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Regional overview

Haina Lu

1. Overall Context

The Asia Pacific region is probably more diverse than any other, which covers a wide geographical area, with diverse landscapes, climates, social structures, cultures, languages, religions, political regimes, and economies. More than half of the world's population lives in the region. The region also contains the largest number of people living in poverty.

The Asia-Pacific region is generally divided into five sub-regions: South Asia, Southeast Asia, Northeast Asia, Central Asia and the Pacific. The countries within a sub-region often share a natural and socio-cultural background and experience similar environmental problems. [1]

The Asia Pacific region has seen a remarkable economic growth in the last four decades. In 2006, the region grew strongly, with the developing countries growing at a rate of 7.9% and the developed countries, 2.2%.[2] Along with the rapid economic development, several countries are also experiencing fast population growth and urbanization, social transformation and technological development.

As a consequence of the expanding economy, the Asia-Pacific countries become also increasingly interdependent among each other in terms of natural resources, finance and trade. As such, environmental problems in the region also share common features in terms of causes, process and impact, while some even have direct trans-boarder implications.

The rich natural resources of the Asia-Pacific regions have contributed to the economic expansion and population growth in the region over decades. However, human activities associated with economic growth have resulted in severe environment degradation, which now poses a serious threat to the sustainable development and growth prospects of the region. Current trends in the Asia-Pacific region are likely to continue or proceed even more in the next 20 years.

[1] See the APFED Final Report of the Asia-Pacific Forum for Environment and Development, *available at* www.apfed.net/pub/apfed1/final_report/pdf/overview.pdf (last visit by 8 July 2007).
[2] See www.un.org/News/Press/docs/2007/ecosoc6283.doc.htm (last visit by 8 July 2007).

It could become the most dynamic region and a growth center for the world by 2025. Sustainable development in the Asia-Pacific region is therefore critical to the sustainable development at the global level.

The population growth has slowed down during the past decades, especially in Northeast Asia. The urban population in the region is predicted to grow at an average of 2.4% per year between 2001 and 2030.[3] In 2030, it was predicted that around 60% of the total population the region will live in urban areas.

Continuous economic growth and dense population concentrations will intensify land use and land use change to open new agricultural areas, leading to a reduction in forest cover. Such population trends will increase energy and food demands, which often result in further pressures on natural resources.

Poverty reduction remained an important challenge in the Asia Pacific region. Most of the poor live in South Asia. Although rapid economic growth had led to rapid sustainable poverty reduction, inequalities rose rapidly in some countries, such an in China and India.

Over half of the labor force in China, India, Pakistan and Vietnam was still employed in agriculture. Growth and trade openness also helped in reducing poverty. High population density is considered as one of the major causes of poverty in the region.

Standards of health and nutrition have improved significantly in the Asia Pacific region due to economic growth. Life expectancy has improved throughout the region. However, children's health, especially in the rural areas and in South Asia is still relative poor.

A number of countries in the region have seen a significant increase in access to primary education during the past decades, attributive to the rapid economic development in the countries. A constantly improving literacy rate has been observed in all sub-regions. More than 95% of children between 6 and 11 years now attend school. Northeast Asia has the highest adult literacy rate of 95% in 2002, while the lowest literacy rate is in South Asia.[4] But South Asia has also improved during the last two decades with a growth rate of 1.3% per year. Learning from the East-Asian experience, other countries in the region were expanding their budget on education.

[3] United Nations Population Division, World Population Prospects, the 1999 revision.
[4] See the APFED Final Report www.apfed.net/pub/apfed1/final_report/pdf/overview.pdf , p. 21.

Asia-Pacific countries need to adopt pro-poor strategies to enable the poor to benefit, combined with investments in rural infrastructure and a shift to the service sector, such as in China. Increased investments were also needed in health and water sanitation for the benefit of the rural poor.

Religious plurality has always characterized the Asia Pacific region. Rapidly changing social, economic, and political conditions, however, have raised the challenge of increasing religious activism. Religious intolerance, violation of the rights of religious minorities, increasing violence, destruction of places of worship, and the attempts to establish theocratic states, have become tragic trends.

Conflicts and violence are increasing in the region. These conflicts are often centered around ethnicity, religion and culture and, specifically in the Pacific, land rights and modes of governance.

2. Environmental Degradation in Asia and the Pacific

With more than 45 countries, the Asia Pacific region has a rich diversity of natural resources and terrestrial and marine ecosystems. The length of its coastline is two-thirds of the global total and it has the world's largest mountain chain. The region faces major challenges in terms of protecting natural resources and the environment. Land and ecosystems are being degraded, water and air quality are deteriorating and increasing consumption and the associated waste are leading to environmental problems. The region is also subject to natural hazards, such as the 2004 Indian Ocean Tsunami, the 2005 Pakistan earthquake, and 2006 landslides in the Philippines.

3. Migration Processes

International migration to and from the Asia and the Pacific region has increased steadily over the past few decades, as a result of globalization and widening gaps among countries in living standards and the supply and demand for labor.

Asia is currently the primary source of migration to most of world's immigrant receiving countries. According to the IOM's report, one-third of immigrants in Australia are from Asia, 33% in Canada, and 24% in the USA (Migration Information Source, 2004). [5] In recent years, Europe has seen a significant increase in Asian immigrants, especially from China (OECD, 2004; IOM, 2003). The nine largest Asia immigrant sending countries: the Philippines, India, Bangladesh, Pakistan, Indonesia, Thailand, China, Sri Lanka and Myanmar, together contribute between 1/2 and 2/3 of all legal immigrants and refugees to the international migration stream.[6]

As of 2005, there were 53.3 million international migrants in Asia and 5 million in Oceania.[7] China, India, and the Philippines are the top three migrant sending countries, with respectively 35, 20 and 7 millions of estimated diasporas.[8] In Pacific, migration from the Pacific Islands to Australia and New Zealand has been a repeated pattern in the past decades.

The more developed economies in the region usually have low rates of population growth and labor force while the less developed economies have higher growth rates. Whereas earlier labor migration from the Asia-Pacific region was primarily toward the Middle East, most labor migration now occurs within the region.

Most labor migration within the Asia-Pacific region is intended as temporary by both sending and host countries but a large number of temporary migrants have become a long-term in many receiving countries in the region. That circumstance is likely to lead to increases in the volume of permanent settlement as well.[9]

International labor migration has become an industry in itself. In 2000, the major Asian sending countries officially deployed over 2.4 million workers overseas and the main destination areas in East and South-East Asia hosted over 5.5 million foreigners. Recorded remittances to the major labor-sending countries in the region exceed US$ 20 billion annually.[10]

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[5] See IOM, *World Migration Report 2005*, *available at* www.iom.int/jahia/Jahia/cache/offonce/pid/1674?entryId=932&srcId=933&grpsrc=yes&publicationEntriesGroup_filter=World%20Migration%20Reports (last visited 10 August 2007).
[6] *Ibid.*
[7] See www.iom.int/jahia/Jahia/pid/255
[8] *Ibid.*
[9] www.unescap.org/esid/psis/meetings/SIIM/index.asp
[10] *Ibid.*

The proportion of female migrants in the region has been increasing and women constitute a majority of the migrants officially deployed from some countries. Migration may empower both female migrants and those women who stay home when male family members migrate. Female migrants are especially vulnerable to harassment and exploitation. Large numbers of them work in the isolation of private households or in the service sector.

When governments' arrangements for labor migration lag behind demand, a significant proportion of migration is irregular. Countries in the region have made significant progress in regularizing much labor migration but large volumes of irregular migration persist in several countries. The trafficking of migrants for employment is a particularly malicious form of irregular migration, especially when the victims are women and children.

In terms of patterns and process of migration, cross boarder migration in the Asia Pacific region can be divided into the following categories.

Contract migrant workers in the Middle-East

The demand for workers in the oil-rich countries in the Middle East in the 1970s started large scale labor migration from and within Asia. Receiving countries adopted the strictly temporary and limited contract migration policy. Initially, migrant workers were mainly from India and Pakistan. In the 1980s, workers from the Philippines, Indonesia, Thailand, South Korea , and Sri Lanka joined in. In the 1970s, migration involves mostly male workers. In the 1980s, as the construction sector was winding down, other workers especially domestic workers evolved, which contributed to the feminization of migration in the region. Most domestic workers came from Indonesia and Sri Lanka.

Labor migration within Asia

In the 1980s, the newly industrialized countries and areas in East and Southeast Asia, particularly Japan, South Korea, Hong Kong (China), and Singapore, became the new destinations of migration. Malaysia and Thailand are both origin and receiving countries of migration workers. The demand for domestic workers in East and Southeast countries further increased the feminization of migration. Migration workers are mainly from Mainland China, South Asia, the Philippines, and Indonesia.

While labor migration in Asia involves primarily low skilled workers, a small proportion of labor flows includes the highly skilled and professionals, including intra-company transfers, IT workers, nurses and health care workers, teachers, architects, and managers.

Prior to the 1990s, Asia was primarily a sending region of the highly skilled, but from the 1990s, countries with the most developed economy have also become a destination for elite workers.

Permanent migration

Permanent migration from Asia to the USA, Canada, Australia and New Zealand increased since the 1970s as a consequence of the dismantling of restrictive immigration policies of these countries. Since 1965 starting from the USA, Asia immigrants gained admission to the countries of settlement through family reunification, skills or humanitarian protection.

Students

A large number of Asian students went abroad to pursue their studies. Many of them stayed in the host countries as skilled workers needed. South Korea, China, Japan and Singapore are the main sources of students studying abroad. Destinations are mainly the USA, Canada, Austria, New Zealand, and European countries.

Refugees

According to the UNHCR, up to the end of 2006, there were 32.9 millions of refugees, asylum seekers and others of concerns to the UNHCR. [11] Among 9.9 millions of refugees, 875, 100 were in the Asia-Pacific region. [12] The Afghan refugee crisis started in 1979, when

[11] See www.unhcr.org/statistics.html

[12] See the UNHCR, *2006 Global Trends: Refugees, Asylum Seekers, Returnees, Internally displaced and Stateless Persons*, p. 5, *available at* www.unhcr.org/statistics/STATISTICS/4676a71d4.pdf (last visited 9 July 2007).

around 6 million fled to Pakistan and Iran. By the end of 2006, both countries together hosted 20% of the world's refugees. [13]

Other refugee migrations that remain unsolved include the more than 100,000 Bhutanese refugees in Nepal, 20,000 Rohingya Muslims fled Burma to Bangladesh in the 1990s.[14] In the mid-1990s, China started to receive between 100,000 to 300,000 refugees from North-Korea fleeing famine and repression. Some of them have managed to leave China and arrived in South Korea.

In the former East-Timor in 1999 some 250,000 people fled to West Timor of Indonesia and 500,000 fled to the mountains to escape the violence.[15] Population displacement stopped when East Timor gained independence in 2002.

Irregular migration

While irregular migration is present all over the region, Malaysia, Thailand and South Korea have the largest share, with estimates pointing to some half to one million of unauthorized migrant workers (Migration News, 2001). Unauthorized migrants in Malaysia are mainly from Indonesia and Thailand. Irregular migrants in Thailand are mainly from Myanmar.

There are a significant number of irregular migrants from Mainland China in neighboring countries such as Russia, South Korea, Japan, Europe, North America and the rest of the world. Irregular immigrants in China are mainly from North Korea and Vietnam.

Irregular migration can take various forms. Irregular migrants may include undocumented immigrants; non-work permit holders who legally enter the host country (as tourists, for example); overstayers; and runaways such as those who run away from their sponsors or employers.

Human trafficking adds to the complications of irregular migration. It is estimated that Asia has close to one million, accounting for some 1/3 of the total global trafficking flow, with 60% of persons trafficked to cities within the region and 40% to the rest of the world (United Nations, 2003).

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[13] *Ibid*., p. 6.
[14] See Marujia M.B. Asis, *Recent Trends in International Migration in the Asia-Pacific*, pp. 15-16.
[15] *Ibid*.

China

Haina Lu

1. Overall context

1.1. Development, population & social-economic trends

Development & population

According to the 2006 Revision of the United Nations World Population Prospects, China's population can be expected to grow only slowly from 1.31 billion in 2005 to 1.46 billion in 2030. The Work Bank data shows that the annual growth rate of population is 0.6% in 2005. With constant fertility, China's population would begin to decline after 2025, reaching 1.34 billion in 2050. While the number of children was increasing rapidly between 1950 and about 1970, it is now declining significantly, due to China's strict one-child family planning program. In the next few decades, China will experience a serious process of population aging. It is projected that 31% of all Chinese will be above the age of 60 in the year 2050.[16]

China is in a process of rapid urbanization. According to recent estimates by the UN Population Division, China's urban population increased from some 70 million in 1950 to roughly 530 million in 2005. By 2015, the urban population will surpass the rural population; and by 2030 China will have a urban population of some 875 million people.[17]

Social-economic trends

China's economy has seen a constant rapid growth for a decade. According to the date of the World Bank, China's GDP in 2005 is 2.2 trillion USD. The annual GDP growth rate is 10.2 % in 2005, while in 2002 the growth rate is 8.4%. GNI per capital is 1740 USD, compared to 930 USD in 2000.

With a total cumulative FDI of 560 billion US$ between 1989 and 2004, China is one of the largest recipients of outside investment. This investment came primarily (45%) from Hong

[16] Source is China-Profile, available at www.china-profile.com/intro/intro_2.htm (last visit 30 July 2007).
[17] *Ibid*.

Kong and Macau. Between 1990 and 2004 the United States and Japan contributed about 9% of the FDI in China. Taiwan directly contributed 7% of foreign investments in China. From 5% to 6% of FDI came from Singapore, South Korea and the Virgin Islands. In contrast, only between 1% and 2% of the cumulated FDI in China came from the UK, Germany, and France since 1990.[18]

China has greatly benefited from participated in the global economy. Both exports and imports increased dramatically since 1978, especially since the country's WTO accession in 2001. Since 1994 China has seen a large trade surplus. Contrary to popular belief that China is an exporter of cheap plastic toys, electronic junk or textiles, China's most important export products are machinery and transport equipment. In fact, 93% of China's exports in 2004 where manufactured goods.[19]

Since 1978 the total number of employed persons in China increased from about 400 to 768 million. The number of employed persons in service industries increased rapidly: from only 48 million in 1978 to 230 million in 2004. Today, in China more people are working in the service sector than in manufacturing and heavy industries.[20] Workers' remittances and compensation has increased from 6.2 billion USA in 2000 to 22.5 billion USD in 2005.

However, China started facing unemployment pressure since 1978, particularly after the massive lay-off of SOEs workers started in the mid-1990s.[21] Unemployment rate is certainly high according to international standards but accurate data are not available. According to statistics of National Bureau of Statistics of China, the unemployment rate on record in urban areas increases annually from 2.5 percent in 1990 to 4.7 percent in 2004.[22] The number of officially registered unemployed is increasing and has reached around 8 million at the end of 2003.[23] However, the official unemployment rate and relative statistics have been widely questioned by scholars, who criticized that these figures under-estimate the number of unemployed people.[24] There are active controversy and different versions with regard to real

[18] See www.china-profile.com/data/fig_fdi_3.htm
[19] See www.china-profile.com/data/fig_trade_2.htm
[20] See www.china-profile.com/data/fig_employment_1.htm
[21] Urban unemployment became significant in 1978 also because a large number of "intellectual youth", who were sent to rural area for "re-education" during the Cultural Revolution, came back to cities but had great difficulties to find a job.
[22] See China's White Paper on Employment Situation and Policies.
[23] *Ibid.*
[24] See Solinger D.J., "Why we cannot Count the 'Unemployed'", in *The China Quarterly*, 2001, pp. 671-688; see also Francis Johnston M. & Li Huimin, "Estimating China's Urban Unemployment Rate: background, mechanics and an alternative", in *Journal of Contemporary China*, 2002, pp. 189-207.

figures. According to estimates made by scholars and China's public institutions through empirical survey, China's real unemployment rate could reach double figure.[25]

1.2. Political context

The People's Republic of China was founded in 1949 and the Chinese Communist Party has been ruling the country since then. Free-market economic reform has fundamentally transformed the economic structure and significantly raised living standards, but politically China remains a Marxist-style Party-State. National leaders are not elected but promoted from the Party's political bureaucratic structure.[26]

Since the reform, China has been criticized by its poor protection of workers' rights, in particular the often outrageous working conditions of rural migrant workers. In the past years, the government has been trying to tackle the problem mainly by improving the labor legislation.

1.3. Social-cultural aspects

In China, there are 56 officially recognized ethnic groups. These groups vary greatly in the number of population. Of them, the Han ethnic group has the largest population, while the other 55 ethnic groups, with smaller populations, are customarily called "ethnic minorities".[27]

At the time of the 2005 census of the Chinese government, Han Chinese are of 1,182,950,000, made up 90.56% of China's total population. Ethnic minorities, including the Zhuang, the Uighurs and other Tukic groups, the Tibetans, the Mongols and several dozen others, are 12,333,000 in number. Ethnic minorities are growing much faster than the Han population, which increases 15.88% compared with the 2000 census, as against a 2.03% rise in Han population.[28] Ethnic minorities have been granted exemptions from the one-child family policy. For example, Tibetan and Mongol nomads are usually allowed to have three children and often disregard restrictions anyway.

[25] See, for example, Giles J., Park A. & Cai Fang, "How has Economic Restructuring Affected China's Urban Workers?" in *The China Quarterly*, 2006, pp. 61-95.
[26] See Country Profile 2007 (China), the Economist Intelligence Unit Limited 2007, www.eiu.com.
[27] www.china.org.cn/english/en-sz2005/sh/sh-mz.htm
[28] www.stats.gov.cn/tjgb/rkpcgb/qgrkpcgb/t20060316_402310923.htm

2. Environmental degradation

2.1 General Overview

China is located in the southeast of the Eurasian landmass, bounded by the Pacific Ocean in the southeast. The total area is 9.598.030 km² and consists of mountains (33 %), high plateaus (26%) and deserts in the west and plains (12%), deltas and hills (10%) in the east (FAO AQUASTAT, CIA 2007). The climate is accordingly extremely diverse ranging from tropical in the south to subarctic in the north and vast areas are under the influence of the East Asia Monsoon. Otherwise cold, dry winters and hot summers are typical for continental part of the country.

With over 1.31 billion people, China has the largest population of any country in the world. Almost half of the total population live along the rivers (= 8 % of total landmass).

China's complex climatic and varied geological conditions expose the country to virtually every type of known natural disaster. These events are estimated to affect an average of one out of six people and lead to several thousand fatalities in China each year. Despite immense economic growth in the last 20 years, there has been an increase of poverty in areas exposed to natural hazards.

The most frequent events are typhoons (about five per year along the southern and eastern coasts); damaging floods; tsunamis; earthquakes; droughts and land subsidence.

Some currently important **environmental issues** resulting from rapid economic growth and industrialization (SwissRe 2006; IPCC 2007) are:

- air pollution and acid rain (greenhouse gases, sulphur dioxide, particulates) from reliance on coal;
- water shortages, particularly in the north;
- water pollution from untreated wastes in coastal areas;
- deforestation (14 % forest cover left)

- estimated loss of one-fifth of agricultural land since 1949 to soil erosion and economic development; food production continues to increase but potential for expansion is limited because of hilly areas, degradation or salinization;
- 27% of total national territory combats the ripple effects of desertification;
- reduction of river runoff (lake shrinkage, contraction of wetlands as consequences);
- climate became warmer and drier in the north, this enhance frequent droughts.

2.2 "Hot spots" of environmental degradation & vulnerability

Three Gorges Dam on Yangtze River

The Yangtze River is considered "Chinas Lifeline" (PBS 2007). The river has its source in the Himalayan Mountains and stretches 3,700 miles to the Yellow Sea/ Shanghai. As the world's third longest river, the Yangtze flows through a region that is home to more than 320 million people. For centuries it was used as a central highway for trade, transportation, spiritual pilgrimage and in modern times as a tourist attraction. It provides sustenance for people who are living on its banks through the use of fertile plains and fishery.

The Three Gorges Dam is the largest hydro-electric project in the world and it is one of the few man-made structures visible from space. After 13 years of construction in 2006 the reservoir had submerged 13 cities, 140 towns, 1350 villages and about 1600 factories. The dam will produce clean and renewable electrical power equivalent to the production of 15 nuclear power plants. The second goal of the dam is flood control, as in the last 2.000 years the Yangtze River has experienced 215 devastating floods. However, there are major environmental hazards resulting from this prestige project. Toxins associated with industry and mining will endanger survival of people and animals in this area. Also 265 billion gallons of raw sewage are dumped into the river annually. Because of the dam, natural flushing out is impossible now. Moreover some hydrologists even say the Yangtze's heavy load of sediment and its shifting floor of gravel could hamper the dam's turbines and fill the bottom of the reservoir, causing even worse flooding (WP 2006, YDPN 2007).

Desertification

China is one of the countries suffering the most serious desertification in the world (EP 2001). Dust storms in China are on the rise, probably as a result of land degradation, such as

deforestation, overgrazing and drought. The Gobi Desert expanded by 52.400 km² from 1994 – 1999 and occupies altogether 1.296.000 km² of land and is slowly moving towards Beijing (EPI 2003). Neighbouring countries like Korea and Japan are also affected by more and more dust storms that originate in China.

2.3. Environmental change and conflict

Three Gorges Dam

After flooding the reservoir, between one and two million people have lost their homes and had to move away. Aside from the loss of cultural history and art, the destruction of the natural river and negative affects on wildlife, many of those who have moved are having trouble adapting to new communities and jobs because of missing knowledge and low education. Furthermore, they settled in already densely populated areas where other problems like poverty, pollution and unemployment already exist. Though the government says it plans to spend about $5 billion to compensate people forced to resettle, many of them never received any aid. A big problem additionally was prevalent corruption between government and the constructors of the dam. Moreover many cases of human rights abuses were published by international press and NGOs like Amnesty International.

Today over 360 million people live within the watershed of the Yangtze River and in the case of a dam collapse, millions of people who live downstream would be endangered (PBS 2007).

Dust storms / Desertification

Desertification has brought about a sharp decrease in usable land, accelerated deterioration of the environment, worsened the poverty of the people living in the desert area, and caused huge economic losses to the country. The dust storms can be hazardous to public health both in terms of air quality and visibility. But the social-economical damage through the storms is immense. Rural people lost their basic resources and were forced to migrate eastward. Expanding deserts are threatening 4,000 villages which could become overrun by drifting sands (Asian Development Bank).

2.5 Scenarios for the future

Increasing flood events will be caused by Himalayan glaciers, which are receding faster than anywhere else in the world. Glacial melt water could serious affect 500 million people in the Himalayan- Hindu- Kush region and a quarter of a billion people living downstream. Persistent current global warming effect could lead to disappearance of these glaciers by 2035, or even sooner (IPCC Report 2007).

The reforested area is expected to extend to 30 million hectares in 2010 – about 17 % of the total land area (UNEP 2002). Rising industrialization, urbanization and population growth could easily worsen water pollution, especially in coastal areas. On the other hand, water quality of some inland rivers could improve.

Rural – Urban migration will still accelerate and prognoses say that by 2025 urban population will probably be 832 million.

3. Migration processes

3.2 Main migration patterns and trends

Internal migration in China

Since China's economic reform started in the 1980s, China has seen a huge wave of internal migrant workers moving from countryside to cities, from western and middle regions to coastal regions. According to the official statistic date, there are around 147 millions of internal migrants in Mainland China in 2005. Among them, 477 millions are cross-provincial migrants. [29]

According to official statistic data, in the end of 2004, there are 757.05 million rural populations, constituting 58.2% of the whole Chinese populations.[30] Among them, around 100 million were working in cities.[31] During the past five years, the number of rural migrant workers increases by from six to eight millions each year.[32] Even working in city without "work permit" was illegal; millions of rural laborers still chose coming to cities for finding a job. An important reason is the widening urban-rural and regional disparity. In addition, the long time strict control of labor mobility by the *hukou* system also caused surplus labor in rural areas.

Internal migration not only takes form of rural-urban movement, but also the interregional movement, which is closely correlated with regional differentials in foreign investment and state investment.[33] Since the reform, regional disparity also increases tremendously. Coastal regions enjoy preferential government policies for attracting foreign investment and developing township and village enterprises. The prospering economy and increased income attracts laborers from central and hinterland regions.

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[29] www.stats.gov.cn/tjgb/rkpcgb/qgrkpcgb/t20060316_402310923.htm (last visit by 26 July 2007).
[30] See the official website of the National Bureau of Statistics of China: www.stats.gov.cn
[31] See the CCTV interview with Mr. Zhen Silin, the minister of the Ministry of Labor and Social Security, on the 2ed February 2005. See the website of the Ministry of Labor and Social Security: www.molss.gov.cn/news/2005/0216c.htm, accessed on 13 April 2005.
[32] See The Drafting Team of the Report, "Reporting on the Problems of Chinese Farmer-turned Workers" (中国农民工问题研究总报告起草组, 中国农民工问题研究总报告), in *Reform* (改革), Vol. 5, 2006, pp. 1-38, *available at* www.usc.cuhk.edu.hk/wkgb.asp (last visit by 7 March 2007).
[33] See Iredale Robyn, "China's Labour Migration Since 1978", p. 229.

International emigration from China

Since the 1980s when the reform started, China ameliorated the diplomatic relationship with many industrialized countries such as the USA and Japan, and started sending students to these countries. The population control policy was also loosened. Emigration became possible. The main destinations were the USA, Canada, Australia, Japan, Singapore, and South Africa. It is estimated by scholars that during two decades after 1979, the number of Chinese immigrating abroad is between one million and two millions. (Ren, 2002) Majority of them went to North America. In terms of the migration pattern, emigration from Mainland China can be divided into four categories.

The first category is Chinese students. It is estimated that from 1978 on, Mainland China has sent 320,000 students to America, Europe, Austria and Japan. The most popular destination is Japan, hosting 47, 073 Chinese students. The USA is at the second place, hosting 46, 985 Chinese students. Only around 110,000 went back to China after completing their study abroad. In other words, two third of Chinese students stayed in the host country and became the so-called "new migrants". If taking into account self-supported students, China has altogether around 400,000 students going abroad to study.

The second category can be called "technical immigrants" or "investment immigrants". This category of Chinese mainly went to Canada, Austria and South-Africa where immigration policies allow technical and investment immigrants.

The third category is "marriage immigrants" or "family reunification immigrants". This category of Chinese mainly marry overseas Chinese or non-Chinese and immigrate to the host country for family reunification. It is worth noting that in the coastal region where there is a tradition of emigration, mainly in Fujian Province and Zhejiang Province, many Chinese immigrate to Europe through family reunification. For example, there have been more than 500,000 Chinese from Fujian Province immigrates aboard. Among them, 90 percent are family reunification immigrants. In Qintian of Zhejiang Province, there have been 150,000 people immigrating to over 70 countries or areas in the world. Majority of them were immigrated through "chain migration" during the two decades after the economic reform started. (Ren, 2002)

The fourth category is illegal immigrants. Certain areas in China such as Zhejiang Province and Fujian Province, which has a local tradition of emigration, have experienced a mass departure of illegal migrants since the reform. Before their departure, they normally have already obtained some information about their routes and destination from returnees who had already experienced this travel. Although human traffickers frequently use modern transportation and communication means, methods of entering the destination country frequently represent the same patterns as that of the "coolie trade" of the 19th century. (Nyiri, 2002:3) Illegal migrants are often in danger such as asphyxiation in trucks. Most illegal migrants are unprepared to live in distinct culture of the host country. Surrounded by only fellow Chinese, migrants often have a very limited knowledge of the local language of the host society. As such, newcomers often have to depend on their Chinese predecessors, who may take advantage of the vulnerability of the newcomer.

Compared to "old migrants", "new migrants" have the following characteristics. First, compared to old migrants who were rather forced to leave China because of war or poverty, new migrants are rather voluntary immigrants who want to seek a better life abroad. Second, while old migrants are almost exclusively from the coastal regions of China, new migrants are from various parts of China. Third, old migrants are mainly low-skilled peasants or workers but many new migrants are students, highly skilled technician or professional, and businessmen. Fourth, while old migrants are exclusively male, new migrants have seen a rather balanced gender proportion.

In the past years, Chinese migration has presented some new trends and new directions. First, Russia and Eastern European countries such as Hungary and Romania have become the new "lands of opportunity" for Chinese immigrants. It is because their geographic location on the way to wealthy Western Europe and the collapse of the Communist regime cleared up some obstacles. The emergence of "Chinese markets" in these countries since the 1990s reflects a changing nature of the Chinese immigration. Unlike old migrants who immigrate to and settle down in a certain country, these migrants tend to continuously shifting among various host countries.

Second, Chinese in Europe and Japan may have several very different occupations in different countries at the same time. For example, a petty entrepreneur in an Eastern European country

may be a student in a Western European country or have a low skilled part-time job at the same time.

Third, since the late 1980s, there has been a significant increase in self-financed language or college study abroad among Chinese. (Nyiri, 2002:2) Apart from learning the language of the host country, entering a language school or college may also be a tool to obtain a residence permit that allows the holder to work (legally or illegally) in the host country. For many, it is just a way to obtain a much higher income than they can get in China. Some Chinese students simply register in the school and pay the tuition fee but do not attend any course. In the past years as China's economy sees a booming, many middle-class family or "new riches" can afford to send their children to study abroad at colleges or even high schools. The phenomenon of "little students abroad" has become significant.

Fourth, in terms of sending areas, Dongbei (three provinces in north-east China) has become a prominent origin of immigrants since the end of 1990s. (Pang, 2004) It is mainly because China started restructuring of State-owned enterprises during this time and largely laying off workers. Dongbei is a traditional basis for heavy industry and is thus the hardest hit.

4. Conclusion: environmental degradation & migration

4.1 Hot spots for environmental migration

Problematic or endangered dams (bin xian shui ku)

According to official sources, there are currently more than 85,000 dams in China. Among them, more than 30,000 dams are still considered as seriously problematic or endangered dams after many years of reparation and treatment.[34] It is reported that during 1954 and 2005, there are 3495 dams collapse, with an average of 67 collapsed dams each year. Flood caused by dam collapse has resulted in more death than natural flood.[35] The Chinese government has claimed to treat the most important endangered dams within 2 or 3 years. Nevertheless, given

[34]See www.jxym.com.cn/shuchu.aspx?NewsID=391 ; see also www.mwr.gov.cn/ztpd/2007ztbd/2007qgsltjch/gzbgdd/20070106111646112b85.aspx (last visit by 29 July 2007).
[35] See http://news.bbc.co.uk/chinese/simp/hi/newsid_6690000/newsid_6697800/6697845.stm (last visit by 29 July 2007).

the large number of these dams and the practical problems appeared in the past, there is still a high risk for the population living in the downstream area of the river concerned, who may be forced to migrate due to flood.

Desertification in north and north-east of China

For example, in Inner-Mongolia, natural disasters and human behavior such as over grazing has resulted in desertification of grassland, which affect the livelihood of many ethnic groups who live by grazing cattle. Since 1990s, environmental migration in these areas have been planned and operated by the government with a view to not only protecting grassland and environment, but also using migration as poverty relief project.[36]

Started in 1998 and accelerated in 2001, more than 6000 people have been removed from environmentally vulnerable areas in Inner-Mongolia. It was planned that altogether around 650,000 should be migrated between 2002 and 2008 within the province, with the governmental budget of more than 100 million *yuan*.[37]

Three-river source area: Northwest China

The three-river source area is located in Qinghai Province, northeast China, next to the Tibetan Autonomous Region. It is where three major rivers in China, Yangtze River, Yellow River and Lancang River find their source. This area contains 4 Tibetan autonomous states, covering 363,000 km2. It has more than 590,000 of population and majority of them are ethnic Tibetans.

This area is often hit by various types of natural disasters. In the past years, the environmental situation is getting worse because of global warming and over grazing and agriculture activities.

[36] See Ren Guoying, "Anthology analysis of the environmental migration of Etuoke Qi in Inner Mongolia"（任国英，内蒙古鄂托克旗生态移民的人类学思考）, in Heilongjiang Journal of Ethnicity (黑龙江民族丛刊), 2005, Vol. 5, pp. 38-44.

[37] See Chu Chunxia & Meng Huijun, "Problems and counter-measures of environmental migration in Inner Mongolia" (初春霞、孟慧君，内蒙古生态移民面临问题及其对策思考)， in *Northern Economy*（北方经济）, 2005, Vol. 6, pp. 57-58..

In 2003, the central government raised the status of three-river natural reserve to the national natural reserve, covering 152,300 km2, constituting 42% of the three-river area and 21% of the area of Qinghai Province.

In 2005, the State Council adopted the "General Plan on the Ecological Protection and Construction of Qinghai Three-river Source Natural Reserve". According to the "General Plan", within 10 years, the State will invest 7.5 billion *yuan* for all types of ecological protection of this area, including repairing grassland, afforestation, construction of small cities and towns and environmental migration.

Since 2003, the government started environment migration. According to the General Plan, among 223,000 habitants in the reserve area, 10140 households and 55770 persons will be moved out of the reserve. Up until 2006, 6156 households and 28,000 persons have been moved out of the natural reserve of three-river source area and resettled in 14 migrant communities.[38]

Southeast costal regions

The coastal region is economically most developed in China. As a consequence, the region is also facing serious environmental damages.

The continent of coastal region has serious air and water pollution due to industrialization, rapid urbanization and dense population. Acid rain has appeared more frequent in the past decade. Lakes have been affected by "red" weed or "blue" weed. A recent event is the massive "blue" weed in Taihu Lake which is important drinking water source for areas like Wuxi City in Jiang Province. As a result, Wuxi habitants had to buy bottle waters for daily life uses and the local government had to transport bottle waters from other cities as emergency.[39] Fishermen in this area are also affected.

Over fishing and sea pollution has resulted in the reduction of aquatic resources and mass conflicts. For example, some fishermen of Liaoning Province (Northeast China) had to travel

[38] See www.qh.xinhuanet.com/misc/2006-10/30/content_8378796.htm (last visit 30 July 2007).
[39] See, for example, http://news.xinhuanet.com/local/2007-05/30/content_6175968.htm (last visit by 30 July 2007).

to Jiangsu Province (East China) for fishing and have cause violent conflict between Liaoning and local fishermen.[40]

It is worth reminding that some areas of Zhejiang Province and Fujiang Province have a popular culture of international emigration, including illegal migration. Although environmental factors do not appear significant in the decision-making of migrants in the past and at the current stage, there is a possibility that environmental degradation in these areas may contribute to the future cross-border migration.

4.2 Selection of case studies

Migration caused by the Three-Gorges Dam construction
& Potential migration from coastal regions

Locations for cases studies: Hubei Province, Chongqin Municipal, Zhejiang Province，Jiangsu Province, Shanghai, etc.

While most migrants are in Hubei Province, Chongqin Municiple and have or will migrate to the nearby areas, some of migrants were arranged by the government to move to six coastal provinces: Zhejiang Province, Jiangsu Province, Shandong Province, Guangdong Province, Fujian Province, and Shanghai. These coastal provinces have distinguished culture and living style from the origin areas and among the provinces themselves. Visiting some of these areas and interviewing migrants there will reveal the relocation operation of the government, migrants' current situation, their adjustment process and plans for the future.

Moreover, these coastal regions have serious pollution of air and water due to industrial development and dense population. Visiting these areas can combine two purposes: studying migrants from the Three-gorge dam areas resettled in coastal regions; and studying potential migration of habitants in coastal regions caused by environmental degradation.

[40] See Yao Xingcai, "Features, causes and countermeasures of current mass conflicts in coastal regions" (姚兴才,当前沿海地区群体性治安事件的特点、成因及对策)，in *China Aquaculture* (中国水产), 2001, Vol. 5, pp. 20-21.

Migration in Inner-Mongolia due to desertification

Locations for case studies: some areas in the Province of Inner Mongolia

Environmental migrants in Inner Mongolia are mainly moved by the government within the province. According to some survey, 40.5% percent of household living on grazing has family member went to cities or towns to work.[41] People living in East Inner Mongolia tend to migrate outside the province to look for jobs, while people in West Inner Mongolia tend to look for jobs in nearby towns and cities within the province. They are voluntary migrants in the sense that they take initiative to migrate. However, environmental degradation may be an indirect contributing factor.

Scholars' research shows that the environmental migration project of the government has not successfully reached its purpose. Selection of migration destinations were often made in hasty, without much research and consideration of migrants' needs. A survey in 2005 shows that only 31.5% of migrant households came out of poverty after migration and 15.2% migrant households turned into poverty after migration.[42] Many migrants have difficulties in changing their living means mainly because of their low level of education and lack of training and other supports.

[41] See Yu Cunhai & Song Yuefei, "Problems of population movement concerning the ecological security of Inner Mongolia grassland and its social policy studies" (于存海、宋跃飞, 内蒙古牧区生态安全的人口转移问题及其社会政策研究)，in *Inner Mongolia Social Sciences* （内蒙古社会科学汉文版）, Mar. 2007, Vol. 28, No. 2, pp. 89-93.
[42] *Ibid.*

Bangladesh

Robert Stojanov and François Gemenne

1. Overall context

1.1. Development, Population and Socio-economic trends

Most of Bangladesh's problems are linked to the geographical situation with many deltas of large rivers flowing from the Himalayas. Many of the 150 million citizens are landless and forced to live on and cultivate flood-prone land. Despite sustained domestic and international efforts to improve economic and demographic prospects, Bangladesh remains a poor, overpopulated, and inefficiently-governed nation. Nearly two-thirds of Bangladeshis are employed in the agriculture sector, with rice as the single-most-important product. (CIA 2007)

Bangladesh has one the highest population density rates in the world, and is affected by extreme poverty. 150,000,000 inhabitants, many of them landless, live on a territory of 144,000 square kilometres, resulting a population density rate of 1041 inhabitant/ square kilometre. The population is also very young, with a median age of 22.5 years (for both males and females). 33% of the population is below age 15, while 63% are between the ages of 15 and 65. The population is growing at a rate of about 2% per year, with a birth rate of 29.36/1000 and a death rate of 8.13/1000. The fertility rate is slightly above 3 children per woman. The infant mortality rate is still high, with 59 deaths/1000 live births, while the life expectancy stands at 62.84 years. Only 43.1% of the population is literate, with a significant gender cap: 53.9% for males, 31.8% only for females.

In terms of the development, Bangladesh is considered as a developing country, and is ranked 140th in UNDP's Human Development Index. Its GDP per capita is US$ 1,400, and 45% of the population live below the poverty line. The debt represents 40 % of the GDP. Despite this sector representing only 11% of the GDP, most of the population (63 %) work in the

agricultural sector, while 11% work in industries and 26% in services. About 90% of the 240,000 kms of roadways are unpaved. About 65,000 people are IDPs. Bangladesh received 1.3 billion US$ worth of international aid in 2005, while remittance represented 5.5 billion US$ in 2006.

1.3. Political context

Bangladesh is a parliamentary democracy, and Islam is the state religion. Its political, administrative and judicial institutions are rather weak, separation of powers was implemented in late 2007 only. Radical islamist parties were banned in 2005, taking the blame for a series of suicide attacks that happened sine 1999. The 2006 general election has been postponed since then, creating political unrest. The military remains powerful, and the constitution was amended in order to allow military participation to politics.

The country is party to the following international environmental agreements: Biodiversity, Climate Change, Climate Change-Kyoto Protocol, Desertification, Endangered Species, Environmental Modification, Hazardous Wastes, Law of the Sea, Ozone Layer Protection, Ship Pollution, Wetlands.

1.3. Socio-cultural aspects

The country is rather homogeneous from an ethnic point of view: Bengali make up 98% of the population, while the 2% remaining are tribal groups. Islam is the overwhelmingly dominant religion, with 83 % of Muslims and only 16 % of Hindus. Bengali and English are the two official languages.

2. Environmental degradation & vulnerability

2.1. "Hot-spots' of environmental degradation and vulnerability

2.1.1. Natural Disasters

Most of Bangladesh sits astride the deltas of a series of large rivers flowing from the Himalayas and about a third of the country floods every year during the monsoon. Many people are landless and are forced to live and farm on flood-prone land. Floods kill hundreds and make thousands homeless every year (AHMED, 2004a) .

Worst flooding in Bangladesh since 1998 affected the country in 2004. 30 million people marooned, 25 of Bangladesh's 64 districts inundated; two thirds of Bangladesh under water. Worst flooding in Sylhet since 1988. 10 million hectares crops destroyed. In July 25 - 40% of Dhaka city was submerged and on September 20 - 800,000 homeless in late monsoon flooding in West Bengal (ANDERSON, 2004).

According AHMED (2004b) the floods in 2004 have left more than 10 million people homeless. About two-thirds of the low-lying and impoverished nation was under water.

The UN Report (UNITED NATIONS, 2004) from July 29 mentioned that more than 23 million people have been affected by the devastating floods, and over 12 million houses and more than 2 million acres of crops have been damaged or destroyed, forcing around 913,241 people to move into shelters.

2.1.2. Desertification (land degradation)

Desertification and soil degradation are widespread because of unsustainable agriculture. In particular, soil acidification and salinization are increasing (UNEP 1993). These problems are widespread in the countries of South Asia as shown in Fig 2. In India land degradation causes productivity losses of around 2.4 billion US $ (UNEP 2002). HOMER-DIXON (1993, 41-42) argues that over the last three decades land scarcity has been a key factor causing the large-scale movement of people from Bangladesh to the Indian state Assam.

2.1.3. Water resources

Ganges River

The Ganges river basin is one of the most fertile and densely populated in the world and covers an area of 1 000 000 km². In India, the river provides water for drinking and farming for more than 500 million people. The water supply to the river depends on the rains brought by the monsoon winds from July to October and the melting snow from the Himalayas during the period from April to June. The delta also experiences strong cyclonic storms before and after the monsoon season which can be devastating. In November 1970, for example, 200.000 - 500 000 people were killed in such storms. Hindus regard the Ganges as the holiest of rivers, they bathe in it and drink the water despite pollution from chemical wastes, sewage and even the remains of human and animal corpses (traditional funerals). But beside the contamination, the river inherently is endangered because of climate change. The Himalayan glaciers that are the sources of the Ganges could disappear by 2030 as temperatures rise (IPCC 2007).

In Bangladesh, naturally occurring arsenic in underground sediment leaches into the groundwater. The main source of drinking water contains dangerous levels of arsenic.

About 2 million people have already been exposed to arsenic poisoning and the agricultural production is affected by arsenic-contaminated water between the Ganges River and the Indian border (UNEP 2002).

2.1.4. Climate

The general climate of the country is tropical monsoon, with an annual precipitation estimated at 1,200 mm. The distribution of the rainfall across the country varies from less than 100 mm in extreme arid areas of western Rajasthan to greater than 3,600 mm in north-eastern States and 1,000 mm from east coast to 3,000 mm in the west coast (UNCCD, 2006: 52).

The most dramatic effects will occur through sea level rise: a considerable part of Bangladesh's territory lies below sea level. Increasing urbanization, industrialization and tourism are degrading the coastal areas. (UNEP 2000).

MYERS´s (1993) argues, that sea-level rise coupled with increase of inland floods (from melting Himalayan glaciers) would affect estimating 142 million inhabitants of India's coast

living of flood zones and people from Bangladesh. His “conservative” estimation for 2050 is 30 million environmental refugees for India and 15 million for Bangladesh (see Fig. 4: *Sea-level rise in Bangladesh*). Brown (2004) presents that “only” one meter rise in sea-level would inundate half of Bangladesh’s rice land and forcing the relocation of easily 40 million people.

Myers (2001b: 611) modified in May 2001 his own forecasts about total numbers of people at risk of sea-level rise (there are not environmental refugees, you can see the change of style), including the numbers for Bangladesh and India. In Bangladesh could be 26million and in India 20 million people at risk (Myers, 2001a).

2.1.5. Population pressure

The human population as estimated in 2001 is 1,027 million with an average growth rate of 1.95 per cent (between 1991 to 2001). Much of this population resides in rural areas with the average population density of the country at 284 persons per sq. km. Gangetic Plains of India has an overage of 456 persons per sq. km. The rate of growth of population during 1981-1991 in dryland region has been 29 per cent as against 23 per cent for the country. Seven districts in Rajasthan showed very high growth rate of 30-35 per cent (UNCCD, 2006: 57).

2.1.6. Food security

The food growth (Average Annual Rate of Change) by 3.2 per cent from periods 1979-1981 and 1990-1992 did not continue and decreased to half level 1.7 per cent between the periods 1995-1997 and 2001-2003. The population growth from the same periods decreased from 2.1 percent to 1.7 per cent (FAO, 2006b). It probably caused by exhaustion of “green revolution” in India.

2.1.7. Development projects

Built in early 1960's, the Karnaphuli Multi-Purpose Project submerged 40 per cent of the rice bowl of the Hill Tracts and displaced one-sixth of the indigenous population. Thousands of hill people migrated into sparsely populated regions of Mizoram, Tripura, Assam and Arunachal. Perhaps 40,000 "environmental refugees" migrated to India and another 20,000 migrated to

Burma. Where today, they live in the Arunachal Pradesh in northeast India. Citizens neither of India, nor of Bangladesh and without citizenship rights in either country (SAMAD, no date).

3. Adaptation and state-capacities

Current activities to combat desertification and soil degradation are watershed management, soil restoration and sand dune stabilization. Reforestation programmes and forest management are as important as reclamation of waterlogged and saline lands to stabilize agricultural land. The big problems of air pollution and carbon dioxide emissions are expected to be ameliorated by decentralization. Satellite cities with better spatial planning and more effective coordination of growth are under construction to relieve the pressure of urban systems (UNEP 2007).

4. *Environmental change and conflict*

Ganges River

People living on the banks of the river use them in many ways. Religious, economic, and agricultural usage are the most important ones. Pollution of the Ganges has become so serious that bathing in and drinking its water has become very dangerous, but more than 400 million people live along the river and an estimated 60,000 persons ritually bathe daily in the holy river. People depend on the river as water supply for daily life, but especially important is the utilization for irrigation. Most problems are between India and Bangladesh because they share a 180 km section of the river. The construction of the Farakka Barrage at the head of the delta in West Bengal is a cause of major tension between the two countries. In recent years, this man-made interference has seriously affected Bangladesh's agriculture, navigation, fisheries, forestry, salinity and various components of the ecosystem (AW 2000).

Food Security

From independence until the mid 1970s, India faced problems of food scarcity. After the green revolution had increased production, recent trends in aggregate production have been a matter for serious concern (UNEP 2007). The combination of dense population, high

population growth rates, poverty, widespread land degradation and increasing water scarcity are the common reasons.

Sea level rise

India's coastline is about 7500 km long and is densely populated as well as low-lying. In Bangladesh the numerous river deltas are especially threatened, tens of millions of people would be displaced by a 1 m increase (IPCC 2007).

5. Scenarios for the future

Seven of the world`s most populous countries are located in Asia and future population growth over the next 50 years is projected to increase the Indian population by 570 million and that of Bangladesh by 130 million respectively (UNEP 2007). Because of this both countries have to increase agricultural production by expanding cropland and intensifying irrigation. But this is already a challenge because of the problems of water scarcity and soil degradation. In Bangladesh, production of rice may fall by just under 10 per cent and wheat by a 1/3 by the year 2050 (IPCC 2007). The coastal and delta regions which are fertile and under paddy cultivation will be endangered by sea level rise. In addition 400 million people living in the river plains depend upon it for their supply of water (ENVOR 2007). The current trends in glacial melt suggest that the Ganges, Indus, Brahmaputra and other rivers that criss-cross the northern Indian plain may become seasonal rivers in the near future as a consequence of climate change with important ramifications for poverty and the economies in the region (IPCC 2007). This development will also impact the fast growing urban and industrial sector in India. The total demand for water is projected to nearly double by 2025 (UNEP 2007).

3. Migration processes

3.1. Main migration patterns and trends

Bangladesh is a typical origin country, rather than a destination country. Its migrant stock is however slightly above 1 million (1,032,000), representing 0.7% of the country's population. Amongst those, 20,000 are refugees, while around 65,000 IDPs have to be added to this total. The annual net migration rate is -70,000: 0,5 inhabitant leaves the country annually for every 1,000 inhabitants. Migrants' remittances represent 5 % of the GDP.

A complex combination of circumstances, geopolitical locations and environmental conditions has turned Bangladesh into a major "reserve of cheap labour". Emigration partly solve domestic unemployment and it is source of foreign exchange earnings (RAHMAN, 2000: 115). Bangladesh had approx. 3 mil. overseas workers who remitted more than 1,5 billion USD in 1998 (RAHMAN, 2000: 109).

HUNTER (2005: 275) argues that migration as a demographic process can be associated with environmental hazards in several ways:

- Proximate environmental hazards might influence residential decision-making by shaping the desirability of particular locales. In the case environmental hazards is factors shaping migration.
- Migration can represent an exacerbating force with regard to environmental hazards as a result of increasing population density in vulnerable locales, for instance the movement of poverty-stricken households to floodplains in Bangladesh (Lein, 2000; Zaman, 1991 in HUNTER, 2005: 275).

Floods and cyclones in Bangladesh regularly cause, often with dramatic outcomes, temporary local displacement. Agriculture in Bangladesh is very much dependent on annual flooding and the floods, therefore, take on unique cultural meaning. Although necessary, the persistent floods also change river courses, with many Bangladeshis losing homes and lands to erosion annually (Zaman, 1991 in HUNTER, 2005: 285). In some regions land remain under water for around seven months every year and agriculture production is strictly limited by environmental constraints. The floods have significant impact on migration decision-making

process in these regions. Villagers cannot rely on agriculture to fulfill their needs and are forced to look for work elsewhere (RAHMAN, 2000: 113-114).

In a survey undertaken in a Bangladesh floodplain in the mid 1980s, 64 per cent of sample households reported having been displaced by erosion at least once, with the mean number of displacements being seven. Typically, migrant households relocate only a short distance away; nearly 88 per cent of households had remained within 2 miles of their previous residence. Such short distance mobility (perhaps temporary) is a product of lack of resources, presence of kin, and belief that land will re-emerge to be reclaimed (Zaman, 1991 in HUNTER, 2005: 285). Migration in these localities is a household coping mechanism, with household members typically having little faith in finding permanent residence and for this reason displacees often continue to live in fear of eviction, either by governmental authorities or natural forces (HUTTON & HAQUE, 2004: 46; Haque & Zaman, 1989; Zaman, 1991 in HUNTER, 2005: 285).

In 1995, the Flood Plan Coordination Organization estimated that river-bank erosion displaced over 728,000 people between 1981 and 1993 along Jamuna, Ganges-Padma and Meghna rivers. Over 40 per cent of the dicplacee-squatters had been uprooted three or four timed and 36 per cent had been displaced between five and ten times. Another 14 per cent had been displaced more than tem times. Only 5 per cent of the displaceed surveyed had been displaced just once and 8 per cent twice. Whereas river-bank erosion mostly affects small landowners, although large landowners can also be negatively affected !Greenberg, 1986; Rogge and Elahi, 1989 in HUTTON & HAQUE, 2004: 46).

A study (Afsar, 2003 in IOM, 2005: 29)of internal migration in Bangladesh showed that all types of migration had increased significantly. Rural-urban migration was found to account for nearly two-thirds of outmigration from rural areas. The share of rural-to-rural migration was 10 per cent compared with 24 per cent for overseas migration. The latest estimates indicate a 6.3 per cent annual increase in migration, when Dhaka is the most common destination because it offers greater work opportunities. Most people look for work in the garments industry, rickshaw transport and the domestic sector. Rapid urbanization is creating these kinds of jobs that exert a stronger attraction than traditional push factors such as frequent natural disasters and poverty and destitution. The garment industry currently employs around 1.8 million people (80-90% of whom are women) in more than 3,500 small and medium-sized factories spread around “Export Processing Zones” and urban areas of Dhaka, Narayangonj, Chittagong and Khulna (IOM, 2005: 30). For more details about the

urbanization in Bangladesh and rural-urban migration during the 1960s – 1970s see KHAN (1982).

Nevertheless disasters do not always create outmigration and show that migration is some king of strategy for survival. The study by PAUL (2005: 370) provides empirical evidence of the non-occurrence of out-migration in the aftermath of the 14 April 2004 tornado in Bangladesh. Data collected from 291 respondents from eight tornado-affected villages suggest that no one from these locations migrated to other areas. The constant flow of disaster aid and its proper distribution by the government and non-governmental organizations (NGOs) were the main reasons why victims did not leave (PAUL, 2005: 379-381).

Tuvalu

François Gemenne

1. Overall context

1.1. Development, Population and Socio-economics trends

The island group of Tuvalu, one of the smallest and remote countries in the world, is located in Oceania which is about half the way from Hawaii to Australia. It consists of nine coral atolls in the South Pacific Ocean. The islands are very low- lying and narrow. The highest point is just 5 meters above the sea- level. Six of the 9 coral atolls, Nanumea, Nui, Vaitupu, Nukufetau, Funafuti, and Nukulaelae, have lagoons that are open towards the ocean. The climate is tropical and temperatures are consistently high during the whole year with an average temperature of 28° C. From March to November there are moderate conditions with easterly trade winds. 60% of the rainfall occurs in the November to April period (CIA 2007).

12.000 people live in an area of just 26 km². Their existence depends on exploitation of the sea, reefs and atolls and from wages sent home by those working abroad. Tuvalu therefore shares with Bangladesh a very population density, of 461 inhabitants/ square kilometre. It should be stressed however that about half of the population lives on the main island Funafuti: the population is not evenly distributed on the nine islands, and inter-island migration is frequent. Tuvalu's population is young, with a median age of 24.9 years (male: 23.9 years, female: 26.2 years). The birth rate is 22.43 births/1,000, while the death rate is 7/1,000. The growing rate of the population is 1.54%, and the life expectancy is of 68.63 years (male: 66.38 years, female: 70.99 years).

Besides fish, Tuvalu has no natural resources. Its economy relies heavily on foreign aid, notably through a Trust Fund established by the UK, Australia and New Zealand. Its GDP per capita is about US$ 1,600. Most people make a living through exploitation of the sea and reefs, or thanks to remittances sent by members of their family aborad (mostly sailors).

The most frequent natural hazards are tropical storms (EM-Dat 2007) because these cyclones occasionally develop near Tuvalu (Informet 2006). As all small island states, Tuvalu is facing similar environmental problems and natural hazards (see Fig. 1):

- *Potable water:* no streams or rivers, no potable groundwater
- *Climate change* and global warming
- Beachhead *erosion* :use of sand for building materials ; excessive clearance of forest undergrowth for the use as fuel landlessness and land reclamation
- Damage to coral reefs temperature of the sea is rising
- *Deforestation* and overexploitation of terrestrial resources
- Solid *waste-disposal*
- Climate change is projected to exacerbate *health problems* such as heat-related illness, cholera, dengue fever and biotoxin poisoning, and would place additional stress on the already over-extended health systems of most small islands. (UNEP 2006, CIA 2007)

1.2. Political context

A former British colony, Tuvalu obtained its independence in 1978. It seceded from Kiribati following a vote in 1976, and was granted full independence two years later. To this date, it has been a constitutional monarchy, with a Governor general appointed by Britain and an elected Prime Minister.

Given the size of the country, there are no political parties or pressure groups. MPs tend however to align themselves informally, and tribal chiefs still retain a siezable power. The Church is also a powerful force.

As said earlier, the country is heavily dependant upon international aid. It has recognised the international sovereignty of Taiwan, and therefore benefits from an important aid package from Taiwan, that has the sole diplomatic representation in the atoll. Other major donors include Japan, the EU, Australia and New Zealand.

Tuvalu is a party to the following international environmental conventions: Biodiversity, Climate Change, Climate Change-Kyoto Protocol, Desertification, Law of the Sea, Ozone Layer Protection, Ship Pollution, Whaling.

1.3. Socio-cultural aspects

Tuvalu is a rather homogeneous country, with Polynesians making up 96% of the total population. The other 4% are Micronesians. Religion plays an important role, and the Congregationalist Church of Tuvalu is ubiquitous, with 97% of followers among the population. Other faiths are also represented, but in small numbers: Seventh-Day Adventists, Baha'I, etc. The country is bilingual, with English and Tuvaluan widely spoken. The households tend to be rather large, with about ten or a dozen members.

2. Environmental degradation and vulnerability

2.1. 'Hot-spot' of environmental degradation

Sea- level rise as a result of climate change

The small island states are extremely vulnerable to global climate change and global sea-level rise because of their small size and unprotected exposure to the sea. At its widest point, Tuvalu only spans one hundred meters. Tuvalu and Vanuatu are actually shrinking and may eventually disappear. During recent years, Tuvalu has already lost one meter of land around the circumference of the largest atoll. Especially the shoreline is rapidly eroding under extreme high tides. And the problem is that the main settlements and vital economic infrastructure are almost invariably concentrated in the coastal zones. Another direct consequence of sea-level rise will be increasing sea flooding, inundation and salinization of soils and freshwater lenses (IPCC 2007).

The El Nino phenomenon affects many environmental characteristics, including sea level, winds, precipitation, air- and water temperature.

Coral reefs react very sensitively to temperature changes. Elevated sea water temperatures above seasonal maxima can seriously damage corals by bleaching and also impair their reproductive functions. Therefore, the mortality of corals and fish increases considerably during warm events triggered for example by El Nino.

Freshwater Shortage is a serious problem in many small island states. Many of these depend heavily on rainwater as their only water source. Pumping from freshwater lenses needs to be carefully monitored and controlled in order to provide warning of impending saltwater intrusion and to test water quality for bacteria counts and chemical residues (UNEP, 2002).

Extreme weather events

The island states are also threatened by more extreme weather events. A cyclone is created in the Pacific Ocean when the surface seawater temperature is above 27 degrees Celsius. The

cyclones can develop into a hurricane which then wanders around in the Pacific Ocean (ESA 2004). Several times during recent years the islands have been hit by severe hurricanes even though the most northern part of the island group is lying outside the "hurricane belt". In 1997 Funafuti was hit by the three hurricanes Gavin, Hina and Helly. They eroded half a square kilometre from the 26 square kilometres island state. In 1992 the unexpected happened. The Northern part of the Tuvalu Island, which lies outside the hurricane belt, was hit by severe storms. A new pier on the island of Waitupo was destroyed. The hurricane in June 2004 for example occurred outside the hurricane season, too.

2.2. Adaptation and state-capacities

In 1986 the government approved the first phase of a sea-wall system to protect the coast. In 1998 Tuvalu joined the United Nations in order to draw attention to the effects of global climate change on their small islands. They have joined the Pacific Island Climate Change Assistance Program (PICCAP) and established a five-point plan to address the effects of global warming on their country. The plan includes the selection of a climate change research committee and a greenhouse gas inventory. Furthermore, the communication with the UN on climate change and rising sea levels and studying the island's vulnerability and developing adaptation strategies is also important. The target is to produce a national implementation strategy for climate change. Tuvalu has already completed the first four tasks and is hoping to have a plan by June this year. In addition, the Australian Agency for International Development (AusAID) funded an Australian Government Initiative. It is called "The South Pacific Sea Level and Climate Monitoring Project (SPSLCMP) and will enable the South Pacific Island countries to manage their own environmental problems and contribute to achieving sustainable development. (SPREP, 2007)

Moreover, Tuvalu and other small neighbouring islands try to raise awareness with campaigns and public relations. They want to sensitize people and governments of the world to global warming. Even global media have increasingly emphasised a scenario with Tuvalu as a symbol of all threatened islands.

Tuvalu has already started to prepare for the new times with warmer weather, higher sea level and more severe winds.. One effort the islands have taken is to collect rainwater for drinking to conserve the water resources.
On the international scale, 36 island nations have formed the Alliance of Small Island States (AOSIS) to lobby for their interests regarding climate change (Germanwatch 2004).

2.3. Environmental change and conflict

Tuvalu is the first country threatened by totally disappearing under water. The sea level is rising 5-6 mm per year. Its 12 000 inhabitants have become the first climatic refugees on a national scale. The sea water lies permanently under the ground surface. During the spring tide, water is already beginning to bubble up through holes in the ground. The sea is inextricably linked to Tuvalu`s natural and social system and it has always maintained life on the islands. Dependence to the sea remains despite of new technologies and lifestyles. Marine resources are needed for food, tools, transportation and waste disposal (UNEP, 2000). Therefore, the increasing sea level is a challenging task in everyday life, as Tuvaluans cannot cultivate taro, the traditional base of their diet, anymore. As a consequence, insufficient food supply and decreases in fishing because of damaged reefs force the island to import more food. More foreign exchange is needed, but also more health and diet problems occur. Another major problem is that there is the lack of exploitable ground water. Rain has already become the main freshwater resource.

Yet internal migration, in search of wage employment, has brought almost half of the national population to Funafuti atoll which has negative local environmental consequences. The land loss is contrast to the rising need for permanent houses and infrastructure of an increasing population.

The government of Tuvalu is forced to try to close a contract with their big neighbours New Zealand and Australia about the relocation of their nation. The program, called the Pacific Access Category (PAC), took effect in July 2002. New Zealand has agreed to a 30-year immigration program, allowing 75 Tuvaluan immigrants per year. But not every Tuvaluan is allowed to participate. The applicant must be of “good character and health, have basic English skills, have a job offered in New Zealand and has to be under 45 years of age”

(MINPAC 2002). Another plan is to relocate the whole nation to Kioa (Fiji island). If the people can stay together the culture of Tuvalu could be retained much better.

Sea-level rise is likely to induce large-scale migration in the longer term and large migrations have at times led to conflict (Barnett 2003, Barnett and Adger 2003).

2.4. Scenarios for the future

The plan for the worst case scenario is to identify a new homeland where the nation of Tuvalu can be resettled, and to establish an official status for environmental/climatic refugees.

During the next century, scientists forecast a rise in the water table between 11 and 77 cm. (ESA). Due to the increasing sea level, the islands have become more swampy and salt water is penetrating. Many plants cannot tolerate this. In the future people need to be educated on how to grow pulaka on higher soil (IPCC 2007). Another danger is that malaria could reach the population on the island. More swampy soil and the higher temperatures will provide better living conditions for the mosquitoes.

3. Migration processes

3.1. Main migration patterns and trends

Even though migrants represent about 3% of the whole population, internation migration flows to Tuvalu are marginal. Internal migration, however, from the outer islands to the main island Funafuti, is important. International emigration is also important, with a net migration rate of -0.1. For every 100 inhabitants, one leaves the country annually. The prime destination is Auckland, New Zealand.

3.2. Migration networks

The Tuvaluan community in Auckland has a strong community life, and many organizations have flourished, in particular island organizations, gathering the emigrants from each island of the atoll. Migration networks play an extremely important role in stimulating and facilitating emigration.

3.3. Migration policies

Tuvaluan migration policies are not very developed, but the government is trying to reduce internal migration by developing services on the outer islands. The replacement of the boat that connected the different islands is a major improvement in that sense. The government also seeks to facilitate the emigration of its citizens, by negotiating migration schemes with neighboring countries. So far two migration schemes have been implemented with New Zealand:

- The Pacific Access Category, for permanent migration on a quota basis.
- A seasonal labour migration scheme.

Vietnam

Olivia Dun

1. Overall context

1.1. Population and Development:

Vietnam is located in Southeast Asia bordered by China, Laos and Cambodia on the western and northern sides of the country and 3,444km of coastline on the eastern and southern sides of the country (CIA 2007). Moreover the territory includes more than 3,000 islands and extends from North to South over 1,650 km with the east-west distance varying in width between 50 and 600 km (CIA 2007). The climate is tropical in the south and monsoonal in the north with a hot, rainy season from May to September and a warm, dry season from October to March (CIA 2007).

The terrain is mainly low and flat including deltas in the south and north, but in the far north, northwest and central parts of the country it is hilly and mountainous (CIA 2007). The Mekong Delta in the south and the Red River Delta in the north are areas where sea and land meet and are accordingly very fertile but sensitive regions. Figure 1 shows the fertile Mekong Delta with its rice fields.

Vietnam has a population of 83.1million people (2005 figure) (World Bank 2007a) covering a total land area of 331,690 km^2 (WRI 2003a) amounting to a population density of 252.4 persons per km^2. The majority of the population is concentrated in rural areas with only twenty six percent of the Vietnamese population living in urban areas (UNDP 2006). The current annual population growth rate is 1.2% (UNDP 2006) and the rate of urbanisation is 28.5% (Nguyen 2005).

In terms of the Human Development Index[43] Vietnam is currently ranked 109th out of 177 countries with an index rating of 0.709 (UNDP 2006). Breaking this down, the life

[43] The United Nations Develop Program (UNDP) HDI "measures the average achievements

expectancy at birth in Vietnam between 2000 – 2005 was 70.04 years (72.9 years for females and 68.8 years for males), the adult literacy rate is 90.3% (86.5% for females and 93.9% for males), combined gross enrolment for primary, secondary and tertiary schools is 62.8% and the GDP per capita in purchasing power parity is US$2,745 (UNDP 2006).

In terms of employment 56.8% of people in Vietnam are employed in the agricultural sector, 37% are employed in the industry sector and 6.2% in the services sector (CIA 2007). Women account for 49% of the labour force in Vietnam (World Bank 2007b). The unemployment rate in Vietnam is 2% (CIA 2007).

1.2. Socio-economic Trends:

Vietnam has experienced significantly rapid social, cultural, economic, environmental, political, technological and demographic change over the past three decades, more so than nearly any other country around the globe (Lindskog *et. al.* 2005). These changes were brought about largely by a process of transition known as *Doi Moi* which involved the transformation of Vietnam from a state-led planned economy to a more market oriented one (Lindskog *et. al.* 2005).

Major agricultural crops produced in Vietnam include paddy rice, coffee, rubber, cotton, tea, pepper, soybeans, cashews, sugar cane, peanuts, bananas, poultry, fish and seafood (CIA 2007). Major industries in order of annual output are food processing, garments, shoes, machine-building, mining, coal, steel, cement, chemical fertilizer, glass, tires, oil and paper (CIA 2007).

Main exports in Vietnam are crude oil, marine products, rice, coffee, rubber, tea, garments, shoes (CIA 2007). Main imports include machinery and equipment, petroleum products, fertiliser, steel products, raw cotton, grain, cement, motorcycles (CIA 2007).

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in a country in three basic dimensions of human development: 1. A long and healthy life, as measured by life expectancy at birth, 2. Knowledge, as measured by the adult literacy rate (with two-thirds weight) and the combined primary, secondary and tertiary gross enrolment ratio (with one-third weight), 3. A decent standard of living, as measured by GDP per capita in purchasing power parity (PPP) terms in US dollars." (UNDP 2006, p394)

1.3. Political Context:

The Socialist Republic of Vietnam is a one-party state led by the Communist Party of Vietnam (CPV), which holds ultimate responsibility for all important policy decisions (EC 2007). The Party's organisational system is arranged in line with the State administrative apparatus from central level to provincial, city, district, and communal levels as well as with administrative bodies, such as schools, enterprises, political/social/professional organisations, army units and police forces (Government of Vietnam 2006). In terms of female representation in politics women occupy 27.3% of the seats in parliament and constitute only 11.5% of the ministerial level of government (UNDP 2006).

The Vietnamese government has engaged in dialogue on human rights issues to a certain degree but respect for human rights lags behind many other countries (EC 2007, Human Rights Watch 2007). The European Commission reports that progress in the field of individual, civil and political rights is still limited and concerns remain about the denied access of independent human rights monitors (EC 2007). Freedom of expression in Vietnam is limited with Human Rights Watch reporting that members of independent churches have been persecuted, imprisonment of people who express their religious and political views has occurred, and that there are restrictions on media, public gatherings, political parties, religious organizations and labour unions (Human Rights Watch 2007).

1.4. Socio-cultural aspects:

There are a diversity of ethnic groups in Vietnam with the dominant group being the Kinh (Viet) constituting 86.2% of the total population (CIA 2007). A 1999 census revealed distribution of other ethnic groups in the following proportions (CIA 2007): Tay 1.9%, Thai 1.7%, Muong 1.5%, Khome 1.4%, Hoa 1.1%, Nun 1.1%, Hmong 1%, and others 4.1%.

According to the same 1999 census 80.8% of the Vietnamese population stated they had no religion. Other religions are represented in the following proportions in Vietnam (CIA 2007): Buddhist 9.3%, Catholic 6.7%, Hoa Hao 1.5%, Cao Dai 1.1%, Protestant 0.5%, and Muslim 0.1%.

Vietnamese is the official language with English increasingly being favoured as a second language (CIA 2007). French, Chinese and Khmer are also spoken along with Mon-Khmer and Malayo-Polynesian in the mountain areas (CIA 2007).

2. Environmental Degradation

2.1 General Overview

According to the CIA (2007) environmental problems in Vietnam include:

- logging and slash-and-burn agricultural practices which contribute to deforestation and soil degradation,
- water pollution and overfishing which threaten marine life populations,
- groundwater contamination which limits potable water supplies, and
- growing urban industrialization and population migration which contribute to rapid degradation of the environment in Hanoi and Ho Chi Minh City.

Vietnam is a relatively disaster-prone country (Sternin 2003). Water disasters or water-related disasters such as storms, floods, inundation, drought, salt water intrusion, storm surge, landslides, and flash floods are disasters which occur over the largest area in Vietnam and cause the most severe damage (Sternin 2003). Wind storms and floods are the most frequent natural hazards in Vietnam. From May to January typhoons and extensive flooding especially in the river deltas can be expected (CIA 2007). In recent years the number and intensity of severe storms has increased (IPCC 1997). Of note, a review by UNICEF identifies emerging threats of new types of disasters including amongst others forest fires, contamination of water sources, and droughts many of which are linked to increasing development and urbanisation in Vietnam (Sternin 2003).

2.2 "Hot spots" of environmental degradation and vulnerability

Sea level rise in river deltas

Vietnam is said to be one of the most affected countries in the world if sea levels continue to rise at current rates (UN Country Team Vietnam 2007).

The Red River Delta, the Mekong Delta and also 3,200 km along the coastline, due to their low elevation, are particularly vulnerable to changes in sea levels. Tidal effects rapidly could be felt for several tens of kilometres inland. Currently the rise of sea level in coastal areas of Asia is reported to be between 1 and 3 mm annually. This value is slightly higher than the global average. If the scenarios of the United Nation`s Intergovernmental Panel on Climate Change were to materialise, Vietnam could lose more than 12 % of its land which is home to 23 % of the Vietnamese people (IPCC 1997; ADPC/FAO 2003). In particular the UN Country Team in Vietnam highlight that estimates of a one metre sea level rise indicate 12.2% of the country's most fertile land would be lost with 40000km^2 of the plain and 17 km^2 coastal areas in the Mekong Delta subject to unprecedented flooding (UN Country Team Vietnam 2007). This damage would lead the country to face losses totaling US$17billion per year (UN Country Team Vietnam 2007).

In connection with global climate change, rapid urbanization in Vietnam (see Figure 3) in low lying coastal areas could expose more and more people to natural disasters. Increasing population density and informal settlement together with coastal destruction make cities like Ho Chi Minh very vulnerable.

2.3 Adaptation and State-capacities

As the world's second biggest exporter of rice, Vietnam is attempting to reduce methane emissions in the coming years. Reforms in the agricultural sector should reduce emissions by 15% to 18 % (Bui 2007). Health care systems have to be established to enhance social capital and minimize the vulnerability of developing countries to climate change. Forecast systems, adaptation measures, disaster preparedness and management has to improve to deal with sea-level rise, more intense cyclones and threats to ecosystems and biodiversity. A potential option could be better stock management and more integrated agro-ecosystem management to enhance land conditions and reduce pressure arising from climate change (IPCC 1997).

Fifty percent of the soils in Vietnam are considered to be "problem soils" in terms of fertility and productivity (Pham et al. 2005). Several policies and programs to combat land degradation are being implemented in Vietnam. Important measures have been adopted in relation to soil and water conservation; reclamation of waterlogged, saline and acid sulphate soils; afforestation and forest management, and rehabilitation of soil fertility in sloping barren

land and in arable lands by use of appropriate integrated measures(Pham Quang Ha et al. 2005).

2.4 Environmental Change and Conflict

The effects of global warming will impact particularly on people without the resources to mitigate those effects. This will rapidly lead to social, environmental and development conflicts in the future.

2.5 Scenarios for the Future

The Mekong Delta is called the 'bread basket' of the country, producing more than 40 % of the country's agriculture products and 50 % of its rice output today (Bui 2007). Annually the total harvest amount is about 16 million tonnes of rice for domestic consumption or export. Every year, annual floods enrich the Delta soils and bring millions of fish to spawn. Sediments carried from far upstream replace the land lost through natural erosion. Without careful management upstream, flooding will become more frequent and more extreme, cancelling out these benefits and causing millions of dollars of damage and lost lives. The Delta is one of the most densely populated areas on Earth. Food insecurity and loss of livelihoods will be the most dramatic consequences. Flooding and coastal erosion in low – lying areas will destroy the agricultural land and the nursery areas for fisheries. Such occurrences in Vietnam's "rice bowl" will affect the country as a whole (World Bank IDA 2007).

Devastating socio- economic impacts are possible in the major cities and ports as well as tourist resorts, commercial fishing and infrastructure development (IPCC 1997). Human health could also be adversely affected by rising temperatures and more rainfall variability. Informal human settlements especially those with high population density, poor shelter, little or no access to fresh water lenses and public health services are highly vulnerable to environmental and natural threats (World Bank 2007cf).

3. Migration Processes

3.1. Main migration patterns & trends

Migration has been an important factor in shaping the historical development of state and society in Vietnam (Zhang et al. 2007). The current net migration rate in Vietnam is -0.5 migrant(s) / 1000 population (IOM 2007) indicating that overall more people are leaving the country than new people entering. Internal migration patterns within the country involve rapid rural to urban migration with the IOM reporting that several thousand labour migrants move to economic zones and cities in search of work (IOM 2007). External migration trends show approximately 3 million Vietnamese live abroad with over 400,000 Vietnamese labour migrants working abroad and a further 70,000 labourers going abroad for work each year (IOM 2007). Remittances from Vietnamese overseas have been a significant factor for the country's development (IOM 2007). Human trafficking is a significant issue in Vietnam and the IOM (2007) reports that the problem is increasing despite efforts at a national and regional level to combat it.

3.2. Migration Networks and Policies

After the *doi moi* reform policy was introduced in 1986, population movement patterns in Vietnam shifted and reversed significantly. The post *doi moi* period has been marked by increased urbanisation and rural to rural migration mainly due to agricultural decollectivisation, land tenure changes and changes to household registration regulations (Zhang et al. 2007). A high population to land ratio in the delta areas also played a role. Interestingly, Zhang et al. (2007) point out that the Vietnamese government is still carrying out its official program of population resettlement but that research indicates that spontaneous population flows from rural to urban areas and rural to rural areas since the 1990s have surpassed population movements organised through the government's program.

Conclusion: Environmental Degradation & Migration

The majority of migration in Vietnam seems to be economically, socially and politically driven. People are motivated to move in search of opportunities for employment and a chance for people to improve their personal and family income (IOM 2007). In addition, major population movement occurs due to relocation under government resettlement schemes. Population flow patterns out of delta regions in the north and south of Vietnam during the last half century have, at times, been driven by a high population to land ratio.

However, in terms of linkages between environmental degradation and migration, disaster-related temporary or permanent migration is an issue in Vietnam. A report by UNICEF on the emergency sector in Vietnam reveals that disaster-induced migration is raised by a large number of studies, trip reports, and other documents from the Vietnamese Government, UN organizations, and international NGOs in Vietnam (Sternin 2003). For example, research by CARE International revealed that there is a high rate of migration towards the south of Vietnam from communities worst impacted by disasters in central Vietnam with Sternin (2003, Appendix 1, p4) highlighting that these "community members directly linked the gradual erosion of their coping capacity caused by successive disasters as a key reason for migrating to the south."

It would be of interest to investigate migration responses to floods in the Mekong Delta region of Vietnam in an attempt to understand the relationship between environmental degradation and migration. Firstly, because the Mekong Delta in the south of Vietnam is said to be one of the worst impacted locations in the world should sea-level rise predictions eventuate. Secondly, this region of Vietnam is already prone to disasters especially flooding. Thirdly, there are already anecdotal stories indicating that poverty caused by heavy flooding pushes people to migrate to find new jobs sometimes even across the border into Cambodia (see, for example, Kola 2004). Current migration responses to flooding could be researched in order to understand what dynamics are at play in migration decision making, what policies are lacking/needed and what future scenarios might eventuate.

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