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ENVIRONMENTAL REFUGEES BETWEEN DEVELOPMENT AND
POVERTY - CASE STUDY OF THE THREE GORGES DAM AREA

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ENVIRONMENTAL REFUGEES BETWEEN DEVELOPMENT AND POVERTY - CASE STUDY OF THE THREE GORGES DAM AREA

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Abstract

Environmental degradation and resource depletion play a contributing role in affecting population movement, often filtered through contexts of poverty, food deficiency and social inequity. Some experts declare that number of incidents, that cause people to leave their houses and fields due to environmental problems, is increasing rapidly and they perceive this as a global serious issue. The work explores the subject of environmental refugees as a significant group of migrants, includes definition of the term and explanation main reasons for fleeing the people from their habitats. The international refugee legislation does not recognize the term "environmental refugees" and they can not count with any material or juridical support of institutions like the UNHCR or government agencies.

The special view is aimed at the analysis of environmental migration in China and the resettlement problems due to construction of development projects, natural disasters and environmental changes or lack of natural resources with security consequences. Construction of some river dams, drought, desertification, floods, tropical storms and pollution are main environmental factors which force people to leave their habitats in China. The huge hungriness for natural resources by the growing Chinese economy and increasing consumption of inhabitants imply big challenges for the world's security.

The paper consists of essential environmental characterization of the Yangtze River basin, especially water utilization and environmental changes in the upper reaches of the Yangtze River. The state of environment in the region is very important for sustainable development of the whole China because it provides strategic supplies of water here. This work discusses the theory of solution the environmental problems and establishing sustainable development by the environmental migration in the area. The author of the work is afraid for that solution of environmental degradation by displacement of people does not deals with causes of the degradation, but looks for reasons for displacement of the people from the development projects area.

The main purpose of this paper is to explain the resettlement issue of the Three Gorges Dam area, especially the resettlement program of Chinese government and the problems connected with its implementation. The missing aspects of the realization are listed. Final part of the paper deals with the analysis of the actual condition of the environmental refugees from the area and their social and economic situation. Some experts claim that environmental migration in the region is closely related to poverty alleviation and environmental regeneration. But the experience of the author of this paper is quite different, the poverty of the displaced people is deeper and the press on environment is much stronger. This analysis also confirms other reports. The work is founded on the field research of the author in this region in October 2004 and the excerption of the facts from the selected research works and documents interested in the issue.

Keywords: environmental migration, refugees, development, poverty, natural resources, the Three Gorges Dam, the Yangtze River.

1. Introduction

The most frequently quoted determinants which play significant roles in the origin of human migration flows are following:

1. Economic and social factors.
2. Political factors.
3. Demographic factors.
4. Environmental factors.
5. Psychological (psycho-social) factors.

We often perceive mutual causing of some factors and it depends on which factor play (or is attributed) more important role.

Environmental degradation and resource depletion play a contributing role in affecting population movement, often filtered through contexts of poverty, food deficiency, conflicts and social inequity. Some authors (e.g. Myers, 1993, 1994; Brown, 2004) declare that number of incidents, that cause people to leave their houses and fields due to environmental problems, is increasing rapidly and they perceive this as a global serious issue, especially in the light of analysis of climate change identified by the Intergovernmental Panel on Climate Change as being very likely to occur in this century (McLeman, Smit, 2004, 5).

Who are environmental refugees? They are people who have been forced to leave their traditional habitat, temporarily or permanently, because of some lack of natural resources and/or an environmental disruption that jeopardized their existence and seriously affected the quality of their life. Region is not able to ensure them safe livelihood. By 'environmental disruption' is meant any physical, chemical and/or biological changes in ecosystem (or the resources base) that render it temporarily or permanently unsuitable to support human life and it can be caused by natural and/or human activity. This often relates to population pressures and poverty in the area. Not all of the refugees flee their country, many being 'internally displaced people' (compare with LiSER, 2004; Myers 1994, 2001b; Leiderman, 2002, 5).

The international refugee legislation - the Treaty of Geneva from 1951 calls refugees "as persons forced to flee across an international border because of a well-founded fear of persecution based on race, religion, nationality, political opinion or membership of particular social group". (UNHCR 2005; UNHCR, 2002) The main conditions are that a person finds himself in a foreign country and does not have legal protection in the country of his nationality in the named individually reasons (compare with LiSER, 2004). For the responsibility for the refugees, correspondent with the treaty, was established the organization United Nations Commissioner for Refugees (UNHCR). Both were established more than fifty years ago and originally were meant for the huge number of displacement people after World War II.

Many critics argue that conditions have changed during the last few decades. There are, at least, two reasons for making changes - categories persons called "internally displaced people" and "environmental refugees" because at this moment the international law does not recognize them as refugees and they can not count with any material or juridical support of institutions like the UNHCR or government agencies (compare with Black, 2001, 1; LiSER; UNHCR, 2002;).

2. Domain of research, methodology and goals

The domain of research is the subject of environmental refugees as a significant group of migrants and their specific social situation. The territory of interest is the Upper Reaches of the Yangtze River, especially Three Gorges Dam area. We also take into consideration environmental issue in the region and lack of natural resources in China.

Considering to complexity of the topic was necessary to weight these following basic factors:

- a. The environmental factors include natural conditions and ecological factors of the regions; the frequency of natural hazards in the region; the recent and possible changes of climate in the future; possible changes of environment; environment pollution and human influences.
- b. The social, economical and political factors include international law in the framework of international migration; environmental migration processes in the region; human conditions for living and principal human rights; economic and social development of the regions; population pressure and poverty.
- c. The relations between environment and security include food and water security; conflicts due to natural resources and the possible threats to future. Above all the fact that the China is the biggest consumer of natural sources (except oil) in the world.
- d. The ethical factor, in the age of globalization, especially in area of global security, pollution of environment and negative influence of climate change, each of us has responsibility for solution the global issues. Especially in the case of most populated country in the world.
- e. The possibilities of predicting the phenomenon of environmental migration in the region.

The range of the work does not allow author to cover all possible factors in detail. Some of them we can only remark.

The main used method is analysis of selected research works, documents, information from specialized websites and the excerption of the most important facts from the materials. The work is also founded on the field research in this region in October 2004 conducted by the author. The research was located at this study area of county Fengdu, Wushan, Zigui and surroundings of Shibao Tower and was oriented on the social situation of the refugees and environmental issue of the area. During the research, author of the paper tried to verify the information from research work of Ming (1999) and other sources through interviewing of some displaced people and observation their real social situation. The document photos from the areas are disposed. The resulting compilation work was created by their comparison of the works and sorting out of the information.

The main goals of the work are to explain situation of environmental refugees in the region and create environment for solution of their situation. Very important question is how to avoid these kind of projects producing big hazards, possibly how to precede them.

3. Environmental refugees in China

1.1 The typology of environmental reasons of displacement

There are most frequent reasons why the people have to force their habitats because of environmental damage or lack of natural resources in China - development project, natural disasters and environmental changes, and lack of natural resources.

1.2 Development projects

Involuntary resettlement in China firstly results from construction of water reservoirs, transport infrastructure, and urban construction (Cernea, McDowell, 2000, 129-130):

- *Reservoir development* was the leading cause of resettlement in past, now displaces no more than 10 percent of the people resettled each year. Reservoir resettlement impacts are much greater and more difficult to deal with than any other type of project. Entire villages, even townships, are overtaken by reservoirs. These populations must frequently be placed on land already used by others, often in a new political jurisdiction. This can result in

host-resettler tensions, and all incomes may decline. Rich fertile land is lost and replacement options depend on fragile soil and less dependable water supplies. New cropping patterns have to be mastered, and land scarcity may force people to look for non-agricultural employment (see below).

- *Transport infrastructure investments* displace primarily rural people located in transport corridors and at the sites of airports, bridge abutment, and so forth. This displacement is therefore limited in scale and may vary from as few as a handful of families to hundreds or thousands, depending on circumstances. Transportation displacements also take place in the urban areas. In the 1980s about 12 percent of overall involuntary resettlement was caused by the construction or upgrading of railroads and roads. In these cases, villages rarely lose all the village land and are able to redistribute the remaining lands to ensure more equity of land use. In more extreme cases they may be given an urban passport and resettled in the nearest town.
- *Urban resettlement* now accounts for the majority of all Chinese resettlement. All urban land is owned by the state and therefore only usufruct rights rather than ownership rights are lost. Any resettlement project must compensate individuals for lost use rights by providing substitute housing of equal or higher standards, and by providing alternative places for doing business and the means to replace lost assets.

The World Commission on Dams published in 2000 report (WCD, 2000) in which evaluated impacts of building the large dams in the second part of 20th century. The displacement is reported from 68 of the 123 big dams (56 per cent), especially in Asia, Africa and Latin America where large river dams are one of the forms of forced displacement. There have left their livelihoods and homes 40 – 80 million people, and 10,2 million of them was in China between 1950 and 1990 according to official statistics. “But independent sources estimate that the actual number of dam-displaced people in China is much higher than the official figure” (WCD, 2000, 102-104; compare with Cernea, McDowell, 2000, 128). It was estimated that only the Three Gorges Dam project displaced or will force to display nearly 2 million persons probably, according to independent sources. Official government statistics still quote 1,2 million people. During the second part of 20th century China constructed more than 84,800 reservoirs together with a total capacity of 485,3 billion cubic meters (Wang, Ren, Ouyang, 2000, 63).

The World Commission on Dams declared, that generally “resettlement programmes have predominantly focused on the process of physical relocation rather than the economic and social development of the displaced and other negatively affected people. The result has been the impoverishment of a majority of resettlers ...” (WCD, 2000, 103). The forced resettlements due to construction of the Three Gorges Dam are in the similar situation (see below in detail).

1.3 Natural disasters and environmental changes

Every year natural disasters, such as floods, drought, storms, hail, earthquakes, landslides and mud-rock flows destroy millions houses and hectares of crops in China and millions people has to be relocated. For example in the period between January 1 and July 20 in 2004 natural hazards „have damaged about 18 million hectares of crops. About 1.6 million hectares of arable land yielded no harvest. An estimated 388,000 houses collapsed and 2.4 million were destroyed, forcing the relocation of nearly 1.3 million people“ and „have killed 659 people and caused losses of about 39.26 billion yuan (4.75 billion USD) ... Floods accounted for more than half the deaths ... and affected 45.7 million people“ in the same period. „The hardest hit provinces and regions were Yunnan, Guizhou, Sichuan and Chongqing in the southwest, Hubei, Hunan and Henan in central China and Guangxi in the south. “ (Lim, 2004) During the first half of the year 2005 floods in southern and eastern China, have killed 567 people, left 165 missing, forced the emergency relocation of 2.46 million people and caused direct economic losses of 22.9 billion yuan (2.77 billion USD), announced Reuters (2005).

The Gobi Desert in China is growing by 10,400 square kilometers a year and the refugee stream is swelling. Asian Development Bank preliminary assessment of desertification in Gansu province has identified 4,000 villages that face abandonment (Brown, 2004). Desert expansion has accelerated with each successive decade since 1950. China's Environmental Protection Agency reports that the Gobi Desert expanded by 52,400 square kilometers from 1994 to 1999 and Gobi far from within 250 kilometers of Beijing. The Chinese population of 1,3 billion and a livestock population of just over 400 million are weighing heavily on the land. "Huge flocks of sheep and goats in the northwest are stripping the land of its protective vegetation, creating a dust bowl on a scale not seen before. Northwestern China is on the verge of a massive ecological meltdown." (Brown, 2003)

The average drought affected an area in the period 1949 - 1990 was 195,92 million hectares (approximately 2 million square kilometers) and the drought disaster area was 7,689 million hectares by year (approximately 77,000 square kilometers). The average loss of cereal production was 11,0 million tons. But in 1988 the cereal loss was 31,2 million tons and 28,4 million tons in 1989. (Wang, Ren, Ouyang, 2000, 34) "Major natural factors that cause droughts in China are a huge population and very low water resource occupation rate, very uneven and imbalanced distribution of water and land resources, and a great variation of precipitation and runoff within and from year to year." (Wang, Ren, Ouyang, 2000, 33)

1.4 Lack of natural resources

China feeds 21 per cent of the world's population (in 1997) with 7 per cent of the world's cultivated lands, and makes important contribution to the world food supply (Wang, Ren, Ouyang, 2000, 63) and world's prices of foodstuffs. In February 2005 Lester Brown, director of the Earth Policy Institute, published comparative report about two biggest consumers of natural resources - United States and China. "Among the five basic food, energy, and industrial commodities – grain and meat, oil and coal, and steel – consumption in China has already eclipsed that of the United States in all but oil. China has opened a wide lead with grain: 382 million tons to 278 million tons for the United States last year. Among the big three grains, the world's most populous country leads in the consumption of both wheat and rice, and trails the United States only in corn use. With steel, a key indicator of industrial development, use in China has soared and is now more than twice that of the United States: 258 million tons to 104 million tons in 2003. As China's population urbanizes and as the country has moved into the construction phase of development, building hundreds of thousands of factories and high-rise apartment and office buildings, steel consumption has climbed to levels not seen in any other country." (Brown, 2005; for detail see Table 1)

With oil, the United States is still in the lead with consumption triple that of China's – 20.4 million barrels per day to 6.5 million barrels in 2004. "But while oil use in the United States expanded by only 15 percent from 1994 to 2004, use in the new industrial giant more than doubled. Having recently eclipsed Japan as an oil consumer, China is now second only to the United States. Looking at energy use in China means also considering coal, which supplies nearly two thirds of energy demand. Here China's burning of 800 million tons easily exceeds the 574 million tons burned in the United States. ... In another key area, fertilizer – essentially nitrates and potash – China's use is double that of the United States, 41.2 million tons to 19.2 million tons in 2004. In the use of the nutrients that feed our crops, China is now far and away the world leader." (Brown, 2005; for detail see Table 1) The new giant's need for access to raw materials and energy is shaping its foreign policy and security planning, especially when China has lack of nearly all natural resources (compare with Brown, 2005). World has to be prepared for this "appetite", including increase in prices of natural resources and other commodities.

Table 1: Annual Consumption and Use of Key Resources and Consumer Products in the China and United States

Commodity	Unit	China	USA
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Grain (2004)	Million Tons	382	278
Meat (2004)	Million Tons	63	37
Oil (2004)	Million Barrels per Day	7	20
Coal (2003)	Million Tons of Oil Equivalent	800	574
Steel (2003)	Million Tons	258	104
Fertilizer (2003)	Million Tons	40	20
Cellular Phones (2003)	Million in Use	269	159
Television Sets (2000)	Million in Use	374	243
Refrigerators (2001)	Million Produced	14	12
Personal Computers (2002)	Million in Use	36	190
Automobiles (2003)	Million in Use	24	226

Source: BROWN, Lester R. (2005): *China Replacing the United States as World's Leading Consumer*. [online]. February 16, 2005, Earth Policy Institute.

With Chinese coal use far exceeding that of the United States and with its oil and natural gas use climbing fast, it is only a matter of time when China will also be the world's top emitter of carbon. (Brown, 2005) The world has two major climate disrupters now. Climate change will alter (or is altering right now) regional agricultural and industrial potential and could trigger large-scale migrations. "The lifestyle of most human populations is adapted to a very narrow range of climatic conditions. Human settlements generally concentrate in areas of high industrial or agricultural potential, that is, areas with hospitable climates, near coastlines, in river and lake basins, or close to major transportations routes." (Hardy, 2003, 160-161). According to most scenarios, climate change will place added demands on urban infrastructures. "Climate change could accelerate urbanization, as people migrate away from low-lying coastal to interior areas or from drought-stricken farms to cities." (Hardy, 2003, 161).

Myers estimates that "due to largely to sea-level rise and flooding of coastal-zone communities, but also as a result of increased droughts and disruptions of rainfall regimes such as monsoonal systems, global warming could put large numbers of people at risk of displacement by the middle of next century if not before." (Myers, 1997, 171) Preliminary estimates indicate that the total amount of people at risk of sea-level rise in China is 73 million. (Myers, 1997, 171; Myers, 2001b, 611; compare with Myers, 2001a)

"China's urban population is expected to almost double to a total of more than 600 million. This will engender greatly increased demand for water for household use, to the detriment of the country's agriculture which currently takes 87 per cent of all water consumed in order to maintain food production." (Myers, 1997, 171) The worsening of sustainable access to safe drinking water in Chinese cities can contribute human migration in future. While coverage increased in rural areas, access to improved sources decreased in urban areas. This contrasting trend in the region reflects what happened in China over the decade (1990 - 2002), with coverage in urban areas decreasing from 100 to 92 per cent. In rural areas coverage improved in the same period from 60 to 68 per cent. But in the country are still almost 300 million people without the access to safe drinking water (UNSD, 2004). The important role plays human migration from rural areas, but the most crucial role plays increasing water's consumption of industry production concentrated in Beijing or around urban areas on coast above all.

While China consumed amount 562,3 billion cubic meters of water in year 1997, in year 2010 total water supply is expected to be 646 billion cubic meters, and for the year 2025 amount 720 billion

cubic meters. China predominantly depends on surface sources of water (Wang, Ren, Ouyang, 2000, 63). Considering present lack of water in cities and some parts of China, we can expect some tensions between states sharing the same water resources together with China. As long as China want to increase the consumption of water from rivers as Brahmaputra or Mekong for irrigation of fields or industrial production, in negative way this could affects the needs of India, Bangladesh, Laos, Cambodia and Vietnam which are likely to protest. India and Vietnam waged wars against China in past.

Compound water security is becoming a critical issue in China in future. This issue includes (compare with Wang, Ren, Ouyang, 2000, 169-170):

- food security (food sufficiency and accessibility, malnutrition, famine);
- human (individual) security (adequate safe water access,);
- environmental security (deforestation, soil erosion, desertification, biodiversity conservation, environmental pollution, frequency of disasters);
- social security (state of economy, employment, refugees issue, etc.)

2. Essential environmental characterization of the Yangtze River basin

The Yangtze is the greatest river in China, and the third largest in the world. The whole length of the river is 6300 kilometers. The total area of the basin is 1,8 million square kilometers, it means 18,8 per cent of the whole China. There lived 420 million people in 1997 and they cultivated land 230 million hm² in the region. Total annual food production is 153 million tons - 36 per cent of the country and industrial production is more than 200 billion USD - 39 per cent of China. (Wang, Ren, Ouyang, 2000, 103)

2.1 Water utilization in the Yangtze River

The amount of water and the proportion of water usage from the river have changed. The total amount of water utilization in the Yangtze basin in 1997 was 173,7 billion cubic meters, while in 1980 was used 135,3 billion cubic meters. The increase rate was about 21 per cent (see Table 2: *Water utilization in the Yangtze River in 1980 and 1997*). (Wang, Ren, Ouyang, 2000, 103-106)

Table 2: Water utilization of the Yangtze River in 1980 and 1997

Year	Water used (billion cubic metres)				Proportion (per cent)			Water used (cubic metres)
	Agriculture	Industry	Domestic	Total	Agriculture	Industry	Domestic	Per capita
1980	104,7	20,9	9,7	135,3	77,4	15,4	7,2	389
1997	106,0	49,6	18,6	173,7	61,0	28,3	10,7	414

Source: WANG, Rusong; REN, Hongzun; OUYANG, Zhiyun (ed.) (2000): *China Water Vision. The Eco-sphere of Water, Life, Environment & Development*; p.106.

The trend of water consumption in the region is increasing in all sectors of production, including domestic consumption. The highest increase in rate of consumption was achieved in industry in this period. The lowest increase in rate water consumption was in agriculture, but this sector remains the biggest consumer of water, absolutely and relatively (see Table 2).

2.2 Environmental changes in upper reaches of the Yangtze River

The upper reaches of the Yangtze River covers an area of 1,056 million square kilometers, it is equivalent of 58,9 per cent of the whole Yangtze River basin. It encompasses a region from the sources of the Yangtze to Yichang city, Hubei Province. The landscape consists of mountains (50 per cent), plateaus (30 per cent), and hills (18 per cent), with small plains (2 per cent). The population in this

region amounts to around 180 million (in 2001), making up 14 per cent of population in China. (Yan, Qian, 2004, 613 – 614).

Most parts of the upper reaches of the Yangtze River are more than 3000 m above sea level and sloping land forms 45,9 per cent of the total cultivated land (40,700 square kilometers). Soil erosion counts among the most severe environmental problem in the region. The present area suffering from soil erosion in the upper reaches of the Yangtze amount between 350,000 – 393,000 square kilometers (it is more than one third of total area upper reaches of the Yangtze). In the 1950s was amount of soil area 299,500 square kilometers. (Yan, Qian, 2004, 620-621; Wang, Ren, Ouyang, 2000, 39) The eroded soil in the upper Yangtze reaches 1,568 billion tons, an equivalent of 3,870 square kilometers of soil, depth of 30 centimeters worn away annually. Some authors quoted annually amount of eroded materials 6,8 billion tons. (Wang, Ren, Ouyang, 2000, 39) In the limestone areas in Guizhou province about 1,800 square kilometers of land is being petridesertified each year and about 76 square kilometers of arable land is lost each year. "Farmers in some villages had to move out of their original locations and resettle to other places due to losses of their farmland." (Yan, Qian, 2004, 621)

Flood periods in some basins in the upper reaches of the Yangtze are four months. (Wang, Ren, Ouyang, 2000, 32) Deforestation has increased frequency and size of floods. During the rainy season, floods, mud-rock flows and landslides in deep valleys occur frequently. Ministry of Water Resources claims while serious floods occurring on the Yangtze in 1998 were mainly caused by abnormal climate and concentrated precipitation, to a great extent they can also be attributed to soil erosion that has reduced the flood discharging and storage capacity of rivers, lakes and reservoirs. (Yan, Qian, 2004, 621) In Sichuan, a province located at the upper reaches of the Yangtze River, there are more than 50 counties with forest coverage of only 3 – 5 per cent (Wang, Ren, Ouyang, 2000, 39).

Environmental destruction causes changes in the climate and land desertification. Climate change in the upper Yangtze River is one of the main factors resulting in the loss of vegetation, degradation of wetlands, etc. Due to regional reduction of rainfall and overgrazing, a vast extent of grassland has been changed to semiarid area. (Yan, Qian, 2004, 622; compare with Wang, Ren, Ouyang, 2000, 43)

2.3 Elemental characterization of the Three Gorges Dam

The Three Gorges Dam is located in west China, in Chongqing and Hubei provinces and it is largest hydropower project in China. Construction of the Three Gorges project started in 1993 and had used 13,7 billion USD (RMB 113.1 billion yuan) investment by the end of April 2005. The total investment will be controlled with 21,8 billion USD (RMB 180 billion yuan) by 2009 when the whole project is completed despite the hikes of building materials prices in recent years. „Considering the factors of inflation and loan interests, the total investment in the project was initially estimated to reach 26,7 billion USD (RMB 203.9 billion yuan), according to the China Yangtze Three Gorges Project Development Corp (TGP, 2005a). According some „independent knowledgeable Chinese banker“ the real investments are about 77 billion USD (Adams, Ryder, 1998).

The reservoir is about 600 kilometres long, and the dam is 2309 meters wide and it is going to be 181 meters high. The area of the reservoir is 1084 square kilometers (Libra, 2004). Since the year 2003 the level of Yangtze River at the reservoir has risen 135 meters and will continue to rise to closing level 175 – 180 meters. Since the year 2003 was flooded about 1,500 towns and villages due to filling the reservoir and in the same year some experts discovered about 80 leaks in the dam and.

3. State of environmental refugees in the Three Gorges Dam area

However the region of upper reaches of Yangtze River is very important for sustainable development of the whole China, the environment has deteriorated due to deforestation, reduction of vegetation, soil erosion and pollution of water. These conditions affected the livelihoods of the people in the region. Construction of the Three Gorges Dam worsened environment and forced to displace nearly 2,0 million people from the area. Official authority still contends that number of migrants is 1,1-1,2 million, but it does not only refer to different data between Chinese authority and “independent sources” outside China. (see Ming, 1999; Adams, Ryder, 1998).

3.1 Environmental migration and sustainable development – theory

Some authors claim that environmental migration in the area is inevitable and it can help to solve the environmental problems of the region and poverty of people developed due to high population density. “Emigration from overloaded water – carrying capacity and ecologically fragile regions is necessary, but needs careful human ecological planning and management.” (Wang, Ren, Ouyang, 2000, 171; compare with Jing, 2000, 26) Yan and Qian claim that some areas do not possess the basic condition for human subsistence. “An important cause is the excessive growth of the population and the continually increasing population densities. Increased population pressure then ensues in over-cultivation, over-grazing, and haphazard logging, leading to reduction in vegetation and exacerbated desertification.” (Yan, Qian, 2004, 614 - 615)

Through environmental migration, the people will be moved out of areas with seriously degraded environment or unlivable natural environment that essentially do not possess the condition for human subsistence and they will rebuild their resettlements in other locations. “Implementation of environmental migration to relieve population pressure and bring about sustainability of development between environment, population, economy, and society in this region has been proposed in recent years.” (Yan, Qian, 2004, 615) West China Development Office of Sichuan estimated amount 10 million people in west China at the end of year 2000 who are poverty-stricken and required environmental migration. (Yan, Qian, 2004, 615)

The solution of environmental degradation by displacement of people is not solution of causes of the degradation but looking for reasons for displacement of the people from the development projects area. Instead of effort to stop the degradation of environment and fragile ecosystems by implementation of environment friendly technologies in agriculture and industry; techniques for reduction of wastage and consumption of natural resource (you can see this in every cities and towns in China); building of sewage disposal plants, penalize of polluters (implement the rule “polluter has to pay”) etc, Chinese authorities choose simpler way – displace the people from their habitats. This way is possible in the case if you have comparable space and conditions for the people. But there is no case of the Three Gorges Dam area. In China, the kind of solution is definitively impossible. There is total deficiency of arable land, water and other natural resources and situation in future will be much worse. And unemployment is raising as a result of collapses many states factories.

For this reason is very sad when fertile fields are flooded and less productive soils remain. Thus construction of the Three Gorges Dam contributed more seriously to environmental pressures. Many people moved to higher parts of valley where the fertility of fields is much/far lesser and they caused higher population density in the areas. There are ecosystems more fragile and vulnerable to soil erosion. Displaced people became often poorer than before, because they have lost essential livelihood conditions, houses, land. Alternative conditions are totally inadequate (see below). Author of the paper observed that many displaced people from the flooded parts of the Three Gorges Dam are trying to come back and stay in their habitats and fruitful fields till last moment, although illegally.

3.2 Resettlement program of Chinese government

China's tragic experiences with Danjiangkou and Sanmenxia Dam displacements in the 1960s and 1970s has led to the adoption of new resettlement policy (Cernea, McDowell, 2000, 25). Author of the paper believes, under the influence of his personal experience in place, that accepted tools or their implementation are not adequate in the case of Three Gorges Dam area.

According to the official figures, more than 1.2 million people have been resettled because of construction of the Three Gorges Dam. More than 40 per cent are rural people engaged in agricultural production (see Table 3). "The rural resettlement has involved three main methods: settling people in nearby areas; moving them to distant locations in groups; and encouraging migrants to relocate on their own initiative, perhaps by going to live with relatives or friends." (CAS, 2002, compare with Jing, 2000, 26) In fact most rural migrants are still being resettled in the vicinity of the reservoir area (see previous; compare with CAS, 2002). Since June 2005 some 813,000 people in the Chongqing Municipality have been relocated due to the Three Gorges Dam according the official authority (TGP, 2005b).

Table 3: The inundated land and displaced population in the Three Gorges area by county (1992)*

County	Population			Farmland (hectares)			Orchard (hectares)			Others
	Total	Non-agricultural	Agricultural	Total	Dry land	Rice Paddy	Vegetable	Total	Orange	
Yichang	6850	1115	5735	293.9	121.9	172.0	-	395.3	360.3	35.0
Zigui	66955	25458	41497	1059.4	328.3	713.3	17.8	1391.9	1390.2	1.7
Xingshan	20915	17154	3761	93	15.4	54.7	22.9	178.1	177.9	0.2
Badong	32090	22812	9278	398.2	237.9	152.6	7.7	422.1	415.1	7.0
Wushan	55653	21852	33801	1231.3	843.9	309.0	78.4	461.7	447.3	14.4
Wuxi	191	-	191	20.1	6.3	13.8	-	3.0	2.3	0.7
Fengjie	78832	42860	35972	1393.9	675.0	625.9	93.0	1062.2	1034.7	27.5
Yunyang	110561	51929	58632	2158.5	970.2	1063.4	124.9	1051.7	881.7	170.0
Wanxian	63229	32356	30873	1329.7	440.7	866.3	22.7	717.4	621.1	96.3
Wanxian City	96104	89344	6760	339.9	93.7	124.5	121.6	70.5	65.0	5.5
Kaixian	110852	49968	60884	2618.7	601.5	1737.2	280.0	555.6	474.2	81.4
Zhongxian	55452	26809	28643	2305.2	913.5	1201.7	190.0	278.1	98.4	179.7
Shizhu	8416	3399	5017	347.0	100.8	238.5	7.7	101.3	46.8	54.5
Fengdu	54582	38124	16458	835.7	418.4	345.6	71.7	164.0	134.1	29.9
Fuling City	68590	49646	18944	1526.6	727.5	583.7	215.4	321.1	150.2	170.9
Wulong	3469	3005	464	75.6	38.5	5.9	31.2	0.1	0.1	-

Changshou	7114	4698	2416	160.7	51.1	40.7	68.9	121.9	121.9	-
Jiangbei	4280	2711	1569	396.2	304.5	82.1	9.6	39.7	6.0	33.7
Baxian	2073	1432	641	574.5	356.7	76.7	141.1	11.1	0.1	11.0
Urban Chongqing	-	-	-	-	-	-	-	0.3	-	0.3
Jiangjing	-	-	-	-	-	-	-	-	-	-
Total	846208	484672	361536	17158.2	7246.0	8407.5	1504.7	7347.1	6427.3	919.8

*If "secondary relocation" and population growth during the period of resettlement are taken into account, the total number of migrants will be 1,220,000.

Source: MING, Wu (1999): *Resettlement Problems of the Three Gorges Dam. A Field Report*. [online]. International Rivers Network. Berkeley. Last modified 18/10/1999.

Author of this paper suppose that implementation of any resettlement program should cover following practical aspects (compare with Yan, Qian, 2004, 629 - 632 and chapter below):

- *adequate preparation*
 - clear and transparent criteria for relocation,
 - social impact assessment,
 - environmental impact assessment,
 - suitable and fertile fields for farmers,
 - suitable and sustainable employment opportunities for workers,
 - new suitable houses (mainly for villager) or flats (mainly for inhabitants of towns and cities)
 - suitable policies for relocation,
- *willingness and participation of migrants*
 - long-term campaign for understanding the people to be displaced,
 - comply to human rights,
 - psychological assistance,
- *willingness and participation of hosted population*
 - allow preserving standards of livelihood,
 - improve the infrastructure situation in target areas,
- *adequate funds for*
 - compensation, rehabilitation and social programmes,
 - construction of new villages, towns, cities or houses, flats,
 - construction of new factories or other employment opportunities,
 - modern environmental technologies and equipment (access to safe water, sewerage, etc.)
 - purchase and adaptation of target areas;
 - relocation,
 - usable instruments and capacity for moving (vehicles, buses, etc.),
- *social integration*
 - allow preserving standards of livelihood,
 - long-term process of integration to new environment, culture, society, etc.

According the report of finance experts from Chinese Finance and Banking Association from 1998, "the dam will affect 1,380 industrial enterprises that have a fixed value of assets at 4.8 billion yuan (580 million USD), or 86 percent the asset value of all industrial enterprises and mining establishments in the Chongqing reservoir area. By December 1996, approval of 3,048 resettlement programs had been granted. For industrial relocation, 2.036 billion yuan (246 million USD), or 34.5

percent of the total budget, was invested into the Chongqing reservoir area. This investment includes the state's offer of 930 million yuan of compensation (112 million USD) ..." (Jing, 2000, 21).

3.3 The real situation of refugees

Yan and Qian claim that "environmental migration in the upper Yangtze is closely related to poverty alleviation and environmental regeneration" (Yan, Qian, 2004, 615). But the experience of the author of this paper is quite different - the poverty of the displaced people is deeper and the pressure on the environment is much stronger. This analysis also confirms report by Wu Ming for International Rivers Network (Ming, 1999) and researchers from the Chinese Academy of Science partly (CAS, 2002).

Official statements give the impression that resettlement is proceeding smoothly, but Ming (1999) discovered that in fact "it has been plagued by mismanagement, official corruption, inadequate compensation, and a shortage of farmland and lack of jobs for the resettlers. Resentment and foot-dragging opposition to resettlement is widespread". He pursued some interviews in the region and these in Yunyang County demonstrated why it is difficult for even the head of the Three Gorges Resettlement Bureau to get hold of reliable information. Yunyang has 120,000 people slated for relocation. In early January, the Yunyang County government opened an exhibition on resettlement. A chart at the exhibition listed three categories of resettlers (Ming, 1999):

- First, 5,940 people were identified as "productively resettled", meaning that they had either new farmland or new factory jobs.
- Second, 2,610 people were said to be "residentially resettled", meaning a place had been found for them to re-establish their homes.
- Third, 187 people were classified as "account-closed resettlers", meaning they had received their share of the compensation and moving expenses and the authorities had no further responsibility towards them.

"All these figures are problematic, if not completely false, according to a Yunyang official. In a private conversation, this official pointed out that the actual figure for the "productively resettled" people ... was at most 3,000. At this early stage of the resettlement program, he explained, the people the county government was trying to relocate were mostly farmers, but only 133,4 of the 1625 hectares of farmland that has reportedly been prepared for resettlers was usable. He said the rest of the newly opened land was described by local farmers as "looking like ditches from a distance and like pigsties at close". As for the "account-closed resettlers," this actually referred to an unfortunate group of farmers who had been persuaded to move to the island province of Hainan under a deal that was struck by Yunyang county and Hainan officials. They returned to Yunyang six months later, complaining that they had been cheated. One of these farmers said in an interview that he and his fellow villagers had been promised a good life in Hainan but found the resettlement site uninhabitable. Now they have exhausted the moving expenses they had received from the government to travel to and then leave Hainan, and are not eligible for any further compensation. They have returned to their old homes, but will still have to move when the water rises. Like the uselessness of the farmland in Yunyang, the resettlement officials have covered up the failure of this scheme to move farmers to Hainan. (Ming, 1999)

Researchers from the Chinese Academy of Science (CAS, 2002) who asked the migrants and the hosts in the resettlement site of Changling town, in the Wuqiao district of Wanxian city in 2000 confirmed that the migrants had more farmland per capita (0.08 ha) in their place of origin, Tailong town, than in the new location (see Table 4). „They could take advantage of the diversity of land resources in Tailong and pursue a variety of livelihoods, such as growing oranges in the orchards and fishing on the Yangtze River, two extremely important sources of income. Unfortunately, after resettlement, the migrants not only experienced a sudden decline in farmland per capita - 0.04 ha, just half the original amount - but also suffered a great loss of cash income, which had largely been earned by growing oranges, animal husbandry and other farming-related activities in their native town. Though Changling town was less than 20 km away from their place of origin, there were no orange

orchards available in the new resettlement site. Some migrant households were further frustrated by the fact that they lost another important part of their livelihood - fishing - because the resettlement site is not situated by the river." (CAS, 2000)

Table 4: A comparison of land use in the place of origin and resettlement site (in per cent hectares/person)

	<i>Cultivat ed land</i>	<i>Gard en plot</i>	<i>Fore st land</i>	<i>Gra ss land</i>	<i>Settleme nt & industri al land</i>	<i>Roa ds</i>	<i>Wat er area</i>	<i>Unus ed land</i>	<i>Per capita land</i>
Original site (Tailong town)	34.97	22.10	4.13	0	5.49	3.70	6.35	23.26	0.08
Resettlement site (Changling town)	74.90	0	0	0	7.34	4.41	0	13.35	0.04

Source: CHINESE ACADEMY OF SCIENCE (2002): *Three Gorges rural resettlement and its impact on the host population and the environment*. [online]. March 1, 2002, Three Gorges Probe - Three Gorges Dam news service.

Ming also found people who have been appropriately resettled in the Three Gorges area, with fine new homes, jobs and compensation. In Badong and Zigui counties in Hubei Province, he conversed with six rural families who were enjoying a comfortable life after resettlement. They had even opened small shops in the new county seats. These families explained, however, that they were prospering largely because they had been designated as "model resettlers", which means that they had received preferential treatment and were showcased by local officials as success stories of the displacement from the Three Gorges area. "But creating such "model" households is expensive: Each one has cost about four times the average amount available for the relocation of a household. And since the central government insists that the total sum for resettlement is fixed, there is a question as to how much money will be available for those resettled later." (Ming, 1999)

Another serious threat to rural resettlers is the institutionalized discrimination they face in the official assessment of compensation according to residential status. Families that are registered as rural households receive less housing compensation than do urban residents, even though the cost of construction materials is the same for both. "For example, in Yunyang County, compensation for every square meter of brick and concrete buildings is 300 yuan for county-seat residents, 225 yuan for township-seat residents and 180 yuan for rural residents. In Zigui, the rates are 480 yuan, 200 yuan and 150 yuan. Many farmers who were interviewed said, often in very emotional terms, that they regarded the compensation as insufficient to reestablish their homes." (Ming, 1999; compare with Jing, 2000, 27-28) Yan and Qian (2004, 632) claim that "it is estimated that the cost of assisting each migrant to move out ranges from 5,000 to 10,000 yuan" (from 605 to 1210 USD).

Compensation rates vary widely across the area, as well as between locations classified as urban and rural, and there has been no indication of whether compensation will be adjusted to reflect inflation. The value of the farmers' property, the cost of moving and the price of construction materials to build new houses were calculated in 1992. Adding to the farmers' anxiety is official corruption, which raises the question of whether they will see any compensation money at all. Every farmer I interviewed mentioned cases of officials who had embezzled resettlement funds or taken bribes for awarding construction contracts. ... The officials had taken bribes from land reclamation and construction contractors eager to profit from the reclamation of new farmland and the construction of roads, schools, apartments, health clinics and office buildings." (Ming, 1999)

Villagers in Gaoyang Township, Yunyang County, have repeatedly appealed to the central government for more resettlement funds. „Their appeal has to do, in part, with the regional discrepancies in the amount of compensation that resettlers can get after part of the resettlement investment is used to build community infrastructures such as roads, irrigation systems, schools, and medical clinics. The following figures are the varying rates of per capita compensation for distribution among individuals:" (Jing, 2000, 26-27)

Fengjie County: 9,458 yuan (1,144 USD)
 Zhongxian County: 7,611 yuan (920 USD)
 Kaixian County: 7,306 yuan (883 USD)
 Wushan County: 7,197 yuan (870 USD)
 Yunyang County: 6,773 yuan (819 USD)

Among the five counties listed above, Yunyang has more cultivated fields to be submerged and a greater number of villagers to be resettled. But it has the smallest amount of compensation to distribute among the local resettlers.

More significantly the migrants experienced a sharp drop in per capita income after displacement. The average per capita income in the 11 households surveyed in Changling town, in the Wuqiao district of Wanxian city decreased from 3,431 yuan RMB (415 USD) in 1999 to 2,450 yuan RMB (296 USD) in 2000 (see Table 5), a decline of 29 per cent, with variations according to the work undertaken by the households. (CAS, 2002)

Table 5. Change in household income by household production category

Farming			Fishery plus farming			Commerce & services plus farming			Transport plus farming			Total income per capita (yuan/per)
Household	Population	Total income (yuan)	Household	Population	Total income (yuan)	Household	Population	Total income (yuan)	Household	Population	Total income (yuan)	
6	21	68075	3	14	45700	1	4	18195	1	5	25000	3431
6	23	48699	1	3	3070	3	12	42905	1	5	10510	2450

Source: CHINESE ACADEMY OF SCIENCE (2002): *Three Gorges rural resettlement and its impact on the host population and the environment*. [online]. March 1, 2002, Three Gorges Probe - Three Gorges Dam news service.

The Three Gorges area cannot absorb a large number of uprooted farmers unless they can be moved out of agriculture into industrial jobs. "This is why one of the goals of the government's "developmental resettlement" policy has been to provide jobs for rural resettlers who will not be able to farm by setting up new industrial enterprises as well as absorbing some relocates into the labor force of existing factories. But over the past few years, the prospect of finding industrial jobs has dimmed for many rural resettlers as local industries have hired all the people they need. Today, hopes of new work in the industrial sector have virtually vanished. Nationwide, unemployment rates increased dramatically in 1997. In the Three Gorges area, hundreds of thousands of urban residents formerly working for state-run or collectively owned factories and enterprises are being laid off. In the areas under the jurisdiction of Chongqing municipality, two million people who once worked for state enterprises are now unemployed, according to conversations with local officials. Unemployment rates in the counties and cities along the Three Gorges area, especially the Sichuan section of the reservoir area, are likely to increase in the next few years." (Ming, 1999)

Closer analysis of each laborer's working day in different sectors between migrants in Changling town shows an apparent shift from agricultural to non-agricultural sectors. This clearly reflects the fact that there is much less farmland available and more business opportunities in the new resettlement site. The statistics indicate that laborers involved in traditional farming spent 67 per cent of their working day on average on these activities before displacement, and that this percentage fell to less than 40 per cent after resettlement. This marked change reflects the sharp drop in farmland per capita. As a result, rural migrants have slipped into a state of underemployment after resettlement, leading to a greater surplus of laborers in the resettlement site. Before resettlement, each laborer worked an annual average of 227.4 days, but this figure declined to 165.7 days a year in the new location (see Table 6). Assuming that a laborer employed full-time works 300 days a year, the current employment rate after resettlement is 55 per cent. Before resettlement, the equivalent employment rate was 76 per cent. Resettlement appears to have a disproportionate impact on women. Before

resettlement, women laborers worked an annual average of 240.8 days, but after resettlement the figure declined to 157 days. If each woman worked 300 days a year, the current employment rate would be only 52 per cent, compared with 82 per cent before resettlement. (CAS, 2002)

Table 6. Migrant employment by sector in the resettlement site (workdays/year)

	Farming	Forestry	Animal husbandry	Fishery	Enterprises	Building industry	Transport	Commerce & services	Total	Number of labourers
1999	1759	1343	656	642	0	612	730	852	6594	29
2000	1405	350	0	133	174	906	730	1107	4805	29

Source: CHINESE ACADEMY OF SCIENCE (2002): *Three Gorges rural resettlement and its impact on the host population and the environment*. [online]. March 1, 2002, Three Gorges Probe – Three Gorges Dam news service.

The researchers from Chinese Academy of Science in their study focuses on the rural migrants resettled in the peri-urban area around Wanxian city identified four groups of problems (CAS, 2002):

1. *Serious shortage of farmland.* It is somewhat surprising to note that local farmers suffer more from the resettlement and urbanization than the migrants do. One reason for this appears to be that the state resettlement policy guaranteed migrants a per capita average of 0.04 ha of farmland, while the host population was persuaded, sometimes forcibly, to hand over part of their land to the migrants. As a result, local farmers had an average of 0.02 ha per capita left for themselves, just half the size of the migrants' land-holdings.
2. *Continuous decline in household income.* A substantial decline in income from traditional agriculture can be seen in both migrants and locals. The poverty-stricken reservoir area seems to have suffered more from this trend because of the weak local economic foundations, a limited labor market and growing competition from other regions in developing non-farm industries and products. Apart from households with members working in the construction industry, both migrants and locals engaged in all other production categories are experiencing a steady decline in household income.
3. *Unemployment and underemployment.* The employment rate among migrants was 76 per cent before displacement, but the rate dropped to just 55 per cent after their resettlement. For the host population, the employment rate was 86 per cent in 1997 but only 65 per cent in 2000. It can be anticipated that, inevitably, a large jobless army is likely to harm the local economy and trigger social unrest in the Three Gorges area.
4. *A low level of education and technical skill among both the migrant and host populations will have a negative impact on future sustainable development in the reservoir area.* The migrants had an average of 6.52 years of schooling in 2000, while the host population had an average of 5.95 years. Workers in factories, the construction industry and in commerce and services had more education than agricultural laborers, who had 5.47 years of schooling (migrants) and 4.36 years (host population). These figures give an indication of why both migrant and local laborers are experiencing a great deal of difficulty in shifting from farm work to non-agricultural sectors.

Wei Yi (Jing, 2000, 29) has reached on the basis of his research in Yunyang that for reduction of social instability in the area would be caused by the resettlement in the next dozen years; the best

solution is probably to lower the dam's planned height so as to reduce the total number of people to be relocated. „For example, if the normal water level in the reservoir were lowered to 160 meters, and the flood control level to 130 meters, more than 500,000 people would not have to be relocated. In short, the resettlement problems must be taken seriously and solutions badly need be found. If not, Wei Yi suggests, social instability in the Three Gorges area is bound to cause far-reaching consequences.“ (Jing, 2000, 29)

4. Conclusion

Research reports from the field and personal experiences of the author of the paper argue that environmental migration generally can not solve environmental problems or poverty of people in the Three Gorges area or in the whole China. The solution of the issue consists of change of access to environment and nature generally, prevention of wastage of natural resources and prevention of water contamination (compare with Wang, Ren, Ouyang, 2000, 44). Agriculture in the area needs to use modern environmentally friendly technologies together with best knowledge (e.g. measures against the soil erosion mainly), which allows producing sustainable food and social security in the region. The experience from study areas (e.g. county Zigui) gives evidence that local people do not use the basic measures against soil erosion in their fields.

It seems to set up necessary application of another ways for sustainable development of the region, especially in the education (elementary, secondary school, but also in family education, environmental education, sanitary norms and quality of water), construction of sewage disposal plants, measures against air pollution, etc. These measures must undertake protecting natural forests or grasslands and replanting trees and other vegetation.

The construction of the Three Gorges Dam can contribute to economic growth in some areas of the region, but it will not surely help to nearly two million displaced people, who had to leave their habitats, houses and fields. Even though the promises of the central government or local authorities, enhance of living standards have not become, but reversely, the environmental refugees from the area have become poorer. Author of the paper can confirm that many of them came back to their original sites in spite of strict prohibition, where they try to live and grow farming products to the last moment. They live in temporary homes (that are frequently built from papers, or plastic foils) and “wait” for reservoir level rise. For this reason their future fate remains unsure. We can expect their illegal migration to some Chinese cities with all negative consequences of their decision.

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