

# THE 2011 SOUTH CHINA FLOODS - DROUGHT, THREE GORGES DAM AND MIGRATION

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## 1. FLOODS AS A HISTORIC PROBLEM

The legend tells of Yu the Great, son of Gun and a morally upright ruler, devising a successful system of flood controls, which led to the prosperity of the Chinese heartland, hence allowing him to found the Xia Dynasty (2100-1600BC). Not adhering to his father's method of "blocking" (directly damming rivers), he sought to "relieve" river flows, by opening irrigation canals, diffusing water into fields, and dredging riverbeds. This technique was studied and repeated in historical water regulation strategies such as by: Emperor Suai (6-1BC) of the Han dynasty, Emperor Ming of the East Han dynasty (69AD), and then more substantively in the Yuan and Ming dynasties.

Just as the story of Yu stays with the Chinese people today, so does the problem of floods. Since ancient times, floods have been plaguing the Chinese soil. Partnering with drought, earthquakes, and slower onset hazards like desertification with the Gobi desert growing at 10,400 km<sup>2</sup>/year, floods represent themselves as only one of China's numbered natural disasters. (Stojanov, 2005) They fall into a greater compound crisis circle of water security of the country. Rapid growing rates of urban areas and industries compete with high agricultural consumptions of water resources. In a state where 21% of world's population feeds on only 7% of the world's cultivated lands, water poses itself as a food security issue to Chinese; whereas urban economic development needs of water creates social security tensions; safe drinking water then threatens human security; and deforestation and soil erosions make environmental security fragile.

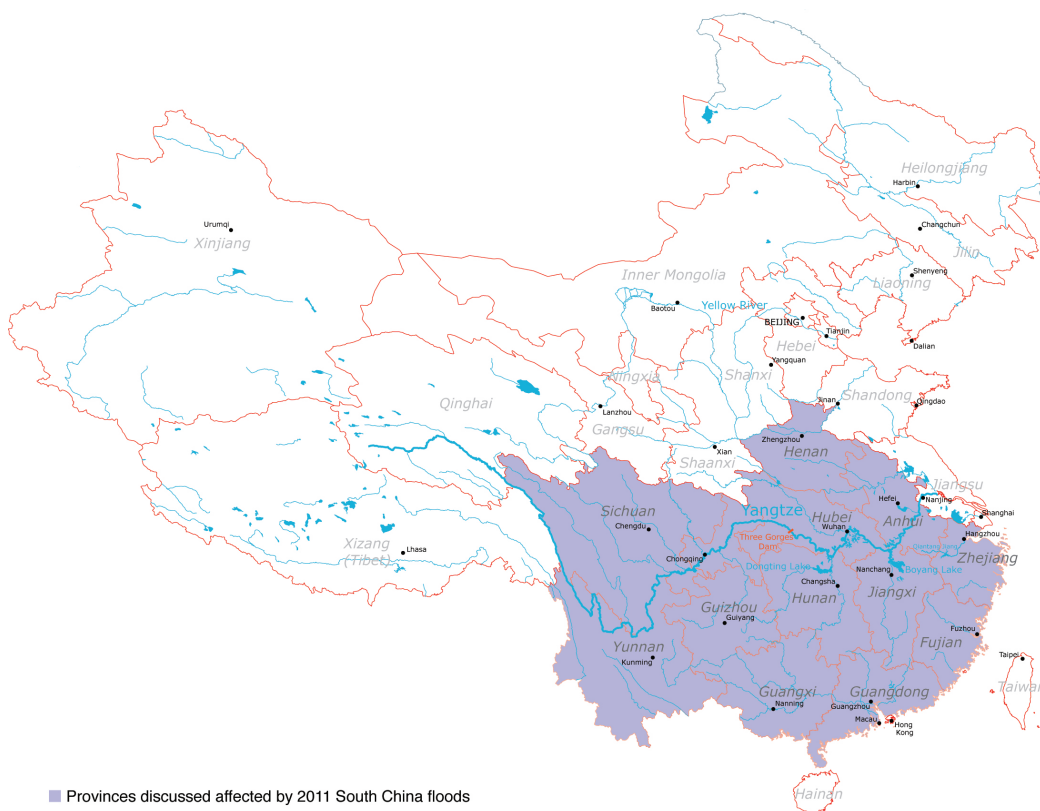
Of the two main Chinese rivers (the Yellow River and the Yangtze River), reports say the Yangtze is accountable for 70% to 75% of all China's floods. (Butler, 2007) It is known to recurrently overflow

its banks and flood huge plains of land along the river basin. These floods occur every year during the monsoon season from June to September. While on average a couple hundreds of people die annually as a result, the Yangtze floods had notoriously produced catastrophic floods. In the 20<sup>th</sup> century alone, four major floods in 1931, 1935, 1954 and 1998 had taken more than 300,000 lives.

### The Three Gorges Dam is modern China's most ambitious project and the largest construction work taken place. The multi-folded purpose of the venture includes:

- Flood prevention: would enhance the Jing River flood regulation capacity so that gigantic floods with unordinary disastrous effects happen once in 100 years instead of once in 10 years; and reduce flood threats to middle and lower reaches of Yangtze.
- Power generation: hydropower as a renewable energy, production measuring up to 84 billion kilowatt-hours of electricity per year, or one eighth of the country's total electricity output.
- Transport and trade: improve navigability of the Yangtze, allowing ships to reach as far as Chongqing, and promoting economic development of the Southwest.
- Water diffusion: support water needs in cities and economic zones located in mid and lower streams of Yangtze; and facilitate water diffusion for Northern uses.
- Other benefits: agricultural irrigation. (source: The fifth meeting of the Seventh People's National Congress, 1992)

When it was first approved in 1992, the Three Gorges Dam construction was estimated to cost USD 8.3 billion. The World Bank originally intended to provide loans for the project, but was discouraged due to pressure from environmental and human rights groups and the United States.

**Map 1.** Chinese provinces affected by 2011 South China floods

## 2. THE FLOODS

In 2011 rains from tropical cyclones and typhoons caused a series of floods in the central and southern parts of the People's Republic of China (PRC). The China Flood Control Office first reported on June 10, 2011 that tropical storm Sarika would be landing between Shanwei city of Guangdong province and Zhangpu city of Fujian province. (Xinhua, 2011a) Subsequently on June 12, the Chinese Meteorological Administration sent out a level III flood emergency warning for the Yangtze River Basin. The alert had then been raised to the maximum level of IV as of June 17 2011. Southern China suffered a further hit from June 16 to June 25 due to tropical storm Haima (Egay), which landed at the Guangdong province; while the east was struck by Sever tropical storm Meari (Flacon), flooding the Zhejiang, Shandong and Liaoning provinces. (Xinhua, 2011b; 2011c) Two tropical depressions reached coastal China in mid July and the southern province of Fujian took the final blow from typhoon Nammadol (Mina) from August 21 to August 31.

Water levels recorded a new height since 1955, surpassing the safety benchmark at the Dongting and Boyang Lakes, the two largest natural lakes that help store and regulate water along the

Yangtze River, and overflowing smaller reservoirs. (BBC China, 2011a) In Zhejiang province, hefty rains caused the Qiantang River to swell hazardously, amounting to 2.4m above safety levels. Authorities evacuated 292,000 people in the city of Lanxi for fear of breaches of the 70 kilometer-long dykes along the Lan River, which was “already overflowing at some points while other dyke sections barely holding.” (Martin, 2011) Meanwhile two dyke breaches were reported in smaller lakes affiliated to Boyang Lake. (BBC China, 2011b)

As much as 3m of floodwater was observed in certain areas such as the Jiangxi province. (Xinhua, 2011b) To aggravate the situation, saturated soil from over precipitation also caused many landslides.

Reports show a total of 13 provinces and autonomous regions being heavily hit by floods. With the floods spreading over a huge area, coherent centralized official data regarding the whole series of floods is absent. Centralized official reports with the highest figure of casualties record 239 deaths, 88 missing persons, 36.73 million people affected, 106,500 houses collapsed, 1.16million hectares of farm land destroyed, and a direct economic loss standing at RMB 43.2 billion (USD 6.65 billion). (Xinhua, 2011d)

### 3. THE DROUGHT

The greatest paradox that occurred regarding the floods was the six-month long severe drought that haunted various parts of the PRC and continued in certain parts as the floods ended.

In the middle reaches of the Yangtze, drought left many reservoirs dry or filled with “dead” water, as was the case of the 1,392 reservoirs in Hubei province. Long expanses of the Yangtze River itself was closed to water transport, leaving hundred of vessels beached in the shallows. (Hays, 2011) Statistics of the Ministry of Civil Affairs in May 2011 showed 35 million people affected by the drought, 4.24 million people suffering from acute water shortage, and 370,000 hectares of harvestable crops being destroyed. At the middle and lower streams of the Yangtze River, average precipitation since spring 2011 was only 194mm, which meant 51% of normal precipitation, a record low in 60 years. (BBC China, 2011c) In regions such as Hunan and Jiangxi provinces, that allow villagers to own small farmlands as well as fishponds, news reports mention drying up of land and ponds deprive people of livelihoods. Many villagers flocked to search for job alternatives in cities. (BBC China, 2011c).

Upon the first two to three days of torrential rain in early June, drought situations in the middle and lower streams of the Yangtze River got alleviated. Government representatives from Jiangxi province expressed relieve but warned of the catastrophe turning from drought to flood, and cautioned the people against land and rockslides. (BBC China, 2011b) According to provincial government statistics, 3.3 million people and 22,000 hectares of land were still affected by drought in Jiangxi; as for the neighboring Hunan province 6.1 million people were in acute water shortage conditions while 6 million were affected by various levels of floods. (BBC China, 2011b) The central government Flood Control Office later announced that despite the rains, 37% of drought-hit lands in the five provinces at mid and lower Yangtze stream remained arid, and 22% of the affected population continued to suffer from acute water shortage. This unprecedented drought followed by huge floodwater exacerbated local afflictions.

### 4. DROUGHT, FLOOD, AND THE THREE GORGES DAM

In May 2011, as the drought crisis worsened, a lot of spotlight had gone to the Three Gorges Dam. Pent-up anger released as torrents of blames on the construction project, not only for causing the

drought situation but also earthquakes in the nearby regions, environmental pollution, and great misery suffered by the 1.4 million original inhabitants relocated to make way for dam building.

There had been suspicions that the operators of the Three Gorges Dam hydropower plant were holding back drought-relief water and resisted release so as to sustain optimum power generation. At the end it took a highly publicized command from the central government to open the gates and let out 3.7 billion tones of stored water, roughly equal to 10% of the Three Gorges reservoir volume, downstream at a rate of 11,000 cubic meters per second as compared to 7,000 cubic meters per second as prior to May 7. (Lee, 2011) Apart from this operational issue, the artificial accumulation of water in the upstream led to reduced volumes reaching the Dongting and Boyang Lakes. Surplus water that helped to enlarge or maintain the sizes of the two lakes before 1998 was now replaced by the gradual drying up of the lake borders, hence reducing both their reserve capacities for drought and regulation capacity as flood basins. (Dingzhi Peng et al., 2005).

#### General criticisms on the Three Gorges Dam project include:

- Submerging 13 main cities, 140 minor ones and towns and 1,352 villages. Relocation of 1.4 million people in respected areas of the Yangtze basin to make way for the dam construction. Often transferred in blocks, people were sent of various parts of China. While some are happy about relocating, some have been complaining about poor compensations, corruptions that have taken away their entitlements, and a shortage of jobs or land in the newly resettled areas.
- As water level of the reservoir rose, landslides have become a problem. As of autumn 2007, directly related landslides exceeded 4,700 and required the evacuation of or concrete reinforcement for 1,000 localities.
- Links have been made to earthquakes, when a government seismologist study published in 2011 revealed a 30-time increase in minor local shakings since the construction of the dam. (Adams, 2011)
- Silt and sedimentation is said to be a major issue, as coarse gravels and rocks from Sichuan could not be flushed out and would stay behind the dam, while reduced discharge volume causes silting in the mid and lower courses as well.
- Of pollution resulted from dam construction, environmentalists estimate 250 billion of raw sewage and other industrial contaminants are trapped behind the dam.
- Environmental catastrophe for aquatic animals.
- Sinking of valuable archeological sites, promoting illegal excavations and smuggling of national properties to foreign countries for sale.
- Corruptions yet to be unmasked, vis-à-vis residents relocation in particular, pollution causation, dam construction and operational benefits.

However, these claims were being rebuked as absurd by hardcore government officials like Zhang Boting, Deputy General Secretary of the China Society for Hydropower Engineering, who said in an interview, “there are more than 20 dams in the world larger than the Three Gorges Dam. But I have never heard of them causing droughts. The big flood last year (2010) could be a good refutation of this claim. It is impossible for it to cause both drought and flood.” (Global Times, 2011) By increasing the water storage level to 175m behind the dam in October 2010, the dam had been highly praised by its operators, the China Three Gorges Project Corporation, to have prevented a dire flood. The highest previous record had been 172.8m, set in 2008. The company chairman Cao Guangjing held that the 2010 act was a “historical milestone” that would enable the project “to fulfill its functions of flood control, power generation, navigation and water diversion to the full”. (Kurtenbach, 2010) Yet the flashfloods of summer 2011 put the Three Gorges Dam into question once again.

While drawing a straight line between the Three Gorges Dam and the 2011 droughts and floods would be oversimplifying the causal relationship, it is an underlying fact that the dam is built to hold back Yangtze water and gives to its planners powerful flexibility in managing the retention and discharge of water, as appropriate according to extremities in rainfall.

Meanwhile, following the prolonged drought catastrophe, the central government made a rare acknowledgment of the downside of the project. In the State Council meeting on May 18 2011, Premier Wen Jiabao openly addressed the “urgent problems” faced by the Three Gorges Dam and announced another RMB 20 billion (USD 3 billion) spending to deal with relocation, pollution and landslide issues. Particularly worthy of mentioning is the first of the six directives established in his “Post-Three Gorges Working Plan”, which provided that livelihoods of dam construction affiliated relocated persons should equate that of residents of Hubei province and Chongqing city by 2020; a strategic economic plan would be put in place for transport, water and other urban facilities development, as well as a social security net that covered both urban and rural areas. (Xinhua, 2011e) In fact already in 2008, when the Premier halted the Leaping Tiger Gorge Dam after reading an investigative article published in the Guangzhou newspaper Southern Daily, the central government’s position on mega projects seemed to have shifted. In the case of the Three Gorges Dam, whether it was to promote the caring facet of the government or a genuine response to popular

discontentment, his words had drawn great attention and appreciation. Headlines of western press wrote for example “China drought renews debate over Three Gorges Dam”. (Zi, 2011) Other government responses to the droughts and floods are to be examined further below.

## 5. FROM EMERGENCY RELIEF TO RELOCATION AND MIGRATION

Government emergency relief of the 2011 floods saw the substantial mobilization of soldiers of the People’s Liberation Army, military police, firemen and civil defence units. In the hard hit Wangmo county of Guizhou province for example, 1200 military persons were involved in rescue, evacuation and relief work, and another 3000 party officials in logistics, communication and coordination. (Xinhua, 2011f) In other places news reports carry photos of uniformed young men maneuvering boats crowded with people stranded in floods. (BBC China, 2011d)

People were relocated to nearby areas to await the retreat of water, which took a few days to a week’s time. The displacement of people followed a number of different initiatives. While those in most dire need benefited from the government-provided public shelters and temporary tents, others found more accommodating refuge in homes of families and friends. In Huainan city of Anhui Province for instance, of the 6061 evacuated, 4770 were unable to return home three days after the flood, 3324 stayed on for a longer period in homes of relatives and friends, 1104 in government public shelters, and 342 in government emergency tents scattered over 14 localities. (Ye, 2011)

About relief supplies, Victor Kan, World Vision program quality director was quoted saying, “food is (was) urgently needed. It is (was) estimated that the affected communities will suffer from food shortages over the next two to three months. Farmers have been struck twice, first with drought and then floods. Many of them are likely to face total crop failure this year.” (Xinhua, 2011g) In places like Zhejiang and Hunan, major crops like corns, soybeans, sugar canes and peanuts were destroyed by the flood, and fishes in ponds were washed away. One Zhejiang city had 70% to 80% of all paddies damaged. People lost their life bearings. (Xinhua, 2011h)

Newspaper reports have noted government deliveries of cup noodles, rice, blankets, medical supplies, temporary shelters and cement (for reconstruction purposes) to victims. (Xinhua, 2011i) In Guizhou province, as one of the first emergency response plans for the summer floods, the National



Commission for Disaster Reduction and the Ministry of Civil Affairs ordered 2,000 quilts, 3,000 clothing and over 100 tents to be delivered. (Xinhua, 2011j) In later rounds of floods, the Guizhou people's government assured that there were adequate food supplies and that each flood victim received 0.5kg of rice per day until the sufficient betterment of their situations. (People's Daily, 2011)

Given that it was a short sudden on-set event, all relief efforts were meant to be provisional, until daily lives return to normal. Government directives were limited to the emergency response period, whereas local initiatives were encouraged in post-disaster recovery. According to Art. 4.18 of *Regulation on the Relief of Natural Disasters* promulgated by the State Council and revised in 2011, evacuation and resettlement was to be

*“organized by the locality's people government, under the pretext of safe situation. It would decide on the best resettlement measures for a transitional period. The process would be a mixed method of government directed resettlement and people's self-directed resettlement.*

*Resettlement locations should be chosen based on transport accessibility, and ease to facilitate recovery and production. Areas prone to potential hazard recurrence should be avoided, so should cultivated farmlands.*

*Locality's people's government should encourage and organize people for self-help recovery.”*

Articles 4.19 to 4.20 then provide for reconstruction and reparation of houses destroyed in the natural disaster. After individual or collective application from the people, the government would review needs and realities and provide appropriate financial and material aid.

As the statute denotes, the return to and recovery of flood-struck areas were the optimum goals. As if it were a habit, the Yangtze River floods recurrently every year, though with different intensities. And people habitually return as well. Those who try to avoid the adverse effects of floods may move, but these displacements are more often regarded as a part of the rural-urban migration trend in the PRC, where economic considerations triumph. In China's recent history, the largest known mass migration resulting directly from Yangtze overflows is a state planned mass relocation as a response to the devastating 1998 floods. The event brought attention to the vigorous illegal land encroachment by farmers and developers that deeply harmed the environment and reduced of the nature's water regulation capacities. The slogan of the project was called “return of farmlands to forests and lakes”, suggesting a return of grain plots on slopes and reclaimed land to forests, grasslands

and lake areas. 2,460,000 people over four provinces along the Yangtze were reported to have been resettled since 1998. (China News Weekly, 2011) Otherwise, no separate data indicate migration directly and solely as result of Yangtze floods, apart from government initiated relocations such as that pertaining to the Three Gorges Dam construction or others related to water and environment regulatory projects.

Both kinds of displacements meanwhile face the same problem of household registration (*Hukou*) restriction (planned relocation to a smaller extent, as residency status in properly handled cases are changed accordingly). The *Hukou* systems links social welfare of nationals to their places of birth, which means that rural-urban migrants are often-times denied social benefits like public health care, housing and education when they leave their villages to work elsewhere. The system was created in 1950s to prevent formation of ghettos in urban areas, but eventually resulting in a worrying situation where rural-urban labor migrants are treated as second-class citizens in cities. They also constitute China's huge floating population. Most of them earn as low-skilled labors, go back home for Spring Festival during the annual hump of human migrations, and do not return to the previous work place anymore, prompting wage rises and other economic problems. Although *Hukou* requirements have been relaxed to a degree to accommodate economic growth, the floating population is still not officially authorized to dwell permanently in the receiving cities and towns. This is the major social policy obstacle for any permanent migration as a solution to floods.

## 6. LEGAL ISSUES

Three main laws govern issues surrounding our topic of discussion. To start with is the *Water and Soil Conservation Law of the People's Republic of China*, as amended by the 18<sup>th</sup> meeting of the Standing Committee of the 11<sup>th</sup> National People's Congress of the PRC in 2010. The law is:

*“formulated to control and prevent water and soil loss; protect and reasonably utilize water and soil resources; reduce disasters of flood, drought and sandstorm; improve the ecological environment and guarantee sustainable economic and social developments”, (Art.1)*

*where “the state shall give priority to prevention, make overall planning, exercise comprehensive control, adopt measures suited to local conditions, strengthen scientific management, and lay stress on efficiency” (Art. 3)*

*under the supervision of “the water*

*administrative department of the State Council (which) shall be in charge of the water and soil conservation work of the whole nation.” (Art.5) Sub-authorities then include the “river basin administrative bodies” and departments of forestry, agriculture, and land and resources at or above the county level. (Art. 6 and 7)*

This statute emphasizes long-term prevention and protection, overall monitoring of water and soil conditions in the country, and sees itself more appropriately applicable in slow onset, or smaller scale natural or man-made damages to the natural environment. For sudden catastrophes, as the flash floods of summer 2011, other statutes play a more important role. Also about prevention is the *Regulation on the Defense Against Meteorological Disasters*, enacted by the State Council in 2010. Elements of meteorological disasters include

*“damages caused by typhoons, rain and snow storms, sand storms, cold spells, extreme temperatures, droughts, thunders, hails, frosts and fogs.*

*Prevention against direct and indirect damages from flood and drought disasters, soil and tectonic disasters, oceanic disasters, as well as forest and prairie fires shall be governed by respective laws and administrative provisions.” (Art. 2)*

*“Disaster prevention stresses human-oriented, scientific research and development, inter-departmental communication, and societal participation.” (Art.3)*

*“Guiding and coordination efforts should be stressed at the people’s government at the county level and above; where meteorological disaster preventions are incorporated into economic and social development plans, related financial estimates reflected in budgetary plans.” (Art.4)*

Finally, emergency relief work is governed by the *Regulation on the Relief of Natural Disasters* promulgated by the State Council. It details response intensity level (I-IV), supervising authority (headed first by the Natural Disaster Reduction Office, reviewing various demands from localities and coordinating works of various departments, such as transport, logistics, agriculture, trade, food, communication, etc. when the intensity level reduces, work is transferred back to the State Council) and relief procedures, post relief aid and rehabilitation work. What they have in common is a desired cooperation between various government departments at different levels, headed by a strong central office at the top.

These laws have been working in line with a number of other natural-disaster relief laws, including the *Emergency Response Law of the PRC* promulgated by the National People’s Congress,

the *PRC Regulation on the Defense against Earthquakes* and the *Regulation on the Defense Against Drought in PRC* put in place by the State Council. The Twelfth Five Year Plan announced by the National People’s Congress in March 2011 recognized the successes in disaster management during the Eleventh Five Year Plan but accentuated the increased frequency and severity of natural disasters in the same period, naming specifically the Wenchuan and Yushu earthquakes, Zhouqu land and rock slides, snow and cold rains over the South, severe floods, droughts, typhoons, wind hails, ocean ice, heavy snow, heat waves and forest fires. (State Council, 2011) It called for amelioration of disaster prevention and management mechanisms and pertaining legal systems. Further, the Five Year Plan reviewed and republished the five legal instruments discussed above.

Follow up government efforts were observed henceforth, especially in disaster review and documentation at the national level. In the annual disaster report issued by the Office of Disaster Reduction, it is stated that floods and droughts across the PRC in 2011 accounted for 40% and 30% of the nation’s total natural disasters in the year. (Civil Affairs Department Office of National Disaster Reduction, 2012) In another flood prevention meeting that took place in Chongqing in February 2, 2012, data from the 2011 floods had been taken as reference for 2012 estimations and selected area focuses. It reported a total economic damage from floods and the prolonged drought of RMB 23.92 billion. Damages of floods stood at RMB 31.01 billion, affecting 31 localities. As much as 260 rivers countrywide had water levels reaching the alarm benchmark, out of them 50 surpassed the safety guarantee level, and 11 of all documented historic levels. Qujiang, the tributary of Jialing River saw a volume surpassing the 1939 records, making it the biggest flood in 100 years. (Lu, 2012)

From the Three Gorges Dam reevaluation to emergency statutes review and to post disaster policy articulation meetings, differing government actions indicate greater eagerness to better address disaster prevention and management.

However though, according to Zhang Qingfeng, water specialist at the Asian Development Bank, China “has a stunningly agile disaster response system but not a corresponding system of risk reduction and management. In other words, China does not prepare for climate-related disasters; it only reacts to them.” (Zhang, 2011) His critic came in June 2011 right in the midst of the devastating floods that followed the second spell of drought in the Yangtze River basin.

He pointed out that damages of natural disasters could not be reduced because most local

governments missed the opportunity to guard their locality against the impact of the hazards. There was a lack of a comprehensive national policy compelling local governments to keep watch for natural hazards like floods and droughts.

Two studies completed by the Asian Development Bank (ADB) in 2010 on Chinese flood and drought management found the two management strategies highly similar, and “stuck in a reactive mode”. (ADB, 2010a; see also ADB, 2012b) Reactions were limited until after an emergency situation had been declared.

Zhang attributed the problem to an absent separate disaster risk management agency. As articles 5-7 of the *Water and Soil Conservation Law of the People's Republic of China*, article 4 of the *Regulation on the Defense Against Meteorological Disasters*, and various provisions of the *Regulation on the Relief of Natural Disasters* show, risk management responsibilities in the PRC are divided among a number of agencies, which are then brought together by means of a strong central control. This structure limits optimum policy focuses on resources direction and determination of hazard cycles; instead, allows room mainly for an alone-insufficient “reaction” to natural disasters.

## 7. POLICY RECOMMENDATIONS

As already proposed by the ADB report in 2010, the PRC's disaster management should be extended “to a six-step risk management: early warning, monitoring and forecasting; risk assessment; risk mitigation; impact mitigation and emergency responses; recovery, evaluation and contingency planning; and stakeholder participation and public education and awareness.” A sound monitoring and early warning system would help greatly diminish response time and cost, hence the flood damage and restoration cost.

A well-defined disaster management policy should be considered together with other dimensions to build a comprehensive integrated approach. Critical it is that long-term plans devise reserves and healthy ecosystem services that would function during floods and drought. In the case of Yangtze River, ecological degradation both related and not related to the Three Gorges Dam are seen and known. They serve to reduce the resilience of the ecosystem to counter impacts of climate change such as extremities in precipitation.

The State Forestry Administration's large-scale national lake and wetlands survey showed more than 1,000 natural lakes and wetlands disappeared since the establishment of new China, and lake areas totaling 1.3 million hectares reclaimed

for either urban or agricultural development. It is not an avant-garde suggestion that more afforestation programs be put in place as a remedial measure. As for conservation and prevention, existing related legal instruments must be applied with greater vigor. They should together form an integrative river basin management model.

Despite the fact that this paper does not draw a direct causal link between the Three Gorges Dam and the natural disaster discussed, it does try to explore their inter-relatedness. To reduce environmental damage and the need of displacing persons, some experts have suggested limiting the maximum height of the water behind the dam for 30m. Technical solutions as such worth much in depth study, but would be beyond the scope of this study. Meanwhile, holding the manipulation power, the dam operators must be more vigilant of water needs and water conditions in the mid and low reaches of Yangtze. Power generation can in no way override humanitarian needs.

Regarding the flood victims, post-disaster financial compensation had proved to be inadequate. Recovery burden had not been sufficiently shared by the government. Ecological compensations and later-stage assistance mechanisms should be given greater emphasis in government response policies. To facilitate rehabilitation of both urban and rural lives, soft-mechanism social assistances must be provided, such as aid to employment, trainings to strengthen skills, etc. Migration as a post-flood solution to better livelihood has been limited largely due to the *Hukou* system. Calls for the system's reform are already heard. Now or later the government must consider it seriously. Allowing broader population mobility will be a need in the PRC's future development.

## CONCLUSION

Floods as a historic plague on China reappeared in 2011, devastating the Yangtze River basin and other areas of PRC. The fact that they came following months of detrimental droughts show the imbalances and uneven distribution of precipitation brought by climate change. The two disasters depict also the compound water crisis the PRC is facing; the floods and drought caused direct human and food insecurity, aggravated by environmental degradation, and threatening social and economic securities. The 2011 floods must therefore be looked at as part of China's overall water problem.

The Three Gorges Dam was built under strong central government directive to address the plight. With its full operation commencing only a few

years ago, and in view of the recent government admission of its downsides, the project is open to debate once again. Whether the Three Gorges Dam is a mere “blocking” mechanism like the one used by Yu’s father, or a more flexible combination of “block” and “relief”, is yet to be demonstrated by the central government’s future policy directives.

The people affected by the discussed natural disasters and the dam construction portray also a population problem to the PRC. For the 2011 South China floods affected population, evacuation and relocation had been provided when the disaster struck. But people were expected to return to their places of origin, despite annual recurrences of the problem. Appropriate post-disaster social assistances given to individuals were restricted in both the time and material extent. For government

directed permanent relocations pertaining to the Three Gorges Dam, critics have long been pinpointing the deprivation of human rights, as people were forcibly moved, settled in worse living environments and given little social assistance. Head of Hehai University Migration Research Centre and Expert Advisor to Three Gorges Dam Migration Development Shi Guoqing estimated that by 2050, more than 5 million Chinese would become environmental migrants, either due to government regulatory projects over the major river basins or other natural disasters. (China News Weekly, 2011) Present social systems, notably *Hukou* would be one of the leading obstacles to personal mobility as a solution to natural disasters. These would need to be better addressed by the government. ■



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