# Assessment of Rural Migrants' Resettlement in the Three Gorges Reservoir Area

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**Abstract** In order to assess the rural migrants' resettlement in the Three Gorges Reservoir Area and provide a reference for formulating the later migrant support policies, we select 342 rural migrants from County A in Hubei Province and County B in Chongqing Municipality for the household survey. The survey results show that after removal, housing, and infrastructure (electricity, transportation, communication, household appliances) concerning the migrants are improved substantially, but there are still some problems in water drinking, land, employment and income restoration. The later support should put great emphasis on the following aspects: including the rural migrants into the social security system; improving drinking water and irrigation facilities; promoting industrial restructuring; strengthening skills training and education for the migrants, to gradually enrich the migrants and make them live a comfortable life.

**Key words** Rural migrants, Production arrangement, Per capita income, The Three Gorges Reservoir Area

The Three Gorges Project is the water control project involving the most migrants in China. There have been relevant empirical researches on the resettlement effect of migrants moving outside the Three Gorges and self-employed migrants. The Three Gorges Reservoir Area is the typical agricultural community. In comparison with the relocation of population in urban areas and enterprises, the relocation of rural migrants may make them not only lost their land, house, and other tangible assets, but also lost the social relationships, habits, concepts, production and management experience, and other valuable social resources and knowledge resources accumulated by several generations, the reacquiring of which needs a long time.

In some ways, rural migrants are the most crucial part in the resettlement of migrants in the Three Gorges Project. Whether the migrants are able to reach or exceed the original level of production and standard of living after removal is an important standard for measuring whether the migrants in one project are resettled properly[1]. It is necessary to assess the effect of rural migrants' resettlement in the reservoir area, in order to make the migrants' living standards reach or exceed the original level[2]. Some scholars have pointed out that the migrants' resettlement project in the reservoir area should focus on the relationship between the migrants' resettlement project and human value. The migrants' resettlement project implemented in the reservoir area, to a great extent, meets the needs of people in the migrant resettlement area, and promotes comprehensive human development[3-5].

Therefore, we take the rural migrants in the Three Gorges Reservoir Area as the research object, to survey their production and living conditions after resettlement. From migrants' production and life (housing, infrastructure, income restoration, *etc.*), we analyze the migrants' satisfaction, and assess the effect of migrants' resettlement, in order to provide a reference for formulating the later migrant support policies.

## 1 The survey sample

We select rural migrants from County A in Hubei Province and County B in Chongqing Municipality for the household survey. We conduct group sampling with towns or villages as unit, and one person from each migrant household completes the questionnaire. Given that the educational level of the respondents is generally low, the survey is completed using the form of the respondents providing information and the surveyors helping them to fill in. A total of 342 valid questionnaires are called back. The average age of the sample is 46 years old. There are 229 male respondents (67.0%), 32 illiterates (9.4%), 137 respondents with educational level of primary school (40.1%), and 148 respondents with educational level of junior high school (43.3%).

## 2 The survey results and analysis

**2.1 Rural migrants' production arrangement** The relevant data on migrants' production arrangement (such as land, housing area, *etc.*) are based on the compensation contract provided by the migrants. Production status mainly includes migrants' land area, land quality, farming convenience and land productivity.

The land is the basis of farmers' survival, and the most important means owned by migrants. The survey shows that above 175 m of the water level in the Three Gorges reservoir area, there are still 331 households having land, accounting for

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96.78% of the total samples. After removal, the majority of migrants mainly grow fruit trees. In terms of land area, before removal, the per capita land area is 0.05 $hm^2$, but it declines to 0.025 $hm^2$ after removal, indicating that the per capita land area in County A and B declines to about 50% of the per capita land area before removal. In terms of land quality, 93.83% of migrants believe that the existing land quality get poorer in comparison with the land quality before resettlement.

In terms of the convenience of farming, 64.83% of households believe that the agricultural land is farther away from home; 60.7% of rural migrants believe that the convenience of production gets poorer, and the proportion of households with irrigation water sources for farmland declines from 48.48% before relocation to 7.10% after relocation. In other words, after removal, the convenience of farming and status of water conservancy facilities is poorer for migrants as against that before removal, which may adversely affect the land reclamation, thereby affecting the land productivity and income. From the ownership of production facilities, tricycle, production and processing equipments ownership changes from 1.75%, 12.87% to 4.68%, 16.37%, respectively, showing the trend of slow growth.

In terms of land productivity, the income from land after relocation tends to decline. In the survey, we subdivide the direct output of the land into the amount of grain and cash crops; obtain the crop market prices from the relevant departments in the current year, in order to calculate the direct output from the land. Indirect income includes the income from feeding livestock and poultry. Land productivity before and after rural migrants' removal can be shown in Table 1. From Table 1, we see that after rural migrants' removal, the land output per unit area declines from 47 670 yuan/$hm^2$ before removal to 26 002.85 yuan/$hm^2$, dropping by 50%. Consequently, the indirect land income is reduced. If considering the inflation of price, the migrants' land income declines more obviously.

**Table 1 Land productivity before and after rural migrants' removal**

| County | Before removal | | | After removal | | |
|---|---|---|---|---|---|---|
| | Total agricultural income//yuan | Land area $hm^2$ | Output per unit area//yuan/ $hm^2$ | Total agricultural income//yuan | Land area $hm^2$ | Output per unit area//yuan/ $hm^2$ |
| A | 1 132 042.38 | 37.393 | 30273.9 | 339 550 | 16.627 | 20 421.90 |
| B | 2 392 924.10 | 36.547 | 65475.9 | 557 550 | 17.873 | 31 194.45 |
| Total | 3 524 966.48 | 73.940 | 47673.3 | 897 100 | 34.500 | 26 002.95 |

**2.2 Rural migrants' resettlement** As to migrants' resettlement status, we mainly conduct analysis from housing, infrastructure (water, electricity, transportation, communication, household appliances, *etc.*), employment and income restoration.

**2.2.1** Housing. The survey results show that the majority of migrants are satisfied with the housing status; the per capita housing area and housing structure experience great changes. 342 rural migrants surveyed all live in the houses with brick and concrete structure. The housing structure is greatly improved, and the per capita housing area rises from 21.94 $m^2$ to 46.91 $m^2$ (Table 2).

**2.2.2** Infrastructure. The survey shows that as to rural migrants' daily life infrastructure, except water, the conditions of electricity, transportation, communication, and household appliances have been dramatically improved.

**Table 2 Rural migrants' housing situation before and after removal**

| County | Before removal | | | | After removal | | | |
|---|---|---|---|---|---|---|---|---|
| | Housing structure//% | | | Per capita housing area//$m^2$ | Housing structure//% | | | Per capita housing area//$m^2$ |
| | Earth and wood | Brick and wood | Brick and concrete | | Earth and wood | Brick and wood | Brick and concrete | |
| A | 41.94 | 7.26 | 50.8 | 27.37 | 0 | 0 | 100 | 59.49 |
| B | 18.68 | 10.44 | 70.88 | 18.54 | 0. | 0 | 100 | 38.90 |
| Total | 28.10 | 9.15 | 62.75 | 21.94 | 0 | 0 | 100 | 46.91 |

(i) It is getting difficult for the migrants to drink water. There is slight difference in this condition between the two counties. 68.15% of migrants in County A and 38.86% of migrants in County B hold that the water quality is getting poor. There are migrants only in 2 villages believing that the water quality turns good. According to migrants' opinions and local government cadres' analysis, the main reason for the deterioration of water quality is the decline in the originally rich surface spring water sources. In the Three Gorges Reservoir Area, the majority of migrants live by the side of river before removal, and the drinking water sources are generally the Yangtze River water and mountain spring water. After removal, drinking the Yangtze River water becomes unrealistic due to long distances of getting water artificially and high cost of mechanical pumping, thus mountain spring water becomes the only water source that can be dependent upon.

After the Three Gorges Reservoir Area stores water, the spring water that is originally everywhere is drastically reduced. At the same time, the migrants live more densely, the water source is short near most of villages or there is no water source at all. In the villages with water shortage, the villagers' daily drinking water may become "grabbing water". In those villages with no water sources nearby, due to high expenses of water diversion or problem of coordination with other villages, the mi-

grants have no choice but to drink rain. In the survey, we see that most of the migrants have impounding reservoir harvesting water in rainy day, for the drinking of people and livestock quite a long time. In some villages near the town, the government tries to divert the tap water into these villages, but the implementation is difficult. On the one hand, the lines of water transportation pipes are long, with high cost, and rural migrants live in a relatively dispersed state, with water consumption lower than that of urban residents, thus it is not worthwhile from the economic point of view. On the other hand, if supplying water for rural migrants, it is bound to add the cost of transport pipes to the water charges, raising water prices, making migrants feel unbearable. Therefore, diverting tap water into migrants' family has not been achieved in the short term.

(ii) The situation of electricity consumption is greatly improved. The migrants generally express the opinion that due to the transformation of rural power grid, the electricity charge is more reasonable, and the power quality is more stable than the previous. 65.75% of migrants believe that the electricity quality gets better after removal, and 53.29% of households' electricity consumption fees increase.

(iii) The transportation conditions are improved to a great extent. 78.98% of the migrants believe that the transportation status has been improved to a great extent, but at the same time, the transportation costs have also risen sharply. The reason may be as follows: on the one hand, the location relative to the town changes; on the other hand, in the case of road transportation in a dominant position, the original household waterway conveyance becomes idle, and the migrants have no choice but to be dependent upon paid bus. At the same time, home ownership rate of transportation vehicle rises and motorcycle ownership rate rises from 5.56% to 16.37%.

(iv) The communication conditions are greatly improved. Fixed telephone and mobile phone ownership rate rises from 24.27% and 6.73% to 69.01% and 57.60%, respectively, 2.84 times and 8.56 times that before resettlement. On the one hand, Based on the survey, the acquisition cost of the communication tools declines significantly and migrants can afford them, which is the main reason; on the other hand, after removal, the migrants are also facing the problem of surplus labor transfer, and most of young labor forces work outside the home, thus communication tools become the main link for communication between the migrant workers and people who are left behind, whose role is particularly important.

(v) Household appliances ownership rates dramatically climb. With the improvement of living standards, color TV, washing machine, and refrigerator gradually become essential electrical appliances for the rural households, also an important symbol of improvement in migrants' living conditions. Among the 342 migrants surveyed, color TV ownership ratio rises from 35.38% to 83.33%; washing machine ownership ratio rises from 39.47% to 75.15%; refrigerator ownership ratio rises from 23.98% to 48.25%. In comparison with County B, the upward trend of County A is stronger.

**2.2.3** Employment and income. In the samples surveyed, the employment pattern of rural migrants is mostly the young labor forces working outside the home, and the old, weak, sick and disabled farm at home, which is similar to the employment pattern in China's vast rural areas. This may partly explain the reason for great average age of the samples surveyed. Based on the samples surveyed, two thirds of respondents still mainly farm, 13.77% of respondents work in the neighborhood of their home, 5.6% of respondents are engaged in business, and 2.9% of respondents are unemployed.

In the survey, we make the migrants recall various types of household income in the year before removal and the year before survey, and the income derived by summarization is gross income for a family. The survey results show that migrant households' income structure and income status are unpromising.

First of all, income per migrant household has declined markedly. Income per migrant household in County A declines from 15 000 yuan before removal to 12 000 yuan in the year before survey; income per migrant household in County B declines more obviously, and per household income declines from 15 000 yuan to below 10 000 yuan.

**Table 3 Rural migrants' income before and after removal**

| County | Income per household // yuan | | Agricultural income per household // yuan | | The proportion of agricultural income // % | | Per capita income // yuan | |
|---|---|---|---|---|---|---|---|---|
| | Before removal | After removal | Before removal | After removal | Before removal | After removal | Before removal | After removal |
| A | 15 897.95 | 15 535.49 | 8 263.68 | 2 478.47 | 51.98 | 15.95 | 3 697.83 | 3 553.19 |
| B | 15 381.27 | 9 029.75 | 11 672.80 | 2 719.76 | 75.89 | 30.13 | 3 583.14 | 2 159.97 |
| Total | 15 588.25 | 11 635.85 | 10 306.92 | 2 623.10 | 66.11 | 22.54 | 3 629.12 | 2 733.15 |

Secondly, the share of agricultural income in total household income has dropped significantly. Before removal, migrant households' crop output is high; sales income from agricultural and sideline products brought by the original location advantages and the labor income also become the main source of household income. After removal, on the one hand, decline in the area of land and decline in the quality of land, directly result in reduction of land productivity; on the other hand, due to changes in market conditions, the prosperity of agricultural markets, stemming from the waterway transportation before removal, is losing their prominence, and the indirect benefits of agricultural and sideline products dramatically decline. These two reasons make the share of agricultural income in total household income plummet, from 66.11 % before removal to 22.54 %.

Thirdly, the per capita income declines sharply. Per capita

income (here it refers to the gross income per capita) is an important symbol representing migrants' living standards. But in County A and B, per capita income of migrants does not maintain steady growth trend like that of China's farmers, but even lower than that before removal. From another level, this reflects migrants' straitened and poor life. Table 3 shows that the per capita income of the migrants in the two counties declines from 3 629.12 yuan to 2 733.15 yuan, but the per capita income of the migrants in County B declines from 3 583.14 yuan to 2 159.97 yuan.

Finally, the proportion of low-income migrant households increases. The survey shows that before the relocation, the migrant households with annual per capita income more than 7 000 yuan (high income) account for 10.2% of total households, but after the relocation, the migrant households with annual per capita income more than 7 000 yuan only account for 3.5% of total households. At the same time, the proportion of low-income migrant households (per capita income below 1 000 yuan) rises from 8% before removal to 18.10%, indicating that after the removal, the income of a small portion of households decline, mired into the plight of poverty.

**2.3 Rural migrants' future expectation** The survey results of migrants' satisfaction show that 50% of migrants are satisfied or very content with the current life; 76.9% of rural migrants believe that the life is better than before removal; 76.50% of people are confident about the future, and hold the faith that the future life will be better than now.

At the same time, the survey also uses open-ended questionnaire to make enquiries of migrants about their expectation on the late support, and each survey object lists three matters that he thinks the most important, needing to be addressed urgently. The questionnaire results are shown in Table 4.

Table 4 shows that what the migrants mention most is security. 37.2% of migrants mention security issues, including life security, older migrants insurance, *etc.* The tap water follows, and 22.51% of the migrants wish to drink tap water in the future. Thirdly, it is the land issue. 12.57% of migrants wish increase in the area of land and improvement in the quality of land in the late support. In addition, what are mentioned with relatively high frequency include skills training and economic development.

**Table 4 Rural migrants' future expectation**

| Future expectation | The specific content | Frequency | The proportion//% | Order |
|---|---|---|---|---|
| Guarantee | Livelihood security, pension insurance | 128 | 37.20 | 1 |
| Water | Having access to tap water | 77 | 22.51 | 2 |
| Land | Increasing the land area and improving quality | 43 | 12.57 | 3 |
| Skills training | Skills training for young migrants | 12 | 3.51 | 4 |
| Economic development | Developing economic industry, and increasing employment opportunities | 10 | 2.92 | 5 |

According to Frederick Herzberg's Two Factor Theory, security, water and land issues are health factors[6]. If they are solved, the dissatisfaction will be eliminated, but it does not produce incentives. Skills training and economic development are the motivating factors, which can motivate people to work harder. Therefore, in the late support in the future, in addition to improving migrants' living and working conditions (health factors), it is necessary to ceaselessly carry out skills training and economic development for migrants, in order to promote the migrants' production skills and employment ability, and really encourage migrants to take the road toward affluence.

## 3 Conclusions and policy recommendations

**3.1 Problems in the resettlement of rural migrants in the Three Gorges Reservoir Area** The survey results show that rural migrants' housing, infrastructure (electricity, transportation, communication, household appliances) have been improved dramatically, but there are still problems in land, drinking water, employment and income restoration. Based on the effect of production and living arrangement and migrants' future expectation, there are still the following problems for rural migrants in the Three Gorges Reservoir Area.

(i) Social security system. Pension and health insurance have not yet been completely covered, and some migrants still face no care for them when they are old and high risk of disease treatment. After removal of rural migrants in the reservoir area, per capita arable land is insufficient, and there are many difficulties in production and living; the basic livelihood of some migrants is difficult to be guaranteed; the old rural migrants may face no care for them and high risk of disease treatment. Security problem becomes an issue that migrants are most concerned about.

(ii) Water drinking problem. The survey results show that rural migrants' water drinking problem is mainly reflected as follows: the water amount is not enough; the water quality is not up to standard; the water use is not convenient enough; the water sources are not well guaranteed. Due to poor holistic basic conditions, the rural migrants universally use mountain spring water, pond water, rainwater collection pool and other types of surface water as drinking water sources. At the same time, the water supply network is imperfect, and water purification treatment facilities are very primitive. The phenomenon of carrying water relying on manpower still exists in some regions, and the safety of drinking water is worrying.

(iii) Land problem. The arable land resources possessed by some rural migrants are seriously short, and the quality of arable land is also low. In the Three Gorges Reservoir Area, the mountains are high and steep; the terrain is rugged; there is a vast population and farmland resources are scarce. The

per capita area of land owned by existing rural migrants is far from reaching the standard of migrants resettlement planning. In addition, the cultivation convenience declines, and the agricultural irrigation facilities are short, resulting in obstacles to improvement in the quality of farmland. Increasing the area of farmland and improving the quality of farmland is also the problem to be urgently solved in the late support for migrants.

(iv) Employment and income restoration problem. Due to backwardness of the existing agricultural productivity, the income from agriculture declines. In addition to the low average educational level of rural migrants, the majority of rural migrants' existing labor skills are the skills with low technological content in the traditional farming and breeding industry, the secondary and tertiary industries, which can not adapt to changes in rural migrants' production and living mode and industrial restructuring requirements after removal, thus their employment ability is poor.

**3.2 Policy Recommendations** To solve the above problems, the late support policy in the future should offer support from the perspective of sustainable development. It should solve the current migrants' production and living difficulties, and the current cumulative problems related to migrants' rights and stability, namely the health factors. It should also take into consideration the long-term development of the reservoir area, increase support efforts to promote migrants to transform from special groups to general groups, namely the motivating factors, in order to achieve long-term stable and comfortable life for migrants.

(i) Including the rural migrants into the social security system. We should include the rural migrants, and especially old migrants, into the social security system of pension and health care. In the framework of the existing social security system, we can offer subsidies for the migrants' individual payment of pension and health insurance, so that migrants' basic livelihood is guaranteed.

(ii) Further improving infrastructure and public services facilities, especially water supply and irrigation facilities. We should comprehensively solve water drinking safety issues for rural migrants; take actions that suit local circumstances, improve water supply and purification system, and promote the popularization rate of tap water pipe network. Meanwhile, based on the characteristics in the Three Gorges Reservoir Area (such as high mountains and steep slopes, scattered farmland and garden plot, small proportion of irrigation, poor facilities and large regional differences), we should focus on irrigation and water conservancy, improve irrigation facilities, and construct the farmland with high standard.

(iii) Promoting industrial restructuring and vigorously developing the economy in the reservoir area. We should actively promote the adjustment of the crop farming structure, improve varieties, optimize the agricultural structure and layout, highlight the advantages of characteristic agriculture, construct ecological agriculture park, and promote the competitiveness of agricultural products, by improving the product quality and production efficiency. At the same time, we should take the eco-industrial park as a platform, use the secondary industry to drive the tertiary industry, and promote the development of the tourism industry, modern logistics, trade services and other service industries, to provide more jobs.

(iv) Strengthening skills training and education for the migrants to gradually enrich the migrants and make them live a comfortable life. We should strengthen industrial restructuring, further intensify the vocational education and skills training, promote labor to transfer from the primary industry to secondary and tertiary industries, and help the disadvantaged groups in their employment, achieving full employment. In the future, on the basis of increase in the universal policies, we should focus on supporting the migrants to receive vocational education and skills training, provide appropriate subsidies, and promote migrants' employment capacity, to create favorable conditions for enriching the migrants and transferring the rural migrants.

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