

GOING BEYOND MITIGATION: THE URGENT NEED TO INCLUDE ADAPTATION MEASURES TO COMBAT CLIMATE CHANGE IN CHINA

I INTRODUCTION

With the release of the Fourth Assessment Report of the Intergovernmental Panel on Climate Change ('IPCC'),¹ it is clearer that global climate change is already a reality, and future warming caused by the emission of greenhouse gases ('GHGs') is probably unavoidable. As a developing country with a large population, low level of economic development, and a fragile ecological environment, China is vulnerable to the impacts of climate change. Changes within China include increased average temperatures, rising sea-levels, glacial retreat, reduced annual precipitation in north and northeast China, and significant increases in southern and north-west China. Extreme climatic events and hydrological events such as floods and droughts are projected to become more frequent in the future, and water resource scarcity will continue across the country. These threats are particularly pressing in agriculture and animal husbandry, forestry, natural ecological systems and water resources, and in coastal and ecologically fragile zones.²

Mitigation and adaptation are widely recognised as two related but distinct methods designed to address climate change.³ However, until recently the focus of debate about global climate change has been on the mitigation of GHG emissions,⁴ while adaptation was put aside. In these circumstances China has put a lot effort into mitigation by the way of energy reforms, GHG emission reduction, industry improvement and development of mode transformation. This article will particularly focus on climate change adaptation brought to the foreground as a result of the international community's abject failure to resolve a number of

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¹ Intergovernmental Panel on Climate Change, 'Climate Change 2007: The Physical Science Basis' in S Solomon et al (eds), *Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press, 2007).

² «中国应对气候变化的政策与行动» [China's Policies and Actions for Addressing Climate Change, 2008] (People's Republic of China) Information Office of the State Council, October 2008, 2.

³ Ian Burton et al, 'From Impacts Assessment to Adaptation Priorities: The Shaping of Adaptation Policy' (2002) 2 *Climate Policy* 145, 145–59.

⁴ Tim Bonyhady, Andrew Macintosh and Jan McDonald, *Adaptation to Climate Change: Law and Policy* (The Federation Press, 2010) I.

critical issues at the United Nations Framework Convention on Climate Change ('UNFCCC') meeting of world leaders in Copenhagen, Denmark in December 2009.⁵ The failure of the Copenhagen summit together with the failure by negotiators at the subsequent Conference of the Parties' meeting at Cancún, Mexico⁶ and the recently concluded meeting in Durban, South Africa to reach a binding agreement on the reduction of GHG emissions has dashed any realistic hope of meeting the target of limiting global warming to a rise in temperature of two degrees Celsius above pre-industrial levels by 2050.⁷ Given the physical attributes of GHG, which will remain in the atmosphere long after they were emitted, the warming phenomenon will not be reversed for at least one century even if we stop emitting GHG immediately. Therefore, the critical issue here is how to adapt to this unchangeable situation.

In the past few years extreme and frequent climatic events, such as floods and droughts, compounded with low adaptive capacity forced China to become increasingly aware of the urgency to adapt to climate change. Though China has proposed that adaptation should be paid equal attention with mitigation, adaptation research and practice is still in its infancy in China, compared to the existing research outcomes on mitigation. In this context this article will discuss China's current environmental policy, law, and practice on adaptation, and to what extent adaptation theories and lessons developed primarily in western countries can be applied in China.

II PART I

A China's Relevant Policy and Law on Adaptation

Policy and law are characterised in many ways. They are formulated by different agencies, employed using different procedures and implemented by means of different tools. However, policy and law will be discussed together in this article,

⁵ Conference of the Parties, United Nations Framework Convention on Climate Change, *Report of the Conference of the Parties on Its Fifteenth Session, Held in Copenhagen from 7 to 19 December 2009 — Addendum — Part 2: Action taken by the Conference of the Parties at Its Fifteenth Session*, UN Doc FCCC/CP/2009/L.1 (18 December 2009); Geoffrey Lean, 'Copenhagen Climate Summit: World Leaders Miss Best Chance', *The Telegraph* (online), 19 December 2009 <<http://www.telegraph.co.uk/earth/copenhagen-climate-change-confe/6841883/Copenhagen-climate-summit-world-leaders-miss-best-chance.html>>.

⁶ Conference of the Parties, United Nations Framework Convention on Climate Change, *Report of the Conference of the Parties on Its Sixteenth Session, Held in Cancún from 29 November to 10 December 2010 — Addendum — Part 2: Action taken by the Conference of the Parties at Its Sixteenth Session*, UN Doc FCCC/CP2010/7 (15 March 2011).

⁷ Conference of the Parties, United Nations Framework Convention on Climate Change, *Report of the Conference of the Parties on Its Seventeenth Session, Held in Durban from 28 November to 9 December 2011 — Addendum — Part 2: Action taken by the Conference of the Parties at Its Seventeenth Session*, UN Doc FCCC/2011/9 (15 March 2012).

for policy and law usually are seen as a collective commitment to a predetermined objective. In addition to that, under an authoritarian regime, policy in China usually has a mandatory effect on subordinate bodies, while law is not always effective except in particular circumstances as the rule of law is still developing and does not yet occupy a dominant position within the Chinese legal consciousness and tradition.

1 *Policies and environmental laws related to climate change adaptation in China*

(a) *National Level*

In accordance with the requirements of the UNFCCC to establish national programs to cope with climate change and influenced by international negotiation progress on adaptation,⁸ China's National Climate Change Program ('CNCCP') was released in 2007, which is regarded as the starting point for China to take adaptation seriously.⁹ CNCCP sets out the guidelines, principles and objectives to deal with climate change, and also identifies the key areas for adaptation and key measures to enhance adaptive capacity, providing policy guidance and impetus for climate change adaptation.¹⁰ Since then, annual reports titled China's Policies and Actions for Addressing Climate Change were released to estimate the progress of CNCCP. In addition to this, a series of policies and plans to address climate change have been implemented in the overall context of national sustainable development strategies, such as the Outline of Medium and Long-term Energy Development (2004–2020), and the Special Plan on Medium and Long-term Energy Conservation, which mainly contribute to economic restructure, energy efficiency improvements, development and utilisation of hydropower and other renewable energies, ecological restoration, and protection.¹¹ Since 2009 departments concerned with vulnerable areas such as agriculture, water resources, forestry and coastal zones, initiated some plans and policies to adapt to climate change, such as the Climate Change Plan on Agriculture, the Comprehensive Plan of National Water Resources, the Climate Change Plan on Forestry and the National Emergency Plan for Meteorological Disaster enhancing adaptive capacity in each area.¹² With a call to build a resource-saving and environment-friendly society, these policies relevant to climate change in general and adaptation in particular,

⁸ The UNFCCC Secretariat, *Climate Change: Impacts, Vulnerabilities and Adaptation in Developing Countries* (10 September 2010) <<http://unfccc.int/resource/docs/publications/impacts.pdf>>.

⁹ 曹格丽, 姜彤 [Cao Geli and Jiang Tong], «中国适应气候变化的政策、行动与进展» [The Policy, Action and Progress of Climate Change Adaptation in China] in 王伟光, 郑国光 [Wang Weiguang, and Zheng Guoguang] (eds), «应对气候变化报告» [Annual Report on Actions to Address Climate Change] (Social Science Academic Press, 2010) 195–216.

¹⁰ «中国应对气候变化国家方案» [China's National Climate Change Program] (People's Republic of China) National Development and Reform Commission, Order No 17, June 2007, 23–5.

¹¹ Ibid 11.

¹² 曹格丽, 姜彤 [Cao Geli and Jiang Tong], above n 9.

are usually combined with energy policy, reflecting China's current core and urgent need to develop sustainably.¹³ A western scholar suggested that China's policy on climate change is best understood as a collection of policies calculated to pursue other interests, such as economic development and social stability, but which have co-benefits for the reduction of GHG emissions.¹⁴

(b) Provincial Level

In June 2008 China initiated the development of provincial level climate change programs. As of November 2011 all the 31 provinces (this includes autonomous regions and municipalities) have released provincial level climate change programs and have proceeded to implement them.¹⁵ These programs or action plans usually identify the key areas of mitigation and adaptation, promote the process of institutional resetting, and enhance regional adaptive capacity.¹⁶ However, unlike mitigation, adaptation is a new topic for most local government officials and requires additional funds to manage climate change risks and adaptive capacity.¹⁷ Unlike western local governments, which are elected by their constituents, China's local governments are not and are beholden to their superior governments. Hence there is little surprise that they place a great deal of emphasis on economic development to enhance growth rates in GDP and leadership abilities are often judged and regarded as a factor in career advancement. In most instances the effectiveness of these programs and action plans has not been assessed.¹⁸

¹³ Qiu Zhong and Guoqing Shi, 'Environmental Consciousness Change: A Comparative Study of the United States and China (1950–2008)' in Sujian Guo, Joel J Kassiola, and Zhang Jijiao (eds) *Environmental Protection Policy and Experience in the US and China's Western Regions* (Lexington Books, 2010) 85, 85–107.

¹⁴ Scott Moore, 'Strategic Imperative? Reading China's climate policy in terms of core interests' (2011) 23(2) *Global Change, Peace & Security*, 147–57.

¹⁵ «中国应对气候变化的政策与行动» [China's Policies and Actions for Addressing Climate Change, 2011] (People's Republic of China) Information Office of the State Council, 22 November 2011.

¹⁶ 曹格丽, 姜彤 [Cao Geli and Jiang Tong], above n 9, 206.

¹⁷ 潘家华, 郑艳 [Pan Jiahua and Zheng Yan], «适应气候变化的分析框架及政策含义» [Adaptation Approaches to Climate Change in China: An Operational Framework] in 王伟光, 郑国光 [Wang Weiguang and Zheng Guoguang] (eds), «应对气候变化报告» [Annual Report on Climate Change Actions, 2010] (Social Science Academic Press, 2010) 300, 300–10.

¹⁸ Xiangbai He, Interview with Interviewee One, National Development Reform Commission of Jiangxi Province (Nanchang, China, 24 October 2011). This paper is based in part on semi-structured interviews conducted by the second author in China from September to October 2011. Interviewees include governmental officials from the national climate change centre, water resource agency, meteorological agency and environment protection agency at central level and local levels. Interviews of some scholars from research institutes and universities contribute to this paper as well. Names of these interviewees will be anonymous for their benefit and will use numbers instead.

Environmental law in China mainly refers to laws and regulations regulating the activities of exploiting, utilising, and protecting the environment and natural resources. These can be categorised into three types: laws to prevent environmental disruption when utilising natural resources, eg water law; laws to prevent environmental pollution and other public hazards, eg water pollution prevention law; and laws to prevent natural disasters and reduce their adverse effects, eg flood control law. In addition to these laws, there are also the environmental protection law, the renewable energy law, the forest law, the grassland law, the land administration law, the law on energy conservation, and the cleaner production promotion law etc, all of which are, in part, relevant to climate change mitigation. It is understandable that there is no reference to climate change in these environmental laws, since these laws were enacted in the 1980s, 1990s and some more recently. It is only in the last few years that climate change has become a hot topic in China. It is through the objectives and substantive provisions of these laws, that we can observe how they contribute significantly to energy conservation, energy efficiency improvement and new and renewable energy development which are the most common methods employed for mitigation. Unlike mitigation, which has the great potential to facilitate sustainable economic development, adaptation has not yet been given serious consideration in the context of China's environmental laws.

2 *Institutions: Who is in Charge of Implementation and Enforcement?*

Climate change is characterised by the Chinese government as both 'an environmental issue and development issue, but ultimately, a development issue'.¹⁹ As a result the National Development and Reform Commission ('NDRC') assumed overall responsibility. However, in 2008, a new Department of Climate Change within the NDRC, was established to deal specifically with climate change.²⁰ Its responsibility is described as:²¹

analysing the economic and social impacts of climate change; drawing up strategies to address climate change; participating in international climate change negotiations; launching international cooperation on addressing climate change and capacity-building; administering Clean Development Mechanism projects and undertaking related energy saving and emission reduction.

Several bureaus share these responsibilities, including mitigation and adaptation activities, as set out in the following schematic diagram.

¹⁹ 庄贵阳 [Zhuang Guiyang] «气候变化挑战与中国经济低碳发展» [The Challenges of Climate Change and the Low Carbon Economy Development in China] (2007) 9–10 国际经济评论 [International Economy Review] 1, 6.

²⁰ 发展与改革委员会应对气候变化司 [Department of Climate Change, National Development and Reform Commission, China], 工作职责 [Working Responsibilities] <<http://qhs.ndrc.gov.cn/jgsz/default.htm>>.

²¹ Ibid.

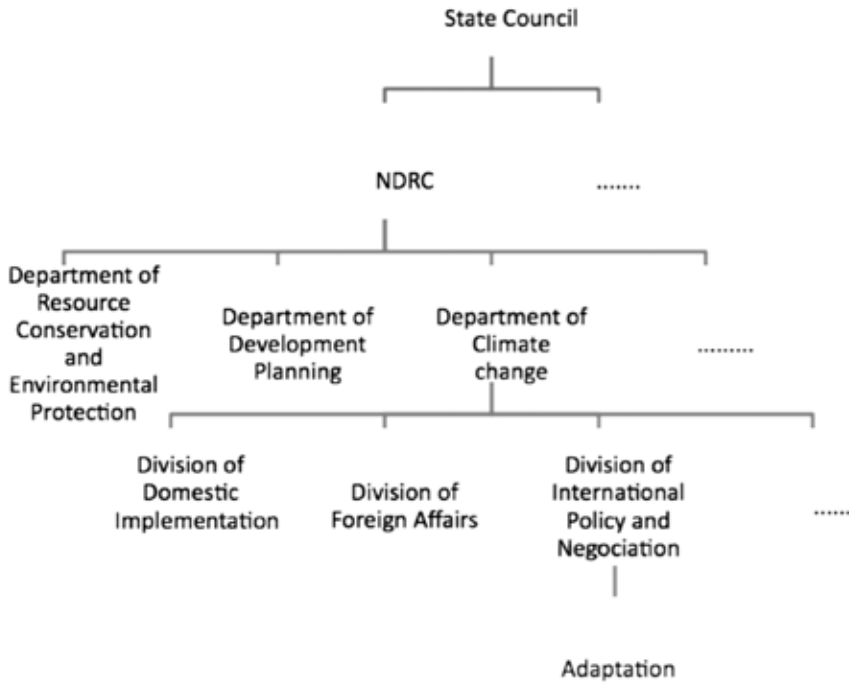


Figure 1: ‘The Structure of Ministries, Departments and Divisions Involved in Climate Change’

It is worth noting that work on climate change adaptation is regulated by the Division of Foreign Affairs rather than the Division of Domestic Implementation. This is partly because much of the emphasis on adaptation in international negotiations has been placed on firstly who should contribute money to help developing countries to adapt and secondly the equity issue associated with adaptation, ie which country should be funded to adapt.²² The key point is the availability of adaptation funds. It is not surprising then that the first priority for the Adaptation Department is to secure adaptation funding from the international community rather than developing domestic adaptation strategies and measures.

In accordance with central level institutional reconstruction, some sub-national level Development and Reform Commissions (‘DRC’) established new departments to administer climate change issues (including mitigation and adaptation) while some provinces work to address climate change within the current administrative and institutional structures.²³ At the city and county level, climate change issues

²² 李玉娥 [Li Yu’e], «气候变化适应行动及谈判进展» [Climate Change Adaptation Actions and Negotiation Process] in 王伟光, 郑国光 [Wang Weiguang and Zheng Guoguang] (eds), «应对气候变化报告» [Annual Report on Actions to Address Climate Change, 2009] (Social Science Academics Press, 2009) 92.

²³ For instance, Jiangxi, Qinghai and Hubei Province are the former case while Shandong and Henan Province are the latter.

are usually found within environmental departments.²⁴ To some extent, this institutional realignment where it occurs is dependent on the central government's mandatory requirements rather than the need to address and properly administer climate change concerns.²⁵

According to CNCCP, specific fields such as agriculture, water resources, forestry, the coastal zone, and health are identified as more vulnerable areas, and need to promote adaptive capacity as a priority.²⁶ Under the policy-making model 'fragmented authoritarianism',²⁷ different departments divide their responsibility in accordance with environment media or sectors, which is also reflected in climate change adaptation. Motivated and supported by various levels of DRCs within their own territory, detailed and diverse adaptation measures are initiated and implemented by different departments, such as the departments of agriculture, forestry, water resources, etc.

B *The General Theories/Lessons of Adaptation*

A number of different adaptation definitions appear in the literature. In the Third and Fourth IPCC Assessment Reports, adaptation was defined, focusing on vulnerability and adaptive capacity, as follows:

Adaptation to climate change is the adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities.²⁸

Likewise, the United Nations Development Program offers a very similar definition — 'adaptation is a process by which strategies to moderate, cope with and take advantage of the consequences of climatic events are enhanced, developed, and implemented' stressing that it consists of strategies in response to climate change.²⁹ The UNFCCC at its Cancún Meeting in 2010 set up the Cancún Adaptation Framework, which stressed the need for action in this area based on international cooperation, 'to reduce vulnerability and build resilience in developing country parties, taking into account the urgent and immediate needs of those developing countries that are particularly vulnerable.'³⁰

²⁴ There are four levels of government which set-up the Development and Reform Commission: central, provincial, city, and county level.

²⁵ Xiangbai He, Interview with Interviewee Two (Nanchang, 24 October 2011).

²⁶ «中国应对气候变化国家方案» [China's National Climate Change Program], above n 10.

²⁷ Kenneth Lieberthal and Michel Oksenberg, *Policy Making in China: Leaders, Structures and Processes* (Princeton University Press, 1988) 137.

²⁸ IPCC, above n 1, 6.

²⁹ Ian Burton, Elizabeth Malone and Saleemul Huq, *Adaptation Policy Frameworks for Climate Change: Developing Strategies, Policies and Measures* (Cambridge University Press, 2005) 1.

³⁰ Conference of the Parties, United Nations Framework Convention on Climate Change, *Report of the Conference of the Parties on its Sixteenth Session, Held in Cancun from 29 November to 10 December 2010 — Addendum — Part 2: Action*

Given these different definitions, adaptation at least should signify: natural and human system adjustment, vulnerability reduction and adaptive capacity enhancement, harm moderation, and opportunity exploitation.

The academic and policy research on adaptation has increased sharply in the past decade and presented various thematic theories and lessons. This article will discuss some basic theories which are closely aligned with China's present adaptation research and experience.

1. *The Interaction Between Adaptation and Sustainable Development*

To rely on adaptation does not mean to exempt mitigation or to weaken society's willingness to mitigate climate change.³¹ The enhancement of adaptive capacity is necessary to reduce the impacts caused by GHG emissions, and vice versa, mitigation could reduce both the pace and extent of future climate change impacts, slowing down the need to adapt to climate change. Therefore, it is no longer a question of whether to mitigate climate change or adapt to it, but a question of how to take effective win-win response measures to balance adaptation and mitigation.³² Under the UNFCCC, a significant number of the world's governments have committed to address climate change in an integrated and holistic manner by taking climate change considerations into account,³³ to the extent feasible, in their relevant social, economic, and environmental policies and actions.³⁴ In some specific areas, mitigation and adaptation are synergised, such as the planting of trees which contributes to both sequestering CO₂ and reducing ecosystem vulnerability. However, the scope of these synergies is quite limited because of the differences between mitigation and adaptation.³⁵ Due to finite resources and funding, compounded with the severe challenges facing developing countries in alleviating poverty, developing their economies and providing health care and equal education, it is increasingly difficult to develop and fund optimal adaptation measures.

Climate change is, to a large extent, riddled with inherent scientific uncertainty which implies that current technologies, tools or scenarios are unable to formulate

Taken by the Conference of the Parties at Its Sixteenth Session, UN Doc FCCC/CP/2010/7/Add.1 (15 March 2011).

³¹ Richard J T Klein, E Lisa F Schipper and Suraje Dessai, 'Integrating Mitigation and Adaptation into Climate and Development Policy: Three Research Questions' (2005) 8 *Environmental Science and Policy* 579, 579–88.

³² Yangfan Li et al, 'Integrating Climate Change Factors into China's Development Policy: Adaptation Strategies and Mitigation to Environmental Change' (2011) 8(4) *Ecological Complexity* 294–9.

³³ *United Nations Framework Convention on Climate Change*, opened for signature 20 June 1992, 1771 UNTS 107 (entered into force 21 March 1994) 3.

³⁴ Jamie Pittock, 'National Climate Change Policies and Sustainable Water Management: Conflicts and Synergies' (2011) 16(2) *Ecology and Society* 25.

³⁵ *Ibid.*

clear and constructive projections of future climate change risks.³⁶ Not only does scientific uncertainty exist, but also epistemological uncertainty (who should be involved in decision-making and whose values count) and ethical uncertainty (who is responsible) must also be considered.³⁷ In that sense, any attempt to map the potential impacts associated with climate change and make policy, legal and institutional changes is inherently speculative because of the cumulative effect of these uncertainties.³⁸

In the context of adaptation, almost all researchers agree that uncertainty pervades the whole process of adaptation — from decision-making to implementation, and we will have to live with and embrace uncertainty for a long time.³⁹ As a consequence a ‘no-regrets’ or ‘low-regrets’ principle must be employed to reduce the risk of failure with respect to policy or law or both. The no-regrets principle requires that adaptation strategies and measures should have the ability to deliver and resolve other economic, social or environmental concerns rather than depending primarily on climate change projections, thus reducing the possibility of wasted investment.⁴⁰ With this principle, adaptation is best mainstreamed in conjunction with routine sustainable development outcomes, such as poverty alleviation, sustainable economic development and political reform and so on.

³⁶ Gabriel Eckstein, ‘Water Scarcity, Conflict, and Security in a Climate Change World: Challenges and Opportunities for International Law and Policy’ (2010) 27(3) *Wisconsin International Law Journal* 410–60.

³⁷ Anne Leitch, Ben Harman and Marcus B Lane, ‘From Blueprint to Footprint: Climate Change and the Challenge for Planning’ in Tim Bonyhady, Andrew Macintosh and Jan McDonald (eds), *Adaptation to Climate Change: Law and Policy* (Federation Press, 2010) 63, 69–71.

³⁸ Fulco Ludwig and Marcus Moench, ‘The Impacts of Climate Change on Water’ in Fulco Ludwig et al (eds), *Climate Change Adaptation in the Water Sector* (Earthscan, 2009) 44.

³⁹ Jan McDonald, ‘Mapping the Legal Landscape of Climate Change Adaptation’ in Tim Bonyhady, Andrew Macintosh and Jan McDonald (eds), *Adaptation to Climate Change: Law and Policy* (Federation Press, 2010) 1 1–37; Bernie J O’Brien and Mark J Sculpher, ‘Building Uncertainty into Cost-Effectiveness Rankings, Portfolio Risk-return Tradeoffs and Implications for Decision Rules’ (2000) 38 *Medical Care* 460, 460; John H Matthews and A J Wickel, ‘Embracing Uncertainty in Freshwater Climate Change Adaptation: A Natural History Approach’ (2009) 1(3) *Climate and Development* 269–79; John Reilly and David Schimmelpennin, ‘Irreversibility, Uncertainty and Learning: Portraits of Adaptation to Long-term Climate Change’ (2000) 45 *Climate Change* 253–78; 夏军, 刘春葵, 任国玉 [Xia Jun, Liu Chunzhen and Ren Guoyu], «气候变化对我国水资源影响研究面临的机遇与挑战» [‘Opportunity and Challenges of the Climate Change Impact on the Water Resource’] (2011) 26(1) *地球科学进展* [*Advances in Earth Research*] 1, 1–12.

⁴⁰ Janet Abramovitz et al, ‘Adapting to Climate Change: Natural Resource Management and Vulnerability Reduction’ (Background Paper, Task Force on Climate Change, Adaptation and Vulnerable Communities, World Conservation Union, Worldwatch Institute International Institute for Sustainable Development, Stockholm Environment Institute, Boston, 2001) 10; McDonald, above n 39, 31.

However, adequate attention must be given to two issues. Firstly, a no-regrets principle of adaptation is valid and effective when there is no scientific and certain knowledge of future climate change and/or impacts of adaptation measures, and thus should only be employed for a short term. However, this uncertainty should not be used as an excuse to delay longer-term plans and strategies, which should be based on a greater understanding of the actual climate change impacts to particular social-ecological systems than we currently possess.⁴¹ Secondly, even with a no-regrets principle, it is necessary to increase investment to implement adaptation measures, especially in developing countries which often lack basic adaptation infrastructure, information and systems. In this case governments must be very careful to keep a balance between adaptation needs and other sustainable development requirements.

2. Context Specific Nature of Adaptation Measures

Unlike mitigation, whose planning and measures are generally designed and implemented uniformly at the international and national level, adaptation strategies and responses are context specific, i.e. they are often developed and employed at a state, regional, local, and community or individual level.⁴² That means there are no panaceas for climate change adaptation and effective adaptation measures are highly dependent on specific geographical and climate risk factors as well as institutional, political, legal and financial constraints. It is context specific because climate change has different impacts in different places due to climate variation and a range of other factors.⁴³ An example of how climate change affects different places in different ways calling for different adaptation strategies is that in the coming years there will be more droughts in the north and northeast of China while flood frequency in the southern area will increase.⁴⁴

Another important aspect of the context specific nature of adaptation is that climate change disproportionately affects various social groups (differentiated by attributes such as gender, minority and age) with existing social, economic or physical vulnerabilities on a local and national scale.⁴⁵ Usually the most vulnerable groups and those with lower adaptive capacity are more severely affected by climate

⁴¹ Robin Kundis Craig, ‘“Stationarity Is Dead” — Long Live Transformation: Five Principles for Climate Change Adaptation Law’ (2010) 34 *Harvard Environmental Law Review* 9, 10–73.

⁴² Andrew Macintosh, ‘A Theoretical Framework for Adaptation Policy’ in Tim Bonyhady, Andrew Macintosh and Jan McDonald (eds), *Adaptation to Climate Change: Law and Policy* (Federation Press, 2010) 41.

⁴³ Barry Smit and Johanna Wandel, ‘Adaptation, Adaptive Capacity and Vulnerability’ (2006) 16(3) *Global Environmental Change* 282, 282–92.

⁴⁴ 夏军, 刘春臻, 任国玉 [Xia Jun, Liu Chunzhen and Ren Guoyu], above n 39, 2–3.

⁴⁵ Kirstin Dow, Roger E Kasperson and Maria Bohn, ‘Exploring the Social Justice Implications of Adaptation and Vulnerability’ in W Neil Adger et al (eds), *Fairness in Adaptation to Climate Change* (MIT Press, 2006) 76–97.

change.⁴⁶ This further exacerbates social justice issues, which are already a serious problem under current economic, social, and environmental pressures, but to date have been largely neglected in a mitigation context. Given this circumstance, social justice should be the central pursuit of adaptation strategies and measures aiming at reducing risks or uncertainties in these areas. A focus on building the adaptive capacity of disadvantaged and vulnerable groups could help to address social justice inequities in the long run. Providing proper and efficient relief when they are affected and facing severe loss is also indispensable. Equity and justice thus can be vital criteria to assess the efficacy of adaptive laws and institutional arrangements.

Not only are the impacts of climate change often context specific, the adaptation capacity (or lack thereof) of governments in various regions frequently confirm that response actions would be better left to local governments. Local government is best positioned in the context of delivering local government functions including the responsibility for laws and regulations that can influence adaptation and mitigation; and the ability to demonstrate leadership and innovative solutions in this area.⁴⁷ There is a growing awareness in some countries that it is better to leave local governments with power and resources to design and implement adaptation strategies. This allows them to tailor adaptation responses to local specific impacts and adaptation capacity.

3. *Vulnerability-Reduction Approach*

Two significantly different adaptation approaches are in widespread use today: the impacts-driven approach and the relatively new vulnerability-reduction approach.⁴⁸ The former approach is modelling the impact of climate change on natural and human systems using simulations or scenarios produced by global climate models ('GCMs'), followed by debate over adaptation options to reduce exposure to predicted impacts. This reliance on models is explained partially by the preponderance of physical scientists in the adaptation research community.⁴⁹ This approach provides vital information on potential climate change impacts for policy or decision-making processes through scientific modelling and is the basis for further response. To date, the impacts-driven approach is applied in the context of most adaptation research and policy discussion undertaken pursuant to the UNFCCC, and by national governments.⁵⁰ However, putting too much emphasis on impacts simplifies the context, decision-making processes and

⁴⁶ See IPCC, above n 1. Adaptive capacity refers to the: 'ability or potential to respond successfully to climate variability and change, including adjustments in behaviour, resources and technologies, and accessibility to needed information, resources and financial or social support'.

⁴⁷ See, eg, Conference of the Parties, Durban Local Government Convention, *Durban Adaptation Charter for Local Governments*, Durban, South Africa, (4 December 2011) <<http://www.iclei.org/?id=12503>>.

⁴⁸ James Ford, 'Emerging Trends in Climate Change Policy: The Role of Adaptation' (2008) 3(2) *International Public Policy Review* 9, 9.

⁴⁹ Ibid.

⁵⁰ Poh-Ling Tan, 'Adaptation Measures for Water Security in a Changing Climate: Policy, Planning and Law' in Tim Bonyhady, Andrew Macintosh and Jan McDonald

relevant elements of adaptation and neglects the complexity of social and economic dynamics which shape vulnerability to climate change.⁵¹ Furthermore, while climate change scenarios are prevalent with uncertainty, predicting future impacts precisely becomes impossible. There appears to be an increasing need to develop a vulnerability-reduction approach, which can be regarded as a preventative method to be employed alongside the impacts-driven approach, more akin to an end-of-pipe treatment method.

The vulnerability-reduction approach is a process-based approach which will direct the focus of adaptation policy and research to address the root causes of climate vulnerability, and which highlights measures that reduce both climate exposure and human sensitivity, and increase adaptive capacity.⁵² Due to the changing and uncertain attributes of climate change and its impacts, it is necessary to monitor and evaluate the dynamic changes to shape forthcoming decision-making processes. This approach does not exclude the impacts-driven approach whose techno-engineering response can play an important role in reducing exposure to climate change impacts, but attempts to facilitate adaptation from various aspects with diversified mechanisms. Rather than focusing on impacts in the mitigation context, this new approach broadens the debate to include improved institutional arrangements and other mainstream concerns such as economic development, information publication, education, public health, poverty alleviation and equitable distribution of resources.⁵³ This extended range of issues corresponds to the requirement of the no-regrets principle, which delivers significant benefits in the form of enhanced ecosystem, social or economic resilience or adaptive capacity, regardless of the precise impacts of climate change.⁵⁴

4. New Governance – a Collaborative Decision-Making Structure and Process

In a risk-adverse society, decision-making must often rely on affected people's opinion, definition and evaluation of risk, which implies a democratic decision-making process. Moreover, the impacts of climate change are widespread and adaptation is not normally in the realm of governments' experience or expertise, hence the government by itself is not competent to solve all dilemmas or risks. Adaptation calls for all members of society, from individual citizens to local and national governments to learn to cope with the changes and enhance their adaptive capacity to face both present and future climate change impacts well beyond their existing empirical knowledge, understanding and experience.⁵⁵

(eds), *Adaptation to Climate Change: Law and Policy* (Federation Press, 2010) 135,137.

⁵¹ Ford, above n 48, 10.

⁵² Ibid 11.

⁵³ Tan, above n 50, 138.

⁵⁴ Abramovitz et al, above n 37; IPCC, above n 1, 246.

⁵⁵ W Neil Adger et al, 'Adaptation to Climate Change in the Developing World' (2003) 3 *Progress in Development Studies* 179, 179–80.

Current decision-making structures and processes, whether in the context of Western democracies or in developing authoritative or totalitarian countries are not open and comprehensive enough to adequately reflect affected peoples' interests and aspirations. In recent years a theory referred to as the 'New Governance' theory has been championed by a growing number of scholars in environmental law and other legal disciplines.⁵⁶ New Governance turns away from the familiar model of command-and-control style, fixed-rule regulation by administrative fiat, and moves towards a new model of collaborative, multi-party, multi-level, adaptive, and problem-solving governance.⁵⁷ This signals a shift away from the top-down governmental structure, that by and large make decisions independently, to a governance regime that incorporates communities and non-governmental actors, away from prescribing, regulating and implementing towards facilitating, providing incentives, coordinating and empowering.⁵⁸ Under the New Governance theory elements, such as the decentralisation of decision-making structures, public participation, flexibility, combination of 'hard' and 'soft' approaches, learning while doing, empowerment, facilitation and providing incentives, collaboration and coordination among different medias, sectors and interests, lie at its core.

III PART II

A *The Application of Adaptation Theories in China*

Most of the above theories and lessons of adaptation are derived from western scholars, who base their research on Western developed markets and democratic forms of government. On the one hand, there is approximately a 10-year gap between western research on adaptation and Chinese research which implies that there is lack of a systematic knowledge base to assimilate and transform western developed theories and lessons.⁵⁹ On the other hand, it must be acknowledged that China has a poorly developed legal tradition under a centralised, undemocratic political system.⁶⁰ Hence, it is problematic as to whether western developed theories and lessons can take root and flourish in China. It is important to be aware of the Chinese maxim and potential risk of the 'curse to the later comer', which holds that if the background, social and political context, institutional arrangements

⁵⁶ Orly Lobel, 'The Renew Deal: The Fall of Regulation and the Rise of Governance in Contemporary Legal Thought' (2004) 89 *Minnesota Law Review* 342; Cristie L Ford, 'New Governance, Compliance, and Principles-Based Securities Regulation' (2008) 45(1) *American Business Law Journal* 1, 1–60; Alana Klein, 'Judging as Nudging: New Governance Approaches for the Enforcement of Constitutional Social and Economic Rights' (2008) 39 *Columbia Human Rights Law Review* 351.

⁵⁷ Bradley C Karkkainen, "'New Governance' in Legal Thought and in the World: Some Splitting as Antidote to Overzealous Lumping' (2004) 89 *Minnesota Law Review* 471, 473.

⁵⁸ Leitch, Harman and Lane, above n 37, 73.

⁵⁹ While Chinese scholars began research on adaptation from the scientific perspective at the beginning of the 21st century, the research on legal and social adaptation only initiated recently, in the late 2000s.

⁶⁰ Joseph W Dellapenna, 'Few Words on Law and the Environment in China' (2005) 24 *Temple Journal of Science, Technology & Environmental Law* 367, 367.

of technologies, theories and experienced are not carefully investigated when learning from others, it will become a disadvantage ('a curse') to the learner countries.⁶¹

Therefore, this section of this paper will examine in further detail some of the difficulties facing policy makers responsible for ensuring that China's response to climate change is both adequate and capable of being integrated with other key policy objectives. In addition, the likelihood of China employing more aggressive measures will be discussed and recommendations for future actions will be suggested.

1. *The Interaction Between Adaptation and Sustainable Development*

Because climate change in China is primarily identified as a development issue, China has invested a significant amount of time and effort on establishing and refining mitigation measures through resource conservation, emission reduction, renewable energy exploitation and industry structure adjustment, that are directly related with and contribute to future sustainable development. With a huge population, vulnerable ecosystems and low adaptive capacity, the impacts of climate change on China's economic, social and environmentally unsustainable development underline the absolute necessity for China to quickly learn how to adapt to climate change.⁶² Furthermore, because China has placed economic development, poverty alleviation and improvement of peoples' living standards as essential, urgent and core tasks of government, adaptation to climate change must be mainstreamed in China's sustainable development agenda.⁶³ It is no accident that China is working assiduously to combine adaptation with sustainable development, especially economic development.

Firstly, in the new twelfth five-year plan (2011–15),⁶⁴ there is a clear requirement that climate change should be taken into account when pursuing economic development, constructing basic infrastructure and formulating important plans or programs.⁶⁵ This requirement facilitates adaptation from a policy-based level and provides the potential of adaptation consideration on various sub-national levels. Secondly, in the CNCCP, agriculture, water resources, forestry and coastal zones

⁶¹ 杨小凯 [Yang Xiaokai], «后发劣势» ['Curse to the Later Comer'] [2004] 8 *新财经* *New Finance and Economy* 120, 120–2.

⁶² 王守荣 [Wang Shourong], «气候变化对中国可持续发展的影响与应对» [*The Impacts of Climate Change on China's Economic and Social Sustainable Development and Response Actions*] (科学出版社) [China Science Press] (2011) 182.

⁶³ Ibid.

⁶⁴ A five-year plan is China's important national economic and social development plan starting from 1953. It provides blueprints and targets for coming years' economic, social and environmental development on national, regional, provincial and local levels.

⁶⁵ «中华人民共和国国民经济和社会发展第十二个五年规划纲要» [The Twelfth National Economic and Social Development Five-Year Plan] (People's Republic of China) National People's Congress, 16 March 2011, ch 6.

are identified as the vulnerable areas for adaptation to climate change. Since then, in order to enhance their adaptive capacity, action plans in those areas covered by, the Climate Change Action Plan on Agriculture, the Climate Change Action Plan on Forestry, and the Comprehensive Plan of National Water Resources have been formulated and implemented.⁶⁶ In addition, measures such as infrastructure construction; the introduction of agriculture insurance; programs to promote the ability to react to emergent disasters and steps to improve the certainty of scientific projection etc. have also been introduced to enhance adaptive capacity.⁶⁷ Guided by the no-regrets principle, these activities can and should be used to facilitate other aspects of sustainable development when contributing to adaptive capacity building.

As a developing country, China has a more urgent need than Western countries to mainstream adaptation in sustainable development processes in order to avoid additional cost and investment. Over the next few years, there will undoubtedly be considerably more discussion about how to optimise adaptation choices to promote sustainable development.

At present the Chinese government needs to put much more emphasis on social and environmentally sustainable development rather than focusing primarily on economic development utilising a suite of comprehensive and innovative tools rather than relying, for the most part, on mainly administrative ones. Theoretically, adaptive capacity is determined by society's economic wealth, information and knowledge, technology, infrastructure, institutions, equity, and natural and social capital.⁶⁸ This means that if China employs a comprehensive approach to facilitating social sustainable development (for example, promoting democratic processes, reducing social injustice, facilitating information access and public participation, and recognising basic rights such as the freedom to organise), the adaptive capacity will be improved in a more balanced, sustainable way and the economy will develop more sustainably.⁶⁹ Secondly, although there has long been a requirement for environmental concerns to be synthesised and synchronised with economic development,⁷⁰ the environmental status quo has resulted in virtually no significant improvement in pollution levels after many years' experience with both the implementation and enforcement of environmental policy and law.⁷¹ Reforms to insure that there is a significant improvement in environmental quality in a range of areas are long overdue and it is apparent that continued reliance on the current environmental regulatory regime, particularly in large urban centres will

⁶⁶ 曹格丽, 姜彤 [Geli and Tong], above n 9.

⁶⁷ Ibid.

⁶⁸ McDonald, above n 39; Klein, Schipper and Dessai, above n 31, 580.

⁶⁹ 蔡定剑 [Cai Dingjian], «民主是一种现代生活» [*Democracy is a Modern Life Style*] (社会科学文献出版社 [China Social Science Academic Press], 2011) 23–30.

⁷⁰ Zhong and Shi, above n 13, 85–107.

⁷¹ Zunxan Chen, 'Tackling China's Water Pollution Problem: A Legal and Institutional Perspective from Taihu Lake Water Pollution Control' (2005) 24 *Temple Journal Science Technology & Environmental Law* 325, 325–50.

not lead to a significant improvement without re-calibrating the balance between development and environmental sustainability.

2. *The Context Specific Nature of Adaptation*

China does quite well in putting this theory into practice. The context specific nature of climate change impacts and the specific counter measures that may be taken to reduce or alleviate these impacts are relatively well understood by both scholars and practitioners. Firstly, although all sub-national DRCs are required to establish corresponding departments to deal with climate change impacts, their respective attitude and reactions vary depending on the severity of climate change impacts on that particular region and the relevant government officers' attitude to climate change.⁷² For example, Hubei Province and Jiangxi Province take adaptation more seriously than Shandong Province because of their more vulnerable ecosystems.⁷³ Secondly, after the CNCCP was released, each province is now responsible to initiate the process to formulate its own provincial program. As of November 2011, all provinces have issued their own programs and have started to implement them. Thirdly, the climate change impacts on eight regions, including Northern China, Southern China, North-eastern China and Xinjiang Province have been assessed and reports issued.⁷⁴ Fourthly, different river basins and regions have taken various measures to adapt to climate change. For example, in the Three Gorges Dam area, where extreme events, soil erosion and geological disaster occur quite often in the context of climate change, measures like improving the predictive ability for extreme events, launching ecosystem protection projects and developing natural disaster response mechanisms have been formulated to enhance adaptive capacity.⁷⁵ For Poyang Lake, which overlaps parts of Jiangxi territory and connects with the Yangtze River, including areas containing natural wetlands and high biodiversity values, a Mountain-Yangtze River-Poyang Lake Program has been launched to develop a sustainable lake basin.⁷⁶ Under this program, adaptation strategies covering water resources, agriculture, ecosystems, transportation and human health are being used to promote adaptive capacity.⁷⁷ Finally, a program named Gender Equality in Social Adaptation to Climate Change in Poyang

⁷² Xiangbai He, Interview with Interviewee One from the National Development and Reform Commission of Jiangxi Province (Nanchang, 24 October 2011).

⁷³ Xiangbai He, Interview with Interviewee Two from Meteorological Bureau, Jiangxi Province (Nanchang, 24 October 2011).

⁷⁴ Xiangbai He, Interview with Interviewee Three from National Climate Centre (Beijing, 22 September 2011).

⁷⁵ 曹格丽, 姜彤 [Geli and Tong], above n 9; 徐明, 马超德 [Xu Ming and Ma Chaode], «长江流域气候变化脆弱性与适应性研究» [*Yangtze River Basin Climate Change Vulnerability and Adaptation Report*] (中国水利水电出版社 [China Waterpower Press], 2009) 61–3.

⁷⁶ Ibid.

⁷⁷ 殷剑敏, 陈晓玲等 [Jianmin Yin], «鄱阳湖流域气候变化影响评估报告» [*China Climate Change Impact Assessment Report: Poyang Lake Basin*] (气象出版社 [China Meteorological Press], 2011) 162–72.

Lake Community, initiated and funded by UNWOMEN, is being carried out to investigate the impacts of climate disaster on women in poverty areas.⁷⁸

With a broad territory, complex ecosystems and diversified economic and social levels of development, the context specific nature of adaptation cannot be more important than in a country like China. Unfortunately, it is still uncertain whether the less-developed research targeting vulnerable groups will receive the attention it deserves in the near-future.

It is appropriate and necessary to formulate provincial level programs because of context specific attributes of climate change. However, when reviewing these provincial programs, it is obvious that much of the content is simply duplicated from the 2007 NCCP and does not provide effective guidance taking into account particular province situations and concerns. Furthermore, is it necessary and effective to require every province to do so regardless of the provincial impacts of climate change? Furthermore, is it more effective to initiate and implement a program on the provincial level or on the regional level? Impacts of climate change are usually assessed at regional or basin level, while implementation of programs is based on the provincial level.⁷⁹ In such instances, efficient and effective adaptation needs collaboration and information-sharing among provinces in the same region. In addition, conflicts should be resolved when designing and implementing adaptation strategies between provinces and river basin commissions. Mal-adaptation risks should also be assessed and prevented in cases where adaptation measures effective in one area may cause adverse impacts in other areas. Additionally, the impacts of climate change on different groups and recommended adaptation measures should be researched and assessed for implementation in the future, which is highly relevant to the one of the government's core interests, namely, societal stability.⁸⁰

3. *Vulnerability-Reduction Approach*

Among the various ways to address the adverse impacts of climate change too much attention is focussed on the mitigation of GHGs emissions and this results in too much reliance on science and technology. Governed by a group of scientists and engineers,⁸¹ and underpinned by 'science and technology as the primary productive

⁷⁸ UNTGG China Gender Facility, UN Women China, *Adopting a Participatory Gender-Integrated Approach (PGIA) for Climate Change Adaptation Actions to Enhance Biodiversity Conservation in Poyang Lake (PYL) Region* (20–22 June 2012).

⁷⁹ See, eg, «中国应对气候变化国家方案» [China's National Climate Change Program], above n 10, 48–59. Impacts of climate change are identified and classified in different regions; serious reports of climate change impacts funded by China Meteorological Commission are carried out on a regional and basin level.

⁸⁰ Moore, above n 14, 147–57; 蔡定剑 [Cai Dingjian], above n 66, 17–23.

⁸¹ Among nine members of the CPC's (Communist Party of China) Political Bureau — China's central committee to select the nation's top leaders, such as the President, Primary Minister and the Committee of the People's Congress — most of them have an education and working background in science, technology and engineering.

forces',⁸² it is little wonder that various levels of Chinese governments, both central government and local governments, tend to resort to science and technology for the solutions when confronting problems. In CNCCP and other climate change plans formulated at local levels, most recommendations for adaptation in the water sector, for example, comprise technology adoption, infrastructure construction and the use of economic instruments.⁸³ 'Softer' adaptation methods, such as enhancing knowledge, providing information, managing changes and legal instruments, which provide greater benefits to nature and human livelihoods and long-term flexibility in addressing negative impacts from anthropogenic climate change, are taken lightly.⁸⁴ This approach can also be seen in the context of the adaptation measures put forward in China's environmental law, such as improving the accuracy of monitoring systems, constructing dams, dikes and other facilities, replacing farming systems with more adaptive ones, land use planning, transforming water management approaches and other 'hard' solutions. In most instances the reason given for a failure of an effective response in extreme events such as floods and droughts is attributed to 'insufficient infrastructure', without investigating the ecosystem vulnerability and explaining the root cause of this vulnerability.⁸⁵ This simplified causality leads to simplified solutions: building more and more infrastructure which, in turn, may disturb the delicate balance upon which the ecosystem depends and consequently lead to more frequent extreme events. Therefore, a vicious circle is evident in China's adaptation responses due in large part to an entrenched reluctance to go beyond an impacts-driven approach.

In the short term, there appears no realistic possibility to change the leadership structure, which implies that science and technology will still play a leading role over the next few years. Adoption of a vulnerability-reduction approach mainly relies on Governors' (central and local) individual predisposition to embrace progressive change. As mentioned earlier, adaptation research is still in its infancy in China, especially in the areas of social and legal research. Although the NDRC has initiated a program Climate Change Legislation,⁸⁶ it is still unsure to what

⁸² Xiaoping Deng brought out this catchphrase during China's Reform and 'open-up' period in 1988, and then it became the guideline of China's economic development.

⁸³ «中国应对气候变化国家方案» [China's National Climate Change Program], above n 10; «湖北省应对气候变化行动方案» [Hubei Province's Climate Change Plan] (Hubei Province) National Development and Reform Commission, January 2011.

⁸⁴ Suzanne Ebert, Orieta Hulea and David Strobel, 'Floodplain Restoration along the Lower Danube: A Climate Change Adaptation Case Study' (2009) 1(3) *Climate and Development*; «中国应对气候变化国家方案及试点省份应对气候变化方案建议报告汇编» [China's National Climate Change Program and Report of Experimental Provinces' Advice on Dealing with Climate Change] (People's Republic of China) National Development and Reform Commission, June 2007.

⁸⁵ See, eg, 杨万国 [Yang Wanguo] «四川水利官员: 西南大旱背后凸显“水利欠账» [Sichuan Irrigational Governmental Official: Drought in Southwest Demonstrates lack of Water Facilities] (24 March 2010) <<http://city.sina.com.cn/2010-03-24/2038.html>>.

⁸⁶ 发展与改革委员会 [National Development and Reform Commission], «发展与改革委员会气候变化司就应对气候变化立法公开征询意见» [The Department of Climate

degree this program can narrow the current gap between environmental law and environmental implementation.

The vulnerability-reduction approach can coexist with a preventative approach, which has been recognised an effective method in tackling environmental pollution in China's environmental laws.⁸⁷ Incorporating other approaches as part of a comprehensive, preventative approach does not whittle away the power and effectiveness of science and technology, but attempts to resolve problems at source through a more comprehensive and sustainable approach. The Chinese government should encourage and facilitate research on adaptation from a legal, social, ethic and even cultural perspective to find out an effective strategy. Moreover, the focus of any government adaptation response should be directed at the underlying causes of adverse climate change impacts rather than dealing only with the impacts themselves.

4. *Adopting Collaborative Decision-Making Structures and Processes*

In China, various levels of DRCs take responsibility of climate change issues from a policy guidance, strategy formulating and action promotion perspective. As discussed earlier detailed adaptation strategies and measures are taken by various departments within the context of their own responsibilities. Here, the Department of Environment Protection will be taken as an example to illustrate how decisions on adaptation are made under China's present decision-making structure.

Under China's environmental protection law decisions are made by administrative departments;⁸⁸ secondly, responsibility for supervision and management for a range of environmental affairs is divided according to different sectors. With this regime structure and based on China's environmental law regime, which rigidly relies on fixed, uniform regulatory instruments, such as technology standards and regulatory prescriptions, most environmental decisions are designed and implemented according to the will of decision-makers and relevant experts. However, when confronting climate change, which cuts across economic, social, environmental, technical and cultural areas, this management regime faces great challenges.⁸⁹ This

Change, NDRC is Consulting on Climate Change Legislation Publicly] (3 October 2011) <http://www.sdpc.gov.cn/yjzq/t20110310_399080.htm>.

⁸⁷ «中华人民共和国环境保护法» [Environmental Protection Law of People's Republic of China] (People's Republic of China) National People's Congress, Order No 22, 26 December 1989, arts 16, 24, 25, 27, 30; «中华人民共和国大气污染防治法» [Air Pollution Prevention Law of People's Republic of China] (People's Republic of China) National People's Congress, Order No 32, 29 April 2000, art 15; «中华人民共和国水污染防治法» [Water Pollution Prevention Law of People's Republic of China] (People's Republic of China) National People's Congress Water Pollution Prevention Law, Order No 87, 28 February 2008, art 22.

⁸⁸ «中华人民共和国环境保护法» [Environmental Protection Law of People's Republic of China] (People's Republic of China) National People's Congress, Order No 22, 26 December 1989, art 7.

⁸⁹ 曲格平 [Qu Geping] «中国的环境管理: 改革与创新» ['Environmental Management in China: Reform and Innovation'] (Paper presented at China-EU Environmental

top-down policy-making structure and program design preferring a command-and-control style of management can result in poor coordination among agencies, weak links among pre-event and post-event actions and other institutional problems.⁹⁰ In addition, the institutional landscape is highly fragmented and sectoral policies and laws are developed in isolation, preventing the implementation of integrative solutions.

In the context of the environment law, public participation is set out as a principle, however the public is charged with protecting the environment rather than contributing to the making of environmental decisions.⁹¹ In the current decision-making structure, scientists are not given a chance to share their professional knowledge or provide independent recommendations; stakeholders are unable to articulate their interests or exercise their legal rights, and communities do not have the opportunity to transfer their indigenous knowledge on adaptation to decision-makers. This arbitrary decision-making structure not only lacks essential communication and interaction among the three connected but irreplaceable parts (government, scientists and the public) but also leads to a dilemma: the requirement of a more democratic and legitimate decision-making procedure and the inclusion of non-government actors.

The Environment Impact Assessment Law and the Interim Ordinance for Environment Impact Assessment Public Participation were initially regarded as positive and promising regulations in the context of public participation.⁹² Nonetheless, there is a significant gap between the regulations and practical implementation,⁹³ not because the public's lack of environment knowledge and consciousness, but because they are not provided an opportunity to express their

Management Innovation and Sustainable Development Conference, Qinhuangdao, China, 27 June 2005).

⁹⁰ 邱秋 [Qiu Qiu], «制度变迁与环境行政手段的变革» [‘Institutional Changes and Ways of Environmental Administration’] 2005 3(3) 湖北经济学院学报 [*Journal of Hubei University of Economics*] 116, 116–20; Louis Lebel et al, ‘Adaptation to Climate Change and Social Justice: Challenges for Flood and Disaster Management in Thailand’ in Fulco Ludwig et al (eds), *Climate Change Adaptation in the Water Sector* (Earthscan, 2009) 125, 125.

⁹¹ «中华人民共和国环境保护法» [Environmental Protection Law of People’s Republic of China] (People’s Republic of China) National People’s Congress, 26 December 1989, ch 1 art 6: ‘All units and individuals shall have the obligation to protect the environment and shall have the right to report on or file charges against units or individuals that cause pollution or damage to the environment.’

⁹² «中华人民共和国环境影响评价法» [Environmental Impact Assessment Law of People’s Republic of China] (People’s Republic of China) National People’s Congress, Order No 77, 28 October 2002; «环境影响评价公众参与暂行办法» [Interim Ordinance for Environment Impact Assessment Public Participation] (People’s Republic of China) State Environmental Protection Administration, Order 28, 22 February 2006.

⁹³ Xiangbai He, Interview with Interviewee Four from Changjiang Water Resources Committee, (Wuhan, 11 October 2011).

opinions.⁹⁴ Public participation in China is government-led participation, i.e. an option of the government rather than legal right to participate. It is the same case with respect to access to information and mandatory publication requirements. Secondly, because government does not bear the responsibility of initiating public participation, it often prefers to substitute ‘certain experts’ for actual members of the public.

It will require considerable time for China to transform from its current command-and-control regime to a more collaborative decision-making structure and process. However, the pressures associated with climate change and the need to collect information, knowledge and experience of adaptation hopefully may serve as a catalyst to encourage the Chinese government to adopt greater flexibility.

Climate change is creating massive new challenges and demands on China’s present decision-making regime amid unprecedented levels of complexity and uncertainty. These challenges also bring a welcome opportunity to rethink and redesign decision-making structures and processes. Given the early developmental stage of democracy in China, the Chinese government can begin this reform or transformation by allowing more transparent climate change information to be made available to the public built on the free flow of information. In addition, leaving more room for meaningful public participation is an urgent need for Chinese citizens, who have already developed a strong will and ability to participate.⁹⁵ The publication of transparent climate change information and the reform of the environmental decision-making process could provide the public with the confidence that the best positive adaptation choices are being made to benefit them. Meaningful public participation can provide the public a legal way to express opinions and concerns, reducing the risk of social instability. It is expected that, if governments at all levels can muster the political will for reform, it will be towards a more democratic, transparent and accountable decision-making regime.

IV CONCLUDING COMMENTS

China has found itself in recent years at the centre of a complicated transformation involving economic and social development and environment protection, all of which are greatly exacerbated by the challenges posed by climate change. The urgent need to seriously consider viable adaptation options brings unprecedented challenges but also provides an opportunity to review and evaluate present practices and to look at how other countries are approaching an equally uncertain future. Not all the adaptation theories referred to in this paper can be assimilated and implemented in China and nor should they, as reform, particularly political and social reform, is often a slow process that must go hand in hand with the development of institutional capacity to properly manage a reform agenda.

⁹⁴ 蔡定剑 [Dingjian], above n 69, 36–7.

⁹⁵ 竺效 [Xiao Zhu], «环境保护: 公众参与最广阔的战场» [‘Environmental Protection: an active area of public participation’] in 蔡定剑 [Cai Dingjian (ed)] «公众参与: 风险社会的制度参与» [*Public Participation: Constructing a Framework for the ‘Risk Society’*] (China Law Press, 2009) 76, 76–106.