

RP617

**RESETTLEMENT PLAN**  
**of**  
**Shihutang Hydropower Project**  
**on Ganjiang River in Jiangxi Province**



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# Contents

<b>PURPOSES OF RESETTLEMENT PLAN AND DEFINITION FOR RELOCATION</b> .....	1
<b>1 REPORT GENERAL</b> .....	4
1.1 Project background.....	4
1.2 Project general.....	5
1.3 Project impact.....	6
1.4 Policy framework of resettlement relocation .....	8
1.5 Implementation planning of resettlement relocation.....	9
1.6 Compensation investment budgetary estimate .....	11
1.7 Resettlement institution and system .....	12
1.8 Public consultation and social adjustment.....	13
1.9 Important contracts and agreements .....	13
1.10 Monitoring and supervision.....	14
1.11 Resettlements implementation Schedule.....	15
<b>2 BACKGROUND OF PROJECT</b> .....	34
2.1 Introduction of project area .....	34
2.2 Project .....	38
2.3 Protection project .....	44
2.4 Investigation of immigrant families .....	56
<b>3. PROJECT IMPACT</b> .....	72
3.1 Summary .....	72
3.2 Impact region in this project.....	72

3.3 Re-check process.....	79
3.4 Re-checked contents and methods .....	79
3.5 Affected population within acquisitioned area .....	85
3.6 Impact of land and property .....	86
3.7 Economic impact.....	93
3.8 Affected population in resettlement areas .....	94
3.9 Effects of dam construction activities .....	94
3.10 Effects on the reservoir area and downstream fisheries .....	95
<b>4 LAW OF POLICY AND FRAME OF LAW.....</b>	<b>107</b>
4.1 Policy and law .....	107
4.2 Compensation Standards .....	114
<b>5 IMPLEMENTAL PLAN OF RESETTLEMENT RELOCATION.....</b>	<b>147</b>
5.1 Guideline principles and objectives of implemental plan for resettlement .....	147
5.2 Target of resettlement plan.....	148
5.3 Plan of resettlement production.....	149
5.4 Implementation planning of life resettlement.....	166
5.6 Restoration planning of specific facilities .....	177
5.7 The development and utilization of the water area of the reservoir .....	179
5.8 The planning of the clearance of the base of the reservoir .....	181
5.9 The planning of environmental protection of the resettlement.....	183
5.10 The balance of the expropriation and compensation of the farmland.....	191
<b>6 BUDGET ESTIMATE OF LAND ACQUISITION INVESTMENT.....</b>	<b>193</b>
6.1 Content, Basis, Principles and Approval Procedure of the Budget Estimate .....	193

6.2 Budget Estimate for Compensation.....	195
6.3 Funds .....	199
<b>7. RESETTLEMENT AGENCIES INSTITUTIONS.....</b>	<b>213</b>
7.1 Relevant agencies.....	213
7.2 Agency responsibilities .....	213
<b>8. PUBLIC CONSULTATION AND SOCIAL ADJUSTMENT.....</b>	<b>221</b>
8.1 Favorable policies .....	221
8.2 Special measures to help affected residents rehabilitate .....	221
8.3 Adjustment during transition period.....	222
8.4 Public participation and consultation .....	223
8.5 Make public resettlement information .....	229
8.6 Complain and grievance.....	229
8.7 Relationships between affected peoples and residents in relocation areas.....	232
<b>9 KEY CONTRACTS AND AGREEMENTS.....</b>	<b>237</b>
9.1 Resettlement agreements.....	237
9.2 Resettlement project construction contracts.....	237
<b>10. MONITING AND SUPEVISION.....</b>	<b>248</b>
10.1 Monitoring indicators.....	248
10.2 Internal monitoring and supervision.....	249
10.3 Independent monitoring and evaluation .....	250
10.4 Resettlement supervision.....	254
10.5 Integral resettlement coordinator.....	258
10.6 Environmental panel of resettlement.....	258
<b>11. THE ARRANGEMENT OF RESETTLEMENT IMPLEMENTATION SCHEDULE .....</b>	<b>290</b>

11.1 Principles for resettlement implementation schedule .....	290
11.2 Schedule .....	290

## **PURPOSES OF RESETTLEMENT PLAN AND DEFINITION FOR RELOCATION**

Resettlement Plan (RP) is made based on state and local related laws and codes of the people's republic of china and Involuntary Resettlement(OP/BP4.12), business guide of the world bank, which purposes are to establish an actualizing plan for resettlement and restoration for people influenced by this project in order to warrant their profits and improve their life level during the construction of project, at least their life level can be restored after the accomplishment of this project.

The definition of affected people by project is as follows:

Affected People by Project are that their life are affected adversely; or property of building, land (including house land, farmland and pasture land), chattel and estate are confiscated temporarily or permanently; or other business, working, dwell and habits are affected adversely. Therefore, affected people by project are either individual or corporate representative of enterprise, common entity. They are including:

- (1) People whose lands, buildings, profits or other property are confiscated temporarily or permanently.
- (2) People who use these lands mentioned above, or other people whose work, inhabit, life are affected adversely.
- (3) People whose life is had adverse effect by land requisition.

In the definition of Affected People by Project, the World Bank does not restrict people's law status, life style or occupations in the influence area of project. So these people should be included:

- (1) People who suffer adverse effect without regard to law right or property requisition.
- (2) People who have no dwell permission in some specific area.

As a result, all people influenced by project without regard to property, land, or society status, should be considered or recorded as affected people by project.

If the number of requisition land or property is more than one person or one household, the compensation should be made based on loss and effect of profit and life. Without

regard to law right, the definition of affected People by Project directly relates to bad effect caused by project.

All affected people by project should be compensated in order to improve or restore their life standard. Loss of property should be compensated in term of relocation cost; in no case can compensation discount by any excuse of depreciation or other reasons. All affected people by project should obtain benefits from project. Furthermore, the people should also be given subsidy so as to help their restoration. The people, who do business, reclaim land, construct without permissive certification of property, rights, inhabitation, should have qualification to restore their living, and obtain compensation of their property as equality as people with permissive certification.

#### Definition of resettlement

Resettlement is to arrange affected people by project to production or living, and to benefit them from project.

- (1) Resettlement site;
- (2) Seek job for affected people by project;
- (3) Restore or compensate to working site, wood, infrastructures etc. influenced by project;
- (4) Compensate the people whose life quality is badly affected by relocation, or toxic gas etc.
- (5) Compensate individuals and common enterprises for influence;
- (6) Restore civilization and common property.

#### Definition of restoration

Restoration is to restore these people' production ability affected by project to former level before project construction or more.

The purposes of this Resettlement Plan is to provide a restoration plan for affected people by project, so as to compensate their loss of property and improve their life standard or maintain their former life. In order to achieve this purpose, some measures

in this plan will be taken to restore these people' income and maintain their living. At the same time, productive resources (including shops, enterprises), common property, infrastructure, civilization property, can also be improved or restored to former standard at least.

# 1 REPORT GENERAL

## 1.1 Project background

Ganjiang river is located in the south bank of mid-down stream of Yangtse river, which is largest river in Jiangxi province streaming whole territory from south to north. The upstream of Ganjiang river in Ganzhou city is called Gongshui river. It can be called Ganjiang river after converge with Zhangjiang river in Ganzhou city. Ganjiang river derives from Wuyi mountain area in the boundary of Fujiang province and Jiangxi province, whose source (main branch) is located in the near of Shiliaodong town, Shicheng county. It runs from south to north, crossing Ganzhou city, Ji'an city, Nanchang city, Jiujiang city etc, and infuses into Poyang lake in Wucheng town, Yongxiu county, Jiujiang city, and cross Xingzi county into Yangtse river in Hukou. Ganjiang valley area in upstream of Waizhou station (control hydrological station) is 80948km<sup>2</sup>. The catchment area controlled by Shihutang hydropower project is 43770km<sup>2</sup>, with the length of 780km from Heyuan to Wucheng.

Ganjiang Valley Planning Report in Jiangxi Province, which was already sanctified, recommended two groups of exploitation scheme (scheme □ and scheme □), from the aspects of flood control, electricity generation, navigation, water resources utilization, construction conditions, investment, cost and profits etc. Scheme □ is exploitation scheme of 8 grades, from up to down which is Xiashan, Maodian, Wan'an, Taihe, Shihutang, Xiajiang, Yongtai, Nongtou mountain. Scheme □ is 10 grades, which is Baie, Baikoutang, Xiashan, Maodian, Wan'an, Taihe, Shihutang, Xiajiang, Yongtai, Nongtou mountain. Step exploitation schemes of both schemes in downstream of Ganzhou city are same, which are Wan'an, Taihe, Shihutang, Xiajiang, Yongtai, Nongtou mountain.

Primarily selected projects in planning are Taihe, Shuhutang, Xiajiang, which will be implemented in the near future. The Shihutang project was selected with norm water level of 56.1m (yellow sea altitude system, same as below), installed capacity of 120MW, which navigation lock is 175×14×2.5m.

Ganjiang river was listed as main waterway in our country by the Ministry of Communication. On the basis of Layout and Programming for Inner River Waterway and Harbor in Whole Country (to be sanctified), main waterway consist of □ waterway or above, which can contain thousands ton ships to navigate, with the supplement of □ waterway that 500 tons ships can be passed. Main waterway and higher grade navigation nets in Yangtse river delta and Pearl river delta, compose state higher

navigational system of “two horizon, one vertical, two nets, sixteen lines”(shortened as 2-1-2-16), one of which is Ganzhou - Hukou waterway with the length of 606km.

Ganzhou - Hukou grade □ waterway with the length of 156 km, related to Shihutang hydropower project, was accomplished in 2004, and will be accepted in the near future. The development of Zhangshu - Nanchang grade □ waterway was begun to construct at the end of 2005. Report on construction the next hydropower project in Xiajiang was finished by department of water resources, and submitted to the Ministry of Water Resources and the Commission of Development & Innovation. Construction of this project can make grade □ waterway in Ganjiang river to extend to upstream, realize goal of programming, and make the need of strategic development of state main waterways and higher navigational system.

River reach related to this project is located in the downstream of Wan'an, which is waterway seriously affected by power station. Due to non-uniform discharge of power station, there are 17 shallow shoals in backwater length of 38km only with standard of grade □ waterway, so navigate in virtue of high water level, and navigation is very unsafe. To Harness this part of waterway to grade □ standard is very difficult, affected by effect of non-uniform discharge of power station and limitation of waterway natural conditions. So trench mode can be used to radically solve the bad effect of non-uniform discharge of power station and little flux in dry season on waterway. Therefore, it is very significant to construct Shihutang project to improve the waterway grade in the midstream of Ganjiang river and higher navigational nets of state.

In addition, River reach related to this project also belongs to a part of Gan-Yue canal, and already brought into state programming on Gan-Yue canal, which is Yangtse river to the north, Pearl river to the south, cross main river of Ganjiang river, Taojiang river(a branch of Ganjiang river), connect Pearl river traverse dividing ridge. Its length is 759km in Jiangxi, accounting for 61% total length of 1237km. After construction of Gan-Yue canal, it will connect two big water systems (Yangtse river and Pearl river), which are most developed navigation in our inner rivers, and make a big transportation passage from south to north in the south area of Yangtse river. It can also enhance the development of economy of south area and north area, accelerate communication of economy, especially boost economic cooperation in Fan-Zhu delta area. The construction of this project can create good condition for overall opening of Gan-Yue canal.

## 1.2 Project general

The main purpose of Shihutang hydropower project is navigation, which can also comprehensive utilize water resources, such as electricity generation. Dam site is located in the midstream of Ganjiang river, 26km distance to highway bridge of Taihe county in Jiangxi province, near to Shihutang village. The valley area in the upstream of dam is 43770km<sup>2</sup>, with total storage capacity of 6.32×10<sup>8</sup>m<sup>3</sup>, and normal storage capacity of 1.491×10<sup>8</sup>m<sup>3</sup>, normal water level of 56.5m, dead water level of 56.2m, dam top elevation of 63.5m, maximum dam height of 26.5m. Installed capacity of power station is 117MW, with average annual electricity of 4.8×10<sup>8</sup>kw.h. Engineering construction mainly conclude project, protective project in reservoir area. Engineering buildings are sand sluicing gates, power plants, navigation lock, and earth-rock dam at the both banks. Protective projects are levee, drainage station, drainage project etc.

In addition, as a linkage project to the Shihutang Navigation Complex, the transmission line will be constructed and managed by Jiangxi Provincial Electrical Authority. However, as required from the Bank, the Shihutang PMO should coordinate with the Authority on ensuring that the resettlement implementation of the line will comply with domestic laws/regulations and Bank policies, and that the Bank can supervise the resettlement implementation.

### 1.3 Project impact

Shihutang project can involve 53 villages among 5 towns in Taihe county, Ji'an city, Jiangxi province. The bad effect of project on socio-economic development is tiny and local. But the people are affected by relocation, and farm land decrease, so some economic measures must be taken.

#### Land requisition

Permanent requisition farmland by project is 2910.5mu, (including 147.5mu farmland occupied by project, 2763.0mu farmland inundated in reservoir area and occupied by protective project and drainage project, 990.1mu paddy field within farmland), which can cause grain loss of 601.74t/y. Permanent requisition garden land is 6.2mu, fish pond 313.0mu(3.5mu occupied by project), woodland 1469.6mu returned from farmland, economical land 282.2mu, timber land 254.4mu(72.0mu occupied by project), sparse woodland 327.5mu, housing land 188.0mu, traffic land 128.9mu, undeveloped land 3341.2 mu(252.0mu occupied by project), water area 32434.8mu. Total permanent requisition land is 41656.4mu. Temporary requisition land is 4954.0mu, which is 3998.0mu in reservoir area including 799.6mu farmland, occupied for 2years; and 956.0mu in project area including 381.0mu farmland, occupied for 4 years.

### Resettlement

There are 597 people needed to relocate, referring to 169 households, due to project. Minority group can not be found in the investigation of affected people. A few of minority, who probably married the Han nationality and melted into Han civilization, can not be regarded as weak group and aborigines on account of discrimination. So OP4.10 (part of aborigines) can not be suitable to this item. There are some weak groups in the process of investigation, accounting for 2% of total resettlement, which are alone old men, households without labors etc. They should gain help and support from government. Resettlement in affected villages accounts for 2% of total population.

### Housing relocation

The area of housing needed to relocate, is 35093.6m<sup>2</sup>, which includes private housing with area of 32616.4m<sup>2</sup>, accounting for 92.9%, enterprise housing with area of 2477.2m<sup>2</sup>, accounting for 7.1%. There are 4 enterprises referring to relocate, but only a few houses and affiliated facilities will be moved.

### Special facility

Referring to grade four highway with the length of 2.41km, village road with the length of 10.71km, 24 ports and docks, cable with the length of 16.87km, underground cable with the length of 6.25km, 5.23km CATV, 35kv living wire with the length of 0.74km, 10kv living wire with the length of 6.63km, 0.4kv living wire with the length of 8.99km, 4 transformers, 2 small-model power stations(520kw installed capacity), 15 minitype irrigation facility, 4 waterworks etc. There not exist cultural relic and historical site in this area.

### Economic effect

Land requisition can have a little effect on production of enterprises. Production and business of only brick factory and sand field among affected enterprises, will be influenced in the period of relocation about 1-3 months. Owing to decrease of farmland, Economic loss per year is 84.2×10<sup>4</sup>yuan, and 2191 peasants will be needed to relocate in the planning year. This loss can be made up for by improving output of unit farmland, in the basis of agricultural production.

### Resettlement population

Not distant relocation is adapted as main relocation mode. All villages are either effect area or relocation area, and society relationship can not be disturbed. So un-resettlement population can not suffer bad effect. On the contrary, compensation of item causes infrastructures better in resettlement area, and benefits un-resettlement population.

#### Protective project

The standard of flood control along river within reservoir is very low, and a big patch farmland and villages usually suffer flood disaster. After construction of this item, the standard of flood control will be improved to 10years, and productivity of land will be also improved. So protect the safety of dwellers.

Main effect is shown as in sketch map of inundated area of Shihutang reservoir and Table 1-1, 1-2 in detail.

#### 1.4 Policy framework of resettlement relocation

Resettlement planning for Shihutang Hydropower Project is developed by the existing legal framework of china, and also conforms to the requirements of the World Bank's Involuntary Resettlement Policy and procedures OP / BP 4.12. Based grounds are:

World Bank's Involuntary Resettlement Policy and procedures OP / BP 4.12;

The Flood Control Law □1997□of The PRC;

The Water Law (1988) of the PRC;

The Land Administration Law (1998) of the PRC;

“Byelaw on Land Acquisition Compensation and Resettlement Relocation in Large and medium-sized water conservancy and hydropower project” (the 471<sup>st</sup> Order of the State Council, 2006);

Specifications on Resettlement Planning of the Water Conservancy and Hydropower Project (SL290-2003) ;

Programming Standards on Village and Small Town Planning GB50188-93 (1994) ;

Measures on Implementation the Land Management Law (2001) of the PRC in Jiangxi

Interim Procedures on Land Acquisition Management in Jiangxi;

Interim Provisions on Flood Control Security Fund Collection in Jiangxi;

Resettlement compensation of Shihutang Hydropower Project mainly developed, according to the above statute. The primary principle is: compensation and the resettlement measures can improve the living standards and create development conditions after its removal. The deserved rights are listed in Table 1-3. Defined compensation standards (shown as in table1-4) includes land, housing and ancillary

buildings, relocation assistance, weak groups assistance, resettlement infrastructure, specialized facilities.

The univalent housing compensation is based on the average replacement rates of various housing, that is, 350 Yuan per m<sup>2</sup> for frame antrum, 300 Yuan per m<sup>2</sup> for brick mixed antrum, 270 Yuan per m<sup>2</sup> for brick-wooden antrum (lodging), 200 Yuan per m<sup>2</sup> for brick-wooden antrum (estate), 150 Yuan per m<sup>2</sup> for mud-timber antrum, 100 Yuan per m<sup>2</sup> for mixed antrum. In addition, another compensation for the framework houses, masonry rooms, brick-wood frame houses (housing) is 50 Yuan/ m<sup>2</sup> due to the decoration and other compensation costs. Proven by the resettlement interviews, the existing standards can cover the relocation costs. Permanent land acquisition compensation is based on the annual production value of the various types of land and the identified multiple of the national policy, unit priced from 2516 to 18882 Yuan per mu.

### 1.5 Implementation planning of resettlement relocation

Resettlement relocation implementation plan propose various housing reconstruction and economic recovery measures in order to realize the following purposes.

(i) providing choices for host population, reducing the resettlement effect through provision of production relocation measures and transitional help; (ii) both the resettlement and the relocation residents can accept; (iii) Re-establishing or improving the incomes and living.

#### □a□Resettlement living relocation

There are 169 families, 597 people in the project area at present, and 172 families, 608 people need to relocate in planning year. According to the principle of the most adjacency and will of the resettlement, based on the number of cultivated land resources, the increasable production capacity and the feasibility of industrial development, the following types of resettlement measures are made:

#### □i□On-site relocation

To reduce the interruption to the existing social economic system, the investigation indicates that there are 262 people in 98 household, accounting for 43.1 percent suits to the on-site relocation. On-site relocation has little impact on the social services system. Its re-habitation is also included in the resettlement planning and the budget. Houses

will be built by the villager according to certain standards.

□ ii □ centralized relocation

The mode of centralized relocation applies to the village with large and mass affected peoples. The relocation planning comprises three relocation sites and 346 people in 74 households, accounting for 56.9 percent of the total affected peoples.

The centralized relocation sites have neat street collocation and various functions. And the infrastructure construction has been fully guaranteed. Houses will be built by villagers in conformity to related standards and street disposal layouts.

□ b □ Production resettlement

The production resettlement measures of this project are based on the following principles: (i) based on the land and providing a wide range of resettlement measures; (ii) giving full use of local resources, avoiding adverse effects on the environment; (Iii) developing the secondary and tertiary industries aptly.

The project will have a number of 2191 people by the planning level year. Among these, 2682.1 units of agrarian area will be adjusted, altered or improved with 1979 resettlement. Breed aquatics will accommodate 88, the secondary and tertiary 124. An investment of  $5506.53 \times 10^4$  Yuan is needed. This comes from the land compensation and the settlement grant funds. The production relocation of village resettlement is shown as in table 1-5.

□ c □ Temporary plot occupied

Temporary occupation of farmland amounts to 1180.6mu, including: arable land of reservoir project for 799.6mu with a period of 2 years, hinge project for 381.0mu with a period of 4 years. The compensation of the reservoir project is the output of two years, while the hinge project is four-years output. The young plant compensation and the ripe-stage plant compensation as well as the rehabilitation are also added to it.

(d) Restoration of special facilities and enterprises

Compensation is made according to the principle of restoring the original standards, functions and sizes. About  $1880.05 \times 10^4$  Yuan is spent on the special establishment,  $90.23 \times 10^4$  Yuan on enterprises relocation and shutdown. Restoration work is done by professional departments and enterprises by themselves.

(e) Protection Planning for age-old trees

No rare trees and wild plants of state-class or province-class specialized protection are discovered in the project areas through the investigation. Most of the 220 age-old trees in the project area are camphor. Main measures to protect them include: the bank revetment projects, masonry wall works of age-old trees and big trees, cut-off wall and transplantation works of age-old trees and big trees, and many other protective measures (e.g. establishing professional conservation, doing daily maintenance of the reserved trees in five years). investment on the protective measures is reckoned in the project total investments separately.

Details are shown in “Report of impact assessment on the age-old trees and specially protected wild tress for Shihutang Hydropower Project”.

1.6 Compensation investment budgetary estimate

Costs involved in the resettlement implementation include (i) compensation costs of basic fee(ii) five fees on survey and design, implementation of management, technical training, supervision and monitoring assessment, group of internal resettlement environment expert; (iii) preparation fees;(iv) special investment on Water and environmental Conservation in Relocation Sites; (v) Related taxes and fees.

By investment budgetary estimate,  $20061.9 \times 10^4$  Yuan is invested in the resettlement implementation, with  $19205.78 \times 10^4$  Yuan on the submerged and protective project in reservoir area,  $856.12 \times 10^4$  Yuan for the hinge project.

Commentary investment budgetary estimate are set out in Table 1-6.

At the same time, some investments are listed in the total project investment separately, such as project construction investment on dike project, drainage works of civil project and electrical and mechanical project, the special investment on protecting age-old trees, the fish-off dam facilities, and measures on the proliferation of fish resources etc.

### 1.7 Resettlement institution and system

Taihe county and its subsidiary townships related to the project should establish corresponding implement management institutions prior to the start of this project. The involved units or agencies of the Shihutang Hydropower Project are set out in Fig. 1-1 and 1-2. Implementing and management agencies of all levels preside over the plan implementation, fund allocation, and day-to-day management, deal with resettlement grievance and complaints, assort with the relationship of all implementing units, work in the planning with the design units. Meanwhile, in the light of requirements of the environmental impact report, they do the manage work in the resettlement sites, project building area and the public health. Every village has 1 to 2 cadre, taking charge of resettlement relocation and environment manage work.

Exterior resettlement units or agencies include institutions of Planning, design, M&E.

Project office commission qualificatory design units cooperate with the county government to carry through the resettlement relocation planning work, including physical indicators survey, proposal amendment to reduce resettlement, assistance in the implementation of management, project affected population evaluation, identifying the resettlement sites and compensation schemes and so on.

Experienced supervision agencies and M&E institutions will be employed by the program. Supervision agencies are responsible for the investment, progress and quality control of the resettlement relocation. The independent M&E institutions take charge of periodic evaluation of resettlement relocation progress, the implement effect (including socio-economic restoration statues) of the resettlement relocation work, as well as the M&E of the social adaptability. It also brings forward comments and suggestions on the relocation effect and solution to the existing problems. At the same time, it puts in M&E report to the implement units and WB.

## 1.8 Public consultation and social adjustment

Establish related measures about public consultation and social adjustment to ensure the objectives of avoiding the adverse effects of the project and benefit from the project as much as possible. Resettlement enjoys preferential policies formulated by the state and other policies listed in this report, mainly including:

(a) While arranging the society development fund on agriculture, poverty alleviation special funds and transportation, post and telecommunications, culture, education, public health etc., give proper care to the resettlement sites to support the living and production development.

(b) In line with local social development ten-year planning, priority should be given to industrial projects which related to the industrial and agricultural production projects of this project section, while resettlement labor force is of the first consideration.

(c) The resettlement relocation funds include the cost of raising support for the weak groups, providing special help for the restoration of the lives of these resettlements.

Consultation and Participation of the affected peoples is an indispensable part of the developing resettlement planning design. Issuing manuals of resettlement entitlement (has already been used in Xiaolangdi Reservoir Resettlement, the World Bank loan project in the Yangtze Dike Resettlement), as well as reaching agreement with Affected peoples, is the base of successful planning and ensuring to make resettlement understand and accept the resettlement relocation.

Smooth and efficient procedures for grievance redress are established and concerned procedures are included in the resettlement entitlement manuals to impact affected peoples understanding. Resettlement Units at different levels will comprehensively record the grievances and solve the problems.

## 1.9 Important contracts and agreements

The resettlement implementation of this project is involved with Taihe county government as well as its subordinate resettlement office, monitoring agency, building construction units of township (town), resettlement and resettlement representatives.

Some contracts and agreements need to be signed to make the relative organs work effectively and identify the responsibility of the different parties. Particularly important contracts and agreements include: (i) Agreements between resettlement office and township (town) government; (ii) Compensation agreements between resettlement and township (town) government; (iii) Land Acquisition agreements between resettlement office and villages. (iv) Resettlement construction contract (including specific environmental requirements).

#### 1.10 Monitoring and supervision

The internal monitoring agency of the resettlement relocation is county resettlement office, taking charge of monitoring the resettlement implementation in the township resettlement offices, coordinating the resettlement work of all units, and holding the resettlement relocation implementation at any time. Major work includes: (i) the resettlement relocation, distribution of housing locations and housing reconstruction; (ii) quality of the resettlement production and development projects; (iii) making suggestions on the existing problems in the implementation process; (iv) income restoration; (v) infrastructure and special facilities construction; (vi) the recovery of weak groups; (vii) punctual resettlement compensation payments; (viii) resettlement participation and consultation; (ix) resettlement training; (x) organization and management of the project. Projects Office submits monitoring report (twice a year) to the World Bank regularly.

County resettlement office will retain independent M&E, monitoring and evaluation of the resettlement land acquisition. The unit's responsibilities include technical advisory services, supervision and monitoring of the resettlement implementation, and handing in report to the county resettlement office. It also participates in the regular public consultation meetings held by township and village-level units. Through regular fact-finding missions, the M&E units will also evaluate the public's complaints; monitor the effectiveness of the grievance process, and if necessary, make recommendations to amend the grievance process. The working hours of the independent monitoring units include construction period and the two years after the end of project.

Resettlement supervision is conducted by independent resettlement management units. They take the responsibility of supervising resettlement implementation and the use of funds, find the problem and reflect it to the resettlement office and the owners, so as to resolve the problem quickly and prevent its intensification and development. The independent resettlement supervising units also control the resettlement relocation implementation, the progress and quality of the relocation of specialized facilities as well as the distribution and use of the resettlement funds. They check and accept the completed projects to ensure that the resettlement project can be completed with the quality requirements and time schedule. Supervision institutions have project supervision headquarters and the field supervision group. One engineer is in the headquarters and two permanent staff responsible for the office and concrete work.

Resettlement supervision must start work no later than August 2008. The total supervision cost amounts to  $136.24 \times 10^4$  Yuan, while the M&E cost comes to  $68.12 \times 10^4$  Yuan. The cost is included in the resettlement overall budget.

Resettlement environment expert group should be established. It evaluates the resettlement relocation progress on a regular period of time; propose the necessary to make the resettlement project accord with the requirements of loan agreement with WB. Resettlement environment expert group is an independent agency, reporting both to the government and the WB and guiding the RP and implementation. From 2008 to 2012, the Group concentrates twice a year, with about a week for each concentration. It is made up of resettlement experts, environmental experts and hydraulic experts. They timely coach and evaluate the resettlement relocation progress, put forward necessary measures, in order to allow the project to meet resettlements of design and environmental protection. Cost of the resettlement environmental experts group is planned around  $100 \times 10^4$  Yuan and it is listed in the foreign investment expenditure of the resettlement budget estimation.

### 1.11 Resettlements implementation Schedule

Early phase of project:

In October 2006, in coordination with government at all levels, the design agency conducts an investigation in physical indicators, resettlement families, the basic socio-economic conditions of the collectivity in resettlement sites and will of resettlement

within the scope of AP groups. At the same time, the design agency does research about the resettlement sites and affected landless people.

In January 2007, the primary feasibility study reports including the RP are completed, and have passed the review by the departments concerned.

In January 2007, the first draft of RP is completed and submitted to the WB delegation.

In March 2007, the feasibility study reports including the RP are completed, and will be going through by superior relevant agencies. Thereinto the governing departments will be in charge of part of protection projects. The reservoir resettlement will ask for the review and reply of the relevant agencies, according to the required procedure ruled in “Byelaw on Land Acquisition Compensation and Resettlement Relocation in Large and medium-sized water conservancy and hydropower project” (the 471st Order of the State Council, 2006).

In May 2007, the RP revised draft will be completed based on the suggestion of WB delegation, and submitted to the WB preparing corporations.

In October 2007, according to the WB suggestion, final version of RP will be completed, and sent to be assessed by WB.

RP will be deposited in the relevant municipal and county libraries for public inspection after the WB evaluation. It will also be announced through newspapers, television, radio, and other press media.

After the approval of the preliminary design, resettlement implementation report will be finished by the design agency.

Resettlement implementation phase:

The established resettlement implementation schedule is based on the following principles: (i) Try best to arrange the resettlement relocation in the farming-leisure period; (ii) make sure that the distribution of the compensation and homestead is finished before relocating; (iii) make ready the public infrastructure in the relocation sites before relocating; (iv) minimize the impact of resettlement arrangements on the whole project as much as possible; (v) make use of the farming-leisure period to do the resettlement training. The overall implementation schedule is shown in Figure 1-3.

The total time limit for a project is 51 months. The resettlement relocation will be completed in the third year. The fourth year of production mostly is for resettlement production training and relocation.

Table 1-1 Table of total physical indicators of land acquisition and resettlement

item	unit	total	reservoir area						embank dike				
			total	Chengjiang town	Tangzhou town	Wanhe town	Yanxi town	Mashi town	total	Chengjiang town	Tangzhou town	Wanhe town	Yanxi town
households	household	169	124			1	109	14	29			29	
population	person	597	431			3	382	46	90			90	
1.agriculture	person	581	426			3	378	45	82			82	
2.non-agriculture	person	16	5				4	1	8			8	
housing	m <sup>2</sup>	35093.6	23029.0	1696.5	31.3	574.7	18996.7	1729.8	7271.6	471.1		6360.0	440.5
1.framed housing	m <sup>2</sup>	866.7							866.7			866.7	
2.brick structure housing	m <sup>2</sup>	10860.5	5722.3	16.9		85.4	5131	489	2329.1	63.8		2170.6	94.7
3.brick log housing	m <sup>2</sup>	16040.7	11553.9	679	31.3	462.5	9166.3	1214.8	3324.3	357.6		2625.2	341.5
4.mud log housing	m <sup>2</sup>	2732.7	2107.6			7.6	2100		179.1	35.4		143.7	
5.miscellaneous Housing	m <sup>2</sup>	4592.9	3645.2	1000.6		19.2	2599.4	26	572.4	14.3		553.8	4.3
land	mu	41656.4	5435.2	55	1630.4	1242.6	2359.2	148.1	1517.9	116.3	636.9	397.8	366.9
1 arable land	mu	2911	1023.4	2.6	351.4	308.5	292.6	68.4	746.7	45.3	292.5	192.5	216.5
(1)irrigated land	mu	990.1	202.5	0.1	83.1	21.5	80.8	17.1	53.4	5.2	22.7	9.4	16.2
(2)dry land	mu	1920.4	820.9	2.5	268.3	287.1	211.8	51.2	693.3	40.1	269.8	183.1	200.3
2.gardening	mu	6.2							4.4		4.4		
3. fish poll	mu	313.0	65.6		47.4	6.1	12.1		18.6	0.2	4.2	12.4	1.8
4.afforestation land	mu	1469.6	905.1		634.1	229	16.6	25.3	375.3		287.5	78.7	9.1
5.econominc land	mu	282.2	230.3				230.3		51.9				51.9
6.woodland	mu	254.4	34.5		32.2		2.2		11	0.1	10.9		
7.open forest land	mu	327.5	278.3		29	70.4	145.6	33.2	31.9		4.7	15.3	11.8
8.residents sites	mu	188.0	103.7			12	91.7		46.5	2.2	2.6	11.5	30.2
9.land for traffic use	mu	128.9	10.1	0.4		1.1	8.6		47.7	2.5	2.2	33.3	9.8
10.unsed land	mu	3341.2	2784.4	52.0	536.2	615.5	1559.5	21.2	183.9	66.2	27.8	54.1	35.7
11. area of water	mu	32434.8											

Continued table 1-1 Table of total physical indicators of land acquisition and resettlement

item	unit	diversion canal					dam area		
		total	Chengjiang town	Tangzhou town	Wanhe town	Yanxi town	total	Wanhe town	Yanxi town
households	household	16	11	3	2				
population	person	76	57	11	8				
1.agriculture	person	73	54	11	8				
2.non-agriculture	person	3	3						
housing	m <sup>2</sup>	4792.9	3216.8	676.9	665.2	234			
1.framed housing	m <sup>2</sup>								
2.brick structure housing	m <sup>2</sup>	2809.1	1858.2	532.2	418.7				
3.brick log housing	m <sup>2</sup>	1162.5	932.8	19.2	162.8	47.7			
4.mud log housing	m <sup>2</sup>	446.0	326.5	119.5					
5.miscellaneous Housing	m <sup>2</sup>	375.3	99.3	6	83.7	186.3			
land	mu	1793.3	373.5	319.6	911.7	188.6	474.6	278.2	196.5
1 arable land	mu	992.9	196.3	190.7	472	134	147.5	94.5	53.3
(1)irrigated land	mu	699.2	63.5	143.4	402.6	89.8	35.0	2.1	32.9
(2)dry land	mu	293.7	132.8	47.3	69.4	44.2	112.5	92.1	20.4
2.gardening	mu	1.7	1.7						
3. fish poll	mu	225.3	56.6	11.1	151.6	6	3.5	3.5	
4.afforestation land	mu	189.2			189.2				
5.econominc land	mu								
6.woodland	mu	136.9	26.6	79.1	25.5	5.7	72		72
7.open forest land	mu	17.4	4.4	7.1	3.3	2.6			
8.residents sites	mu	37.9	15.8	1.7	20	0.4			
9.land for traffic use	mu	71.1	54.3	9.5	6.2	1.1			
10.unsed land	mu	120.9	17.8	20.4	43.9	38.8	252	180.8	71.2
11. area of water	mu								

Table 1-2 Impacts to affected areas caused by land acquisition and resettlement

County name	township (country)	general situation of affected areas			resettlement and land acquisition			the proportion of impact		
		households	population (persons)	arable land (mu)	households	population	arable land (mu)	households	population	arable land
Taihe	Wanhe Town	10510	44072	71850	32	101	1067.22	0.30%	0.23%	1.49%
	Yanxi Town	4940	19305	35670	109	382	696.36	2.21%	1.98%	1.95%
	Tangzhou Town	6970	29531	50175	3	11	834.5	0.04%	0.04%	1.66%
	Chengjiang Town	9076	25786	31905	11	57	244.08	0.03%	0.22%	0.77%
	Mashi Town	7630	32413	60105	14	46	68.35	0.18%	0.14%	0.11%
	total	39126	151107	249705	169	597	2910.51	0.41%	0.40%	1.17%

Table 1-3 Resettlement entitlement in land acquisition

Project impacts	Affected peoples/affected entity	Affected peoples/affected entity	Other measures
Land losing caused by permanent land acquisition	Arable farmland, woodland, garden, pond and Affected peoples in the area of hinge projects and protection works.	<input type="checkbox"/> provide equivalent arable farmland nearby(if possible) <input type="checkbox"/> cash compensation for affected villages( unit price is based on the land output, compensation multiple and the relevant regulations) <input type="checkbox"/> <input type="checkbox"/> Compensation standard is shown in Table 1-4.	<input type="checkbox"/> readjust the land in the village or relocation host <input type="checkbox"/> use the land compensation to develop the land, in order to make effective use of the land
Land losing caused by temporary borrow	Arable land near hinge project and protection bank	<input type="checkbox"/> plunk down land-borrowing compensation(the sum is based on the annual output and re-cultivate cost) <input type="checkbox"/> compensation standard is shown in Table 1-4.	<input type="checkbox"/> return the temporary borrowed land after cooperation
Housing, affiliated construction and small woods etc.	Housing, affiliated constructions and residents affected by the projects	<input type="checkbox"/> based on relocation price, include private housing(town and village) <input type="checkbox"/> at the same village as far as possible; arrange housing bases( local village) <input type="checkbox"/> if can not be relocated in local village, choose the nearest(collective relocation) <input type="checkbox"/> practice house-exchanging relocation in town <input type="checkbox"/> cash compensation for the city residents <input type="checkbox"/> based on original area <input type="checkbox"/> <input type="checkbox"/> compensation standard is shown in Table 1-4.	<input type="checkbox"/> construction materials can be used in the new building <input type="checkbox"/> resettlement helps when building new house <input type="checkbox"/> provide housing and economic help in the transition <input type="checkbox"/> hand out the transport or moving subsidies by household

Plant losing	Plant destroyed in the project areas	□cash compensation for affected peasantry( based on the average output of the last three years)	□avoid land acquisition in harvest season , in order to reduce the crop losing
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Continued table 1-3 Resettlement entitlement in land acquisition

Project impacts	Affected peoples/affected entity	Affected peoples/affected entity	Other measures
Enterprises	Enterprises and workers	<input type="checkbox"/> compensation for land, building and facilities; <input type="checkbox"/> compensation for job suspension and relocation; <input type="checkbox"/> compensation standards are shown in table1-4.	<input type="checkbox"/> during transition periods, provide temporary sites for enterprises to make workers keep working or compensate wage loss.
Loss of public facilities	Relocate housing and facilities for water and power supply and health.	<input type="checkbox"/> rebuild facilities for water and power supply and health(former infrastructure facilities); <input type="checkbox"/> compensation standards are shown in table1-4.	
Infrastructure facilities	Affect roads and facilities for water and power supply, communication and broadcast in the areas.	<input type="checkbox"/> compensation is transferred to owner of infrastructure; <input type="checkbox"/> compensation standards are shown in table1-4.	<input type="checkbox"/> relocate land in time to carried out infrastructure;
Impacts on weak people	Affected peoples such the olds, orphans, widows and families without families.	<input type="checkbox"/> extra subsidy is provided to weak groups; <input type="checkbox"/> compensation standards are shown in table1-4.	<input type="checkbox"/> transfer money to weak groups as soon as possible.
Loss of cultural heritage	No major impacts are found.	<input type="checkbox"/> unfeasible	<input type="checkbox"/> unfeasible

### Foundations

The Land Administration Law (1999) of the PRC

“Byelaw on Land Acquisition Compensation and Resettlement Relocation in Large and medium-sized water conservancy and hydropower project” (the 471st Order of the State Council, 2006)

Specifications on Resettlement Planning of the Water Conservancy and Hydropower Project SL290-2003

Detailed (1986) rules on reservoir-submerging physical indicators of water and hydropower projects.

Procedures on Implementation the Land Management Law (2001) of the PRC in Jiang

Table 1-4 Compensation standard table

series	Cost titles	unit	standard(Yuan)	remark
I	Compensation for Permanent Land acquisition and relocation			
	1□arable farmland	mu		
	(1)paddy field	mu		
	Once in two years or above	mu	18882	
	Once in two years below	mu	15323	
	(2)dry land	mu		
	Once in two years or above	mu	13417	
	Once in two years below	mu	10352	
	2□garden plot	mu	13750	
	3□pound	mu	13200	
	4□forest land returning from farmland	mu	6760	
	5□economic woods	mu	3800	
	6□material woods	mu	3400	
	7□woodland	mu	3000	
	8□land acquisition for new sites	mu	7966	
	9□un-utilized land	mu		
	(1)cultured	mu	6533	
	(2)ever cultured	mu	4403	
	(3)un-cultured	mu	2516	
II	Temporary expropriation for construction	mu		
	1□arable farmland	mu		
	(1) paddy field	mu	5350	
	(2) dry land	mu	4496	
	2□woodland	mu	650	
	3□un-utilized land	mu	500	

Continued table 1-4 Compensation standard table

series	Cost titles	unit	standard(Yuan)	remark
III	Relocation cost of housing and facilities			
	1□housing	m <sup>2</sup>		Add in the decorate fee and other fees(mean)
	(1) framework housing	m <sup>2</sup>	350	50
	(2) masonry rooms	m <sup>2</sup>	300	50
	(3) brick-wooden Housing	m <sup>2</sup>		
	Living	m <sup>2</sup>	270	50
	estate	m <sup>2</sup>	200	
	(4) mud-timber antrum	m <sup>2</sup>	150	
	(5) mixed antrum	m <sup>2</sup>	100	
	2□ancillary buildings			
	(1) wall	m <sup>2</sup>	25	
	(2)cement ground	m <sup>2</sup>	20	
	(3)water-pressed well	entry	200	
	(4)well	jaws	1000	
	(5)manure pit	entry	200	
	(6)miasma pool	entry	800	
	(7)cooking range	entry	200	
	(8) facility building	entry	50	
	(9)get way	entry	1000	
	(10)fixed phone	seat	180	
	(11)CATV	household	600	
	(12)graves	seat	300	
IV	Compensation for water facilities in villages			
	1□small hydropower station	kW	5000	

Continued table 1-4 Compensation standard table

series	Cost titles	unit	standard(Yuan)	notes
	2□small lift irrigation facility	locate	20000	
	3□flood drainage facility	locate	5000	
	4□diversion canal	km	30000	
	5□sand-mining ground	locate	50000	
V	Rebuilding cost of the infrastructure	person	1600	
VI	Moving and transport cost	person	250	
VII	Other compensation			
	1□ little fruit trees	trunk	50	
	2□ other subsidies	person	250	
	3□ subsidies for vulnerable groups	household	5000	
VIII	Moving and building cost of enterprise			
	1□housing	m <sup>2</sup>		
	(1) framework housing	m <sup>2</sup>	350	50
	(2) masonry rooms	m <sup>2</sup>	300	50
	(3) brick-wooden Housing	m <sup>2</sup>	270	50
	(4) mud-timber antrum	m <sup>2</sup>	150	
	(5) mixed antrum	m <sup>2</sup>	100	
	2□ancillary buildings			
	(1) wall	m <sup>2</sup>	25	
	(2) cement ground	m <sup>2</sup>	20	
	(3) water-pressed well	entry	200	
	(4) well	jaws	1000	

Continued table 1-4 Compensation standard table

series	Cost titles	unit	standard(Yuan)	notes
	(5) cooking range	entry	200	
	(6) facility building	entry	50	
	(7) manure pit	entry	200	
	(8) get way	entry	1000	
	(9) water tower	seat	20000	
	3□relocation and transport cost	m <sup>2</sup>	15	
	4□compensation for infrastructures	m <sup>2</sup>	70	
	Relocating/alerting costs of special facility			
IX	Restoration cost of transport facilities			
i	1□fourth-level highway	km	500000	
	2□machine road(cement ground surface)	km	240000	
	3□new building of the fourth-level highway bridge	seat	200000	
	4□dock	entry		
	□1□strengthening the customer/goods dock	entry	250000	
	□2□strengthening the goods dock	entry	250000	
	5□ferry	couple		
	□1□steam strengthened	couple	250000	
	□2□persons strengthened	couple	150000	
ii	Telecom infrastructures	km		
	1□aerial optical cable	km	35000	
	2□sub ground communication cable	km	30000	
iii	Mobile telecom cable	km		
	1□aerial optical cable	km	35000	
	2□sub ground cable	km	50000	

Continued table 1-4 Compensation standard table

series	Cost titles	unit	standard(Yuan)	remark
iv	Un telecom infrastructures	km		
	1□aerial optical cable	km	35000	
	2□sub ground cable	km	50000	
v	Military telecom infrastructures	km		
	1□aerial optical cable	km	25000	
	2□sub ground cable	km	50000	
vi	CATV infrastructures	km		
	1□aerial optical cable	km	20000	
vii	Transmission and Distribution infrastructures			
	1□35kV circuitry	km	60000	
	2□ 10kV circuitry	km	45000	
	3□0.4kV circuitry	km	15000	
	4□transformer	entry	10000	
viii	others			
	1□waterworks	set	700000	
	2□deposition pool	entry	200000	
	3□Electric Power Station	kw	3500	
	special fisher folk	person	1000	

Table 1-5 Layout of resettlement production relocation

Town	Administrative villages	Villager team	Productive population relocation	planting industry relocation									breeding industry relocation		The second and third industry relocation		Total Investment (10 <sup>4</sup> Yuan)
				Readjusted farmland in this team			Transferred farmland in this team			Change farmland with mid-low output			Affected peoples	Investment (10 <sup>4</sup> Yuan)	Affected peoples	Investment (10 <sup>4</sup> Yuan)	
				Adjusted farmland (mu)	Relocation population (person)	Investment (10 <sup>4</sup> Yuan)	Adjusted farmland (mu)	Affected peoples	Investment (10 <sup>4</sup> Yuan)	Change farmland with mid-low output (mu)	Affected peoples	Investment (10 <sup>4</sup> Yuan)					
Chengjiang	9	25	278	139.49	106	260.85	66.33	107	124.04				16	48	49	147	579.89
Mashi	5	9	64	63.89	42	119.47	11.95	22	22.34								141.81
Tangzhou	9	51	573	495.74	288	927.02	256.49	252	479.64				28	84	5	15	1505.66
Wanhe	17	79	872	563.35	333	1053.46	370.63	435	693.09	100	10	42	44	132	50	150	2070.54
Yanxi	8	28	404	435.74	265	814.82	178.5	119	3333.81								1208.64
sum		192	2191	1698.20	1034	3175.63	883.9	935	1652.92		10	42	88	264	124	372	5506.53

Table 1-6 Overall table of the compensation investment estimate

unit □ 10<sup>4</sup> Yuan

serials	items	total	protective projects	main projects	remark
1	Compensation for land acquisitions and relocation	7798.35	7201.51	596.83	
2	Cost of Housing and subsidiary constructions	979.47	979.47		
3	relocation cost of infrastructures	97.28	97.28		
4	moving and transport cost	15.20	15.20		
5	Other compensation for residents	22.58	22.58		
6	compensation for water-electric infrastructures in villages	453.36	453.36		
7	Moving and relocation cost of enterprises	90.23	90.23		
8	moving/altering cost of the special projects	1880.05	1880.05		
9	protection works cost	2866.79	2866.79		
10	reservoir bottom cleaning cost	17.15	17.15		
11	Other costs	1138.82	1138.82		
	1 □ survey and design cost	340.59	340.59		
	2 □ implement and management cost	408.71	408.71		
	3 □ institution cost	40.87	40.87		
	4 □ tech training cost	44.30	44.30		
	5 □ supervision cost	136.24	136.24		
	6 □ M&E cost	68.12	68.12		
	7 □ resettlement environment expert group cost	100.00	100.00		
12	Preparing cost(10% )	1476.24	1476.24		
13	static total investment	16238.67	16238.67		
14	Water and environment protection cost	79.10	79.10		
15	Relevant tax and fees	3147.29	2888.01	259.29	
	1 □ farmland cultivating cost	1568.94	1493.08	75.87	
	2 □ farmland occupation cost	984.84	843.84	141.00	
	3 □ forest vegetation recovery cost	280.13	251.33	28.80	
	4 □ management cost (3% of the land acquisition cost)	225.24	216.05	9.19	
	5 □ farmland reconnaissance tax	14.69	13.95	0.74	
	6 □ flood control security funds	73.45	69.76	3.69	
16	Total investment	20061.90	19205.78	856.12	

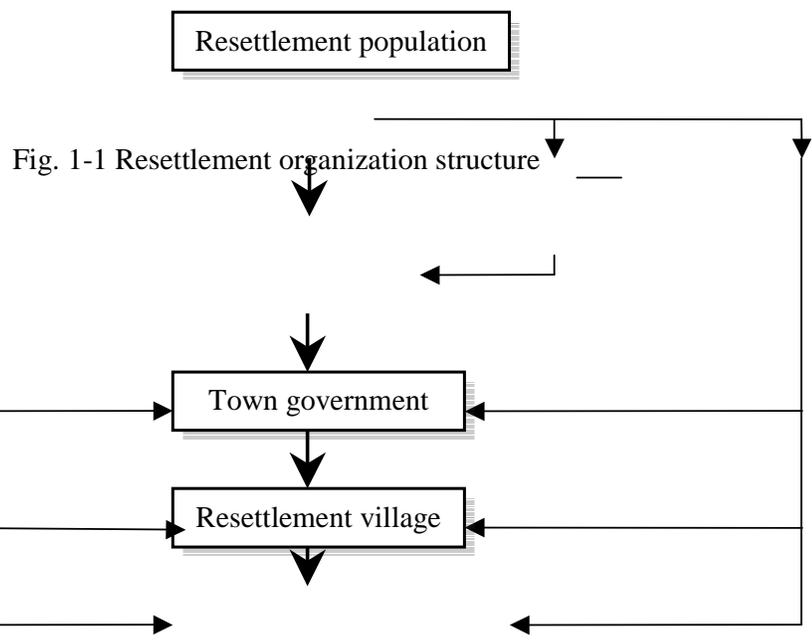
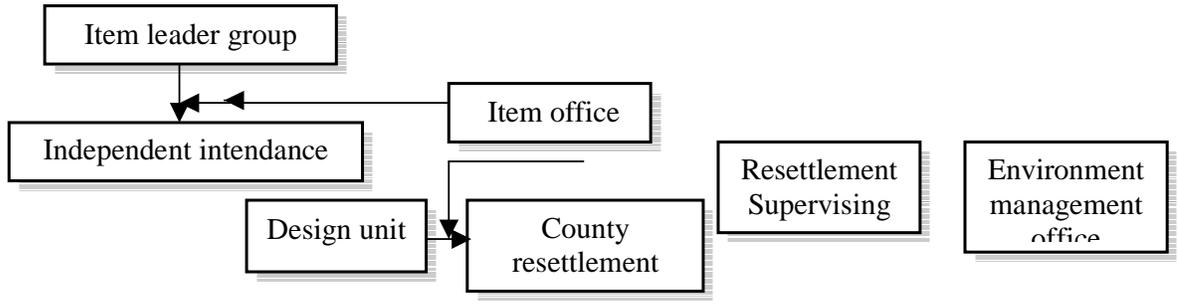


Fig. 1-1 Resettlement organization structure

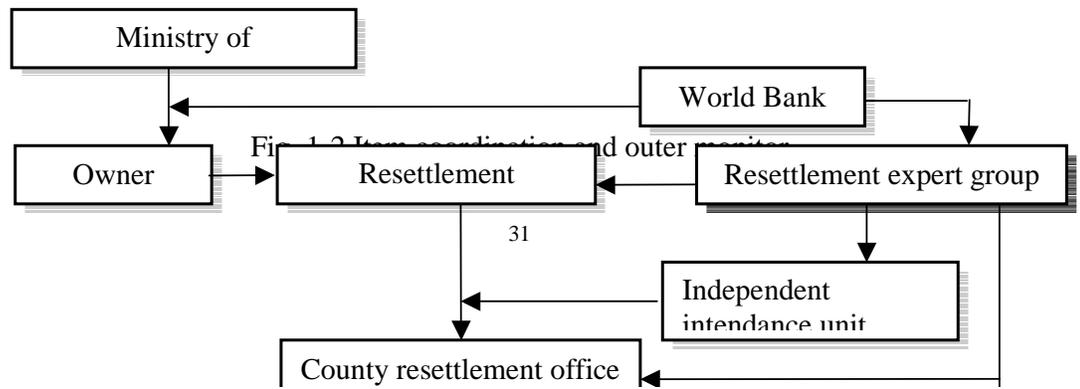


Fig. 1-2 Item coordination and outer monitor





## 2 BACKGROUND OF PROJECT

### 2.1 Introduction of project area

#### 2.1.1 Natural conditions

Taihe country where is the Shihutang Hydropower Project located in is located on the middle-southern part of Jiangxi province and southwest part of Ji'an city, North Latitude 26°27'-26°59', East Longitude 114°57'-115°20', and its Southeast adjacent is Xingguo country, Southwest adjacent is Suizhou city, Ganzhou city, West adjacent is Jinggangshan city, Yongxin country and North and Notheast adjacent is Ji'an. 'the terrain make land and water equilibrium, beautiful landscape reflection and relation, and is read out at one glimpse', it is fecund Jitai basin and hinterland.

The land area in the country is 2665.41 km<sup>2</sup>, located in the confluence zone of the extension of Luoxiaoshanfangwanyang Mountains to Northeast and Northwest Yu Mountain in Yufanghewuyi Mountains, the total terrain is high in the East and West, it is low in the middle and decreased from the East and West to the middle in Ganjiang river, which presents asymmetric basin topography. The main landform is mountains, hills and plains. Taihe country is the locality of orthodox black-bone chicken which is listed as top grade product for healthy in 'compendium of material medical of the ancient famous doctor Lishizhen and reward golden prize in international Panama exposition. Taihe black-bone chicken is famous for its unique appreciation, medicinal value, health care, cosmetology and cancer prevention in the world and imperial basilica tribute in the past dynasties, rare bird in the world. In Taihe country is prolific in more than 26 mineral resources such as tungsten, gypsum, china clay, molding sand, iron, potassium salt, limestone, among them gypsum reserve and limestone reserve is the greatest. In Taihe country is prolific in water resource and the development of hydropower is about 18×10<sup>4</sup>kw. The forest coverage is about 50%, the memory capacitance of living trees is about 450×10<sup>4</sup>m<sup>3</sup>. There are Almost small plain basins.

Taihe county lies in the middle subtropics, near Pacific Ocean, typical eastern monsoon climate of mid-subtropics, abundant sunshine, warm and moist, abundant rainfall, typical characteristic of climate diversification. Ganjiang Basin is subtropical warm-moist climate, east Asian monsoon region, climatic characteristics in one year is abundant plum rains in spring and summer, decreased rainfall in autumn and winter, short in spring and autumn, long in summer and winter, cold in spring and hot in summer, clear in autumn and cool in winter, short in ice fall period, long in frostless season and sunshine time, great relative humidity and typical characteristic of climate

diversification. Moderate climate, abundant sunshine and rainfall are subtropical warm-moist climate. The climate is that cold in spring and cool in winter, hot in summer and clear in autumn, abundant rainfall in early summer and drying in middle autumn, typical characteristic of climate diversification, rain in hot season, long in frostless period is quite beneficial for crops and vegetations.

Ganjiang Basin is abundant rainfall, long year average precipitation is 1300~1800mm in basin interior of rivers, annual distribution precipitation is very uneven, in Ganjiang Basin each representative station statistical data shows that long year average precipitation accounts for 41%~51% of annual total rainfall. In basin interior of rivers the rainfall in edge mountain area is more than basin.

Rainstorm is frequent in Ganjiang Basin. The statistical data about observed rainfall in calendar year from rainfall station shows that the most daily rainstorm amount is frequently in April□September, frontal gland precipitation make the heavy rainstorm more centralized in May□June and the rainstorm evens because of typhoon in July□September.

In reservoir area the perennial mean temperature is about 18□, the perennial mean relative humidity is about 79%, the perennial mean wind speed is about 1.8m/s and the perennial mean yearly maximum wind speed is 13.4m/s.

### 2.1.2 Population

Shihutang Hydropower Project is one of the most important hubs in main stream planning in Ganjiang river for cascade development, and it is located in Shihutang Ziran village Wanhe town Taihe country.

At the end of 2005 the total population in Taihe country is  $51.57 \times 10^4$  People, natural growth rate of population is about 9%, population density in per square kilometer is 193. There are 11 nationalities such as Han, Manchu, Mongolian, Hui, Miao, She, Dulong, Uigur and Gaoshan nationalities. The labor in this country is  $24.92 \times 10^4$  People. The agricultural population is 81.1%. Annual net income per capita of rural residents is 3747 Yuan and per capita disposable income of urban residents is 7271 Yuan.

### 2.1.3 Economic status

Taihe country has a long history. It first belonged to the Wu country, Yue country and later belonged to Chu country, Qi country in the Spring and Autumn Warring States. It

belonged to Lulin country in Han Dynasty. At the end of East-Han Dynasty it belonged to Lulin prefecture. 12 years after the establishment of Sui Dynasty(in 591), it is renamed Taihe country because of 'harvest for grass steppe result from harmonious society'. Although During the change of the state, country and 'Tai', 'Tai', from Ming Dynasty (in 1369) (except Soviet Area used the name 'Wantai' for 4 years), the name 'Taihe' last till now. Now Taihe country have 16 towns, 6 townships, 290 villages, 14 residents committee, 6 communities and 3354 villager teams. 2005 annual report shows that the country is  $51.57 \times 10^4$  People, among them the agricultural population is  $41.84 \times 10^4$  People, the agricultural labor is  $24.87 \times 10^4$  People, the total cultivated land area is about  $66.02 \times 10^4$  mu. The GDP of this country is  $37.11 \times 10^8$  Yuan, the primary industry value added is  $11.93 \times 10^8$  Yuan, the secondary industry value added is  $14.16 \times 10^8$  Yuan, the tertiary industry value added is  $11.02 \times 10^8$  Yuan. The commercial agricultural output is  $6.3 \times 10^8$  Yuan, the commodity rate is 61%.

The grain and oil is the primary agricultural product, the rice is the primary cereal product, the soybean, the sweet potato and others are the secondary ones; the economic crops are rape, sesame, peanut, tobacco and other crops. In 2005, the planting area of food crops in this country is 81952 ha, the total yields of grain is  $36.57 \times 10^4$  ton; the oil planting area is 19950 ha, the oil overall production is  $1.84 \times 10^4$  ton and the citrus is the primary fruit production.

The total population of township is  $22.54 \times 10^4$  People involved in the project, and among them the agricultural population is  $15.11 \times 10^4$  People, the total area cultivated land is about  $24.97 \times 10^4$  mu and the total yields of grain are  $13.7 \times 10^4$  ton.

In the area the infrastructure condition is good, 105 National Road, 319 National Road, Beijing-Kowloon Railway and Yue-Gan superhighway are here and the advanced program control optical cable communication have been connected with common farms in each rural.

The basic situation of agricultural production involved in submerging with Shihutang Reservoir in Taihe country shows as in Table 2-1, the comprehensive state of economy shows as in Table 2-2.

Table 2-1 The basic situation of planting in 2005 in Taihe country and townships involved in project

country (township)	population (people)	cultivated area (mu)	per capita cultivated land of agricultural population (mu)	food crops in cultivated land (%)	total yields of grain (t)	specific yield in sown area (kg/mu)	grain-produced per capita (kg)	economic crops in cultivated area (%)	remarks
	total population (people)	among them; agricultural population (people)							
Taihe country	515655	418412	660210	1.58	68.9	365697	297	874	31.1
Wanhe town	46577	44072	71850	1.63	64.9	35748	268	811	35.1
Yanhe town	20428	19305	35670	1.85	59.8	17567	331	910	40.2
Tangzhou town	31977	29531	50175	1.70	65.4	28932	324	980	34.6
Chengjiang town	90207	25786	31905	1.24	58.4	18246	328	708	41.6
Mashi town	36245	32413	60105	1.85	67.9	36396	339	1123	32.1
minor total	225434	151107	249705	1.65	64.1	136889	312	906	35.9

Table 2-2 The table about 2005 comprehensive state of economy Taihe country

project	unit	Taihe country
GDP	10 <sup>8</sup> Yuan	37.11
primary industry	10 <sup>8</sup> Yuan	11.93
secondary industry	10 <sup>8</sup> Yuan	14.16
tertiary industry	10 <sup>8</sup> Yuan	11.02

#### 2.1.4 Present situation of water transportation

Recently because the grades of each channel of Ganjiang river are different, the channel is not transfixion which result in the Ganjiang river navigation capacity greatly reduced. Because of Rapid development of Railway and highway, the development of water freight transportation in Ganzhou Port is restricted seriously, the traffic volume increases slowly and it is decreased year by year in the traffic economy of this city, also the freight transportation limits in wood, freestone, cement, petroleum, chemical fertilizer, feed, grain and other finite materials. And water tourism landscape and interval short distance passenger transport are the primary passenger transport, the toll passenger transport have been gradually withdraw water transport market.

## 2.2 Project

### 2.2.1 Necessity of project

#### 2.2.1.1 Extension of the main shipping channel, implement the state building needs for high-grade channel system

Ganjiang river was listed as the main channel of the waterway by the Ministry of Communication. Also is one of “two across, a longitudinal, two networks, sixteen lines”, an important component of the national high-grade channel system. So construct the item, making the grade III fairway in Ganjiang river extended to the upper reaches, ultimately achieving planning objectives, conform the strategic requirements about the construction of the national main channel and the building of national high-grade fairway system.

#### 2.2.1.2 Project profiting the further improvement to build an integrated transport system throughout the province

More developed traffic is in Ganjiang river valley. A Beijing-Kowloon Railway runs through the region, the Zhejiang-Jiangxi Railway runs from the east to the west. The network of radiation centered with Nanchang, Ji'an, Ganzhou has been basically formed, the basic realization of township roads. In the comprehensive transport system, water transportation has lagged far behind other kinds of transport infrastructure, water transportation has lagged far behind the development of railways and highways. The implementation of the project will speed up the construction of Ganjiang river main fairways network, promote the modernization of port facilities in the channel, and support the protection system. Promote containers, special professional ship transportation development. At the same time, speed up the realization of the modernization of bulk carriers, large and standardization. So the shipping industry in

Ganjiang river enter a virtuous circle of development phase. To further improve the province's comprehensive transport system, accelerate the formation of the integrated transport network, it has important practical significance.

Jiangxi-Guangdong canal incorporated into the national planning studies, north will be the Yangtze River and Pearl River south, go through the Poyang Lake, the main stream in Ganjiang river, Taojiang river, a tributary in Ganjiang river, the Guangdong Pearl River to the sea. Guangdong, Jiangxi Canal completed, it will communicate the Yangtze River, Pearl River, the two major river systems. The two major river systems of China's inland shipping will be linked, form the north and south of waterborne transport major thoroughfare in the south area of the Yangtze River, strengthen North-South economic development, promote economic exchanges, particularly it has far-reaching significance about the promotion of economic cooperation in Pan-Pearl River Delta regional.

2.2.1.3 This item conducive to promoting the construction of large ships in Jiangxi Province, the development of standardization and improving efficiency of transport enterprises.

River shipping large, standardization is the only way to improve transport efficiency, to adapt to the market competition. Due to the driving force of economic development and the strong pressure of market competition, the shipping industry in Jiangxi province has been in the development of self-adjustment, large-scale development of the ship is a direction. Many individual owners have come to realize the construction of large vessels has better return on investment than the construction of small ships. Jiangxi province has an excellent mineral resource, such as building materials, The Yangtze River, Ganjiang river, Xinjiang river, the main channels communicate the middle and lower reaches of Yangtze River and the Yangtze River Delta region, the construction materials in the areas has been exuberantly demanded. Expected in 2030 in Shihutang of Ganjiang river shipments will reach 13.2 million tons. Shihutang hydropower project completed, reservoir fairway conditions can be greatly improved, with the whole river changed channels, the large ships can be realized with direct access from the mainstream to tributaries, thereby reducing transit times, reducing transport links, and lowering transport costs, but also improving the economic efficiency of the transport enterprises.

2.2.1.4 Project construction - one of the effective measures to ease power shortages in Jiangxi province.

In recent years, Jiangxi provincial economy and society developed rapidly, the shortage of electricity consumption, electricity power limitation occurred from time to time. With the region's rapid economic development, the total energy demand will continue to grow, the energy structure will continue to change, and quality requirements will be higher. Shihutang hydropower project near the load center in Jiangxi province, for medium-sized power stations, and the reservoir have certain regulatory functions, the network will become the backbone of Jiangxi hydropower station. After the project is completed, alleviating the shortage of energy in Jiangxi, promoting its economic development and improving living standards, will certainly play an important role.

To sum up, Ganjiang river is a main channel of the State Water Transportation, it is an important component of country's network of high-grade fairways and Canal Jiangxi and Guangdong. Shihutang hydropower project of the building would drainage canalized 38 km, it has an the significance meaning for the middle reaches of the Ganjiang River to promote drainage and increase the middle reaches of the Ganjiang River Waterway levels, promote development and improve the waterways integrated transport system in Jiangxi province Ganjiang River. Works installed capacity of 117 MW power station, for years the average generated capacity of  $4.8 \times 10^8 \text{kW} \cdot \text{h}$ , which can ease the strain on electricity contradictions in Jiangxi Province, optimizing system power structure, improving the quality of electricity supply grid, and promoting the development of natural resources along the Yangtze River region, promoting the region along Jiangxi economic development, particularly has an important role Jinggangshan old revolutionary base areas and leading the hinterland of the economic development in poverty-stricken areas. Therefore, as soon as possible build the Shihutang hydropower project is very necessary.

### 2.2.2 The main contents of construction and investment

Shihutang hydropower project mainly comprises the project and reservoir protection project, a project's main buildings are flood flushing sluice, power plants, and the two sides lock and earth dam, the main reservoir are embankment protection works, the pump station, guide up drainage works.

This item permanent occupied cultivated land 2910.51 mu (of which project occupied cultivated land 147.5 mu, reservoir inundation and protection, drainage works occupied cultivated land 2763.01 mu), the relocation of the population 169, 597.

### 2.2.3 Projects affected regions

After protective measures taken, the reservoir flooded areas involves Taihe county, Wan'an, Yanxi, Tong Chau, Chengjiang, Mashi five township (town) of 53 villages, Wushan reclamation field and Taihe county. Shihutang hydropower project resettlement and distribution of relocation are shown in the following schematic figures.

The reinforcement of new or protective dike in Taihe county, Wan'an, Yongchang, Yanxi, Zhangtang five protection zones, the banks along the original often submerged lands and population is protected, making regular land inundated with security, the total area of protection is 72.3 km<sup>2</sup>, arable land 6.58 million mu, population 53,000.

Based on the beaches of Woodside, shallow left bank tributaries Yunting River inundated area and Kuwei Mashi basic farmland lifting the field taken protective measures, the protection of arable land 1911.19 mu.

#### 2.2.4 Reducing resettlement measures

Reservoir inundation, new dike reinforcement works is the main reason for immigration. After technical and economic rationality of the study and optimization of the design, to meet the requirements without affecting navigable river flood capacity of the circumstances, this item to adopt the following measures to reduce immigration:

(a) New dike project is the best measures to reduce immigration. New dike project can protect 53,700 people and  $6.58 \times 10^4$  mu farmland.

(b) The formulating of operation of reservoir regulation, directed by floods upstream runoff flow scheduling operation mode, when the upstream runoff flows reach a certain design flow, all the sluice Shihutang hydropower project opened to reduce the water level, keep river maintaining natural conditions.

(c) For the reservoir area which is densely populated and cultivated concentrated, or with the temporary protective conditions inundated area or shallow flooded areas take protective measures and lift field measures.

(d) In the reservoir area dike project design, the local villages across the embankment sections take the form of the construction of protective wall, to reduce the levee section, thereby reducing the relocation of migrants caused by dike.

#### 2.2.5 Technical and economic feasibility study

Shihutang hydropower project drainage of the fairway mileage is 38 km, after the implementation of the project, it can reach fairways class III fairways standards, perennial can access 1000 t-ship. It installed power station capacity of 117 MW, for years the average annual generation capacity 480 million kW/h.

The project is based on the shipping of the item, balance power generation, flood control projects comprehensive utilization, but also to transportation, energy as the guide and promote the development of regional infrastructure for the national economy, in line with the state's industrial policy. The implementation of the project, in addition to make the national economic efficiency and enterprise financial benefits, it will result in the form of currency that can not be the social benefits, as demonstrated in the following aspects:

□1□The projects located in the middle reaches of the Ganjiang river, in accordance with the relevant planning, the upstream hub is Taihe hub, Wan'an hub, and downstream is Xiajiang. Wan'an hub has been completed; the hub and Xiajiang hub Taihe preparation work is ongoing. Ganjiang river fairways Nanchang to Hukou paragraph 156 km waterway has reached level III standards, Zhangshu to Nanchang 92 km waterway has reached the standard V-Channel, which is now standard on-III-class fairways to improve the situation, is expected completed in 2008, this section will reach grade III fairways, so that Ganjiang river shipping functions will be in full play. With improved shipping conditions, relying on water transport along the Yangtze River will be the convenience of the layout of the new industries, and other cities along the Yangtze River region and the economic exchanges will become more frequent, resulting in induced traffic demand, pulling Ganjiang river economic development.

□2□Compared with other modes of transport, water transport has outstanding merits as large capacity, low energy consumption, less pollution, low costs, which has advantages and development potential other modes of transportation irreplaceable. With the fairways conditions improve, it will attract some highways, railways disposable goods on the land to water, or public water, rail -water transport, thus enabling Gan river traffic transported to rapid development, but also benefits other hub Ganjiang river the overall efficiency of play.

□3□Rail, road construction cost large investment and land, construction of 1 km railway takes about an area of 30 mu, building 1 km expressway takes about an area of 60 to 80 mu, and drainage of the fairways not only occupy less land resources, but also

could rely on the reservoir area to develop leisure tourism, aquaculture, and resettle rural surplus labor force and improve the local ecological environment, therefore, the construction project is in line with the strategy of sustainable development.

□4□Shihutang hydropower project in the reservoir area located in famous Jitai Basin. Low standard existing in flood reservoirs along the river, large areas of farmland and villages often suffer flooding, After completion of the reservoir, flood control protection standards will be increased to 10years event, protecting arable land and a population of the banks. Flood control efficiency is significantly.

After calculations, the national economy of this project internal rate of return is about 10 percent; the national economy NPV greater than zero, thus ,the construction of this project is economically and reasonable.

This works as a social welfare project of comprehensive utilization of water resources, the financial evaluation of the project aims is to study the availability of electricity to support freedom conditions. The estimates, the financial investment in power plants all internal rate of return than the current lending rates, the power station's own financial targets feasible.

To sum up, this item excellent indicates the national economy, the construction of the project is very necessary. Financial Evaluation indicators show that the projects have the raise electricity flight conditions.

#### 2.2.6 Project management agencies

The construction was specific charged by the Bureau of Jiangxi Province Harbor, and the project offices was established, who responsible for project implementation, coordination, funding, use, management, supervision, material tendering and procurement, immigration, environmental monitoring and so on. As detailed in the levels of organizational diagram 2-1, 2-2.

To strengthen the cooperation between the government departments and the World Bank, the project cooperated with Jiangxi Harbor Bureau to do the matter with the World Bank delegation and Environmental resettlement expert group.

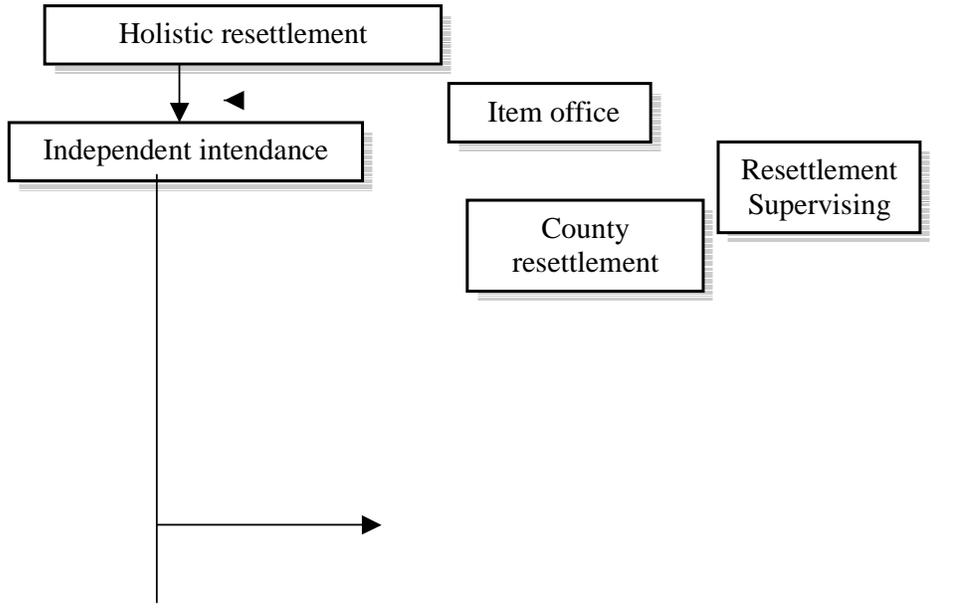


Fig. 2-1 Resettlement organization structure

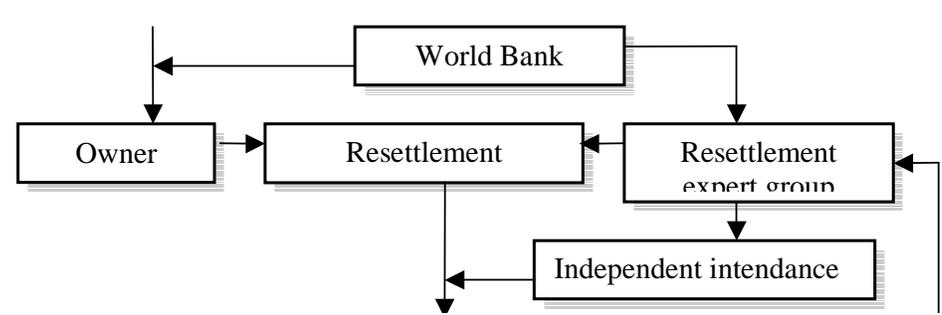
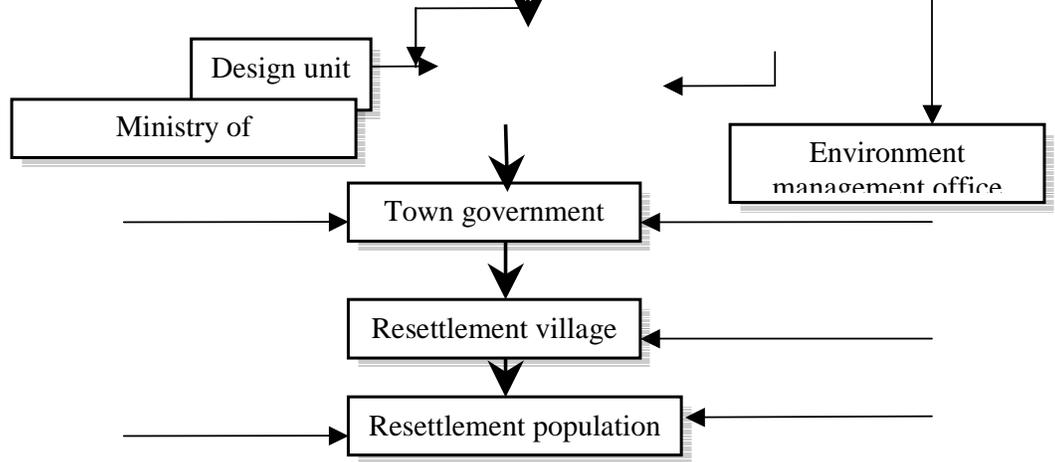


Fig. 2-2 Item coordination and outer monitor

## 2.3 Protection project

### 2.3.1 The need for protection project

The Shihutang Hydropower Project area is in the famous Jitai basin upstream – in the Taihe county. The banks of Gan River in the reservoir have terrain flat and fertile land. Water system in the reservoir is developed, but water drainage area is not large, areas more than 100 km<sup>2</sup> are Yunting river, the Guanwan Water, they are 763 km<sup>2</sup>. 558 km<sup>2</sup>. There are many small streams, the gradient of tributaries and small these streams in the middle and upper reaches is large, the water level downstream because of the Ganjiang river backwater, forming alluvial valley plains. Ganjiang river Mainstream ~~cross-strait~~ → terrace general width is 600 ~ 1400 m, ground elevation is generally 48 to 60 m, the population and arable land are concentrated. Ganjiang river existing dikes along the flood control standards are generally low, the flood is serious.

Normal water level 56.5 m programs, the main stream end of the reservoir backwater will be in Taihe county (Shigan CS18, the water level 60.50 m, corresponding flow of 4,700 m<sup>3</sup> / s), the backflow will be 38.19 km, if no protective measures will be carried out, the reservoir inundation area will be 102.82 km<sup>2</sup>, including flooded land area of 78.49 km<sup>2</sup>, submerged area will cover Taihe county in the county and its five townships, 53,700 people and 6.87×10<sup>4</sup> mu farmland will be inundated. Submerged affected area and the submerged loss will be a large scale, the Shihutang hydropower project need to be addressed in the construction of the very key issues.

To maximize decrease the effect of the reservoir inundated for the national economy and the local ecological environment, reduce land inundated and the number of population movements, the reservoir area where is densely populated, land-focused, with the conditions of temporary protection engineering inundated area or shallow flooded areas, as well as some of the deeper submerged areas to take protective measures, to eliminate or reduce the water formed due to the submerged reservoir areas, such as immersion effect of lower investment project, the construction of the reservoir area protection engineering is very necessary. At the same time ,the enhanced flood control standards of the banks of the Ganjiang River, and improve water conservancy conditions of the farmland along banks, promote local economic and social development, and also allows the Shihu Tong Navigation & Hydropower Junction project to maximize economic efficiency, serve the country.

There protection engineering major indicators reservoir inundation comparison are shown in Table 2-3.

Table 2-3 Comparison reservoir inundation key indicators with protection project and without

No.	item	units	entire reservoir area		protection efficiency
			submerged area before protection	submerged area after protection and possession area of protection	
1	land area	km <sup>2</sup>	78.49	6.15	72.34
2	population	p	53664	597	53077
3	housing	m <sup>2</sup>	2607223	35094	2572129
4	farmland	mu	68676	2910.51	65765.99
5	corner	mu	3051.4	6.17	3045.23
6	use	mu	12484.5	2261.7	10222.8
7	corner	mu	9926.1	188.00	9738.10
8	use	mu	1844.8	128.86	1715.94

### 2.3.2 Protective engineering design standards

#### (1) Engineering degree and the flood control standards

Based on GB50201-94 "flood protection standards" and the actual situation of the protection object, in the reservoir engineering degree of village protection is IV, Taihe county in the city is III, and other works, flood control standard return period were 10 to 20 and 20 to 50. Refers to the experience similar projects in Jiangxi Province, in light of the Protection Project reservoir characteristics, in order to coordinate the relationship of flood control reservoir downstream and upstream Protection District ,requested the relationship between the designed flood standard value Taihe county in the city and rural areas of flood protection return period were 20 and 10.

#### □2□ Drainage design standards

In accordance with the relevant norms of order, in the light of experience of similar projects in Jiangxi Province, villages in protected areas, protective zones of towns, drainage standards adopted 5 years, 3days rainstorm will be drained to resistance submerged depth in 3days; Taihe county drainage standards adopted "Taihe county preliminary design report for flood control project " (Ji'an City Water Conservancy and

Hydraulic Planning and Design Institute) described that drainage standards adopted 10 years, 1day rainstorm will be drained to main buildings do not submerge elevation in 1day; Drainages in protective areas drainage standards adopted corresponding return period of drainage standards, protective zones extraneous water drainage adopted corresponding design flood standards.

### 2.3.3 Choose of the protection program

According to terrain geological conditions in the reservoir, the initial 5 protection zones for new or protective dike reinforcement are Taihe county, Wanhe, Yongchang, Yanxi, Zhangtong, to left bank of shallow Yunting River tributaries inundated area, the beaches of Woodside, Xinzhou Island and the Kuweima town taken at the basic farmland protection measures lift the field.

### 2.3.4 Protection project planning and design

#### 2.3.4.1 The principle of protection engineering layout

##### (1) Embankment line layout principles

a. The line layout should suit the flow of river regime and parallel with the mainstream of the flood lines. Hence, the Polygonal axis of breakwater will be smoothed and partial adjusted, to make the flow smooth and reduce the adverse erosion of the flood embankment.

b. Should make the fullest possible use of existing embankments and favorable terrain, construct on the foundation better, more stable beach and have a proper width on the beach for the benefit of drawing stability.

c. Embankment line layout should under the premise meet the flood width, as little as possible to use land and reduce housing demolition, at the same time, avoiding cultural heritage sites.

d□Embankment distance identified:

According to the survey of the Ganjiang River Taihe-ji'an channel topography, geology, hydrology sediment characteristics, characteristics and evolution of the riverbed erosion and deposition of changes in natural conditions, at the same time ,taking into consider of Shihutang hydropower project layout, and other factors, and refers to similar projects

built domestic, initial distance between dike embankment in reservoir area (including the dam site) is not less than 700m (local topography and location under submerged conditions can reduce demand), and wide in the appropriate channel. According to the reservoir area backwater flood water flow at all levels of calculation results with the corresponding standard natural circumstances comparative analysis of the water line, based on the above principles embankment caused high surface small, and thus proved that the dike is developed from the basic appropriate.

#### (2) The principle of drainage pipes line layout

Excavation up in the drainage conditions in the reservoir area, the layout of the guided up drainage pipes axis contour should along the protection district hillside, drainage axis elevation of the river should match the outside river, and strive to achieve drainage axis smooth.

#### (3) The principle of drainage pump-station layout

To save the project investment, facilitate the operation and management, each protective area only set one pump-station in principle, considered with the geological conditions of topography, drainage pump-station installed at the original drainage exports, or at the low net lift pump-station location.

#### 2.3.4.2 Arrangement protection project

River Reservoir is a shallow hill-gully, cross-strait terrace is developed, located in the Ganjiang river tectonic erosion in the upper reaches of the river erosion and accumulation of hilly landscape, along the Ganjiang river and its tributaries cross-strait general development level terraces and two terraces, ground elevation lower, the dike project is the basic level at the front terrace area. The level terrace for the majority is the fourth component of the Holocene alluvial layer, the upper layer is clay, sand to the bottom, gravel rock, dual structure. Some of the existing protection zones have a small embankment, and low levee, poor-quality, low standard, un-formation a complete system of protection, most of them do not have protection functions. There is generally leakage deformation in the foundation, impervious to be taken reinforcement measures.

The population and land of reservoir area is intensive; agricultural economy is well developed; the submerged will cause larger losses. The populations are dense, land is concentration, and along the river of arable land (population) are concentrated, thus it

appropriate to take protective works protection. Protection Project chief embankment line is 40.89 km, in which Taihe county is 3.17 km, Wanhe is 9.5 km million, Zhang Tong 1.07 km, Yongchang is 15.93 km, Yanxi is 11.22 km; the guide up drainage chief is 57.34 km, of which the original section dredge up restoration of the county guide up drainage is 17.23 km, according to the design standards refurbishment Yongchang guide drainage 14.67 km, a new repair and Yanxi guide up drainage 25.44 km; refurbishment of the diversion channel 11.85 km; 6new pumping station, the general armament department Machine capacity of 6174 kw; 2 new regulators., The layout of the protection project is shown as in Table 2-4.

#### (1) Protective embankment design

According to the protection dike line layout topography, geology, reservoir backwater, materials distribution and the actual balance of earth and stone, the design of the protective dike embankment type layout are as follows:

Wanhe paragraph No.0+000 -4+330, 4+640 - 8+400 are the homogeneous soil embankment sections, No.4+330 - 4+640 considering the housing-intensive and take into account flood guarantee width it used to protect the construction of flood protection walls, near the hub area No.8+400 -9+400 the dike used clay core sand and gravel embankment.

Zhang Tong paragraph: use heterogeneous earth embankment all line.

Gold Beach paragraph: protective embankment about 15.93 km, of which No.0+000 - 1+000 and No.1+150- 7+000 use homogeneous earth dam, No.1+000 -1+150 use the C20 concrete flood control wall ,No.7+000 - 15+929.5 use clay core sand and gravel dam.

Yanxi paragraph: Traffic in and around the town, layout 1.38 km concrete retaining walls, numbers range of 0+150-1+530 1+530 ~ 3+050 layout heterogeneous earth embankment; 3+050 - 11+365 use clay core sand gravel embankment.

Taihe paragraph: use clay core sand and gravel embankment all line.

#### ① Dike design

Clay core sand gravel embankment: embankment slope both internal and external use 1:1.8 the slope, use C15 concrete embankment along the river prefabricated block surface protection, slope protection thickness 0.10 m, inward flow radial turbine slope use sod bream, levee crown set mud stone pavement, and located 0.7 -1.0 m high wave wall. Using reclaimed sand and gravel levee, and impermeable clay core, top width 2 m, slope ratio of 1:0.25. Behind the embankment set drainage.

Heterogeneity earth embankment: the river embankment surface slope ratio of 1:2.5, using C15 concrete prefabricated block surface protection, slope protection thickness is 0.10 m, and a 0.15 m thick sand and gravel layer, inward flow radial turbine slope ratio of 1:3, using sod revetment, levee crown use mud stone pavement, as well as 0.7 - 1.0m-high wave wall. Use impermeable clay levee heterogeneity. Set drainage behind the embankment.

Floodwalls: C20 concrete gravity walls, top width 1.0 m, back slope 1:0.3.

## ② Anti-seepage of dyke

When the embankment behind protective object ground elevation below 4700 m<sup>3</sup> / s reservoir backwater elevation, or the results calculated in accordance with impermeable flood standards in the design of a foundation under seepage damage, the foundation set up cut-off wall, in order to ensure the safety of protected areas.

There are some canals forming technology of cut-off wall, in common, there are impact drill into common shafts, shock reverse circulation drilling rig into groove, hydraulic slot machine and slotted water jetting into slot machines into slot. Compare variety of slot method, water jetting technology into groove method is reasonable, convergence process closely, equipment and a complete matching system, broadly adapt in scope, high-precision in vertical wall, construction layout flexibility, little difficult in incident handling and higher cost-effective notable advantages. After 1998 catastrophic flood in history, in the Yangtze River, Ganjiang river and Poyang lakes, and other important domestic levee reinforcement projects, is widely used, achieving good social and economic benefits. Thus the foundation works use water jetting construction of the wall. Refers to experience of similar projects, water jetting construction of the wall thickness is 0.22 m.

## (2) Drainage pump-station (regulators) layout

Each protection drainage pump-station (regulators) layout should consider with the natural topography of water conditions to determine the location and number of sluice

station. Generally, protective pump-stations installed at the exit of the original drainage district. Taking into account the extraordinarily serious floods occurred when will be full of water to the region protection, After that also requested timely pump and drain, using axial pump, pump-stations for the wet room type, layer compose of water pump and motor components ,station ground filled to high elevation flush with levee crown.

### (3) Guide up drainage layout

Guide up drainage lines, Section integrated flow topography, geology and land and housing distribution ,in accordance with the relevant regulatory requirements, housing demolition should be minimized, occupation of cultivated land should be less, and make full use of the existing drainage . Channel longitudinal slope generally is  $i=0.00015-0.00050$ , excavating soil drainage channel slope  $m=1.5$ , stone channels  $m=0.75$ , filled channels  $m=1.50$ , using practical economic section, the flow rate within the drainage meet the regime conditions, drainage top ultra-high  $h / 4 +0.2$  m, the water level not lower than the export channels with the frequency of Jiang's water level. Guide up drainage pipes fill top width is 2.0 m.

### (4) Overall arrangement of protection project

According to the geological terrain conditions, and in accordance with the above design principle, the protection of layout is shown as in Table 2-4.

Table2-4 Layout of the protection works

sequence number	project name	protection embankment						approach channel /surface drain							drainage dumping station/controlling gate		remark
		name of embankment	length (km)	design water level (m)	height of levee crown (m)	width of levee crown (m)	average levee crown (m)	name of dike	length of channel alignment (km)	width of channel bed (m)	water height of channel (m)	channel grade i	design water level (m)	height of levee crown (m)	name of station	installed capacity (kW) /discharge (m <sup>3</sup> /s)	
1	protection project along stream	Along steam embankment	11.215	58.69 ~ 60.68	59.69 ~ 61.68	4	3.3	upper approach channel along stream	2.753	2.52 ~ 1.9	2.51	0.0035	59.98 ~ 58.33	63.7 ~ 60.9	drainage dumping station along stream	920/12.40	There is new repair for channel.
								lower approach channel along stream	3.194	1.21 ~ 2.5	2.01	0.0004	60.82 ~ 58.10	61.53 ~ 58.81			There is new repair for channel.
								approach channel along stream	2.0	3.94	1.77	0.0005	52.77 ~ 51.77	53.41 ~ 52.41			There is refit for channel.
2	Wanghe protection project	Wanghe embankment	9.50	57.87 ~ 59.47	58.87 ~ 60.47	4	3.55	Wanghe diversion channel (new repair)	19.50	11.70 ~ 11.40	3.65	0.000184	50.27 ~ 53.86	51.42 ~ 55.02	Wanghe drainage dumping station	2210/28.50	Integrate pump with gate, free drainage can reach 70m <sup>3</sup> /s out of flood season.
								Wanghe approach branch channel (refit)	2.20	3.50	1.85	0.0005	50.59 ~ 51.69	51.25 ~ 52.35			Wanghe controlling gate
3	Zhangtang protection project	Zhangtang embankment	1.073	59.646 ~ 59.579	60.646 ~ 60.578	4	3.64							Zhangtang controlling gate	993	lockage capacity	

Continued Table 2-4 Layout of the protection works

sequence number	project name	protection embankment						approach channel/surface drain							drainage dumping station/controlling gate		remark
		name of embankment	length (km)	design water level (m)	height of levee crown (m)	width of levee crown (m)	average levee crown (m)	name of dike	length of channel alignment (km)	width of channel bed (m)	water height of channel (m)	channel grade	design water level (m)	height of levee crown (m)	name of station	installed capacity (kW) /discharge (m <sup>3</sup> /s)	
4	Yongchang city protection project	Yongchang embankment	15.93	60.16 ~ 63.25	61.16 ~ 64.25	4	4.56	divagation channel of Yunting River	16.40	60	4.0	0.0004	68.09 ~ 61.51	69.09 ~ 62.51	Yongchang drainage dumping station	1080/13.90	The section of Yunting River which has changed its course is 2km.
								upper approach channel	5.52	0.9 ~ 4.64	1.49 ~ 2.09	0.0006 ~ 0.00032	65.43 ~ 61.20	66.00 ~ 63.85			Its exit is in Yunting River, and there is a refit for channel.
								lower approach channel	9.15	1.04 ~ 6.02	1.72 ~ 2.22	0.0006 ~ 0.00027	65.37 ~ 58.11	66.00 ~ 60.76			There is a refit for channel.
								Yongchang lower approach channel	3.65	3.51	2.05	0.0005	53.05 ~ 54.88	53.76 ~ 55.59			There is a refit for channel.
5	Taihe country protection project	Taihe country embankment	3.17	61.54 ~ 62.07	62.54 ~ 63.07	4	4.12	upper field approach channel	6.24	5.71 ~ 5.97	1.78 ~ 2.69	0.0003	65.66 ~ 60.90	66.30 ~ 64.28	Huangjia dam drainage dumping station	1920/38.3	There is a dredging for channel.
								Donggang approach channel	10.99	3.59 ~ 6.59	1.62 ~ 2.97	0.0004 ~ 0.0003	65.62 ~ 59.00	66.22 ~ 62.50			There is a dredging for channel.
								Country approach channel	3.00	5.24	2.36	0.0005	57.50~ 55.50	58.29~ 56.29			There is a refit for channel.

### 2.3.5 Survey of the index of material objects

Shihutang navigation power junction protected area is in the middle and upper reaches of the Ganjiang river where the tectonics of low mountains and hills are denuded and sedimentary belt is eroded by rivers, the first and secondary terraces are developed on two banks along Ganjiang river and its tributaries, the height of order panels are low, embankment engineerings are basically in front of the first terraces. The upper part of the first terrace is clayey stratum, and the lower part is sandy gravel stratum, it has dual structure.

#### 2.3.5.1 Survey of the protected area of Taihe city

The protected area of Taihe city which is in the left bank of Ganjiang River belongs to the flood influence area, 18km from dam site. As the site of Taihe county government and Chengjiang county government, it is also one of distributing centers of agricultural byproducts in central south of Gang, Beijing-kowloon railway, 105 national road and 319 national road penetrate the county town from south to north, so the protected area of Taihe city is the key protected area of Shihutang navigation power junction.

In the protected area, water-collecting area is  $57.36\text{km}^2$ , among them hillside water-collecting area is  $33.32\text{km}^2$ , in this area, there is not foreign water system, surface relief is high in the east and low in the west, ground altitude is mostly between 57 and 62 meters. At present, the protected area has formed the basic system of flood control and water drain, main buildings include an embankment (protection embankment of county town), two stations (Dongmen drainage pump station and Huangjiaba drainage pump station) and three channels (Shangtian approach channel, Donggang approach channel and Centre surface drain), but operation of the buildings was poor, especially Donggang approach channel has been silted severely, local part of Centre surface drain has not been dredged, these two channels have not exerted their functions. Now there is a protection embankment impeding the northern bank of Ganjiang river, its is about 11.4km long, the height of embankment is  $63.53 \sim 66.26\text{m}$ , the protection of most parts of embankment reach the standard that flood occurs once in 20 years, local area including 3.4km still can not reach this standard.

Area of infection in Taihe county town are southern gate and northern gate, they are vegetable base and main living region of urban residents. Submergence area is  $5.67\text{km}^2$ , among which cultivated land is 4768 mu, the population of people who are influenced is 6988, and there is no backup condition around. According to *Urban Master Planning of Taihe county town (1999-2020)*, Taihe county will be a city and it will be developed to

a medium-sized cities in 2020. At that time, its population will reach 180 thousand. From 1999 to 2004, according to *Urban Master Planning of Taihe county town(1999□2020)* and related review opinion, water conservancy and design academy of Ji'an city has compiled *Feasibility Study Report of Taihe Country Town Flood Prevention Engineering* and *Initial Design Report of Taihe Country Town Flood Prevention Engineering*. Development and Reform Commission of Ji'an city has inflicted on them both, and has agreed the prevention flood planning and controlling flood project construction of Taihe county town. At present, city construction of Taihe county town has been implemented step by step according to master plan. According to the topography and geology of Taihe county town , adopting engineering consolidated method to protect urban area is necessary and feasible. It is also an important project to decrease loss of reservoir inundation.

#### 2.3.5.2 Survey of Wanhe protected area

Wanhe protected area belonged to submerged area before, it is on the right bank of Ganjiang river and next to the site of dam, it is also an important protected area of Shihutang navigation power junction. The topography of protected area is like a basic, area of rain collection is 51.32km<sup>2</sup>, among them area of rain collection in hillside is 19.40km<sup>2</sup>, in this area, there is not foreign water system, ground altitude is mostly 1.0m lower than reservoir normal water level, population is about 19 thousand, cultivated land is 23.3 thousand mu, this area is packed with buildings, and many houses are close to bank side. Now the flood protection embankments of reservoir area along Ganjiang river are low, poor quality and low standard, but they have formed an initial system of flood protection. Flood control standard of the embankment is that flood occurs once in 2 to 5 years.

#### 2.3.5.3 Survey of Jintan protected area

Jintan protected area belonged to submerged area before, it is on the right bank of Ganjiang river and face each other with Taihe county town protection area across the river, it is next to Zhangtang protection area and 15 km away from the site of dam, it is also an important protected area of Shihutang navigation power junction. Yunheting river is the largest foreign water system in the protection area, its basin area is 763km<sup>2</sup>, and its lower reaches is about 10km long, the exit of the river runs though the whole protection area, its channel parallels to the channel of Ganjiang river approximately, but it is perpendicular to Ganjiang river in the exit. Area of rain collection of the protection area is 61.38km<sup>2</sup>, among them area of rain collection in hillside is 22.19km<sup>2</sup>.In this area, ground altitude is about 56.60~62.00m, population is 18.6 thousand, cultivated

land is 23.6 thousand mu, this area is packed with buildings. There are only local flood protection embankments of reservoir area along Ganjiang river which are low and poor quality, and they have not formed an initial system of flood protection.

#### 2.3.5.4 Survey of along stream protected area

Along stream protected area belonged to submerged area before, it is on the left bank of Ganjiang river and face each other with Taihe county town protection area across the river, it is next to Taihe county town protection area and 4.0 km away from the site of dam, it is also an important protected area of Shihutang navigation power junction. In this area, surface relief is flat and step-shaped. Area of rain collection of the protection is 32.37km<sup>2</sup>, among them area of rain collection in hillside is 14.85km<sup>2</sup>. In this area, there is no foreign water system and it has one large and one small internal water system, which drain to Ganjiang river. Population is 5.1 thousand, cultivated land is 9.0 thousand mu, and many houses here are close to bank side. There are only local flood protection embankments of reservoir area along Ganjiang River which are low, poor quality and low standard, and they have not formed an initial system of flood protection.

#### 2.3.5.5 Survey of Zhangtang protected area

Zhangtang protected area belonged to submerged area before, it is on the right bank of Ganjiang River and next to Wanghe protection area, and it is 10.0km away from the site of dam. In addition, it is also an important protected area of Shihutang navigation power junction. Guanwanshui river is the secondary largest foreign water system in the protection area, it is constituted by Ningxi river, Xiancha river and Renshan river, and its basin area is 558km<sup>2</sup>, flow is large in flood season, Tongkou reservoir (middle-sized reservoir) is on the upper reaches of Renshan river. In Zhangtang reservoir area, the export of external water is small, but the hinterland is large, the shape of the reservoir area is like a cucurbit. It is the emphasis and difficulty of protecting reservoir bank of Shihutang navigation power junction. In this area, the area in which ground altitude is lower than 57.5m is 6.5km, population is about 3270, cultivated land is 8079 mu, there is a rather big inundation loss.

### 2.4 Investigation of immigrant families

#### 2.4.1 Investigation purpose

In October 2006 and September 2007, with the help of governments at all levels, the investigation of basic situation of social economy of immigrant families and immigrant

villages and the investigation of wishes of immigrants are implemented, at the same time, the investigation of peasant families of resettlement area and lost-land peasant families is also implemented. The goal is:

- (a) propagandizing the importance of this project to immigrants;
- (b) carrying on an investigation into influence degree of project to immigrants and the lost-land peasants;
- (c) soliciting opinions of immigrants, analyzing the will of resettlement families and lost-land immigrants and trying to consider their wishes in production arrangement plan and life recovery plan;
- (d) analyzing economic income and expenditure levels of immigrants, determining the goal of economic development of influence area and offering accurate basis for resettlement planning;
- (e) building a model for economic income of resettlement families and analyzing the changes of economic income between before resettlement and after resettlement.

#### 2.4.2 Contents of investigation

##### (1) Investigation of resettlement families

Investigation of resettlement families is classified into three categories. The first kind is the investigation of basic situation of immigrants. The second kind is the investigation of wishes of immigrants. The third kind is the investigation of income and expenditure of resettlement families

- (a) The contents of investigation of immigrants' basic situation mainly include general situation of family, material production of family, land family contract and so on.

**General situation of family:** include householder's name, sex, nation, habitat, labor, housing area and structure, cultivate land contract and so on.

**Material production of family:** material production includes land family contract, water area, family's industrial and sideline production, production machinery(include trucks and boats etc), means of subsistence include big house furnishings, televisions, fridges,

washing machines, video cassette recorders, fanners, air-conditions, motorcycles, bicycles, telephones, mobile telephones, computers etc.

(b) The contents of investigation of wishes of immigrants include current housing structure, drinking water, communications, residential electricity, fuels, traffic, hospitals, schools and employments etc. In addition, the contents of investigation also include immigrants' understanding degree to the project, their attitudes, acceptable lifestyle and produce-pattern, professions that they want to do, requirements of the new sites of their houses etc.

(c) Income and expenditure of family:

Income of family includes operation income and unearned income.

① Operation income includes planting industry, forestry, grazing, fishery and part-time jobs, □ Unearned income includes dividend of stock participating, presenting gifts, all kinds of subsidy and so on.

Expenditure of family includes productive expenditure, expenditure of taxes and fees and life expenses.

□ Productive expenditure includes seeds, chemical fertilizer, pesticides, seedlings, feed etc, □ Expenditure of taxes and fees includes agriculture taxes, hire of agricultural machinery, irrigation and burden of social obligation etc, □ Life expenses include foods, clothing, hats and shoes, daily necessities, books and newspapers, fuels, water and electricity, medical fees and so on.

(2) Investigation of peasant families of resettlement area and lost-land peasant families  
The investigation of peasant families of resettlement area and lost-land peasant families is the situation of their income and expenditure, their comprehension of the project, their wishes of resettlement and so on.

(3) Investigation of the village-level situation of social economy of resettlement

The investigation includes number of population, structure of population, living space per person, cultivate land per person and net income per person and so on of

administrative villages. In addition, materials information , such as cultivate land, hold land of the project, yield of cultivate land etc, situation of infrastructure, such as traffic, communications, water and electricity, cultural educational and hygiene etc, agricultural procreative resource, corporations ,degree of cultural education etc, are also included in the investigation.

#### 2.4.3 Investigation methods and process

(1) Investigation of the basic social and economic conditions of resettlement families adopts the mode of interview, investigation form is brought forward by design department, field investigation is carried out in resettlement villages under the coordination of owners and local government. Field investigation adopts the mode of interview and the investigation forms are filled in by designers, then immigrants put their signature on the forms. This project involves 169 resettlement households, including 597 immigrants. According to random sampling way, we extract 54 samples and they account for 32% of gross resettlement households. The distribution of samples region of resettlement household is shown as in table 2-5.

(2) Investigation of peasant families of resettlement area and lost-land peasant families is implemented through the form of questionnaire. Questionnaires are provided by design department, questionnaires are given to the respondents with the help of local government, and then investigation personnel recollect the questionnaires and analyze the effective questionnaires. This time 173 effective questionnaires are recollected, including 597 immigrants, it accounts for 28% of gross resettlement population of 2139.

(3) The investigation of the village-level basic situation of social economy of resettlement is implemented through sampling survey with collecting annual reports. Objects of survey are administrative villages that are influenced by the project. The village-level basic situation is shown as in table 2-6.

Table 2-5 Distribution table of samples region of resettlement household

town	administrative village	subscriber number	population	quantity of sampling survey	
		(door)	(people)	subscriber number	proportion
along stream	Caoping village	107	372	35	32.71□
	Gaoping village	2	10		
	minor total	109	382		
Wanghe	Pingshang village	15	48	12	85.71□
	Gaozhang village	9	25	2	22.22□
	Huwei village	6	20	1	16.67□
	Huangkeng village	2	8		
	minor total	32	101		
Tangzhou	Xiaoxi village	1	3		
	Tuzhou village	1	3		
	Zengjia village	1	5		
	minor total	3	11		
Chengjiang	Dongmen village	1	11		
	Beimen village	8	36		
	Xingling village	2	10		
	minor total	11	57		
Mashi	Shukou village	14	46	4	66.67□
Total of Taihe county		169	597	54	24.43□

Table 2-6

Questionnaire for the village-level basic situation of social economy of resettlement

town	adminis- trative village	subscriber number	population	labor	rural infrastructure				cultural educational hygiene			cultivate area		grain		oil		vegetable	
					car	tele- phone	broad- cast	elec- tricity	number of elemen- tary school	teacher	number of medical station	total area	per capita	plant- ing area	total yield	plant- ing area	total yield	plant- ing area	total yield
Wanghe town	Sangyuan village	389	1777	1013	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	3	1	2730	1.54	325	1318	136	141	5	64
	Pingshang village	538	2516	1434	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2	8	3	2370	0.94	278	1060	111	169	5	65
	Nanlong village	235	1104	629	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	2	1	1140	1.03	123	489	53	54	3	40
	Gaozhang village	320	1550	884	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	3	2	1335	0.86	160	620	65	66	3	39
	Huwei village	514	2452	1399	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	3	2	2340	0.95	268	1045	108	117	5	66
	Zhushan village	270	1547	881	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	2	1	2910	1.88	282	1107	124	120	4	54
	Huangkeng village	261	1188	677	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	2	1	3105	2.61	326	1316	146	153	3	40
	Dapeng village	415	1552	885	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	3	1	4605	2.97	473	1930	214	223	8	106
	Chixi village	309	2102	1198	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	3	1	2595	1.23	283	1132	121	126	4	52
	Zhongbu village	348	1454	829	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	3	1	2520	1.73	263	1063	118	122	4	53
	Xiashan village	498	2305	1314	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	4	2	3300	1.43	349	1459	153	158	4	52
	Tangwei village	412	1994	1137	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	3	2	3060	1.53	320	1294	142	149	5	65
Jiangnan village	396	1736	990	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	3	1	2850	1.64	342	1376	135	139	5	64	

Continued table 2-6

Questionnaire for the village-level basic situation of social economy of resettlement

town	adminis- trative village	subscriber number	population	labor	rural infrastructure				cultural educational hygiene			cultivate area		grain		oil		vegetable	
					car	tele- phone	broad- cast	elec- tricity	number of elemen- tary school	teacher	number of medical station	total area	per capita	plant- ing area	total yield	plant- ing area	total yield	plant- ing area	total yield
Wanghe town	Poxi village	326	1621	924	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	3	1	2685	1.66	333	1341	125	129	4	53
	Jiyi village	487	2281	1301	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	3	1	3015	1.32	377	1509	140	144	5	66
	Qianjin village	485	2034	1159	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	3	1	2895	1.42	370	1489	137	140	5	65
	Huagaisha n village	333	1522	868	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	3	1	2040	1.34	212	855	95	97	3	39
Chengji ang town	Huanggang village	397	1484	742	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	2	1	1883	1.27	209	890	2.7	0.8	2.0	45
	Nanzhen village	310	1132	657	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	2	1	1579	1.39	109	445	9.1	5.5	6.7	109
	Sanxi village	284	1094	555	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	2	1	1503	1.37	196	880	15.3	13	7.5	120
	Guanxi village	480	1680	850	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	2	2	1986	1.18	288	1181	2.7	1.6	13.4	201
	Xingling village	374	1566	856	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	2	1	1559	1.00	73	390	15.1	13	15.0	1502
	Dongmen village	737	2834	1669	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	2214	0.78	279	1255	6.1	3.6	1.0	156
	Nanmen village	1057	3876	2016	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	2	4	1729	0.45	7	17	0.0		112.8	2082
Wentian village	378	1391	699	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	2	1	1139	0.82	112	479	13.1	12.4	7.3	250	

Continued table 2-6

Questionnaire for the village-level basic situation of social economy of resettlement

town	adminis- trative village	subscriber number	population	labor	rural infrastructure				cultural educational hygiene			cultivate area		grain		oil		vegetable	
					car	tele- phone	broad- cast	elec- tricity	number of elemen- -tary school	teacher	number of medical station	total area	per capita	plant- ing area	total yield	plant- ing area	total yield	plant- ing area	total yield
Tangzh ou town	Zhoutou village	728	2756	1708	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	3	3	4500	1.63	292	1250	85	105		
	Zhujia village	483	2155	1272	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	3	1	3135	1.45	125	890	95	88		
	Shangpeng village	310	1165	674	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	2	1	615	0.53	10	15	25	5		
	Hejiang village	558	2328	1322	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	3	2	2580	1.11	152	960	60	39		
	Shangzhou village	290	1099	661	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	2	1	780	0.71	10	13	20	3		
	Huangtang village	438	1742	1027	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	3	1	4590	2.63	496	3050	115	106		
	Xiaoxi village	357	1438	835	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	2	1	2850	1.98	211	1050	90	63		
	Zengjia village	375	1818	1091	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	2	1	3330	1.83	303	1238	98	79		
	Donghu village	328	1332	778	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	2	1	2550	1.91	195	724	80	55		
	Xinping village	351	1355	783	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	2	1	2925	2.16	260	1042	82	62		

Continued table 2-6

Questionnaire for the village-level basic situation of social economy of resettlement

town	adminis- trative village	subscriber number	population	labor	rural infrastructure				cultural educational hygiene			cultivate area		grain		oil		vegetable	
					car	tele- phone	broad- cast	elec- tricity	number of elemen- -tary school	teacher	number of medical station	total area	per capita	plant- ing area	total yield	plant- ing area	total yield	plant- ing area	total yield
										person		mu	mu	hm <sup>2</sup>	ton	hm <sup>2</sup>	ton	hm <sup>2</sup>	ton
Along stream town	Shijian village	342	1215	608	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	3	1	2025	1.67	202	845	147	148		
	Heshu village	414	1706	821	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	3	2	3810	2.23	287	1282	145	143		
	Caoping village	225	1012	530	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	2	1	1876	1.85	25	120	100	101		
	Gaoping village	343	1215	608	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	3	1	1770	1.46	179	697	127	125		
	Leshan village	288	1061	1086	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	2	1	2100	1.98	174	751	87	88		
Mashi town	Shukou village	817	3186	1652	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	9	3	2565	0.81	273	1064	70	71	5	66

## 2.4.4 Results of analysis on samples

### 2.4.4.1 Population and family

Rural resettlement: average population of each family is 4.3, among them 98% is agriculture population. Proportion of male and female is 0.96: 1. In the structure of age, labor of 17 to 60 years old is 60% of gross population, the other 40% have no or incomplete labor ability.

### 2.4.4.2 Family possessions

Rural resettlement: average housing area of rural resettlement is 138.4m<sup>2</sup> during survey, living space per person is 37.6m<sup>2</sup>,cultivate land per household is 7.3 mu, cultivate land per person is 1.92 mu, among them dry land is 81%,paddy field is 19%.Every 100 household resettlement have 8.3 family industrial and sideline productions .

Family possessions: Every 100 household resettlement have 337.5 pieces of large furniture and 200 televisions(among them, the number of black white TV set is 112.5,the other are color TV ), 16.7 fridges,66.7 video disk players,341.7 fanners,62.5 radio cassettes,145.8 mobile telephones,83.3 fixed telephones,16.7 computers,83.3 motorcycles,220.8 bicycles .4.2% family possess agriculture vehicles , tractors, boats and large agriculture equipments, every 100 household resettlement possess 237.5 cattle or sheep , 262.5 pigs or rabbits, 1466.7 chickens or ducks.

### 2.4.4.3 Family income and expenditure

Rural resettlement: annual per capita income of peasant is 4841.81 yuan, primary industry is 47.4% of gross income according to source, family business accounts for 11.9%, temporary employment accounts for 31%; we can see that local primary industry (agriculture, forestry, grazing, fishing) and temporary employment are two main peasant income ways.

Annual per capita total expenditure of peasant is 4425.24 yuan, among them average production expenditure per person is 892.89 yuan, it accounts for 20.1%; Average

consumption expenditure per person is 3084.16 yuan, it accounts for 69.7%. From table 2-7, 2-8 we can see that the model of income and expenditure of rural resettlement in project area may reflect their average living level.

Table 2-7 Investigation of average personal income of rural resettlement

project	basic situation		
	unit	quantity	proportion in annual gross income
1,operation income	yuan	4665.65	96.36%
income of primary industry	yuan	2294.18	47.38%
income from household business	yuan	575.63	11.89%
income from part-time job	yuan	1498.75	30.95%
wage and bonus	yuan	206.89	4.27%
other operation income	yuan	90.2	1.86%
2,non-operation income	yuan	176.16	3.64%
gross income	yuan	4841.81	100.00%

Table 2-8 Investigation of average personal expenditure of rural resettlement

project	basic situation		
	unit	quantity	proportion in annual gross income
1,productive expenditure	yuan	892.89	20.10%
productive expenditure for agriculture	yuan	749.41	16.90%
cost of secondary industry	yuan	98.83	2.20%
cost of tertiary industry	yuan	44.65	1.00%
2,basic production assets	yuan	53.86	1.20%
3,expenditure of tax	yuan	19.01	0.43%
4,life expenses	yuan	3084.16	69.70%
mian and supplementary foodstuff	yuan	1649.08	37.30%
dress, shoes and cap	yuan	202.33	4.60%
daily practice sundry goods	yuan	344.68	7.70%
book and news tuition fee	yuan	355.81	7.80%
transportation and communication fees	yuan	359.89	8.10%
medical fees	yuan	129.65	2.90%
5,expenditure for property and transfer	yuan	375.32	8.50%

gross expenditure	yuan	4425.24	100.00%
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#### 2.4.4.4 Infrastructure

The infrastructure construction situation of rural emigration: living space per person is about 37.6m<sup>2</sup>, 54% of which are brick-concrete houses, 46% of which are brick-wooden houses. Rural drinking water is well water, using artesian diversion mode. Rural communication is developed. There are communication facilities such as broadcast, TV, telephone, mobile phone and so on in each family. Most rural labors have junior high school culture degree. The persons who have grade school culture degree and having no degree account for 26.5% of the total, and it is about 17.7% people have the degree of high school or above. Enrollment rate of right age children reaches 100%. 12.5% fuel is biogas, and 87.5% fuel is firewood. The use of power can be guaranteed basically. There are opened to traffic roads in every village, making traffic convenient. It is convenient for villagers to go shopping and hospitalize. Generally, they can be treated in township hospital.

#### 2.4.4.5 Emigrate consciousness

The most concerned issues of rural emigration: 21% persons care whether they can get sufficient compensation or not. 46% persons care whether the compensation can be provided according to standard or not. 8% persons care whether the resettlement is idea or not. 25% persons care whether it will affect their production or income after they emigrate. Old migrants care more about the latter two. Young migrants care more about the former two.

The first requirement of migration for rural emigration: 84% persons hope good living conditions. 8% persons hope many employment opportunities. 8% persons hope good educational conditions and common language. Most women hope good living condition. Most men concern many employment opportunities and good educational conditions.

The best transport mode for rural emigration: 33% persons hope that the entire village lives in the same place. 21% persons hope the people of the same surname live in the same place. 29% hope the same group lives together. It doesn't matter for 17% persons. The most hopeful industry they want to engage in for rural emigration: 88% persons prefer to engage in their own agricultural production. 12% persons hope to engage in business or working in city.

The main communicated relatives for rural emigration: all migrants hope it will be the same as former.

The best resettlement mode for rural emigration: 64% persons hope to build their own

house by themselves. 30% persons hope to live in self-building in district. 6% persons hope to build special residential district.

The understanding in pivotal project for rural emigration: almost all people know or quite know.

The support attitude about pivotal project for rural emigration: almost all people support it.

The message about emigration for rural emigration: 12% persons know a lot or more. 88% persons know a few. Men know more than women.

The ways they know about pivotal project for rural emigration: 33% know it at meeting. 67% persons know it by other ways.

#### 2.4.4.6 Residents at resettlement region and project impact

As is known by interviewing and investigating in planning resettlement region, 92% persons support the construction of this project, and they welcome those who immigrate in their village. They believe that it will promote economic development and improve local conditions of infrastructure by resettling immigrants. There are 8% persons who have some other thought. They mainly worry about whether immigrants will impact the existing interests of native dwellers or not.

#### 2.4.4.7 Farmers losing farmland and project impact

Among villages (53 villages) influenced by this project, 2910.5 mu farmland are occupied, accounting for 6% total farmland in requisition villages (48 villages). There are line and partial impact of this project by building new dike, reinforcing them or some other protection engineering except individual village. The impact of expropriation and housing removal is dispersed. Expropriation takes a pretty small proportion in the whole project, which will bring little adverse effect to local industrial and agricultural production, people's living and social economic development.

As is known through the questionnaire of farmers losing farmland, 95% of them understand and support the construction of this project. 26% of them think that land expropriation of project construction will impact their own income, and 74% of them think it will not. There are 33% farmers' income mainly depend on farmland. Land expropriation will impact them a lot. Farmers losing farmland agree with the planning

production resettlement measures (adjust farmland, improve medium and low-yielding farmland, develop breeding industry and so on). 91% of them think these measures are reasonable and feasible. And they can restore and increase their income. 57% farmers will take other measures to increase their income after land resources decrease including the secondary and tertiary industry, working out and so on. Farmers (45%) concerned whether the production resettlement fund will arrive or not firstly, coming next is whether the production resettlement mode is reasonable and reliable or not, which accounts for 32%.

#### 2.4.4.8 Women and project impact

The present of women's situation at the place of this project is of typical Chinese rural characteristic. Women can basically participate in social economic activities equally to men. Most of them stay at home looking after their family and managing farm work. They stick to the the principle of male first on employment opportunity. On politics, women's political status is improving gradually in project impact region. The proportion of woman cadres, consciousness of women's participation in politics and social activities, consciousness of women's right are enhanced gradually. On education status, women can basically get educational opportunity equally to men. On marriage, its form mainly includes free amativeness and introduction. Elder family members don't arrange marriage any more.

The impact of this project construction for women mainly shown as follows: In economy, project construction has to occupy fields. The decrease of fields will lead to less household sideline production income. 28% women think this project construction will bring opportunity engaging in non-farm economy activities to them. On politics, women's right consciousness will be awaked further. Participation consciousness will be strengthened further. They will concern more about social public affairs. The impact is mainly positive. There is no negative effect to women's education and marriage status.

#### 2.4.4.9 Weak groups and project impact

There is no inhabitation place of minorities in this project region. Individual minority would manage han, and they have already integrated into han culture. They will not be regarded as weak groups or local aboriginals because of their race.

Weak groups this project refers to mainly include isolated elders household, main labor disability and deficient male exertional household. There are four households which account for 2% of total removal households. It has to consider the social economic life

characteristics of vulnerable groups in resettlement process and make sure that expropriation and removal will not decline their life level. At the same time, it has to care more about them on policy and compensation, giving each weak group household 5000yuan for extra allowance.

### 3. PROJECT IMPACT

#### 3.1 Summary

It points its necessity of project construction out in front. It mainly discusses loss and potential negative effect due to this project construction. This is one of the most important parts in this report.

From July to September in 2007, water conservancy and design academy Jiangxi province, Zhujiang river reconnaissance planning design ltd of Chinese water, owner and previous office reexamines the real object index effected by expropriation roundly under the coordination of local relevant departments. The reexamination modes shown as follows: using the results of removal scope of feasibility research when it is in the phase of feasibility research. If feasibility research design dike line changed, using newly added removal data. Project impact refers to 597 persons of 169 households in five townships, 53 administrative villages in Taihe County.

There are line and partial impact of this project by building new dike, reinforcing them or some other protection engineering except individual village. It brings little adverse effect to local social economic development. Emigrants are impacted because of removal and resettlement. It must take some economy adjustment measures due to the decrease of farmland.

#### 3.2 Impact region in this project

##### 3.2.1 Reservoir submerged area

###### 3.2.1.1 Design standard of reservoir inundation treatment

According to regulation performance of reservoir, importance of submerged objects and its original flood control standard, using different standards shown as follows according to different submerged objects of Shihutang reservoir:

Urban of Taihe county: P=5%

Town and rural residential area: P=10%

Farmland, garden plot: P=50%

Forest land and unutilized land: according to reservoir normal water storage

General special facilities:  $P=10\%$

Special objects (such as grade highway, optical cable):  $P=5\%$

### 3.2.1.2 Dispatching operation modes of reservoir

Dispatching operation modes of flood is indicated by upstream flow in Shihutang navigation hydropower junction engineering. The concrete modes are as follows: close flood control sluice at Guanyuanshui outlet (open flood control sluice in drainage canal at Guanyuanshui, incoming water drainages to Gan river dam site's downstream through the canal) when the upstream flow at Dongbei station less than critical flow ( $4330\text{m}^3/\text{s}$ , relevant to  $4700\text{ m}^3/\text{s}$  at Shihutang dam site) and the flow at Guanyuanshui outlet less than critical flow ( $70.0\text{ m}^3/\text{s}$ ). Close or open part of release sluice, making sure water level in front of dam maintain on normal pool level (56.5m), which meets the profiting requirement of every department. Close flood control sluice at Guanyuanshui outlet (open flood control sluice in drainage canal at Guanyuanshui) when the flow at Dongbei station greater than or equal critical flow and flood still has an ascending trend, but the flow at Guanyuanshui outlet less than critical flow. Open all release sluices, decline water level in front of dam. Open both flood control sluice at Guanyuanshui outlet and release sluice (close flood control sluice in drainage canal at Guanyuanshui at the same time) when the flow at Dongbei station and Guanyuanshui outlet are both greater than or equal critical flow and flood still has an ascending trend. Canal keeps natural status basically.

### 3.2.1.3 Sediment deposition

Sediment content in water flows is low, and it is fine sediments in Gan river. Annual average total Sediment Transport is about  $428 \times 10^4\text{t}$  at Shihutang dam site. Viewing from project general layout, dispatching operation modes and reservoir type, flow shape change little compared to natural situation, but sediments are finer. Sediments don't easily deposit at the end of reservoir, and most sediments from upstream can be discharge out of reservoir with flow. Backwater in Shihutang reservoir is quite long. Bed load don't easily move to the front of dam. The bed load in front of dam will be discharge out of reservoir with flow because of low bottom elevation of discharge sluice, which is favor of discharge sediments. So sediment body will be a small delta in Shihutang reservoir. There will be little sediments at the end of dam and the front of

dam. Sediment deposition has little effect on both flood surface line and operation of this project.

#### 3.2.1.4 Range determination of reservoir inundation treatment

According to regulations in Water and Hydropower Engineering Construction Expropriation and Migration Design Code, it has to determine range of immersion, bank failure and landslide on the spot based on geological data.

Location of pinch-out point: terminal of backwater is at the place where natural flood level of the same frequency is not higher than backwater of reservoir for 0.3m. The end of reservoir takes horizontal extension close.

This project is low dam navigation hydropower junction project. Because of the long duration of normal pool level and the impact of wind wave and ship wave, in front of dam where the effect of backwater is not significant, population migration line value higher than normal pool level for 1.0m connecting to backwater surface line, and land expropriation line value higher than normal pool level for 0.5m connecting to backwater surface line to keep safe.

According to calculated results of surface line, after building gate dam and protection embankment, if flow at Shihutang dam site greater than critical flow  $4700\text{m}^3/\text{s}$  (relevant to flood flow meeting once two years after flood) or the flow at Guanyuanshui outlet greater than critical flow ( $70.0\text{ m}^3/\text{s}$ ), open all release sluices. the difference value between level along river and natural level of the same frequency is less than 0.3m. If the flow at Shihutang dam site is less than critical flow  $4700\text{m}^3/\text{s}$ , and the flow at Guanyuanshui outlet is less than critical flow ( $70.0\text{ m}^3/\text{s}$ ), water level in front of dam maintain on normal pool level 56.5m.

According to dispatching operation modes of flood in Shihutang navigation hydropower junction engineering and calculated results of reservoir backwater, based on backwater submerged envelope curve in flood season and non-flood season, determine calculated results of reservoir backwater shown as in Table 3-1 and Table 3-2.

The end section of reservoir backwater is near Guojia Shigan CS18 section. Population migration and expropriation are pinched out according to 60.50m elevation extending to natural level of the same frequency.

Because it will build flood control sluice at Guanyuanshui outlet, according to such

factors as design water level for storm drainage of Guanyuanshui branch, determination modes of lock-release critical flow, dispatching operation modes of flood and so on, land expropriation line is 54.3m, population migration line is 54.8m in Guanyuanshui branch.

According to rang of inundation treatment mentioned above, reservoir backwater is about 38.19km long when the normal water storage is 56.5m at upper dam site.

Table 3-1 Achievement table about design water surface line of Gan River branch (unit: yellow sea · m)

the number of section	location	distance from starting point (m)	water surface line in flood season						critical flow (4700m <sup>3</sup> /s, corresponding to P=50% in non-flood season)			normal water storage 56.5m	
			natural surface line			build sluice dam			natural surface line	build sluice dam		population migration line	land expropriation line
			P=5%	P=10%	P=50%	P=5%	P=10%	P=50%		after opening sluice	before opening sluice		
Shi upper dam site	Jiangjiazhou	0	58.39	57.58	54.99	58.55	57.71	55.07	52.40	52.40	56.50	57.50	57.00
Shigan CS4	Yinxiajiang	2040	58.69	57.89	55.36	58.89	58.09	55.48	52.75	52.84	56.58	57.50	57.00
Shigan CS5	Gaozhang	4000	58.99	58.18	55.61	59.21	58.42	55.75	53.04	53.14	56.65	57.50	57.00
Shigan CS6	Sunjia	6130	59.32	58.52	56.02	59.54	58.78	56.19	53.43	53.57	56.74	57.50	57.00
Shigan CS7	Zhushan	9160	59.77	59.04	56.95	59.98	59.27	57.00	54.05	54.23	56.94	57.50	57.00
Shigan CS8	Huangkeng	11110	60.06	59.37	57.44	60.26	59.58	57.48	54.46	54.60	57.10	57.50	57.10
Shigan CS9	Xinju	13870	60.51	59.85	57.95	60.70	60.06	58.02	55.13	55.16	57.32	57.50	57.32
Shigan CS10	Kangjiahu	16320	60.91	60.27	58.28	61.09	60.49	58.41	55.66	55.61	57.48	57.50	57.48
Shigan CS11	Pengxia	18860	61.33	60.71	58.58	61.47	60.88	58.74	56.00	55.98	57.65	57.65	57.65
Shigan CS12	Xiazhou	21560	61.78	61.20	59.16	61.91	61.34	59.29	56.63	56.59	57.95	57.95	57.95
Shigan CS13	Yongchang	24240	62.28	61.69	59.69	62.39	61.81	59.81	57.28	57.34	58.29	58.29	58.29
Shigan CS14	Gaocheng	27540	62.92	62.30	60.19	63.02	62.41	60.29	57.88	57.86	58.61	58.61	58.61
Shigan CS15	Zhoutou	30440	63.49	62.83	60.63	63.58	62.94	60.72	58.31	58.28	58.93	58.93	58.93
Shigan CS16	Shukouzhou	33340	64.12	63.43	61.16	64.23	63.56	61.27	58.91	58.92	59.43	59.43	59.43
Shigan CS17	Pengzili	35840	64.67	63.94	61.72	64.77	64.09	61.83	59.63	59.62	59.99	59.99	59.99
Shigan CS18	Guojia	38190	65.20	64.45	62.30	65.29	64.59	62.38	60.27	60.23	60.50	60.50	60.50
Shigan CS19	Chengzhou	40840	65.78	65.02	62.95	65.86	65.14	63.00	60.95	60.88	61.06		

Table3-2 Achievement table about design water surface line of Xinkaiyunting River

the number of section	location	distance (km)	design water level (yellow sea · m)									
			P=5%		P=10%		P=20%		P=50%		Q=4700m <sup>3</sup> /s	
			present situation	backwater	present situation	backwater	present situation	backwater	present situation	backwater	present situation	backwater
Yun CS3'	Xinkai River Estuary	0	61.91	62.03	61.32	61.46	60.65	60.75	59.29	59.42	56.78	58.04
Yun CS4'	Heqiuguo	0.80	62.08	62.18	61.49	61.60	60.79	60.89	59.35	59.48	56.89	58.09
Yun CS4	Songjia	1.82	62.25	62.35	61.64	61.75	60.95	61.04	59.44	59.56	57.08	58.19
Yun CS5	Tongling	3.67	62.51	62.59	61.87	61.97	61.13	61.21	59.60	59.70	57.48	58.42
Yun CS6	Zhouzishang	5.12	62.81	62.88	62.15	62.23	61.40	61.47	59.88	59.98	58.09	58.75
Yun CS7	Gaoxian	6.92	63.43	63.49	62.75	62.81	61.98	62.02	60.53	60.57	59.35	59.62
Yun CS8	Cunbei	8.28	63.83	63.87	63.18	63.23	62.44	62.47	61.08	61.10	60.14	60.27
Yun CS9	Xinju	9.66	64.40	64.43	63.87	63.89	63.28	63.29	62.47	62.48	61.97	62.00
Yun CS10	Jiangxia	11.23	65.52	65.52	65.08	65.09	64.61	64.62	63.78	63.78	63.36	63.37
Yun CS11	Bengkan	12.60	66.54	66.54	66.16	66.16	65.70	65.70	64.91	64.91	64.56	64.56
Yun CS12	Fujia	14.20	67.42	67.42	67.10	67.10	66.71	66.71	66.00	66.00	65.58	65.58
Yun CS13	Zhengkengkou	15.30	68.35	68.35	68.09	68.09	67.73	67.73	67.07	67.07	66.74	66.74

### 3.2.2 Engineering affected area

#### 3.2.2.1 Pivot engineering affected

Pivotal project holds land mainly including dam and power house, production, the engineering precinct and the permanent road, living land etc.

#### 3.2.2.2 Dike engineering affected

In the reservoir of Shihutang, the farmland (population) is more concentrated along the river, the agriculture economy more developed, the reservoir region submerging loss much, so adopting protective project to protect it is suitable. The total length of the protective project's dike-line was 40.89km, where the length of Taihe county town was 3.17km, and Wanghe was 9.5km, Zhangtang was 1.07km, Jintan was 15.93km, Yanxi was 11.22km. The dike engineering affected area mainly was in the design of the section range of the dike and the drain affected area after the dike.

#### 3.2.2.3 Drainage engineering affected

Drainage Engineering affected was mainly the guide-entrust (row) channel and the storm drainage electric power station affected, the total length of the five guide-entrust (row) channels was 57.34km, where newly-built guide-entrust (row) channel was 25.44km, the renovation of the guide-entrust channel was 14.67km, the dredging and restoration of the guide-entrust channel was 17.23km, the total area of the flowage was 69.74km<sup>2</sup>, every protective area except the flowage other low-lying areas use electric power station, five protective areas set 6 electric drainage stations, the total area of the storm drainage was 124.95km<sup>2</sup>, the total installed capacity was 6174kw, the length of the refitting storm and diversion canal was 11.85km.

### 3.2.3 Protection area

In order to maximally reduce the effects of the reservoir's flood on the local national economy and ecological environment, and reduce the land submerged and the number of the immigrant, according to the condition of the topography and geology of the reservoir area, the dyke project in the five protection area in Taihe, Wanghe, Yongchang, Yanxi, Zhangtang was constructed or settled to protected, totally reducing the 57 thousand of persons relocated, and preserving farmland 65.8 thousand mu, by adopting the Lift the Field protecting measure to protect the basic farmland of the Xinzhou isolated island, Jintangulin and the left bank's shallow reservoir zone of the

Zhiliuyuntinghe River and Mashi town in the tail of the reservoir, the submerged farmland was totally reduced 1911.19mu (Xinzhou isolated island was 224.45mu, Jintangulin 54.4mu, the left bank's shallow reservoir zone of the Zhiliuyuntinghe river 625.34mu, Mashi town in the tail of the reservoir 1007 mu).

### 3.3 Re-check process

According to national professional standard and technical requirement, namely Hydropower Project Construction Immigrants Of Land Requisition Design Status (SL290-2003) and Hydropower Project Reservoir Submerged Index In Kind Investigation Bylaw (1986), Water conservancy and design academy Jiangxi province realized the reexamined syllabus of the project in July 2007. From July to September 2007, with the coordination of the local government and the civil administration, the water management, the land management, the environmental protection management, the statistical management and the related departments, adopting town (township, yard), village, small group of peasants as its basic unit, impacts of the population, land and building on the project construction were re-checked in details. Due to make the re-checked process fair, impartial, open and the immigrants field involved in, the investigation results obtained the affected population and the unit signature and accreditation, and getting the local all levels government approval.

### 3.4 Re-checked contents and methods

The re-checked contents are as follows: urban-rural residential population, the land, the village small-size sideline and water facility, sporadic fruit tree, enterprise and institutions, special facilities (power transmission and transformation, electric wire, communication Line, various pipelines, railway, highway, bridge, water facility and cultural relics).

#### 3.4.1 Population re-checked

Population re-checked (including Non-Agriculture Population in rural area) was based on the local public security sector providing household registration book in the residential site, checking with registering household head and family number. Non-registered excess births, the directional enrolled graduates whose registered residents were temporary roll-out, were back to home, compulsory serviceman and re-education through labor in re-checked population after obtained the proof of the township's government, were able to follow household head registered, and given some specific examples in remark column to illustrate. The people who had the housing property right

but not household registration and the non-household registration contract labour were moreover statistics. Several problems worthy of note in population survey as follows:

(1) For the people who possess the house property on the upper and lower submerged line, if long-term lived on the lower submerged line, then the population are inflicted upon registration, otherwise they are not registered.

(2) For the people whose residential certificate were took off for working outside or lost, it needs village committee, small town government sign opinion and the police station open the proof of the residential certificate.

(3) For the people who renting house resident in the reservoir zone and have the residential certificate, are registered, otherwise they are not registered.

(4) The married women whose residential certificate has not emigrated still resident in hometown, then they are inflicted upon registration.

(5) The married daughters' residential certificate has not emigrated, and the son-in-laws' residential certificates emigrate their wives' address, then they are inflicted upon registration.

(6) According to Marriage Law, factual marriage needs the proof of the village committee, small town government signing opinion, the police station open the proof of the residential certificate.

(7) After retirement, the people who are supported by their child but their household registration is not in the reservoir zone are not registered.

(8) The layoffs who return to hometown go in for agricultural production, but the residential certificate still preserves in the primary unit, and they who have laid-off with license and the related proof of the local government are inflicted upon registration.

(9) For the natural and man-made calamities or other reasons, this people who came over to the relatives in the reservoir zone long-term live together, but their residential certificate has not emigrated and they have the related proof of the local government are inflicted upon registration.

(10) The people who are supported by their child but their in the reservoir zone are registered.

(11) The people whose household registration has emigrated other town are not registered.

(12) In the re-checking, the staff, officer, students of colleges and secondary technical schools, foreign students etc whose relationship of the household registration is in the other place , grown or has sedentary living in the local, and in principle they are nor included in the population migration, if having the building removal, then only figuring in the building etc.

In the process of the re-checking, the weak community (the elderly and disabled people is the five-guarantee households, the main exertional disability household is the disabled with license, the lack of the male exertional household is widow) should be paid special attention to and be clearly indicated in the register form.

#### 3.4.2 The Building and auxiliary structure re-checked

According to the actual condition of the local building, the reexamine and statistics is based on the related regulations of Regulations of Submerged Objects Index of Reservoir Survey in Hydropower Projects. Auxiliary structure is statistical by square meter or number.

##### 3.4.2.1 Houses classified

(1) Property classified: according to the ownership and the membership relation, the building is divided into three types: private, collective owned and state owned.

(2) Structure classified: according to the materials of load-bearing members, the building is divided into three types: framed building, brick concrete building, brick and log building, mud and log building, miscellaneous building, and the similarity class should be merged as possible.

##### 3.4.2.2 Calculation of the area of the building

The building architecture area is calculated by square meter, measuring the building area which is enclosed by the edge of the outer wall over the plinth of the building (not the eaves of the building or the dripping boundary).

The area of the floor is calculated according to the following formula:

$$S=A \times B$$

S —— the area of the floor

A —— the support area, namely the building area of the first layer

B —— the conversion factor

The methods of the conversion area calculation of the floor:

□ The storey height of the floor (the floor slab to the contact point of the roof and outer wall ) is over 2.1 m (including 2.0 m), and if the floor slab, four sides, door and window are complete, then the area is calculated according to the whole layer.

□ The storey height of the floor is from 2.1 m to 1.8 m, then the layer area is calculated according to the conversion factor which is 0.8.

□ The storey height of the floor is from 1.8 m to 1.5 m, then the layer area is calculated according to the conversion factor which is 0.6.

□ The storey height of the floor is from 1.5 m to 1.2 m, then the layer area is calculated according to the conversion factor which is 0.4.

□ The storey height of the floor is less than 1.2 m, then the layer area is not calculated .

The interior patio and the eaves without column, rain awning, temporary salsa (cover), stair of the outdoor are not calculated in the area of the building.

The calculation of the corridor of the outdoor: these which have no pillar are nor calculated in the area; the calculation of the other is half of the area enclosed by the outer pillar, and it is figured in the area the building.

Regardless of the high, the calculation of the one-story building area is based on one layer.

The area of the balcony and bartizan is calculated in half, but the enclosed balcony and bartizan is all figured into the area of the building.

The building under construction which was approved by the government department in

charge of the urban construction, is based on the image, progress to determine the building area, and give specific examples to illustrate. The building the foundation of which has built is registered by one third layer, half-layer registered by one layer, one-and-a-half Layer registered by two layers.

#### 3.4.2.3 Auxiliary structure

They include brick (stone) fence, concrete drying yard, well, pool, cellar, biogas pool, manure pit, powder pen, general focus, energy economy cooking stove, grave and other temporary building. The fence was set at the area of the facade, the concrete drying yard was set at the level area, the pool was ser at cubic volume, and other were ser at the number.

The migration of population and house in this project are in summary table shown as in Table 3-3.

#### 3.4.3 Check of land

##### 3.4.3.1 Land classification

The ownership of lands belongs to the nation or the community. It can also be divided into three types as agriculture land, construction land and unused land. Lands of every administrative village are investigated basing on horizontal projected area and calculated by mu standard □ 1 mu=666.7 square meter □.

Agriculture lands (ditch, drainage, roads and ridge, width of which is less than 1.0 m, are contained) can be divided into farmland, garden-plot, forest land, grassland and other lands.

Construction land can be divided into traffic land, residential land, special use land and so on. Unused land are those lands except agriculture land, construction land and water area.

##### 3.4.3.2 Calculation of the area of acquisitioned land

Various statistical areas of land occupied works was diagramed for units to groups of villagers, according to the 1 / 1000 and 1 / 2000 category topographic maps of the reservoir area measured by the Water Resources Planning and Design Institute of Jiangxi Province. It is based on the scope of area which should be treated for the

reservoir inundation, protection project arrangement designed and its area according to the reservoir water line, combining the project area 1 / 10000 land use map. Various land type and village boundary are verified at the scene with the topographic map (The village has been recognized).

Summary of land acquisition can be seen in Table 3-4.

#### 3.4.4 Enterprises and institutions review

Investigate the basic situation and project occupancy within the area acquired by enterprises and institutions involving the area of dike, reservoir inundation and the project. Physical indicator reexamination includes area occupying the flats, workshop or building name, area and structure of housing, location, competent departments, economic nature, building date, commissioning date, actual value of fixed assets and net, operating (output of main products, annual output value, major markets, sources of raw materials and fuel, and collaboration of interdependence between plants), population of the region and so on.

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Summary of demolition of housing and ancillary buildings can be seen in Table 3-5.

#### 3.4.5 Special facilities review

Professional project includes mining industry and transport facilities, power transmission and conversion facilities, telecommunication facilities, radio and television facilities, water conservancy and hydropower facilities, various types of pipes and so on.

##### 3.4.5.1 Power transmission facilities review

Affiliation with transmission lines, voltage grading, specifications of lines and length of covering lines should be identified. Substation review their PSA levels, capacity and substation facilities, equipment.

##### 3.4.5.2 Telecommunications facilities review

Line name, grade, specification, affiliation, location and the length of pole within the area (only search trunk line length of urban lines) should be identified. Post Offices (agencies) reexamine transform machine capacity, equipment, number of facilities.

### 3.4.5.3 Radio and television broadcasting review

Line name, O-D location, affiliation, building date, voltage occupying locations, voltage occupying length, technical specifications of line (material and length of pole and line specifications) should be identified.

### 3.4.5.4 Various pipelines

Various pipelines include gas, oil and water pipelines. Names of different pipelines, affiliation, diameter, material quality, transportation capacity, O-D locations, pipeline length and the number of facilities within the area should be identified.

Summary of physical indicators for the above survey is shown in Table 3-6, Table 3-7.

## 3.5 Affected population within acquisitioned area

The number of population relocated because of land requisition is 597, totally 169 families. They are all rural residents. Agricultural population is 581, which takes 97.3%. The total number of people affected by the land requisition is 2191. They need to be resettled.

Through works of new or reinforced embankments and other such protective works building, the major impact of the project is linear and local except in individual villages. The impact on land demolition is rather scattered. Compared with the entire project area, the proportion of land requisitioned is smaller. Adverse effects on local industrial and agricultural production, people's life and socio-economic development is also small. (shown as in Table 3-3, Table 3-4)

Rural residents will be resettled in or near village within 2 km. Social system and the impact on the social and production system will be reduced to the minimum.

There are no setting places of minorities within the land requisitioned. The individual minority may have been married with han and has integrated into Han culture. They will not be considered weak groups or native as a result of racial reason, so OD4.20-indigenous population does not apply to this item.

Weak groups, a total of four, are mainly childless elderly people, disabled households and the male labor shorted households. They take 2% of the total number of demolition. These families are affected by a greater impact on the demolition project. It is more

difficult for them to build new houses after the demolition. Their housing subsidies should be increased when resettled.

### 3.6 Impact of land and property

#### 3.6.1 Land acquisitioned by projects

2910.5 mu cultivated land has been acquisitioned permanently by the item (147.5 mu for the project, 2763.0 mu for reservoir inundation and protection, drainage works, 990.1 mu for paddy field), which causes food losses 601.74 tons per year. 6.2 mu corner, 313.0 mu of fish ponds (3.5 mu occupied by project), 1469.6 mu forest returned from farmland, 282.2 mu economic forest, 254.4 mu timber land (72.0 mu occupied by project), 327.5 mu woodland, 188.0 mu land for settlement, 128.9 mu traffic land, 3341.2 mu unused land (252.0 mu occupied by project), 32434.8 mu unused state-owned beach and river have been acquisitioned by permanent. There is a total of 41656.4 mu above.

In addition , 4954.0 mu land will be temporarily occupied for construction, of which there are 3998.0 mu temporarily covered for reservoir engineering .It includes 20.0 mu paddy, 779.61 mu dry land , 1199.4 mu woodlands and 1999.0 mu unused land . Temporary land requisition takes a period of two years. 956.0 mu land will be temporarily acquisitioned by the project, including 53.0 mu paddy, 328.0 mu dry land , 282.0 mu woodlands, and 293.0 mu unused land .Period of temporary land requisition takes four years. Compensation will be paid according to crop losses and rehabilitation costs.

#### 3.6.2 Demolition of housing and construction subsidiary

The demolition area for housing construction is 35093.6 m<sup>2</sup>, of which enterprises take 7.1 percent, 2477.2m<sup>2</sup>, resident housing taks 92.9 percent, 32616.4 m<sup>2</sup>.

##### (a) Shelter residents

Total area for resettled residents of this housing project is 32616.4 m<sup>2</sup>, of which there are 241.4 m<sup>2</sup> framework housing ,10843.6 m<sup>2</sup> masonry housing ,15211.3m<sup>2</sup> brick and wooden housing ,2711.3 m<sup>2</sup> mud housing and 3608.8 m<sup>2</sup> miscellaneous housing . Statistics on resident housing for resettled migrants can be seen in Table 3-3.

##### (b) Enterprises

A total of 4 enterprises are affected by this item. As is shown in Table 3-5, the total area of demolition of housing is 2477.2 m<sup>2</sup>, of which there are 625.3 m<sup>2</sup> framework Housing, 16.9 m<sup>2</sup> masonry housing, 829.4 m<sup>2</sup> brick and wooden housing, 21.5 m<sup>2</sup> mud housing, 984.1 m<sup>2</sup> miscellaneous housing.

#### (c) Subsidiary construction and fragmentary fruit trees

The other property affected by the item are mainly 5151.4 m<sup>2</sup> brick wall, 11142.9 m<sup>2</sup> concrete drying yard, 13 wells, 121 pressure wells, 34 manure pools, 43 simple buildings, 148 tombs, 1076 fragmentary fruit trees.

### 3.6.3 Special facilities

On the basis of survey data in the inquiry, the entire professional project facilities are additionally reviewed at this stage.

Special facilities affected mainly include 241 km highway of grade 4, 10.71 km tractor-plowing road, 24 ports and ferry crossing, 16.87 km overhead cable, 6.25 km underground cable, 5.23 km CATV line, 0.74 km 35kV transmission line, 6.63 km 10kV transmission line, 8.99 km 0.4kV line, 4 transformers, 2 small hydropower stations (520 kw), 15 small irrigation power facilities, four waterworks and so on. They all need to be compensated or restored for the demolition.

### 3.6.4 Cultural property

In the survey of physical indicators, important heritage sites do not need to be demolished within the items covered area. It is issued by corresponding proof offered by the professional sector.

### 3.6.5 Reservoir leakage, immersion and bank stability

Shihutang Reservoir is a channel reservoir, the basic bank is formed by the first and second terrace, some of which are low-lying, lower than the normal water level, some of which are low-hill gentle slope. But the low hilly terrain around the reservoir is far higher than the normal reservoir water level. There is no low pass area and adjacent valley leading to the structure fractured zone. Topographic conditions are good around the reservoir. According to the survey for Minjing Reservoir and Shantang Reservoir

along the hilly area, the reservoir water level is higher than normal water level. So after water storage, the possibility of permanent leakage will be smaller.

In this design stage, the hydrogeology section immersion is arranged by the geology engineering, which can predict the possible immersion section.

According to the rising groundwater level and the corresponding immersion standards after water storage of every protected area, the initial forecast of immersion area is shown as follows:

#### (1) Taihe County protected area

On the first terrace at the left bank of the Ganjiang River in the protected area, the surface elevation of protected area is generally 60.2 ~ 58.3 m from upstream to downstream. Depth of clayey soil is generally 5 to 6 m on the top of the terrace.

Protected area is used for agriculture mainly on rice cultivation, except for the south for the city. After reservoir water storage, height of clay roof with water in the agricultural area at the north of City is generally 56.5 to 58.9 m, and water table depth is 0 to 0.9 m. For the south of Xingling, north of Gaoying, east of Guanxi until Huangjia Dam, paddy fields and the following buildings will be affected by the immersion when elevation is below 59.5 m. In the southern city ground elevation is generally 59.5 to 61 m. Height of clay roof of aquifer is generally 57 to 58.6 m after the reservoir water storage. Water table depth is generally 0.90 to 3.3m, which takes an immersion effect on most 2 to 4 layer town buildings with a 1.5 to 2.2m depth of foundation in the city.

#### (2) Wanhe protected area

On the first and second terrace at the left bank of the Ganjiang River, most of the protected area is used for agriculture mainly on rice cultivation. The surface elevation of first terrace is generally 54 ~ 56 m. Ground elevation of some depression and ancient course of Ganjiang River is 52 ~ 54 m. There are only a small amount of platforms with a height of 56 ~ 58 m in the protected area, which are used for economic crops. Depth of clayey soil on the top of the first terrace is generally 3.6~6m in the area. The elevation in most protected area is below normal water storage elevation of the reservoir at 56.50m. They belong to inundated area. After reservoir has built the dike and completed impoundment, water table elevation within the protected area is generally 56.4 to 58.62m after water rising. The areas whose terrace elevation is below 56.5m are waterlogging area. But the areas whose terrace elevation is above 56.5m are almost

immersed wetlands. Only a small number of isolated island-shaped platforms are not affected by the immersion.

### (3) Yonghe protected area

The protected area mainly locates on the first terrace at the left bank of the Ganjiang River, which is used for agriculture mainly on rice cultivation. The second terrace only locally exists around the area from Laodongtang to Maowubei. Surface elevation of the first terrace within the area takes 1-1 immersion profile as its boundary, which is generally 56-58m from Laojintan to the east of Xinzhou., 58-60m in the west, 61-63m partially on the rear edge. The Reservoir stored to the elevation at 56.5 m. The elevation of reservoir water in Yongchang protected area returned to about 56.8-57.2m.

Depth of clayey soil on the top of the third terrace from Laojintan to the east of Xinzhou is generally 4.5-10m, which is partially lacked on the leading edge. After reservoir have built the dike and completed impoundment. Water table elevation in the terrace is 54.95-56.83m, while water table depth is 0-3.06m. Mazhou, Jinhu and Zhujiacun, whose elevation is below 57.4m, are generally waterlogged area or wetland immersion area.

Depth of clayey soil on the top of terrace from Laojintan to west of Xinzhou is generally 4-7.2m, which is partially lacked in the front of Ganjiang River and Yuntinghe Terrace. After reservoir have built the dike and completed impoundment, elevation underground is generally 57.11-57.95m within the terrace area. Water table depth is 1.22-2.75m, which has no immersion effect on most area within the area where elevation is above 58-60m. The perennial water-levels of Yunting River is generally 57.2m, almost the same with Ganjiang River. It has immersion effect on the land between Yunting River and Ganjiang River whose elevation is below 58.0m (the area under the shelf) and land on banks of Yunting River whose elevation is below 58.0m.

### (4) Protected area along the stream

The protected area is mainly located on the first and second terrace at the left bank of Ganjiang River, which is used for agriculture mainly on rice cultivation. It partially locate on dry lands of second terrace used for economic drops.

Surface elevation of the first terrace is generally 54.5 to 56.5 m within the area. Only the surface elevation of lawn in the upper until Chenjia is partially 56.5□57.3m, where it is almost flooded area. Depth of clayey soil on the top of terrace is generally 2□5m. Clayey soil is partially lacked. After reservoir have built the dike and completed impoundment, water elevation underground within the terrace, where it is generally waterlogged area or wetland immersion area, is 55.86□57.15m. Water table depth is 0□0.75m .

The surface elevation of the second terrace is generally 60 to 62 m within the area. In the joint parts of leading edge and the first terrace there is a ditch developing towards northeast, from Xiaojiacun in the upperto Zhijiapeng until Ganjiang River. Surface elevation of the leading edge is 58□60m because of flood erosion. Depth of clayey soil on the top of terrace is generally 4 to 7 m . It is gravel at the bottom of the terrace. After reservoir have completed impoundment, elevation underground within the terrace is 56.37□60.25m, while water table depth is 0.85□2.75 m. The dry lands and villages are generally located in the higher ground, so reservoir water storage almost takes no immersion effect on the second terrace.

#### (5) Zhangtang protected area

The protected area locates on at the left bank of Ganjiang River, which is used for agriculture mainly on rice cultivation. Protected area mainly locates on the first terrace at the two banks of Guanyuanshui and its tributaries. The surface elevation is generally 58□54m from top to bottom. Surface elevation of the first terrace at the right bank of Ganjiang River is generally 56 to 57 m , which only partially exist along the river. The dike is planned to be built along the bank of Ganjiang River, foundation of which employs vertical seepage treatment. Wanhe Head Channel is planned to be extended to Guanyuanshui. Two regulator gates are planned to be set. The bigger one (Zhangtang regulator gate) is to be set where Guanyuanshui flows into Ganjiang River, while the smaller one (Wanhe regulator gate) is to be set at the head of Wanhe flood drainage channel. Through flood regulation of the layout of flood-relief sluice and the two regulator gates at Guanyuanshui, Guanyuanshui River Channel will basically maintain the natural state. According to this, when the foundation of dike has employed vertical seepage treatment, elevation underground within the protected area has a close hydraulic link with Guanyuanshui. As the project construction almost does not change the natural state of Guanyuanshui, the possibility that immersion problem exists in this area is small.

#### (6) Zhoutou and Ma City at the tail of the reservoir

With the normal water storage level of the reservoir at 56.5m in the front of dam and 2400m<sup>3</sup>/s full load of Taihe Project units, level of returning water surface is generally 57.5 to 57.9 m, only 0.8 to 1.1m higher than the level of nature river with the same flow. According to investigation, elevation of the first terrace in Zhoutou and Ma city is generally 61 to 62 m. Depth of clayey soil on the top of the terrace is generally 4 to 6 m. After water level of reservoir reaches to 56.5 m through water storage, underground water level is generally 58 to 59 m within the area after water rising. Water table depth is generally 3 m. Immersion problem almost does not exist in this area.

According to the information provided by an investigation and local agriculture and municipal construction department, the various crops of the reservoir are mainly rice, rapeseed, tea, cotton, sugarcane, Zhugao potato and so on. Depth below surface of ground of constructions in the reservoir area can be divided into three types. The first type is one to three layer rural civil construction, whose foundation is almost stripy. Its depth below surface of ground is 0.5 to 0.6 m. The second one is 2 to 4 layer town construction, whose foundation is almost stripy. Its depth below surface of ground is 1.5 to 2.2 m. The third one is town buildings with pile foundations, whose layer number is more than 5. The holders of the layer are gravel or bedrock below underground water level.

In view of dual structure of terrace stratum within the reservoir area, most of groundwater is confined water. According to the engineering experience of Datengxia reservoir in Qianjiang River, Shitoukoumen reservoir in Songhuajiang River and other completed projects at home, the calculation of underwater level after water rising adopt the theory of clayey soil combined with hydrodynamic theory to get depth of the roof underground in the water bearing clay layer.

According to engineering experiences, height of capillary rise of water in clayey soil within reservoir area is 1.0 to 1.5 m. Meanwhile, immersion standards are proposed according to "farmland drainage engineering technical norms" (SL/T4-1999) and characteristics of distribution of local buildings and crops.

According to water table depth forecasts and the corresponding immersion standards after water rising caused by reservoir storage provided by geological specialty, all the area except flooded area ("lift the field" is carried in immersion area of Ma City) may be affected by immersion within every protected area in the reservoir area.

In the protection engineering design of every protected area, protective embankment is heightened, reinforced or newly built. Closed protective circle is basically formed. Permeable layer in dual foundation of the protective embankment employs vertical seepage treatment. Gutter on the plains of the region are renovated and dredged. Drainage pump station and drainage sluice gates are set at the outlets for drainage of floodwater and waterlogging. Incoming water along the hillside is guided and drained. So immersion problems are basically resolved within every protected area.

This reservoir is a channel-type reservoir, reservoir banks are basically constituted by the first and second terrace. According to the investigation, adverse physical geological phenomenon such as big collapse and landslides are not found around the reservoir. Only in the front terrace small-scale shore collapse exists. Reservoir banks are basically stable. According to preliminary analysis, after reservoir water storage, a range of bank collapse will appear in the front soil slope of the terrace with the long-term wave erosion. The erosion takes no great effect on project construction.

According to the surveys, stability of current top-lashed reservoir banks and reservoir banks where jet flows along, constituted by the first terrace, is poor. Reservoir banks mainly locate from Jiangjiazhou to Huwei within Wanhe protected area, from Jiangbei to Huangkeng within Zhangtang protected area, from Yanxi Town to Xiaojia Village within Yanxi protected area, from Tangxuan to Shangtian Terminal within Taihe protected area and from the left bank of the outlet of Shushui River to most outer bank of Yuntinghe River. The total length is 29 km. Bank slope has got a dual structure. On the top it is mainly constituted by silty clay, loam, sandy silt or powder-fine sand and so on. At the bottom it is generally constituted by gravel. Elevation of bank slope partially vertical is 5 to 7 m higher than perennial water level. Slope angle is generally 60 to 75° above perennial water level, while it is generally 15 to 30° below perennial water level. According to the preliminary forecast with graphic method, after the reservoir water storage collapse width of reservoir shore is generally 15 to 21 m.

Although most of other reservoir slope is constituted by quaternary loose sediments, there is little shore collapse after reservoir water storage. The bank slope is located at the accumulation of river shore (convex shore). Erosion of water flow is weak. The slope is gentle, so the stability is fairly good under the current situation. Reservoir slope, from Dahe Tower on the left bank to the river bank on the right bank and around highway bridge are low mound constituted by cretaceous red strata. Height of slope is generally 30 to 40 m. Strike direction of strata whose total length is 2 km is northeast. The dip angle is generally 15° and almost horizontal. The current situation is basically stable. Landslide almost does not exist after reservoir water storage.

### 3.6.7 Reservoir relics and mineral resources

According to preliminary investigation confirmed by relevant professional sectors, no ancient cultural sites and mining mineral resources of important value are found below the submerged line.

### 3.7 Economic impact

Due to impact of land acquisition, 2910.51 mu farmlands, among which there are 990.1 mu paddy fields, will be reduced in the project area, and cause grain loss of 601.74 t/y. Under water storage arrangement of this project, the base year of this resettlement is established as 2007. Design average year is established as 2011, in which a total of 2191 agricultural population needs to adjust its production methods. Generally speaking, the projects do not cause arable land great losses, accounting for 6% total farmland area of requisition villages (48 villages). Added value of agricultural products should be increased through land dispensing, transformation of low-yielding farmland, development of aquaculture industry, extension of agricultural production technology, support for village-run enterprises and the tertiary industry and other measures. In this way farmers will have fair solution to production and life, and economic losses will be made up for decreasing farmland.

At the same time, present standards for flood embankment along the river within the reservoir are very low. Large areas of farmland and villages often suffer from flood disaster. Standards will be increased for the 10-year flood within the protected area after the project is completed. Land productivity will be improved and safety of the residents will be guaranteed.

A total of 4 enterprises and institutions are affected, which are mainly warehouses, processing plants and some enterprises. Most of affected areas are within the area affected by the dike or on the edge of reservoir inundation line. Land and facilities for production and daily life of enterprises and institutions are partially affected. No affected unit needs an overall relocation. They are all partially affected, whose main body are not affected. There is little effect on land and facilities for production and daily life. Production losses should be considered. Principle called “Jiujinhoukao” should be adopted when resettlement is arranged. Loss in the cut-off period should be considered. Employment in the area will not be reduced. Enterprises and institutions will be rebuilt or compensated according to the original function and scale for the demolition. But loss in the cut-off period of relocation and reconstruction should be compensated.

### 3.8 Affected population in resettlement areas

Rural settlements are in the village. As part of arable land was requisitioned, residents in settlement area are affected by economic the same as immigration. Through the aforementioned measures of land development, the whole community will benefit.

As is shown in the socio-economic survey of acquisitioned land, by source of farmers' income of the primary industry takes 47.4%. Income of family business takes 11.9%. Income of temporary work takes 31%. We can see that the local primary industry (agriculture, forestry, animal husbandry, fisheries) and temporary wage income are the two main channels of farms' income. Although per capita cultivated land will decrease after resettlement, flood control standards will be improved by newly built and reinforced dikes. And in the planning level year, farmland conservancy projects will be better. Planting will be optimized. Shihutang power station will provide local power protection and create favorable conditions for the development of rural industry, restaurant industry and commercial industry. So employment opportunities of local residents will increase and income of residents will be steadily increased.

### 3.9 Effects of dam construction activities

According to the general arrangement of project construction, construction sites are all rent by the construction units from local residents, which will be returned to local residents after completion.

Living areas are arranged on both banks of the dam site. During construction projects, the number of foreign constructors and other related staff is large. Due to relatively concentration of constructors within the construction area, increasing density of population, temporary living facilities, poor living conditions, relatively poor sanitary conditions, and higher labor intensity, body resistance and immunity of constructors will decrease and the possibility of occurrence and cross contamination of hepatitis, dysentery, typhoid and local waterborne diseases will also increase. It will bring adverse effects on health of constructors and local population. At the same time living facilities of constructors are temporarily set and construction standards are relatively low without perfect. It may increase mosquito breeding and mouse density. If corresponding measures are not adopted, Japanese encephalitis, hemorrhagic fever and other arbo infectious diseases and natural focal infectious diseases will break out.

Therefore, measures should be taken to control various diseases. Health management should be strengthened. Health and epidemic prevention knowledge should be actively promoted. Regular health vaccination and health screening of associated personnel should be conducted. Sanitary latrines should be built. Waste of daily life should be managed centralizely. Drinking water, kitchen, and food sanitation of construction area should be inspected regularly by local health and epidemic prevention department, so the occurrence of various diseases will be controlled.

At the same time, as the construction period is long, measures should be taken in order to prevent the spread of AIDS and sexually transmitted diseases among local residents. On the one hand, according to the laws of China, prostitution and other illegal activities should be resolutely cracked down. On the other hand, healthy lifestyles should be promoted and among foreign construction personnel. Condom vending machines should be set up in guest houses, hotels, dance halls and other entertainment venues in the living area of both banks, and a variety of ways should be adopted to prevent sexually transmitted diseases and the spread of AIDS.

There is a rural road running through in Wanhe Town on the right bank, while a tractor-plowing road runs through on the left bank. The tractor-plowing road can be used as external transport channel after proper maintenance, whose renovation length is about 4 km. It is a two-lane road, built according to standards of four level mud-crushed roads. It will not cause blocked traffic among local residents and will be available to the local residents after the project is completed.

### 3.10 Effects on the reservoir area and downstream fisheries

Shihutang water conservancy project involves three fish spawning grounds of Ganjiang River, which are respectively in Taihe (Chengjiang River), yanxidu and Baijiaxia. The one in Baijiaxia is located at the upper reaches of the inundated area. Its main spawning fish are carp, black carp, grass carp, parabramispekinensis, silvey club, hemibarbus maculatus bleeker and so on.

The completion of Shihutang water conservancy project will cause some change in original natural conditions in Taihe section of Ganjiang River. It will also bring about a certain impact on some aquatic organism result in changing the old ecological balance. But new balance will be set by adjusting of fish and its biological food.

After reservoir water storage, the fish living environment will be changed to a certain extent in the river within the reservoir area. The original spawning grounds of river sections will disappear, causing a certain impact on the supplement of fish resources in the reservoir area. In order to maintain good development of fish resources and protect fish resources within reservoir waters, fish restocking proliferation is to be adopted. At the same time, fish road is reserved between the door and lock groove in the main engineering design, whose reserved width is 8 m.

The formation of the reservoir increases corresponding depth of the reservoir area. Fishing methods will change to some extent. Corresponding training work is necessary. 14 professional fishermen need to be trained. Training fees of each person is 1,000 yuan. A total of 14,000 yuan is needed.

Ecological compensation measures as proliferation and “fangliu” will be taken within the reservoir area. River fish resources will be protected through setting fish-ways by the project. At the same time, there is no basic change in downstream river runoff. The construction of this project takes little adverse effect on downstream fisheries production.

Details can be seen in Attachment 1.

Table 3-3 Summary of migration number and housing of the item

town name	village name	class number	number of families	number of population			housing (m <sup>2</sup> □)
				total	agriculture	non-agriculture	
5	20	29	169	597	581	16	35093.6
Chengjiang River	6	6	11	57	54	3	5384.5
	Dongmen	2	1	11	11		695.86
	Beimen	2	8	36	35	1	1850.03
	Nanmen	1					182.60
	Xingling	2	2	10	8	2	908.66
	Sanxi	1					51.06
	Zhongshan Community	1					16.48
	unit(3)						1679.97
Wanhe	6	10	32	101	93	8	7600.17
	Zhushan	1	‘				33.66
	Huanghang	1	2	8	8		631.51
	Huwei	1	6	20	18	2	1155.82
	Gaozhang	3	9	25	21	4	1905.39
	Nanlong	1					124.58
	Pingshang	3	15	48	46	2	2951.98
	unit(1)						797.23
Yanxi	4	6	109	382	378	4	19670.48
	Shiqian	1					234.04
	Heshu	2					440.51
	Caoping	2	107	372	368	4	18592.50
	Gaoping	1	2	10	10		403.43
Tangzhou	4	3	3	11	11		708.37
	Xiaoxi	1	1	3	3		292.21
	Tuzhou	1	1	3	3		304.59
	Zengjia	1	1	5	5		80.26
	Zhujia						31.31
Mashi	1	1	14	46	45	1	1729.98
	Shukou	1	14	46	45	1	1729.98

Table 3-4

Summary of acquisitioned land of the item unit (mu)

county	adminis- trative village	paddy field	2-year flood paddy fiela	dry land	2-year flood dryland	garden plot	fishpond	returned land from farming to forestry	economic forest	timber forest	thin stocked land	unused- land	residential area	traffic land	water surface of river	total
5	53	990.14	222.68	1920.87	1255.05	6.17	313.01	1469.60	282.18	254.39	327.52	3341.21	188.00	128.86	32434.8	41656.8
Cheng jiang River	10	68.72	5.24	175.35	37.04	1.74	56.77			26.69	4.40	136.02	17.97	57.13		544.79
	Beimen	12.29		64.21			22.41					3.93	3.51	17.18		123.53
	Dongmen	22.21	3.54	32.13	9.8		16.06			0.05		82.00	3.24	3.45		159.16
	Guanxi	1.66		7.32			4.17				3.31	2.81	0.82	7.71		27.8
	Huanggang	10.15		2.16			4.18			8.65	1.04	0.96	5.38	19.82		52.34
	Nanmen			27.24	27.24							30.83	1.45	0.97		60.49
	Nanzhen									5.82		3.62		2.69		12.13
	Sanxi	12.98		8.02			0.27			12.17	0.06	2.38	1.25	0.15		37.28
	Shangtian	0.86		1.34			0.60							1.43		4.23
	Wentian	1.70	1.7									8.97				10.68
	Xingling	6.84		32.93		1.74	8.86					0.52	2.32	3.72		56.93
	Government						0.23									0.23
Ma City	6	17.12	17.12	51.23	51.23			25.29			33.24	21.18				148.05
	Baitou	4.20	4.2	26.55	26.55							2.94				33.69
	Banzhou											10.16				10.16
	Jiangbing	7.45	7.45													7.45
	Shukou			12.31	12.31			25.29			27.71	8.08				73.39
	Wuxi			5.44	5.44						5.53					10.96
	Xianxi	5.47	5.47	6.93	6.93											12.40

Table 3-4 Summary of acquisitioned land of the item (Continued) unit (mu)

County	adminis- trative village	paddy field	2-year flood paddy fiela	dry land	2-year flood dryland	garden plot	fishpond	returned land from farming to forestry	economic forest	timber forest	thin stocked land	unused- land	residential area	traffic land	water surface of river	total
Tang- zhou	10	249.09	105.73	585.41	477.45	4.42	62.66	921.66		122.31	40.84	584.42	4.26	11.73		2586.81
	Donghu	11.38	11.38	87.72	81.92	0.56	18.17			2.05		23.94				143.82
	Hejiang River	78.62	78.62	171.25	141.22		31.76				2.54	46.42		0.16		330.76
	Huangtang	21.88		10.61			0.83			19.04	6.10	5.95		0.75		65.16
	Shangpeng							108.90								108.9
	Shangzhou			1.44	1.44			117.03								118.47
	Tuzhou	11.03		19.45			0.62			6.22		2.30		6.19		45.81
	Xiaoxi	46.66	1.2	115.44	105.56		3.92	214.67		48.68	25.84	2.42	1.62	3.89		463.13
	Xinping	7.52	7.52	11.61	11.61			2.49								21.62
	Zengjia	36.84		1			1.04				0.98	1.13	1.38	0.18		42.55
	Zhujia	35.15	7.01	166.89	135.7	3.86	6.32	230.10		46.33	5.38	502.26	1.26	0.55		998.1
	dispute							248.47								248.47
Wanhe	18	435.55	26.34	631.72	327.98		173.67	496.88		25.48	88.96	894.33	43.46	40.55		2830.59
	Chixi							4.40				234.61				239.02
	Dapeng	16.05	16.05				4.09	15.03			35.85	148.18				219.20
	Gaozhang	1.45		97.41	14.61		3.67	48.10			12.71		3.39	9.56		176.30
	Gutang	5.21					1.30									6.51
	Huwei	39.16		110.4	76.79		5.46				18.63	33.69	0.03	0.78		208.15
	Huanghang	32.72	3	104.06	82.02		5.52	123.01		22.23	0.55	47.43		0.45		335.98
	Jiyi	60.01								0.67				0.33		61.01

Table 3-4 Summary of acquisitioned land of the item (Continued) unit(mu)

county	adminis- trative village	paddy field	2-year flood paddy fiela	dry land	2-year flood dryland	garden plot	fishpond	returned land from farming to forestry	economic forest	timber forest	thin stocked land	unused- land	residential area	traffic land	water surface of river	total
	Jiangnan	2.44					82.51									84.95
	Luojia	6.07														6.07
	Nanlong	0.43		3.41	3.41		4.61	1.53				88.24		1.37		99.58
	Pingshang	1.59	1.59	24.04	13.55		3.49	29.16			1.99	92.07	20.07	22.83		195.24
	Qianjin	66.11		2.15			1.17	82.36		1.19				0.27		153.25
	Sanyuan	17.68	5.7	187.55	83.27		27.21	99.63		1.38		181.72	10.92	0.25		526.34
	Shalong	5.68														5.67
	Tangwei	100.26		3.04			0.46							1.10		104.86
	Xiashan	15.50														15.5
	Zhongbu	10.26					10.31					1.68				22.25
	Zhushan	54.93		99.66	54.33		23.87	93.66			19.23	66.71	9.05	3.61		370.72
Yanxi	9	219.66	68.25	476.66	361.35		19.91	25.76	282.18	79.92	160.08	1705.26	122.31	19.45		3111.2
	Cangling	20.40					0.11							0.42		20.94
	Caoping			119.53	119.51		2.06		176.07		120.19	986.22	74.62	5.02		1483.7
	Donggang	5.58										3.68				9.25
	Gaoping			14.61	1.64			9.14	104.06			227.02		3.52		358.35
	Heshu	50.17	19.34	258.66	219.75		2.72				19.65	36.85	29.21	0.22		397.47
	Leshan	105.82	48.06	41.15	12.04		9.66	16.62		74.23	17.64	440.58	0.05	1.18		706.92
	Loutian	2.06														2.06
	Shiqian	35.64	0.85	33.51			5.35		2.04	5.70	2.61	10.93		9.09		104.88
	Yanxi			9.2	8.41								17.55			26.75
	forestry bureau of the county												0.88			0.88

Table3-5 Summary statistics of demolition of housing units and ancillary buildings

township	company	house						ancillary buildings							
		total	framework house	masonry house	brick and wood house	mud and wood house	miscellaneous house	wall	cement ground	simple construction	pressure well	well	fecal pod	gatehouse	strove
		(m <sup>2</sup> )	(m <sup>2</sup> )	(m <sup>2</sup> )	(m <sup>2</sup> )	(m <sup>2</sup> )	(m <sup>2</sup> )	(m <sup>2</sup> )	(m <sup>2</sup> )						
Dengjiang town	Taihe shipping ferry	16.91		16.91											
	brick factory	1286.21			302.1		984.11		1823.9	2	2		1		1
	sand field	376.86			376.86				18.19	1	2				
Wanhe town	Wanhe grain station	797.23	625.27		150.48	21.48		328.4				1		1	
Total	4	2477.18	625.27	16.91	829.44	21.48	984.11	328.4	1842.1	3	4	1	1	1	1

Table 3-6 Physical indicators summary

number	item	unit	total	reservior	project
	total area affected	km <sup>2</sup>	27.77	27.45	0.32
	land area	km <sup>2</sup>	6.15	5.83	0.32
	waters area	km <sup>2</sup>	21.62	21.62	
	county		1	1	
	town		5	5	
	population	p	597	597	
	house	m <sup>2</sup>	35093.6	35093.6	
part one	in village				
1	land				
	1.farmland	mu	2910.51	2763.01	147.5
	(1)paddy	mu	990.14	955.14	35.00
	more than once in two year	mu	767.46	732.46	35.00
	less than once in two year	mu	222.68	222.68	
	(2)drylands	mu	1920.37	1807.87	112.5
	more than once in two year	mu	665.33	552.83	112.5
	less than once in two year	mu	1255.04	1255.04	
	2.garden	mu	6.17	6.17	
	3.fish ponds	mu	313.01	309.51	3.50
	4.land of returning farmland to forests	mu	1469.6	1469.6	
	5.economic forest	mu	282.18	282.18	
	6.timber forest	mu	254.39	182.39	72.00
	7.sparse woodland	mu	327.52	327.52	
	8.residential land	mu	188.00	188.00	
	9.traffic land	mu	128.86	128.86	
	10.waters area	mu	32434.82	32434.82	
	11.cultivated land	mu	3341.21	3089.21	252.00
	(1)farming	mu	302.26	302.26	
	(2)farming over the past	mu	1125.36	1125.36	
	(3)not farming	mu	1913.59	1661.59	252.00
2	agricultural immigration of population	p			
	1.population	p	597	597	

Continued table 3-6 Physical indicators summary

number	item	unit	total	reservior	project
	2.population in planning year	p	608	608	
3	demolition of housing	m <sup>2</sup>	32616.43	32616.43	
	1.framework house	m <sup>2</sup>	241.43	241.43	
	2.masonry house	m <sup>2</sup>	10843.63	10843.63	
	3.brick and wood house	m <sup>2</sup>	15211.25	15211.25	
	house	m <sup>2</sup>	13249.47	13249.47	
	property house	m <sup>2</sup>	1961.78	1961.78	
	4.mud and wood house	m <sup>2</sup>	2711.28	2711.28	
	5.miscellaneous house	m <sup>2</sup>	3608.84	3608.84	
4	ancillary buildings				
	1.wall	m <sup>2</sup>	4823	4823	
	2.cement ground	m <sup>2</sup>	9301	9301	
	3.pressure well		117	117	
	4.wells		12	12	
	5.fecal pod		31	31	
	6.methane-generating pits		12	12	
	7.stove		231	231	
	8.simple buildings		42	42	
	9. gatehouse		29	29	
	10.fixed telephone		51	51	
	11.cable		24	24	
	12.graves		148	148	
5	rural water and other facilities				
	1.small hydropower stations	kW	520	520	
	2.small irrigation facilities		15	15	
	3.diversion channel	km	0.62	0.62	
	4.drainage culvert		53	53	
	5.mining battlefield		27	27	
6	sporadic fruit tree		1076	1076	
7	1.enterprises		4	4	

Continued table 3-6 Physical indicators summary

number	item	unit	total	reservior	project
	2.house	m <sup>2</sup>	2477.18	2477.18	
	1.framework house	m <sup>2</sup>	625.27	625.27	
	2.masonry house	m <sup>2</sup>	16.91	16.91	
	3.brick and wood house	m <sup>2</sup>	829.44	829.44	
	(4)mud and wood house	m <sup>2</sup>	21.48	21.48	
	(5)miscellaneous house	m <sup>2</sup>	984.11	984.11	
	3.ancillary buildings				
	1.wall	m <sup>2</sup>	328.4	328.4	
	2.cement ground	m <sup>2</sup>	1842.1	1842.1	
	3.pressure well		4	4	
	4.wells		1	1	
	5.fecal pod		3	3	
	6.stove		1	1	
	7.simple buildings		1	1	
	8. gatehouse		1	1	
	(9) water tower		1	1	
part two	city (sets) of the town				
part three	industrial enterprises				
part four	professional project				
1	transport facilities				
	1. grade 4 way	km	2.41	2.41	
	2.tractor-plowing Road (cement pavement)	km	10.71	10.71	
	3.bridge of grade 4 way		6	6	
	4.terminal		13	13	
	(1)people(goods)terminal		3	3	
	(2)goods terminal		10	10	
	5.ferry		11	11	
	(1)car ferry □outage□		1	1	
	(2)people ferry		10	10	
2	telecommunications facilities	km	11.05	11.05	
	1.overhead cable	km	10.55	10.55	

Continued table 3-6 Physical indicators summary

number	item	unit	total	reservior	project
	2.underground cable	km	0.5	0.5	
3	GPRS communication facilities	km	5.465	5.465	
	1.overhead cable	km	3.475	3.475	
	2.underground cable	km	1.99	1.99	
4	CMCC communication facilities	km	2.843	2.843	
	1.overhead cable	km	0.963	0.963	
	2.underground cable	km	1.88	1.88	
5	military communication facilities	km	3.76	3.76	
	1.overhead cable	km	1.88	1.88	
	2.underground cable	km	1.88	1.88	
6	cable TV facilities	km	5.23	5.23	
	1.overhead cable	km	5.23	5.23	
7	power transmission facilities				
	1.35 kV line	km	0.74	0.74	
	1. 10kV line	km	6.625	6.625	
	2.0.4kV line	km	8.99	8.99	
	3 transformers	/kVA	4/235	4/235	
8	other				
	1 water plant		4	4	
	2 sedimentation tanks		1	1	
	3 pump station	kw	240.4	240.4	
	4 hydrometric station		1	1	

Table3-7 Land requisition and resettlement on the impact of the project area

name of county	township	basic situation of affected zone			situation of land requisition and resettlement			proportion of affected□%□		
		households	population	farmland	households	population	farmland	households	population	farmland
Taihe	Wanhe town	10510	44072	71850	32	101	1067.22	0.30%	0.23%	1.49%
	Yanxi town	4940	19305	35670	109	382	696.36	2.21%	1.98%	1.95%
	Tangzhou town	6970	29531	50175	3	11	834.5	0.04%	0.04%	1.66%
	Dengjiang town	9076	25786	31905	11	57	244.08	0.12%	0.22%	0.77%
	Mashi town	7630	32413	60105	14	46	68.35	0.18%	0.14%	0.11%
	Total	39126	151107	249705	169	597	2910.51	0.43%	0.40%	1.17%

## **4 LAW OF POLICY AND FRAME OF LAW**

### 4.1 Policy and law

#### 4.1.1 Procedure of World Bank BP4.12

Establish the plan about resettlement allocation is an indispensable part of world bank's assistance project. During the critical period of project, project group will make sure the involuntary resettlement. During the whole project, project group will ask the opinions of the local department and vice-president of world bank and should ask for the suggestion of the Resettlement Committee when necessary.

According to the request of operation policy, The borrower should provide the resettlement planning, the resettlement policy framework or resettlement procedures framework report to the World Bank as the one condition of project evaluation.(Seem business policy OP4.12, seventeen-thirty section).

Once allocation documents are sent to World Bank by borrower, they will be checked up by staff of World Bank and lawyer, affirming if the reporter offers detailed basic data to project evaluation and inform some conclusions to relevant departments. Once national director general agree it, the resettlement settle project will be sent to public information center of World Bank. Project group makes English abstract reporter and sends it to directorate secretariat, attaching to explanation, ensuring this reporter and its abstract will be changed in the period of evaluation.

During projects implementation, project manager needs to monitor the implementations of projects, assuring necessary masters of social financial law and technology take part in project inspections, We should focus on supervision and inspection of the implementation of the project and the resettlement of affected peoples in order to see whether the implementation of legal documents, including project planning and implementation of resettlement documents. If the original agreement is different to the inspection deviation, Project teams should discuss with the borrower and reporting to District management departments, in ordering to be corrected. Project teams should periodically review internal project monitoring reports, In due course, should also check an independent external review of the monitoring report, To ensure internal and external monitoring and the problems identified in the implementation of the proposed projects have been absorbed and accepted. In order to handle the possible problems of resettlements settlements, Project team will take discussions with borrower, if

necessary; amend the relevant resettlement documents, in order to achieve the policy objectives.

#### 4.1.2 Operational policies OP4.12

##### 4.1.2.1 Policy objectives

If we do not carefully plan and take appropriate measures, involuntary resettlements may cause serious long-term difficulties, poverty and environmental damage. Thus, the World Bank involuntary migration policy the overall objective as follows:

(a) Discuss all feasible project design programs to the extent possible, avoid or reduce the involuntary resettlements.

(b) If the resettlement is inevitable, resettlement activities should be as sustainable development program to be designed and implemented. Adequate funding should be provided so that resettlements can share the project's benefit. Resettlements should carry out serious consultation, so that they can have the opportunity to participate in the resettlement program planning and implementation.

(c) It should help them to strive to improve the livelihoods and living standards, at least to really return to relocate before the start of the project or before the higher level.

##### 4.1.2.2 Required measures

The borrower shall prepare a resettlement planning or resettlement policy framework, which covers the following elements:

(a) Resettlement Plan or resettlement policy framework to take corresponding measures to ensure that affected peoples:

(i) In the resettlement of affected peoples inform themselves on the issue of the right to choose and other rights;

(ii) To understand the technical and economic feasibility of the program, taking participation in the consultations, and will have the opportunity to choose;

(iii) The full replacement cost, accessing to prompt and effective compensation to offset the project caused by the direct property losses.

(b) If the impact of including relocation, resettlement planning or resettlement policy framework should take corresponding measures to ensure that affected peoples:

(i) Receiving assistance in the relocation period (such as the removal of subsidies);

(ii) Accessing to housing or house, or on request access to agricultural production locations. Agricultural production establishments production potential, location and other advantages of a combination of factors should be at least and the favorable conditions for the original places considerable.

(c) We should also take the necessary measures to ensure that affected peoples to achieve the policy objective of resettlement planning or resettlement policy framework

(i) After the relocation, according to restore livelihoods and standards of living may be necessary and reasonable budget for the transition period, in this transitional period of help;

(ii) In addition to paragraph (a) (iii) referred to in paragraph compensation measures, but also access such as land, credit, training or employment aspects of development assistance.

Policy for the realization of this goal, special attention should be paid resettlements in the needs of vulnerable groups, especially those below the poverty line are those who had no land of people, the elderly, women, children, minorities, or might not land compensation regulations State protection.

In the new resettlement sites or resettlement communities, to provide the necessary infrastructure and public services to improve, restoring or maintaining resettlement and resettlement of communities use of the existing facilities and the standard of service. Provide alternatives or similar resources available in order to compensate for the loss of community resources (such as fishing areas and pastoral areas, fuel or fodder).

#### 4.1.2.3 The formulation of resettlement plan, implementation and monitoring

Borrowers under this policy will be responsible for the preparation, implementation and monitoring of the corresponding Resettlement Plan, the resettlement policy framework or procedural framework ("Resettlement document"). Resettlement policy document shows that the achievement of the objectives of the strategy, and involves the proposed

resettlement of affected peoples in all its aspects. The World Bank is involved in a project, the key factor in determining whether that is guaranteed to the borrower and to successfully accomplish the resettlement work.

On the borrower side ensure the project implementation plan and the resettlement of affected peoples fully consistent with the contents of the documents.

Resettlements as a project involving the assessment Overview conditions, the World Bank provided loans direction of the policy in line with the relevant resettlement draft document, and affected peoples and local NGO to facilitate the access of local issuance, its format, style and language should be easy to be understood by them. The World Bank identified on the document estimates for the project provided an adequate basis, through its public information center will open its. The World Bank approved a final version of the document after the resettlement of affected peoples, the World Bank and borrowing the same way again is open.

#### 4.1.3 Laws of state and regulations

About this item resettlements important state laws and regulations, as shown in table 4-1.

(a) Land Management Law which is published by the People's Republic of China in 1999 [Reference 10]

Method is for the People's Republic of China the land-use planning law. This Act Chapter 5 with particular emphasis on the resettlement problems, the first 47: payment of compensation for land and resettlement subsidies but do not need to make the resettlement of the farmers maintain their standard of living, the provinces, autonomous regions, municipalities directly under the jurisdiction approval, which would increase subsidies for resettlement. However, land compensation and resettlement subsidies for the sum of not more than three years before the land was requisitioned an average annual output value of 30 times.

No. 42 building projects and the need for geological exploration or temporary use of state-owned land collectively owned land farmers, the people's governments above the county level by the departments in charge of land administration approval. Among them, in the city planning area for the interim, before the approval, it should be first by the relevant administrative departments in charge of urban planning consent. Land users should be based on land ownership, with the land administration departments or rural collective economic organizations, the village committee signed the temporary use of

land contracts, and in accordance with the agreed terms of the contract to pay compensation for the temporary use of land.

Users of the temporary use of land use should be in accordance with the temporary use of land contractual use of land, and they are not allowed to build permanent structures. The general duration of the temporary use of land does not exceed two years.

The Article 51 of Chapter 5: The State Council makes decisions for land acquisition compensation payment standards and the resettlement of affected peoples about large and medium-sized water conservancy and hydropower project construction. Shihutang avionics hub project is a large water conservancy projects, so is restricted by such terms.

(b) " The Water Law of People's Republic of China" which is issued on 1988 year [Reference 11]

Section 22: The resettlement occurs because of the State water project, the local government responsible for the proper arrangements for their living and production. Settlers' resettlement requirements for construction should be included in the investment plan and should be completed as planned resettlement work in the construction stage.

(C) "Large and medium-sized water conservancy and hydropower project construction land compensation and resettlement Ordinance" issued by the State Council in 2006 471 orders [Reference 12]

The Ordinance: large and medium-sized water conservancy and hydropower project construction on farmland, land compensation and resettlement subsidies fees and charges levied for the first three years of cultivated land was the average annual output value of 16 times. Land compensation fees and placement needs to be subsidies for the resettlement of affected peoples maintain the existing standard of living, and the need to raise standards by the legal person or department in charge of the project was approved by the project approval or approval. Other sites on the land compensation and resettlement subsidies for standards, in accordance with projects, provinces, autonomous regions, municipalities, require standard implementation.

(d) The "The specifications about resettlements land of water conservancy and hydropower project design" which is issued by the Ministry of Water Resources on 2003 [Reference 13]

The second point of Article 8 Of Chapter II: the impact of the submerged rail, road, shipping, electricity, telecommunications, radio and television facilities which are need to be restored, according to flooded extent and impact, according to the old scale, the original standard (grade), the principle of restoring the original features, selecting economies of the rationale rehabilitation program. A local infrastructure can be combined reservoir resettlement and rural market towns, urban relocation, overall planning, proposing financial reasonable rehabilitation program. The facilities which do not need or difficult recoveries, the impact should be submerged under specific circumstances, offering reasonable compensation.

The third point of Article 14 of Chapter II, Rural Resettlement compensation payment is calculated with the following:

1 The compensation of land acquisition and resettlement subsidies fees, in accordance with the "Regulations" and the relevant provinces, autonomous regions and municipalities promulgation of the relevant provisions.

2 housing and compensation fees of ancillary buildings are in accordance with different structure types, quality standards reconstruction prices.

(e)The Ministry issued the "Water Resources and Hydropower Engineering Indicators survey inundated by reservoir Rules" on 1986 (chapter1, 2, 3, 5) [Reference 14] the rule provides for the calculation of compensation, it also applies to flood control projects and Reservoir Project.

(f) Ministry of Construction issued the "town planning standards" (2.Town size classification; 4. Planning and construction sites standard) on 1994 [Reference 15] Article II describes about the design content of the town planning and the resettlement points. Article 4 outlines the method of calculation about the living space, as well as how to set up infrastructure.

#### 4.1.4 Rules and regulations of Jiangxi province

Jiangxi Province revised "implementation of Jiangxi Province <PRC Law on Land Management> approach" on 2001 [reference 17].

Article 27, land acquisition should be paid according to the following provisions of compensation for land requisition land units, laws and administrative regulations from the otherwise provided that:

(I) Acquisition of arable land (including vegetable plots), the land expropriated by the former three-year average annual output value of 6 to 10 times the computing;

(II) Acquisition of Urban districts intensive culture of the suburbs of fish ponds, by the use of the land by the former three-year average annual output value of 6-9 times, the acquisition County, the district seat of the Municipal People's government outskirts of towns intensive culture of fish ponds, according to the land has been taken before the three-year average annual output value of 5 to 7 times the computation;

(III) The acquisition Corner, non-intensive culture of fish ponds, water habitat, woodland, pasture, the land has been taken by the former three-year average annual output value of 5 to 6 times the computing;

(IV) Acquisition house, making Comparison with neighboring farmland before the three-year average annual output value of 4-5 times the computing;

(V) Acquisition of barren hills and wasteland, wasteland and other land adjacent farmland, mutatis mutandis, the former three-year average annual output value of 2 to 3 times the calculation.

Article 28 land acquisition should be paid according to the following provisions of flat land for resettlement subsidies, laws and administrative regulations from the otherwise provided that:

(I) The requisition of farmland and land acquisition before the unit was an average of arable land 1,333 square meters and above, the arable land was requisitioned by the former three-year average annual output value is 4-5 times the computing; Per capita arable land 667 square meters above 1,333 square meters below, the arable land was requisitioned by the former three-year average annual output value 5-7 times the computing; per capita arable land 333 square meters above 667 square meters below, the arable land was requisitioned by the former three-year average annual output value is 7-9 times the computing; per capita arable land 200 square meters above 333 square meters below, the arable land was requisitioned by the former three-year average annual output value of 9 to 10 times the computing; per capita arable land 200 square meters

below, by not more than the expropriation of farmland was before the three-year average annual output value is 15 times the computing;

(II) Acquisition Corner, non-intensive culture of fish ponds, water habitat, woodland, pasture, the land has been taken by the former three-year average annual output value is 4-5 times, the intensive culture of fish ponds acquisition by 6 to 10 times the computing;

(III) The acquisition of other land adjacent farmland, mutatis mutandis, the former three-year average annual output value is 2-4 times the calculation.

Article 29: land acquisition should be paid according to the following provisions of flat ground fouling and the land requisition compensation for the Young:

Being on the Young land acquisition compensation payment of compensation to the actual loss, housing, the price of trees and other fixtures compensation, can be repaired and planted in the land requisition program announced after the rush-planting trees and build facilities without compensation.

Article 41: city and county governments shall in accordance with the local conditions in the following provisions limit the development of rural villagers in the construction of residential land area standards

(I) Idle occupied house and the village, each household not more than 180 square meters

(II) The occupation of cultivated land, each household not more than 120 square meters

(III) The terrain conditions, living scattered and occupy barren hills, slopes, each household not more than 240 square meters

Rural villagers can only have a one house, where so densely populated areas, residential land must be strictly controlled, standards to lower, not higher.

## 4.2 Compensation Standards

### 4.2.1 Land compensation

In Table 4-4 lists compensation, the rate applicable standards, as well as projects to reduce the impact of other measures.

(1) The per-mu yield of main crops

Levy region mostly grain crops are rice, beans, potato, the major economic crop for the sugar cane and oil (including rapeseed, peanut and sesame) and vegetables and so on. According to the various project areas involving township Annual Report data were calculated with the grain, sugar cane and oil as the main output of paddy fields, dry land Mu average output. Crop yields from 2003 ~ 2005 average unit price of agricultural products by 2007 second quarter Taihe county comprehensive market value. Arable land per-mu yield values in Table 4-2.

Table 4-1 Involved in the resettlement of affected peoples to relevant laws and regulations

law class	promulgation date	terms	the following chapters quote the relevant clause
LAW			
"PRC Land Management Law"	1999	The method for the People's Republic of China the land-use planning law. This Act Chapter 5 with particular emphasis on the resettlement problems, the first 47: requirements to pay compensation for land and resettlement subsidies but do not need to make the resettlement of the farmers maintain their standard of living, the provinces, autonomous regions, municipalities directly under the jurisdiction approval, which would increase subsidies for resettlement. However, land compensation and resettlement subsidies for the sum of not more than three years before the land was requisitioned an average annual output value of 30 times.	section 4,5 chapter
"PRC Water Law"	1988	Section 23: State water project construction must be due to resettlement, the local government should responsible for the proper arrangements for settlers living and production. Settlers resettlement fees required for the construction project should be included in the investment plan. And resettlement work should be completed in the construction stage.	section 4 chapter
STATUTE			
"Large and medium-sized water conservancy and hydropower project construction land compensation"	2006	Large and medium-sized water conservancy and hydropower project construction on farmland, the total of land compensation and resettlement subsidies fees charges levied for the first three years of cultivated land was the average annual output value of 16 times. Land compensation fees and placement needs to be subsidies	section 4,5 chapter

and resettlement Ordinance"		for the resettlement of affected peoples maintain the existing standard of living, and the need to raise standards by the legal person or department in charge of the project was approved by the project approval or approval. Other sites on the land compensation and resettlement subsidies for standards, in accordance with projects, provinces, autonomous regions, municipalities, the required standards implementation.	
"Water Conservancy and Hydropower Engineering Construction land requisition resettlements design specifications	2003	The Ministry of Water Resources issued	section 4 chapter
"Water Resources and Hydropower Engineering Indicators survey inundated by reservoir Rules"	1986	section 1,2,3,5 chapter	section 4 chapter
"Town Planning Standards"	1993	2□ Villages and towns grading scale, 4. Land Planning and Construction Standards	section 4,5chapter
"Water Conservancy and Hydropower Civil Engineering Construction Contract clauses		Generic and exclusive terms of the contract with the content, the use of such methods	section 9 chapter
The provinces presented to the implementation		About nation-building land acquisition compensation, the relevant provisions of the standard	section 4,5chapter

of the land management		grant	
The World Bank Operations Manual	2001.12	OP/BP/GP 4.12	Appendix 4-1

Table 4-2 Analyze and calculate the value of the per-mu yield about farmland

item		paddy land					dry land						
		early rice	Middle rice	late rice	mixed rice	Cole	legume	Potato species	peanut	gingeli	hemp species	sugarcane	Chinese herbal medicines
main product	yield (kg/mu)	335.7	367.4	334.9	230.2	53.1	87.9	327.3	137.8	47.3	28.9	3930.8	163.3
	price (yuan/kg)	1.5	1.6	1.6	1.1	3.5	4.5	0.6	4.0	6.0	3.8	0.25	5
	Output (yuan)	503.55	587.84	535.84	253.22	185.85	395.55	196.38	551.2	283.8	109.82	982.7	816.5
By-product output (yuan)		47.00	50.36	58.78	53.58	25.32	18.59	39.56	19.64	55.12	28.38	10.98	98.27
Output Subtotal (yuan)		516.98	553.91	646.62	589.42	278.54	204.44	435.11	216.02	606.32	312.18	120.80	1080.97
In the per mu yield of the crop sown area		0.915	0.915	0.054	0.938	0.001	0.417	0.039	0.43	0.64	0.093	0.0009	0.24
In the per mu yield of the crop sowing output		473.03	506.82	34.92	552.88	0.28	85.25	16.97	92.89	388.04	29.03	0.11	259.43
Output (Yuan/mu)		1180.15					838.57						

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According to calculation results, projects involved the integrated township in per-mu yield of paddy fields is 1180.15 yuan/mu, the per-mu yield of dry land is 838.57 Yuan/mu. Taking into account Shihutang avionics project occupation of cultivated land, mostly in Ganjiang along stair mesa, prone affect by Ganjiang flood, protection engineering part of cultivated land occupied by relatively good farming conditions, the comprehensive analysis of the item occupation of cultivated land into below two years - flood level and above 2 years flood level of one in two case compensation calculation. That is 2 years and above flood level of one in the compensation standard is calculated using the annual report information, 2, the following meet with a flood level of compensation standard is used field surveys, the proportion of farming systems were calculated according to a paddy field, dry land farming ratio. The per-mu yield of paddy fields is 957.69 Yuan/mu, the per-mu yield dry land value 647.01 Yuan/mu. See Table 4-3, Table 4-4, and Table 4-5, Table 4-6.

Table 4-3 Paddy field farming proportion

item	paddy field	cultivate system proportion			
		early rice-late rice	early rice-late rice-cole	late rice-cole	late rice
proportion		0.60	0.09	0.14	0.17

Table 4-4 Dry land farming proportion

item	dry land	Proportion of crops planting									
		Peanut-cole	Peanut-plantago	gingeli-cole	gingeli-plantago	seed watermelon-cole	seed watermelon-plantago	peanut	gingeli	sugarcane	penny's potato
proportion		0.31	0.10	0.23	0.05	0.04	0.02	0.11	0.08	0.04	0.02

Table4-5 Shihutang in the reservoir area paddy output value calculation table

planting mode		crop proportion	product name	yield (kg)	price (Yuan / kg)	annual output value (Yuan)	
						output value of the crop	total
1	early rice-late rice-cole	100	early rice	335	1.5	503	1221
		100	late rice	350	1.65	578	
		100	Cole	40	3.5	140	
2	early rice-late rice	100	early rice	335	1.5	503	1080
		100	late rice	350	1.65	578	
3	late rice-cole	100	late rice	350	1.65	578	718
		100	Cole	40	3.5	140	
4	late rice	100	late rice	350	1.65	578	578
Integrated output							957.69

(2) Compensation standards

Pursuant to section 471 orders to the State Council issued the "large and medium-sized water conservancy and hydropower project construction land compensation and resettlement regulations" and "implementation of Jiangxi province <PRC Law on Land Management> approach" identified this permanent land compensation and resettlement subsidies standards.

(a)Permanent land compensation and resettlement subsidies standards

Farmland: Based on the "large and medium-sized water conservancy and hydropower project construction land compensation and resettlement regulations," relevant regulations, determine the compensation for each mu of arable land and resettlement subsidies multiples from 16 times.

Paddy field, requisition compensation standards paddy fields were 18,882 Yuan/mu, 15,323 yuan/mu.

Dry land, dry land requisition compensation standards is 13,417 Yuan/mu, 10,352 Yuan/mu.

Garden plot, Reference dry land compensation standards, plus a nursery stock compensation costs 550 Yuan/mu, total compensation standards for 13,750Yuan/mu. Pound, fish ponds yield fish 480 kg/mu, 2.5 Yuan/jin calculation□compensation for expropriation admitted six times, placement subsidies admitted five times, the total compensation standards for 13,200 Yuan/mu.

In returning farmland to forests, the main planting Poplar, after investigation and analysis, an annual output value of about 480 Yuan/mu, according to "the implementation of Jiangxi Province <PRC Law on Land Management> approach", requisition compensation fee from six times, placement subsidies from five times, according to "The State Council on further improving the cultivated land Lin views of a number of policy measures, "the National Development [2002] on the 10th spirit and the State Council has recently decided, China's policy of returning farmland to forest grant another extension of a cycle. The expiry of the existing policy of returning farmland to forest subsidies, the central financial authorities will continue to direct subsidies to farmers cultivated land for the Yangtze River basin and the southern part of the annual grant for each mu of cultivated land for cash 105 Yuan, the Yellow River basin and the northern region to the annual subsidy for each mu of cultivated land for cash 70 yuan. The cultivated land to the original is per mu annually 20 Yuan living subsidies for farmers to direct subsidies, but linked to the responsibility to protect. The notification requirement extended cycle of returning farmland to forest ecological forest eight years, the economic forest five years, the grass two years. That is, giving food 150 kg if each mu of returning farmland to forest , under the current unit price per kilogram 1.6 Yuan, and the annual subsidy for each mu of cultivated land for the cash 125 Yuan, with 8 times and trees compensation fee 480 Yuan/mu, total compensation for 6760 Yuan/mu.

Economic Forest: similar reference projects, an annual output value of 380 Yuan/mu, according to "the implementation of Jiangxi province <PRC Law on Land Management> approach", requisition compensation and resettlement subsidies together by nine times, another tree and fouling of additional compensation costs 380 Yuan/mu, together compensation standards for 3800 Yuan/mu.

Timber Forest: annual output value from 340 Yuan/mu, according to "the implementation of Jiangxi province <PRC Law on Land Management> approach", requisition compensation and resettlement subsidies together by nine times, another tree

and fouling of additional compensation costs 300 Yuan/mu, total compensation for 3400 Yuan/mu.

Scanty Timber Forest: annual output value from 300 Yuan/mu, according to "the implementation of Jiangxi province <PRC Law on Land Management> approach", requisition compensation and resettlement subsidies together by nine times, another tree and fouling of additional compensation costs 300 Yuan/mu, total compensation for 3000 Yuan/mu

Table 4-6 Shihutang reservoir area of dry land annual output calculation table

planting mode		Corp proportion	product name	yield (kg)	price (yuan / kg)	annual output value (yuan)	
						output value of the crop	total
1	peanut-cole	100.00	peanut	100	4.00	400	540
		100.00	cole	40	3.50	140	
2	peanut-plantago	100.00	peanut	100	4.00	400	650
		100.00	plantago	50	5.00	250	
3	gingeli-cole	100.00	gingeli	50	6.00	300	440
		100.00	cole	40	3.50	140	
4	gingeli-plantago	100.00	gingeli	50	6.00	300	550
		100.00	plantago	50	5.00	250	
5	seed watermelon - cole	100.00	seed watermelon	50	4.00	200	340
		100.00	cole	40	3.50	140	
6	seed watermelon - plantago	100.00	seed watermelon	50	4.00	200	450
		100.00	plantago	50	5.00	250	
7	peanut	100.00	peanut	100	4.00	400	400
8	gingeli	100.00	gingeli	50	6.00	300	300
9	sugar cane	100.00	sugar cane	5000	0.25	1250	1250
10	penny's potato	100.00	penny's potato	2700	3.00	8100	8100
Integrated output							647.01

Grassland, and other unused land: Based on the "implementation of Jiangxi province <PRC Law on Land Management> approach."

(1) Now have planted (land status map for the unused land): according to 2 years below flood level of one in paddy fields, dry land annual output value of 16 times as compensation standards, in accordance with the circumstances of paddy field, the number of projected proportion of dry lands, and the comprehensive calculated priced at 6,533 Yuan/mu.

(2) previously but now farming had not planted (land status map for the unused land): According to 2 years - flood level following paddy fields, dry land annual output value of 10 times as compensation standards, in accordance with the circumstances of paddy field, the number of projected proportion of dry lands, and the comprehensive calculated priced at 4,403 Yuan / acre.

(3) Land not cultivated :( the unused land according to the land utilization map). Compensation shall be three times the annual output value of dry land that is 2516 Yuan/mu.

According to Jiangxi province implementation methods of Land Administration Law of the People's Republic of China, no compensation for state-owned and unused beach sands areas and natural rivers.

No compensation for the residential land in this project. During life resettlement, new requisitioned land shall be compensated as part of the infrastructure. Compensation is 7966 Yuan/mu.

(b) Compensation rates for temporary land acquisition

(1) The occupied land is for the construction of key project and reservoir protection project. According to the characteristics of the construction, land occupation time of key project is four years, and land occupation time of reservoir protection project is two years. In accordance with Jiangxi Province implementation methods of Land Administration Law of the People's Republic of China, compensation for arable land occupation can be made by multiplying the temporary occupation time and the annual output value, plus compensation for young plant (at half of the annual output value), considering compensation for the maturing land that is 400 Yuan/mu and the arable land reclamation cost that is 2000 Yuan/mu. Therefore, in the key project, compensation for temporary occupation of the paddy fields is 7711 Yuan/mu in total and compensation for the dry land is 6174 Yuan/mu. In the reservoir protection project, compensation for

temporary occupation of the paddy fields is 5350 Yuan/mu in total and compensation for the dry land is 4496 Yuan/mu.

(2) Woodland (open woodland). Multiply the temporary occupation time and the annual output value of the woodland that is 250 Yuan/mu. Compensation for the wood attachment is 150 Yuan/mu. So compensation for the woodland in the key project is 1150 Yuan/mu and compensation for the woodland in the reservoir protection project is 650 Yuan/mu.

(3) The unused land. Compensation is 500 Yuan/mu.

#### 4.2.2 Compensation for house and subsidiary buildings

Compensation for house is based on the average replacement cost of various houses. Compensation for framed house is 350 Yuan/m<sup>2</sup>. Compensation for brick concrete house is 300 Yuan/ m<sup>2</sup>. Compensation for brick-wood house (housing) is 270 Yuan/ m<sup>2</sup>. Compensation for brick-wood house (property house) is 200 Yuan/ m<sup>2</sup>. Compensation for mud-wood house is 150 Yuan/ m<sup>2</sup>. Compensation for miscellaneous house is 150 Yuan/ m<sup>2</sup>. In addition, compensation for the decoration and other costs of framed house, brick concrete house and brick- wood house (housing) is 50 Yuan / m<sup>2</sup>. According to the survey of the housing cost, existing standard can cover the replacement costs. Compensation for subsidiary buildings is based on average replacement costs.

In the budget, Calculate unit area cost of private house with brick concrete structure. According to on-site survey and calculation of the farmer's new house in the project (farmers in non-resettlement area), make a detailed investigation to wages, building materials and decoration conditions. On-site investigation of three houses shows little difference in basis cost and decoration cost affecting the house price. Price determining of other types of house refers to compensation rates of hydraulic engineering. House cost is shown in Table 4-7, Table 4-8, Table 4-9 and Table 4-10.

Table 4-7 Questionnaire of housing cost

administrative: Yongchang village Tangzhou town Ji'an city Taihe county Jiangxi province							
householder: ChenYu-hua			house structure: masonry		Floors: 3	completion date: August 2006	
foot print of house: 90 m <sup>2</sup>			housing total construction area: 270 m <sup>2</sup>			decoration degree:	
material name			unit	number	unit price (yuan)	total price(yuan)	remarks
1	wage	civil engineering	man-days	320	30	9600	
		installation engineering	man-days	120	50	6000	
2	stone	sand	m <sup>3</sup>	90	38	3420	
		stone	m <sup>3</sup>	50	30	1500	
3	ceramic materials	standard brick 240×115×53mm	10 <sup>3</sup>	60	220	13200	
		clay tile 380×240mm	10 <sup>3</sup>				
		small tile	10 <sup>3</sup>				
4	cement materials	quick lime	kg	2600	0.2	520	
		cement#425	t	34	330	11220	
		pitch	kg				
		asphalt felt	m <sup>2</sup>				
5	glass	Glass δ=4mm	m <sup>2</sup>				
		aluminum	m <sup>2</sup>	80	125	10000	
6	wood	Chinese fir	m <sup>3</sup>				
		ordinary wood	m <sup>3</sup>				
7	steel	reinforcing steel I	t	4.5	3300	14850	
		wire	t	30	4.8	144	
8	fuel	electricity	10 <sup>3</sup> w.h	320	0.6	192	
		water	m <sup>3</sup>	350	1.5	525	
9	pipe	steel pipe valves				1560	
		stainless steel buckets		1	400	400	
10	template		m <sup>2</sup>	450	6.5	2925	
11	packaged door			8	300	2400	
12	steel fees		m <sup>2</sup>	12	180	2160	
13	basic fees					6100	
14	meals fees					3200	
15	other	electricity, indoor general decoration				18040	
Total: 10.7956×10 <sup>4</sup> yuan. include decoration cost 1.814×10 <sup>4</sup> yuan, take 15.6% of total cost.							
renovation costs include the painting of the outside wall, terrazzo floor on the first floor, tiles, water and electricity indoors installation fee stainless steel handrail of staircase on second and third floor							

Table 4-8 Questionnaire of housing cost

administrative: Shandong village Yanxi town Taihe county Ji'an city Jiangxi province							
householder: Kuang Zhi-qing			house structure:		Floors: 3	completion date: October 2004	
foot print of house: 160 m <sup>2</sup>			housing total construction area: 353 m <sup>2</sup>			decoration degree:	
material name :			unit	number	unit price (yuan)	total price(yuan)	remarks
1	wage	civil engineering	man-days		32	18500	
		installation engineering	man-days			1400	
2	stone	sand	m <sup>3</sup>			2000	
		stone	m <sup>3</sup>			500	
3	ceramic materials	standard brick 240×115×53mm	10 <sup>3</sup>	96	125	12000	
		clay tile 380×240mm	10 <sup>3</sup>				
		small tile	10 <sup>3</sup>				
4	cement materials	quick lime	kg		0.06	3500	
		cement#425	t		250	11000	
		pitch	kg				
		asphalt felt	m <sup>2</sup>				
5	glass	Glass δ□4mm	m <sup>2</sup>	44		6500	
		wire				600	
6	wood	chinese fir	m <sup>3</sup>		500	1800	
		ordinary wood	m <sup>3</sup>				
7	steel	reinforcing steel□	t			45000	
		wire	t			500	
8	fuel	electricity	10 <sup>3</sup> w.h			700	
		water	m <sup>3</sup>	250	1.5	375	
9	pipe	for door				2300	
		for stair				1600	
10		foundation treatment				4000	
11		decoration				6500	
		life hospitality				3000	
		input of householder				3600	
Total: 12.5×10 <sup>4</sup> yuan. include decoration cost 0.65×10 <sup>4</sup> yuan, take6.2% of total cost.							
renovation costs include facade renovation							

Table 4-9 Questionnaire of housing cost

Administrative: Pingshang village Wanhe town Taihe county Ji'an city Jiangxi province							
householder: Xiao Ke-hai			house structure: masonry		Floor: 3.5	completion date: December 2003	
foot print of house: 0.1072 mu			housing total construction area: 300 m <sup>2</sup>			decoration degree:	
material name			unit	number	unit price (yuan)	total price(yuan)	re- marks
1	wage	civil engineering	man-days	400	35	14000	
		installation engineering	man-days	20	50	2000	
2	stone	sand	m <sup>3</sup>	119	38	4522	
		stone	m <sup>3</sup>	60	28	1680	
3	ceramic materials	standard brick 240×115×53mm	10 <sup>3</sup>	80	220	17600	
		clay tile 380×240mm	10 <sup>3</sup>				
		small tile	10 <sup>3</sup>				
4	cement materials	quick lime	kg	28	0.2	5600	
		cement#425	t	35	330	11550	
		pitch	kg				
		asphalt felt	m <sup>2</sup>				
5	glass	Glass δ=4mm	m <sup>2</sup>				
		wire		89	135	12000	
6	wood	Chinese fir	m <sup>3</sup>				
		ordinary wood	m <sup>3</sup>				
7	steel	reinforcing steel I	t	5.42	3300	17886	
		wire	t	36	4.8	172.8	
8	fuel	electricity	10 <sup>3</sup> w.h	360	0.59	212.4	
		water	m <sup>3</sup>	380	1.5	570	
9	pipe	steel pipe valves				1680	
		steel bucket		1	400	400	
10	template		m <sup>2</sup>	540	6.5	3510	
	packaged door			5	560	2800	
	steel fees			18	200	3600	
	other	electricity, indoor general decoration				18916.6	
Total: 11.87×10 <sup>4</sup> yuan. include decoration cost 1.88×10 <sup>4</sup> yuan□take14.6% of total cost.							
renovation costs include porcelain plate, indoors floor, water and electricity indoors Installation fee, stainless steel handrail of staircase and door							

Table 4-10 Summary of housing cost(masonry)

name	construction area	total cost(10 <sup>4</sup> yuan)		unit price(yuan)
	(m <sup>2</sup> )	total	include : renovation cost	composite price
Chen Yu-hua	270	10.8	1.814	399.84
Kuang Zhi-qing	353	12.5	0.65	354.11
Xiao Ke-hai	300	11.87	1.88	395.67

#### 4.2.3 Subsidies for the relocation of affected peoples

Subsidies for the relocation of affected peoples mainly include transfer costs, material losses fees, delay subsidies, board and lodging on the way and so on.

Considering the characteristics of this project that latterly settled relocation or moving to nearby places is the main relocation method, determine subsidies for the relocation are 250 Yuan / person.

In the earlier stage of relocation, life and other subsidies are 250 Yuan/person.

#### 4.2.4 Compensation for special facilities

Special facilities affected are roads, various lines and so on. In accordance with their original size, original standard (grade) or the principle of restoring the original function, determine the compensation rates referring to similar projects.

#### 4.2.5 Compensation for utilities and infrastructure

Utilities and infrastructure include new requisitioned land, ground leveling, roads of the relocation site, water supply, drainage, electricity and others (including schools, hospitals, places of business, cultural and entertainment, etc.). According to typical design of the relocation site, compensation is 1600 Yuan / person.

Considering the difficulties of a few weak households, compensation for them is 5000 Yuan/household.

#### 4.2.6 Compensation of enterprises and institutions

Because of different effect degree, industry, and relocation distance, compensation is calculated by the following two kinds of types.

(a) Production of the enterprises and institutions is not affected. According to the aforementioned standards, pay compensation for the house, subsidiary buildings, the requisitioned land and other material objects.

(b) Production of the enterprises and institutions is affected. In accordance with their original size, original standard (grade) or the principle of restoring the original function, the cost of their rebuilding should be included. Compensation for facilities, losses induced by the suspension of production and transfer costs should also be included in the compensation of enterprises and institutions.

Compensation rates are shown in Table 4-11, Table 4-12 and Appendix 4-1.

Table 4-11 Compensation rates of the project

number	name of the costs	units	compensation rates(Yuan)	note
part one	compensation for permanent land acquisition and resettlement subsidy			
	1. arable land			
	(1) paddy fields	mu		
	more than once every two years	mu	18882	
	less than once every two years	mu	15323	
	(2)dry land	mu		
	more than once every two years	mu	13417	
	less than once every two years	mu	10352	
	2. garden plot	mu	14017	
	3. fishpond	mu	13750	
	4. forest land returned from arable land	mu	6760	
	5. economic forest	mu	3800	
	6. timber forest	mu	3400	
	7. open forest land	mu	3000	
	8. new acquisition land	mu	7966	
	9. unused land	mu		
	(1)cultivated now	mu	6533	
	(2) cultivated before	mu	4403	
	(3)not cultivated	mu	2516	
part two	temporary land acquisition for construction			
	1. arable land			
	(1) paddy fields	mu	5350	
	(2) dry land	mu	4496	
	2. forest land	mu	650	
	3. the unused land	mu	500	
part three	compensation for the residential house and subsidiary buildings			

Continued table 4-11 Compensation rates of the project

number	name of the costs	units	compensation rates(Yuan)	note
	1. house			decoration costs and other costs on average
	(1) framed house	m <sup>2</sup>	350	50
	(2) brick concrete house	m <sup>2</sup>	300	50
	(3) brick- wood house	m <sup>2</sup>		
	residential house	m <sup>2</sup>	270	50
	property house	m <sup>2</sup>	200	
	(4) mud-wood house	m <sup>2</sup>	150	
	(5) miscellaneous house	m <sup>2</sup>	100	
	2. subsidiary buildings			
	(1) enclosing wall	m <sup>2</sup>	25	
	(2) cement ground	m <sup>2</sup>	20	
	(3)press well	each one	200	
	(4) water well	each one	1000	
	(5) manure pit	each one	200	
	(6)methane pool	each one	800	
	(7) cooking range	each one	200	
	(8) simple building	each one	50	
	(9) gate construction	each one	1000	
	(10) fixed telephone	each one	180	
	(11) cable television	household	600	
	(12) grave	each one	300	
part four	compensation for the relocation	person	250	
part five	infrastructure construction of the relocation site	person	1600	
part six	other subsidies for the resident			
	1. sporadic fruit tree	each one	50	
	2. other subsidies	person	250	
	3. subsides for vulnerable groups	household	5000	

Continued table 4-11 Compensation rates of the project

number	name of the costs	units	compensation rates(Yuan)	note
part seven	compensation for rural water conservancy works			
	1.small hydropower station	kW	5000	
	2.small-sized lift irrigation facilities	each	20000	
	3. drainage facilities	each	5000	
	4.diversion canal	km	30000	
	5.sand pit	each	50000	
part eight	compensation of enterprises and institutions			
	1. house			decoration costs and other costs(average)
	(1) framed house	m <sup>2</sup>	350	50
	(2) brick concrete house	m <sup>2</sup>	300	50
	(3) brick- wood house	m <sup>2</sup>	270	50
	(4) mud-wood house	m <sup>2</sup>	150	
	(5) miscellaneous house	m <sup>2</sup>	100	
	2. subsidiary buildings			
	(1) enclosing wall	m <sup>2</sup>	25	
	(2) cement ground	m <sup>2</sup>	20	
	(3) press well	each	200	
	(4) water well	each	1000	
	(5) cooking range	each	200	
	(6) simple building	each	50	
	(7) manure pit	each	200	
	(8) gate construction	each	1000	
	(9) water tower	each	20000	

Continued table 4-11 Compensation rates of the project

number	name of the costs	units	compensation rates(Yuan)	note
	3.transfer costs	m <sup>2</sup>	15	
	4.compensation for the infrastructure	m <sup>2</sup>	70	
part nine	compensation for the restoration of specialized project			
first	restoration of the transportation facility	km		
	1.fourth-class road	km	500000	
	2. roads for transporting (cement pavement)	km	240000	
	3.new bridge of the fourth-class road	each	200000	
	4. wharf	each		
	(1) reinforcement of the cargo-passenger wharf	each	250000	
	(2) reinforcement of the freight wharf	each	250000	
	5 ferry strength			
	(1) steam ferry reinforcement	couple	250000	
	(2) manual feery reinforcement	couple	150000	
second	telecom infrastructure of China Telecom	km		
	1. aerial optical cable	km	35000	
	2. underground optical cable for rural telecom	km	30000	
third	communication facilities of China Mobile	km		
	1. aerial optical cable	km	35000	
	2. underground optical cable	km	50000	
fourth	communication facilities of China Unicom	km		
	1. aerial optical cable	km	35000	
	2. underground optical cable	km	50000	
fifth	military communication facilities	km		
	1. aerial optical cable	km	25000	
	2. underground optical cable	km	50000	
sixth	CATV facilities	km		
	1. aerial optical cable	km	20000	
seventh	transmission and substation facilities			
	1. 35kV line	km	60000	
	2. 10kV line	km	45000	

	3. 0.4KV line	each	15000	
	4. transformer	each	10000	
eighth	others			
	1. waterworks	each	700000	
	2. sedimentation tank	each	200000	
	3. electric power station	kw	3500	
	4. hydrologic station	each	1500000	
	5. navigation mark project		500000	

Table 4-12 Entitlement matrix of a proposed compensation and resettlement policy

effects of the project	the affected people or entity	compensation policy	other measures
loss of permanent land acquisition	arable land, forest land , garden plot ,fishpond and related agricultural population affected by reservoir area, key project and reservoir protection project	<input type="checkbox"/> If land is available, provide equivalent land nearby. <input type="checkbox"/> Pay compensation for the affected villages in cash <input type="checkbox"/> Compensation is the output value of arable land .Compensation multiple is determined according to related laws on land management <input type="checkbox"/> . <input type="checkbox"/> Compensation rates are shown in Table 4-11.	<input type="checkbox"/> Adjust land in the original village or the relocation village. <input type="checkbox"/> Use the compensation for land development in order to make more effective use of land.
loss of temporary land acquisition	arable land near dam sit and protection embankment	<input type="checkbox"/> Pay compensation for temporary land acquisition (compensation is based on the annual output value and reclamation cost). <input type="checkbox"/> Compensation rates are shown in Table 4-11.	<input type="checkbox"/> Return the land after cooperation.
house, subsidiary buildings, sporadic fruit tree and so on	house, subsidiary buildings and resident affected by land acquisition for reservoir area ,key project and reservoir protection project	<input type="checkbox"/> Compensation for private housing (rural and urban) is included. <input type="checkbox"/> Relocate affected peoples in the original village if possible and provide residential land <input type="checkbox"/> in the original village <input type="checkbox"/> . <input type="checkbox"/> If it is not possible, chose the relocation site as close as possible (collective relocation). <input type="checkbox"/> Exchange house in the urban. <input type="checkbox"/> Pay compensation to urban affected peoples in cash (based on the original housing area). <input type="checkbox"/> Compensation rates are shown in Table 4-11.	<input type="checkbox"/> Materials removed from the old house can be used for the construction of new house. <input type="checkbox"/> Provide help when affected peoples build new house. <input type="checkbox"/> In the transition period, provide housing and financial assistance. <input type="checkbox"/> Transfer subsidies are paid to each household.

loss of crops	crops occupied by reservoir area ,key project and reservoir protection project	<input type="checkbox"/> Pay compensation to the affected farmers in cash (based on average output value for the previous three years).	<input type="checkbox"/> Avoid land acquisition in harvest season to reduce the loss of crops.
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effects of the project	the affected group	compensation policy	other measures
enterprises and institutions	enterprises ,institutions and the staff	<input type="checkbox"/> Compensation for land, buildings and facilities. <input type="checkbox"/> Compensation for suspension of the production and transfer costs. <input type="checkbox"/> Compensation rates are shown in table 4-11.	<input type="checkbox"/> During the transition period, provide enterprises with temporary venue to continue work or compensate for the loss of wages.
loss of utilities	housing and water, electricity and sanitation facilities of the enterprises	<input type="checkbox"/> Compensation for rebuilding water, electricity and sanitation facilities (former infrastructure). <input type="checkbox"/> Compensation rates are show in Table 4-11.	
infrastructure	water, electricity telecommunication and broadcasting facilities and roads	<input type="checkbox"/> Compensate the infrastructure owner. <input type="checkbox"/> Compensation rates are shown in Table 4-11.	<input type="checkbox"/> Timely distribute the land for infrastructure rebuilding.
effects on weak groups	Affected peoples who are the elderly, orphans, widows and families without labor.	<input type="checkbox"/> Pay additional subsidies to weak groups. <input type="checkbox"/> Compensation rates are shown in Table 4-11.	<input type="checkbox"/> Pay subsidies to the weak groups as early as possible.
loss of cultural property	Great impacts haven't been found in the project.	<input type="checkbox"/> not suitable	<input type="checkbox"/> not suitable

**Foundations:**

- (a) Land Administration Law of the People's Republic of China (1999)
- (b) Rule for land requisition compensation and resettlement of mid-large scale water conservancy and hydropower project (No.471 order of state council,2006)
- (c) Rule for resettlement plan of water conservancy and hydropower project  SL290-2003
- (d) Investigation rules for tangible material indices of reservoir inundation (1986)
- (e) Jiangxi Province implementation methods of Land Administration Law of the People's Republic of China (2001)

(f) Jiangxi Province implementation methods of Land Administration Law of the People's Republic of China (2001)

Appendix 4-1 The application of World Bank Guidelines to the project

Manual No.	brief requirements	unrelated	relation to the entire report	applicable sections
OP4.12	guide to practice		X	
1	Resettlement planning and implementation must meet the following section 4 requirements.			
2	Policies apply to all parts of the resettlement project due to the use of land or water resources.			Chapter 2
3	Avoid or minimize involuntary resettlement, wherever feasible.			Chapter 1
4	The objective of the resettlement project is that affected peoples are not adversely affected and benefit from the project.		X	
5 a	1 Must tell the resettlement family their choice and rights. 2 In the choice of the resettlement way must consult with affected peoples. 3 The losses caused by the project must be compensated timely and fully. 4 If replacing arable land , the production capacity of the new arable land can not be worse than the original arable land. 5 During the transition period , support resettlement families to maintain income level.			7.4,6.3, 5.3,7.9 and Chapter 4
5 b	Support should be given to resettlement families who have formal rights or ‘customary’ rights.	X		
5 c	Must tell resettlement communities the resettlement plan promptly and provide opportunities for them to participate in resettlement, implementation and monitoring.			7.4
5 d	Must tell the hosts promptly and provide opportunities for them to participate in resettlement, implementation and monitoring.			7.4

5□e□	Maintain social and cultural conditions of original villages and relocation site if possible.		X	
5□f□	Before the resettlement, ensure that compensation has been paid, new house construction has been completed and income way has been prepared.			7.9, Chapter 9
5□g□	Must monitor the implementation of resettlement.			Chapter 9
benefit qualification				
6	The borrower must prepare acceptable procedure to World Bank, in which the compensation qualification has been determined clearly (including public participation).			7.4
7□a□	Affected peoples who have a legal right to use land and water resources have benefit qualification.			
7□b□	Affected peoples who have ‘customary’ rights also have benefit qualification.	X		
8	Affected peoples who illegally use land and water resources do not have the benefit qualification, but they should be given some other kinds of relocation.	X		
resettlement plan				
9	Resettlement plan prepared by borrowers must be in accordance with OP4.12.		X	
10	The borrower must regard resettlement as part of the implementation plan of the project.			Chapter 1
11	The borrower must make the draft of resettlement plan open .a and b types of Word Bank projects should be open before the overview assessment.			7.6
12□a □	World Bank uses into shop to make the draft of resettlement plan open.			7.6

12 <input type="checkbox"/> b <input type="checkbox"/>	After approval of the final resettlement plan, the borrower and World Bank make the plan open.			7.6
13	The agreement of resettlement plan must reflect the elements of the project .The borrower must notify World Bank the progress of the project promptly.			8.2
projects containing subprojects				
SI and FI loan				
14	For SI loan, the borrower must submit to World Bank the framework of resettlement policy which should be in accordance with OP4.12 and include requirement information in section 14.	X		
15	For FI loan, the same as the 14th.	X		
16	For SI and FI loan of the subprojects, the borrower should submit the resettlement plan in accordance with OP4.12 before the overview assessment.	X		
other projects containing subprojects				
17	For SI and FI loan of the subprojects, the borrower should submit the draft of resettlement plan before the overview assessment (special situation is shown in the 17th).	X		
agent of the approval right				
18	for terms of the 14th, 16th, 17th	X		
resettlement support				
19	The World Bank will provide the following help	X		
	<input type="checkbox"/> a <input type="checkbox"/> various aspects of resettlement planning	X		

	<input type="checkbox"/> b <input type="checkbox"/> technical support financing for improving the capacity of resettlement agency	X		
	<input type="checkbox"/> c <input type="checkbox"/> technical support for policy, strategy and plan of the resettlement		X	
	<input type="checkbox"/> d <input type="checkbox"/> resettlement investment	X		
GP4.1 2	good down methods	X		
resettlement planning				
responsibilities of the agency				
1	<input type="checkbox"/> a <input type="checkbox"/> The borrower or executing agency should make institutional framework of the resettlement management as soon as possible during the preparation of the project.			Chapter 6
	<input type="checkbox"/> b <input type="checkbox"/> If necessary, the borrower's or the agency's capacity of resettlement planning and implementing should be enhanced through a variety of means, including the establishment of separate resettlement department.			6.9,6.5
community's participation in the process of relocation				
2	If possible, maintain the existing social system and relocate people in groups during resettlement planning.			Chapter 4
3	During resettlement planning and implementing, public participation of affected peoples and hosts is necessary.			7.4
4	Resettlement planning should ensure that conditions of the relocation site will not deteriorate due to the resettlement.			7.10
compensation and rights				

5□a□	If loss of the arable land is less than 20 percent, pay compensation in cash or replace arable land of the same quality.			4.4
5□b□	If loss of the arable land is more than 20 percent, the same as 5(a).			4.4
complain				
6	Resettlement plan must include practical methods of dispute resolution.			7.7
site selection				
7	Choose the best location site, considering the affected peoples' income level.			
8	Successful resettlement implementing needs to transfer the responsibility from resettlement agency to the affected peoples.			7.9,6.8.2
infrastructure and social services				
9	Resettlement planning should allow the affected peoples to build house by themselves.			4.3
economic development				
10	Resettlement planning should find all possible means of income.			4.4
environmental protection and management				
11	Resettlement planning must meet environmental requirements.			8.4,6.4, Chapter 9
	timetable for implementation, monitoring and evaluation			
12	Resettlement monitoring agency must have sufficient funds and involve resettlement experts.			Chapter 9

implementation and management				
13	Review the progress of projects regularly (including the occasional in-depth investigation).	X		
<input type="checkbox"/> APLS <input type="checkbox"/> resettlement				
14	For projects (APLS) including resettlement, a better approach is to establish laws and institutional framework of resettlement referring to the previous projects (APLS).	X		

## **5 IMPLEMENTAL PLAN OF RESETTLEMENT RELOCATION**

### 5.1 Guideline principles and objectives of implemental plan for resettlement

Shihutang hydropower project is a social welfare project, and its main aim is to raise Ganjiang fairways' grade, and the implementation of the project will also produce about  $4.8 \times 10^8 \text{ kW} \cdot \text{h}$  of electricity efficiency annually. At the same time, new reservoir dike can bring a corresponding increase the flood control standards in some regions of the reservoir area along the river. Therefore, Shihutang hydropower project will bring the residents' production and lives a certain degree of influence, but immigrants held in support of the project. As resettlement covers a wide range and includes related policy and complicating social factors, the resettlement is reasonably practicable and will be directly related smoothly to the implemented project of the reinforcement and have a far-reaching impact. of the area's economic development and social stability. Therefore, according to the relevant national and local laws, regulations, rules, the World Bank involuntary resettlement policy and World Bank procedures OP / BP 4.12, and experience of another resettlement, implemental plan's guideline, principles and objectives of resettlement can be worked out as follows:

#### 5.1.1 Implemental plan's guideline of resettlement

According to the spirit of "large and medium-sized hydropower project construction's land compensation and immigrant resettlement regulations" and the actual situation of the project, the guideline of resettlement Plan is shown as follows:

- (a) Resettlement plan should be combined with the strategic thinking, including implement of social, economic and environmental sustainable development, and it can coordinate with social and economic development, resettlement, environment.
- (b) According to properties of resources and placement capacity in the resettlement, choosing reasonably on life and productive resettlement and leaving room appropriately for development, each one can resume or overpass the original standard of the necessary material foundation for living;
- (c) According to coordinating the plan making economic and rational use of the compensation exploiting local nature resource, and realizing growth of the economy on immigrants and non-immigrants district simultaneously, the immigrant would live happily and work leisurely.

#### 5.1.2 Principle of resettlement plan

- (a) Saving land is Chinese basic national policy. Resettlement planning should be based on the actual condition of more people in less land, so reducing the number of occupied land and the immigrants should be considered as far as possible.
- (b) The resettlement plan should make coordination with rectification of land, the national economy and social development. Resettlement should be combined with construction of area, exploitation of natural resources, economic development, protection of environment and conservation of soil and water .According to local conditions, the measures about recovery and development of resettlement production should be enacted. All these provisions would make good conditions about the development of immigrants.
- (c) According to implementing the immigrants' principle of exploratory, upholding static support, preferential policies and the overall situation, balancing state, the collective and individual interests of the three sides, immigrants have been made to reach or exceed the original living levels;
- (d) The productive resettlement of migrants should mainly relay on large-scale farming and base on land. Resettlement plan must cherish and develop the land resources priorly. By means of saving water and soil strictly and improving the ecological and environmental conditions, development of wasteland resources would be planned reasonably;
- (e) Choice of resettlement areas should follow the principle of convenience to product, convenience to live, saving land and insurance of safety. In the premise of the environment, as far as possible on the nearest from post, decentralized and centralized ways of resettlement should be taken;
- (f)Resettlement should be connected with town planning and urban planning
- (g) Resettlement plan should fully reflect the will of immigrants and should be understood and consented by the migrant;
- (h) The scale and standards of relocation projects construction should take the principle of restoring the original scale, the original standard (grade) and the original function. With regional development, the necessary required investment of expanding the scale, improving standards and long-term planning should be resolved by the local government and departments.

## 5.2 Target of resettlement plan

Construction period of this project will be 2008 to 2012 preliminarily. According to arrangements of water storage, we make sure that this resettlement planning base year is 2007 and the planning level year is 2011.

The objectives of resettlement planning:

(a) Resettlement could secure their housing, find out a new way of production and reach or exceed the previous standard of living.

(b) People would be helped to improve their standard of living.

(c) Environment of settlements living, public facilities, infrastructure would be resumed and improved.

### 5.3 Plan of resettlement production

#### 5.3.1 Object of productive resettlement

Object of productive resettlement is the population due to the loss of land requisition. According to the "People's Republic of China Land Management Law", the relevant provisions: "The population need to be resettled is calculated according to the formula: the quantity of cultivated land occupied divided by this area per capita before the resettlement ". Formula: □

$$P_T = S \div A \times (1+f)^{T_2-T_1}$$

□

In formula:  $P_t$  means the population of productive resettlement in the year of T

□

S means the arable requisitioned land

A means arable land area per head in planning base year

f means the natural population growth rate

$T_2$  means planning level year

$T_1$  means planning base year

According to this project arrangement of water storage, the planning base year is 2007 and the planning level year is 2011. Taking village for the unit by using formula in this stage, under the present conditions, a total agricultural population of 2139 is needed to be

relocated. According to Taihe county statistics, natural growth rate of the population in the project areas is 9 percent. By this ratio, in planning level year, productive resettlement population is 2191.

Population of agricultural productive resettlement in project area is shown as in Table 5-1.

### 5.3.2 Resettlement targets

By measures of the new construction or reinforcement in the dike of reservoir, the land of Shihutang hydropower project is local or zonal distribution. Per capita arable land is decreased from 1.57 mu to 1.47 mu in the regional land of requisition, and decreasing rate is just 6.4 percent. At the same time, due to land dispersion in 53 administrative villages, the expropriation of farmland in construction have less effect on the local people's basic living capacity.

The production target of resettlement is to reach, or exceed the original standard of living. , According to the regional socio-economic survey, the average annual income of datum lever is about 4,842 yuan / person (including family operating income,4665.6 yuan / person).And as for its originations, the first source of industry revenue accounts for 47.4%, family business revenue for 1.9%,and temporary wage income accounts for 31%.It can be seen that local primary industry (agriculture, forestry, livestock, fishing) and temporary wage income is the two primary channels of income for the farmers (seen table 5-2,5-3). According to statistics in Taihe county, the growth of the first source of industry revenue of rural households is about 8.8%, and income on other source accounts for about 19.2 %.Therefore, the primary industry revenue for rural households on the datum lever is about 3,491 yuan / person, other income about 6132 yuan / person. Shihutang avionics project, the main impact on immigrates is reduction of farmland resources, and this directly affects their changes on primary industry revenue. Based on the analysis above, criteria for the resettlement of migrants production is determined as follow: if the work occupies less than 10% of the overall cultivated land, adjust farmland in the village resettlement, and the per capita arable land swap should not be less than the per capita arable land of the village, and if lmore than 10% ,adjust arable land resettlement through the adjacent villages, and according to the existing arable land resources, the per capita arable land swap standard of 1.2 mu to 1.8 mu.

After the resettlement of migrants, the number of per capita arable land area would be reduced, and the per capita agricultural income will experience a corresponding decline. Wage income and other income changed slightly.

Protection zones are largely in both bank of Ganjiang River. Most of the status is without protection from levees, and some of the existing farmland is often endangered by flood in the Ganjiang river, therefore there is a low production. However, after the protection project is completed, the flood control standards will be enhanced (the design flood standard in rural protective zone is the first in ten years), so the measures can be taken to strengthen the construction of water-conservation measure in agriculture and land reclamation in protection zones, transform the low yield fields to the good fields, increase yield per unit area and increase the farmers' income.

Total investment of the item can be used in the land compensation of resettlement production is about 6968.78 million yuan. Security funds is provided for the local production and development .Part of the land compensation funds can be used to improve the water-conservation measure in agriculture, to promote new farming technology actively, to optimize planting structure and expand the proportion efficient economic crop cultivation, to establish the agricultural industrialization base, to develop the eco-agriculture (greenhouse vegetables, melons and other fruits) and to farm commodity rate. All these can make the farmers' income increased.

Through the implementation of these measures, farmers can achieve the agricultural income level before construction of the reservoir .At the same time, Shihutang hydropower project's average power is  $4.8 \times 10^8$  kW.h, The reliable electricity will provide the local with development of the processing industry and commerce industry , more job opportunities, and increase the income of residents correspondently.

According to the survey results, the house of the residents in the project area is mainly in masonry wood (about 75.8%). internal emplacing of most settlements is cluttered, and health status is poor. According to the plan, after the relocation of migrants, the settlements will be emplaced within a unified plan, and residents housing construction will be mainly the brick. Immigrants living conditions will be improved.

In addition, according to "The State Council on the views of improving the latter part of large and medium-sized reservoirs immigration policies for supporting " State of the [2006] on the 17th, the resettlement of large and medium-sized reservoirs will get the support.

According to the placement and support measures, immigration income will be steady growth, and immigration life can meet or exceed the original standard of living.

Table 5-2 Table for per capita income of rural residents(planning basic year)

item	basic conditions		
	units	number	proportion of the income of the year
1.operating revenue	Yuan	4665.65	96.36%
primary industry	Yuan	2294.18	47.38%
family business	Yuan	575.63	11.89%
temporary workers	Yuan	1498.75	30.95%
wages and bonuses	Yuan	206.89	4.27%
other operating revenue	Yuan	90.2	1.86%
2.non-operating revenue	Yuan	176.16	3.64%
total	Yuan	4841.81	100.00%

Table5-3 table for per capita expenditure of rural residents(planning basic year)

item	basic conditions		
	units	number	proportion of the expenditure of the year
1.production expenditure	Yuan	892.89	20.10%
agriculture production expenditure	Yuan	749.41	16.90%
second industry expenditure	Yuan	98.83	2.20%
tertiary industry expenditure	Yuan	44.65	1.00%
2.fixed assets of production	Yuan	53.86	1.20%
3.tax expenditure	Yuan	19.01	0.43%
4.living expenditure	Yuan	3084.16	69.70%
staple wholesale food	Yuan	1649.08	37.30%
clothes shoes and cap	Yuan	202.33	4.60%
living thing	Yuan	344.68	7.70%
fee of newspapers and tuition	Yuan	355.81	7.80%
transportation and communications cost	Yuan	359.89	8.10%
medical expenditure	Yuan	129.65	2.90%
5.property and metastasis expenditure	Yuan	375.32	8.50%
total expenditure	Yuan	4425.24	100.00%

### 5.3.3 Environmental capacity analysis

By measures of the new construction or reinforcement in the dike of reservoir, the land of Shihutang hydropower project is local or zonal distribution. Per capita arable land is decreased from 1.57 mu to 1.47 mu in the regional land of requisition, and decreasing rate is just 6.4 percent. The expropriation of farmland in construction make less affection on the local people's basic living .At the same time, due to land regional dispersed in 53 administrative villages, the way of adjusting farmland and changing low-yielding farmland should be taken to solve the problem of Immigrants resettlement.

Analysis and calculation of agriculture resettlement environmental capacity is shown as in Table 5-4

#### 5.3.4 Productive resettlement program

Most of the villages in the affected area, have rich land resources in the item, so planning should be agriculture resettlement mainly. By adjusting the planting structure and changing the low-yielding farmland, the path should be taken of the combinative development on farming, trade and migration. The focus is to improve the conditions of agricultural production, limited by the land resource which can not recover to the original living standards by planting, so those Villages should shift to the development of aquaculture industry, processing industry, the restaurant industry, and commerce industry, and other secondary and tertiary industries as well as skills training organizations to work elsewhere. By the above productive resettlement measures, the target would be achieved of restoring or exceeding the original level of farmers' working and living standards.

Adjustments farmland is 2582.1mu in the item, and the resettlement of local people is 1969. The transformation of low-yielding farmland is 100 mu and have resettled 10 farmers. Aquaculture industry has resettled 88 farmers. Secondary and tertiary industries have resettled 124 farmers. Those are accounted for 89.9 percent, 0.5 percent, 4.0 percent and 5.6 percent. Agriculture migrants productive resettlement planning is shown in Table 5-5.

##### (a) Adjusting the structure of agriculture

There is a single planting in the resettlement area. The major product is rice, vegetables, etc. Most farmers have planted them generally poor in quality and quality. Their income is low, and the market competitiveness is not strong.

Therefore, using the advantages of vicinity of the town, promoting agricultural science technology, optimizing the structure of farming expanding the ratio of economic crop cultivation, establishing Penny's potato fruit base to introduce new varieties and to practice some technical training, the income of villagers would have increased .In

addition, increasing the area in cultivation of vegetables, developing eco-agriculture (greenhouse vegetables, melons and other fruits) and increasing farm commodity rate can increase the farmers income.

(b) Transformation low-yielding farmland and improving water facilities

With full use of the existing resource, the construction of water-conservation measure in agriculture and land reclamation should be strengthened. Changing the low yield fields to the good fields, increasing yield per unit area, not cutting the yield and increasing the income of the farmers could make stability and improvement for the living standards of farmers.

(c) Aquaculture industry

The villagers have lived in both banks of Ganjiang river in the project area for long time. They know waterborne well and have good fishing. After cutting the river for water storage, aquaculture can be done in old river. The villagers accept the technical training, and the economy in resettlement areas has broad prospects for development.

(d) Development of the secondary and tertiary industries

With the completion of this project, the investment environment would be improved and the immigrants would be brought to more job opportunities. The secondary and tertiary industries as planting restructuring chain supporting industries, through technical training for immigrants and improve the quality of its personnel, the establishment of socio-economic immigrants social service system for immigrants to find direction for surplus laborers, agricultural and sideline products find markets for immigrants, immigrants provide production technology and information services. In the development of the secondary and tertiary industries, with the use of agricultural natural resources, projects of processing of agricultural products is chosen, and combining production, supply and marketing is the model of economic development. A local flavor should be made, and brand strategy should be implemented to enhance their productive capacity and output efficiency.

(e) Guiding farmers in the resettlement area to work elsewhere

According to a survey, more farmers in resettlement areas go to work elsewhere. With the exceptive people of old and disability or having sideline, they go to work elsewhere in the free time, so income of working elsewhere has become an important part. Currently, due to the lack of professional skills, workers tend to have lower income. Therefore it is necessary to make the local labor who are literate in a certain extent

receive professional skills training to increase their ability to adapt in the market and finally to improve income

#### 5.3.5 Land compensation costs and production resettlement investment balance

Land compensation and relocation costs, should be used to restore and develop production, to arrange employment for the surplus labor due to land requisition and also as life subsidies for the unemployed. These costs can also be arranged by counties (cities) for land development and immigration production, making arrangements for their livelihood, but these costs must be earmarked, neither be embezzle, nor be misappropriated. If the land compensation costs and resettlement subsidies can not meet the requirements of immigration production resettlement, the need for resettlement subsidies can be increasing appropriately. Therefore, the land compensation and resettlement costs as subsidies should be served as the only source of funds for the resettlement production.

This total investment of land compensation, for resettlement development is about 69.6878 million yuan, more than the investment required in the production, 55.0653million yuan.it means that the land compensation standards would meet the resettlement of migrants production funding requirements, and the excess funds can be used to improve the resettlement areas irrigation facilities to ensure the standard of living after the previous level.

#### 5.3.6 Temporary land

##### 5.3.6.1 Affected areas

The project will also require an area of 4954.0 mu temporarily, including: reservoir engineering covering 3998.0 mu, which include paddy 20.0 mu, dry land 779.61 mu of woodlands 1199.4 mu, and unused land 1999.0 mu. The requisition lasts two years. Project provisional covering 956.0 mu, including paddy 53.0 mu, dryland 328.0 mu of woodlands 282.0 mu, and unused land 293 mu, and this last four years. Compensation should be made according to crop losses and rehabilitation costs.

##### 5.3.6.2 Temporary appropriation funds

The provisional cost of appropriation funds as an area of the land compensation fund projects is included in the total project investment.

##### 5.3.6.3 Land transfer request

In the construction process, borrowing must be strictly accordance with the procedures, so as to protect soil layer. After the expiry, construction units are responsible for restoration. Immigration commissioner of the department is responsible for conducting supervision and rehabilitation, land management departments and the county office are responsible for organizing acceptance.

Table 5-1 Agriculture population of productive resettlement in project area

involved township	village	villagers group	agriculture population	total area of cultivated land (mu)	per capita cultivated land(mu)	drowned and occupied cultivated land(mu)	proportion of current cultivated land(%)	remain cultivated land (mu)	per capita cultivated land after project (mu)	reduce farmland per one (mu)	population of productive resettlement in 2007	population of productive resettlement in planning year	remarks
Dengjiang town	Beimen	4	891	777.37	3.54	76.51	9.84	700.86	3.21	0.33	100	103	
	Dongmen	2	511	652.00	2.64	54.35	8.34	597.65	2.41	0.23	41	42	
	Guanxi	2	323	478.80	2.95	8.99	1.88	469.81	2.90	0.05	7	7	
	Huanggang	4	903	913.19	4.10	12.31	1.35	900.88	4.02	0.08	12	13	
	Nanmen	1	359	202.62	0.56	27.24	13.44	175.38	0.49	0.08	49	50	
	Sanxi	4	708	1013.13	5.55	21.00	2.07	992.13	5.45	0.10	15	16	
	Shangtian	1	92	150.98	1.64	2.20	1.46	148.78	1.62	0.02	2	2	
	Wentian	1	62	211.92	3.42	1.70	0.80	210.22	3.39	0.03	1	1	
	Xingling	6	1051	1228.05	1.17	39.77	3.24	1188.28	1.13	0.04	44	44	
total	9	25	4900	5628	25.58	244.07	4.34	5383.99	24.63	0.95	270	278	
Mashi	Baitou	3	784	1373.21	1.75	30.75	2.24	1342.46	1.71	0.04	19	19	
	Jiangbin	2	432	935.00	2.16	7.45	0.80	927.55	2.15	0.02	3	4	
	Shukou	1	307	179.02	0.58	12.31	6.88	166.71	0.54	0.04	22	22	
	Wuxi	1	159	256.74	1.61	5.44	2.12	251.30	1.58	0.03	4	4	
	Xianqiao	2	253	354.00	1.40	12.40	3.50	341.60	1.35	0.05	14	15	
total	5	9	1935	3097.97	1.60	68.35	2.21	3029.62	1.57	0.04	62	64	
Tangzhou	Donghu	5	902	1592.92	1.77	99.10	6.22	1493.82	1.66	0.11	51	53	
	Hejiang	4	882	1001.67	1.14	249.88	24.95	751.79	0.85	0.28	208	212	
	Huangtang	6	1110	2717.40	2.45	32.49	1.20	2684.91	2.42	0.03	17	18	

Continued Table 5-1 Agriculture population of productive resettlement in project area

involved township	village	villagers group	agriculture population	total area of cultivated land (mu)	per capita cultivated land(mu)	drowned and occupied cultivated land(mu)	proportion of current cultivated land(%)	remain cultivated land (mu)	per capita cultivated land after project (mu)	reduce farmland per one (mu)	population of productive resettlement in 2007	population of productive resettlement in planning year	remarks
	Shangzhou	1	120	101.00	0.84	1.44	1.42	99.56	0.83	0.01	2	2	
	Tuzhou	6	590	1611.00	2.73	30.48	1.89	1580.52	2.68	0.05	15	16	
	Xiaoxi	9	1204	2214.00	1.84	162.10	7.32	2051.90	1.70	0.13	90	90	
	Xinping	2	176	204.00	1.16	19.13	9.38	184.87	1.05	0.11	20	21	
	Zengjia	7	671	1599.00	2.38	37.84	2.37	1561.16	2.33	0.06	18	20	
	Zhujia	12	1594	2496.27	1.57	202.05	8.09	2294.22	1.44	0.13	139	141	
total	9	51	7249	13537.26	1.87	834.50	6.16	12702.76	1.75	0.12	561	573	
Wanhe	Dapeng	3	379	932.00	2.46	16.05	1.72	915.95	2.42	0.04	8	8	
	Gaozhang	8	989	881.00	0.89	98.86	11.22	782.14	0.79	0.10	117	120	
	Gutang	2	286	380.80	1.33	5.21	1.37	375.59	1.31	0.02	5	6	
	Huwei	10	1599	1541.04	0.96	149.56	9.70	1391.48	0.87	0.09	182	183	
	Huangkeng	5	358	1018.88	2.85	137.27	13.47	881.61	2.46	0.38	51	52	
	Jiyi	4	632	836.00	1.32	60.01	7.18	775.99	1.23	0.09	46	47	
	Jiangnan	3	400	728.00	1.82	2.44	0.34	725.56	1.81	0.01	3	4	
	Luoja	5	781	847.00	1.08	6.07	0.72	840.93	1.08	0.01	8	7	
	Nanlong	1	160	239.00	1.49	3.83	1.60	235.17	1.47	0.02	3	3	
	Pingshang	4	732	599.00	0.82	25.63	4.28	573.37	0.78	0.04	34	35	
	Qianjin	8	926	1583.00	1.71	68.26	4.31	1514.74	1.64	0.07	46	47	
	Sangyuan	6	740	784.33	1.06	204.69	26.16	579.64	0.78	0.28	194	201	

Continued Table 5-1 Agriculture population of productive resettlement in project area

involved township	village	villagers group	agriculture population	total area of cultivated land (mu)	per capita cultivated land(mu)	drowned and occupied cultivated land(mu)	proportion of current cultivated land(%)	remain cultivated land (mu)	per capita cultivated land after project (mu)	reduce farmland per one (mu)	population of productive resettlement in 2007	population of productive resettlement in planning year	remarks
	Shalong	2	228	279.00	1.22	5.68	2.03	273.32	1.20	0.02	6	5	
	Tangwei	5	822	1494.20	1.82	103.30	6.91	1390.90	1.69	0.13	54	56	
	Xiashan	3	458	500.00	1.09	15.50	3.10	484.50	1.06	0.03	16	17	
	Zhongbu	3	385	393.50	1.02	10.26	2.61	383.24	1.00	0.03	12	12	
	Zhushan	7	1101	2610.00	2.37	154.59	5.92	2455.41	2.23	0.14	67	69	
total	17	79	10976	15646.75	1.43	1067.22	6.82	14579.53	1.33	0.10	852	872	
Yanxi	Cangling	5	742	1502.93	2.03	22.96	1.53	1479.97	1.99	0.03	15	14	
	Caoping	6	967	1816.00	1.88	119.53	6.58	1696.47	1.75	0.12	69	71	
	Donggang	1	82	198.00	2.41	3.01	1.52	194.99	2.38	0.04	2	2	
	Gaoping	1	99	150.00	1.52	14.61	9.74	135.39	1.37	0.15	10	10	
	Heshu	6	1478	3020.92	2.04	308.82	10.22	2712.10	1.83	0.21	144	147	
	Leshan	3	490	738.00	1.51	147.01	19.92	590.99	1.20	0.31	97	100	
	Loutian	1	131	271.00	2.07	2.06	0.76	268.94	2.05	0.02	1	2	
	Shiqian	5	965	1571.33	1.63	78.37	4.99	1492.96	1.55	0.08	56	58	
total	8	28	4954	9268.18	1.87	696.36	7.51	8571.81	1.73	0.14	394	404	
total of all	48	192	30014	47178.22	1.57	2910.51	6.17	44267.71	1.47	0.10	2139	2191	

Table 5-4 Analysis and calculation to the environmental capacity of resettlement in project area

concerning township	administrative village	villagers' group	agricultural population	total farmland area (Mu)	farmland area per capita (Mu)	inundated and occupied farmland area(Mu)	rate of occupied farmland area (%)	rest farmland area(Mu)	farmland area per capita after engineering(Mu)	decreased farmland area per capita (Mu)	resettlement population capacity
Chengjiang town	Beimen	4	891	777.37	0.87	76.51	9.84%	700.86	0.79	0.09	41
	Dongmen	2	511	652.00	1.28	54.35	8.34%	597.65	1.17	0.11	23
	Guanxi	2	323	478.80	1.48	8.99	1.88%	469.81	1.45	0.03	32
	Huanggang	4	903	913.19	1.01	12.31	1.35%	900.88	1.00	0.01	60
	Nanmen	1	359	202.62	0.56	27.24	13.44%	175.38	0.49	0.08	
	Sanxi	4	708	1013.13	1.43	21.00	2.07%	992.13	1.40	0.03	71
	Shangtian	1	92	150.98	1.64	2.20	1.46%	148.78	1.62	0.02	9
	Wentian	1	62	211.92	3.42	1.70	0.80%	210.22	3.39	0.03	6
	Xingling	6	1051	1228.05	1.17	39.77	3.24%	1188.28	1.13	0.04	64
total	9	25	4900	5628.06	1.15	244.07	4.34%	5383.99	1.10	0.05	306
Mashi	Baitou	3	784	1373.21	1.75	30.75	2.24%	1342.46	1.71	0.04	78
	Jiangbin	2	432	935.00	2.16	7.45	0.80%	927.55	2.15	0.02	43
	Shukou	1	307	179.02	0.58	12.31	6.88%	166.71	0.54	0.04	
	Wuxi	1	159	256.74	1.61	5.44	2.12%	251.30	1.58	0.03	16
	Xianqiao	2	253	354.00	1.40	12.40	3.50%	341.60	1.35	0.05	25
total	5	9	1935	3097.97	1.60	68.35	2.21%	3029.62	1.57	0.04	163
Tangzhou	Donghu	5	902	1592.92	1.77	99.10	6.22%	1493.82	1.66	0.11	65
	Hejiang	4	882	1001.67	1.14	249.88	24.95%	751.79			

Continued table 5-4 Analysis and calculation to the environmental capacity of resettlement in project area

concerning township	administrative village	villagers' group	agricultural population	total farmland area (Mu)	farmland area per capita (Mu)	inundated and occupied farmland area(Mu)	rate of occupied farmland area (%)	rest farmland area(Mu)	farmland area per capita after engineering(Mu)	decreased farmland area per capita (Mu)	resettlement population capacity
	Huangtang	6	1110	2717.40	2.45	32.49	1.20	2684.91	2.42	0.03	111
	Shangzhou	1	120	101.00	0.84	1.44	1.42	99.56	0.83	0.01	12
	Tuzhou	6	590	1611.00	2.73	30.48	1.89	1580.52	2.68	0.05	59
	Xiaoxi	9	1204	2214.00	1.84	162.10	7.32	2051.90	1.70	0.13	120
	Xinping	2	176	204.00	1.16	19.13	9.38	184.87	1.05	0.11	6
	Zengjia	7	671	1599.00	2.38	37.84	2.37	1561.16	2.33	0.06	67
	Zhujia	12	1594	2496.27	1.57	202.05	8.09	2294.22	1.44	0.13	119
total	9	51	7249	13537.26	1.87	834.50	6.16	12702.76	1.75	0.12	590
Wanhe	Dapeng	3	379	932.00	2.46	16.05	1.72	915.95	2.42	0.04	38
	Gaozhang	8	989	881.00	0.89	98.86	11.22	782.14	0.79	0.10	6
	Gutang	2	286	380.80	1.33	5.21	1.37	375.59	1.31	0.02	29
	Huwei	10	1599	1541.04	0.96	149.56	9.70	1391.48	0.87	0.09	54
	Huangkeng	5	358	1018.88	2.85	137.27	13.47	881.61	2.46	0.38	36
	Jiyi	4	632	836.00	1.32	60.01	7.18	775.99	1.23	0.09	63
	Jiangnan	3	400	728.00	1.82	2.44	0.34	725.56	1.81	0.01	40
	Luojia	5	781	847.00	1.08	6.07	0.72	840.93	1.08	0.01	42
	Nanlong	1	160	239.00	1.49	3.83	1.60	235.17	1.47	0.02	16
	Pingshang	4	732	599.00	0.82	25.63	4.28	573.37	0.78	0.04	0
	Qianjin	8	926	1583.00	1.71	68.26	4.31	1514.74	1.64	0.07	93
	Sangyuan	6	740	784.33	1.06	204.69	26.69	579.64	0.78	0.28	

Continued table 5-4 Analysis and calculation to the environmental capacity of resettlement in project area

concerning township	administrative village	villagers' group	agricultural population	total farmland area (Mu)	farmland area per capita (Mu)	inundated and occupied farmland area(Mu)	rate of occupied farmland area (%)	rest farmland area(Mu)	farmland area per capita after engineering(Mu)	decreased farmland area per capita (Mu)	resettlement population capacity
	Shalong	2	228	279.00	1.22	5.68	2.03	273.32	1.20	0.02	23
	Tangwei	5	822	1494.20	1.82	103.30	6.91	1390.90	1.69	0.13	82
	Xiashan	3	458	500.00	1.09	15.50	3.10	484.50	1.06	0.03	32
	Zhongbu	3	385	393.50	1.02	10.26	2.61	383.24	1.00	0.03	11
	Zhushan	7	1101	2610.00	2.37	154.59	5.92	2455.41	2.23	0.14	110
total	17	79	10976	15646.75	1.43	1067.22	6.82	14579.53	1.33	0.10	674
Yanxi	Cangling	5	742	1502.93	2.03	22.96	1.53	1479.97	1.99	0.03	74
	Caoping	6	967	1816.00	1.88	119.53	6.58	1696.47	1.75	0.12	97
	Donggang	1	82	198.00	2.41	3.01	1.52	194.99	2.38	0.04	8
	Gaoping	1	99	150.00	1.52	14.61	9.74	135.39	1.37	0.15	10
	Heshu	6	1478	3020.92	2.04	308.82	10.22	2712.10	1.83	0.21	148
	Leshan	3	490	738.00	1.51	147.01	19.92	590.99	1.20	0.31	
	Loutian	1	131	271.00	2.07	2.06	0.76	268.94	2.05	0.02	13
	Shiqian	5	965	1571.33	1.63	78.37	4.99	1492.96	1.55	0.08	97
total		28	4954	9268.18	1.87	696.36	7.51	8571.81	1.73	0.14	447
total		192	30014	47178.22	1.57	2910.51	6.11	44267.71	1.47	0.10	2180

Table 5-5 Production resettlement planning in project area

concerning township	administrative village	villagers' group	production resettlement population	planting industry resettlement									breeding industry resettlement		secondary and tertiary industry resettlement		gross investment (10 <sup>4</sup> yuan)
				adjusted farmland in group			adjusted farmland in village			reformed low and middle yield field			resettlement population	investment (10 <sup>4</sup> yuan)	resettlement population	investment (10 <sup>4</sup> yuan)	
				adjusted farmland (Mu)	resettlement population	investment (10 <sup>4</sup> yuan)	adjusted farmland (Mu)	resettlement population	investment (10 <sup>4</sup> yuan)	reformed low and middle yield field (Mu)	resettlement population	investment (10 <sup>4</sup> yuan)					
Chengjiang	Beimen	4	103	26.96	26	50.42	23.89	45	44.67				16	48	16	48	191.09
	Dongmen	2	42	34.98	23	65.41	10.43	11	19.51						8	24	108.92
	Guanxi	2	7	10.20	7	19.07											19.07
	Huanggang	4	13	13.49	13	25.24											25.24
	Nanmen	1	50				12.21	25	22.84						25	75	97.84
	Sanxi	4	16	24.29	16	45.41											45.41
	Shangtian	1	2	3.23	2	6.05											6.05
	Wentian	1	1	3.39	1	6.34											6.34
	Xingling	6	44	22.95	18	42.92	19.80	26	37.03								79.95
total	9	25	278	139.49	106	260.85	66.33	107	124.04				16	48	49	147	579.89
Mashi	Baitou	3	19	32.86	19	61.46											61.46
	Jiangbing	2	4	10.67	4	19.95											19.95
	Shukou	1	22				11.95	22	22.34								22.34
	Wuxi	1	4	6.32	4	11.82											11.82
	Xianqiao	2	15	14.03	15	26.25											26.25
total	5	9	64	63.89	42	119.47	11.95	22	22.34								141.81
Tangzhou	Donghu	4	53	60.96	33	114.00	22.21	15	41.53				5	15			170.53

Continued table 5-5 Production resettlement planning in project area

concerning township	administrative village	villagers' group	production resettlement population	planting industry resettlement									breeding industry resettlement		secondary and tertiary industry resettlement		gross investment (10 <sup>4</sup> yuan)
				adjusted farmland in group			adjusted farmland in village			reformed low and middle yield field			resettlement population	investment (10 <sup>4</sup> yuan)	resettlement population	investment (10 <sup>4</sup> yuan)	
				adjusted farmland (Mu)	resettlement population	investment (10 <sup>4</sup> yuan)	adjusted farmland (Mu)	resettlement population	investment (10 <sup>4</sup> yuan)	reformed low and middle yield field (Mu)	resettlement population	investment (10 <sup>4</sup> yuan)					
	Hejiang	4	212	36.90	31	69.00	135.09	156	252.61				20	60	5	15	396.62
	Huangtang	6	18	41.28	18	77.20											77.20
	Shangzhou	1	2	1.66	2	3.10											3.10
	Tuzhou	6	16	40.65	16	76.02											76.02
	Xiaoxi	9	90	149.92	86	280.34	6.63	4	12.40								292.74
	Xinping	2	21	4.65	3	8.69	11.95	15	22.35				3	9			40.04
	Zengjia	7	20	48.26	20	90.25											90.25
	Zhujia	12	141	111.45	79	208.41	80.62	62	150.75								359.17
total	9	51	573	495.74	288	927.02	256.49	252	479.64				28	84	5	15	1505.66
Wanhe	Dapeng	3	8	19.01	8	35.55											35.55
	Gaozhang	8	120	5.12	5	9.58	63.52	99	118.78				16	48			176.36
	Gutang	2	6	7.55	6	14.12											14.12
	Huwei	10	183	38.77	33	72.50	84.80	122	158.57	100	10	42	18	54			327.07
	Huangkeng	5	52	77.31	33	144.58	42.92	19	80.26								224.84
	Jiyi	4	47	57.76	47	108.01											108.01
	Jiangnan	3	4	7.27	4	13.59											13.59
	Luoja	5	7	5.08	4	9.49	2.67	3	4.99								14.48
	Nanlong	1	3	4.41	3	8.25											8.25

Continued table 5-5 Production resettlement planning in project area

concerning township	administrative village	villagers' group	production resettlement population	planting industry resettlement									breeding industry resettlement		secondary and tertiary industry resettlement		gross investment (10 <sup>4</sup> yuan)	
				adjusted farmland in group			adjusted farmland in village			reformed low and middle yield field			resettlement population	investment (10 <sup>4</sup> yuan)	resettlement population	investment (10 <sup>4</sup> yuan)		
				adjusted farmland (Mu)	resettlement population	investment (10 <sup>4</sup> yuan)	adjusted farmland (Mu)	resettlement population	investment (10 <sup>4</sup> yuan)	reformed low and middle yield field (Mu)	resettlement population	investment (10 <sup>4</sup> yuan)						
	Pingshang	4	35				26.91	35	50.31									50.31
	Qianjin	8	47	72.49	47	135.56												135.56
	Sangyuan	6	201	19.21	15	35.92	110.1	126	205.92				10	30	50	150		421.84
	Shalong	2	5	6.07	5	11.35												11.35
	Tangei	5	56	91.47	51	171.05	9.84	5	18.39									189.45
	Xiashan	3	17	9.07	8	16.96	8.08	9	15.12									32.08
	Zhongbu	3	12	1.10	1	2.06	10.29	11	19.25									21.31
	Zhushan	7	69	141.65	63	264.88	11.50	6	21.50									286.39
total	17	79	872	563.35	333	1053.46	370.63	435	693.09	100	10	42	44	132	50	150		2070.54
Yanxi	Cangling	5	14	26.00	14	48.62												48.62
	Caoping	6	71	106.69	67	199.52	6.79	4	12.71									212.22
	Donggang	1	2	4.76	2	8.89												8.89
	Gaoping	1	10	13.70	10	25.62												25.62
	Heshu	6	147	174.44	93	326.21	109.94	54	205.58									531.79
	Leshan	3	100	27.95	20	52.27	60.6	60	113.33						20	60		225.60
	Loutian	1	2	4.11	2	7.68												7.68
	Shiqian	5	58	78.09	57	146.02	1.17	1	2.19									148.21
total	8	28	404	435.74	265	814.82	178.5	119	333.81						20	60		1208.64
total		192	2191	1698.20	1034	3175.63	883.9	9235	1652.92	100	10	42	88	264	124	372		5506.53

## 5.4 Implementation planning of life resettlement

### 5.4.1 Resettlement mode

According to the concrete conditions and combining the resettlement consciousness, the resettlement within Shihutang hydropower project were arranged by latterly settled immigration near their villages, who is resettled in the group, the village, the town or the county. The advantages of this planning are following:

- (a) The immigrant living environment and social relations will not change much.
- (b) Thanks to adopting the replacement price compensation to the houses, the resettlement can build their new houses which are not lower than the original housing standard by using the compensation and discount of or using the old material.
- (c) Shortening the relocation distance and saving the journey costs.
- (d) Resettlement production radius would not extend.

### 5.4.2 Resettlement standard

According to Town and Village Planning Standard and combining new rural construction and present status of land occupation for local rural residents' house, construction land area per capita was defined as  $60\text{m}^2$  (contains public infrastructure land use) by typical design. The building construction of the rural resettlement were designed and built by themselves, according to their personal hobbies, fashions and local custom. But related regulations in the Implemental Measures of Land Management Law of the People's Republic of China in Jiangxi province must be abided by. Rural villagers could have only one homestead each household. The total homestead area each household of the newly built or rebuilt house (contains all subsidiary facility) should not over  $120\text{m}^2$  if using farmland, the area should not over  $180\text{m}^2$  if using homestead or idle land in village, and should not over  $240\text{m}^2$  when fell or wild slope was occupied for topographical condition limit or dispersal of residents.

### 5.4.3 Resettlement planning

With the vigorous coordinates of counties, towns, villages governments at all levels and residents in the project area, fact-finding was taken to immigrant resettlement region of the project. According to the conditions of land occupation for house removal in the project and combining the immigrant consciousness, many resettlement modes was taken, many planning of life resettlement such as latterly resettled immigration nearby, dispersed resettlement and centralized resettlement had been drafted, and the planning and design of the infrastructure in immigration-relocation setting points had been made to make sure the immigrants would enjoy a good life after removal. 169 households, that is 597 people, need to be transferred in present situation in Shihutang hydropower project, and the number will be 172 households and 608 people, considering natural population growth. The type of relocation and resettlement are shown as in Table 5-6.

Table 5-6 Types of resettlement

resettlement type	total	
	household number	population
latterly resettled immigration nearby, dispersed resettlement	98	262
centralized resettlement	74	346
total	172	608

#### 5.4.3.1 Latterly resettled immigration nearby and dispersed resettlement

According to the principle of immigration resettlement and combining the concrete conditions and the immigration consciousness, the mainly object of latterly resettled immigration nearby and dispersed resettlement was the migration-relocation setting points meeting the condition of latterly resettled immigration nearby. 261 people in 98 households were resettled in the range of the administrative region of their villages or groups, the safety zones more than 100m away from the reservoir bank or 50m away from the levee toe.

For latterly resettled immigration nearby and dispersed resettlement, the income

restoration was based on carrying on the work before the resettlement (such as farming or sideline). Production resettlement measures in Section 5.3 would be in implementation if their land were lost. Such as farmland adjustment, low and middle yield field reformation, and so on. The land compensation investment was used for land adjustment, the construction of facilities for farmland and water conservancy, breeding industry, the development of secondary and tertiary industry, and so on.

The immigrant housings were rebuilt by themselves in latterly resettled immigration nearby and dispersed resettlement. Local resettlement office (village and town) and land management department are responsible to solve the problem of the immigrant homestead for new housing, and can not charge for the homestead in addition. The infrastructure of latterly resettled immigration nearby was mainly depended on the existing infrastructure and social service system. Besides the principle of restoring the original scale, the original standards, the original function in reconstruction, some improvement was carried out to the original facilities by concentrating funds, distributing reasonability and unifying the construction on the basis of convenience for production and living, according to the economic development status and development planning. The compensation investment for leveling up the homestead and the construction of the water, electricity and road could be paid to the immigrant household directly according to the load. Also, the construction could be fulfilled as a whole by village committee.

#### 5.4.3.2 Centralized resettlement

The way centralized resettlement was taken to the villages with quite centralized immigrants in large amount. 346 people in 74 households were centralized resettled in 3 setting points according to the resettlement planning. Homestead leveling, the construction of centralized setting points and the organization and implementation to the infrastructure and public facilities were fulfilled as a whole by village committee on the basis of convenience for production and living, considering all factors about the topography, the traffic, the power, the communication, the water, and so on. The form of the immigrant housings rebuilt in new village should be in accord with the regional planning and requirement.

Places for resettlement each village are shown as in Table 5-7.

Table 5-7 Statistical summary of places for resettlement

town	village	household	population	resettlement mode
5	20	172	608	
Chengjiang	1	11	58	
	Dongmen	1	11	latterly resettled immigration nearby and dispersed resettlement
	Beimen	8	37	latterly resettled immigration nearby and dispersed resettlement
	Xingling	2	10	latterly resettled immigration nearby and dispersed resettlement
Wanhe	4	33	103	
	Huangken	2	8	latterly resettled immigration nearby and dispersed resettlement
	Huwei	6	20	latterly resettled immigration nearby and dispersed resettlement
	Gaozhang	9	26	latterly resettled immigration nearby and dispersed resettlement
	Pingshang	15	49	centralized resettlement, Xiabian resettlement
Yanxi	2	111	389	
	Caoping	64	129	latterly resettled immigration nearby and dispersed resettlement
	Gaoping	45	250	centralized resettlement, Xinzhou resettlement
Tangzhou	4	3	11	
	Xiaoxi	1	3	latterly resettled immigration nearby and dispersed resettlement
	Tuzhou	1	3	latterly resettled immigration nearby and dispersed resettlement
	Zengjia	1	5	latterly resettled immigration nearby and dispersed resettlement
Mashi	1	14	47	
	Shukou	14	47	centralized resettlement Wuxi sub-field resettlement site

#### 5.4.3.3 Typical planning and design of the resettlement sites

In the feasibility study, Xiabian village in Wanhe town and Wuxi sub-field was chosen as two typical resettlement sites. Topographic map at 1:1000 had been surveyed and hydrologic survey had been investigated accordingly. Anzhou and Paoping setting point were added in this stage and the comparing in each setting point was going on. Comprehensive unit price in feasibility study was adopted temporarily in this stage. Earthwork volume in each setting point was calculated according to design drawing.

The planning of road, water supplying and draining facilities, and power supply facilities was done at the same time.

#### (1) Suitability evaluation of resettlement sites

##### 1) Wuxi sub-field resettlement site

Wuxi sub-field resettlement site, the original Wuxi sub-field of Wushan reclamation field, is located in north shore of Shushui river, tributary of Ganjiang river. 47 people in 14 households would be resettled there, adjacent to mountain.

There are holocene alluvium of quaternary and red fragment rock of Maodian formation in upper of Cretaceous outcropped in resettlement site. According to the fact-finding, the position for the resettlement site is located in foothill belt at the ground elevation of 62~64m. The resettlement site will face alluvial plain on its southwest side at the ground elevation of about 60m and back on mountain with low mountain body about 40m and gentle slope in 15~20° on its northwest side. The models of slope structure are converse slope with combination bank slope of soil and rock. Landslide distribution will not easily happen for well stability in natural state. There is no gully envisaged the point, soluble strata, golf of mining layer, or artificial underground cavern distributing in the area. So geological hazard like landside, mudflow and ground collapse, will hardly happen in natural state. But Technical Specifications for Foundation Pits Excavation for Buildings and Code for Design of Building Foundation must be obeyed strictly to determine safe slope ratio reasonably and avoid geological hazard when leveling up space for construction. The planned resettlement point is not far away from the bank of Ganjiang and Shushui river, and will be influenced by the flood in flood season to some extent. The planned resettlement point is on the combining site between after-edge of the first terrace and low hill. The thickness of clay soil upper quaternary holocene stratotype alluvium is 3~6m. Under sand and gravel is rich in water content and groundwater has relatively shallow burial depth, and it can be domestic water for inhabited area. The planned Wuxi sub-field resettlement point is suitable for the resettlement project in overall evaluation.

##### 2) Xiabian village resettlement site

Xiabian village resettlement point is Xiabian village in Wanhe town inside of the protection embankment, first terrace on the right side of Ganjiang river. Ground elevation there is 55~57m, and 49 people in 15 households are planned to resettle here.

According to the exploration, the topography is flat and wide in the area and geological phenomena are not developed. There is quaternary holocene stratotype alluvium outcropped in resettlement point, with binary structure. Silty clay and loamy soil is in the upper portion with thickness of 4~7m. Fine sand and gravel is in the lower portion with thickness of 5~6m. The lower bedrock is mudstone and silty mudstone of Zhoutian formation in upper of Cretaceous. Under sand and gravel is rich in water content and groundwater has relatively shallow burial depth, and it can be domestic water for inhabited area. The resettlement point is located inside the planned Wanhe flood protection embankment, so it will hardly be influenced by Ganjiang river flood. The planned Xiabian village resettlement point is suitable for the resettlement project in overall evaluation.

### 3) Donggang resettlement site in Yanxi town

Donggang resettlement site in Yanxi town is located in Donggang village, with topography of low hill and plain, which elevation range from 58.2m to 61.9m. 45 households, 250 people will be resettled here.

This resettlement site lies on the first terrace of Ganjiang river. Access traffic is convenient because of the county road through the resettlement point, which is between Taihe county and Wanhe town. Farmlands and ponds spread on the land surface. Groundwater with good quality, is abundant and not influenced by Ganjiang river flood. Generally speaking, Donggang resettlement site is suitable to resettlement.

### (2) Planning of resettlement in each typical resettlement site

1) Xiabian village resettlement site in Wanhe town (according to the typical design in feasibility study temporarily)

The geomorphology of Xiabian village resettlement site in Wanhe town is low hill and plain. The general slope of the ground surface is  $5^{\circ}\sim 8^{\circ}$ , and the ground elevation is 53.5~57.5m. Farmland and pond is spread on the ground.

The population to be resettled in the place is 110 people in 30 households. Xiabian resettlement site can accommodate 49 people, 15 households on account of dyke line modification in this stage. The access traffic is convenient because of the county road though the resettlement point, which is between Taihe county and Wanhe town. The construction of pavement is hardened to the main trunk road in the area according to the practical situation in the resettlement site. The total occupied area is 12.86mu, where is  $12.86\text{m}^2$  per capita, including 7.68mu of paddy field, 1.34mu of wild grass ground, 2.10mu of homestead, 0.31mu of shrub land and 1.44mu of pond. All houses in the area are arranged in one-level platform according to the topographical condition. The total amount of excavation is  $3500\text{m}^3$ , and this number of fill is also  $3500\text{m}^3$ .

The planned resettlement point is on the first terrace of Ganjiang river. With the abundant groundwater and good water quality, most residents drink groundwater by pressure wells. So, drilling a pressure well every household is in the water source planning.

An indoor toilet each household and biogas stove as possible are in the planning of sanitary latrine.

The discharge ditch with the size of  $20\times 20\text{cm}$  was arranged with total line length of 2298m.

A potential transformer is installed in the planning, and connected with each household by low voltage line with the length of 1739m.

According to calculation, the total investment will be  $19.81\times 10^4$ Yuan, including  $4.13\times 10^4$ Yuan for ground leveling,  $7.23\times 10^4$ Yuan for water supply and drainage pipeline,  $5.37\times 10^4$ Yuan for power line,  $2.13\times 10^4$ Yuan for road hardening,  $1.89\times 10^4$ Yuan for other costs.

## 2) Wuxi sub-field resettlement point

Wuxi sub-field resettlement point is adjacent to Wuxi sub-field of Wushan reclamation field. The geomorphology is lowhill with the ground elevation at 53.5~57.5m and thick overburden.

The population to be resettled in the place is 47 people in 14 households. The total occupied area is 3.07mu, where is 44m<sup>2</sup> per capita, including 0.18mu of dry land, 2.3mu of homestead, 0.13mu of pond, and 0.46mu of unused land.

All houses in the area are arranged in one-level platform. The total amount of excavation is 3500m<sup>3</sup> and this number of fill is also 3500m<sup>3</sup> in account while homestead leveling. Road hardening will be done to some section, according to the practical condition in the place.

The planned resettlement point is on the first terrace of Ganjiang river. With the abundant groundwater and good water quality, most residents drink groundwater by pressure wells. So, drilling a pressure well every household is in the water source planning.

An indoor toilet each household and biogas stove as possible are in the planning of sanitary latrine.

The discharge ditch with the size of 20×20cm was arranged along the sideline of the mountain body behind the resettlement point, with total line length of 224m.

There is no potential transformer installed here, and low voltage line will be connected from Wuxi sub-field with the length of 216m.

According to calculation, the total investment will be 2.87×10<sup>4</sup>Yuan, including 0.96×10<sup>4</sup>Yuan for ground leveling, 0.78×10<sup>4</sup>Yuan for water supply and drainage pipeline, 0.67×10<sup>4</sup>Yuan for power line, 0.32×10<sup>4</sup>Yuan for road hardening, 0.27×10<sup>4</sup>Yuan for other costs.

### 3) Donggang resettlement site in Yanxi town

The geomorphology of Donggang resettlement site in Yanxi town, with 2km distance to Xinzhou village, is low hill and plain. The general slope of the ground surface is 5°~8°, and the ground elevation is 53.5~57.5m. Farmland and pond is spread on the ground.

The population to be resettled in the place is 250 people in 45 households. The access traffic is convenient because of the county road though the resettlement point, which is between Taihe county and Wanhe town.

The planned resettlement point is on the first terrace of Ganjiang river. With the abundant groundwater and good water quality, most residents drink groundwater by pressure wells. So, drilling a pressure well every household is in the water source planning.

An indoor toilet each household and biogas stove as possible are in the planning of sanitary latrine.

In this resettlement site, typical design can not be made, so can adopt typical design achievement.

The quantities and investment of each infrastructure in the two typical resettlement points are shown as in Table 5-8.

By the typical design calculation, the cost of recovery to the infrastructure in the resettlement point will be 1530Yuan per capita. And 1600Yuan is taken as the number, according to other factors not mentioned.

Table 5-8 Investment calculation of the infrastructure in the resettlement point

serial number	item	quantity unit	unit price (Yuan)	resettlement point		investment (×10 <sup>4</sup> Yuan)
				Xiabian village	Wuxi sub-field	

			(Yuan)	number	currency amount	number	currency amount	currency amount
	total				19.81		2.87	23.75
1	ground leveling	10 <sup>4</sup> Yuan			4.13		0.96	5.09
	excavation	m <sup>3</sup>	8.50	3500.0	2.98	810.0	0.69	3.66
	fill	m <sup>3</sup>	3.30	3500.0	1.16	810.0	0.27	1.42
2	road hardening	m <sup>2</sup>	20.00	1065.0	2.13	162.0	0.32	2.45
3	discharge ditch	m	28.20	2298.0	6.48	224.0	0.63	7.11
4	pressure well	number	250.00	30.0	0.75	6	0.15	0.90
5	power facilities	10 <sup>4</sup> Yuan			5.37		0.67	6.04
	pressure well	m	30.90	1739.0	5.37	216.0	0.67	6.04
6	other engineering cost	10 <sup>4</sup> Yuan	10.0%		1.89		0.27	2.16

## 5.5 Resettlement planning of enterprises and institutions

### 5.5.1 Principle of recovery resettlement planning

(a) The treatment scheme of the enterprises and institutions is established on the principle of technical feasibility and economically reasonableness. If only the subsidiary production workshop, facilities and area for work or life is occupied, with the principal production workshop out of the land occupied, latterly resettled immigration nearby is adopted on principle. If the principal production workshop is occupied, recovery nearby or the method resettled far away can be in consideration. Closedown, shutout, combination, changeover, bankruptcy is adopted to the enterprises not accorded with the national industrial development policy and environmental requirements.

(b) According to the treatment scheme of the enterprises and institutions and on the principle of compensation base on the original scale and standard, the compensative investment is calculated on the basis of the result of factual matter ratio survey.

## 5.5.2 Resettlement planning of enterprises and institutions

### 5.5.2.1 Influence of land expropriation and resettlement

According to the result of factual matter ratio survey in Shihutang hydropower project, houses of 2477.2m<sup>2</sup> relating to 4 units need to be removed, including 625.3m<sup>2</sup> of frame constructions, 16.9m<sup>2</sup> of brick and concrete buildings, 829.4m<sup>2</sup> of brick and timber buildings, 21.5m<sup>2</sup> of mud and timber buildings, and 984.1m<sup>2</sup> of other buildings. Most enterprises and institutions being influenced by the project are storages, finished factories, and other enterprises. Most of the units, whose land and facilities are being influenced, are in the range of influence scope of the protection embankment or at the rim of the submerged line. All of the units are partially influenced, not concerning the principal part. The enterprises and institutions being influenced are shown as in Table 5-9.

Table 5-9 Resettlements planning of enterprises and institutions

unit name	removal building area(m <sup>2</sup> )	influence degree	resettlement mode
Ferry of Taihe shipping company	16.91	partial	removal and compensation
mechanical brickfield	1286.2	partial	partially removal and compensation, partially recovery nearby
sand factory	376.86	partial	removal and compensation
Wahhe grain distribution station	797.23	partial	partially removal and compensation, partially recovery nearby

### 5.5.2.2 Resettlement planning of enterprises and institutions

Latterly resettled immigration nearby is adopted to the concerning enterprises and institutions, against the features of the project. It is benefit not only to the productive continuity of the units, but also to the production and life to the workers. If majority housings (factory building) were removed and can not be latterly resettled immigration nearby, enterprises can consider resettling in other place by self-selection according to the resettlement opinion made by itself.

### 5.5.2.3 Investment calculation of the compensation for the removal units

The budgetary estimation of the compensation for the resettled units is based on the original scale and standard. The compensation mainly includes land compensation, Three connections and one leveling in new place, compensation of housings and annexes, infrastructure compensation, production facilities and equipments, shutdown cost, transport cost in resettlement and so on. The compensation for the enterprises and institutions amounts to  $90.23 \times 10^4$  Yuan.

### 5.6 Restoration planning of specific facilities

#### 5.6.1 Principle of restoration and reconstruction

Principle of restoration and reconstruction:

(a) Traffic facilities, power facilities, telecommunications facilities, and broadcast facilities in the resettlement in demand based on the function analysis, should be reconstructed according to the original scale and standard. The special facilities lost the original function and not need to be reconstructed, are not in planning any more.

(b) The planning of traffic facilities, power facilities, telecommunications facilities, and broadcast facilities in new housing centre can not effect the good running of the original system, and choose the nearest line. The planning of power facilities, telecommunications facilities, and broadcast facilities should be considered to increase the capacity of facilities if necessary.

(c) Water conservancy facilities, hydroelectric stations, electric irrigation pumping stations, trunk irrigation canals for instance, should be planned for reconstruction according to the concrete conditions of influence degree and benefit area. Reasonable compensation should be paid if reconstruction is not necessary.

(d) The planning of professional project having a certain grade or scale should be planned by professional design department. Such as county-level highway, county road, 35kV substation and 35kV electric transmission line.

(e) The treatment and compensation of enterprises and institutions should according to the original scale and standard. The application of the existing equipment and technology should be fully considered to reduce losses in the resettlement.

(f) The increase investment caused by technology reform, industrial structure adjustment, scale expansion or raising standard should be settled themselves by the department concerned.

## 5.6.2 Reconstruction planning

### 5.6.2.1 Power, communication, broadcasting facilities planning.

The facilities influenced include, aerial optical fiber cable (16.87km), underground optical fiber cable (6.25 km), CATV (5.22km), 35KV living wire (0.74km), 10KV living wire (6.63km), 0.4KV living wire (8.99km), and four transformers. According to the characteristic of the lines' distributing and scheme of the immigrant settlement, the facilities should be reconstructed to satisfy their former functions and the scale of them should be the same as the formal ones. The reconstruction includes, aerial optical fiber cable (21.93km), underground optical fiber cable (6.25 km), CATV (6.66km), 35KV living wire (0.96km), 10KV living wire (8.61km), 0.4KV living wire (11.69km), and four transformers. The budget of the reconstruction is  $183.93 \times 10^4$  Yuan.

### 5.6.2.2 Traffic facility planning

The traffic facilities removed include highroad (2.41km), village road (10.71km), ferry and 24 docks. According to the scheme of the settlement of the migration, the compensation should be made and the principle of the reconstruction is that the formal function of the facilities should be resumed and their scale should be the same as the formal ones. The reconstruction includes highroad (3.13km), 6 road bridges, village road (13.92km), and the reinforcement of ferry and 24 docks. The budget of the reconstruction is  $1110.58 \times 10^4$  Yuan.

### 5.6.2.3 The planning of the reconstruction of small hydropower station.

The channel (0.62km) used for rural irrigation is influenced in the project of the reconstruction. Principle of its reconstruction is that the former function of the stations should be resumed and the scale of them should be the same as the former ones. Two small power stations (the installation is 520kW) are influenced for submergence and should be dismantled. The compensation is 5000 Yuan/ kW.

#### 5.6.2.4 The planning of pumping station

The project of land expropriation contains the design of the pumping stations and culvert bakes. Some of them should be dismantled, reconstructed or rebuilt. (The budget of it was included in the budget of the drainage engineering of the main project.)

#### 5.6.2.5 The planning of hydrological station, navigation mark project and so on.

Some hydrological stations and navigation marks are influenced in the land expropriation and dismantlement project. Their function should be totally resumed, and some of them should be dismantled, reconstructed or rebuilt.

### 5.7 The development and utilization of the water area of the reservoir

#### 5.7.1 The principle of the development and the utilization of the water area of the reservoir

- 1). The water area of the reservoir should be developed by the department in charge of the operation of the hydraulic complex and should obey the overall dispatching of the reservoir to make sure the safety of the project.
- 2). The investment of the tourism, fish breeding and so on should be afforded by the department in charge of them.
- 3). The migration should enjoy the priority of the use of the water area of the reservoir
- 4). The water quality and the ecological condition should be protected when developing the water area.

#### 5.7.2 The planning of the fish breeding of the reservoir.

The villagers have been lived near Ganjiang river for several generations, and they are good at swimming and fishing. The old watercourse can be used for aquiculture after impounding, and technically training can be given to villagers to boost the economic strength of the resettlement area.

#### 5.7.3 The planning of navigation of the reservoir

Ganjiang river is one of the most important marine traffic courses. It is also is an important part of the nation's waterway net. The hydraulic complex is located in a river reach which is an important part of Gang-Err ship canal. Shihutang hydropower project can canalize waterway for about 38km. The construction of it is very significant to the upgrade of the waterway of the middle course in Ganjiang river, to the development of marine conveyance in Jiangxi province and to the improvement of the body system of transportation in Ganjiang river drainage area.

#### 5.7.4 The planning of tourism of the reservoir

Raising the water level, the reservoir makes Taihe town a tourist attraction. Corresponding to the riverine construction of the Taihe town, and according to the guideline that, who invests, who gains, the tourism of the reservoir will be developed to enrich the townspeople's life.

#### 5.7.5 The planning of the temporary inundated land.

The temporary inundated land, referring to the land under the line of land expropriation, is above the water level for some time of the year. Owned by country, temporary inundated land, often served as the purpose of planting, should be governed by the department in charge of the reservoir.

According to the backwater computation, the land, between the normal water level (56.5m) and the line of land expropriation, is above the water level some times of the year and can be used for planting for its enrichment.

According to the growing season of the cop, the operational mode of the reservoir, and the tillage's habit of the migration, the temporary inundated land can be used for

planting to relief the tensional situation of the land shortage, and to improve the life of the migration.

The inundated land can not be accounted in the terra resource for immigration.

## 5.8 The planning of the clearance of the base of the reservoir

According to the Specifications on land requisition and resettlement design for construction of water resource and hydropower project□SL 290-2003□, the base of the reservoir should be cleared before impounding, to make sure the safety of Shihutang hydropower project and the health of the people live in downstream. The clearance of the base of the reservoir can also pave the way for the development of the reservoir.

### 5.8.1 The contents of the clearance

The items of the clearance includes, dismantlement and clearance of the building and temporary building, clearance of pollutant, clearance of the woodland after cutting, and the clearance for special items. There are normal clearance and special clearance. Normal clearance includes, dismantlement and clearance of all kinds buildings and temporary buildings below the line of migration, cutting the trees below the normal water level, clearance for sanitation and anti epidemic, the buildings and temporary buildings (such as bridge, inscription and so on) between normal water level and the water level which is 2 m below the level of the dead water should be dismantled and cleared. Special clearance refers to the clearance of some facilities of special departments. And those departments are in charge of the clearance to satisfy their demand.

### 5.8.2 The contents of the clearance and the needed technology

#### 5.8.2.1 The clearance of the building

1). The houses and the building attached to them within the clearance area should be dismantled, the enclosed wall and the chimney and so on should be pushed over and flattened, and the floating rubbish should be burnt or hauled out of the reservoir.

2). Within the inundated area, the road, mill and other surface building and the building attached to them should be dismantled, if they hinder the operation or the development of the reservoir. The facilities and surplus materials should be hauled over the reservoir. The large obstruction such as piers should be destroyed by explosion and the height of the remainder of them should be less than 0.5m above the ground.

3). The underground building within the inundated area should be blocked or treated by other measures according to the geology of the reservoir and the development of the reservoir.

#### 5.8.2.2 The clearance for health

1). All the pollutant sources within the reservoir should be treated for health purpose. When cleaning up toilets, manure pits, animal houses, and rubbishes and so on, the pollutant should be hauled over out of the reservoir. If it is difficult to haul over, sterilization should be done. And the pits should be sterilized by using  $0.5\sim 1\text{kg/m}^2$  quicklime. And the sewage pit should be blocked by earth.

2). The important pollutant source such as industrial enterprises, hospitals, veterinary stations, and the tombs of the people dying of infectious disease and so on should be treated under the guidance of the health department.

3). Whether it is necessary to move the tombs more than fifteen years old out of the reservoir depends on local custom. If it is,  $0.5\sim 1\text{kg}$  bleaching power should be used to sterilize for every pit.

#### 5.8.2.3 The clearance of the woodland

1). If there are valuable trees within the area of the clearance, those trees should be transplanted out of the reservoir. So do the young trees.

2). The trees which can not be transplanted and the odds trees should be cut and hauled out of the reservoir. And the stump should be less than 0.3m above the ground.

3). The branches of the tree, dead wood, shrubbery, and other floating matters should be bunt or hauled out of the reservoir.

### 5.8.3 The physical quantity of the clearance of the base of the reservoir

According to the scope and the requirement of the clearance, a survey was made to establish the physical quantity of the clearance of the base of the reservoir. The objects of the survey include, the buildings built on the mainstream and the tributary of the reservoir, the wastes which can not be recycled, the remainder of the destroyed houses, floating materials and the pollutant influencing the water quality of the reservoir. According to the survey, the square of the building (which include houses built by brick and –stud, or by earth, framing houses and houses built by brick and cement) needed to be moved is 35093.5m<sup>2</sup> in the clearance area of Shihutang hydropower project. The square of the woodland needed to be cleared is 2261.69 mu according to the inundated area. And 148 tombs should be disposed according to the number of the resettlement (608 people in planning year).

### 5.8.4 The investment of the clearance

According the scope, content and the requirement of the clearance mentioned above, and referring to the similar projects, the general estimate is  $4.5 \times 10^4$  Yuan/km<sup>2</sup> in inundated area, and the total amount is  $17.15 \times 10^4$  Yuan.

## 5.9 The planning of environmental protection of the resettlement

In resettlement, environmental protection is very important, for solving the ecological and environmental problem coming from the migration project, can create a good living condition for migration. And the society and environment can be harmoniously developed hand in hand.

Corresponding to the main environmental problem of the settlement, the feasible measure should be done to alleviate the bad environmental influence coming from the settlement of the migration. The settlement of the migration and the protection of the environment should be considered hand in hand, to max the all-around benefit of the project and to create a good living condition for the migration.

### 5.9.1 The environmental protection of resettlement

#### 5.9.1.1 The analyses of the environmental influence

In this project, there are not too many people needing to resettle. The total number of the families moved is 169. Generally, the relocation residents should live in the some town but move away from the river. The scale of every resettlement is small and spared. The resettlement site mainly locates in farmland and the land unused. The traffic is convenient there, and has very little influence on the biological resources.

The effect of the project on the relocation residents includes, lose of production goods of the land, loss of housing, the change of living and housing condition. The natural resource is rich and the traffic is convenient in the settlement, but the industrial structure is simple, so the economic potential is enormous. According to the analyses of the capacity of the environment, the ribbon of the land, occupied by the Shihutang hydropower project to enforce the embankment of the reservoir), contains little farmland (the square of farmland per capita reduce from 1.57mu to 1.47 mu, the rate of reduction is 0.057). So land appropriation has little influence on the life of the people living there. Meanwhile, the number of the resettlement is small and spared in 48 villages, so the problem of the resettlement can be solved by improving the quality of the farmland and making adjustment on the farmland. The environmental capacity of the resettlement is large (for details see the attached list of the environmental capacity). According to the planning of the resettlement, the relocation residents will mainly live on farming. Great emphasize should be placed on the adjustment on the industrial structure of the village to make sure that every relocation residents can earn a living there. Accompanying the progress of the project and the execution of the developmental policy of the migration, the living condition of the resettlement will be guaranteed and improved.

We should be on our guard that there may be epidemic in resettlement for the instability of the relocation residents and the shortage of the health water resource there. The water resource can be influenced by migration for the discharge of the sanitary waste.

#### 5.9.1.2 The environmental protection of the resettlement sites

##### 1). The disposal of the sanitary waste of the resettlement sites

The number of the relocation residents living in the resettlement is large and spared, so the sanitary should be treated to satisfy the standard. Generally, the sanitary waste will

be treated in marsh gas tank. There will be 4 marsh gas tanks per family. Septic tank is another choice to treat sanitary waste. The allowance of the tank is about 1000 Yuan per one.

The sewage discharged by the inhabitation should ferment in the mash tanks, the mash can be used as the fuel of the inhabitation, and muck and the sewage will be much cleaner after fermenting, so the muck can be used as the fertilizer of the farmland and the sewage used in irrigation. So the bad influence of the sanitary waste on the environment can be diminished, and there will be more fuel and fertilizer for villager.

## 2). Disposal of the solid waste material

The rubbish is dumped wherever villagers like to dump for there is none dump in village and environment will be polluted if it rains, so proper places should be selected to prevent environmental pollution. The rubbish should be classed to decide whether it should be recycled or burnt.

## 3). The environmental protection in the construction of infrastructure

The families should be moved off the river in the some village or to other villages. The protection of the environment and the construction of infrastructure should be considered hand in hand, and the measure should be taken to protect environment.

(1). The resettlement sites should be far away form industrial mills, and located in the upstream of them, to avoid the bad influence of sewage and exhaust gas on people's health.

(2). When choosing resettlement sites, the waste hill and waste land should be used to save as many as woodland and farmland. The resettlement should be located in hills and sloping fields with good geological condition. And the drainage ditch should be dig on the excavation slope to prevent erosion and guaranteed the safety house. The waste earth from digging should be used to plant trees and grass to prevent soil and water loss.

(3). The road and the drainage facilities should be built in the resettlement sites. And the vegetation and the relief should be prevented from being destroyed. The bared land should be planted to resume its former feature.

(4). Special cautions should be placed on the building of animal houses (such as pig house and so on). The sewage coming from them should be treated in the special to prevent their polluting environment.

(5). The layout of the resettlement sites should be planned to reduce the use of the land and to get more daylight. Great effort should be made to provide the tap water to migration so that the migration can get drinking water without much effort.

(6).The local people's life will be influenced by the relocation residents. So communication should be done to make a harmony society. The local people should get benefit in the construction, so that their life quality can be improved and the society can be peacefully developed.

(7). There should be greening planning in the housing area, and the rate of the coverage of the grass and the trees should be more than 30 percentages. There should be trees everywhere in the village. The seeds of trees should be chose to cater the interest of the villagers. Not only the living condition can be decorated but also the income can be increased.

#### 4) .The protection of the health

(1) In the process of the resettlement, the budget should be there in time and the life condition of the relocation residents should be known, and the quality of the drinking water should be inspected.

#### (2) Measures of epidemic prevention

The health propaganda should be made to mobilize the crowd to destroy mousse mosquitoes, to fill the depression, to prevent the epidemic from transmission.

According to the cleaning measure of the base of the reservoir, before impounding, the pollutant should be cleared to prevent forming a new source of epidemic by water diffusion.

The work of the hygiene should be done in the resettlement. To those who move off the river but live in the same village, the housing should be uniformly planned and should

be located in a place with good lighting and aeration. The animal and human should live apart, and the mating public facilities should be constructed. The sterilization should be scheduled. Unhealthy water resource should not be used to drink. The physical examination of the migration and the local people should be made to prevent the infectious diseases being brought to the local people by migration or the migration infecting the infectious diseases.

### (3) The management and the inspection of the epidemic

The scope of the inundated area is very large, so the organization of the inspection of the epidemic should be established. After the completion of the reservoir, the sample survey of the people's health can be made to prevent the epidemic and guarantee people's health.

The special spot should be set to propagandize the AIDS and other diseases' prevention. The compensation of each spot is 200 Yuan, and there are five spots. There will be one toilet for every family, and the compensation will be 100 Yuan per one. The compensation will be listed in the total investment.

## 5.9.2 Soil and water conservancy

In resettlement, two reasons cause soil and water losses, which are production in resettlement sites and infrastructure construction.

### 5.9.2.1 The analyses on the soil and water loss

According to the planning of the resettlement, to the year 2012, the number of the migration needed to move is 608 for the construction of the Shihutang reservoir. The migration should move away from the river or should move to the other towns. Land should be expropriated for the resettlement of the migration, for the construction of the entrepreneurs, and the total square of the land should be expropriated is 5.21hm<sup>2</sup>.

Living mainly on farming, the relocation residents living in the same place should be separated into several groups and should be settled by groups. Large scale excavation should be avoided to conserve water and soil. But the construction of the house and

diving farmland will change the mode of the land utilization, so the vegetation will be destroyed, the soil and water will lose, and the land will be eroded.

The corresponding measure should be taken, or the loss of the soil and water will not only influence the environment of the resettlement sits and but also the agriculture. The factors causing the loss of the water and soil are show in Table 5-10.

Table 5-10 Analysis of the water and soil loss influence

project	the influence of water and soil loss
resettlement	1. Loss of the water and soil. If the situation of loss of water and soil is serious and there are no drainage facilities, when it rains, the silt will be rushed into depression. If slope is excavated□it will be easily erodes and the ditches will be made on it by rain.
	2. The problem of the drainage. If the resettlement is located in a slope without drainage channel□the silt will be rushed into the neighbor village, unnecessary confliction will be occurred.
	3. The rainwater rushing into the house. Some dwellings are located in low-lying lands and when it heavily rains, without drainage, the rainwater will rush into house.
	4. The influence of the upstream. If large scale of dwellings are located in the foot of slope, and when it heavily rains, the rainwater will rush into village to have very bad influence on villager’s life
diving up farmlands	The slope of excavation cubage, the fill and the excavation slope will be bared. For the surface of the farmland is peeled off□when being washed out by heavily rains□serious loss of water and soil will happen.

### 5.9.2.2 The responsibility of the prevention of the loss the water and soil

According to the principle ,who develop, who protect, and who cause the loss of soil and water, who father, and the corresponding rule, the responsibility of this project include, ,requisition, and permanent and temporary occupation. The area needed to

prevent the loss of water and soil includes, resettlement  $3.4\text{hm}^2$  and the farmland  $12.7\text{hm}^2$  the total amount is  $117.66\text{hm}^2$ .

### 5.9.2.3 The measure of prevention

#### 1) The prevention of loss of water and soil in rural resettlement.

There is corresponding measure to control the loss of the water and soil in the main project. Planning trees in the resettlement is taken into consideration in this design, and the trees will be planted around the houses. The square of the planning will be  $3.4\text{hm}^2$ .

The most serious loss of water and soil will happen when the land is flattened, for the vegetation has already been destroyed and the land is bared.

If there is large watershed area in the upstream, the drainage ditch should be built to keep the bared land and the resettlement safe. The resettlement should be located in the upstream of the slope, and the intercepting ditch should be built to prevent the silt block the channel of the downstream farmland. The direction of the bailing should not have bad influence on farmland channel and downstream village.

The land should be sufficiently utilized and according the principle that the tree chose to plant should suit the land. When considering the economic benefit and the ecological benefit, the tree suitable for planting are orange and the pasture of great benefit to the local people. According to the plan, 7 orange trees and four groups of bamboos will be planted for each family. There will be 1372 orange trees and 784 groups of bamboos planted in the resettlement.

The excavated surface of the slope in resettlement, slope protection should be made by planting and laying stones to the surface of the slope. The square of the slope protection is  $0.74\text{hm}^2$ . The quantities of the slope protection include, the quantities of laying stones ( $330\text{m}^2$ ) and the square of the land should be planted is  $0.37\text{hm}^2$ .

#### 2) The protection measure for diving farmland.

The square of the farmland is  $127.4\text{hm}^2$ . When diving, the surface of the farmland should be peeled of, so the protection of the earth of the farmland should be taken.

Some measure should be taken to protect the earth of farmland being piled up and those measures include, in order to protect and to utilize the land resource which can not regenerate, before diving, the surface soil of the farmland should be piled up in a separated spot. And after the completion of the project, that soil can be used by backfill. The should be a spot to pile surface soil of the farmland, the height of the pile should less then 3m above the ground, and the degree of the slope should be about 1:1.5 to prevent the loss of water and soil when the soil of the surface farmland. The retaining wall and the drainage ditch should be built around the pile by woven bags, the dimension of the ditch should be ,0.3m (upper bottom) ×0.3 m (lower bottom)×0.6m (height), and the upper surface of the pile should be covered by rain wear or grass as the temporary protection. After diving, the slope should be paved by stones and should be covered by grass to prevent the loss of water and soil.

The square of the sod used for paving is about 0.8hm<sup>2</sup>, the stone used for paving is about 500 m<sup>3</sup>, and the retaining wall is about 346 m<sup>3</sup>, and the rain wear is about 6000 m<sup>2</sup>. The cubic meter of earth of the ditch's excavation is 156 m<sup>3</sup>.

### 5.9.3 The general estimate of environmental protection and water and soil conservation.

The general estimate of environmental protection and water and soil conservation is 79.1×10<sup>4</sup> Yuan.

According to the 62<sup>nd</sup> cause of the Environmental Protection of Construction Item Specification, the budget all the facilities suing for the environmental protection should be listed in the general estimate of environmental protection. In this project, the main influence of the migration is social influence. The supervision of the work for migration should be enforced, and the budget of the supervision is contained in the budget of migrant planning supervision. The budget of environmental protection is 41.16×10<sup>4</sup> Yuan. General invest of environmental protection in resettlement planning are shown as in Table 5-11 detaily.

Table 5-11 General invest of environmental protection in resettlement planning

number	subject and cost item	brief description	unit	number	unit price	total (10 <sup>4</sup> Yuan)
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1. environmental protection measures						27.62
1	life sewage disposal	marsh gas tank (septic tank)		169	0.01	16.90
2	population health	quarantine one time, 80 Yuan / time		357	0.01	3.57
3	sanitary disposal	disinfection, garbage disposal and so on	hm <sup>2</sup>	4.46	1.00	4.46
4	others	propaganda points		5	0.2	1.0
5		toilet		169	0.01	1.69
2. independent cost						11.21
1	environmental management fees					3.00
2	environmental supervision fees					3.00
3	survey and design fees			according to the 8% total of one to two part		2.21
4	crowd health monitoring of reservoir areas					3.00
3. basic preparation fees				according to the 6%total of one to two part		2.33
total						41.16

According to the 27th cause of Water and Soil Protection of the People's public of China, the budget for the protection of water and soil for the construction should be listed in the budget of construction investment. So do this project. And the budget of the water and soil conservation is  $37.94 \times 10^4$  Yuan.

General invest of environmental protection in resettlement planning is shown as in Table 5-12 detaily.

#### 5.10 The balance of the expropriation and compensation of the farmland

We should try our best to protect land resource, in this project, protecting embankment is constructed and the farmland is dived off to protect it. According to the achievement of the planning, the budget coming form the margin of the farmland reconstructed and the farmland expropriated by Shihutang reservoir should be contained in the budget of cultivation. And the construction unit entrust the qualified units of Jiangxi province to expropriate land to fulfill the assignment.

Table 5-12 General invest of water and soil conservation in resettlement planning

number	project or cost	unit	number	unit price (Yuan)	total (10 <sup>4</sup> Yuan)
one	engineering measures fee				10.19
1	lifting field				6.23
	slope masonry revetment	m <sup>3</sup>	500	120	6.00
	earth excavation of drain ditch	m <sup>3</sup>	156	14.43	0.23
2	resettlement areas of immigrant				3.96
	slope masonry revetment	m <sup>3</sup>	330.00	120	3.96
two	plant measures fees				12.16
1	lifting field areas				3.20
	grassed slope	m <sup>2</sup>	8000	4.00	3.20
2	resettlement areas				8.96
	bamboo	one	784	16.00	1.25
	orange	one	1372	24.00	3.29
	slope grass	hm <sup>2</sup>	0.37	40000	1.48
three	temporary measures				2.94
	temporary stop	m <sup>3</sup>	346.41	65.40	2.27
	waterproof cloth	m <sup>2</sup>	6000	1.00	0.60
	others interim measures				0.07
four	independent costs				10.50
	construction supervision fees				2.00
	water and soil conservation supervision fees				2.00
	survey and design fees				2.00
	construction management fees				1.50
	project quality supervision fees				3.00
five	preparation fees	according to the 6%total of one to four part			2.15
total					37.94

## **6 BUDGET ESTIMATE OF LAND ACQUISITION INVESTMENT**

### **6.1 Content, Basis, Principles and Approval Procedure of the Budget Estimate**

#### **6.1.1 Content of Budget Estimate**

According to the requirements of design code and in light of the characteristics of the project, the following budget estimate contents are determined:

- (a) Compensation costs for the village population;
- (b) Compensation costs for the township residents;
- (c) Compensation costs for the enterprises;
- (d) Compensation costs for professional project;
- (e) Cost of land-occupied fee of protection works;
- (f) Compensation costs for reservoir bottom cleaning;
- (g) Other costs;
- (h) Preparation costs
- (i) Environmental and water protect costs in relocation sites;
- (j) Relative taxes and fees;
- (k) Total compensation investment;

#### **6.1.2 Compilation Basis and Principles of Budgetary Estimate**

##### **6.1.2.1 Basis of compilation**

(a) “Byelaw on Land Acquisition Compensation and Resettlement Relocation in Large and medium-sized water conservancy and hydropower project” (the 471st Order of the State Council, 2006)

(b) The Land Administration Law (1986) of the PRC.

(c) Measures on Implementation the Land Management Law (2001) of the PRC in Jiangxi

(d) Specifications on Resettlement Planning of the Water Conservancy and Hydropower

Project (SL290-2003)

(e) Temporary Provisions on land- acquisition tax of PRC

(f) Provisions on land- acquisition tax in Jiangxi

(g) Relative Regulations and Criterion of professional units.

(h) Physical Indicators of land-occupied effect of the land investigated in researching stage

#### 6.1.2.2 Principles of Compilation

1) Taking the physical indicators investigated as the basis, in accordance with the relevant state policies and norms and in light of the project's actual conditions, compiles the investment estimate and deals with the relationship of county, collectivity and persons rightly.

2) Land as well as the ground attachment compensation for permanent and temporary acquisition is confirmed by "Byelaw on Land Acquisition Compensation and Resettlement Relocation in Large and medium-sized water conservancy and hydropower project" (the 471st Order of the State Council, 2006) and Measures on Implementation the Land Management Law □2001 □of the PRC in Jiangxi

3) Compensation of housing and its ancillary facilities is confirmed by its replacement price

4) Compensation costs for professional projects are based on the "three original" principle (original scale, original standard, original function). According to its actual recovery, the increased investment needed to improve standards or scales comes from the local government or relative units themselves.

5) The objects having no use or being difficult to renew are given the compensation of demolition, transport costs and reasonable compensation costs.

### 6.1.3 Approval Procedures

The budget of compensation for land requisition resettlement in Shihutang Hydropower Project is compiled by design units. After WB appraisal and ministry of communications review, it will be submitted to the National Development and Reform Commission to ask for its approval.

## 6.2 Budget Estimate for Compensation

### 6.2.1 Basic Costs

Basic costs include resettlement compensation, relocation compensation for enterprises, recovery compensation for professional projects, reservoir bottom cleaning costs and so on.

#### 6.2.1.1 Resettlement Compensation

(a) Compensation for land acquisition and relocation, including acquisition compensation of various lands like infield, woodland, fishing pond etc, is  $7798.35 \times 10^4$  yuan, including  $7201.51 \times 10^4$  yuan in protective project and  $596.83 \times 10^4$  yuan in main project.

(b) The total compensation for houses and affiliated bulidings is  $979.47 \times 10^4$  yuan.

(c) The total cost of rebuiling resettlement infrastructure is  $97.28 \times 10^4$  yuan.

(d) The total cost of transportation for relocation is  $15.2 \times 10^4$  yuan.

(e) Other comensation for resettlement is  $22.58 \times 10^4$  yuan.

(f) The total compensation for rural water conservancy facilities is  $453.36 \times 10^4$  yuan

The total compensation for resetlement is  $9366.23 \times 10^4$  yuan.

#### 6.2.1.2 Compensation for Enterprises relocation

(a) The total compensation for houses and subsidiary construction compensation  $69.18 \times 10^4$  yuan.

(b) The total cost of transportation for relocation is  $3.72 \times 10^4$  yuan.

(d) The total infrastructure compensation is  $17.34 \times 10^4$  yuan.

The total cost for enterprises relocation is  $90.23 \times 10^4$  yuan.

#### 6.2.1.3 Compensation for Professional Project

The affected professional projects, such as roads, electricity communications circuits, radio and television lines, will be compensated according to their replacement price. The total compensation is  $1880.5 \times 10^4$  yuan.

#### 6.2.1.4 Land Compensation of Protection Works

Mainly include the compensation for dikes, drainage projects and land-uplifting works. The compensation standard of dikes, drainage projects is consistent with the land in the reservoir region. The investment of land-uplifting works is  $2866.79 \times 10^4$  yuan, estimated as 15000 Yuan per mu, according to its typical design.

#### 6.2.1.5 Investment on Reservoir Bottom Cleaning

Investment on reservoir bottom cleaning mainly include building cleaning, sanitation cleaning, graves cleaning, woodland clearing etc. according to the scope, content and clean-up requirements, in the light of similar engineering design, the investment on submerged land area is reckoned as  $4.5 \times 10^4$  Yuan per  $\text{km}^2$ . The investment counts up to  $17.15 \times 10^4$  Yuan.

#### 6.2.2 Other Costs

Other costs include costs of survey and design, implementation, institutional start-up, technical training, supervision, M&E, international expert group, amounting to  $1138.82 \times 10^4$  Yuan.

- (a) Survey and design cost: by the rate of 2.5 percent of the basic fee, it is  $340.59 \times 10^4$  Yuan.
- (b) Implementation cost: by the rate of 3 percent of the basic fee, it is  $408.71 \times 10^4$  Yuan.
- (c) Institutional start-up cost: by the rate of 10 percent of the basic fee, it is  $40.87 \times 10^4$  Yuan.
- (d) Technical training cost: by the rate of 0.5 percent of the basic fee, it is  $44.3 \times 10^4$  Yuan. It is used to improve the production technology, cultural quality, cadre training and agricultural technology generalizing of the village resettlement.
- (e) Supervision cost: by the rate of 1 percent of the basic fee, it is  $136.24 \times 10^4$  Yuan.
- (f) M&E cost: according to the rate of 0.5 percent of the basic fee, it is  $68.12 \times 10^4$  Yuan.
- (g) International expert group cost:  $100 \times 10^4$  Yuan is listed.

#### 6.2.3 Preparation Costs

According to Specifications on Resettlement Planning of the Water Conservancy and Hydropower Project□SL290-2003□, the preparation costs is  $1476.24 \times 10^4$  Yuan, accounting for 10 percent of the basic fee.

#### 6.2.4 Environmental and water protect costs in relocation sites

Total environmental and water protect costs in relocation sites is  $79.1 \times 10^4$  Yuan.

#### 6.2.5 Relative Taxes and Fees

Relative taxes and fees, including land reclamation cost, land expropriation tax, forest vegetation restoration costs, land management fees, land surveying cost and flood control security funds are  $3147.29 \times 10^4$  Yuan, which are  $2888.01 \times 10^4$  Yuan in reservoir area and protective project,  $259.29 \times 10^4$  Yuan in main project.

##### (a) Land reclamation cost

Land reclamation cost is determined on the regulation of the following laws: “Notice (2001) of relative issues on the land using of the Water Conservancy and Hydropower Project” (the 355th Order of the State Land Resources Dep.) and “Measures on Implementation the Land Management Law (2001) of the PRC in Jiangxi”. As for the land-occupying of non-agriculture construction, the relevant units take the charge of cultivating land equivalent to the number and quality of the occupied land, with the principle of “cultivating based on occupying”. At the place which has no conditions for the cultivation or falling short of the requirement, land reclamation cost should be charge by the rate of 70 percent of the minimum standards of the arable land reclamation fee, according to the regulation of province and municipality. Costs of arable land reclamation is calculated at 5.6 times of annual mu output, water land 6609 Yuan per mu, and the dry land 4696 Yuan per mu. The radix figure for the number of fields is the permanent occupied land after deducting the number of uplifting land (including land of relocation sites). It is estimated that land reclamation cost is  $1568.94 \times 10^4$  Yuan, including  $1493.08 \times 10^4$  Yuan in reservoir area and protective project,  $75.87 \times 10^4$  Yuan in main project.

##### (b) land-occupying tax

According to the notice“ Impalement Measures (1987) on Expropriation of the land-occupied tax in Jiangxi(the 21<sup>st</sup> Notice)” issued by Jiangxi province government, permanent expropriation of farmland is 4.0 Yuan per m<sup>2</sup> in Taihe county. According to the "Interim Regulations on the farmland tax in the PRC (Amendment Draft)" (not yet released), when it is expropriated less than one year, farmland tax is free if; More than one year (including one year) with 2-year, halving the half; 2 years or more (including 2), full charge; For temporary land expropriation of protect works under 1 year, half charge; For temporary land expropriation of hinge projects with 4 years around, the farmland tax is full charged. It is estimated that land-occupying tax is  $984.84 \times 10^4$  Yuan, including  $843.84 \times 10^4$  Yuan in reservoir area and protective project,  $141.00 \times 10^4$  Yuan in main project.

(c) Forest vegetation restoration costs

It is charged on the basis of the regulation" Interim Procedures for the expropriation and use of forest vegetation restoration costs" (the State Forestry Administration, the Ministry of Finance). Its standard is formulated as 6 Yuan per m<sup>2</sup> for economic forest and timber forest, 3 Yuan per m<sup>2</sup> for woodland. It is estimated that forest vegetation restoration costs is  $280.13 \times 10^4$  Yuan, including  $251.33 \times 10^4$  Yuan in reservoir area and protective project,  $28.8 \times 10^4$  Yuan in main project.

(d) Land management fees

According to the “Interim Procedures on Land Acquisition Management in Jiangxi”, the land management fees of this project are rated as 3 percent of the land acquisition fees. It is estimated that land management fees is  $225.24 \times 10^4$  Yuan, including  $216.05 \times 10^4$  Yuan in reservoir area and protective project,  $9.19 \times 10^4$  Yuan in main project.

(e) Land surveying cost

Land surveying cost is  $14.69 \times 10^4$  Yuan, including  $13.95 \times 10^4$  Yuan in reservoir area and protective project,  $0.74 \times 10^4$  Yuan in main project, which is calculated according to 50

Yuan per mu for the arable land acquisition (including relocation covering).

(f) Flood control security funds

This project is a key project of the province. According to the “Interim Provisions on acquisition of flood control security fund in Jiangxi”, the food control security funds are requisitioned by 250 Yuan per mu. It is estimated that flood control security funds is  $73.45 \times 10^4$  Yuan, including  $69.76 \times 10^4$  Yuan in reservoir area and protective project,  $3.69 \times 10^4$  Yuan in main project.

### 6.2.6 Total Investment

The total investment of land acquisition resettlement relocation is  $20061.90 \times 10^4$  Yuan, of which the submerged and protect works is  $19205.78 \times 10^4$  Yuan, hinge projects is  $856.12 \times 10^4$  Yuan. ( shown as in table 6-1 ~ 6-3)

## 6.3 Funds

### 6.3.1 Sources of Funds

The total funds needed for the land acquisition compensation is  $200.619 \times 10^4$  Yuan, and are paid by the domestic local matching funds. The fund sources include:

- (a) Subsidies from ministry of communications
- (b) Financial assistance in Jiangxi Province
- (c) Domestic bank loans

### 6.3.2 Fund Appropriations

After the approval of resettlement Special funds, the county resettlement office allocates the funds according to the construction items:

(a) Local government of township, village level manages the land acquisition compensation and relocation subsidies as a whole, and is responsible for the production relocation of every village. County resettlement office checks out the use of funds regularly.

(b) As for the compensation for housing, construction subsidiary, relocation subsidies and weak family housing, the resettlement office coordination team at the township level gives out them to the villagers through village committee.

(c) According to the contractual agreements, the compensation for public and infrastructure are plunk down to the construction unit in baths by the county resettlement office.

(d) For the compensation for the professional project and enterprise, county resettlement office gives it to the relevant departments of the affected enterprises affiliating to the original project directly.

(e) For the centralized relocation sites needing unite building, with full respect for the resettlement will and authorized signature resettlement office of county or township level can manage the compensation for housing and the subsidiary construction in general, in order to guarantee sufficient funds to complete resettlement sites smoothly. When the building is completed, according to costs of housing resettlement selected, settlement will be disbursed in phase.

### 6.3.3 The Annual Investment Plans

According to the construction design, land acquisition removal must be completed ahead of time to ensure the project implementing under the control of the design schedule, which makes prepare for the compile of the Resettlement schedules of the Shihutang Hydropower Project (Chapter 11). And the annual investment plan for the land acquisition costs is confirmed based on this, shown in table6-4.

Table 6-1 Summary table of investment estimate of the land acquisition compensation

unit: 10<sup>4</sup>Yuan

Serial number	items	sum	Land acquisition costs of Protect works	Land acquisition costs of hinge works	note
1	Compensation for land acquisition and relocation	7798.35	7201.51	596.83	
2	Cost of Housing and subsidiary constructions	979.47	979.47		
3	relocation cost of infrastructures	97.28	97.28		
4	moving and transport cost	15.20	15.20		
5	Other compensation for residents	22.58	22.58		
6	compensation for water-electric infrastructures in villages	453.36	453.36		
7	Moving and relocation cost of enterprises	90.23	90.23		
8	moving/altering cost of the special projects	1880.05	1880.05		
9	protection works cost	2866.79	2866.79		
10	reservoir bottom cleaning cost	17.15	17.15		
11	Other costs	1138.82	1138.82		
	1 survey and design cost	340.59	340.59		
	2 implement and management cost	408.71	408.71		
	3 institution cost	40.87	40.87		
	4 tech training cost	44.30	44.30		
	5 supervision cost	136.24	136.24		
	6 M&E cost	68.12	68.12		
	7 resettlement environment expert group cost	100.00	100.00		
12	Preparing cost( 10% )	1476.24	1476.24		
13	static total investment	16238.67	16238.67		
14	Water and environment protection cost	79.10	79.10		
15	Relevant tax and fees	3147.29	2888.01	259.29	
	1 farmland cultivating cost	1568.94	1493.08	75.87	
	2 farmland occupation tax	984.84	843.84	141.00	
	3 forest vegetation recovery cost	280.13	251.33	28.80	
	4 management cost (3% of the land acquisition cost)	225.24	216.05	9.19	
	5 farmland reconnaissance cost	14.69	13.95	0.74	
	6 flood security funds	73.45	69.76	3.69	
16	Total investment	20061.90	19205.78	856.12	

Table 6-2 Subentry investment estimate computing table of the reservoir-submerged dealing

items	Sub-items	unit	unit price(Yuan)	physical objects	investment(10 <sup>4</sup> Yuan)
Section1	□moving and relocation cost of village resettlement				8859.63
	(I) Compensation for Land acquisition and relocation				7201.51
	I. Permanent Land acquisition				6662.40
	1. arable farmland	mu		2763.01	3765.20
	(1) paddy field	mu		955.14	1724.24
	Once in two years or above	mu	18882	732.46	1383.03
	Once in two years below	mu	15323	222.68	341.22
	(2) dry land	mu		1807.87	2040.95
	Once in two years or above	mu	13417	552.83	741.74
	Once in two years below	mu	10352	1255.04	1299.21
	2 garden plot	mu	13750	6.17	8.48
	3 pound	mu	13200	309.51	408.55
	4 forest land returning from farmland	mu	6760	1469.60	993.45
	5 economic woods	mu	3800	282.18	107.23
	6 material woods	mu	3400	182.39	62.01
	7 woodland	mu	3000	327.52	98.26
	8 land acquisition for new sites	mu	7966	54.72	43.59
	10 un-utilized land	mu		3346.01	1175.63
	(1) cultured	mu	6533	302.26	197.47
	(2) ever cultured	mu	4403	1125.36	495.50
	(3) un-cultured	mu	2516	1918.39	482.67
	(4) disputed land				64.61
	II Temporary expropriation for construction	mu			539.12
	1. arable farmland	mu		799.6	361.21

Continued

Continued table 6-2 Subentry investment estimate computing table of the reservoir-submerged dealing

item	Sub-item	unit	unit price(Yuan)	physical objects	investment(10 <sup>4</sup> Yuan)
	(1) paddy field	mu	5350	20	10.69
	(2) dry land	mu	4496	779.61	350.51
	2. woodland	mu	650	1199.4	77.96
	3. un-utilized land	mu	500	1999	99.95
(II) Relocation cost of housing and facilities					979.47
	1. housing	m <sup>2</sup>		32616	929.16
	(1) framework housing	m <sup>2</sup>	350	241.43	8.45
	(2) masonry rooms	m <sup>2</sup>	300	10843.63	325.31
	(3) brick-wooden Housing	m <sup>2</sup>		15211.25	396.97
	Living	m <sup>2</sup>	270	13249.47	357.74
	estate	m <sup>2</sup>	200	1961.78	39.24
	(4) mud-timber antrum	m <sup>2</sup>	150	2711.28	40.67
	(5) mixed antrum	m <sup>2</sup>	100	3608.84	36.09
	(6)decoration and other compensation(for frame housing, masonry rooms and birck-wooden housing)	m <sup>2</sup>	50	24334.53	121.67
	2. ancillary buildings				50.31
	(1) wall	m <sup>2</sup>	25	4823	12.06
	(2) cement ground	m <sup>2</sup>	20	9301	18.6
	(3) water-pressed well	set	200	117	2.34
	(4) well	jams	1000	12	1.2
	(5) manure pit	set	200	31	0.62
	(6) miasma pool	set	800	12	0.96
	(7) cooking range	set	200	231	4.62
	(8) facility building	set	50	42	0.21
	(9) getway	set	1000	29	2.9

Continued

Continued table 6-2 Subentry investment estimate computing table of the reservoir-submerged dealing

item	Sub-item	unit	unit price(Yuan)	physical objects	investment(10 <sup>4</sup> Yuan)
	(10) fixed phone	set	180	51	0.92
	(11) CATV	household	600	24	1.44
	(12) graves	set	300	148	4.44
(III) Compensation for water facilities in villages					453.36
	1. small hydropower station	kW	5000	520	260
	2. small lift irrigation facility	one	20000	15	30
	3. flood drainage facility	one	5000	53	26.5
	3. diversion canal	km	30000	0.62	1.86
	4. sand-mining ground	one	50000	27	135
(IV) Rebuilding cost of the infrastructure		person	1600	608	97.28
(V) Moving and transport cost		person	250	608	15.2
	1. vehicle and boat cost	person	50	608	3.04
	2. room and board cost	person	40	608	2.43
	3. material transition cost	person	80	608	4.86
	4. fee-for-service	person	10	608	0.61
	5. material losing cost	person	10	608	0.61
	6. delayed-working cost	person	60	608	3.65
(VI) Other compensation					22.58
	1. little fruit trees	trunk	50	1076	5.38
	2. other subsidies	person	250	608	15.2
	3. subsidies for vulnerable groups	household	5000	4	2

Continued

Continued table 6-2 Subentry investment estimate computing table of the reservoir-submerged dealing

item	Sub-item	unit	unit price(Yuan)	physical objects	investment(10 <sup>4</sup> Yuan)
	(VII) Moving and building cost of enterprise				90.23
	1. housing	m <sup>2</sup>		2477.18	62.31
	(1) framework housing	m <sup>2</sup>	350	625.27	21.88
	(2) masonry rooms	m <sup>2</sup>	300	16.9	0.51
	(3) brick-wooden Housing	m <sup>2</sup>	270	829.4	22.39
	(4) mud-timber antrum	m <sup>2</sup>	150	21.5	0.32
	(5) mixed antrum	m <sup>2</sup>	100	984.11	9.84
	(6)decoration and other cost(only for frame housing, masonry housing and brick-wooden housing)	m <sup>2</sup>	50	1471.57	7.36
	2. ancillary buildings				6.87
	(1) wall	m <sup>2</sup>	25	328.4	0.82
	(2) cement ground	m <sup>2</sup>	20	1842.1	3.68
	(3) water-pressed well	set	200	4	0.08
	(4) well	jams	1000	1	0.1
	(5) cooking range	set	200	1	0.02
	(6) facility building	set	50	1	0.01
	(7) manure pit	set	200	3	0.06
	(8) get way	set	1000	1	0.1
	(9) water tower	set	20000	1	2
	3. relocation and transport cost	m <sup>2</sup>	15	2477.18	3.72
	4. compensation for infrastructures	m <sup>2</sup>	70	2477.18	17.34
	Section2: Moving and building cost of the residents				
	Section3: Moving and building cost of industries				

Continued

Continued table 6-2 Subentry investment estimate computing table of the reservoir-submerged dealing

item	Sub-item	unit	unit price(Yuan)	physical objects	investment(10 <sup>4</sup> Yuan)
Section4: Moving and building cost of special projects					1880.05
(I)	Restoration cost of transport facilities				1110.58
	1. fourth-level highway	km	500000	3.13	156.5
	2. machine road(cement ground surface)	km	240000	13.92	334.08
	3. new building of the fourth-level highway bridge	set	200000	6	120
	4. dock	set		13	325
	(1) strengthening the customer/goods dock	set	250000	3	75
	(2) strengthening the goods dock	set	250000	10	250
	5. ferry	couple		11	175
	(1) steam strengthened	couple	250000	1	25
	(2) persons strengthened	couple	150000	10	150
(II)	Telecom infrastructures	km			49.52
	1. aerial optical cable	km	35000	13.72	48.02
	2. sub ground communication cable	km	30000	0.5	1.5
(III)	Mobile telecom cable	km			25.77
	1. aerial optical cable	km	35000	4.52	15.82
	2. sub ground cable	km	50000	1.99	9.95
(IV)	Unicom infrastructures	km			13.78
	1. aerial optical cable	km	35000	1.25	4.38
	2. sub ground cable	km	50000	1.88	9.4

**Continued**

Continued table 6-2 Subentry investment estimate computing table of the reservoir-submerged dealing

item	Sub-item	unit	unit price(Yuan)	physical objects	investment(10 <sup>4</sup> Yuan)
(V)	Military telecom infrastructures	km			15.5
	1. aerial optical cable	km	25000	2.44	6.1
	2. sub ground cable	km	50000	1.88	9.4
(VI)	CATV infrastructures	km			13.32
	1. aerial optical cable	km	20000	6.66	13.32
(VII)	Transmission and Distribution infrastructures				66.04
	1. 35kV circuitry	km	60000	0.96	5.76
	2. 10kV circuitry	km	45000	8.61	38.75
	3. 0.4kV circuitry	km	15000	11.69	17.54
	4. transformer	desk	10000	4	4
(VIII)	others				584.14
	1. waterworks	set	700000	4	280
	2. deposition pool	set	200000	1	20
	3. Electric Power Station	kW	3500	240.4	84.14
	4. hydrometric station	set	1500000	1	150
	5. navigation aids project				50
(IX)	Training special fisher folk	person	1000	14	1.4
Section5: protection works cost					2866.79
1. land-uplifting works		mu	15000	1911.19	2866.79
Section6: reservoir bottom cleaning cost					17.15
	reservoir bottom cleaning cost	km <sup>2</sup>	45000	3.81	17.15
Section1~section6					13623.61

Continued

Continued table 6-2 Subentry investment estimate computing table of the reservoir-submerged dealing

item	Sub-item	unit	unit price(Yuan)	physical objects	investment(10 <sup>4</sup> Yuan)
Section7: Other costs					1138.82
	1. survey and design cost		2.50%		340.59
	2. implement and management cost		3.00%		408.71
	3. institution cost		10%		40.87
	(10% of the implement and management cost)				
	4. tech training cost (village )		0.50%		44.3
	5. supervision cost		1.00%		136.24
	6. M&E cost		0.50%		68.12
	7. resettlement environment expert group cost				100
Section1~Section7					14762.43
Section8: Preparing cost					1476.24
	basic Preparing cost		10%		1476.24
Section9: static total investment					16238.67
Section10: Water and environment protection cost					79.1
Section11: Relevant tax and fees					2888.01
	1. farmland cultivating cost	mu		2790.37	1493.08
	(1) paddy field	mu	6609	955.14	631.25
	(2) dry land	mu	4696	1835.23	861.82
	2. farmland occupying tax	mu		3562.61	843.84
	(1)Permanent expropriation	mu	2668	2763.01	737.17
	(2) Temporary expropriation	mu	1334	799.6	106.67
	3. forest vegetation restoration costs	mu		792.09	251.33
	(1) economic and material woods	mu	4000	464.57	185.83

	(2) woodland	mu	2000	327.52	65.51
	4. management cost (3% of the land acquisition cost)		3%		216.05
	5. farmland reconnaissance cost	mu	50	2790.37	13.95
	6. flood control security project	mu	250	2790.37	69.76
<b>Section12: Total investment</b>					<b>19205.78</b>

Table 6-3 Subentry investment estimate computing table of the hinge project

item	unit	unit price(Yuan)	physical objects	Investment (10 <sup>4</sup> Yuan)
Section1 □ villages				596.83
(I) permanent land acquisition of the construction				306.38
1. arable farmland	mu		148	216.76
(1) paddy field	mu	18882	35	65.14
(2) dry land	mu	13417	113	151.61
2. garden plot	mu	14017		
3. woodland	mu	3000	72	21.60
4. fishing pond	mu	13200	3.5	4.62
5. un-utilized land	mu	2516	252	63.40
(II) construction expropriation				290.46
1. arable farmland	mu		381	243.38
(1) paddy field	mu	7711	53	40.87
(2) dry land	mu	6174	328	202.51
2. garden plot	mu			
3. woodland	mu	1150	282	32.43
4. un-utilized land	mu	500	293	14.65
Section2 □ Relevant tax and fees				259.29
1. farmland cultivating cost	mu		148	75.87
(1) paddy field	mu	6609	35	22.80
(2) dry land	mu	4696	113	53.06
2. farmland occupation tax				141.00
(1) permanent expropriation	mu	2668	148	39.35
(2) temporary expropriation	mu	2668	381	101.65
3. forest vegetation recovery cost	mu	4000	72	28.80
4. management cost (3% of the land acquisition cost)				9.19
5. farmland reconnaissance cost		50	148	0.74
6. flood control security funds		250	148	3.69
Section3 □ Total investment				856.12

Table 6-4 The annual investment schedule of land acquisition

item	Total investment(10 <sup>4</sup> Yuan)	Annual investment(10 <sup>4</sup> Yuan)			
		1	2	3	4
Moving and relocation cost of reservoir resettlement	8859.63	885.96	2657.89	3543.85	1771.93
moving/altering cost of the special projects	1880.045	37.60	263.21	263.21	1316.03
reservoir bottom cleaning cost	17.15		1.71	8.57	6.86
Land acquisition cost of protection works	2866.785	573.36	1146.71	860.04	286.68
Land acquisition cost of hinge projects	596.83	208.89	208.89	71.62	107.43
Other costs	1138.82	227.76	341.65	341.65	227.76
Preparing costs	1476.24	147.62	295.25	442.87	590.50
Relevant tax and fees	3147.29	314.73	629.46	1573.65	629.46
sum	20061.90	2395.93	5544.77	7105.45	5015.74

## **7. RESETTLEMENT AGENCIES INSTITUTIONS**

### 7.1 Relevant agencies

Shihutang Hydropower Project is one of the large domestic Hydropower Project as well as an WB loan project. It is necessary to establish a comprehensive resettlement agency and management system. Mainly include planning and design units, implementing administrative agency, advisory and monitoring agencies and so on.

The framework of management agencies are as follows: establishing the leading group of Shihutang Hydropower Project as the leading agency of the project.

Project Leading Group has the Project Management Office (short for project Office afterwards) as its subordinate body. The project office manages the implement works like project construction, resettlement and environment management in the process of implementation. So does the towns. At the same time, it also takes charge of commission or bidding works of service units. Thereinto commissioned design unit, supervision unit and independent bidding unit have very close connection with resettlement. Parallel environmental management is described in the EIA report.

Resettlement offices at all levels concretely participate in various resettlement implementation works.

A project coordinator is recommended to facilitate the preparation of the overall resettlement status and the work and visit of the Ministry of Communications, expert groups and WB delegation.

Personnel composition at all levels is shown in Table 7-1.

### 7.2 Agency responsibilities

#### 7.2.1 Leader agency

The leading group of Shihutang Hydropower Project is the top decision-making body of this project, taking completely charge of the implementation of the project. Project office as the owner are complete responsible for various works of Shihutang Hydropower Project, and it follows the lead of the leading group.

#### 7.2.2 Agencies involved in the RP

Commissioned by the project construction office, water conservancy and design academy of Jiangxi, water and electricity survey and design academy of Hubei as well as the Zhujiang river planning and survey Ltd., share the design work of land acquisition removal and resettlement.

Although the design academy is the main planning agency, Taihe county government and other departments have provided important information. Principals and the mass representatives from the affected town, village and team also actively take part in the RP works (details of public participation are shown in 8.4).

The main planning tasks of the design academy are as follows:

- (a) Physical indicator investigation. If possible, amend the building plans to reduce resettlement.
  - (b) Analyze the land and environment capacity in relocation sites.
- In addition, the design academy cooperate with the local governments at various levels
- (c) Prepare the resettlement action plan
  - (d) Determine the compensation budget
  - (e) Removal plan
  - (f) Prepare related charts
  - (g) Provide necessary documents (reports, charts, notification etc.) for resettlement supervision
  - (h) Assist the resettlement offices at all levels in the resettlement relocation
  - (i) Modify the resettlement action plan according to the needs of actual situation

### 7.2.3 Resettlement implementation agency

Special resettlement offices at county or township level and the coordination teams in the villages specifically preside over the various implementation works. The personnel compiling of resettlement offices is 3 to 5 people at county level, 2 to 3 at township and 1 to 2 in villages (shown as in Table 7-1).because the resettlement is a administrative work with strong sociality, resettlement offices at various level should be constituted by staff from government, land administrative department, water resources units and agricultural units etc.. The leader usually is a well-experienced person. The specified personnel list at various management agencies must be determined before the completion of the original designing.

Resettlement offices exert the function of management, planning, implementation, coordination and monitoring and supervision on behalf of the owners.

----county resettlement offices function as the day-to-day administrative body of the land requisition management. The function is:

- (a) According to the approved land requisition design, implementation planning and budget, conduct macro-regulation
- (b) According to the overall implementation plan, compile the annual implementation plan, specifically organize and manage the implementation plan and funds, coordinate the relationship of resettlement and monitoring units, do well in the relocation works on behalf of the owners.
- (c) Carry out examination and acceptance of the resettlement works with the township (town) government
- (d) Take charge of the auditing, declaring of the RP and report
- (e) Take charge of the commission and management of monitoring, supervision and design
- (f) Specifically assign officers to help design units complete the specific planning works of the resettlement relocation
- (g) Be responsible for receiving letters and visits about land requisition resettlement
- (h) Supervise and monitor the subordinate resettlement offices implement the relocation works, and compile schedule report to submit to the superior monitoring department

----resettlement offices and resettlement coordination teams at township (town) level

Township and villages affected on behalf of the government take charge of the relocation works and participate in compensation treaty, relocation site defining and other activities in general. The villages are the primary executive agency. Physical indicator investigations, regulation of compensation and relocation plan as well as the implementation afterwards, all need the participation of resettlement offices and the coordination of local government at various levels. The main function is to assist the superior to do the following works:

- (a) Land dispensing
- (b) Development of secondary and tertiary industries
- (c) Organizing the resettlement removal
- (d) Help rebuilding residential housing
- (e) Publicizing relevant polity to resettlement (and host population)
- (f) Resolving the issues in the process of relocation implementation
- (g) Supporting the resettlement to be free of poverty

#### 7.2.4 Monitoring and supervising units

Monitoring and supervising of land requisition is an important part in resettlement implementation. The monitoring and supervising works of this project will be entrusted with qualified independent special agency.

##### 7.2.4.1 Supervising units

The function of supervising system of Shihutang Hydropower Project is doing supervision, according to “construction supervising provisions on water conservancy project and the actual situation of the project”. The project will be commissioned to National qualified supervision units. The focus of resettlement supervision is to control the investment, schedule and quality of the resettlement projects, cooperate with the local on review, coordination and inspection, and supervise the implementation of the locals and special design units as well as the acceptance of the completed projects.

##### 7.2.4.2 M&E units

According to the requirements of the WB loan agreements, an independent professional body will be employed to monitor and evaluate the socioeconomic development. The contents of the evaluation mostly include agricultural output of the new relocation sites, employment, education, public health, income, public participation and evaluation of the social development etc.

#### 7.2.5 Environment management agency

An environment management office will be set up. The responsibilities are to coordinate the implementation of the environmental protection measures required in the EIA report. Environmental inspectors will also be appointed to check out the implementation and effect of the environmental protection measures. At the village level there are village cadres, reporting the construction schedule and relocation monthly.

Monitoring of the public infrastructure and health protection services in the relocation sites has close affinity with resettlement, including providing safe water source for safe water drinking, adequate toilet facilities in the housing, proper solid garbage management, as well as surface drainage, and so on.

#### 7.3 Overall resettlement coordination

The main tasks of the overall resettlement coordinators are joining with the county resettlement Office to prepare relevant reports of the overall resettlement status, so as to facilitate the work and visit of the Ministry of Communications, expert group and the WB delegation.

The responsibilities of the overall resettlement coordinators are as follows:

- (a) Supervise and coordinate the operation of the monitoring units and environment management office, in order to effectively realize the goals in the whole project area.
- (b) Recommend, approve and implement special research or state subsidy to meet environmental requirements.
- (c) Arrange and coordinate the visit of Ministry of Communications, expert group and the WB delegation.
- (d) Compile resettlement status reports regularly (twice a year), present the reports to the Ministry of Communications, expert group and the WB delegation.

#### 7.4 Resettlement management institutions

A variety of measures are taken in the course of project management, including owner responsibility system, supervision system, bidding system, contract management system etc.

Resettlement Offices as a whole have the responsibility for implementation and the bidding works of the special and infrastructure construction. Besides, National qualified supervision units are required to conduct supervision. All contracts signed during the construction are the responsibility of the supervision unites. Meanwhile, project offices will also employ M&E agencies to monitor the relocation works.

In addition, the resettlement office must use computers to manage the information, save the files of resettlement and documents in the implementation.

#### 7.5 Training

To make sure the smooth implementation, the training for resettlement and resettlement staff is indispensable. The training planning must be set down.

---resettlement staff training

Technical training of the resettlement staff is an important guarantee for resettlement implementation. Personnel training and HR exploiting system at all levels play an important role in promoting the resettlement implementation. The training can be conducted in many forms, such as seminars, technical training courses, study tours and

field training etc, cost of which belong to operation and management fees (shown as in Table 7-2). The training contents include:

- (a) Explain the principles and policy about relocation to the managers and technicians.
- (b) Project management training (information management, investment management, financial management, etc.).
- (c) Implementation and monitoring management.
- (d) Systematic training for staffs dealing with issues of social adaptability

----resettlement training

Land requisition and demolition damage the original production system of the resettlement, while relocation provide new environment for resettlement in relocation sites. This changes the patterns of production, farming systems and business nature to some extent. Some farmers may not be familiar with the mode of production in the new relocation sites. Therefore, it is necessary to carry through the agricultural production techniques and industrial employment training. The focus of agricultural training is to develop economic forestry, the sideline, breed aquatics, dry farming, vegetable greenhouses, irrigation agriculture, and other economic crops etc. The training object is the resettlement labor force in all project areas. Professional technical training will be provided to household registration changing resettlement and other village resettlement that have the possibility to work in secondary and tertiary industries. Resettlement preparing to launch family enterprise will be trained on basic knowledge of business plan and operation. The training works are organized by the resettlement training center of county and township (town).

The training plan above is an important step to help the resettlement learn and use new skills. More importantly, each is equipped with practical training manual. Resettlement may refer to the manuals when necessary, and the concepts introduced by the training center can be remembered more easily. Training courses and manuals should indicate the channels for more information and recommendations (such as through the township technology station, technicians, etc.). Encourage resettlement to develop formal or informal groups for developing new skills, in order to enhance the cooperation between resettlement. In this way, experiences can be shared and cohesion of the community be improved.

Resettlement training schedule is shown in Table7-3.

## 7.6 Measures for strengthening institutional capacity

In order to improve the effects of management and implementation, the following measure will be taken to enhance institutional capacity:

- (a) Define the responsibility and purview of resettlement offices at all levels and strengthen management of resettlement works. The overall resettlement post of project coordinator as well as the suggestions from independent M&E units and monitoring units will help to supervise the function-exerting status continually. It also helps to clear the responsibility of the relevant bodies, the best mechanism and departments to deal with the issues.
- (b) Increase the capacity of resettlement agencies at all levels gradually, especially professional technical capacity. Strengthen its technical equipment, such as computers, testing equipment, transport, etc.
- (c) Replenish forces of resettlement agencies at all levels step by step, in particular the professional and technical strength. Strengthen its technical equipment. Choose resettlement staff strictly. Enhance business skills training. Raise the operational capacity and management level of the resettlement staffs.

Resettlement agencies can draw on experienced staff based on the own needs. The objective of the training items in section 7.5 is to increase management skills and improve relocation effects.

Table 7-1 Personnel compiling of resettlement offices at various level

item	unit	Resettlement offices at various level			remark
		sum	County level	township	
1.managers	person	13	3	10	
2. financial personnel	person	12	2	10	
3. engineering technicians	person	2	2		
4.material supplier and rear service staff	person	1	1		
sum		28	8	20	

Table 7-2 Training plan of resettlement management cadres

Training items	number	place	Starting time	Number of days □day□	budget □10 <sup>4</sup> yuan□
Lectures on policy and laws	15	Taihe county	2009.02	7	2.52
Planning manangement	15	Taihe county	2009.02	10	3.6
Implementation plan design	15	Taihe county	2009.03	10	2.7
Schedule management	15	Taihe county	2009.04	10	2.7
Financial management	15	Taihe county	2009.04	10	1.8
Quality control of the project	15	Taihe county	2009.06	10	1.8
Management information system	15	Taihe county	2009.09	15	2.7
Project supervision	15	Taihe county	2009.09	15	2.7
Monitoring and evalutaion	15	Taihe county	2009.10	15	2.16
Program management	15	Taihe county	2010.02	10	1.44
Foreign trainign	8	Out of China	2011.02	15	48
sum	163			127	72.12

Table 7-3 Training plan

item	Person-time	Numbers of days □day□	Training outlay □10 <sup>4</sup> Yuan□
Rice plant and management	150	5	2.63
Aquiculture and management	80	6	1.68
Environment sanitation of community	55	8	1.54
Economic crop plant and management	320	6	6.72
Skills training in second and third industry	250	12	10.5
sum	855	37	23.07

## 8. PUBLIC CONSULTATION AND SOCIAL ADJUSTMENT

### 8.1 Favorable policies

According to the favorable policies stipulated in the relevant laws and regulations of the state: ' development resettlement is advocated and supported by the state and earlier stage compensation and allowance and later stage production support are adopted ', favorable policies are taken as follows:

- (a) According to the Society Development Ten Year Planning of Jiangxi province, industrial projects related to agriculture production development in the project area should be arranged with preference, meanwhile recruitment of residents in resettlement area and resettlement labor force claims priority.
- (b) While the state arranges the dedicated fund for pay agriculture and support the poor and social development fund for transportation, telecommunication, education and health and so on, the resettlement area should be paid more attention in order to support the resettlement arrange livelihood and develop production.
- (c) In order to alleviate the burden of affected person, those whose build houses can remit farmland occupy tax, land use tax, real estate tax, flood control security fund and so on. So the affected person and residents in the resettlement can be supported.
- (d) The industrial and agricultural and animal husbandry tax should be adjusted according to the impact of resettlement.
- (e) Mineral resource of quarrying, mining sand and making titles for building houses can be exempted from mineral resource compensation fees.
- (f) Establishing anti-poverty fund, as the later-part poverty alleviation fund for affected person, which can assure them can maintain a basic living in special situation.

Resettlement production rehabilitation fees should be specially used to rehabilitate and develop production to improve the residents' production ability. In order to assure the compensation fund can be effectively used in the special channel, it should be transferred to the District Resettlement Office and be managed by District Resettlement Office. So the local government can take advantage of multi-discipline, plan and build feasible production systems and enterprises, and avoid the risk caused by the compensation fund transferred to affected person directly (being not good at management, wrong investment decision-making and so on). In order to assure the development planning can meets the demands of affected person, supervising the Resettlement Office compensation fund usage is one task of independent resettlement monitoring and evaluation units.

### 8.2 Special measures to help affected residents rehabilitate

The relocation and rehabilitation of residents in the project affected areas needs a relatively long phrase, during which s the proper living and production relocation and agriculture technology and other related skill training for affected person are needed. Besides that, under the state and governments at all levels favorable policies and according to local specific situation, special measures for living and production should be made to help affected persons especially affected person as follows:

- (a) In every affected village, special help should be supplied to weak people (such as poverty households, women, childless elders and so on) especially on building and buying houses. Resettlement relocation fund contains special compensation fund for weak groups.
- (b) Besides fund help, for the affected person belong to special weak groups, the villages should organize labor force to help them build or buy houses in order to relocate as soon as possible.
- (c) During the process of resettlement implementation, governments at all levels should make comprehensive security measures, provide necessary vehicles labor force and temporary shelter, arrange special security inspectors who are responsible for the maintenance of local security and traffic order to protect affected person life and property security and assure the resettlement implementation runs smoothly.
- (d) According to the spirit of “the state council view on improving large and medium-sized reservoir later period resettlement supporting policy”(the state [2006]17<sup>th</sup> document), to help reservoir resettlement eliminate poverty, promote reservoir areas and resettlement areas economic and social development, guarantee new era water resource and hydropower healthy development, build socialist harmonious society and improve large and medium-sized reservoir late period support policy, the scope of support is large and medium-sized reservoir rural resettlement and each can be granted 600yuan RMB annually. Shihutang reservoir is a large reservoir type II, and the resettlement is among the scope of late period support determined by the above-mentioned documents.

### 8.3 Adjustment during transition period

Resettlement is a comprehensive task, which has the characteristic of wide coverage and long implementation period. And the effective management during the transition period is vital to whole stage of resettlement implementation. So, during planning stage the

will of affected peoples should be fully understood and they should be organized to take part in the consultation of resettlement work. Try to relocate the same background (such as neighbors, relatives, etc.) resettlement in the same area to reduce their stress and psychological concerns during the transition stage.

Resettlement plan includes temporary housing subsidiary and compensation for loss of delays. The compensation for affected houses and the site of affected houses should be transferred three months before houses demolition, so the affected peoples can have full preparation time and it can alleviate the temporary housing demands.

Besides, during the transition period of resettlement implementation, a lot of people do not like to accept the risk, pay more attention to life-safeguard and have a negative attitude. As a result, during this period, the key work for the resettlement office and villages cadres is to assure the Affected peoples feel content with the living and production in the initial stage. In order to make the Affected peoples pass through transition period, the measures can be taken as follows: supply key fundamental infrastructures (such as water, road, power, garbage disposal, etc.), open credit, and supply technical service on agriculture, the secondary and tertiary industrials, train Affected peoples, provide health facilities and related workers, expand market information service, build resettlement involved organization, and seriously organize related activities to enhance affected persons' enthusiasm and independence and reduce difficulties during transition period.

It is showed as experience that even the compensation has transferred to affected person, many of them still live with their relatives and they build houses step by step while demand for building materials decreases. Especially for a village which has small proportion of affected peoples and takes the method of local area relocation and the relatives can provide temporary housing, the situation is even just so.

During transition period, affected peoples can live on the compensation for crops. Because resettlement is arranged after the harvest season, the affected peoples can have twice income, which is the fund support during transition period.

#### 8.4 Public participation and consultation

During the process of resettlement planning, through meeting, discussing and consulting with representatives of the villagers, the agreement is signed with related departments. They participate in the survey of physical indicators. Information is disseminated through affected people's intention sample survey, which is collected from affected

person and cadres. Resettlement participation planning and implementation is showed as follows and the activities which have been carried out listed in table 8-1.

#### 8.4.1 Affected peoples and representative participation

The first step: before survey, work out working outline, and listen to the ideas of local government on the investigation contents, methods and requirements.

The second step: during general investigation, responsible persons of townships, villages and groups are invited to participate in it, and the necessity of project construction, project efficiency, project impacts, compensation principles and resettlement timetable should be propagated to them. Resettlement relocation possible whereabouts is discussed on the base of consultation. While survey groups arrives a village, the village assembly (including women) is held in the village. Although it is not possible for all the villagers to participate in it, after which the information can be effectively disseminated.

The third step: during resettlement planning stage, Designing Institute staff choose resettlement areas on the base of discussion with county and township leaders at all levels and listening to opinions, requirements and possible problems. In addition sample survey is carried out to obtain detailed information on wills and attitudes of affected persons. It is an important part of planning process to work out resettlement rights manual and hand out it to each affected peoples

The fourth step: contract with all the affected villages and relocation area including land and property, compensation standards, relocation area and mode, timetable and bilateral liabilities. If the affected villages do not accept resettlement planning, then on consideration of their demands carry out resettlement planning again.

The implementation of various aspects of resettlement active participation is an important guarantee for success. During the process of resettlement implementation, the affected persons should participate in the following items.

House-building: rural affected person are always responsible for building houses for themselves or hire labor force to build houses. They can use the building materials demolished from old houses to build new houses. They can demolish houses before deadline and then they can handle land and houses transfer documents.

Training: based on relocation area conditions and affected persons' will, provide necessary training to help them restore and improve income.

Complains and grievances: affected persons and residents in relocation area are encouraged to make use of complains and grievance procedure (showed in chapter8.6), which supplied mechanisms for solving and finding problems (showed in chapter8.6).

Through handing out resettlement titles manual to ensure them be familiar with the existence and operation of complains and grievances.

Through training to encourage affected person and residents in relocation area to establish and make full use of interest and mutual-benefit groups. These groups have social nature, which can also be on production. Through sharing experience, the groups can not only improve living standard restoration, but also enhance new social environment cohesive force. In addition, these groups can effectively find problems, reflect to cadres and resettlement office and represent community to participate in the visit of resettlement supervision evaluation unit.

Through sample population investigation, independent resettlement supervision evaluation units collect data on the change of income and living standards from affected communities.

#### 8.4.2 Resettlement wills investigation

Resettlement family basic social economy situation is surveyed through the method of talk face to face. Investigation tables are supplied by designing departments. With the help of owner and local government, the spot investigation is made in the resettlement villages. It takes the form of questions and answers, which is filled in by design staff and recognized by affected peoples' signature. 169households are involved in the project, with population of 597 in total. According to random sample, 54 households are selected to be investigated, 32% of all the households.

Survey on households of families in relocation area and landless farmers takes the form of questionnaire. The questionnaires are supplied by designing department, handed out to the targets by local government, then retrieved and statistic. 173 copies of effective questionnaires have been retrieved, covering a total of 597 people, 27.2% of the total 2191 people. The result is showed as follows:

Resettlement problems being paid most attention by affected peoples: 21% of them concern whether the compensation is full, 46% cares whether the compensation is paid by the standard, 8% pay more attention to whether the relocation areas are satisfactory and 25% interests whether income or production is affected by resettlement. In total, the old concern whether the relocation area are satisfactory and income and production is affected by resettlement, while the young concern the problem of compensation.

Requirement of first importance by rural affected peoples: 84% of them hope the life will be better, 8% expect more job opportunity, 8% demands better education situation and the same language. The women expect better living environment, while the man interest more job opportunity and better education.

Best relocation method approved by rural affect people: 33% of them hope the whole village will relocate in the same area, 21% expect those with sane family name live together, 29% like the same group to stay together, and 17% do not care to it.

Industries affect people like to participate in: 88% of them like to engage in original agriculture production, while the rest want to engage in commerce and industry and so on.

Contracts among relatives after resettlement: all of them expect it is the same as former.

Best resettlement method approved by affected peoples: 64% like to self-build houses nearby, 30% prefer self-build houses in centralized community, while the rest expect to live in community with the same planning.

Understanding of the project: 100% of the affected peoples know about it.

Supportive attitude of rural affect people: almost all of them express support.

Information on resettlement: 12% know better, 88% know the generalized situation, of which man know much better than women.

The ways the affected peoples know information: 33% of them know it via meeting, the rest via other ways.

#### 8.4.3 Project-related parities

##### (1) Residents in relocation area

Through survey in drafted relocation area and talks with the residents, the results indicate most of them support this project and agree with affected peoples from other parts relocated in their group. They think the resettlement will promote the local economy and improve infrastructure facilities. Only 8% of the residents have concerns and they worry about whether the affected peoples from other areas can integrate into the local environment and whether their arrival has negative impacts on the existing benefit.

### (2) Land loss households

This project needs to requisition 2910.5 mu farmlands, accounting for 6% in total farmland of requisitioned villages (48 villages). Except some villages, the construction of new-built and reinforced protection project has liner or partial impact, which is scattered. In terms of the whole project area, the proportion of land acquisition is small and the negative impact on local industrial production, people living standard and Scio-economy is little.

Through questionnaire survey on households affected by the project, most of the potential land loss households (95%) know about and support it. 26% of them think the project construction land acquisition has negative impact on their income, while the rest think it has little impact. Of the entire affected household, 33% of them live mainly or at a large apart on the income from farmland and the project construction has large impact on those households. Land loss households agree with the drafted production rehabilitation measures (such as arable land adjustment, middle low yield field transformation, cultivation industry development), think the measures are feasible and they can restore and improve their income. When the arable land is decreasing, 57% of them think they will take other measures to improve their income, including the second and third industry, working, etc. These households pay most attention to the issue whether the compensation fund is paid in time (45%), and then whether production relocation method is feasible (32%).

### (3) Women

Women in the project area presents typical Chinese rural characteristic. Generally, they have the same right with man to participate in Scio-economic activities. It is their voluntary choices of staying at home, looking after family and doing agriculture job. In terms of job opportunity, they insist that man have priority. In politics, the political position of project area is increasing. The proportion of women cadres, awareness of

women participating in government and political affairs, awareness of women rights and awareness of participating in social activities are also enhanced. In terms of education, the female have the same right with the male. Basically, the young have free love.

Impacts on women by project construction are as follows: in the part of economy impact, because of land acquisition, the arable land is decreasing, which causes the contribution of women to household sideline production is lowing. But a part of women (28%) think the project construction will bring none-agricultural economy opportunity. In the part of political impact, awareness of women rights is increasing; awareness of participation is enhanced and at the same time women pay more attention to social public affairs. So the impact is positive. Project construction has no negative impact on the position of education and marriage.

#### (4) Weak groups

Within the range of project area, there is no minority habit area. Some individual minorities can marry to Han ethnic group and integrate into Han culture, so they can not be considered as weak groups. And there are no indigenious.

The weak groups involved in project are elderly childless people, disabled households, and male labor shortage households, which are 4 households in total, 2% of the affected households. During the process of resettlement relocation, the Scio-economic characteristic of weak groups should be taken into account. Try to keep their living standard being not lower than before. Policy and compensation is favorable to them at some extent. It is drafted to hand out 5000yuan extra subsidiary to each household.

Environmental impact evaluation research of project should listen to view and attitude broadly and adopt project-related parties' advice (including affected peoples, residents in project area and other parties). Through measure of talks face to face and filling in questionnaire, know about the attitude of all parties on Shihutang avionics project construction and main issues of public issues.

It is worth taking into account that many people put forward their ideas and think resettlement relocation is the issue they concern about most. The majority expect the resettlement planning and compensation should be comprehensive.

The investigation indicates that resettlement management has an important position in the mind and public participation in resettlement relocation is vital to rebuilding new communities.

#### 8.5 Make public resettlement information

From the beginning of project till the whole process of resettlement relocation, information on project and related laws and regulations should be made public through the way of public participation (conference, discussion, etc., showed in table 8-1). Resettlement staff and local government should make the affected peoples know clearly about the quantity of physical indicators, compensation standard calculation method and compensation ways, resettlement relocation measure, allocation and usage of resettlement compensation and subsidiary, rights and favorable policies, and etc. Meanwhile, resettlement information should be made public to residents in relocation area, including land acquisition, land compensation standard, fund usage and information on affected peoples. Resettlement rights manual improves the awareness of affected people, transparency of resettlement relocation work and work efficiency.

#### 8.6 Complain and grievance

##### 8.6.1 The possible complain and its' solution

Shihutang avionics project is a social welfare project of comprehensive utilization of water resource. It is build to improve the rank of Ganjiang river aviation channel. After the completion, it will annually produce  $4.8 \times 10^8$  kW·h power. Meanwhile, through newly-building and enhancing reservoir dike, flood control standard of regions along the river in reservoir area and land productivity in protective region is improved. Besides, safety of residents is protected. As a result, the project may cause impact on the production and living of residents and the affected peoples also can get benefit from the project. In terms of generally benefits, the project should be supported actively. Resettlement planning is made based on the generally impact of the project. Although during the process of resettlement implementation, local governments, resettlement management organization, affected peoples and residents in relocation areas make full consultation, the change of actual situation and the implementation operation may cause complains. According to resettlement experience of related hydropower projects and the existing problems, complains are as follows:

##### a) Physical indicators of demolition

Because of computational error during the process of investigation, statistic and calculation, there may be phenomenon of leaking and mistaken items, which may affect the interest of affected peoples. When these problems occur, the affected people of the village committee can report to county resettlement office, and then the county submits the result to owner and supervision in document. Then the design staff of owner and supervision personnel may verify on spot. When recognized, the physical indicators of leaking and mistakenly registered items will be compensated according to the standard.

b) Resettlement compensation standard

Because of misunderstanding of resettlement laws and regulations, the minority affected peoples complains that the compensation standard is too low to satisfy the demands of relocation and rehabilitation. In such condition, local governments and resettlement management organization should actively make public resettlement laws and regulations to them and organize designing staff to explain the principle of compensation standards to make them understand the related policies and documents and eliminate their doubt in minds. Meanwhile, properly plan the construction of facilities and ancillary building to do a good job of production and living relocation.

c) Usage of land compensation fund

During the process of implementation, misunderstanding during the process of complementation usage, which can causes complains. Local governments, resettlement organization and designing organizations should explain the principle of compensation determination and usage to eliminate their doubt in minds.

d) Funds implementation

During the process of resettlement relocation implementation, because of some reasons, the compensation could not be transferred in time, which prevents the progress of living and production relocation. For these problems, supervisor on spot should control fund, process and quantity to ensure resettlement funds for special use. Meanwhile, coordinate and supervise financial department allocate fund according to relocation process to assure the resettlement project carried out on time.

e) Production and living relocation

After the completion of the project, land acquisition causes the area of per capita arable land decreases, which is another source of complains. For this type of problem, local governments should make full use of land acquisition compensation and resettlement

relocation subsidy and take a series of measures such as land reformation, promotion of science and technology, and rural industrial structure adjustment to improve output of arable land and assure that the income and living standard of rural affected peoples are not lower than before.

f) Production and living relocation of non-rural affected people

For non-rural affected people such as those participate in commerce, industry and labor service, they complain about loss of original production and operation sites. According to their vocational skill, local government should supply proper production and operation sites and favorable policies such as credit supply and tax relief to make the affected people can relocate and develop.

8.6.2 Grievance channel and process

Affected peoples can enjoy the entitlements conferred by constitution and laws. Existing laws and regulations of the state guarantee the legitimate rights and interest inviolability. When violability happens, they can grievance to petition office, procuratorial organ and other specialized agency responsible for civil arbitration. If the affected persons are not satisfied with compensation, the following procedures can be adopted to solve the problems.

a) Grievance channel

County resettlement offices have the authorities to supervise resettlement work carried out by the lower level. Other departments such as citizen's petition offices and resettlement petition of county city and even the sate can handle the problems.

Resettlement project supervision units with the responsibility of supervising resettlement implementation according to related regulations, can audit check and coordinate grievance.

Independent resettlement supervision and evaluation agencies which supervise resettlement implementation according to related laws and regulations and have the responsibilities to maintain legitimate rights and interests, can deal with and report resettlement grievance problems to related departments. Law departments of administrative supervision, discipline, audit, disciplinary inspection, justice and prosecution can deal with cases of violating laws and disciplines.

## b) Grievance channel

If the affected peoples are satisfied with resettlement relocation, they can report to village committee. Then village committee and affected peoples can negotiate with local resettlement offices to seek solutions or appeal to resettlement office of high level by speaking and writing. While receiving grievance, resettlement office of high level records it and negotiates with village committee to solve it in ten days. When encountering disputes which can not be solved by negotiation, according to the administrative litigation law of PRC, village committees have rights to appeal to administrative departments (such as project office, resettlement management organizations, citizen petition office and departments of administrative supervision, disciplinary inspection and prosecution) with jurisdiction rights hierarchically. If still unresolved, they have rights to appeal to court. Resettlement offices are responsible to record grievance and solutions.

Although it is prescribed that all grievance should be recorded in files, this issue is always be neglected. Especially on the level of village, grievance is put forward in the oral form. In spite of the form and nature of grievance, it should be recorded in files to make the affected peoples confident with importance and solution of the problems. These records should be periodically transferred to county resettlement office (county resettlement should record them automatically). Dependent resettlement superstition and evaluation organizations check and evaluate grievance recorded in files to assure the grievance problems solved properly and in time and the use of grievance procedure.

## 8.7 Relationships between affected peoples and residents in relocation areas

During the process of resettlement relocation implementation, most rural affected peoples adopt relocation in nearby areas. After relocation, they are familiar with living environment and the social relations and social guarantee systems still exist, which do not cause large changes to affected peoples as a result of relocation. Civil affected peoples adopt relocation in new community and they stay in the same town. The relocation areas are planned in the places convenient with traffic and water and power supply. Although they live in an unfamiliar environment and former social relations and social guarantee systems change a little, new social relations and social guarantee systems can be rebuilt through communication and mutual-help to understand and support each other. To promote the integration of affected peoples and residents in relocation areas, the follows must be accepted:

(a) Participation in planning: in order to get cooperation from residents in relocation area and affected peoples, while making resettlement planning, rights and interests and optional programs should be introduced to them. They can make choices from acceptable programs. They can negotiate directly or determine solutions by the formal or non-formal leaders and representatives. In most situations, institutional arrangement could be made such as regular meetings between project officials and local organizations to reflect their opinions during resettlement planning and implementation.

(b) Sufficient resources supplied: after affected peoples have relocated in new areas, demands for land, water, woodland and social service are increased, which may cause conflict because of resource competition. Resettlement relocation planning should evaluate whether existing resource and services could meet more demands. If not, planning should be made to it upgrade and expand and related-budget (such as water supply, power and roads) should be made accordingly. Besides, improved rubbish treatment measures and new sanitation standards should be implemented to improve existing public health conditions.

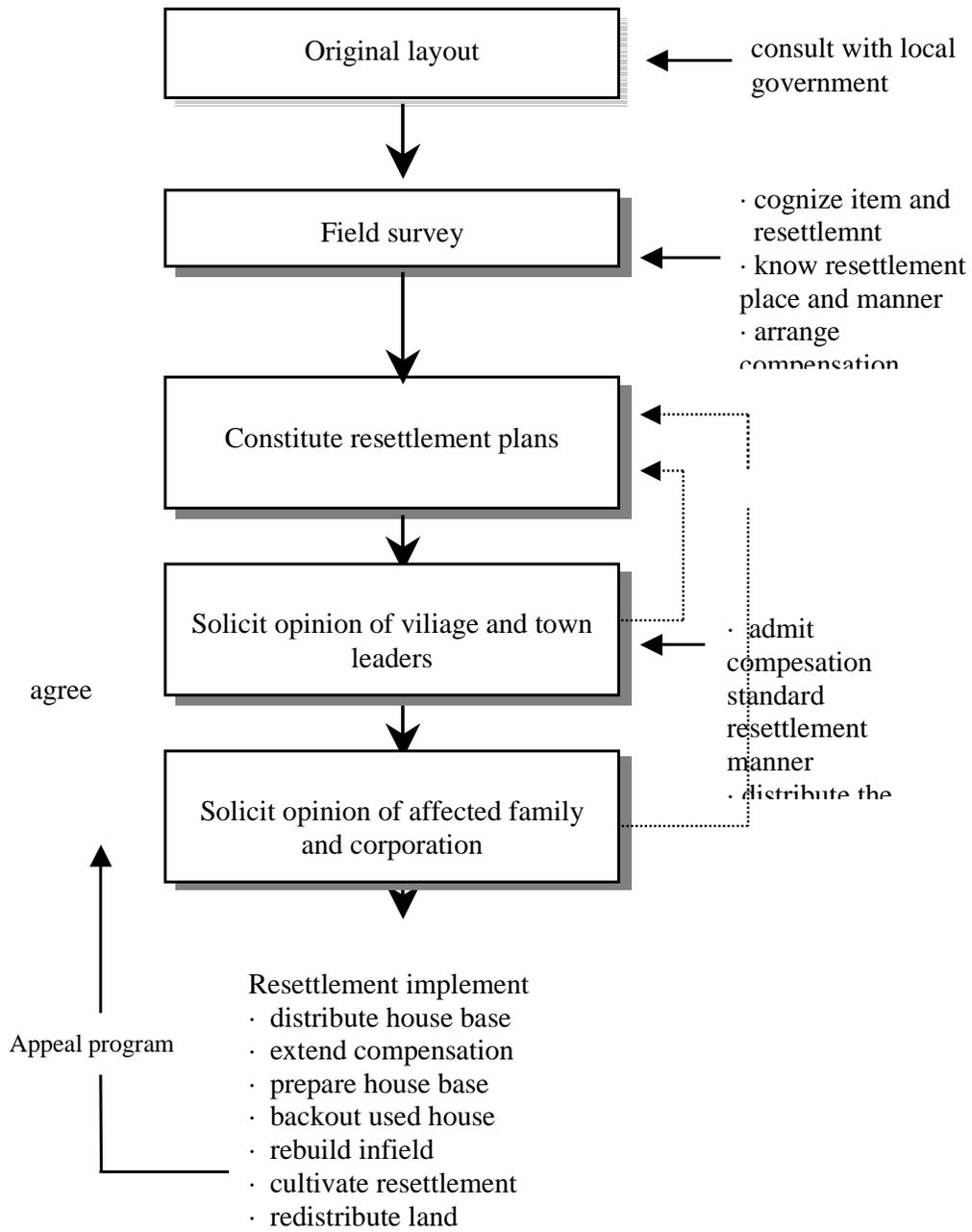


Fig. 8-1 Public participation of resettlement plan

Table 8-1 Contents and modes of public participation and consultation

phrase	time	area	staff	content	mode	result
	September,2006	Taihe	Owner, designing staff and related government departments	Project introduction	discussion	completed
	October, 2006	Taihe	Owner, designing staff and related government departments	ask for advice on survey outline	discussion	completed
	November,2006	Taihe	Owner, designing staff , related government departments and residents in project areas	collect willing on physical indicators and economic investigation	visiting, meeting and questionnaire	completed
	January, 2007	Taihe	designing staff , related government departments ,affected peoples and residents in project areas	Consult relocation	Visiting and meeting	completed
	January, 2007	Taihe	designing staff , related government departments ,affected peoples and residents in project areas	Ask for advice on compensation	Visiting and meeting	completed
	March, 2007	Taihe	Owner, designing staff and NGOs	Ask for advice on resettlement	discussion	completed
	November, 2007	Taihe	designing staff , related government departments ,affected peoples and representatives of relocation areas	Ask for advice on relocation area designing and implementation report	discussion	planning
	2008	Taihe	Village committee and land affected peoples	Consult production relocation	Village committee	planning
	From 2008 to 2012	Taihe	Resettlement organizations, departments of designing and supervision, experts and affected peoples	Consult problems during implementation	Visiting, discussion and meeting	planning



## **9 KEY CONTRACTS AND AGREEMENTS**

In order to strength project management, it is necessary to retain resettlement supervisors to manage quality, funds and schedule during the process of project implementation, while project office only manage those projects which have large investment or impacts. Contracts must be signed between resettlement relocation areas and related local governments. Other contacts should be signed between contractors and project offices, county resettlement office and affected villages according to project amount.

### **9.1 Resettlement agreements**

- (a) Contracts should be signed to determine total funds of resettlement and its sources. Contracts should be signed between project office and county resettlement office (showed in appendix9-1). County resettlement office will complete resettlement relocation tasks within the total fund determined in the contract.
- (b) Contracts should be signed to select resettlement programs and resettlement relocation areas: after resettlement programs put forward by designing institute and county government is approved, consultation should be made with affected peoples to determine relocation sites, relocation mode, relocation timetable and compensation funds, and then signed resettlement relocation contracts.
- (c) Agreement reached on demolition physical indicators: based on investigation files made by designing units in 2007, then resettlement office, inspection units, designing units and affected households check on sites. Finally, compensation contracts for affected households should be signed (showed in appendix9-2). On this basis, agreement should be reached among county, townships and villages. All data should be approved with signatures.
- (d) Before relocation, agreement should be reached on compensation investment between local government and affected peoples to determine compensation investment amount, relocation sites, relocation mode and obligations and responsibilities of all parties.

### **9.2 Resettlement project construction contracts**

#### **9.2.1 General requirements**

In order to strength construction market management, standardize bidding and contract management, effectively guarantee legitimate rights of both contract sides and assure project construction management and bidding work smoothly on the fairly and impartial

basis, all special projects construction should sign resettlement project construction contracts according to 'water conservancy and hydropower civil construction contracts conditions'[referred 24],( contracts conditions is divided into general contract terms and special contract terms).

The following is contained in general contract terms:

- a) Terminology meaning
- b) General obligations and responsibilities of both sides
- c) Fulfillment guarantee
- d) Units and staff of supervision
- e) Intercourse letters
- f) Drawings
- g) Assignment and subcontract
- h) Staff and management of both sides of contract
- i) Materials and equipments
- j) Traffic and transportation
- k) Project schedule
- l) Project quality
- m) Construction measurement and payment
- n) Price adjustment
- o) Modification
- p) Breach for contract and claims for compensation
- q) Solution to conflict
- r) Risks and assurances
- s) Completion and maintenance
- t) Environment protection measures
- u) Others

The format of contracts is showed in appendix9-3.

#### 9.2.2 Environment constraints on project construction contractors

As showed in project environment impacts evaluation report, project construction contract is necessary to include detailed items of environment protection measures. When preparing bidding papers, contractors are clear demands on environment protection and related cost. Environment protection measures are listed in appendix9-4.

## Appendix9-1 contracts between project and county resettlement office

### Contract of Shihutang Navigation Hydropower Pivot Engineering Resettlement Relocation

Shihutang navigation hydropower Pivot engineering is a province key project. After the completion, it will produce giant navigation and power benefit. Whether the resettlement relocation is finished successfully will determine the success or failure of project. In order to finish the project as soon as possible, the obligations and responsibilities of related units are specified as follows:

#### I Time requirements

\_\_\_\_\_county people's government should complete production relocation of \_\_\_\_\_ households with the population of \_\_\_\_\_ and related infrastructure facilities before \_\_\_\_\_. Meanwhile, construction of production development and professional items should be finished by stages according to requirement of relocation.

#### II Compensation investment

According to project review opinions of related departments, it is determined that the total amount of compensation investment of \_\_\_\_\_ county is \_\_\_\_\_ Yuan, showed in appendix. \_\_\_\_\_county people's government is responsible for its usage.

#### III Responsibilities of all parties

1 Within the time stipulated in article I, \_\_\_\_\_county people's government should timely finish the task of resettlement demolition and relocation in project area of Shihutang navigation hydropower pivot engineering with high-quality. During the process of resettlement relocation, work should be carried out according to "Shihutang navigation hydropower pivot engineering land acquisition and resettlement relocation implementation planning repot", which can not cause second time relocation. If programs need adjustment or amendment, they should be approved with project office and then can be executed. If the tasks could not be completed within the stipulated timetable, \_\_\_\_\_ county people's government is responsible for the results.

2 Project offices will allocate resettlement funds to \_\_\_\_\_ County timely according to money usage plan. If the funds can not be allocated timely which may affect resettlement implementation, project office is responsible for the results.

3 Project office will check, supervise and coordinate resettlement implementation, manage resettlement funds according to related resettlement ordinances and is responsible for reviewing resettlement planning and approving annual plans and special projects.

IV This contract is signed mutually by project office and \_\_\_\_\_ county people's government, one format \_\_\_\_\_ copies with the same effect.

\_\_\_\_\_ Project management office :( official seal) Legal representative: (signature)

\_\_\_\_\_ County people's government :( official seal) Legal representative: (signature)

Appendix 9-2 Resettlement compensation agreement between affected households and township

Relocation compensation agreement for affected households

No:

First party: people's government of \_\_\_\_\_ township (town) of \_\_\_\_\_ county

Second party: head of the household with \_\_\_\_\_ persons, \_\_\_\_\_ group \_\_\_\_\_ village \_\_\_\_\_ township (town)

In order to grantee Shihutang navigation hydropower pivot engineering carry out successfully and support province key project construction, according to large and medium water conservancy and hydropower project construction land acquisition compensation and resettlement relocation ordinances of the state, land management law of PRC, province land management implementation methods and Shihutang navigation hydropower pivot engineering land acquisition and resettlement relocation arrangement planning report approved by the sate, this household belongs to affected households and involuntarily take the mode of \_\_\_\_\_relocation. All the events is agreed as follows and abided by the two parties.

I items, quantity, standard and amount of compensation

1 The items and amount of compensation is checked on sites by resettlement office, designing units and affected households on the basis of files surveyed by designing units in 2006.

2 Account with the standards approved by this project

3 The total land acquisition and demolition compensation is \_\_\_\_\_Yuan, (details showed in appendix).

II Compensation payment mode by the first party

1 The first party transfers the total compensation in resettlement relocation and rehabilitation account opened in credit cooperative at one time to the second party, and honored by issuing current deposit book.

2 The second party must accept the acceptance certificate conducted by village and group (70% of households in the group sign) and quasi-relocation conducted by township (town) people's government. And then, go through census migration certificate in the original household registration department.

3 The first party approve according to copy documentation of acceptance certificate, quasi-relocation certificate and census migration certificate presenting by the second party. Compensation and subsidy (10% of compensation for fragmentary wood can be detained as cutting fees, which can be paid after the completion of cutting) can be transferred to the second party at one time.

III According to the requirements of local governments at all levels such as county and township, the second party must guarantee all the houses should be demolished before \_\_\_\_\_ (date), and all the affected households be relocated in \_\_\_\_\_ group \_\_\_\_\_ village \_\_\_\_\_ township \_\_\_\_\_ county. Do not permit changes in relocation programs and moving back.

IV If the relocation is not completed before \_\_\_\_\_ (date), the second party is responsible for the loss by themselves.

V The first party and the relocation township people's government sign contract on the production relocation of the second party. The local people's government is responsible for production relocation.

VI Overlooking population natural growth, production relocation population is determined by the deadline of relocation fees accounting.

VII After relocating, the affected households should abide by laws and regulations, local village regulations, and local customary and habits. Meanwhile, they enjoy preferential policies supplied by the state.

VIII After the first party fulfills the resettlement policies according to Shihutang navigation hydropower pivot engineering land acquisition and resettlement relocation arrangement planning report, the resettlement relocation of second party breaks off from the first party.

IX If the articles of the contract could not be fulfilled, both sides could appeal to county resettlement office through grievance. After investigation, the county resettlement office will put forward solutions.

X The contract is a format three copies, of which each held by both sides and one is filed in county resettlement office. It goes into effect by the signature of both sides.

The first party (official seal)

The second party (signature)

Legal representative (signature)

County resettlement office (official seal)

Legitimate representative (signature)

Resettlement inspector (signature)

Appendix 9-3 Resettlement project construction contracts

Resettlement project construction implementation contract

Contact name: \_\_\_\_\_

Contract No. \_\_\_\_\_

\_\_\_\_\_ (called the party awarding the contract as follows) prepare a project and accept the bidding of \_\_\_\_\_ (called contractor as follows). An agreement has been reached between both sides and the contract is signed in \_\_\_\_\_ (date).

The total amount of contract is \_\_\_\_\_ Yuan.

1 The words in this contract have the same meaning with the words listed below in the second articles of special contract articles and genera contract articles.

2 The following documentations are contained in this contract:

Agreement (including the memorandum)

Bid-winning notification

Tender quotation

Special contract articles

General contract articles

Technology articles

Drawings

Inventory of engineering amount marked price

Related environment protection articles (showed in appendix 9-4)

Other documentations

The compile of all the documentation above substitutes all agreements, memorandums, and documentation with mutual commitment signed before this contract.

3 Contractor guarantee all the work stipulated in contracts completed on time, and is full responsible for the obligations prescribed in contracts.

4 The party awarding the contract guarantees to pay money according to the contract and is full responsible for its obligations stipulated in the contract.

5 This contract comes into effect since the signature of legitimate representative or authorized representative of both sides (if notarizations or appraisals are needed, it comes into effect after completing formalities).

6 The contract is one format \_\_\_\_\_ copies. Of which two are originals, each side holds one copy. \_\_\_\_\_ copies are transcripts; the party awarding contract holds \_\_\_\_ copies and the contractor holds \_\_\_\_\_ copies. Other copies are sent to related department.

The party awarding contract: (official seal) Contractor: (official seal)

Legitimate representative: (signature) Legitimate representative: (signature)

Undertaker: Undertaker:

Address: Address:

Post code: Post code:

Telephone No. Telephone No.

Fax: Fax:

Deposit bank: Deposit bank:

Account: Account:

Appendix 9-4 Environment protection requirements on project construction

No.	items	requirements
1	Waste water	Discharge of waste water should meet standards of the state.
2	Control of air pollution	a. Machines using oil as fuel must meet national emission standards;
		b. Blasting dust control measures;
		c. Control of road dust;
		d. To avoid the emission of toxic fumes .
3	Water usage	According to plans.
4	Health of workers	a. undergo medical examination and remove infectious virus carriers;
		b. Safe drinking water source ;
		c. treat and control wastewater ;
		d. prevent schistosomiasis;
		e. food sanitation;
		f. eradicate rats and mosquitoes ;
		g. Health care capacity and facilities (including first-aid facilities);
		h. proper treatment measures for excrement and urine;
		i occupational safety and health ;
		j housing with sanitation facilities.
5	Control noise	a. all the machines meet the national standards;
		b. Try not to construct in residential areas at night ;
		C. provides protection facilities for workers operating noisy machines.
6	Treatment of construction waste	Deal with construction waste in designated areas and with designated mode
7	Solid waste disposal	Periodically collect solid waste and dispose it in the safe location by the safe manner;
8	Soil erosion	Re-process surface soil and filling soil
9	heritage	Protect heritages: once finding heritages, stop construction.
10	Ecology of Ganjiang river	When explosive operation happens during the period rare animals haunt, inspectors should be assigned to observe them.
11	Land use	Occupy land under provisions; do not cause damage to arable land and crops; after using, conduct formation.
12	Monthly	Contractors of project construction are fully responsible for

	environment report	built-up areas and residential areas. Contractors should monthly put forward report to environment management office or environment inspectors on the implemented environment protection measures,
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Note

a  all above requirements should meet laws and regulations of the state and the stipulation of related project construction.

(b) project office and environment office should make detailed environment requirement according to articles above. All the requirements should be included in the project construction contracts.

## **10. MONITORING AND SUPERVISION**

### 10.1 Monitoring indicators

Many indicators should be considered, including the progress of project construction and planning measures, the effectiveness of relocation, the performance of implementation agency in achieving the objectives of production relocation, and social integration, etc. The main monitoring indicators are expounded respectively as follows.

#### 10.1.1 Living relocation

The monitoring indicators of living relocation mainly include the time and progress of transfer; the payment and utilization of housing compensation; the area, site, progress and quality of housing; the family income level, income source, family property and living quality before and after resettlement; the progress and quality of infrastructures restoration (e.g., water, power, road, post and telecommunication, television and broadcast, etc.) after resettlement; the type, site, occupied area, and ground formation and progress of constructing resettlement towns; employment and enrollment of resettlement, etc.

#### 10.1.2 Production relocation

The monitoring indicators of production relocation include the quantity, time and progress of land acquisition; the payment and utilization of land compensation; the change of production mode of Affected peoples; the quantity, progress and quality of production and development project (including adjustment of land, development of courtyard economy, and the second and third industry relocation, etc.); the rehabilitation progress and quality of matching infrastructures and special facilities; the training of productive skills and its effectiveness, etc.

#### 10.1.3 Others

The other monitoring indicators include the implementation progress of resettlement, completion situation of funds, the implementation of contract and financial situation; the signature of demolition contract; the restoration of weak groups; the preparation of relocation area; the arrangement of interim in transfer process; the measures of social security such as medical treatment, sanitation, etc.; the organization, training, work time and efficiency of resettlement agency.

#### 10.1.4 Participation and Consultation

The monitoring indicators of public participation and consultation mainly include the time, method, content, degree and effectiveness of participation and consultation for affected peoples and host population; the proportion of women and weak groups in participatory process and its effectiveness, etc.

#### 10.1.5 Grievance

The monitoring indicators of grievance mainly include the channel and procedure of grievance; the problems and conflicts that occurred in implementing relocation and their solutions, etc.

### 10.2 Internal monitoring and supervision

#### 10.2.1 The organization of internal monitoring institution

The project office is the internal monitoring agency of land acquisition and resettlement of Shihutang navigation and hydropower project. This office should appoint a special leader to deal with issues related to resettlement relocation. This leader should have the relocation experience and authority to coordinate all departments that involved in resettlement relocation. In order to better fulfill duties, staff in project office will get a further training to promote the ability in management, planning, supervision and monitoring (see section 2, chapter 7).

#### 10.2.2 The purpose of internal monitoring

Internal monitoring is implemented by project office, which aims to maintain a good function of all resettlement agencies in the implementation of the resettlement operations, to cooperate with the work of relevant departments and master relocation situation of resettlement at any moment.

#### 10.2.3 The implementation procedure of internal monitoring

County resettlement office coordinates and monitors the implementation of township resettlement office, while its reports to project office (see Table 10-1).

#### 10.2.4 The contents of internal monitoring

Internal monitoring mainly includes the following issues:

- (a) Resettlement demolition, allocation of housing site and housing re-establishment, etc.
- (b) Implementation progress and quality of resettlement production and development project (including adjustment of land, development of courtyard economy, and the second and third industry relocation, etc.);
- (c) Investigation, coordination and suggestions of the main issues that existed in resettlement and implementation agencies in implementation process;
- (d) Restoration level of family income after resettlement;
- (e) Implementation progress and quality of infrastructures and special facilities project;
- (f) Restoration of weak group;
- (g) Payment, utilization and arrival of resettlement compensation funds;
- (h) Degree of resettlement participation and consultation in implementation;
- (i) Resettlement training and its effectiveness; and
- (j) Work organization, training, work time and efficiency of local resettlement office.

#### 10.2.5 The responsibility of internal monitoring

- (a) Cooperate with resettlement implementation agency, external monitoring and supervision unit;
- (b) Make a corresponding table according to monitoring contents and request implementation unit to give a monthly report to administrative department and owner periodically;
- (c) Supervisor should check and investigate on spot monthly and take part in the acceptance of resettlement project;
- (d) Supervise the implementation of yearly work schedule and the utilization of funds, and conduct a yearly financial audit with resettlement management agency;
- (e) Submit monitoring report to World Bank and integral resettlement committee periodically (twice a year); and
- (f) Report implementation situations to county resettlement office periodically and consult with administrative department if needed.

### 10.3 Independent monitoring and evaluation

#### 10.3.1 The institution of independent M&E

Project office (the owner) will retain the resettlement M&E Co., Ltd. to deal with issues of land acquisition and resettlement relocation compensation work. The independent monitoring unit will conduct an internal supervision for the owner; provide technical

consultations about management and full information about resettlement implementation with the owner; guide and evaluate the work of resettlement supervision unit; report implementation progress, existing problem and treatment suggestions to the owner and integral resettlement committee.

### 10.3.2 The purpose of independent M&E

The aim of independent monitoring is to evaluate the work of resettlement relocation in a wide and long-term view. Independent monitoring agency should trace the relocation activities to evaluate whether the objective of resettlement relocation has been achieved.

### 10.3.3 The contents of independent M&E

The independent monitoring unit will conduct a monitoring and evaluation about the implementation results of village resettlement relocation, re-construction of special facilities infrastructure and allocation and utilization of resettlement funds.

(a) Monitor and evaluate the implementation planning of village resettlement relocation. The work includes preparation before relocation, planning, project design, preparation of funds, formulation of implementation plan and preparation of affected peoples' living and production resource. To develop and adjust land, reconstruct the housing, restore water, power, road and matching infrastructures, reestablish the social service system, monitor the living standard level and quality before and after resettlement in the relocation process according to the requirement of relocation. Investigate the destination of affected peoples who relocate in the second and third industry and their income and living standard before employment, as well as their training on production skills and the promotion of comprehensive knowledge.

(b) Monitor and evaluate the reconstruction project of special facilities. It monitors all facilities, including water and power supply, post and telecommunication, broadcast and television, and transportation, etc. and conducts an M&E on the quality, progress, investment and effectiveness of the reconstructed project, on the basis of approved documents of project planning.

(c) Monitor and evaluate income restoration. The contents include that the changes in the quantity and quality of production mode, comparison income that engaged in second and third industry before and after resettlement, whether there is any training for resettlement to promote production skills, and whether Affected peoples participate in, etc.

The table of M&E for above issues is set out in appendix 10-A.

### 10.3.4 The responsibility of independent M&E

The independent monitoring agency should act as a consultant of project office and resettlement office, which will evaluate the activities of resettlement office and put forward some alternatives when appearing foresee problems, in order to achieve all objectives in resettlement relocation schedule. The independent monitoring agency is responsible for evaluating resettlement supervisor's result (see section 10.4.3) and its supervising quality; assessing resettlement plan and implementation of county and village by a regular field survey and records of resettlement office. Activities that needed to be carried out are expounded respectively as follows.

#### 10.3.4.1 The evaluation of Living standard

The independent monitoring organism should put forward and survey general living standard before relocation, which is based on affected people's random sample and a control team. The living standard investigation should be conducted every year to measure changes on affected people's living standard. If the relocation has been conducted, analysis of affected people's living standard should be based on investigated general living standard in this area (current situation of design) and to see whether it has achieved the designed living standard.

#### 10.3.4.2 Public consultation

Independent monitoring agency will take part in public consultation meeting held by town and village authorities periodically. Independent monitoring agency should evaluate the effectiveness of affected peoples' participation and the participation degree of affected peoples in resettlement implementation. All consultations like this should be recorded, which include participant name, title, suggestions and possible measures. Besides, independent monitoring agency should also consult with affected people to acquire their information, favors and wishes in living restoration, and report the findings to resettlement office. After the resettlement, these activities should mainly discuss the measures of income restoration.

#### 10.3.4.3 Grievance problems

The independent monitoring agency should interview the affected site periodically, and adopt the form of interviewing with resettlement office and Affected peoples to consult and investigate the grievance problems. Contiguously monitor the efficiency of

resolving grievance problems, if needed, put forward suggestions about the possible changes in this process to make it more effective.

#### 10.3.4.4 Other responsibilities

The independent monitoring agency should put forward suggestions during the preparation and implementation of relocation plan, the following indicators should be monitored:

- (a) Payment of compensation;
- (b) Re-adjustment of land;
- (c) The preparation of relocation site and its sufficiency;
- (d) Housing rehabilitation;
- (e) Transfer of Affected peoples
- (f) Restoration training of resettlement income
- (g) Restoration of vulnerable group
- (h) Rehabilitation and restoration of infrastructures and special facilities
- (i) Compensation for assets loss
- (j) Compensation for working time loss
- (k) Interim allowance
- (l) Compensation for the replace cost of assets loss
- (m) Time frame of above activities (application in any time)
- (n) Organization of relocation net

The work scheme (draft) of independent monitoring agency is set out in Table 10-1.

#### 10.3.5 The measures of independent M&E

(a) Monitoring unit send people to conduct field survey and field interview regularly or irregularly in the monitoring process. Discover problems in time and submit them to all levels of project offices to take measures in time, and provide M&E report with the owner.

(b) Establish the monitoring sites about the effectiveness of resettlement implementation and adopt trace monitoring. Monitoring sites is established according to the theory of sampling survey and the density of monitoring sites is established according to the sort of the actual resettlement livelihood (industry, composition of labors, educational level, gender and age, economic status, region distribution, etc) which is no less than 1/200 of population or 1/50 of total households. The monitoring sites are established by independent monitoring unit and given certain rewards according to the measures of rural statisticians.

- (c) Establish the input-output model of resettlement, analysis on the typical administrative unit of resettlement and make forecast.
- (d) Summarize the effectiveness of relocation, coordinately determine and establish demonstration area, and popularize advanced experience.

#### 10.3.6 The cycle and cost of M&E

The work time of independent monitoring unit include construction period of project and two years before project completion. Report is conducted at least twice a year. All the reports should be submitted to resettlement supervision, project office and integral resettlement committee and are copied by county resettlement office. The contents are set out in reports, including the records in monitoring period, analysis on problems encountered, existing problems, and the proposal of solution methods and implementation steps.

In addition, independent monitoring unit should cooperate with the World Bank delegates and resettlement panel to evaluate the status of resettlement implementation. Independent M&E unit will be appointed before August, 2008 and the monitoring cost can be listed in the total budget of resettlement.

#### 10.4 Resettlement supervision

The resettlement implementation should be supervised by the agency qualified the national supervision, Concerning the construction, quality, progress, funds use of the single relocation project (the main project is charged by the project construction supervision). The supervision should reflect the issues to resettlement office and the owner in time, solve issues quickly, and avoid intensifying and expanding.

##### 10.4.1 The purpose of supervision

Supervision unit control the progress, quality, and allocation and funds use of relocation implementation and special facilities rehabilitation, check and accept the completed project, and assure that the project is completed according to the quality requirement and project schedule.

##### 10.4.2 The contents and methods of resettlement supervision

- (a) The supervision work before relocation

- Review the implementation plan and progress that proposed by resettlement agency and construction unit (see Appendix 10-B, Table 1).
- Review the planning of labor arrangement, construction material, building tools supply that is acquired according to the progress requirement, and fill in the review table (see Appendix 10-B, Table 2).
- Review the planning of balance payment of demolition, relocation, and production relocation that is submitted by county resettlement office, or the situation of quarterly income and expenditure, in order to raise and arrange the resettlement funds rationally. And fill in the review table (see Appendix 10-B, Table 3).
- Review subcontractor and partner of special facilities, supply unit of material and equipment that selected by county resettlement office. Fill in the table of qualification review after review (see Appendix 10-4, Table 4). The construction unit selected by contract can not choose subcontractor and should be approved by supervision engineer if needed.
- Review and approve the selected principal (project management) of special facilities rehabilitation and production relocation. The construction unit should submit the main experience and material of similar projects to resettlement supervision. Fill in the review table of principal qualification (see Appendix 10-B, Table 5)
- Supervision engineer should check the residential area carefully, review whether possess the construction conditions, and supervise the resettlement office to construct according to the contract requirements.

(b) Quality control of relocation

The field management of resettlement agency and system of quality inspection are checked by resettlement supervisor in time, and supervise the construction unit to conduct self-inspection and self-supervision of quality and make construction records at every stage. Notice the resettlement office to deal with the construction unit which conducted self-inspection un-carefully and had quality problems or hidden troubles in time. Check and accept the project according to contract requirements. When the project of each residential relocation area, production relocation and the special facilities have been completed, construction unit should notice the supervision engineer to check and accept ahead of two days, and invite relevant resettlement representative or department representative to evaluate the project. Fill in the quality review table of relocation project after acceptance (see Appendix 10-B, Table 6).

- The acceptance standard of each project are determined according to design requirement or the standards consulted by the resettlement and owner.
- The resettlement supervisor should provide with treatment suggestions of quality accidents occurred in relocation process and fill in quality accident review of relocation

project and notice of quality problem (see Appendix 10-B, Table 7 and Table 8). And keep the big accident in the form of field evidence photo or video and fill in the table of spot evidence (see Appendix 10-B, Table 9).

The resettlement supervision has the right to propose shutdown of project, release the shutdown notice, and fill in the shutdown notice. If the issue has been solved, the resettlement office would go back to work after receiving the starting notice released by supervisor (see Appendix 10-B, Table 10).

#### (C) Progress control of relocation

The supervisor should supervise the resettlement progress each month and fill in the monthly supervision report. If the conflicts occurred in resettlement implementation affect the construction progress, resettlement supervision engineer notice resettlement office in writing to take measures.

Resettlement office should complete the relocation assignment in regulated period according to the contract and can not protract the construction period. If the period needs to be protracted for some reasons, it should be reviewed and agreed by resettlement supervision and ratified by the owner before protracting. Resettlement supervision notice resettlement office in writing.

#### (d) Funds control of relocation

Resettlement office and construction unit complete the relocation assignment in the range of regulated funds according to contract. For changes of project amount aroused by design modification, the resettlement office put forward detailed quotation. Resettlement supervision checks the quotation and notices the resettlement office and the owner in writing. Then, resettlement office and the owner execute the plan coordinately.

Resettlement fund is paid in installment according to the regulated term and methods. Resettlement supervisor inspect the quantity and quality of competed project carefully, account the payment fund, check the installment payment reported by resettlement office and construction unit whether accord with the project quantity. Resettlement supervision issues the payment certificate after check and pays after reviewed by administrative department.

The resettlement supervisor should deduct 5% of the payment as margins in the maintenance period, for special facilities project of subcontract or contract, and will repay to contractor after the assignment had been completed.

#### (e) The acceptance of relocation project

- Resettlement supervisor should participate the initial acceptance of whole project or partly project after the resettlement relocation had completed (or partly). And record carefully for the unqualified project (or part) according to the requirement of contract and design. Then, require the construction unit and resettlement office to revise and reestablish in regulated period (see Appendix 10-A, Table 10) and accept until the project accord with quality standard and requirement. If qualified, resettlement supervision together with relevant units issue “acceptance certificate of completed relocation project”. Issuing date is completion date.
- Resettlement supervisor should submit relevant technical documents to the owner after resettlement relocation project had been completed, and
- Resettlement supervisor should supervise the construction unit to revise disfigurement carefully for the project deducted 5% maintenance funds in maintenance period. Issue the “completion certificate of responsibility in maintenance period” after maintenance work had been completed. And refund the margins after maintenance period was due.

#### 10.4.3 The responsibility of resettlement supervision

- (a) Explain the report of resettlement relocation planning and construction drawing to all levels of resettlement agencies and contractor, and supervise the relocation, production relocation and special facilities construction whether complete according to requirements of contract document, construction rules and construction drawing;
- (b) Approve and consult the matters stipulated by contract, including resettlement relocation project, implementation scheme and instruction drawing that is compiled by county resettlement office, and revised relocation document;
- (c) Check the transportation means, construction materials, special facilities and installment quality in relocation according to the requirements of planning report, contract and construction drawing; supervise the resettlement agency to submit design documents, completion report, monitoring materials for future reference;
- (d) Issue implementation requirements to resettlement agency and construction unit according to the requirements of design documents and construction drawings and reply the problems proposed by resettlement agency and construction unit;
- (e) Review and calculate the allocation plan and payment amount, and pay after the owner had reviewed;
- (f) Execute the work requirements drafted by supervision headquarters, fill in all kinds of tables regulated, and form technical files of supervision by putting the other files together;
- (g) Report the details of resettlement implementation to project management unit and the resettlement M&E unit periodically every month, and

(f) Cooperate with project management unit, resettlement M&E unit and the panel to work.

#### 10.4.4 The organization of supervision

Project supervision headquarters is established in supervision agency and field supervision group is established according to the work assignment of affected area. Headquarters set one chief supervision engineer, two field standing personnel who are in charge of the work of office and specific supervision.

Each supervision group set one group leader, one supervision engineer, and one field standing personnel.

#### 10.4.5 Working cycle and cost

Supervise in the whole implementation of resettlement operations and submit summary report after the implementation had completed. The work should be started before August, 2008. Supervision cost can be listed in the budget of resettlement.

#### 10.5 Integral resettlement coordinator

The establishment of integral resettlement coordinator is in order to provide necessary connection with the resettlement activities in all departments. The resettlement coordinators include a professional manager and an assistant who are in charge of the coordination of resettlement relocation of Shihutang navigation and hydropower project. Resettlement coordinator and county resettlement office compile report concerning the status of resettlement in the whole project area, according to the results of monitoring. If needed, provide the necessary help with the panel and World Bank delegates, including submitting report periodically, coordinating with field survey, interviewing with relevant agencies and replying any kind of consultation, etc.

#### 10.6 Environmental panel of resettlement

##### 10.6.1 Necessity

The establishment of an environmental panel is to evaluate the relocation work periodically and put forward some necessary measures to meet the requirements of World Bank loan agreement. The environmental panel is an independent agency and submit report to both government and World Bank; and the administrative service for executing functions is provided by government. The panel is significant for the

resettlement planning and implementation which avails to solve the complex issues in resettlement work in time, avoid delay, reduce the loss, and secure the resettlement going on wheels.

#### 10.6.2 The composition of the panel

The panel consists of three resettlement experts including two internal experts. The experts are neither staff of ministry of communications nor clerks of World Bank.

#### 10.6.3 The responsibility of the panel

The panel inspects and evaluates the whole situations of resettlement implementation, including the work of all levels of resettlement agencies. The panel not only inspects or evaluates the resettlement progress, but also cooperates with the relevant agencies to solve some significant issues.

#### 10.6.4 Arrangement of activities

Activities arrangement plan to start in August, 2008 and activities are carried out throughout the whole construction term (2008-2012), twice a year and 7 days.

#### 10.6.5 Reporting system

The first work of the panel should carry out in:

(a) A report concerning the relocation progress should be submitted to the panel by integral resettlement coordinator before each activity. Moreover, the arrangement schedule should be submitted before the activity start.

Memo (including the work arrangement for each day and necessary explanations) specify some issues that should be given priority to solve.

(b) Each expert should write his own report concerning the work of inspection or evaluation, which will become an appendix for the panel report.

(c) If the panel report bases on two personal reports, the foreign expert should play a leading function in the panel report and represent the opinions of the panel. and

(d) The panel report (including the personal report as appendix) should be submitted to both government and World Bank.

#### 10.6.6 Cost

The panel report should be submitted to both government and World Bank. The cost for consultative panel is one million Yuan totally.

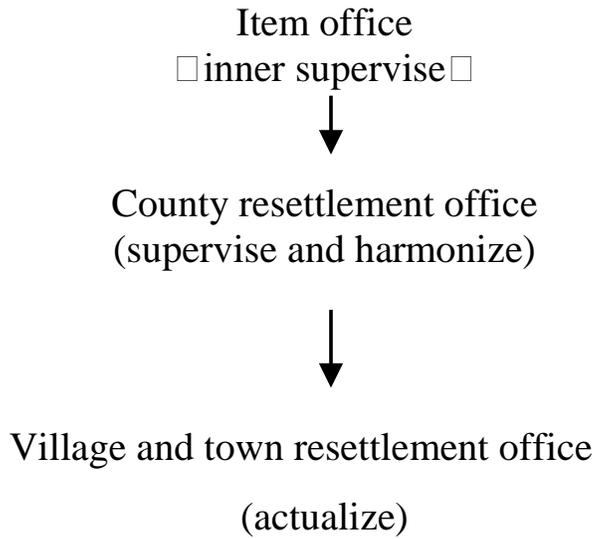


Fig. 10-1 Flowchart of inner supervising actualization

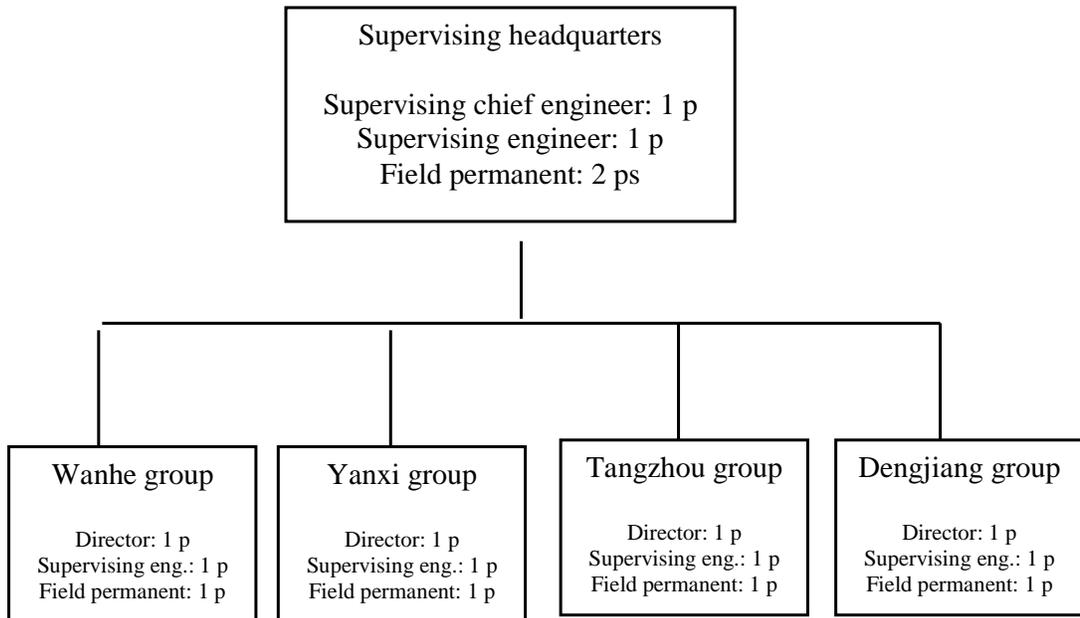


Fig. 10-2 Supervising organizing structure

Table 10-1: The table of internal and independent monitoring and evaluation

monitoring item	responsive measures of project	
	internal monitoring	independent M&U unit
community restoration		
compensation for villager	comparing with schedule and budget, county resettlement office reports the allocation progress of compensation	evaluates the reporting progress of county resettlement office and compares with implementation survey data
the progress and quality of house building	resettlement supervisor and village cadre supervise the rehabilitation, and county resettlement office identify weak groups	evaluates whether compensation can cover with replacement cost and compares with survey situations
the progress and quality of infrastructure	The progress and quality control are provided by resettlement supervisor who submit report to both town resettlement office and county resettlement office	evaluates the primary planning, the progress of county resettlement office and supervision, and the records of demolition time
the preparation of relocation area		
production resettlement		
maintain the living standard before relocation (especially for vulnerable groups)	the reparation of resettlement and relocation village is supervised by resettlement supervision, and the agreements of main infrastructures are contracted by county resettlement office	checks the progress of preparation (including infrastructure and land)
un-relocation enterprise affected		evaluates the production, house building of weak groups during field survey (face-to-face interview )
resettlement work and education	village cadre consults with family affected and solve or report grievance	Surveys enterprise affected, evaluates the situation of workers and production. surveys the village affected at random on the spot during consultation
support in interim	Village cadre monitors the village whether maintain normal production and receive education. County resettlement office monitors the work condition of villagers who receive un-agricultural relocation training. Income restoration is monitored by village cadre.	checks the records of work situation concerning county resettlement office after training, and the summary of village production relocation  Checks the report of county resettlement office through field survey and makes evaluation.

Continued table 10-1: The table of independent monitoring and evaluation

monitoring item	responsive measures of project	
	internal monitoring	independent M&E unit
public participation the progress, sufficiency and application of village land compensation	township resettlement office monitors the progress of village and relocation area and the sufficiency of resettlement development funds	checks the allocation records and confirms whether delay production relocation and comply with the regulated use of funds
cognition of village (including resettlement) about project and its effect	county resettlement office checks the progress of figure indicators investigation which make people recognize the project	ensure villages know the RP by participating village committee regularly and checks the progress of agreement that contracted by resettlement and relocation village
measures of supporting vulnerable group	township resettlement office determines the relevant requirements though village cadres	evaluate the planning (especially training and interim support)
grievance solution villages know the grievance channel	the village and county resettlement office keep the records of grievance	the tables sent to villages can promote cognition of this aspect
File the records of grievance	village cadre reports the grievance time, treatments, and the time, method and nature of solution	evaluates the utilization of grievance mechanism and the solution of grievance
rapid solution for grievance	county resettlement office determine the problems according to the report of township resettlement office	evaluates the time of grievance treatment suggestions and whether the solution method is sufficient according to the records and field survey of county resettlement office
resettlement organization	township resettlement office reports the staffing situation to county resettlement office in normal reports	evaluates and propose suggestions to promote efficiency if needed
complete assignment efficiently and quickly		evaluates and put forward suggestions to county resettlement office
sufficient staffing		
whether the organization structure and implement procedures are valid		



□ Housing area statistics of affected peoples

category \ area		before relocation □m <sup>2</sup> □	after relocation □m <sup>2</sup> □
housing	structure		
	brick-concrete		
	brick-wood		
other housing	brick-concrete		
	brick-wood		
Total			

Township (Town.farm)(seal)

Investigator□

□ Family assets statistics of affected peoples

category \ quantity	before relocation (set)	after relocation (set)
TV set		
washing machine		
fanner		
bicycle		
sewing machine		
automobile		
tractor		
boat		
farm cattle		
other		

Township (Town.Farm) (Seal)

Investigator□

□ Land area and planting crops questionnaire of affected peoples

item		unit	quantity	
			before relocation	after relocation
□ total area of land		mu		
□ farmland	subtotal	mu		
	paddy field	mu		
	dry land	mu		
	sloping field	mu		
□ pond		mu		
□ garden plot		mu		
□ woodland		mu		
□ commercial vegetable plot		mu		
□ housing land		mu		
□ grain crops		mu		
□ paddy	sowing area	mu		
	yield	kg		
□ Cole	sowing area	mu		
	yield	kg		
□ wheat	sowing area	mu		
	yield	kg		
□ yam	Planting area	mu		
	Yield	kg		
□ cash crops		mu		
□ cotton	planting area	mu		
	yield	kg		
□ sugarcane	planting area	mu		
	yield	kg		
□ vegetable		mu		
		mu		

□ Income and expenditure questionnaire of affected peoples

quantity category	before relocation (Yuan)	after relocation (Yuan)
<input type="checkbox"/> agricultural income		
<input type="checkbox"/> grain		
<input type="checkbox"/> cash crops		
<input type="checkbox"/> forestry income		
<input type="checkbox"/> fruit tree		
<input type="checkbox"/> medicinal materials		
<input type="checkbox"/> tea		
<input type="checkbox"/> stockbreeding		
<input type="checkbox"/> pig		
<input type="checkbox"/> cattle		
<input type="checkbox"/> sheep		
<input type="checkbox"/> chicken, duck, goose, and so on		
<input type="checkbox"/> fishery		
<input type="checkbox"/> fish		
<input type="checkbox"/> the second and third industry		
<input type="checkbox"/> casual worker		
<input type="checkbox"/> long-term contract worker		
<input type="checkbox"/> other income		
gross income		
<input type="checkbox"/> productive expenditure		
<input type="checkbox"/> living expenditure		
Total expenditure		
Net income		

Psychological questionnaire of affected peoples

Date  Year moth day

Name		<b>address</b> <input type="checkbox"/> <b>county</b> <b>town</b> <b>village</b>
your most cared issues :		
your most concerned issues:		
investigation officer :		



Table 3: Questionnaire on Demolition agreement signature of affected peoples

name of township	signable		signed		Percentage%	
	number of household	number of person	number of household	number of people	by household	by person











Appendix 10-B: The table filled by supervision

Table 1 Review of relocation progress plan

Name of project	Date	
The contents of relocation plan:		
Review opinion of supervisor:		
Chief supervision engineer:		

Table 2 Review table of labors arrangement, materials, construction tools plan

Name of project		Date	
Site		Major	
Participants			
Review contents <input type="checkbox"/>			
Opinions of supervisor <input type="checkbox"/>			
Chief supervision engineer <input type="checkbox"/>			

Table 3 Review table of balance plan on project funds

Name of project		Date	
Site		Major	
participants			
Review contents	<input type="checkbox"/>		
Opinions of supervisor	<input type="checkbox"/>		
Chief supervision engineer <input type="checkbox"/>			

Table 4 Qualification review of subcontractor, partner and material supply unit

<p>Details:</p>
<p>Review opinions</p>
<p>Chief supervision engineer <input type="checkbox"/>      Year   Month   Day</p>
<p>Review opinions of last time</p>
<p>Year   Month   Day</p>

This table is in three copies and each of them for construction unit, owner and supervision unit.

Table 5 Qualification review table of project principal

<p>Details</p>
<p>Review opinion</p>
<p>Chief supervision engineer <input type="checkbox"/>      Year    Month    Day</p>
<p>Review opinions of last time</p>
<p>Year    Month    Day</p>

This table is in three copies and each of them for construction unit, owner and supervision unit.

Table 6: Quality review of relocation project

Name of project		Site		Implementation unit	
Completion date	Year	Month	Day	Required review date	Year Month Day
Checking contents:					
Review opinions:					
Head of quality department <input type="checkbox"/>		seal			
Head of technical department <input type="checkbox"/>		Year Month Day			
Representative of resettlement <input type="checkbox"/>					
Review result of supervisor <input type="checkbox"/>					
		seal			
Chief supervision engineer <input type="checkbox"/>		Year Month Day			

This table is in three copies and each of them for owner, resettlement office and supervision unit

Table 7: Quality accident review of relocation project

Name of project		Date	
Implementation unit		Design unit	
<p>The situation of Accident <input type="checkbox"/></p>			
<p>Treatment scheme of implementation unit:</p>			
<p>Supervision opinions <input type="checkbox"/></p> <p style="text-align: right;">Chief supervision engineer <input type="checkbox"/></p>			



Table 9: Photos of spot evidence

Time	
Site name	
Brief description	(photo)
Brief description	(photo)

Table 10: Instruction list of reworking project

[NO.]

Name of project  \_\_\_\_\_

Project contracted unit  \_\_\_\_\_ Contract NO.  \_\_\_\_\_

<p>To project contracted unit <input type="checkbox"/></p> <p>Due to the reason depicted by the instruction unit, notice your department to rework according to the requirement listed in the below table and assure that the reworked project reach the qualified standards.</p> <p style="text-align: center;">Supervision unit ; Signer Signature date <input type="checkbox"/> Year <input type="checkbox"/> Moth <input type="checkbox"/> Day <input type="checkbox"/> Hour</p>	
<p>Reasons of reworking</p>	<p><input type="checkbox"/> quality unqualified <input type="checkbox"/> not comply with the designed requirements</p> <p><input type="checkbox"/> due to the revision of design document</p> <p><input type="checkbox"/> belong to the changing of project or contract</p> <p><input type="checkbox"/></p>
<p>Requirement of reworking</p>	<p><input type="checkbox"/> demolition <input type="checkbox"/> replace material <input type="checkbox"/> amend the disfigurement</p> <p><input type="checkbox"/> replace a qualified construction team</p> <p><input type="checkbox"/> the construction team appointed by the owner</p>
<p>Notes</p>	<p><input type="checkbox"/> the cost happened by reworking is solved by contractor unit.</p> <p><input type="checkbox"/> the cost happened by reworking can be listed in payment declaration</p> <p><input type="checkbox"/></p>

Send to  project contracted unit

Copy to



Table 12: Monthly report of supervision project (description of relocation project)

Name of project	Implementation unit	
Description of this moth		
Problems to be solved	<p style="text-align: center;">Chief supervision engineer <input type="checkbox"/> Year Moth Day</p>	



Table 14 Monthly report of supervision work  other matters

Table 15 Records of itinerant inspection by chief supervisor

Name of project	Implementation unit	
Site of sample survey		
suggestions of sample survey		
Situations and treatment suggestions		
Signature of implementation unit:		Name of supervisor:
		Title:
Year Month Date		Year Month Day

This table is in three copies and each of them for owner, implementation unit and supervision unit.

## **11. THE ARRANGEMENT OF RESETTLEMENT IMPLEMENTATION SCHEDULE**

### 11.1 Principles for resettlement implementation schedule

- (a) Nearby and scattered relocation method: since the relocation target is mainly the village resettlement, the schedule should be made according to the character of agricultural production, and land acquisition and housing reconstruction should be arranged in farming free period as possible, namely from September to next April every year, so as to relieve the influence on agricultural production.
- (b) Resettlement should start after the agreement had been signed and compensation had been paid, and be completed before project construction if possible, in order to relieve the construction influence on inhabitant's living environment.
- (c) Compensation payment and housing base allocation should generally be started three months early before house demolition, so as to give affected peoples enough time and funds to reconstruct housing before demolition and relieve the influence in transition period.
- (d) Infrastructures in relocation area should be completed before resettlement, in order to give affected peoples convenience to rebuild housing.
- (e) Enterprises relocation should conform to the principle of building new workshop first, then moving, so as to bring down their loss suffered from stop production.
- (f) Production relocation project should immediately start after the payment of land compensation
- (g) Resettlement schedule should be closely connected with project construction, trying best to create more advantages for project construction while the relocation quality is guaranteed.

### 11.2 Schedule

The total schedule of resettlement relocation is 51 months, from year 2008 to year 2012. there are three steps for resettlement implementation: First, initial preparation stage, mainly including schedule made and compensation agreement signed; Second, specific implementation stage, including demolition, house building, reconstruction of infrastructure and special project, implementation of relocation measures, etc.; Third, project check and review.

According to above principles and main stages, compile the resettlement schedule of Shihutang navigation and hydropower project (see Chart 11-1).



