Migrants Selectivity and the Effects on Environmental-induced Migration Project in Sanjiangyuan Area in China

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Abstract: Sanjiangyuan area is located in Tibetan Plateau in Qinghai Province in China. It's the source of Yangtze river, Huanghe River and Lancangjiang river. Since the ecological environment became worse in recent decades, Qinghai government conducted an environmental migration project to move the herdsman out of Sanjiangyuan area to protect the environment. From 2005 to 2009, nearly 50 thousand herdsmen and their family have moved out from the pastoral area and were resettled in places near cities, towns or county capitals. Who migrated? Do there have selectivity between migrants and non-migrants? Does the selectivity have any effect on the efficiency of the project? Using the data we collected in 5 environmental migration resettlement villages in 2009 and the basic information of the non-migrants, the index of migration differences will be calculated to examine the differences between them. The policy implication will also be discussed in this paper.

Keywords: Environmental-induced migration, Migrants Selectivity, Sanjiangyuan area

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1 Background and significance

Environmental-induced Migration Project is an important measure for Chinese government to protect the ecological environment in the ecological fragile area and to relieve the poverty in the same time. Environmental Migration Project started in the beginning of 21st century and was conducted in the whole country especially in the western China. It was expected to play an important role on protecting the environment in China. Along with the conduction of the projects, research on environmental migration also became a hot issue in China. Many scholars have published research papers on the significant of the projects, the effects of the projects and the adoption of the migrants after their migration. (Bao, 2006; Chen, 2007; Hou, 2002; Pi, 2008; Shi, 2008). At the same time, some scholars has pointed out that most of the researches are qualitative studies and there is still lack the quantitative analysis based on the statistic investigation and field work. They suggested doing more empirical study in this area (Liu & Wang, 2008). environmental migration is a new kind of migration in China. What's the characteristic of this kind of migration? Is it same or difference with the other kinds of migration, such as volunteer migration, or other kinds of development project migration? What's the selectivity of the migrants? These are the questions we are interested in.

Sanjiangyuan Area is located in the hinterland of Tibetan Plateau in south of Qinghai province

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in China. It is the source of Yangtze River, Huanghe (Yellow River) and Lancang River and plays a critical important role for the above three great rivers' water security. The geographic location of Sanjiangyuan Area lies between $31^0$39'-$36^0$16' North and $89^0$24'-$102^0$23' East and the attitude is 3450-6621m. It includes 16 counties under the 5 minority autonomous prefectures (Yushu, Guoluo, Hainan, Huangnan and Haixi) and one township (Tanggulashan township) under governing of Golmud City. There are totally 119 townships (22 towns) in Sanjiangyuan area with 153,670 households. The total population is 650 thousand and 86% of the population is farmers or herdsmen. The ethnic minority population in this area is 544 thousand (84% of the total population). Most of them are Tibetan people. The area of Sanjiangyuan is 36.31x104km^2, if calculated by the administrative zoning, and 31.81x104km^2, if calculated by the area of basin of Yangtze River, Huanghen River and Lancang River (Chen, 2007).

Sanjiangyuan area is the most valuable treasure of nature for human beings. The ecological environment situation in this area is very fragile. It is facing serious challenge and crisis in last several decades due to the interactivity of natural factors and human factors. For protecting the environment there, Qinghai government started environmental migration project in 2004. By May 2009, 86 resettle villages have been built and nearly 50 thousand people have migrated into the new villages or communities (Xinhua net, 2009). It's one of the biggest environmental migration projects in China and most difficulty migration project since most of the migrants are Tibetan herdsmen. They lived in Tibetan for all generations and it's a great change for them to live in the cities or townships. Several studies have been conducted on the importance of the project, the adaption of the migrants in the destination of migration (Sheng, 2006; Shi, 2009; Zhan, 2008; Zhang & Lu, 2007). But we still haven't seen any analysis on the selectivity of the migrants. We don't know their characteristics as a whole comparing to the non-migrants. This paper will base on the basic data we got from the migration villages to analysis the basic characteristics of the migrants and also analysis what effects such characteristics will bring to the project.

2 Literature review and research hypothesis

Migration selectivity means usually the migrants have the characteristics differ with the non-migrants. The difference between migrants and non-migrants and their effects on place of destination and origin has been the most important area of the migration study. In the earliest migration study, Ravenstein concluded that the female migrants are more than male migrants in short distance migration, "Females appear to predominate among short-journey migrants." (Ravenstein, E. , 1885 , 1989). This is the sex selective migration. In the paper A Theory of Migration, Lee talked about selective migration specifically, "Migration is selective.— This simply states that migrants are not a random sample of the population at origin. The reason why migration is selective is that persons respond differently to the sets of plus and mimus factors at origin and at destination, have different abilities to overcome the intervening sets of obstacles, and differ from each other in terms of the personal factors at origin and at destination, have different abilities to overcome the intervening sets of obstacles, and differ from each other in terms of the

personal factors." He then indicated that, "The characteristics of migration tend to be intermediate between the characteristics of the population at origin and the population at destination. Persons with different characteristics react differently to the balance of plus and minus factors at origin and destination. Even before they leave, migrants tend to have taken on some of the characteristics of the population at destination, but they can never completely lose some which they share with the population at origin." (Lee, 1966) . Many studies in migration have proven the selective of migration, though the characteristic of selective is different from region to region and also from time to time. Usually, labor age population more like to migrate comparing with children and elderly from the time on, single, divorced people more like to migrate than married population, and population with high education usually more like to migrate(Odland J and Shumway J M , 1993 ; Yao & Xu , 2008 ; Cao , 2007). Migration in China is also with high selective on age, sex, marriage situation and education according to the study based on the fifth population census data (Tang and Ma , 2007).

The environmental migration in Sanjiangyuan area is collective migration and the migrants migrated by the unit of family. So we can suppose that the selective of migration will not be as dramatic as volunteer migration. The characteristics of the migrants will more close to the characteristics of origin. Though the migration is organized by the government, the migrants are not forced to migrate. They still have the right to choose if migrate or not. So we still want to check if there has some selectivity among the migrants and non-migrants.

3 Research Method and Data

In this study, we mainly focus on the selectivity of the migrants comparing to the place of origin and place of destination. We use indices of migration differentials to measure the selectivity. The formula is:

$$IMD = 1 - \frac{\frac{mi}{M}}{\frac{ni}{N}}$$

Here, IMD is indices of migration differentials.
m_i is the migrants with a specific characteristics
M is the total migrants
n_i is the non-migrants with a specific characteristics
N is the number of non-migrants or total population

The higher the IMD, the higher selectivity of migrants is. If the characteristic of the migrants is completely same as the non-migrants, the IMD will be equal to 0.

According to the importance of the variable and the availability of the data, we mainly choose the age structure, sex structure, family structure and size, size of grassland the family owned, number of livestock, income, and education level as variables to calculate the indices of migration differentials.

The population variables of place of destination and origin we used in this paper mainly from the fifth population census data and social-economic variables are mainly from the Qinghai Statistic Year Book. We couldn't get the whole information of the migrants. The data about the migrants we analysis in this paper is from the investigation we conducted in five migration villages in July 2009. Those migration villages are Sanjiangyuan New Village (Village A) in Tongren County, Hainan Autonomous Prefecture; Beibatan (Village B) Migration Village and Nanbatan (Village C) in Tongde County, Hainan Prefecture; Chengduo Migration Village (Village D) in Chengduo County and Kunlun Migration Village (Village E) in suburb Gulmod City. The villages can be classified into two groups by the pattern of migration. Village B and D are intro-county migration, and another three are across-county migration. Village E is the long distance migration and the place of destination is the biggest different with the place of origin.

4 Analysis of the migration selectivity of Sangjianyuan Area

4. 1 Age selectivity of the migrants

From the calculation result, we can see that there has no significant age selectivity. The index of migration selective is relative low both comparing with the place of origin and place of destination, especially in the intro-county migration. This means that not only the selectivity of migrants is not significant, but also the place of origin and place of destination are similar. The biggest difference of the age structure of the migrants with the place of destination is Village E. The IMD is 0.43, -0.21 and 1.40 for children, labor fore and elderly. That's because of the difference of place of origin and destination. Qumalai County is the typical pastoral area, while Gulmod City is the second biggest city in Qinghai Province. The population structure is quite different.

Table 1 Migrants' Age Structure Differences

Place	Age structure (%)			Indices of differential		
	0-14	15-59	60+	0-14	15-59	60+
Village A	34.2	59.8	6.0			
Tongze County (o)	32.5	58.0	9.6	0.05	0.03	-0.38
Kuze County (d)	37.6	55.7	6.8	-0.09	0.07	-0.11

Village B	19.8	72.3	7.9			
Tongde County	33.4	59.9	6.6	-0.41	0.21	0.19
Village C	33.0	62.9	4.1			
Tongde County(o)	33.4	59.9	6.6	-0.01	0.05	-0.38
Maduo County (d)	33.2	61.8	5.1	0.00	0.02	-0.19
Village D	31.6	58.2	10.2			
Chengduo County	31.9	59.3	8.8	-0.01	-0.02	0.16
Village E	35.3	57.1	7.5			
Qumalai County (o)	36.3	58.0	5.7	-0.03	-0.02	0.31
Golmud City (d)	24.6	72.3	3.1	0.43	-0.21	1.40

4. 2 Sex selectivity of the migrants

From the result (Table 2) we can see that though not very high, there is a slightly sex selectivity among the migrants. The sex ratio of the migrants is somewhat higher than the sex ratio of origin. Especially in Village B and C, sex ratio is higher than 110. The sex ratio of migrants is higher than the sex ratio of place of destination too. The only exception is village E which sex ratio is lower than the sex ratio of Golmud City. That's because that Golmud City is migration city itself and it's sex ratio is high than other places. So though the migration took place by the unit of family, there is still a slightly sex selectivity, that means more males migrated than females. But the selectivity is not significant.

Table 2 Migrants' Sex Structure Differences

place	Sex Ratio	Indices of differential
Village A	101.21	

Tongze County (o)	92.93	0.09
Kuze County (d)	98.61	0.03
Village B	111.86	
Tongde County	97.92	0.14
Village C	112.77	
Maduo County (d)	102.78	0.10
Village D	99.60	
Chengduo County	93.38	0.07
Village E	101.41	
Qumalai County (o)	90.75	0.12
Golmud City (d)	107.34	-0.06

4. 3 The family size and structure of the migrants

Different with the low selectivity of age and sex structure, the family size of migrants in every migration village is lower than the average family size in the place of origin. The IMD are all above -0.2. The average family size of migration village D is 2.2 persons and it's only the half family size of Chengduo County. If we look the family structure, we can find the same trend. Most of the families only have three or less person. For example, in village A, one person household consists 10.1%, two person household contains 20.2% and three person household takes 26.7%. The totally of three person household or less makes nearly 60% of the total family.

The reason for the phenomena is partly because that some big family divided their family into small families before they migrated. Thus some of them can still stay in the place of origin and still own their livestock, while some of them migrated to the place of destination and can get the

benefit of migration. Since the government subsidy is provided to the family and do not related with the family size. Thus, even one person household will get the same subsidy as the family with more family members.

Table 3 Migrants' Average Family Size Differences

Place	Average family size	Indices of differential
Village A	3.62	
Tongren County	4.64	-0.22
Kuze County	4.95	-0.27
Village B	3.73	
Tongde County	5.86	-0.36
Village C	3.11	
Maduo County	4.36	-0.29
Village D	2.20	
Chengduo County	4.34	-0.49
Village E	3.71	
Qumailai County	4.87	-0.24
Golmud City	2.90	0.28

4. 4 The grassland and livestock owned of the migrants

The area of grassland and number of livestock of the migrant's family owned is an important indicator for us too. The goal of the environmental migration is to protect the environment of the place of origin. So only the family with large area of grassland and large number of livestock migrated out, the goal that relief the carrying capacity and protect the environment can be achieved effectively. The situation is not so satisfied in this case. In our investigation, we found that the families owned large area of grassland and large number of livestock didn't want to migrate out. Most of the migrated families are poor families owned only less grassland and

livestock. Some of them even have no grassland or livestock at all. For example, in Tongde County, the average grassland of the migrated families is 500 Mu while compared with the average grassland of 3564 Mu with the local level. The average income per month of the migrated family is 797 Yuan while compare with the 2517 Yuan of the local level. We found this situation in almost every migration village. This means that only the poor family with less grass land and livestock would like to move out. For the family with high income and more land and livestock, their income will far more than the subsidy the government will give them. They don't want to move out at all. For the local government, they don't want the high income family moved out too because it will affect their GDP and development of animal husbandry.

4. 5 The education situation of the migrants

Education selectivity exists in many migrations. Usually, person with higher education level are most likely to migrate. So the education level of migrants usually will be higher than the education level of non-migrants. But it's not the case in Sanjiangyuan Area. We can see in table 4, the education level of the migrants are similar or even lower than the non-migrants. The illiterate rate above age 15 is all higher than 50%, some villages are even higher than 60%. The percent of middle school education level is lower than 10% in all the migration villages. In the short-distance migration and intro-county migration, the education level difference is not very big among migrants and non-migrants of origin and destination. In the case of village E, the difference is very significant. The illiterate rate in village E is 53.4%, which much higher than the illiterate rate of the place of destination, 14.3% It is the dominant reason for the migrants who couldn't adapt to the new life in the new place. The pattern of life is just greatly different between them.

Table 4 Migrants' Education Differences

Place	Illiterate rate (%) (above age 15)	Indices of differential
Village A	58.10	
Tongren County	41.20	0.41
Kuze County	66.30	-0.12
Village B	43.20	
Tongde County	50.18	-0.14
Village C	61.40	
Maduo County	35.41	0.73
Village D	60.70	

Chengduo County	66.75	-0.09
Village E	53.35	
Qumailai County	69.87	-0.24
Golmud City	14.34	2.72

4. 6 The situation of Ethnicity

The migrants are all Tibetan. They have been living in the high altitude Tibetan Plateau for generations. Most of them can only speak Tibetan language, they couldn't speak or understand Mandarin. They make their lives by farming pasture. After migration, they lost their grassland and livestock, they have no grassland or farmland in the place of destination. Their knowledge and skills are useless in the destination. The life they are facing now is quite different with the life they lived in the place of origin in every aspect. They also face the great challenge on language side. Also among the Tibetan area, they are not the same. There are differences in different region. So the cross-county migration will also raise the problem of the melting and adopting. Especially the migrants in Golmud City，they were resettled in the two villages that 8 km far away from the city and were separated with the city residents. Though the governments of origin and destination both put great efforts to help the migrants to live well in the new place and try to help them to get job to support themselves. But the effects are not so obvious. Many migrants still couldn't get their living in the new place and some of them have return to the posture area to graze again.

5 The effects of migration selectivity of Sanjiangyuan Migrants on Environmental Migration Project

The environmental migration in Sanjiangyuan area is different with the volunteer migration that they migrate by their own decision and the forced migration which migrants have no choice for their migration. It is a kind of in-volunteer migration, but the migrants can still make their choice for migration or not. So the characteristics of the migrant are different with those two too. From the result we analysis above, we can see that because the migration is by the unit of family, so the selectivity on sex and age is not significant. Also, the education selectivity is not obvious. The illiterate of the migrants are very high. The very unique characteristic of the migration is the migrants' family size is smaller than the non-migration family. Many of the migration family are only one person, two person or three person. Also, observing from the economic situation, most of the migrants have less grassland and livestock and their income is lower than the non-migrants.

The goal of the environmental migration in Sanjiangyuan Area is to protect the environment by moving the people out to decrease the carrying capacity of this area. So the more effective way is to move the family with large area grassland and large number livestock. For the government, the in-put is the same because the subsidy and housing are provided to the migrants by family. For the

place of destination, they should put same effort to arrange the migrants. But for the place of origin, though some people moved out, the graze carrying capacity will not be able decreasing much.

There are two reasons caused this situation. One is the push factors in Sanjiangyuan area are relatively weak. Though from outsider's view, the environment is bad and the living condition is hard there. But for the Tibetan herdsmen who lived there for ages, they love their land very much and they have their own way to protect the environment and to live harmony with the nature. In our investigation for the reason of migration, only 8.9% migrants think that their place of origin is too hard to live so they wanted to move out. Only 17.6% migrants declared that they migrated for protecting the environment.

The second reason is that the pull factors are not so attractive for the migrants. Though government built house for the migrant family and they can get better facilities on electricity, road, water and other benefits, but the 6000 yuan subsidy for each family one year is not an attractive bone for most of the families especially for those rich families. Income they get from the grassland and grazing is much more than the government subsidy. Not mention the great change they will face in the new place. Different life style, different production pattern, different culture and environment, those are great obstacles for the migrants when they make decision to migrate. So many families just divided their family into parts to avoid the crisis they may face in the new place. It's quite understandable. The migrants answered that the main reason for the migration is to response the government's migration policy. That means that government's policy is the driving force of the migration. In the pull factors, most attractive factor for the migrants is the better education condition in the place of destination. Some families decided to migrate for their children to get better education. So in migration village, we saw many families with only elderly and children or mother and children. For the poor families, what they lost from the migration is relative less, they can get benefit from the migration such as the subsidy, house, training for job and every kinds of support from the government , thus, they may have a chance to change their life.

6 Suggestions and conclusion

For protecting the ecological environment in Sanjiangyuan area, the Qinghai government has put great effort to conduct the migration project. The project has been carried out according to the plan. Migration villages were built and migrants migrated to the villages every year. If only see the number of migrants, it's a successful migration. But as we indicated above, the number of migration village and migrants is not the final goal of the project, the goal is to protect the environment of Sanjiangyuan area. From the analysis above, we can see that whether the goal has been achieved is not just so simple to judge. We need to think about some of the questions seriously before we conduct further more migration projection.

First, we need to make clear the goal of migration. The project itself and the number of migrants is not the goal of the project. For protecting the environment, we need to have certain criteria when we chose the migrants. The area of grassland and number of livestock should be also a standard

for migration. Otherwise, the effectiveness of the migration will get down. Also, after the migration, how to protect the returned grassland and how to monitor and evaluate the effective of the environment protecting also need to be concerned.

Second, if the government wants to attract big-size and rich families migrate out, they need to increase the pull factors in the place of destination. The amount of 6000 yuan per year for the migration family is not enough to attract the rich families moved out and also, the subsidy is provided according to the family not the members in the family, this also hindered some big families moved out.

Besides, migration in Sanjiangyuan area is the most complex migration project in China, because the migrants will face huge challenge in every aspect. How to help them to find their job in the new place and adapted to the new place, it's still a challenging issue. In our investigation, we found that especially in the long distance cross-county migration, the migrants usually couldn't cope with the change well. Returned migration happened in every migration village. Actually many local leaders and herdsmen suggested that they can protect the environment by cutting down the graze carrying capacity. Government can give them some subsidy on this and they would like to look after their land there instead of moving out. Actually the environment also needs people to protect. They can encourage the people migrate out and give them some support, but not by the way of through a project. Letting herdsmen migrate out by their own will may be a more smooth, natural and effective way.

Also, when we take account the environment protecting of the place of origin, we need to concern with the environment protection of the place of destination. Actually most of the places of destination are also located in Sanjiangyuan area. The construction of migration villages, the development of the migrants in their new places will also make a kind of threat and destruction on the environment of destination. The life style in the destination is kind of way that more consuming and expending.

After all, due to the unique of the environment and specialty of the social and culture tradition, the effectiveness of the migration project need to do more research and think over.

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