 of the 188 households grow fruit trees, averaging 6.1 mu per household.<sup>39</sup>

**Shift from Land-Based to Nonland-Based Activities.** Compared to the resettlement plan, the actual outcome of the reestablishment of household economic activities showed a smaller proportion of land-based activities, and a corresponding larger proportion of nonland-based activities. There are a number of reasons for this. First, the original resettlement plan was prepared in 1983, at a time when the Chinese economy was still predominantly rooted in agriculture. Second, the rules of reservoir planning issued by MWR stipulated that as far as possible, resettlement should be based on “moving back.” There was no planned reduction of the agricultural sector foreseen in the plan. As a result, the plan continued to rely heavily on land. However when the time came to implement, conditions had changed, in that marginal land could be left undeveloped in favor of the development of nonfarm-type income generation opportunities that had presented themselves, as the economy saw the introduction of more market-based elements. In the end, instead of 75 percent, agriculture accounted for only some 50 percent of jobs. This shift was not brought about because the planners saw it coming and adjusted their plan accordingly. In fact, the plan itself was never revisited. What did happen was that in the course of implementation, the local governments—villages, townships and counties—responded to changed and changing conditions by concentrating greater efforts and budget on the creation of nonland-based economic opportunities that had become apparent as the coastal economy, of which Fujian Province was very much a part, started to grow by leaps and bounds. This was also the time that the results of the introduction of the responsibility system started to be felt, in that agriculture became more productive, and consequently agriculture on marginal lands became less attractive. It should be remembered that the potential for “move-back” agriculture was always limited, as steeper slopes could not accommodate the crop of the day—rice—while the investment cost of developing cash crops such as fruits was high, required long lead times, and was only promoted by local governments when there was no alternative. Any good move-back land would already have been placed under cultivation prior to reservoir planning, so at the time of planning, the planners had only a

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<sup>39</sup> In some villages, in order to increase village collective income-earning power, village-owned orchards were created along with individual ones. The one mentioned here is considered as a relatively large one, which provided full-time jobs for 36 resettlers to manage the orchard.

limited resource available. At the same time, the transition from subsistence agriculture to commercial agriculture has been speeded up as a result of the resettlement.

**Nonfarm-Based Economic Rehabilitation.** The second phase of economic rehabilitation was dominated by a wide range of nonfarm and nonland-based income-generation activities. Broadly speaking, these can be divided into four categories: (a) traditional industrial activities, utilizing existing and newly created factories to provide jobs; (b) rural-based sideline activities, such as raising pigs and ducks, cage fishing, and growing mushrooms; (c) service-oriented activities, such as small shops and road and water transportation services; and (d) migrant worker services, ranging from provision of specialist services outside the region to the export of unskilled labor to the industrial and service sectors in the coastal area. The extent to which the various categories of rehabilitation were adopted was dependent on location and size of the village accessibility and resource availability. It was also dependent to a large extent on the imagination and dynamism of village leadership, with some villages faring much better than others in the variety of activities undertaken.

**Industrial Development.** Since the 1970s, rural industrial development, usually in the form of township and village enterprises (TVEs), has been considered by the local governments as the most effective way to develop the local economy. Even before the Shuikou reservoir inundation, a certain level of industrial development had been achieved in the reservoir area. According to the ECIDI survey of 35 sample villages, before the move there were 96 enterprises, providing employment for 2,186 people or 11.2 percent of the local labor force, and contributing 10.8 percent of village income. During relocation, most affected enterprises were relocated and their facilities reconstructed.

In the process, some TVEs took this opportunity to either expand their operation, or to restructure their existing production in order to respond to changing market conditions. A few, such as timber shipping businesses, were either closed down or merged into other enterprises. By the end of 1993 when relocation activities had been completed and the reservoir had been inundated, the number of TVEs in the 35 sample villages was reduced to 85, a drop of 11.5 percent. However, the number of resettlers working in these TVEs had increased to 2,932, an increase of 34.1 percent, and the percentage of the work force employed by the TVEs increased from 11.2 percent to 14.8 percent (Table 11). The increase of employment in TVEs is even more apparent in reservoir-wide statistics compiled by SRRO. These show that the percentage of the work force employed by TVEs increased from about 8 percent before 1992 to around 20 percent after 1993 (Table A5 in Annex A).

**Table 11: Percent of Enterprise Employment among 35 Sample Villages**

Year	Number of TVEs	TVE Employment	Total Employment	% Employment in TVEs
Before Move	96	2,186	19,518	11.2
1992	96	2,561	20,488	12.5
1993	85	2,932	18,557	15.8
1994	89	2,906	19,118	15.2
1995	88	2,821	19,061	14.8

Source: ECIDI, Report No. 9.



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Investment in TVE development came from compensation for enterprise relocation, amounting to Y 6.09 million, and from land compensation earmarked for economic rehabilitation.<sup>40</sup> Figures on the proportion of land compensation funds invested in TVE development are not available. Supplemental investment in TVEs came from a number of other sources, including (a) savings from individual resettlers; (b) village and township budgets; (c) outside investors; (d) bank loans; and (e) interest-free loans from the reservoir resettlement revolving fund. TVE development depended on both public and private initiatives. The role of local governments was usually one of support and facilitation, identifying potential investors, providing incentives in relation to taxes and land; and entering into joint ventures. This was very important, and for each successful TVE, it is generally possible to identify a pro-business government official who was actively involved in its establishment and initial operations.

For newly established enterprises, reasons cited for setting up in the Shuikou reservoir area include tax incentives, cheap electricity, cheap labor and availability of certain natural resources. As noted earlier, the *Fujian Provincial 17 Preferential Policies for Shuikou Resettlement* provide that, for all affected and newly established enterprises, various income tax holidays would apply, each affected township and village would receive 500 kilowatt-hours (kWh) of electricity per year per resettler at a subsidized price. This enabled villages to attract small energy-intensive industries. With improved access and the entry of outside investors, traditional timber and bamboo processing factories have prospered, with various new products being developed. These industries, which are labor-intensive, also provided employment to many women and generated additional employment for those collecting raw materials. The Zhanghu Bamboo Brush Factory, which produces bamboo brush sticks (for calligraphy brushes) is an example. The preparation of these sticks involves collection of bamboo stalks and cleaning, sorting and cutting them to different sizes.

**Sideline Activities.** Traditional sideline activities, such as growing mushrooms and raising ducks and pigs, were also identified and promoted by the local governments. Sideline activities selected by different villages varied depending on local conditions, such as natural resources, proximity to markets and village tradition. In many villages of Gutian County, mushroom growing became an important income-generation activity; while in some villages in Youxi county, duck farming and related fish production were quite popular. In Meixong Village in Mingqing County, cage fishing alone contributed over 15 percent to total village income (1996), while in Yangwei Village, Nanping City, pig farming accounted for more than one third of the village income. Table 12 shows the percentage of animal husbandry income (including fishing) to total village income among selected villages in 1996. It can be seen that these activities contribute one third to one half of total village income.

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<sup>40</sup> SRRO, p. 10. See Table A7.

**Table 12: Percent of Animal Husbandry Income as Total Village Income in Selected Villages, 1996**

Village	Husbandry Income (Y)	Husbandry Income per Person (Y)	Percent of Total Village Income
Yangwei	1,319,000	1,253	54.1
Sanlian	830,000	1,071	40.4
Meixiong	1,520,000	1,421	29.9

Source: Field notes, Youxuan Zhu, 1997.

Compared with employment in enterprises, one major advantage of sideline activities is that they can be easily operated by individual households, with the scale of operation suited to the resources and capacity of the household. They are also easier and less costly to implement. They have become the main economic activity for some households and provided supplementary income for others.

Sideline activities also owed much of their success to the support of local government. For example, in Sanlian village, with a per capita land area of only 0.28 mu, the village leaders turned to sideline activities, such as duck farming and fishing, taking advantage of the proximity of the village to Xibing Town. Incentives were given by the village to those resettlers who were willing to take the lead in experimenting with integrated duck and fish farming. They were provided with a fishpond without charge and free construction materials for building duck sheds, and interest-free loans for working capital. As a result, duck farming flourished. As of 1996, 86 households or 47 percent of all households in Sanlian were involved in duck farming, keeping a total duck population of 75,000 and 176 mu of fishing ponds.<sup>41</sup> Per capita income from sideline activities averaged Y 1,000, accounting for 40 percent of total income.

Local government support was also important in the provision of necessary technical assistance to the resettlers, which they were able to provide through their agricultural departments. In some cases, such as cage fishing in Mingqing and mushroom growing in Gutian, the local governments brought in special technical experts from provincial- and county-level institutions to provide needed guidance.

Another factor important to the success of sideline activities, which was sometimes overlooked by resettlement officials, was whether the village layout could accommodate the proposed activities. The relative success of Yangwei and Sanlian in developing their activities was largely attributable to the available land and water areas within their villages and the relatively low density of village housing. By contrast in villages such as Xiaban (Zhanghu), and Liujia (Taiping), the density approached that of urban neighborhoods with little or no space available for even small-scale husbandry activities. This significantly reduced the income potential of these villages. Taking Xiaban village as an example, in 1996 the total sideline (husbandry) income was only Y 300,000, averaging only Y 170 per person, 5.2 percent of village income. The dense

<sup>41</sup> Among the total number of ducks, 25,000 are for eggs and 50,000 are for meat.

housing layout was also cited as the main reason for the poor mushroom output in Xilan and Wankou villages in Gutian county. The lack of separate structures for growing mushrooms increases the risk of disease, resulting in reduction of yield. The lesson to be learned is that the village layout should consider, as well as normal urban planning criteria, the potential for various sideline activities to supplement village income.

Generally, based on local conditions and village traditions, villages concentrated on one or two types of sideline activity as their main income-generation activity. This had the advantages of specialization, economies of scale, focused technical assistance, and so on, while usually maintaining the advantages of individual management.

**Service-Oriented Activities.** As for sideline activities, the potential for developing service-oriented activities was very much dependent on the location and layout of the resettlement towns and villages. The potential for service-oriented activities to provide employment for some nonagricultural resettlers was considered in the original resettlement plan, being a factor in the decision to concentrate resettlement villages into towns or larger villages. Towns emerging from Shuikou resettlement have populations over 10,000, with concentrated villages having populations of over 1,000. These are large enough to support service activities, such as convenience stores, restaurants, beauty salons and repair shops. Resettlers whose houses were located along the main streets were able to convert part of their houses into small shops. The opportunity for many sideline and service activities was created by the construction of Highway 316 between Fuzhou and Nanping back in the resettlement period. This led to many small transportation and roadside businesses. It also provided access to markets and attracted outside investments.

Depending on their size and accessibility to the highway, some villages enjoyed more rapid commercial growth than others. Taking Xiyang village as an example, in 1996, 123 of the 570 households had small shops that employed 216 resettlers, accounting for 20.6 percent of the labor force. Table 13 provides figures for several villages.

**Table 13: Share of Service Employment in Selected Villages (1996)**

Village	Population	Connected with Town	Name of Town	Percent of Service Employment
Meixiong	1,070	Yes	Xiongjiang	13.5
Wankou	2,336	No		11.4
Shuikou	3,774	Yes	Shuikou	26.5
You dun	936	Yes	Youxikou	18.8
Xiyang	2,148	Yes	Xibing	21.6

Source: Field notes, Youxuan Zhu, 1997.

It can be seen that villages with a relatively high percentage of employment in services tend to be connected with the town center, which is the commercial and administrative center of the township. As such, it attracts people from outlying villages, providing customers for the town shops. In some towns, such as Xibing and Youxikou,

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resettlers found that they could lease their street-fronts as shops, for Y 3,000 to Y 5,000 per year to obtain supplementary income.

Transportation services were also popular. With the newly constructed highway<sup>42</sup> connecting most villages to Nanping and Fuzhou, some resettlers bought minibuses and started bus services. Given the high cost of the vehicles, households often cooperated on a joint-venture basis. Some resettlers also bought small trucks or tractors to provide transport services within the villages. Similar investments were made in passenger boats to provide transportation on the reservoir. A boost was given to larger commercial operations with the commencement of trial operation of the Shuikou shiplock in February 1996. Up until the end of 1998, some 30,819 boats with a total tonnage of 1,160,600 tons had passed through the lock in 3,731 passes, or 1,442 tons on average. Typically, the lock can pass 12 boats at one time. Annual volumes have increased from an initial 120,000 tons per year to about 700,000 tons per year in 1998, still well below the 3.2 million ton estimated capacity of the facility, but tonnages are projected to continue to increase as the availability and reliability of the lock becomes more widely known, and boat sizes increase to the size that can now navigate the river and reservoir. The dynamic growth of this shipping industry is providing jobs and income for resettlers in the field of ship building, operations and cargo transfers.

**Migrant Workers.** In the Shuikou reservoir area, migrant workers can be divided into two categories. In the first category, specialized skills and services are providing on a contract basis, and in the second, unskilled labor is exported to the coastal area.

There are two villages supplying migrant workers in the first category. One specializes in building and managing amusement parks all over China, and is based in Zhanghu Town, Nanping City. The other provides installation of heating and air conditioning duct insulation in commercial and industrial buildings throughout China, and is based in Xiadao Town, Nanping City. Although exact figures on employment and income generation are not available, employment in insulation activities is quite impressive according to officials from Xiadao. A total of 5,000 people in Xiadao are involved, of whom 3,000 were resettlers (1993). The gross revenue earned by these migrant contractors amounted to Y 120 million, at least one third of which was returned to Xiadao Town. In Xuyang Village, 17 percent of the labor force was involved in the insulation business. No similar data are available for theme park activities.

As for the second category, until 1996 outside jobs were usually obtained by individuals, generally high school graduates, with little help from local governments. In 1996, SRRO began to focus on organizing employment for young high school graduates in the coastal area. In that year some 80 resettlers were sent to Xiamen, the coastal special economic zone of Fujian Province. In 1997, it was planned to increase this to about 500.

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<sup>42</sup> National Highway No. 316, which follows the right bank of the reservoir connecting Fuzhou to Nanping and constructed over the period 1995 to 1997, was not financed by the Shuikou Project.

SRRO considers that the advantage of this program, beyond the provision of jobs and income, is in the experience and the business knowledge gained by working in the coastal area, which will benefit their communities on their return to Shuikou.

### **Social Rehabilitation**

In addition to economic rehabilitation, social rehabilitation was also an integral part of the resettlement program. As noted earlier, maintaining the existing social structure was a key objective driving the resettlement strategy, to be achieved through moving of affected villages as whole communities into the same townships and counties. Social rehabilitation can be considered to consist of two components: first, the reestablishment of social infrastructure, such as schools, clinics and other community structures, which has been described earlier; and second, the social support provided to resettlers, particularly in providing assistance to vulnerable individuals and families, such as the elderly and disabled.

The social support system for the resettlers relied heavily on the traditional welfare function for the elderly and disabled. Since most affected villages were moved as complete units, this traditional function was maintained. For vulnerable village members, the village helped them rebuild houses, and provided grain or cash subsidies to meet their daily needs as had been provided before moving. The scale of such support depended on the capacity of the affected township or village, with typical cash subsidies being between Y 300 to Y 500 per year. However, such assistance was not extended to relatively poor resettlers not falling into the categories of elderly or disabled. According to local township and village officials, no special measures were taken to assist such individuals since they would benefit from the general economic rehabilitation measures.

### **Financial Aspects**

The initial resettlement budget for Shuikou Reservoir of Y 410 million, prepared by the planning team, was approved in 1984. However, when the construction of the project began in 1987, three years after the approval of the project, the budget was already inadequate. While this was partly due to a small change in scope (number of affected people and inundated properties), inflation was mainly responsible. Along with the rapid pace of economic reform, prices of food, construction materials and labor increased dramatically in the 1980s. Accordingly, during the first coordination conference for the Shuikou Project convened by MWREP in March 1987, a cost readjustment was proposed by the relevant provincial departments. A readjustment plan was subsequently prepared by ECIDI. After passing through the various approval processes, the readjustment was eventually approved by SPC in November 1989. The approved readjustment raised the total budget to Y 888 million, an increase of 117 percent. According to the analysis carried out in support of the adjustment, about 90 percent of the increase was due to inflation and policy changes such as conversion of controlled prices to those determined by the market. In March 1993, after four years of implementation, when it became clear that more work would be required, the budget was increased again, to Y 1,057.5 million.

The Shuikou resettlement budget was revised again in 1996 following torrential rains and a major flood that occurred in 1994. The flood caused damage to 93 sections of reservoir bank totaling 23.5 km, with erosion encroaching on many resettlement sites. Some of this damage was due to a lower standard adopted for resettlement site preparation in the early planning and implementation stage. The total cost for bank treatment totaled Y 308.1 million, with all structures under El. 61 m being reinforced as underwater structures. The revised budget raised the total resettlement cost by Y 330.58 million to Y 1.388 billion. The majority of the additional budget was used for the bank stabilization efforts. Table 14 shows the increases between 1983 and 1996.

**Table 14: Shuikou Resettlement Budget (1983, 1989, 1993 and 1996)**  
(Y million)

Items	1983	1989	1993	1996
Total	410.0	888.0	1,057.5	1,388.0
1. Rural Resettlement	218.2	504.1	604.6	614.3
(a) Relocation of which	125.1	297.0	369.6	379.3
- housing	81.4	210.3	227.3	227.3
- site leveling	34.4	69.8	126.5	136.2
(b) Rehabilitation of which	93.1	207.2	235.0	235.0
- acquired land	3.4	6.4	6.4	6.4
- agriculture	83.1	189.3	217.1	217.1
- enterprises	4.6	8.0	8.0	8.0
- other	2.0	3.5	3.5	3.5
2. Special Infrastructure of which	129.4	226.2	259.3	269.0
- road	49.3	80.0	84.4	84.4
- port	6.0	13.5	16.6	16.6
- enterprises	74.2	132.6	159.2	159.2
3. Nanping City Flood Control of which	58.3	126.7	161.6	161.6
- housing	24.4	43.6		
- infrastructure	5.8	9.0		
4. Management	1.2	10.1	12.2	15.3
5. Other	2.9	20.9	19.8	327.9

Source: SRRO.

The expenditure of the resettlement budget over time is shown in Table 15. This shows the final budget in dollar terms to be equal to \$240.5 million, about 16 percent above the 1983 estimate in dollar terms of \$207.1 million. The final costs of the rural resettlement (excluding the Nanping urban redevelopment) is \$211.1 million or some \$3,150 per capita, or \$14,130 per household.

Of the final resettlement budget of Y 1.39 billion, about Y 235 million was allocated for economic rehabilitation, of which Y 217 million was in the form of compensation for land or fruit trees; with the remainder for enterprise relocation and acquisition of sloped land from other jurisdictions. SRRO provided a year-by-year fund allocation under these cost headings (Table A7 in Annex A), but no detailed information

was available on how the land compensation funds were expended in relation to the various economic rehabilitation activities described above).<sup>43</sup>

**Table 15: Shuikou Resettlement Expenditures**

	<b>Total (Y million)</b>	<b>Applicable Exchange Rate</b>	<b>Expenditures (\$ million)</b>
1988	163	Y 3.73=US\$1.0	43.7
1989	131	4.73	27.7
1990	198	5.24	37.8
1991	195	5.45	35.8
1992	174	5.77	30.2
1993	39	5.81	6.7
1994	90	8.46	10.6
1995	48	8.33	5.8
1996-99	350	8.30	42.2
<b>Total</b>	<b>1,388</b>	<b>5.77</b>	<b>240.5</b>

Source: SRRO.

While the resettlement program has basically been completed, activities by the "Reservoir Maintenance and Construction Fund" will continue in the reservoir area. On February 2, 1995, Fujian Province followed the national regulation and passed "Temporary Provisions (No. 145) for the 10 years Shuikou Reservoir Maintenance and Construction Fund," which provided for Y 0.004/kWh of energy generated by the power plant for the further development of the population resettled due to the Shuikou Reservoir. This has now been increased to Y 0.005/kWh in accordance with a central government regulation issued in 1996, which provides for a "Later Stage Support Fund." The estimated annual revenue under the later provision is Y 25 million. SRRO received its first payment into this fund of Y 10 million in 1995. Thereafter it received payments of Y 20 million in 1996 and 1997. SRRO has the discretion to determine allocations from the fund. It considers that for the first few years, about half should go toward infrastructure improvement, with the remainder toward improvement of production measures. After the initial period, the fund would generally be allocated to production measures.

<sup>43</sup> This schedule reflects the year when the fund was allocated to the city or county resettlement offices, not necessarily the year the money was finally received by the village or individuals.

## 5. MONITORING AND EVALUATION

### Internal Monitoring

During implementation of the resettlement program, SRRO carried out its own internal monitoring program, which generally recorded physical progress and expenditures over time. As noted earlier, investment plans were prepared and reviewed on an annual basis and funds allocated in accordance with approved plans. At year-end, statistics were collected and an analysis undertaken of fund use and results. Local officials were held accountable through this process. In addition, SRRO staff carried out frequent field visits to inspect operations and help solve problems, spending some two thirds of their time in the field. They were therefore very aware of the situation on the ground and were very effective in resolving problems at an early stage.

However, SRRO was less effective when the resettlement program moved into the rehabilitation phase. Instead of focusing on individual villages as in the relocation phase, they tended to focus more on statistics aggregated to the county level and monitor the progress with aggregated figures. No serious efforts were made to ensure that each affected village created enough employment according to the original plan, and restored all livelihoods. This is attributed to a weakening of emphasis and pressure from the provincial government and a shift of responsibilities toward local government.

The 1992 appraisal report for the second loan by the World Bank reported that the SRRO approach to monitoring and reporting of physical progress, and the lack of intermediate milestones of performance, did not allow an independent evaluation of progress in completion of the physical works to be made. It was not until 1994 that SRRO finally produced a summary report on resettlement implementation, providing for the first time an overview of physical progress and employment development. However, most of the data presented were aggregated to the county or city level, so that poorly performing villages could not be identified.

### External Monitoring and Evaluation

Faced with the inadequacies of the SRRO monitoring system during appraisal of the second loan, and the already advanced stage of physical relocation activities, the appraisal team decided to shift the emphasis of monitoring from physical progress to end-results. It was agreed that the previously planned IER, which was largely intended as a post-project evaluation would be commenced earlier, with the intention of providing timely warning to government authorities of problems in reestablishment of income or general welfare. The IER would be based on sample surveys of households and villages. The contract for the IER was awarded to ECIDI and signed in December 1991. The contract covered the period 1992 to 1996.



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## Methodology

The IER was based on an annual interview survey of 35 sample villages and 524 sample households. Based on a set of agreed indicators three different tables were progressively compiled. The first of these tables showed livelihood changes among the 524 households before and, at various times, after relocation. The indicators selected included move date, family structure, production situation, various classes of assets and annual net income. The second table tracked changes in basic infrastructure in the resettlement villages, and included indicators of population profile, and presence and standard of housing, electricity, roads, clinics, schools, telecommunications and retail facilities. The third table documented the changes in production systems of the 35 villages in terms of land resources, output of different products, employment situation, and village per capita income. There are 143 variables in these three tables. The methodology focused heavily on the recording of annual household incomes, and improvements to the income estimation methodology were incorporated with each successive field survey. Incomes in cash and in kind were both recorded to ensure that an overall picture of the standard of living was presented. Since neither the sample households nor the enumerators changed over the period of the field surveys, it is likely that the reliability of the survey has improved over time. Another methodological aspect received considerable attention by ECIDI: the adjustment of annual income increases for inflation. This provided, in a period of high price inflation, a realistic picture of real changes in income.

In accordance with the contract, ECIDI started the first survey in May 1992. They assembled a 65-member evaluation team from the four levels of government: provincial, county, township and village. This team was reassembled each year for the annual survey and did not change over the period 1992 to 1996. Before the start of the baseline survey, ECIDI conducted a training program for the evaluators and followed this up in later years according to needs, ensuring the quality of the survey.

By the end of June 1997, nine evaluation reports had been produced, five of which were based on actual sample surveys (No. 1, 3, 5, 7 and 9) and four of which (2, 4, 6 and 8) were collections of comments and explanations on the preceding reports. Over the period of the IER, after the actual move, Shuikou resettlement experienced relocation, transition, restoration and development.

The IER proved to be an invaluable tool in tracking the process of rehabilitation. It also identified weakness in the resettlement implementation, such as the need for strengthening resettlement institutions in later phases, the need for timely allocation of funds, and the need for better maintenance of infrastructure in resettlement villages. All these suggestions were well received and were later addressed by local governments.

Reference has already been made to the uneven monitoring performance of the SRRO. Therefore, the ECIDI annual evaluation reports took on a greater importance, as they allowed an opportunity to learn what was happening to relocated households and villages. For instance, the sample household survey of 1995 indicated that out of the total

of 524 households, only 20 (less than 4 percent) had a per person income of less than Y 600, considered to be a poverty level indicator; these were mostly households with only one person earning an income. The year prior, there had been 35 households with a per person income of less than Y 600. The surveys thus provided an indication of the progress made toward meeting the income objectives of the resettlement. The ECIDI reports were carefully examined by FPEPB, SRRO, the Reservoir Committee of China Water Power Engineering Society and the World Bank. The written comments made by these organizations were recorded in follow-up reports that were circulated. Beyond Shuikou, the IER was the first such independent evaluation carried out over a number of years for a power project. The methodology has proven to be workable. Much was learned about doing consistent sample surveys, measuring of incomes from all sources, making inflation adjustments to recorded incomes in order to produce estimates of real income, recording changes in assets, interviewing village leaders about the changes that had taken place and the problems still remaining, and reporting annually about the emerging new conditions. Since Shuikou, multiyear independent evaluations of resettlement have been used in other projects in China, both World Bank-financed and others, and are now being routinely required for reservoir projects.

## 6. OUTCOMES

### Housing

Compensation was designed to provide replacement value of housing based on equivalent type and floor area. With the provision of subsidized construction materials, and their own labor contribution, it might be expected that resettlers would slightly improve their housing standards. However, new houses turned out to be bigger and of better quality than those replaced, largely because of individual contributions to the cost of the new house. Many resettlers spent most of their individual compensation money on housing. Some of them used additional savings and even borrowed from relatives. For the whole reservoir area, some 2.1 million m<sup>2</sup> of housing were replaced by new housing amounting to 2.7 million m<sup>2</sup>. On a per capita basis, housing area increased from 31 m<sup>2</sup> to 41 m<sup>2</sup>. The quality of the houses improved significantly. Before the move, about 90 percent of the structures were made of wood and earth while after the move, 98 percent were concrete and brick structures (see Table 16).

**Table 16: Housing Areas (m<sup>2</sup>) and Types Before and After Resettlement**

Type of Structures	Before the Move		After the Move	
	Area	Percent	Area	Percent
Concrete/brick	6,065	0.3	2,697,730	98.5
Wood/brick	57,060	2.7	-	-
Wood	765,810	36.6	-	-
Earth	1,079,480	51.5	39,770	1.5
Auxiliary	186,580	8.9	-	-
<b>Total</b>	<b>2,094,980</b>	<b>100.0</b>	<b>2,737,500</b>	<b>100.0</b>
Per Capita	31.2		40.7	

Source: SRRO.

### Community Facilities

Rebuilding social infrastructure such as schools, clinics and other community buildings was generally the responsibility of relevant local government departments such as public health, education, and social welfare. In addition to the compensation received for demolished structures, these departments provided additional resources to rebuild the social infrastructure in the resettlement towns and villages. As a result, newly constructed community structures were generally larger and of better quality than those being replaced. Table 17 shows that reconstructed community floor space increased by 34.2 percent before the move, from 700,000 m<sup>2</sup> to over 950,000 m<sup>2</sup>. The improvement of building quality was even more remarkable, with almost 100 percent of new buildings being of concrete or brick construction compared with only 8 percent before the move.

Table A8 in Annex A details construction type and quality of selected community facilities in Yanping District (Nanping City).

**Table 17: Nonresidential Structures (m<sup>2</sup>)**

Type of Structures	Before the Move		After the Move	
	Amount	Percent	Amount	Percent
Concrete/brick	53,653	7.6	943,700	99.0
Wood/brick	193,734	27.3	-	
Wood	98,440	13.9	-	
Earth	301,295	42.5	7,700	1.0
Auxiliary	61,623	8.7	-	
<b>Total</b>	<b>708,745</b>	<b>100.0</b>	<b>951,400</b>	<b>100.0</b>
Per capita	10.5		14.1	

Source: SRRO.

### Job Creation

The measurement of job creation in relation to various physical indicators was explained previously. In fact, by the time resettlement occurred, living standards had improved considerably and the definition of what constituted a job had to be revised. Table 18 shows the achievements by the end of 1995, in terms of physical quantity, the new standards and the calculated number of jobs. The new standards are substantially higher than those used in initial planning. For example, the area of young forest trees constituting a "job" increased from 15 to 30 mu; and for tea trees, it increased from 4 to 20 mu. The reduced ability of land-based occupations to provide well-paid jobs is another factor explaining the gradual shift in economic rehabilitation strategy from primarily a land-based approach during the planning stage to a more diversified approach during implementation.

Table 18 shows that by 1995, some 39,220 jobs<sup>44</sup> had been created, representing 58 percent of the population resettled. Among this population, 50 to 55 percent are regarded as qualified workers (able-bodied men and women with ages between 18 and 50). Therefore from a macroeconomic viewpoint, the economic rehabilitation task for Shuikou had basically been completed.<sup>45</sup> Of the jobs created various planting activities accounted for 48.6 percent, small enterprises 15.1 percent, service activities 13.6 percent, sideline activities 5.8 percent and other nonfarm activities 17 percent. Altogether, about 51 percent are involved in nonfarm or nonland-based economic rehabilitation activities.

<sup>44</sup> It will be noted that this figure is slightly different to that provided by SRRO in the same year of 35,995. It also in apparent conflict with the 1996 figure of 38,473 jobs provided previously. The differences are attributed to changing definitions of "a job," variation of definitions by county, and varying categorization of some economic crops.

<sup>45</sup> The labor ratio of 50-55 percent is based on the ECIDI 35 sample village survey information.

**Table 18: The Production Development in Shuikou (1995)**

Items	Unit	Amount	Employment Standard	Number of Jobs
<b>Planting</b>				19,466
Forest	mu	205,566	30.0	685
Fruit trees	mu	52,354	7.5	6,981
tea trees	mu	10,250	20.0	513
Bamboo	mu	26,075	40.0	652
Vegetables	mu	8,224	1.5	5,483
New land	mu	937	10.0	94
Mushroom	ton	2,530	0.5	5,060
<b>Husbandry</b>				3,707
Cage fishing	mu	48	5.0	10
Pond fish	mu	2,312	5.0	462
Reservoir fish	mu	6,246	60.0	104
Pigs	-	53,278	20.0	2,664
Goat	-	7,909	50.0	158
Chicken	-	79,704	500.0	159
Ducks	-	74,836	500.0	150
<b>Enterprises</b>				6,971
Planned	-	275	-	-
in operation	-	205	34.0	6,971
<b>Service</b>				4,573
Retail	-	994	-	-
Food	-	396	-	-
Transport	-	1,243	-	-
Other	-	544	-	-
Other	-	-	-	4,502
<b>Total</b>				39,220

Source: SRRO, 1995, *ibid.* p.12.

### Investment

The actual resettlement expenditures totaled Y 1,388.04 million in comparison with the initially budgeted Y 410 million (refer to Table 14). Most of the increase was due to inflation and policy changes such as conversion of controlled prices to market prices. However, some increase was due to the underestimation of the number of persons to be relocated (Table 7 has shown that 7.6 percent more persons were relocated than were indicated in the 1986 SAR) and due to resettlement items or tasks having been underestimated. Furthermore, due to the major flood of 1994, large additional expenditures had to be made for reservoir slope stabilization. The actual resettlement expenditures on a per person basis amounted to \$3,150, which is among the highest ever expended in China, if not the highest. The resettlement budget alone is not the full measure of the investment that has been made into the reservoir region. Many households used savings and/or loans to supplement the compensation funds available and took the opportunity to upgrade their new housing, frequently to a level substantially beyond what they enjoyed previously. While there are no figures available on the amount of private investment made into housing, judging by the quantity and quality of housing stock that has been constructed, there is little doubt that private investment was considerable. It should be pointed out that strictly speaking there was no need or compulsion to make this

investment; relocated households simply took a once-in-a-lifetime opportunity to improve their housing situation, which, incidentally, had been held back for some years in anticipation of the relocation. The catalytic effect of the capital goods formation boom, including township and village infrastructure and regional transportation works, has further benefited the area, as it increased the demand for local goods and services, including labor. Additional investment also took place in the development of individual and township and village enterprises; given the large number of enterprises that were established following relocation, the investment would have been considerable, although, once again, no figures are available. OED, in their 1998 report, made a very rough estimate of the total investment in Shuikou resettlement, as discussed here, and suggested that double the actual resettlement expenditures might be an informal estimate. Regardless of the actual amount, one can draw the conclusion that money was not a problem in Shuikou resettlement; this must be singled out as one of the contributing factors in its success.

### Restoration of Incomes

For the 524 sample households, based on individual interviews, per capita net income increased from Y 780 before the move to Y 1,641 in 1995, an increase of 110 percent (Table 19). This does not consider the impact of inflation. During the period from 1988 to 1995, price inflation in rural Fujian, as in all of China was quite high, totaling 97.9 percent over the period. With inflation factored in, the increase in per capita income is 11.3 percent. (Table 20).

**Table 19: Income Analysis of 524 Sample Households**

Year of Move	Number of Sample Households	Before the Move		1995		Income Change (%)
		Number of People	Per Capita Income	Number of People	Per Capita Income	
1988	388	1,969	783	1,903	1,719	119.4
1989	58	304	723	289	1,170	61.9
1990	47	257	749	250	1,549	106.7
1991	22	103	832	104	1,499	80.2
1992	9	47	1,084	43	2,252	107.8
<b>Total</b>	<b>524</b>	<b>2,680</b>	<b>780</b>	<b>2,589</b>	<b>1,641</b>	<b>110.3</b>

Source: ECIDI, Report No. 9, Appendix Table 7.8.

**Table 20: Income Analysis of 524 Sample Houses (Inflation Adjusted)**

Year of Move	Number of Sample Households	Before Move Per Capita Income	1995 Per Capita Income	Income Change (%)	Inflation Rate (%)	Income Change with Inflation Adjustment (%)
1988	388	783	1,719	119.4	97.9	10.9
1989	58	723	1,170	61.9	66.5	-2.8
1990	47	749	1,549	106.7	68.8	22.5
1991	22	832	1,499	80.2	63.9	9.9
1992	9	1,084	2,252	107.8	58.6	31.0
<b>Total</b>	<b>524</b>	<b>780</b>	<b>1,641</b>	<b>110.3</b>	<b>90.6</b>	<b>11.3</b>

Source: ECIDI Report No. 9, Appendix Table 7.8.

These survey results may underestimate the actual changes of income since households that moved in 1988 constituted a very high proportion (74 percent) of those in the sample. If the analysis is adjusted to apply the income change by year of moving to the actual numbers moving in that year, the average per capita income of resettlers in 1995 increased by 14.5 percent from the time of moving (Table 21).

**Table 21: Income Analysis of 524 Sample Households**  
(with inflation but using the total relocation population to determine the average)

Year of Move	Number of Resettlers	Before Move Per Capita Income	1995 Per Capita Income	Income Change (%)	Inflation Rate (%)	Income Change with Inflation Factor (%)
1988	4,456	783	1,719	119.4	97.9	10.9
1989	17,552	723	1,170	61.9	66.5	-2.8
1990	28,332	749	1,549	106.7	68.8	22.5
1991	13,478	832	1,499	80.2	63.9	9.9
1992	3,421	1,084	2,252	107.8	58.6	31.0
<b>Total</b>	<b>67,239</b>	<b>780</b>	<b>1,487</b>	<b>91.1</b>	<b>68.8</b>	<b>14.5</b>

Source: ECIDI, Report No. 9, Appendix Table 7.7.

The 35-village sample reflects similar trends with per capita income increasing from Y 618 in the year before moving to Y 1,787 in 1995 on an unadjusted-for-inflation basis. The income measured after the move is within 10 percent of the average of the sampled households (Y 1,641). However, income before the move is considerably less than that measured in the household survey (Y 780). A possible explanation is that the first surveys of the IER did not occur until 1992 and resettlers who moved before that date had to estimate "before move" incomes retroactively. High inflation in the intervening period may have affected their recollection. A follow-up survey was carried out in 1998 to obtain 1996 incomes of the 35 sample villages (but not sample households) found that incomes continued to increase sharply in 1996. They increased from Y 1,860 to Y 2,438, an increase of 31 percent on a unadjusted-for-inflation basis and 25.5 percent on an adjusted basis.

The change in employment structure noted earlier is also reflected in the change in income structure. Based on survey of 35 sample village data, the income from cultivation dropped from 36.2 percent before the move to only 22.5 percent in 1995. Income from industrial enterprises increased from 10.8 percent to 16.4 percent. And income from other sources, including service activities and migrant laborers, increased from 13.2 to 34.8 percent (Table 22).

**Table 22: Average Per capita Income Composition in 35 Resettlement Villages**

Income Source	Before the Move		1995	
	Amount (Y)	Percent (%)	Amount (Y)	Percent (%)
Cultivation	223.6	36.2	402.9	22.5
Forestry	87.6	14.2	88.1	4.9
Animal Husbandry	54.7	8.9	114.5	6.4
Sidelines	97.3	15.8	210.8	11.8
Fishery	5.8	0.9	58.1	3.3
Enterprises	66.5	10.8	292.7	16.4
Others	82.3	13.2	622.4	34.8
<b>Total</b>	<b>618.0</b>	<b>100.0</b>	<b>1787.0</b>	<b>100.0</b>

Sources: ECIDI, Report No. 3—Table 13; ECIDI, Report No. 9—Tables 4.1 and 17.

Other measures of living standards were also included in the independent evaluation. According to the household survey the number of large furniture items increased 21.2 percent from before the move to 1995. Corresponding figures for bicycles and electronic appliances were 32.6 and 60.9 percent. Motorcycles and telephones increased 4.4 and 22.5 times during the same period.

In spite of the impressive income increase among Shuikou resettlers, until 1995 their incomes still lagged behind average rural incomes in Fujian Province (Table 23). However, the rate of income growth among Shuikou resettlers was larger than that in Fujian Province. For example, between 1994 and 1995, while per capita income increased by 30 percent in Fujian Province, the per capita income in Shuikou reservoir increased by 35 percent. The 1998 follow-up survey in relation to the 35 sample villages indicated that this trend continued in 1996. The provincial rural area per capita income at end-1996 was Y 2,492, increasing 21.6 percent from 1995, while the average income of the resettlement villages was Y 2,438, an increase of 31.1 percent over 1995. Thus, according to village-wide figures, Shuikou resettlement villages moved from a situation of lagging Fujian rural income by 38 percent before the move to a situation where they are only 2.2 percent behind and still gaining. According to officials from SRRO, the improved infrastructure and accessibility and changed economic structure in the Shuikou reservoir region, plus favorable resettlement policies, contributed to the higher growth rate.

**Table 23: Per Capita Income of Resettlers and Rural Fujian Province (Yuan)**

Year	Resettler Per Capita Income (524 Sample Households)	Fujian Rural Area Per Capita Income	Difference (%)
1992	783	984	25.2
1993	884	1,211	35.6
1994	1,218	1,578	29.7
1995	1,641	2,049	24.9
Change	110%	108%	

Source: ECIDI, Report No. 7, Table 10.



### **Resettler Satisfaction**

Overall, relocatee satisfaction as observed by the IER was remarkably high. While some complaints were voiced, the level of dissatisfaction that one could anticipate with a major relocation simply was not evident, although those interviewed were given ample opportunity to state their opinions. This was also observed by the periodic World Bank supervision missions and OED missions.

## 7. ANALYSIS AND CONCLUSIONS

Based on the above outcomes, it can be concluded that Shuikou resettlement was carried out successfully. The OED evaluation<sup>46</sup> concurs with this assessment. In this section an attempt is made to identify the reasons for this success while, at the same time, identifying weaknesses in the process, which may offer some lessons for future projects.

It is considered that the main factors responsible for the success of Shuikou resettlement are as follows:

- **Government Policies.** The central government policy most directly responsible for the serious treatment of Shuikou resettlement is detailed in the Regulations for Land Acquisition and Resettlement for the Construction of Large- and Medium-Size Water Conservancy Projects, issued by the State Council. This regulation establishes the principles and methods of development-based resettlement and restoration of living standards. The regulation implements the policy directive contained in the 1988 Water Law that stipulates that in the case of reservoirs, the local governments shall be responsible for the proper arrangement of the livelihood and production of the relocatees. The local governments include provinces, in this case Fujian Province, that enact specific land requisition regulations that provide the basis for the calculation of compensation payments for land and other assets. More important, Fujian Province passed preferential policies and incentives that would directly benefit the relocated and host populations, such as lower electricity rates, a reservoir development fund tied to power production, priority use of the reservoir resource, etc. The policy, legal and regulatory framework under which Shuikou resettlement was planned and implemented provided clear directions (reference Section 2).
- **The institutional framework for resettlement,** based on the local government administrative system: a single-purpose provincial resettlement office (SRRO) staffed by professionals, with counterpart offices and responsible officials at the county, township and village levels, supported by functional departments at the various levels. This decentralized approach provided the necessary oversight and technical support while facilitating participation, and flexibility in planning and implementation. For example, while villages and townships were given freedom on what economic activities to be adopted, the review and approval for using resettlement funds had to be decided by the county and provincial resettlement offices. For projects and investments of less than Y 500,000, the county resettlement

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<sup>46</sup> World Bank, 1998.

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office could make the final decision, whereas investments in large projects needed to be approved by SRRO who enlisted the help of professional institutions.

- **The Methodical Planning Process.** The planning of the resettlement was conducted under an early draft (1983) of the MWREP Design Standards for Dealing with Reservoir Inundation. This regulation provides the methodology for assessing the project impacts and how to deal with these. With the assistance of the local governments (village, township and county levels), a survey of the affected population and assets was conducted, as well as a survey of potentially available land resources. This was done under the direction of ECIDI, the professional design institute responsible for the planning on behalf of the project owner. At the field survey level, villagers were given the opportunity to comment on the measures that should be taken to rehabilitate the village economies. Specifically this involved the identification of waste or underutilized land that could be considered for development, as well as other economic development opportunities such as TVEs. It also involved the identification of suitable village relocation sites. This participatory planning culminated in the preparation of a resettlement plan that was subsequently reviewed at all levels of government. The planning process and procedures, and the manner in which a village-based plan was prepared, resulted in a clearly articulated reservoir relocation and rehabilitation plan (reference Section 3).
- **Participation and Flexibility during Implementation.** The local levels of government, particularly those up to the county level, were given the direct responsibility to implement the plans and therefore it was easier to make changes in the implementation of particular elements of the plans as conditions changed. Hence the implementation can be characterized as a participatory and flexible approach that reflected emerging market conditions as well as the preferences of villagers. For instance, when it was found that the effectively available land resource was less than expected, greater attention was paid to nonland-based economic activities. When villages expressed a desire to relocate as whole communities, the relocation schedule was changed to allow this to happen, even though this resulted in a bunching of relocation. The implementation of the resettlement plan can be considered to have been successful in no small part due to the positive attitudes shown by relocatees and officials alike, which allowed for a flexible approach (reference Section 4).
- **Provisions for Adjustment of Resettlement Budgets.** The fairness and flexibility shown by government in increasing budgets to provide for inflation, more detailed planning and changed and unforeseen circumstances, and the strong support of FPEPB in obtaining approvals for additional funding were also essential elements in the eventual success of the program.
- **The Independent Evaluation of Resettlement (IER).** This was an innovative feature of the overall resettlement process. It provided for a multiyear sample household interview survey and a survey of a sample of village leaders. This annual evaluation, more so than the monitoring by SRRO, was able to determine the strong

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points as well as the weaknesses of the resettlement process, based on feedback from the information gathered in the field that not only measured how income restoration was progressing (in a rigorous quantitative format), but also how the attitudes of the relocatees were affected by the process. The IER was conducted by ECIDI, the design institute responsible for the preparation of the resettlement plan. The IER was supervised collectively by SRRO, the Reservoir Committee of the China Water Power Engineering Society, FPEPB and the World Bank, thus providing excellent interaction and follow-up. The IER was an effective contributor to the overall successful outcome (reference Section 5).

- **The constructive approach to resettlement** taken by local government at various levels, and most importantly by the people themselves. While not necessarily looking forward to resettlement, they approached the task positively, seeking to take advantage of the development opportunities arising from it. In pursuit of this objective, most were prepared to contribute additional funds, which were largely responsible for the substantial improvement in living conditions in the resettled communities.
- **Factors specific to Shuikou**, which contributed to the success of the resettlement were its location close to the dynamic coastal economy, creating opportunities for nonland-based resettlement. These were enhanced by the subsequent construction of National Highway No. 316 paralleling the reservoir, improving access of the resettlement communities to markets in the cities of Nanping and Fuzhou and to the coastal areas. The topography around the Shuikou Reservoir, in many respects better than at other Chinese reservoirs, allowed for the planning of a significant fruit tree component as part of the economic rehabilitation program, although not much in terms of cash crop cultivation. This made it possible to minimize distances between original villages and relocation villages and their associated lands. In turn, this made it possible for the villagers to continue to work their old lands until the time of inundation. This was a major benefit, as the construction of the new houses took time away from the development of new lands.

Despite the successes and the positive lessons that will provide valuable guidance to future projects, some areas have been identified where the process could be improved, which should also be taken into account in the design of future projects.

- **The disadvantage of the decentralized resettlement planning and implementation process** is its dependence on the leadership and technical competence at lower levels of government. The provincial resettlement office and relevant government departments should play a greater role in supervision and technical assistance, particularly in income restoration and development activities.
- **Resettlement planning should be further advanced at appraisal stage**, at least to the same level of detailed design as the engineering plans for the dam and powerhouse. Specifically, more detail is required on the economic carrying capacity

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of the relocation sites, to ensure that the projected population can be accommodated. For the village sites, the infrastructure design should be completed. The cost estimates for the implementation of the plan components should be prepared in detail, as these are usually underestimated in feasibility-level planning. It must be established that the funds that will become available by means of compensation payments will actually be adequate to restore infrastructure, assets and livelihoods. If not, additional sources of funds must be sought. If planning is prepared in greater detail, this will result in not having any delays in the start of implementation. Ample allowance for contingencies should be incorporated in the plans, to have budget available when such contingencies arise, and to avoid having to seek new approvals, which always result in delays. A trend toward preparing resettlement plans in somewhat greater detail has recently been observed in China, although this still has a long way to go before resettlement planning is at par with engineering planning. In this respect it is noted that up-to-date reservoir design standards and regulations are required from MWR to give effect to the introduction of more detailed planning at the local level.

- **Resettlement planning at all stages could benefit from a greater input from professional town planners.** For example, resettlement villages could have been planned to accommodate sideline activities, which became an important contributor to income restoration. Further, conceptual planning for a resettlement program of Shuikou deserves a regional approach. While actual planning identified the advantages of concentrating resettlement villages to create opportunities offered by the reservoir highway and the reservoir itself, in linking the resettlement communities to the regional center of Nanping City, to Fuzhou, the provincial capital, and to the new industries in the coastal areas. This may have led to the advancement of the highway construction. During village planning, professional town planners would have made more specific allowances for sideline activities and other income-generation activities appropriate to the environment, and produced village layout plans with a capacity for growth.
- **Implementation of resettlement should be advanced as much as possible,** particularly land development for economic tree production, which typically requires a lead period of a number of years, as well as considerable capital input. It is not realistic to expect timely income restoration if the replacement land development activities are not commenced in a timely manner. This conflict needs to be resolved at the planning level, as leaving it to be resolved during implementation might already be too late. In Chinese reservoir resettlement it seems to be accepted as a matter of common practice that household incomes will decline first, before returning to pre-relocation levels. This need not be so, and must be avoided at all cost. In the case of Shuikou, an even relocation schedule of six years was assumed by the authorities (see Table 7), yet some 88 percent of all the relocation took place in just three years, with 42 percent of project relocation taking place in a single year. This frantic pace is to some extent understandable, given the villagers' preference for relocating as whole villages, which was accommodated. However, it also produced inefficiencies such as the need for village infrastructure to catch up with house construction. It most

certainly caused the economic development pace to lag behind. The lesson of Shuikou is that resettlement should have started earlier and should have been implemented at a steadier pace. This would have allowed physical and economic activities to be developed in unison.

On the whole, and taking into account the positive and negative factors, there is little doubt that Shuikou now stands as an example of successful resettlement. While the process was facilitated by an expanding coastal economy during this period, this is only one factor contributing to its success. Treatment of resettlement as a development opportunity may be the most important lesson learned at Shuikou.

## ANNEX A: STATISTICS

**Table A1: Relocated Villages and Resettlement Sites for Shuikou Reservoir  
Concentrated Resettlement (46 villages)**

Number	Original Site	Resettlement Site	Population
<b>Nanping City</b>			9,803
1.	Zhongban	Zhanghu Town	
2.	Xiaban	Zhanghu Town	
3.	Bantou	Zhanghu Town	
4.	Linjin	Zhanghu Town	
5.	Zhonghe	Zhanghu Town	
6.	Taiping Village	Taiping Town	2,685
7.	Taiping Neighborhood	Taiping Town	
8.	Xiadao Village	Xiadao Town	4,396
9.	Xiadao Neighborhood	Xiadao Town	
10.	Xiqing Town	Xiqing Town	387
11.	Longchi	Longchi	403
12.	Xikou	Xikou	3,904
13.	Xinling	Xinling	1,998
14.	Xiangshan	Xiangshan	1,204
15.	Wubu	Wubu	1,102
16.	Gaozhou	Gaozhou	273
17.	Nanxi	Nanxi	2,014
18.	Liuja	Liuja	1,531
19.	Jutan	Jutan	264
20.	Yuexi	Yuexi	428
21.	Hushan	Hushan	930
22.	Xiexi	Xiexi	1,223
23.	Xuyang	Xuyang	1,832
24.	Qiaotou	Xuyang	
25.	Dazhou	Dazhou	602
26.	Guxi	Guxi	1,258
<b>Gutian County</b>			
27.	Hutian Village	Huangtian Town	4,695
28.	Jiangbing Neighborhood	Huangtian Town	
29.	Shuikou Neighborhood	Shuikou Town	4,903
30.	Chaotianqiao Village	Shuikou Town	
31.	Shuangkeng	Shuangkeng	3,569
32.	Songfeng	Songfeng	416
33.	Yiyang	Yiyang	2,093
34.	Wankou	Wankou-Xilan	2,633
35.	Xilan	Wankou-Xilan	
<b>Youxi County</b>			
36.	Youdun Village	Youxikou Town	931

Number	Original Site	Resettlement Site	Population
37.	Youkou Neighborhood	Youxikou Town	
38.	Xiyang Village	Xibing Town	2,033
39.	Xibing Neighborhood	Xibing Town	
40.	Xiadun	Xiadun	467
41.	Gouxi	Gouxi	589
42.	Shanlian	Shanlian	785
43.	Liuban	Liuban	491
44.	Yongkou	Yongkou	916
<b>Minqing County</b>			
45.	Xongjiang Town	Xongjiang Town	977
<b>Total</b>			<b>61,735</b>

Source: SRRO, 1996.



**Table A2: Relocated Villages and Resettlement Sites for Shuikou Reservoir  
Scattered Resettlement (27 villages)**

	Name of Village	Number of Resettlers
<b>Nanping City</b>		
1.	Ruluo Village	501
2.	Wakou Village	342
3.	Yangyu Village	381
4.	Yangkeng Village	535
5.	Xiaoju Village	390
6.	Anji Village	139
7.	Taxia Village	352
8.	Hougu Village	76
9.	Anfeng Village	131
10.	Dongkeng Village	13
11.	Xinghua Village	176
12.	Xiqing Village	272
13.	Huwei Village	349
14.	Huangdang Village	66
<b>Gutian County</b>		
15.	Chunli Village	188
16.	Shangxi Village	57
17.	Wenxi Village	91
18.	Muting Village	183
19.	Wentan Village	118
20.	Songxi Village	190
21.	Shuicao Village	46
<b>Youxi County</b>		
22.	Lingbian Village	169
23.	Banji Village	136
24.	Yianxi	27
<b>Minqing County</b>		
25.	Meitai Village	142
26.	Sibao Village	180
27.	Tangji Village	111
28.	Shizheng	67
29.	Fishing Team	121
	<b>Total</b>	<b>5,549</b>

Source: SRRO, 1996.

**Table A3: Shuikou Reservoir Town Relocation Sites and Population**

	Name of Towns	County	Number of Villages	Number of Resettlers
1.	Xongjiang	Minqing	2	977
2.	Huangtian	Gutian	2	4,695
3.	Shuikou	Gutian	2	4,903
4.	Youxikou	Youxi	2	931
5.	Xibing	Youxi	2	2,033
6.	Zhanghu	Nanping City	6	9,803
7.	Taiping	Nanping City	2	2,685
8.	Xiadao	Nanping City	2	4,396
9.	Xiqing	Nanping City	1	387
<b>Total</b>			<b>21</b>	<b>30,810</b>

Source: SRRO, 1996.

**Table A4: Detail Cost Estimated for Shuikou Population Resettlement (1983)**

Items	Quantity	Unit Price (Yuan)	Amount (million Yuan)
Land Requisition (mu)	42,477.61		67.83
Paddy and farm fields	30,277.56	1,533.42	46.43
Vegetable plots	1,116.55	15,011.20	16.76
Reclaimed land	11,083.50	418.68	4.64
Tree and Forest			
Middle-age timber mature timber	5,075.35		
Settlement fee for timber			
Firewood, rushes, shrubs			

Source: Shuikou Resettlement Planning Team.

**Table A5: Enterprise Development in Shuikou Area (1987-96)**

Year	Number of TVEs	TVE Employment	Total Employment	Percent Employment in TVEs
1987	27	246	3,083	7.98
1988	41	502	6,185	8.10
1989	58	772	9,590	8.10
1990	75	1,058	13,367	7.91
1991	124	1,631	19,081	8.55
1992	155	6,326	25,457	24.85
1993	184	6,438	29,741	21.65
1994	190	6,429	33,517	19.18
1995	205	6,971	34,063	20.47
1996	263	6,700	38,473	17.41

Source: SRRO, 1995, A Comprehensive Report on Shuikou Resettlement 1987-95, pp. 23-28.

**Table A6: Budget for Rural Resettlement from Shuikou Reservoir, 1993 (Y million)**

Year	Relocation	Rehabilitation	Total	Percent
1988	69.87	48.24	118.12	19.53
1989	85.60	10.87	96.47	15.96
1990	71.18	12.26	83.44	13.80
1991	77.48	1.61	79.09	13.08
1992	17.19	75.53	93.32	15.43
1993	0.00	13.40	13.40	2.21
1994	61.76	18.79	80.56	13.32
1995	0.00	32.79	40.22	6.65
<b>Total</b>	<b>390.83</b>	<b>213.39</b>	<b>604.62</b>	<b>100.00</b>

Source: SRRO.

**Table A7: Investment on Economic Rehabilitation for Shuikou Resettlement (Y million)**

Year	Total	Percent	Acquire land	Agriculture Development	Enterprise Relocation	Other
1989	10.87	5	0.80	5.59	2.82	1.66
1990	12.26	6	4.66	7.60	0.00	0.00
1991	1.61	1	1.54	0.07	0.00	.00
1992	75.53	35	0.00	75.53	0.00	0.00
1993	13.40	6	0.00	13.40	0.97	.00
1994	18.79	9	0.09	18.79	0.00	0.00
1995	33.08	15	0.00	33.08	0.00	0.00
Total	213.78/a	100	7.80	197.24	6.09	2.66
Budget	234.99		6.39	217.08	8.04	3.48
Percent Completed	91.0		122.0	90.9	75.5	76.4

/a Not including Y 23.25 million controlled by provincial agencies. Otherwise, the actual total is Y 237.03 million or 100.87 percent of the budget.

Source: SRRO, 1997, *ibid.*

**Table A8: Demolition and Reconstruction of Selected Community Infrastructure in Yanping District (Nanping City)**

Items	Demolished (number)/amount (m <sup>2</sup> )	Reconstructed (number)/amount (m <sup>2</sup> )	Change (%)
Elementary Schools	(34) 30,209	(28) 43,044	42.5
Middle Schools	(3) 15,606	(3) 8,708	-44.2
Clinics	(5) 8,913	(5) 8,469	-5.0
Water Supply (t/day)	4,630	11,575	150.0
Electricity (KVI)	5,520	6,900	25.5
Road (km)	5.77	12.66	119.4

Source: Nanping City Resettlement Office.



