



中国环境与发展国际合作委员会
China Council for International Cooperation on
Environment and Development

CCICED ISSUES PAPER 2012-2016

PREFACE

Established in 1992, the China Council for International Cooperation on Environment and Development (CCICED) is a high level not-for-profit advisory body to the Government of China. It is chaired by a senior leader from the State Council, with Members from various Chinese and international organizations. Its core tasks are to conduct policy research on environment and sustainable development problems of domestic, regional or global significance. Reports and Recommendations from CCICED task forces and other studies are submitted to the State Council, and made available online in Chinese and English language versions. CCICED is financially supported by many sources and maintains many research links with Chinese and international organizations.

Through its work and various meetings, CCICED opens a door to advanced international concepts and efforts including those related to the UN 2030 Sustainable Development Goals and the Paris Agreement on Climate Change; to many national and local efforts such as Low Carbon Cities, Green Supply Chains, Sustainable Production and Consumption; and to topics relevant to China's War on Pollution. CCICED also serves as a bridge to promote exchanges between China and the World. It provides a platform for two-way dialogues to improve understanding of Chinese approaches such as Ecological Civilization; plus ways to ensure China is more integrated into the world stage on environment and development decision-making.

Since 2002 the International and Chinese Chief Advisors have produced an Issues Paper each year for the use of CCICED Members, high level policy makers and others during the Annual General Meeting where research findings and recommendations are discussed. The International Chief Advisor (Dr. Arthur J. Hanson) takes the lead on preparing this document, but the document has always been a team effort including Chinese associates and the Chinese Chief Advisor. The intent is to provide a sense of recent events and policy shifts globally and within China, and key issues to be considered for current CCICED work.

This report is a reproduction of the individual Issues Papers produced during CCICED Phase V (2012-2016). Reading these materials will give access to China's ideas, policies and actions during this period of rapid change in overall thinking on development reform. CCICED has pressed for green transformative change including improved governance, legal reform, green finance, regional approaches to air pollution control, ecological redlining and a number of other major shifts linking environment, economy and social development. During the past half-decade Ecological Civilization has emerged as an important element of government policy, along with China's 13th Five Year Plan, which is described as China's first national green plan. All of these and other topics are discussed in the CCICED Issues Papers.

More information is provided on the CCICED official website, and a companion website at Simon Fraser University where all reports including all past Issues Papers are archived. (www.cciced.net/cciced and www.sfu.ca/china-council).

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I. REGIONALLY BALANCED AND GREEN DEVELOPMENT

1. INTRODUCTION

China seeks to build a society where all citizens will be moderately well-off by 2020—a nation in which people and nature can live in harmony and that will proudly take its place as a key player on the world stage—through its overseas direct investment, its success as a trading and manufacturing nation, and through its contributions to solving global problems including climate change, poverty elimination and sustainable ocean use.

As Premier Wen Jiabao has noted, China still faces a situation of “unbalanced, uncoordinated and unsustainable development.”¹ Recent analyses have tried to identify how China might turn the situation around by 2030, a time frame of only 17 years from now.² The economic development results achieved over the past three decades, show that positive changes can be made in remarkably quick order within China. However it is inconceivable that further transformative changes can be accomplished without greater attention to and investment in a new relationship between environment and development. This new relationship will be one that is unprecedented among the world's nations.

The long-term aspiration has been for China to become an Ecological Civilization, a view strengthened at the 18th CPC Congress in November 2012 where this concept, renamed Ecological Progress, was elevated to the same

level as Politics, Economy, Society and Culture, as one of the main drivers of the whole society.

The congress called for making great efforts to promote ecological progress. We should raise our ecological awareness of the need to respect, accommodate to and protect nature, incorporate ecological progress into all aspects and the whole process of advancing economic, political, cultural, and social progress, intensify protection of the ecosystem and the environment, work hard to build a beautiful country, and achieve lasting and sustainable development of the Chinese nation.³

At Rio+20 Premier Wen called for “a green & prosperous world” in his address.

1.1. Seeking “Balanced, Coordinated and Sustainable Development”

CCICED understands the urgency of today's environment and development situation in China and Asia, in other regions and globally. Thus, as CCICED enters Phase V of its work (2012-2016), the Council will need to consider topics on balanced regional development, coordination needs, and improved policies for sustainable development implementation within China. Furthermore, CCICED also needs to take into account China's international situation on environment and development. The latter point was underscored at Rio+20 in June 2012, where it was very apparent that

¹ Speech by Premier Wen Jiabao at Stockholm +40 Meeting, Stockholm, Sweden. April 2012.

² See for example World Bank and Development Research Center of the State Council. 2012. *China 2030. Building a Modern, Harmonious, and Creative High-Income Society*. 448 pp., including Chapter 5. *Seizing the Opportunity of Green Development; Asian Development Bank. 2012. Toward an Environmentally Sustainable Future – Country Environmental Analysis of People's Republic of China*. ADB, Manila. 199 pp.

³ Xinhua. 14 November 2012. *Full Text of Resolution on CPC Central Committee Report*. http://news.xinhuanet.com/english/special/18cpcnc/2012-11/14/c_131973742.htm

China efforts will help to determine the success of future international efforts on green growth, green economy and green development.⁴ Domestically, it is the right time for strengthened policies and action for broadening the scope and quality of development, given that the decadal renewal of government is underway.

Fortunately much of the necessary groundwork is in place. Especially with the 12th Five Year Plan (12th FYP), which takes a more sustainable scientific development approach aimed at reducing alarming development gaps among the regions; addresses difficult and worsening pollution issues such as NO_x, and soil pollution; and places greater emphasis on quality of life in both cities and countryside. But the fundamental issue of uncoordinated development remains at the heart of many difficulties faced in China.

The economic juggernaut model of development in Eastern China is gradually shifting to other regions and in particular to the very large Western China Region, raising the spectre of repeating past patterns of high pollution and profligate energy use in new development locations, or even repeating past bad domestic practices in some locations abroad where China private sector investors are active. Now instead of major provinces in Eastern China leading GDP growth, it is provinces in the west. It is not certain that these western provinces and autonomous regions will be able to meet energy and pollution targets.

All parts of China require a new model of development that will be “greener”, will place greater emphasis on domestic consumption, and will set priorities that “put people first.” Of course there can be no “one size fits all” approach. These are dilemmas of balanc-

ing regional development, and in designing differentiated regulatory and incentive systems that are also fair and workable.

1.2. CCICED Theme – 2012 AGM and Phase V

At this year’s AGM, CCICED examines Regionally Balanced and Green Development. The choice of wording is very deliberate. One can consider a range of unbalanced development situations in regions of China at the present time, but ultimately all must be transformed into environmentally, socially and economically sustainable forms of development. This will involve many different kinds of actions in both rich and poorer provinces and regions, in the interactions among regions, for example in transfer payments such as eco-compensation, and in new regulatory frameworks to take into account integrated management needs such as for China’s marine and coastal regions.

Green Development has taken on greater significance globally since Rio+20 where there was extensive discussions on Green Growth, a concept that gained political traction after the 2008 financial crisis and through efforts particularly on the part of OECD, and on Green Economy, which has been explored in great detail by UNEP, and well-embraced by countries during Rio+20. Green Development is a term favored in China. Indeed, China is as advanced as any other leading nation in its understanding the value of this concept and related approaches such as Low Carbon Economy and Circular Economy. However, serious implementation gaps exist for all countries, including China, for mainstreaming these good ideas into decision-making nationally and locally.

⁴ China’s overall sustainable progress and its vision for the future have been summarized in its report to Rio+20. *The People’s Republic of China National Report on Sustainable Development*. Beijing 2012. 100 pp.

It has been proposed that Green Development be taken as an overall theme for CCICED’s Phase V. Thus it is appropriate for CCICED to explore how Green Development can be more effectively implemented in the various regions of China—in the immediate future and over the longer-term, certainly for the critical decade of 2020-2030. The 12th FYP is a first big step towards Green Development in China.

1.3. 2012 CCICED studies

Five CCICED study teams related to regional and green development will report their recommendations during the 2012 AGM. Their efforts are outlined below:

12th Five Year Plan Task Force (12th FYP TF) examined how to achieve mandatory pollution targets of the Plan, with regionally differentiated regulatory needs. The TF also proposed possible environmental protection needs for future Five Year Plan periods, especially for the 13th, 14th and 15th FYPs. This longer-term view underscores the time required to bring complex pollution issues under full control. This TF provides an overarching perspective for the other studies, examining specific pollution control needs for regionally balanced and green development needs in China. The diagram below, from the TF report, illustrates how, nationally, there must be a very major decoupling of resource consumption in order for economic growth to rise and environmental quality to be restored; otherwise environmental conditions will decline from today’s levels.

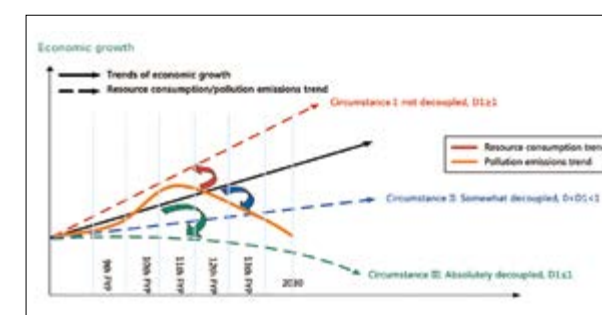


Figure 1-1

Western China Green Development TF (Western TF) proposed a roadmap for green development in this ecologically and ethnically complex region of China which is home to most of China’s remaining citizens still experiencing extreme poverty, has most of China’s desertified areas, is the headwaters of the major rivers of China, and holds most of China’s biodiversity in its fragile ecosystems. As a consequence of the Western Development Strategy in place since 1999, expanded investments especially for mining and urban development, and migration of industrial operations from other regions of China is taking place. Ecological protection, green industrialization, sustainable natural resource development for both agriculture and mining, energy use, sustainable urbanization and rural development are key Green Development needs. It also is necessary to have a robust approach to climate change mitigation in this vast region. There are fears that local emphasis on GDP growth could destabilize both ecology and social harmony. This vast region is the most significant in terms of Main Functional Zoning, where land and water use zones delineate areas for various levels of protection or multiple use. This promising zoning effort is still at an elementary stage but the initiative highlights the difficult path ahead, since there are major social and economic impacts of any restriction on uses.

Eastern China Development Special Policy Study (Eastern China SPS) was established to consider how the rich eastern coastal region might put in place advanced approaches for Green Development. Some of the sub-regions such as the Yangtze Delta, Pearl Delta, and Beijing are building post-industrial economies in which the service economy will account for more than 50% of GDP. Advanced energy and environmental protection mechanisms; achieving better quality of urban lifestyle; sustainable consumption; green jobs; and greater use of market instruments for achieving Green Development are some of the matters considered by this SPS. Also, how to avoid dismantling and migration of dirty factories to new locations away from richer cities; and how to share environment and development experience from these

regions, for example, from major events such as the Beijing Olympics and the Shanghai Expo. The graph below from this SPS report shows the rise in household consumption in Beijing between 1996 and 2010 as illustrated by 7 major items. Clearly some are essential such as refrigerators; others likely could make a positive contribution to sustainable development, for example, mobile phones, and some, including private automobiles and air conditioners, contribute to environmental problems. Multiply the problems of unsustainable consumption within 600 cities throughout China, and the issues of rapid urbanization become very important, especially of the expanding middle class with higher disposable income levels.

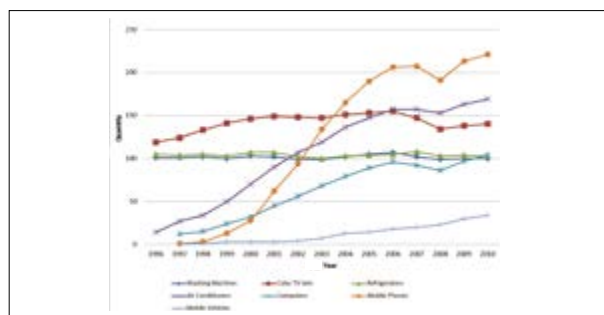


Figure 1-2

Regional Air Pollution SPS (PM2.5 SPS) addressed emerging air pollution problems such as photochemical smog and ozone that have become serious threats even as problems such as SO₂ have been reduced in intensity during the 11th FYP. These new problems are complex since they involve chemical transformation and formation of new compounds, often turning into small particles suspended in the atmosphere (particulate matter, PM). Over the past year there has been considerable public debate over PM2.5, the smallest particles which are particularly dangerous to the respiratory system. These are responsible for turning officially reported “blue sky days” into citizen observed gray days in many cities. Most importantly, no single city can adequately control smog, since airsheds cover large regions. China’s serious air quality problems therefore require regional strategy and policies for complex issues such as PM2.5 and ground level ozone pollution control. These emerging problems are still

on the rise and likely will require decades to control. This point is illustrated below in a graph from the SPS report, where it is seen that many cities today exceed ambient air quality standard, even for the more controllable pollutants such as PM10. While targets are important, they need to be linked to good regional monitoring information that can demonstrate whether the actual environment conditions (ambient) are getting better.

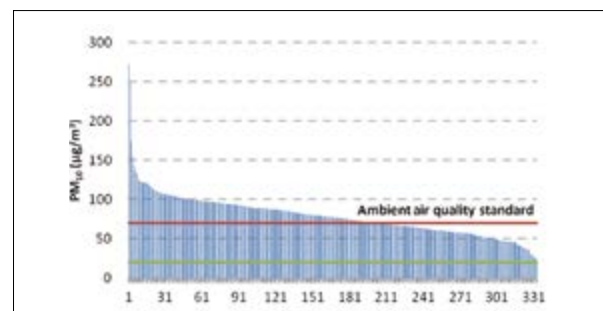


Figure 1-3

Marine Oil Spill Prevention & Response SPS (Bohai Oil Spill SPS) examined a 2011 Bohai Bay oil spill associated with offshore oil development. The incident provoked severe reactions on the part of many resource users such as aquaculturalists, with the result that very substantial cleanup costs and compensation payments were required. There is recognition that the Bohai Sea is facing a dismal future unless good environmental planning, management and monitoring is in place, with full cooperation from industries and resource users. In particular, disaster response strategy has been called into question. This study is to give specific guidance on these points and is a very operational follow-up to CCICED warnings provided in 2010 concerning the declining health of this very economically and ecologically important ocean region. The diagram below from a presentation of the Bohai Oil Spill SPS team illustrates a key issue—how to deal with integrated planning, management and emergency response. The actual number of governmental organizations, enterprises and other stakeholders involved is actually much larger than indicated in this summary diagram.

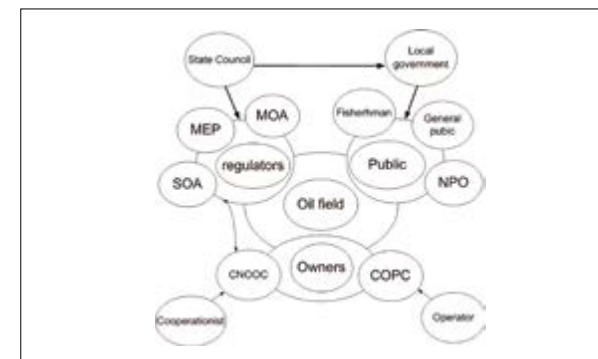


Figure 1-4

The five studies provide a rich set of examples and recommendations on how to shift towards more balanced and coordinated approaches. In 2011 CCICED examined Green Development in a more sectorally-defined way and at a national level. The 2012 work has drawn upon this earlier work, and takes advantage of other work carried out since that time.

This Issues Paper provides a short review of some current factors influencing economy and environment globally during this past year; gives an overview of the evolution of regional development strategy in China, a complex subject in its own right, plus analysis of how today’s four regions in China can be linked to green development strategy; and concludes with several key issues that are challenges to be overcome.

2. INTERNATIONAL ECONOMIC CRISIS AND GREEN DEVELOPMENT

As the financial crisis that began in 2008 continues to ricochet around the world—even threatening the European Union, and slowing anticipated recovery in the USA and certain other countries. The implications for China have been serious. GDP growth has slowed

to about 7.5% year-on-year, manufacturing jobs lost, and international trade reduced. There is hope that China might be a kind of savior for the economies of other countries, or as a source of new investment capital. While this hope may be somewhat misplaced, it is clear that China will continue to expand its investment abroad via its now well-established Going Out Strategy.⁵ Furthermore, China has expanded the number of bilateral and multilateral arrangements for investment and trade in Asia, the Asia-Pacific Region and elsewhere.⁶ This expansion is helping to rewrite old relationships, and open new opportunities. However, these agreements are not directly tuned into green development or, for that matter, environmental concerns in any systematic fashion.

China’s growth continues at a time when much of the rest of the world continues to operate in the shadow of recession. There is widespread worry abroad that sooner or later China could experience much lower growth rates, leading to a downward economic spiral worldwide. This is a simplified view of a complex situation, not completely taking into account all aspects. Notably, China is fostering its domestic consumption, although not with the full-blown approach of the stimulus applied in 2009 and 2010. Also, it does not take into account the major investments made to enhance value-added in China’s export products, and the country’s innovation efforts designed to open new sectors that could help meet national priorities such as clean energy, while contributing to international sustainable development. Examples are solar and wind energy, and in battery technology.

But it is also apparent that the downturn of economy in other countries and the rise of Chinese share in some of the new technology markets is leading to

⁵ This topic is well covered in the Report of the CCICED Task Force on Investment, Trade and Environment. 2011. *Going Global Going Green*. <http://www.iisd.org/publications/pub.aspx?pno=1615>; also, see http://www.ecfr.eu/page/-/China_Analysis_Facing_the_Risks_of_the_Going_Out_Strategy_January2012.pdf

⁶ See for example, China FTA Network <http://fta.mofcom.gov.cn/topic/enpacific.shtml>, and the China-ASEAN Investment Agreement (2009) <http://www.aseansec.org/Fact%20Sheet/AEC/2009-AEC-031.pdf>

challenges that threaten some of the new industries. This is particularly the case with complaints recently brought forward to the European Commission, the US International Trade Commission, and the World Trade Organization (WTO) concerning subsidy and trade practices for solar and wind energy products manufactured in China for sale abroad.⁷ China has responded with complaints concerning EU subsidies on solar panels and complaints regarding US practices. In addition, there are pressure points on other topics such as the requirement for airplanes flying into EU region airports from other parts of the world to participate in the EU emissions trading system. This action has been suspended temporarily following complaints of a number of large countries including the USA, China, India, and Russia.⁸

The escalation of trade disputes on matters related to important new technologies for green growth and development is unfortunate. Certainly it is not in anyone's best interest to see impediments to the rapid commercialization of environmental goods such as those now being disputed. Price reduction to make these energy sources more competitive against high carbon energy sources is essential. And market size is a primary consideration to make that happen. It is also unfortunate that in the slow movement on Doha Round the issue of exemptions for environmentally beneficial goods is not fully resolved.⁹ Therefore there are gray areas that likely will become contentious as seen over the past year.

Despite the disputes centred on renewable energy technologies and other green trade problems described above, progress has been made in recent months by agreeing within APEC (Asia-Pacific Eco-

nomic Cooperation) to a planned reduction of tariffs to 5% or less for a long list of environmental goods.¹⁰ This is seen as a "commitment to pursuing green growth objectives, addressing climate change and securing sustainable economic development".

In the 12th FYP China set out lower targets for annual GDP growth nationally, even though actual performance for some provinces remain in the double-digit level. Growth reductions are a realistic appraisal in the face of international economic downturn, but within China they also are interpreted by government as a focus on quality of development, including pollution reduction, greater energy efficiency and protection of ecological services. However, it is a fine line that must be observed—if growth rates fall too much, job creation worries emerge; and if revenues are diminished, funds needed for environmental protection may be difficult to find, or enterprises may be uncooperative.

Chinese leaders have repeatedly noted that they will not ignore the need for environmental protection, and green development. This is an important statement and there is evidence of its implementation, including the commitments made in the 12th FYP. However, this does not necessarily mean that if a more serious global recession were to occur, there would be a repeat of the massive stimulus spending on environment, such as water and sewage infrastructure, at the level seen in 2009-2010. Indeed, as Vice Premier Li Keqiang has said: *"We should insist on protecting the environment while developing, and developing while protecting the environment, actively exploring China's 'new environmental protection way' characterized as 'small cost, good returns, low emission, sustainable'. Create a new situation for environmental protec-*

tion."¹¹ This pragmatic approach should be kept in mind while considering issues and policies related to Green Development. In particular, greater attention to outcomes is needed, since meeting pollution targets or other environment targets does not automatically lead to improved ambient environmental conditions, or lower risks to health of people and ecosystems—the desired outcomes.

Concern is expressed that prolonged conditions of global or national recession will lead to a gradual relaxation of environmental regulations and standards. This view was expressed at Rio+20, including the observation that the meeting outcome might otherwise have been much stronger in terms of commitment to Green Economy. In addition, there is a concern that enthusiasm on the part of investors for renewable energy sources and for bringing new sustainable development technologies to commercialization will slow as a consequence of greater exploitation of non-conventional fossil fuel sources such as natural gas obtained by "fracking" of shale gas,¹² or for other reasons, as biotechnology companies seeking advanced biofuels have found.

China may have advantages in these circumstances. It can invest more in S&T development than most others, and it has potentially large domestic markets. China is improving its capacity to innovate, as measured by patents registered. It is reasonable to believe that China could have significant advantages in moving ahead on sustainable green technologies, even if others fall behind during these lean, recessionary times. This point is a matter of concern for regional development in all

parts of the country including Western China—there are many elements of green development such as agriculture and water conservation where there are major innovation opportunities.

The bottom line for many countries, including China is job creation and poverty elimination. There are differing views about the extent to which new green growth strategies and green economy initiatives will produce net employment benefits. Certainly UNEP's view is the most optimistic view.¹³ OECD does not see green growth as being primarily about job creation, but instead focuses on environmental benefits, and transformative change of industry, energy, etc., leading to fundamental industrial ecology shifts.¹⁴ It is quite possible that the situation will be quite variable, according to national, local or sectoral circumstances. The Rio+20 outcome document¹⁵ is backed by solid analysis that suggests positive employment gains are possible. China could turn out to be one of the best cases in terms of turning green development into net employment gains and for poverty reduction. Certainly green development will be an important driver for creating structural adjustment between secondary and tertiary sectors, with the latter producing the largest share of jobs in the future. This shift will require a very disciplined approach to investment strategy, especially for heavy industry, a point made in current strategic analyses of China's economy.

3. CHINA'S REGIONAL DEVELOPMENT¹⁶

The great regional differences in China's geography

⁷ *US will place tariffs on Chinese Solar Panels*. 11 October 2012 New York http://www.nytimes.com/2012/10/11/business/global/us-sets-tariffs-on-chinese-solar-panels.html?_r=0&pagewanted=print, <http://ictsd.org/i/news/bridgesweekly/134029/> *China-US sparring over renewable energy intensifies*

⁸ <http://ictsd.org/i/news/biores/150032/> *European Commission announces temporary suspension of aviation emissions law*

⁹ G. Balineau and J. de Melo. 2011. *Stalemate at the negotiations on goods and services at the Doha Round*. Working Paper/P28. FERDI. 29 pp. <http://www.ferdi.fr/uploads/sfCmsContent/html/112/P28.pdf>

¹⁰ http://www.apec.org/Meeting-Papers/Leaders-Declarations/2012/2012_aelm/2012_aelm_annexC.aspx

¹¹ Government Net. 20 December 2011. *Speech by Vice Premier Li Keqiang at 7th Environmental Management Conference*. http://www.gov.cn/ldhd/2011-12/20/content_2025219.htm

¹² <http://news.nationalgeographic.com/news/energy/2012/08/120808-china-shale-gas/>

¹³ See UNEP. June 2012. *Building an Inclusive Green Economy for All*. <http://www.unep.org/newscentre/default.aspx?DocumentID=2688&ArticleID=9169>

¹⁴ See *Green Growth and Sustainable Development OECD and Rio+20* <http://www.oecd.org/greengrowth/oecdandrio20.htm>

¹⁵ United Nations. June 2012. *The Future We Want*. Rio+20 outcome document.

¹⁶ This section is a summary of a longer background document included as an Annex to this Issues Paper. They provide an introduction to the complexities of regional development in China. It is written in a narrative style without full referencing. Further information and a longer document in Chinese prepared by Dr. Zhang Shiqiu is available upon request. We wish to acknowledge the valuable efforts of Zhang Shenghao and Wang Peishen in translations from the original document.

and environment, resources, and culture, have been important in its historical pattern of development. As well, over the past sixty years, China has experienced several economic reforms as well as major changes in development policy, especially Opening Up in Eastern China. In recent years, various social contradictions, and conflicts created by unbalanced and uncoordinated development have affected social stability, economic growth, environmental and ecological protection, social justice and fairness. To resolve problems both nationally and regionally matters, programs for revitalization and for intensive development have been initiated, for example, in Northeastern China and the Western Development Strategy. Still, these efforts have been ineffective in producing a genuinely sustainable pattern of development, and for some areas income gaps continue to widen, especially between urban and rural populations.

3.1. Evolution of today's regional structure

The modern-day evolution of thought on uneven regional development in China started in 1935 with the famous "Hu Line", a diagonal line drawn from China's Northeast to the Southwest, which more or less divides China into western and eastern areas. This line is still relevant today in terms of population density (low in west and high in east), and also in relation to ecological transitions and vulnerabilities.

The line is also relevant to ecological vulnerability and transitions. Landslides, mudslides, and other landform disasters are concentrated along parts of it. The middle part of the line crosses the Loess Plateau, with its erosion and dust storms and main source of Yellow River sediment. The Hu Line is a boundary transiting from waterlogged areas in the northwest region to the flood zone in the southeast, with floods and drought on the east side of the line. This dichotomous pattern was used for planning till the 1980s.

During the 7th FYP (1986-1990), the central government divided the huge inland regions into central

and western regions, and producing a clear gradient structure—eastern coastal region, the central inland region, and the western region. This was the period of rapid development of the eastern coastal areas each having their own characteristics: Liaoning Province relies on heavy industry to promote regional economic development; Jiangsu and Zhejiang provinces, on the rapid development of the private economy; Guangdong relied on the open-door-driven policies.

With the implementation of the Western Development Strategy in 1999-2000, coverage of the geographical scope within the three regions changed. Guangxi and Inner Mongolia were reassigned to the western zone, but the three zones pattern did not change. With the first-mover advantage, the Eastern Region continued to maintain rapid development, and, until recently, the growth rate has been generally higher than in the Central and Western regions. Inter-regional development disparities continue to expand. The resource mobilization capacity of the developed areas comes from the market, whereas within the underdeveloped areas, funds from the market mechanism are relatively small.

The Western Development Strategy is the first regional development strategy formally implemented by the central government. Subsequently, in order to resolve the issue of economic structural changes in resource-based cities and to improve efficiency of state-owned enterprises, the government proposed the strategy of revitalizing the old industrial base in the Northeast Region of China. After that, to balance the regional development and to avoid the collapse of the central region, attention was given to improvements in the Central Region and efforts to accelerate the development of the Eastern Region. Therefore, during the 10th FYP, the pattern of four plates gradually formed.

The 11th FYP proposed an overall regional development strategy, which is promote the development of the western region, revitalize the old industrial bases in northeast China and other regions, promote the

rise of the central region, and to encourage the eastern region to lead the development as the regional pattern of four plates. The Eastern Region refers to 10 provinces and municipalities including Beijing, Tianjin, Hebei, Shanghai, Jiangsu, Zhejiang, Fujian, Shandong, Guangdong, and Hainan; the Central Region consists of Shanxi, Anhui, Jiangxi, Henan, Hubei, and Hunan provinces; the Western Region includes 12 units—provinces, autonomous regions, and municipalities—Inner Mongolia, Guangxi, Chongqing, Sichuan, Guizhou, Yunnan, Tibet, Shaanxi, Gansu, Qinghai, Ningxia, and Xinjiang; and the Northeastern Region refers to 3 provinces—Liaoning, Jilin, and Heilongjiang Province.

The 12th FYP has placed greatest emphasis on the Western Region and also the Northeast, as noted below the China Daily¹⁷ in a report of a State Council meeting in January 2012:

China will continue to boost the development of the country's less-developed western and northeastern regions, according to a statement released after an executive meeting of the State Council...The meeting, presided over by Premier Wen Jiabao, has approved guidelines for the development program of China's west and the revitalization of the northeast old industrial bases in the country's 12th Five-Year Plan period (2011-2015)...The vast western region is still a "short plate" in the country's regional development, and achieving its prosperity is an important but difficult task in the building of an all-round well-off society.

Priority should be given to the implementation of the strategy of large-scale development of the western region in the country's overall regional development scheme, to maintain its continued stable and rapid economic and social development...Efforts should be undertaken to keep the growth of the regional GDP and the residents' income higher than the national average in the five-year period...More emphasis should be put on the construction of "development priority zones" with their own development focus and priority according to their environmental features, natural resources, current development stage and development potential.

¹⁷ http://www.chinadaily.com.cn/china/2012-01/10/content_14410199.htm

¹⁸ An Shuwei, Yu Peng, 2009.

The State Council also underscored the importance of infrastructure construction, environment protection, promotion of advanced industries and agriculture, and the development of small towns and villages, education and opening-up.

The statement said that there were still unsolved systematic and structural problems that have restricted the development of China's northeastern region, and that local governments should continue to deepen reform and accelerate transformation of development pattern in the 12th Five-Year Plan period. The State Council urged those involved to make vigorous efforts to promote agricultural development, further perfect modern industries, and optimize regional development strategy in the northeastern provinces. Local governments should also work to ensure sustainable development of resource-rich cities, improve infrastructures, enhance environmental protection, boost employment and affordable housing construction, and deepen reforms of state-owned enterprises while accelerating the growth of the private sector.

The more developed eastern and central provinces should offer better assistance to the development of these regions, the statement said.

3.2. Building a Well-off Society and unbalanced regional realities

Over the past 30 years, China has achieved a "high-speed" average annual growth rate of 9.6%. Although the national economy is moving towards the desired comprehensive well-off stage, among the various regions economic gains are very uneven. In fact the disparities among regions are multi-dimensional, including level of economic development accessibility towards basic public services and state of ecological wealth. Regional development strategy is intended to confront the challenge of strong ones getting stronger, and weak ones getting weaker constantly.¹⁸

The following sections will discuss similarities and differences among the four regions based on eight

aspects: degree of accomplishing a Well-off Society, level of economic development, urbanization, living standards, regional self-development capacity, basic public services, pollutant emissions, and environmental resources pressure. Despite its relevance, we have not examined environmental resources pressure as a separate point since it is not a subject that permits a brief overview and use of numbers like the other measures.

There are six indicators for measuring the efforts towards accomplishing a Well-off Society: economic development, social harmony, quality of life, democracy and rule of law, culture and education, resources and environment. How these are actually measured will not be discussed here, only some results as perceived by the government of China.

Figure 1-1 shows steady progress in attainment of the Well-off Society goal, but the reality is that only in the Eastern Region is it nearly achieved. The levels of full achievement in 2010 were Eastern Region 88.0%, Northeastern Region, 82.3%, Central Region 77.7%, Western Region was 71.4%. From 2000 to 2010, the highest levels were in the Eastern Region, and the Western Region was the lowest. As cities move towards a 90% level of achievement research indicates a slow-down in meeting the goal. And the indicators do not cover all aspects of what a Well-off Society might be expected to encompass.

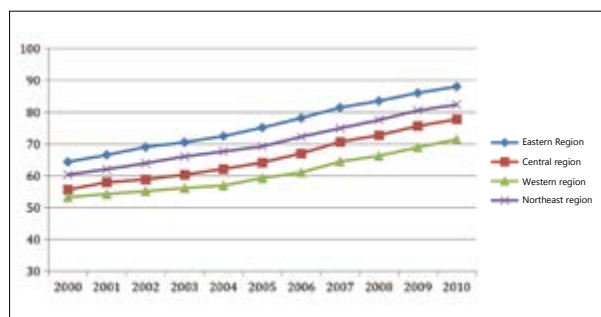


Figure 1-5. Regional accomplishment in building up a Well-off Society (blue diamond-eastern region; red square-central region; green triangle-western region; purple cross-northeastern region)

3.2.1. Level of economic development and industrial structure

Based on the aggregate GDP, from 1992 to 2010, the Eastern Region ranked first. The GDP of the Eastern Region in 2010 accounted for 57.8% of the national GDP, the Central Region 21.5%, the Western Region 20.3%, and the Northeastern 9.3% of the national GDP. The year 2007 was a turning point in terms of growth rate. Before then, the fastest growing economy was in the Eastern Region; and the Northeast Region had the smallest economic growth in most years. After 2007, the situation reversed; the Northeast Region had the fastest economic growth, and the Eastern Region became the slowest. In 2010, the Central Region experienced the fastest economic growth with a 14.1% GDP growth rate; the Eastern Region had a rate of 12.9%, the slowest. The Western (13.7%) and Northeastern (13.6%) Regions ranked in second and third place. From 1992 to 2010 the Eastern Region achieved much higher GDP per capita than the national average. In 2010, the GDP per capita reached RMB 45,798.2 a level 1.53 times the national GDP per capita. By contrast the proportion of the Western Region's GDP per capita rose from 67% in 1992 to 75.4% of the national average in 2010.

There also are important difference in the industrial structure of the four regions, meaning a range in 2009 from the Eastern Region stepping into the late stage; the Central and Western Regions just entering to the middle stage; while the Northeastern Region was in the late phase of the middle stage of industrialization. Taken together, the national industrialization level was at the middle stage. These points are important since criticism exists that China has overinvested in heavy industry in recent years. This leads to overcapacity and a search for markets to sell surplus products in China and abroad. And, as the most developed region seeks pollution reduction and energy efficiency, the dirty industries are likely to be moved out, certainly the case in Beijing and Shanghai.

In general there is a major effort to further optimize

industrial structure in all four regions. The proportion of the primary industry has declined although the decline in the Northeast has been very small. Among the four regions, the proportion of secondary industry in the Eastern region is steady, and the proportion of tertiary industry (service sector) has increased steadily to the point where some cities such as Beijing now have more than 50% of the economy vested in the tertiary sector, a "post-industrial" situation.

3.2.2. Urbanization

The dramatic shift of China from an agrarian society to one where soon most people will live in cities is unprecedented in scale and vision for the future. Clearly sustainable urbanization must be a priority, and that is a great challenge. With over 600 cities, China faces planning and administrative challenges at an unprecedented scale. It is believed that China's urbanization process involves migration numbers greater than any other country at any time in history. Cities are the crucible for industrial innovation, and the hub of manufacturing success, but regrettably also the source of much pollution and problems related to land allocation, transportation and many other development issues.

China is on a pathway of urbanization that will see at least 70% of its citizens housed and working in cities. In 2009 the levels of urbanizations in the four regions were: Eastern Region 56.7%, Central Region 42.3%, Western Region 39.4%, and Northeastern Region 56.9%. Increasingly, there are initiatives aimed at improving the models of urban development, for example, through development of Eco-cities, and through designation of some urban areas as Low Carbon cities.¹⁹ A substantial number of Chinese cities are rated as highly polluted on WHO lists and by other interna-

¹⁹ <http://usatoday30.usatoday.com/news/world/story/2012-07-15/china-building-green-cities/56219286/1> ; see also *Eco-cities A Global Survey, 2011*. This survey, conducted by the University of Westminster International Eco-cities Initiative, indicates that China likely has the largest number of eco-cities found in any country. <http://www.westminster.ac.uk/?a=119909>

tional agencies. But there has been progress on both environmental planning and specific issues like water pollution.

3.2.3. Living standard – income gaps

Corresponding to the level of economic development, disposable income of urban residents in the Eastern Region is significantly higher than other regions (Figure 1-6). In 2010, the disposable income per capita of urban residents in the Eastern Region was RMB 23,272; the differences among the Central, Northeastern, and Western regions are very small, RMB 15,962, RMB 15,941, and RMB 15,806, respectively. From 2000 to 2010, the net income per capita for Eastern Region rural residents was much higher than the other three regions, increasing from RMB 3,588 to RMB 8,143. In 2010, the ratio of urban to rural income was 2.48 in the northeastern region, 2.86:1 for the Eastern Region, and 2.90:1 for the central region. The urban-rural income gap in the western region is relatively high, a ratio as high as 3.58:1 (Figure 1-7).

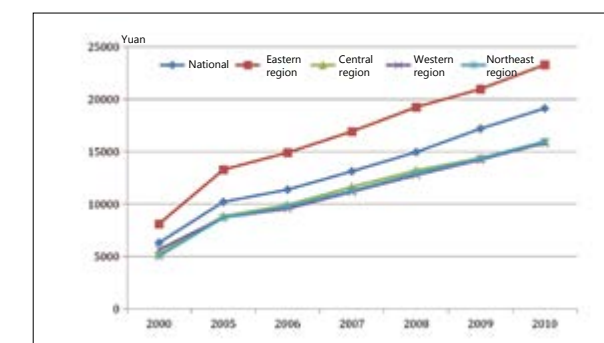


Figure 1-6. Disposable incomes per capita of urban residents 2000-2010 (blue diamond-national; red square-eastern region; green triangle-central region; purple cross-western region; turquoise cross-northeastern)

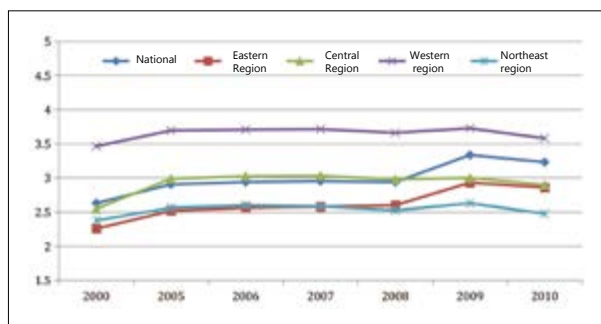


Figure 1-7. The income gap between urban and rural inhabitants in China's regions (blue diamond-national; red square-eastern region; green triangle-central region; purple cross-western region; turquoise cross-northeastern)

3.2.4. Regional self-development capacity

Capacity to undertake regional development includes the ability to raise revenues locally. Certainly the Eastern Region is best placed to do so (see Figure 1-8, describing total locally-raised fiscal income levels). The Western Region has shown considerable increase in capacity since about 2007.

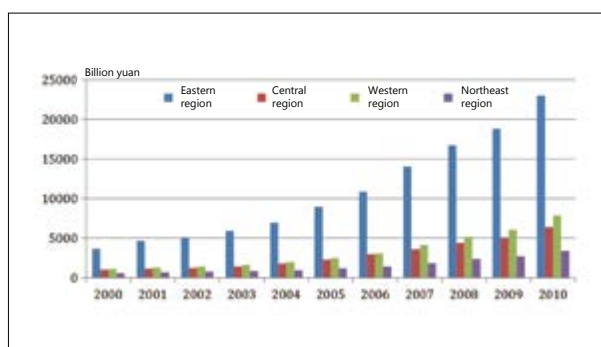


Figure 1-8. Fiscal income level in billion yuan (based on prices of the years) (blue-Eastern, Red-central, Green-western, Purple-northeastern)

Another useful measure of self-development capacity is the proportion of local fiscal revenue in local fiscal expenditure. This figure is relatively stable over the decade for each region but dramatically different between regions (see Figure 1-9). In 2010, the per-

centage ranged from 76.2% in the Eastern Region to 36.8% for the Western region.

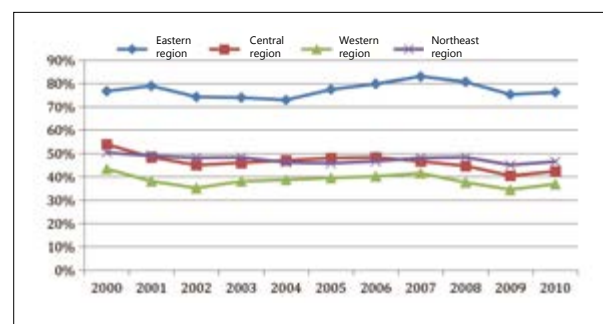


Figure 1-9. Proportion of local fiscal revenue in local fiscal expenditure (blue diamond-eastern region; red square-central region; green triangle-western region; purple cross-northeast)

3.2.5. Public services

Public services have advanced considerably in all regions over the past two decades, in both urban and rural areas. The rise has been particularly significant in the last decade, including the efforts brought about through post-2008 stimulus expenditure. Here only a few examples are profiled. For example, there are significant difference in the proportion of people with a college degree or higher: in 2009 the figures were 9.02 % for the Eastern Region, 6.1 % for Central Region, 5.6% for Western Region, and 9.07% for the Northeast Region. In fact, the regional disparities have grown over the period 2005-2009.

For water conservancy, environment and public facilities management industry, from 2003 to 2010, there were significant differences among the four regions in fixed asset investment in such services. After 2007, the Eastern Region's fixed asset investment in water conservancy, environment and public facilities management industry grew significantly faster than the other three regions (as shown in Figure 1-10).

Both road and railroad mileage increased very dramatically in the past decade, with much of the devel-

opment in the Western Region (see Figure 1-11 for road expansion between 2005 and 2010 according to region).

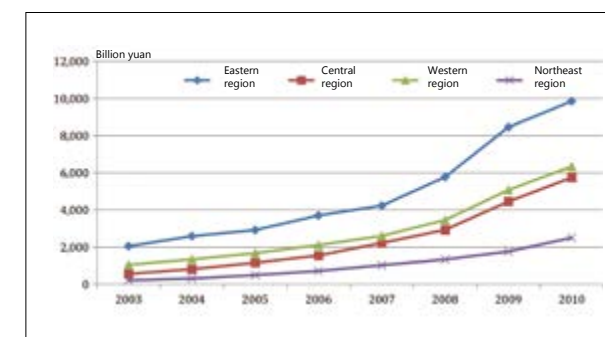


Figure 1-10. Fixed asset investment in water conservancy, environment and public facilities management industry (blue diamond-eastern region; red square-central region; green triangle-western region; purple cross-northeastern region)

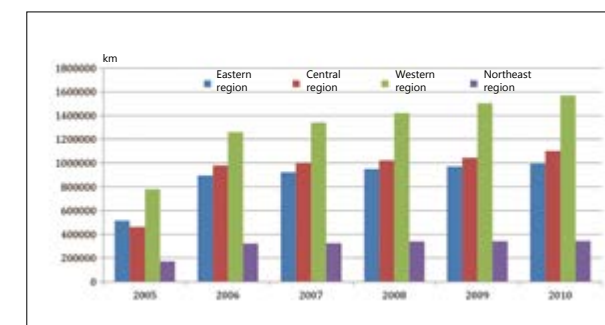


Figure 1-11. Operating mileage (km) of roads by region (blue-eastern; red-central; green-western; purple-northeastern)

3.2.6. Pollution emissions and environmental emergencies

In 2002-2010, for water pollution the Chemical Oxygen Demand (COD) emissions in tonnes per unit of GDP (billion RMB) showed a declining trend in the four regions. This is, of course, an intensity measure rather than an absolute decline in pollution. The convergence of figures is of interest. Western China started at a much higher level of intensity, and yet was

relatively close to the intensity of other regions by the end of the decade (Figure 1-12).

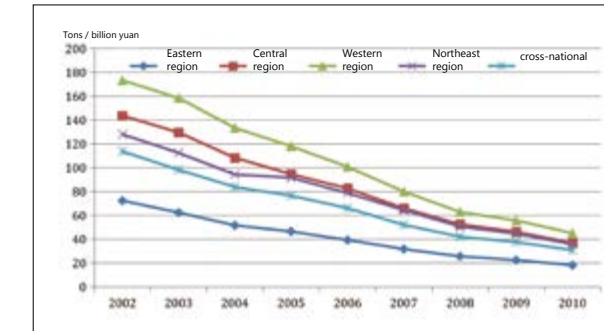


Figure 1-12. Chemical oxygen demand (COD) mission per unit of GDP (tonnes per billion RMB) (blue diamond-eastern region; red square-central region; green triangle-western region; purple cross-northeastern region; turquoise cross-national)

Between 2002 and 2010, the sulphur dioxide emissions per unit of GDP also displayed a declining trend in the four regions (Figure 1-13).

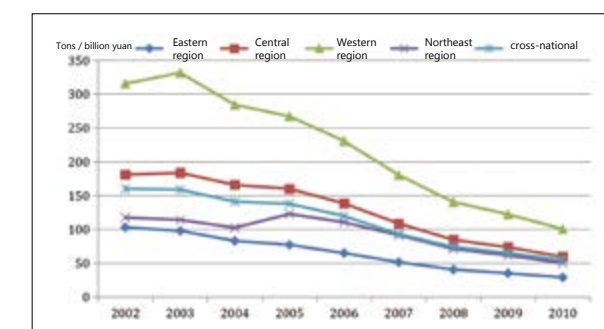


Figure 1-13. Sulphur dioxide emissions (tonnes) per unit of GDP (RMB) (blue diamond-eastern region; red square-central region; green triangle-western region; purple cross-northeastern region; turquoise cross-national)

From 2002 to 2010, within the four regions, the number of environmental accident emergencies has generally reached a lower level (Figure 1-14). In the Northeastern Region the numbers have generally been at a lower level, although with some serious

incidents. In the Western Region, the number of environmental accidents dropped from 893 in 2002 to 67 in 2010; in the Central Region, the number decreased from 621 in 2002 to 53 in 2009. The situation in the eastern region is very different. Starting in 2008, the number of environmental accidents has again been increasing, from 172 in 2006 to 255 in 2009.

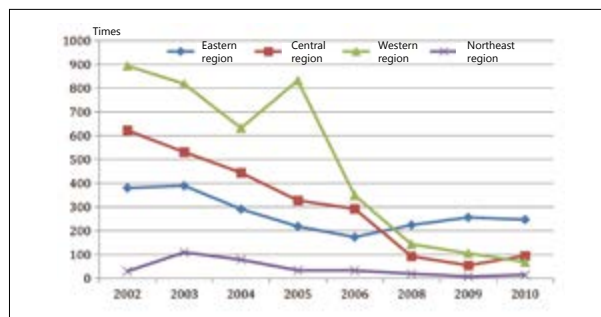


Figure 1-14. Emergency environmental accidents 2002-2010 (blue diamond-eastern region; red square-central region; green triangle-western region; purple cross-northeastern region; turquoise cross-national)

3.3. Summary observations on unbalanced regional development

There are many hypotheses and conclusions about regional development. However there is not really a consensus on which conclusions are the most important, or even the most credible. Furthermore, the most relevant and appropriate metrics for green and sustainable development still need to be identified. Nevertheless there are some points that cannot be ignored including those noted below.

3.3.1. Regional performance characteristics

(1) *The Eastern Region is at the highest level of economic and perhaps social development, but certainly this has been achieved at a very high environmental cost. Yet there is no full picture of the costs, especially in terms of cumulative impacts, and costs related to health and well-being of ecological services, human health, plus*

economic productivity reductions.

The economic strength of the Eastern Region continues to lead the country with the aggregate GDP and GDP per capita significantly ahead of other regions; the tertiary service sector is developing rapidly, and drives further optimization of the industrial structure. But in recent years, economic development has slowed down, and the high dependence on foreign trade has led to development influenced strongly by the international situation including global economic volatility. People's living standards in the Eastern Region are in the leading position—the disposable income per capita of urban residents and net income per capita of rural residents rank first among the four regions. In addition, the infrastructure of the Eastern Region is the most complete. However, the level of urbanization lags behind the level of industrialization, and the income gap between urban and rural residents is growing. Migrant workers from other regions, or even from rural areas in the Eastern Region do not have access to full social benefits accorded urban residents.

(2) *The Central Region shows many signs of advanced development, but with bottlenecks.*

The aggregate economy of the Central Region has continued to increase, and its national proportion shows a rising trend. Living standards improve very fast; the growth rate of net income per capita for rural residents is the highest among the four regions. The construction and development of infrastructure is good. However, the level of urbanization improves slowly, and still lacks coordination with industrialization.

(3) *The Western Region has made substantial progress, but still has the lowest level of comprehensive development.* There are still major concerns related to the human dimensions, including poverty reduction, income gaps and education; and to ecological fragility, especially at a time of more rapid infrastructure and mineral development, and with pressures from

agriculture and grazing on landscapes, Furthermore impacts of climate change and other factors affecting water and ecological services are being experienced. Entry conditions for enterprises are not well worked out. More adequate monitoring and standards are needed.

The economic development of the Western Region has been significantly accelerated, and the overall economic strength has continuously improved, but its overall economic development is still lagging—GDP per capita is at the bottom of the four regions; there is rapid increase in the level of industrialization, but the industrial operational level is low, and the structure is unreasonable. The growth rate of disposable income per capita of urban residents ranks first in the four regions; the income gap between urban and rural residents is the highest, but the net income per capita of rural residents is lowest.

Infrastructure development needs, low level of basic social services, strong dependence on the central support policies, and weak self-development capacity have seriously restricted the economic and social development of the western region. In addition, COD and sulphur dioxide emission levels of the Western Region ranks highest among the four regions, and ecological damage is very severe. The change of economic development mode is urgent. Furthermore, sustainable development in Western China is a prerequisite for environmentally sustainable development of all China, as downstream impacts from degraded watersheds, polluted airsheds and soils will affect the other regions.

(4) *The Northeast Region has a good development foundation, but relatively low growth.*

Economic development of the Northeastern Region overall has a relatively strong capability—GDP per capita, and the level of industrialization is right after the Eastern Region. But economic structural changes are difficult; the development of high-end industry and modern service industry is not good enough;

upgrading the industrial structure is proving to be a hard task. However the net income per capita of rural residents is only lower than the Eastern Region; the income gap between urban and rural residents is the lowest, and presents a continuously shrinking trend. In addition, the development of education in the Northeastern Region is excellent; the level of urbanization ranks first in the four regions, and human resources are well positioned for economic restructuring, perhaps better than other regions. In recent years, infrastructure development, for example highways, has been slow; urbanization is lagging behind industrialization to a certain extent.

3.3.2. Environmental performance

The environmental performance of the Eastern Region is better than that of the Central and Western regions, especially during the 11th FYP. Whether the total discharge of pollutants, emissions per unit of output value, or the quality of the urban environment, the Eastern Region appears better than the Northeastern, Central and Western regions. Yet, the advent of serious emerging problems in Eastern China, mostly related to development of the last decade may yet change this observation. Marine and coastal concerns such as oil spills and other contaminants, soil pollution and the major air pollution problems such as smog and ozone are pressing matters, with very significant health impacts in some of the richest cities, and with a spread across regional airsheds. Furthermore, the ecological footprint arising from development in the Eastern Region extends far beyond its boundaries as a result of rapidly increasing material demands.

3.3.3. Poverty reduction and income disparities

Although China has made very major gains in dealing with the Millennium Development Goals, the job is not yet complete, and income gaps are growing both within and between regions. Peng Tengyun and Xu Yong respectively utilized the Gini

and GE (generalized entropy index) methods²⁰ and concluded that uneven development in China is expanding according to the data from 1995 to 2003. However, this expansion of income has been relatively slow since there has been a general uplifting of economic conditions. Referring to data from 1993 to 2003, Li Qian and other scholars (2006) found that the tendency of uneven regional development expanded after 1993 as measured by per capita GDP, in which the contribution of Central and Eastern Regions exceeds 50%. The research of Jin Xiangyu and Hao Shouyi (2006) shows that after the start of Chinese Economic Reform, especially since 1990, among the 31 provinces and municipalities as well as the Eastern, Central and Western regions in China, uneven regional development is expanding.

The data analysis of the per capita GDP gap coefficient in China shows that this gap coefficient has gone through shrinking (1978-1990), expanding (1990-2004), and then shrinking again (2004-2010) phases, forming a reverse U shape. The analysis of the data in the years of 1978 to 2010, after the Chinese Economic Reform, shows that the Gini coefficient started to fall from 1978 to 1991, and then rose in the years 1991-2003, then fell again in the years of 2004-2010.

3.4. Causes of regional development imbalances

Regional economics as well as national economic development provide explanations for the uneven regional/area development in China. But various other factors significantly affect regional development. These factors include government policies, macroeconomic factors, regional resource endowments, liquidity of elements, and interactions among these factors. No single theory can fully explain unbalanced regional development in China. In pragmatic terms, there are a number of factors that in the past have been

important and will continue to be significant as China attempts to narrow development gaps. These include natural endowments and the cumulative effects of six decades of planned development. There are historical origins of the imbalance in regional development mainly manifested in two aspects: available infrastructure, and social capital. Regional social capital will influence the economic efficiency, including efficiency, sense of competition, cultural traditions, and education structure. These points are discussed in more detail below.

3.4.1. Differences in geography and natural resource endowments

Access and transport lead to important transaction cost differences. The improvement of water transportation (especially marine transportation) and land transportation cost-savings, have been advantageous for coastal areas especially for expanding international trade. Inland western regions have significant disadvantages due to inconvenient transportation linkages resulting in high transaction costs.

Resource development costs tend to be higher in the Western Region by comparison to Eastern Region in particular. Although mineral resources are abundant, those located in distant high mountain areas are difficult to access, extract and process. Costs are therefore high. The natural resources buried in the mountains are difficult to extract, and costs also higher.

Quality of agricultural development varies considerably, with the Eastern Region and parts of some other regions being favorably endowed, and close to high population markets. By contrast, for much of the Western Region's vast lands the quality and potential are lower and subject to environmental risks including climate change impacts, erosion, etc.

3.4.2. Strong correlation between ecologically-fragile and poverty-stricken counties in the Central-Western Region

Within Central and Western regions, of the counties recognized as ecologically sensitive areas, about 76% are also poverty-stricken. For ecologically-sensitive areas, about 43% of such lands lie within poverty-stricken counties. For arable lands classified as ecologically sensitive areas, 68% is located within the poverty-stricken counties, accounting for 74% of the total arable land of the poverty-stricken counties. And, for populations living in areas classified as ecologically sensitive areas, about 74% of such populations live in poverty-stricken counties, accounting for 81% of the total population of these poverty-stricken counties. These figures suggest that the relationship of ecology and poverty in at least some of the poorer areas of China is significant, likely complex, and certainly a significant matter to be considered for sustainable development.

3.4.3 Cumulative effects of development history over 60 years

China's development policy has undergone three stages, including: the stage of focusing on the development of basic agriculture and industry; the stage of implementing the regional gradient development strategies and eventually prioritizing regional development of the Eastern Coastal Region with an emphasis on Opening Up, accompanied by economic and some financial and political reforms; and the stage of implementing balanced development strategy, including the Western Region Strategy.

The economically well-developed regions obviously have benefitted greatly from preferential policies of the national government.. The disparities of the Opening Up period led to a more open economic environment in some cities while others remained closed to outside investment. Prioritizing the coastal economic system reform created crucial differences in regional

development. From a practical point of view, areas with the Opening Up pilot project experience got rid of the rigid planning system first, stimulated their economic vitality, and realized the rapid development of the private economy. In addition, geographic advantages could be optimized, such as access to cheap shipping from coastal ports.

3.4.4. National development strategies and plans during different periods

From 1949 to 1972, the government's strategy was even development; during this period of time, the priority was given to the development of the backward inland areas. By setting up heavy and chemical industries in the inland areas, this strategy was trying to change the previous eastern-oriented layout for heavy and chemical industries. The Central and Western regions invested in low value-added mining and energy industry, whereas the East Sea coastal area was focusing on processing industry. Therefore, with regard to industrial structure, the Central and Western regions were in a disadvantaged position. From 1973 to 1978, China's development strategy gave priority to the development of coastal areas.

During the 6th FYP (1981 to 1985), the government emphasized setting up regional development strategies based on regional comparative advantages. At this stage, the development strategy was gradient development from coastal to inland. The coastal areas had the priority to optimize the industrial structure, build up infrastructure, and participate in international trade and investment. Inland areas needed to develop energy, transportation and raw materials industries to support coastal areas. The special economic zones and opening-up policies were implemented, mainly along the south coast, especially the Pearl River Delta, and including Zhuhai, Shantou, Xiamen, and Hainan special economic zones plus 14 opening cities. Overall, the eastern coastal areas gained greater autonomy in finance, taxation, prices, investment, credit policy, and the eastern coastal areas have rela-

²⁰ For explanation of these terms see Fernando G De Maio. 2007. Income inequality measures. J. Epidemiol Community Health. 61(10): 849-852. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2652960/>

tively greater institutional innovation space.

From 1991 to 2000 (8th and 9th FYPs) the development strategy aimed to coordinate development of regional economies and reduce regional disparities. It adopted a series of policies to stimulate the development of inland areas, including increasing the funds for the infrastructure construction of the inland areas, attracting foreign investment for the inland areas, and guiding the collaboration between inland and coastal areas. The Special Economic Zones began to expand from the southern coast (southern section) to the central coast and the northern coast, forming the Yangtze River Delta-centred "middle section" and the Bohai Bay-centred "northern section". Meanwhile, the regional development focus moved from the eastern coast to the central and western regions, especially from the east to the west along the Yangtze River Valley.

Starting with the 1999 Western Development Strategy, the government tried to implement balanced and coordinated development. The Western Development Strategy focused on attracting foreign investment through improving the basic infrastructure and business environment, with the hope that the Western Region could catch up with the development in the Eastern Region. However, based on actual results, the regional disparities between the eastern and western region were not significantly lessened. In addition, the government promoted the "Revitalization of the Northeast Industrial and Other Old Industrial Bases" strategy (2004), "the Rise of Central Region" Strategy (2006) and other policies, such as to increase transfer payments. Now, in the 12th FYP, the government aims to reduce regional disparities and seek coordinated regional development.

3.4.5. Regional industrial structure

The industrial technical content, added value, and economic scale of different regions are different, leading to differences in how fast industries can

change and advance. In the Western Region, the main industry has been primary industrial raw materials processing. In the development of a heavy industry strategy in the Central and Western regions, many large and medium-sized state-owned enterprises have been established; most belong to low value-added extractive industry and energy industry, and raw material industry with low processing depth and level. These industries are hard to integrate into local rural industrial structure and further promote the development and growth of the rural township enterprises. After the Chinese Economic Reform, the Eastern Region gave priority to the development of high value-added industry including finance, trade, information, and communication. The Western Region became a periphery zone of agricultural and other primary products, resulting in the expansion of inter-regional disparities for more than 20 years. Qin Chenglin's (2011) analysis shows that primary industry has made a great contribution to resolving the issue of regional development imbalances in China. Contributions of other industries including service industry, the wholesale and retail industry, hospitality industry, and the financial industry to the uneven regional development in China ranked at the second, third, and fourth place respectively.

3.4.6. Regional marketization and ownership

At the moment, the marketization level of the Eastern Coastal Region is relatively high; collective, private, foreign and other non-state-owned economy have all made relatively large contributions. The situation in the Western Region is the opposite. Wang Feng (2007) found that regional differences in human capital, the development of a non-state-owned economy, and the extent of opening to the outside world are important causes of the imbalance of regional economic development in the present stage. Wang Xiaolu and Fan Gang (2004) pointed out that the economic growth gap between the Central-Western regions and the Eastern region is mainly due to the low productivity.

This issue depends mainly on the regional difference of technological progress and marketization. In terms of marketization, the disparity between the eastern and western regions is very significant, particularly, the regional disparities on the non-state economic development and factor market development (capital, labour, land).

Regional restrictions have existed for a long time in the capital market and the labor market in China. Specifically, the inter-regional free flow of labor cannot be achieved; imbalance exists in regional investment. These factors are an important cause of the differences between the coastal and inland areas. In addition, technical workers prefer to find higher-paying job in the coastal areas. Also, there are differences between the coastal and inland areas on the growth of investment, financing structure, and the efficiency of funds allocation. These factors can amplify regional differences. Furthermore, the imbalances in regional development cause labour migration to the well-developed regions, and therefore intensify the regional differences.

3.4.7. Central fiscal policy

At present, the central government promotes regional coordinated development through fiscal transfer payments and by improving public services. To accomplish fiscal transfers payment, the government changed the previous decentralized fiscal tax system to the current tax sharing fiscal tax system. As a result of the reform, the central fiscal income has accounted for a big proportion of total fiscal revenue and changed the former situation of local fiscal domination for some areas. As the central government has gained more revenue, it can provide more subsidies for the less developed regions. The design of central government's fiscal policy design is not based on local economic development and sources of revenue growth, but on the average of recent years' fiscal revenue and expenditure. Regions like Eastern China with larger fiscal expenditures and higher potential for

economic growth benefit by gaining more income.

3.4.8. Chinese Economic Reform policy (globalization and economic liberalization)

Globalization and economic liberalization amplify the regional disparities. Through export and foreign investment, globalization promotes economic growth; adopting advanced technology promotes economic growth and competition among enterprises. The Economic liberalization promotes economic growth by optimizing the resources allocation. However, at the same time, owing to the regional difference in resource endowments, economic structure, and policy, globalization and liberalization may broaden regional disparities.

Chinese Economic Reform policy implemented policies preferential to the eastern coastal regions, including low tax rate, high financial return, and permission to use land for high-tech industrial development. This situation benefits the eastern region in many ways, for example, through better utilization of foreign capital for economic development, accumulating capital from international trade, introducing advanced technology, and adopting good management experience. Over the past 20 years of economic reform, market-oriented foreign direct investment and private investment drove the large amount of capital flows to the Eastern Region with accelerated economic growth results, but also expanding regional disparities. Commercialization of scientific and technical achievements in the Central and Western Regions is still very low. The resulting disparities in human capital between the Eastern and the Central-Western regions have become an important factor in regional differences.

3.4.9. Role of policy interventions

In the 8th FYP, China began to focus on more even regional development, and proposed coordinated regional development strategy: *to handle and perform regional advantages and the national coordination*

of planning, and the relationship between the coastal and inland areas, the economically developed regions and less developed regions, motivating the regional economy to move towards reasonable division of labor, performing advantages, advantages of complementarity, and coordinated development direction. This strategic thinking was further explained and specific measures identified during the 3rd Plenary Session of the 16th Central Committee of the CPC as the Five Overall Arrangements. Strategies like the development of the Western Region, the rise of the Central Region, and the revitalization of the old industrial bases in the Northeastern Region aim to narrow the regional development gap and to promote more even regional development and targeted measures.

The specific contents of the **Five Overall Arrangements** are to:

actively promote the development of the Western Region, revitalize of the old industrial bases in the Northeastern Region and other regions, promote the rise of the Central Region, and encouraged prioritization in Eastern Region development; continue to highlight advantages of the various regions and enthusiasm, improve the market mechanism, cooperation mechanism, mutual aid mechanisms, support mechanisms, and gradually reverse the trend of the regional development gap, forming the new pattern of the western and central regions to promote each other, to take advantage of complementarities, and to promote common development goals.

The 16th Plenary Session of the Fifth CPC Central Committee passed the suggestion of the 11th FYP from CPC on the national economy development and social development. This suggestion promotes the healthy development of urbanization, adherence to coordinated development of medium and small cities and small towns, improvement of the overall carrying capacity of cities and towns; continue to upgrade the driver and radiation effects of the Pearl River Delta, Yangtze River Delta, and the Bohai Sea region on the mainland's economic development; and continue the role of special economic zones and the Pudong New

District of Shanghai, while stimulating the economic development of Tianjin Binhai New Area, and other areas with advantageous conditions.

The Decision of the Central Committee of the Communist Party of China on Several Important Issues on Building up the Socialist Harmonious Society passed by the 6th Plenum of the 16th CPC Central Committee, mentioned:

implementing the overall strategy for regional development and promoting coordinated regional development to form a regional industrial structure with reasonable division of labor; obvious characteristics, and complementary advantages, and to promote the common development of all regions; increase support to less developed areas and difficult areas, improve the infrastructure and the education, health, cultural and other public service facilities of the central and western regions, and gradually narrow down the gap among the regional basic public services; improve the support for the old revolutionary base areas, ethnic minority areas, border areas and poverty-stricken areas as well as major grain producing areas, mineral resources development areas, areas with ecological protection challenges, and ethnic groups with small population; support the economically developed areas to accelerate industrial structure optimization and industrial transfer; support the advantageous industrial projects in the Central and Western regions to speed up the transformation from resource advantages into economic advantages, encourage the Eastern region to help the development of the Central and Western regions, expand the developed areas to provide related assistance to the less developed areas and ethnic minority areas, form the mutual benefit mechanism with government as the leader, market as the channel, enterprises as the mainstay, the project as the carrier, establish a system for resource exploration with the pay to use and compensation mechanisms, put up measures to support the implementation of regional economic transformation in areas confronting resources recession and depletion.

Corresponding to the above policies, the government controls and regulates the developmental spaces through planning, policy, investment, and other measures.

Measures aiming to balance and correct regional development disparities include:

- **Improving management of land resources.** This is the measure that most governments try to implement. China has strengthened the planning and management of land, including 18 million acres of arable land with red line protection.
- **Developing better regional policy.** For example, when implementing the development of the Western Region, carrying out the Northeastern Region revitalization, and promoting the development of poverty-stricken areas the government carries out a series of preferential policies to support the region to accelerate development.
- **Improving overall planning.** The central government already has prepared some 86 regional planning or guidance documents. The major contribution of those efforts is to provide functional orientation for regional development, and clarify the role for each area in the national socio-economic development. Better coordination of plan implementation, attention to overlaps that create clashes between objectives, and other efforts towards integrated planning and management must become key priorities.
- **Promote infrastructure construction and implement of major land improvement projects.** Construction of the Qinghai-Tibet Railway and much other highway length and other infrastructure is intended to improve the conditions for regional development.

In 2006, the national 11th FYP put forward promotion of the regional main functional areas. Regional main functional area planning is based on: the region's resources and environmental carrying capacity, existing development density and development potential, consideration of the future of China's population distribution, economic layout, land use, and urbanization patterns, and division of the land space into classes based on development potential and protection needs. Areas suitable for future large-scale accumulation of population and industries would be-

come the development class areas, and ecologically sensitive areas would be the protected class area. Within these general categories, according to the degree of capacity and sensitivity, areas will be further divided into four main functional areas: optimized development, key development, limited development, and prohibited development areas. Different regions have different functional orientation and assessment index systems (Zhang Xiaorui and Zong Yaoguang, 2010). The regional main functional area planning helps to go beyond ecologically insensitive administrative divisions, with the hope that better coordinated allocation of resources can achieve balanced social, economic and environmental development. However, the planning of the regional main functional areas is still at the elementary stage operating at a scale sometimes too coarse for use in local planning.

3.4.10. Multiple factors at play

Uneven regional development in China is the outcome of many factors. First, the economic geography, history, and a variety of factors lead to the situation that the level of economic development of coastal areas is higher than the inland areas. This is an early gap effect, that is, during the early stage of development, the gap of income per capita or starting points has a major role in enlarging the disparity at a certain stage. There can be cumulative effects. Second, the national gradient development strategy and tilt policy accelerate the trend of enlarging the economic disparity between coastal area and inland area due to the benefit gained from participating in the globalization and liberalization of the economy. Third, among different regions in China, the investment model is very different. The investment in human capital in developed coastal area is significantly higher than the central and western inland regions. The return on investment in human capital, social capital, and intangible capital is higher than the return on investment in the development of natural resources, physical capital, and tangible capital.

4. SOME KEY ISSUES

4.1. China's environmental still faces serious challenges despite vigorous mitigation efforts.

The pressures on environment continue to rise as a consequence of China's rapid development even though there have been important advances in pollution control and other environmental planning and management efforts especially in the 11th and 12th FYPs. Current efforts will help, especially transformative changes in the economy related to industrial restructuring and improved regulation and market-based incentives. There have been enhanced efforts to address the most difficult pollution problems such as non-point agricultural pollution sources, and photochemical smog. However, there remain institutional cooperation and coordination issues, implementation inefficiencies, and great difficulties in the conduct of integrated environmental planning and management. These systemic issues will continue to hold back progress unless they can be tackled effectively.

Overall there is a need for accelerated efforts to tackle significant challenges in the environment and economy relationship of China, especially in the implementation of Circular Economy, Low Carbon Economy, and Green Economy. The continuing decline of ambient conditions needs to be stopped during the 12th and 13th FYP periods, so that environmental protection guarantees can be well implemented during the decade after. Then China can truly meet its expectations for an Ecological Civilization and Ecological Progress. By 2030 to 2035, the main environment and development problems of today should be solved, or well on the way to solution. The tasks are massive for this to happen well.

The sobering thought is that new issues will continue to emerge, especially as China's domestic consumption expands, and as Climate Change impacts are expressed throughout the country. China is already encountering various limits and scarcities created by

a variety of factors, including push-back from citizens concerned about development, from high food, energy and many other demands on natural resources, and, internationally from matters related to trade and investment and from the increasing demands linked to regional and global environment matters. Expectations are high on the part of China's citizens and from the global community that China will play a growing role on green development internationally, including transfer of its best experiences into other developing countries.

There are also emerging opportunities associated with the transformative changes required in environment, economy and development relationships. Green development and sustainable development will produce new streams of revenue as well as jobs and better quality of life. Turning these hopes into reality will require that the current efforts to mainstream environment into economic and social decision-making must be considerably strengthened—at the national level, and within all regions of China.

As CCICED's 2012 study reports indicate, whether a region in China is economically advanced, even becoming post-industrial; or whether at an earlier stage, such as Western China, there are both significant challenges and opportunities for environment and development. Another reality check is that it will take insight and effort on the part of those cooperating with China internationally to keep a steady and productive relationship that optimizes outcomes for all sides. Otherwise, it is possible that the shift to green economy and development could stall. That would be most unfortunate whether the impacts are in China or in other countries.

4.2. Today's regional development strategy does not guarantee sustainable development within or among regions.

Certainly over the past 15 to 20 years there has been a shift towards a more comprehensive approach to regional development policy and planning. The four

main regions have benefitted differentially, yet all have experienced trade-offs between environmental quality and economic growth, and with different levels of natural, human and social capital as a result. The richer areas of Eastern China have experienced significant declines in air and water quality, but now have the management capacity, including well-trained people, technical and financial resources, to deal with these and even the most difficult environmental protection problems in the coming years. Other areas, especially in Central and Western Regions, are not as well equipped to deal with the environmental stresses associated with high growth rates. Some areas are experiencing the double-digit economic growth rates common until recently in Eastern China provinces. However these other regions face the possibility of pollution spreading and intensifying from inward migration of heavy industry; impacts of mineral resource development; and the effects of rising market demand for animal protein on grasslands and water quality.

Regional growth places emphasis on transportation and infrastructure development. Some decisions are on track in relation to efficiency of energy use as well as opening opportunities for implementing renewable energy, for addressing poverty, and for ensuring that basic environmental infrastructure (water and sewage, solid waste disposal, protection against natural hazards) is in place throughout China. All these investments often have major environmental impacts, for example, from dams, and water diversion projects, and the effects of highways and pipelines on ecosystems and biodiversity. Indeed, new corridors transform landscapes on a massive scale. The cumulative environmental impacts of transportation and infrastructure are only beginning to be well understood in some of the larger parts of the country, especially in Western, and inter-regional effects.

Although China has experimented extensively with water basin planning and management, marine and coastal planning, and, more recently, with regional strategies for air pollution, these efforts have not

met with necessary levels of success. Often there are collisions of objectives among sub-regions, or between regions. Mechanisms such as eco-compensation for protection of ecological services have taken hold. However no national system is in place. Some problems such as smog have become regional issues where no single city or industrial area can control the problem, since airsheds are polluted from multiple sources over extensive areas. This same problem exists for non-point agricultural pollution, and of course, marine areas.

Unless regional development strategy places greater emphasis on green development throughout all parts of China, and on inter-regional issues, it will be difficult to achieve sustainable development either regionally or nationally. The regions are so interlocked that even if there are improvements in part of the country, these achievements will be endangered if conditions decline elsewhere. This has already occurred in relation to air and water quality, and possibly in soil pollution problems. The difficulty to be faced is how to fairly and effectively address needs for differentiated approaches while still ensuring that the nation as a whole benefits.

4.3. Mechanisms for differentiated regional green development are still at an elementary stage.

It is appropriate for the goals of green development to vary between regions; and, within each of the four major regions to vary among the different provinces, autonomous regions and municipalities. This point is often explicitly recognized, for example by setting out differences in the environmental targets to be reached, and in relation to actions such as outmigration from areas that need strict ecological protection, or in the funding allocated to reforestation or grassland programs for protecting ecological services. The best efforts deserve considerable praise as successful efforts to accomplish both environmental and social economic development objectives. However, there is considerable confusion, sometimes with objectives working at cross-purposes and lack of capacity and

understanding for newly introduced management concepts.

Confusion exists over national vs. regional pollution standards and practices. Although it is not surprising that differing levels of pollution control are a reality in China today, there must be some agreement about the future. The issue is whether major pollution emitting centres should be treated more or less alike, and cleaned up to similar standards and over similar time periods. Or should there be more lax standards in areas of lower population, or at an earlier stage of development?

Western China development is being based in part on policies related to Eastern China's past experience and primarily based on stimulating economic growth through increased investment. This strategy, which can rapidly raise growth rates to levels above 10 to 12%, led to high energy and high pollution outcomes and the same could happen in Western China and perhaps in other areas: 'pollute first, clean-up later'. Certainly there is some hope that the worst will be prevented, but the capacity to deal with rapid development is limited, and there is limited control in dealing with the large number of industrial shifts taking place.

Incentives for environmental improvement are inadequate in the taxation system and in regulatory measures such as fines for pollution control. Enterprises have limited incentive to spend on environmental controls as long as there limited financial sanctions, or if they are not encouraged through sharing of costs for improvements. Competition between regions and provinces to secure industrial development is severe and cutting environmental corners by accepting less than best practices in order to secure industry growth is an issue. Green tax reform has been slow.

R&D investment in green technologies and capacity building of innovation skills is limited in some areas. If the right combination of human resources and access

to green technology cannot be put in place, there is limited potential for green development. This places some sub-regions at a severe disadvantage, as cities and resource-dependent communities in rural China have discovered.

Main functional zoning is not developed well enough to be a reliable tool for sustainable and green development. China's laudable effort to define zones according to sustainable land and water use based on ecological conditions, existing uses and special conditions has been underway for a half decade. Yet main functional zoning is by no means a success at this point. The scale is too coarse (i.e., not operative at very local levels), and the designations are poorly understood locally. The functional zones and their boundaries are defined without full participation of affected people and resource users. They may become locally contentious. Thus what could be a most useful means to resolve land and water user conflicts and marine resource overlaps must be considerably upgraded to achieve optimal results. This will take a decade or more based on experience in other countries, and it is urgent to accelerate progress.

There is no comprehensive, unified eco-compensation system in China, although substantial financial support is expended each year on such compensation. China has a well-established and quite extensive set of initiatives to provide longer-term protection for watersheds, wetlands, and other areas that provide ecological services. Most of the payments originate from central government, or upstream subnational jurisdictions. Those benefitting most from the services (e.g., cities on rivers downstream) generally pay little. Furthermore, at this point, there is limited assessment of how to achieve best value for expenditure. Eco-compensation is a vital part of both national and regional green development strategies and likely could produce much greater benefits at lower cost, with more consideration of having beneficiary regions directly share in the costs. Better outcomes might then occur more quickly.

4.4. Industrializing and post-industrialization processes require separate but linked green development approaches.

China is currently paying much attention to structural adjustment of its heavy industry in order to reduce the extent of overinvestment and environmental damage, and to provide a quicker path to more balanced growth, including expansion of the service sector. As the service sector's contribution rises to levels of 50% or greater, there should be positive effects on environmental conditions in the Eastern Region. The assumption would seem reasonable, but the balance is precarious since there is redistribution of heavy industry especially to Central and Western Regions.

Green development for industry must be multi-pronged, taking into account cleaner production based on lower pollution intensity, ultra-energy efficient and non-polluting new production processes, and substitution of processes and products. Such industrial ecology is becoming well tested in China, but still not widely enough applied. Consolidation into large, modern operations combined with forced closure of inefficient producers occurs frequently and this trend will continue.

Soon industrialization will see quite separate types of situations. One is in the newly industrializing locations such as Western China and parts of Central China, where there may be good intentions but limited capacities to move directly to a desired high level of clean production and advanced technologies. The second is the post-industrialization situation in areas such as the Northeast and East, but also in the other regions, where dirty industries have moved out, leaving a legacy of brownfields that require expensive remediation. The post-industrialization areas also face the emergence of new service-oriented facilities and activities that have their own new types of environmental problems such as the high energy use of major computer data storage facilities, the demands on the financial sector for improved environmental

monitoring of their loans and other activities, and the tourism sector with its impacts on biodiversity and fragile ecosystems. Thus separate but linked pathways of green development are needed to make regional green development supportive of national needs.

For greening of older industrialized areas that remain in place, entrance requirements need to be high so that best practices are favored. It will be necessary to have high standards put in place throughout China—so that simply dismantling old high polluting, high energy use industrial plants and re-assembling them in new locations is not an option. Mechanisms are needed for sharing experience based on success stories where production facilities have been environmentally upgraded cost-effectively. Much of this successful experience can be gleaned from locations in the Eastern Region.

For some of the service industries that increasingly will be found throughout China, there are challenges that include green building design, design and operation of new business campuses, and light industry or high-tech green industrial parks, and the development of green relationships, whether for investments, market supply chains, or customer/client oriented certification or other programs that demonstrate commitment to green development and green products.

At the heart of all these approaches is corporate social responsibility, covering the industry's license to operate in a community and its profitability based on meeting—in a transparent way—specific environment and green development goals.

4.5. Green development coordination and integrated management is limited in effectiveness.

Coordination mechanisms are insufficient at local-provincial, regional and within central government levels. This is a general problem concerning development within China, but it is perhaps more severe in the case of environment and green development

concerns. The reason why is that many such concerns are “spill-over” problems, or externalities. In addition, most of China’s rich resource bases are now being exploited in a single-minded way to meet very specific objectives that demand a more or less constant increase in production. The Bohai Sea is an example in the marine environment, where more is being demanded from fisheries, aquaculture, offshore oil and gas, tourism, and from shoreline development that includes extensive infill and loss of wetlands. There is no effective integrated planning and management; nor is there a robust emergency response system. Thus when an oil spill occurs, the economic cost is high and ecological damage excessive. Similarly, the pollution over China’s cities now requires an integrated management approach since the primary pollutants from various sources and locations form into secondary pollutants such as PM2.5 small particles that spread widely and form a costly regional problem that is hard to solve.

The success of past efforts for environmental protection has been based largely on meeting defined single targets, whether for reforestation (% of forest cover) or pollution reduction and energy efficiency (reduction of SO₂, energy intensity reduction). The problem is that these targets do not necessarily translate directly into improvements in ambient environmental conditions, or to more healthy ecosystems, or even to reduced environmental risks. This is a dilemma that will be repeatedly encountered in the complex situation of regional green development in China, where there already exists a high level of demand on the part of citizens for actual environmental improvements. The argument for effective integrated assessment and management includes improved capacity for monitoring for improvements in environmental quality progress, plus human and ecosystem health. The recently-created MEP regional offices have demonstrated the value of independent monitoring, and should be strengthened in order to carry out their mission even more effectively.

Given that existing regulation and institutional ar-

rangements are not working to solve these and other such problems such as integrated water basin management, there clearly must be a move to new ones. There are numerous models to draw on from international experience, for example Los Angeles on air pollution, Murray Darling river basin management in Australia, the Barents Sea integrated management and the Black Sea Commission in Europe. China may learn from these and other approaches, but it will need to define approaches unique for its own complex situation. Two great problems need to be addressed: (1) overlapping institutional responsibilities without clear lines of authority; and (2) limited monitoring and enforcement abilities, with many dispute resolution needs.

More broadly, there is no clearly defined green development authority at any level of government in China; nor is there a full understanding of how far-reaching an integrated planning and management approach to green development might have to become. Green development certainly requires new investment strategies, new indicators of progress, improved sharing of information, regulatory streamlining, clearer lines of accountability, and capacity development. It may be valuable to consider consolidation of implementation authority so that resource and environmental management may be dealt with on a more holistic basis, and in the context of regional green development.

4.6. Lack of a clear long-term vision and strategy to guide national and regional action for green development in China.

The 1994 China Agenda 21 document provided a comprehensive sustainable development outline appropriate for China’s needs at that time. It was to a considerable extent outstripped by the high economic growth rates of the past 15 years, leading to the situation of today’s “unbalanced, uncoordinated and unsustainable development.” While many of China’s existing policies are suitable for a national green development strategy, they are still pieces that do not add up to a whole, and there is no nationally-adopted

strategy. A vision and strategy at least to 2030 are needed, and for some important elements such as Low Carbon Economy, the need extends well beyond that time frame. A strategy for Green Development needs to consider the optimal balance and utilization of natural, economic, social and human capitals to bring about and sustain green regional development and prosperity. In addition there must be political leadership and good governance at a national level without which any strategy is likely to fail. The timing for defining and adopting a Green Development Strategy is excellent, given that, at the 18th CPC Congress in November 2012, Ecological Civilization/Progress was elevated to the same level as Politics, Economy, Society and Culture—all main drivers of change for the whole Chinese society.

Citizens should play a responsible & helpful role in green development planning and implementation, yet the opportunities to do so are largely beyond their reach at present. Four examples of how this situation could be improved include:

- Expanding opportunities for more substantive direct citizen input to environmental assessments and other planning processes; with government providing full disclosure on green development concerns including topics such as toxic waste inventory and disclosure, and regular monitoring of environmental problems.
- Fostering green job opportunities within regions, e.g., to support low carbon economy, circular economy, etc. This may require financial inputs through mechanisms such as eco-compensation.
- Putting in place co-management arrangements with local community groups in Western China & elsewhere for ecological construction and nature protection including ecosystem and biodiversity conservation.
- Placing greater emphasis on environmental education, community improvement initiatives and other

means to promote an understanding and capacity for green development.

Green consumption should be part of the Green Development vision and strategy. This element should be tied to both consumers and producers. If green choices are unavailable, poorly understood, not offered at a reasonable price point, or uncompetitive for other reasons they will not be purchased. Both goods and services are of concern, especially regarding personal transportation, government procurement, and in market supply chains. It is observed that a significant number of urban dwellers in China are moving towards western consumption levels either at home or in their office workplaces, often in western-styled high energy consuming buildings. While a small number of office buildings in China are built to LEED standards, most are not.

China’s cities are essential partners for Green Development and yet in the rush to build quickly and cheaply this potential is not being fully exploited. There is no overall Green Development Strategy for China’s urban development, although there are many interesting initiatives unfolding. The concept of eco-cities, pioneered in other countries but also found in China is one starting point. Another is the enthusiastic reception of many Chinese cities to Low Carbon Economy, as highlighted at the Shanghai Expo.

China’s urban development allows for a variety of approaches to take into account the uniqueness of setting, cultural, stage of development, and other characteristics. Also, there is the opportunity to build specific innovations centred around sustainable technologies, for example related to green automobile development and production, and a focus on high quality of urban living through outstanding urban planning and design. Gateway cities to areas of outstanding natural beauty can develop a tourist based service economy. It is quite likely that within the various regions of China, it is the cities that will take the

lead in defining green development opportunities and pathways.

4.7. Alignment of China's Green Development with International Green Economy Trends.

Rio+20 emphasized Green Economy directions at the national level, but was not particularly strong on sub-national regional development needs. Generally, China is ahead of many other countries in terms of exploring the implications of green growth, economy and development. However it is essential for China to draw upon the relatively rich experience in other parts of the world that could hasten China's own transformative changes. Secondly, China already is in a position to market both goods and services for green development to other countries and thus turn its efforts into substantial economic gains. Third, there are important implications for China's future international cooperation, especially with transferring experience and technologies to developing countries, and in co-operation with countries to solve problems of mutual interest such as clean energy technologies. There is a need to green China's Outward Direct Investment (ODI) and perhaps include this process in the overall Green Development Vision and Strategy.

Finally, given that Green Economy and Green Growth will be an important component of discussions in future international negotiations and dialogue, China can seek workable partnerships and other cooperation that will benefit its own regional and national development, and will contribute to better development elsewhere and globally.

5. CONCLUSIONS

Consolidation of environmental protection and management, low carbon economy, circular economy and sustainable development strategies with green growth and green economy is needed in order to provide a strategic direction for green development.

In a few words: mainstreaming green development into national and regional decision-making. China's most recent elevation of Ecological Progress places the subject at the highest level of societal drivers. This should permit accelerated consideration of green development in future regional development efforts well into the future, especially in the critical period between now and 2030. While the CCICED studies this year provide insight into green development roadmaps for specific regions and types of problems, it is very evident that a national green development strategy strongly focused on regional development and also on China's external environment and development relationships is needed for guidance. Such a strategy would be very helpful in providing substance and practical guidance for implementing a comprehensive approach for Ecological Progress.

5.1. Mainstreaming regional Green Development

China has made substantial commitment in the 12th FYP to addressing regional economic imbalances and to enhancing environmental quality throughout China. These commitments will provide a substantially altered baseline condition by the start of the 13th FYP. The richer provinces will focus on pollution reduction, but it is very important that new sources of environmental degradation not be allowed to gain a foothold anywhere, as happened with nitrogen pollutants during the 11th FYP. Migration of heavy industry is already taking place on a considerable scale, but should not be at expense of the environment, for example in Western China. Significant issues of inter-regional cooperation & competition, transfer payments, eco-compensation. Urbanization is a key matter for regionally balanced development, including regional clusters of very advanced infrastructure development and with great possibilities for mainstreaming green development. As well, rural-urban migration is one of the most significant subjects with regard to inter-regional development management, and will play an on-role on green development.

The following conclusions are useful considerations for the mainstreaming of green development:

- All regions are interdependent with regard to environmental changes and impacts, but the actual issues and the capacity of regions to deal with them are quite different and depend on many factors. Thus, while high quality of environment should be maintained throughout the nation, and the necessary standards put in place to ensure this happens, differentiated strategies are needed at regional and sub-regional levels.
- Continuous attention and guidance is needed from senior leaders at all levels to ensure that better coordination produces optimal outcomes. This co-ordination should be both vertical and horizontal, and between sectors. Green development requires institutional changes and considerable attention to capacity development. There is a need to improve accountability and to monitor outcomes through improved ecological knowledge and environmental quality. Green development requires good governance in order to achieve cost-effective, high quality outcomes.
- Green development has to be a longer-term planning effort with an agenda that extends until at least 2030, and increasingly demanding objectives including those of the current 12th FYP and the 13th FYP. Over time it should be possible to build more integrated green development approaches for topics such as poverty elimination and protection of ecologically fragile areas, green urban development, and rural ecological progress.
- Major investment decisions are required on the part of both government and enterprises to ensure effective and efficient use of funds for environmental protection and for the emerging low carbon economy. Many of these decisions involve SOEs, and also municipal levels of government. There has been

much concern on how the concept of scientific development can best be applied for these decisions and in the follow-up management actions. Further improvements of environmental impact assessment, new efforts such as social risk management, and environmental audits are being discussed at present. These are promising mechanisms, but require careful consideration of how they can produce better results without further administrative confusion and coordination complexity. They also require a high level of transparency in their application.

- Laws and regulations pertaining to greening of regional development, and necessary incentive systems require further attention. Some environmental laws are outdated, and perhaps are not sufficiently robust to address emerging problems such as regional air pollution, adequate fines or other punishment for major incidents, or health and environment risks. Promotion of the rule of law includes the need for improved disclosure of environment and development information. It also means full access to courts for citizen complaints and other mechanisms that improve the capacity of citizens to monitor, comment upon, and take action for the safeguarding of their local environment, and participating in the improvement of the country's Ecological Progress.
- China's efforts for mainstreaming green development may be helped by improved linkages to green growth & green economy efforts elsewhere in the world, including both developing & industrialized countries

5.2. Practical priorities for Green Development

Among the many practical priorities that have been identified in the discussion on regional green development, seven stand out for special attention in all regions:

- Improved human capital in all regions through robust employment strategies, with a focus on poverty reduction, education, health, and advanced skills for value-added employment especially in the service sector.
- Improvement of the integrity of urban and rural environments and ecosystems and biodiversity management, improvement of ecological services, high quality of the built environment, regional pollution control, sustainable resource use.
- Transition to a Low Carbon Economy including sustainable energy transportation & infrastructure, application of green technologies throughout energy production and utilization in key sectors, and major shifts away from today's approach to coal use.
- Green industrialization in primary, secondary and tertiary levels of industry.
- Optimized land and water use, including river basins, marine & coastal areas, waterbasins, in urbanization and rural sustainable development.
- Sustainable consumption and a relatively small ecological footprint are essential elements of a moderately well-off society.
- Livable cities and rural communities with low levels of environmental risks.

5.3. Innovative tools for regional Green Development

A number of tools now in use within China are specifically designed for application at the regional level in addition to those of general application for environment and development these include:

- Ecologically-based Main Functional Zoning can be used for ensuring green development based on

local attributes, ecological services value and fragility of ecosystems. But zoning information and the actual use of such zoning for local decisions still require considerable refinement.

- Eco-cities and eco-provinces are terms used in China, with interesting local experiments, However, the expansion of today's experimentation into full practice in every part of the country could be accelerated. The benefits and costs also require careful assessment, since showcasing can be an expensive approach of limited value.
- Eco-compensation experience in China has expanded greatly over the past decade, but is not yet a comprehensive national system. It must be considered a national system since it meets needs of both richer and poorer regions. The sources and levels of funding and the use of incentives in expenditures will be important considerations in future design and long-term application.
- Ecological construction is of great value to China, with use in restoration of damaged areas. In general this approach has seen its most significant application in rural areas of Western and Central China. However as the country addresses soil pollution and brownfield sites in the industrialized areas, and ecologically damaged marine and coastal areas in Eastern China, the experience gained in operating the forest and grassland rehabilitation efforts may be put to get use. These existing programs also require improvements, especially for grassland-dominated regions.
- Innovation clusters for green technology development & application have become important in many cities and it should be possible to harvest the results of investment in such clusters during the coming decade. The possibilities for expansion into areas and development matters of sub-regions within Western China and elsewhere will open new opportunities for innovation.

- Investment models in green development will continue to evolve. This is a matter not fully resolved by any means. The potential roles of smaller start-ups and the much larger SOEs is one area of concern. Both are important. Another is the potential of FDI into areas beyond the Eastern Region to introduce new technologies and management approaches for green development. Investment in heavy industry will likely fall off somewhat after 2020, opening new possibilities for more balanced and green development. This will accompany the interest in stimulating domestic consumption levels. However, there is no guarantee that the trend will be towards sustainable consumption. Investment can help to shape the directions taken.

5.4. New Political Opportunities

CCICED's 2012 Annual General Meeting is taking place

at a time of political transition in China. It is therefore appropriate to leave the final word on development to a new political leader. In his speech at the conclusion of the 18th CPC Congress, China's Vice-President, Mr. Xi Jinping noted that:

Our people have an ardent love for life. They wish to have better education, more stable jobs, more income, greater social security, better medical and health care, improved housing conditions, and a better environment. They want their children to have sound growth, have good jobs and lead a more enjoyable life. To meet their desire for a happy life is our mission.

These wishes hopefully will be turned into reality during the coming years, and in the process, green development achieved for all parts of China. Such an outcome will be an immense contribution for the whole world's environmental state as well.

II. ENVIRONMENT AND SOCIETY

1. INTRODUCTION

This year marks the start of new leadership for China's government, and the mid-point of the 12th Five Year Plan for social and economic development. Indicators point to China being able to meet its ambitious GDP goals for a 'moderately well off society' by 2020. There will be substantial improvement towards education, and some health and other social development goals. And China will continue along its dramatic path towards rapid urbanization. Yet despite bold development plans, China is caught in a serious situation of environmental challenge, as the smog situation in many cities revealed this year. It is a challenge of governance and therefore of government at national and local levels, since it has the potential to destabilize development plans and their outcomes, to undermine confidence and trust on the part of citizens, to affect quality of life at a time of rising expectations, and to degrade ecological services needed for society to thrive.

Substantial investment on environmental protection has already taken place¹ but still not enough to turn the curve towards consistent environmental improvement. At the same time, emerging pressures from both new and existing types of development, climate change, and rising domestic consumption are setting off new alarm bells. In particular, institutional and management strengthening for a sustainable relationship between the natural environment and society have not kept up with the pace of economic growth and development.

China has made important technological and managerial strides towards new solutions for environment and development, many of which will become very important in the middle term, between 2015 and 2030. Even more significant, however, is what remains to be done for creating a satisfactory relationship between environment and society within China, and in the country's international relationships.

In November 2012 at the CPC 18th Party Congress, the idea of Ecological Civilization was incorporated into the meeting report and enshrined into the newly revised Constitution of the Party, and at the same time accelerated action for environmental improvement was called for.² In March 2013 at the National People's Congress renewal of government, these points were again emphasized. Thus China is now at an important crossroads along the path towards sustainable development.

How can Chinese society move towards becoming one that has a deep respect for nature and ecological systems, while fully meeting human needs? This is the fundamental question driving the idea of Ecological Civilization, now placed as one of the five most important policy areas for the country (along with social progress, economic progress, political progress and culture). Ecological Civilization is part of the larger vision for China's future. This larger vision promoted by President Xi Jinping is the 'China Dream': for Chinese society, especially its younger members, to rejuvenate

the nation along the lines of socialism with Chinese characteristics.

According to the China watcher Robert Lawrence Kuhn, the Dream *has four parts: strong China (economically, politically, diplomatically, scientifically, and militarily); Civilized China (equity and fairness, rich culture, high morals); Harmonious China (amity among social classes); Beautiful China (healthy environment, low pollution).*³ Another view, with apparently strong support in China, is from Peggy Liu, co-founder of the NGO JUCCE⁴ established to address the sustainability aspects of the Chinese Dream. As she indicates,

*China's middle class will grow from 300 million today to 800 million by 2025 and the country could shift from 'made in China' status to 'consumed in China'...The China dream realigns success with a healthy and fulfilling way of life — living more, rather than just having more. It promotes a sustainable lifestyle, but is not explicitly green...For China, this is no time for incrementalism. It needs to steer the emerging middle class to greener pastures before they develop the unsustainable tastes and habits of the western middle classes...China is unique because the government can help push behaviour change with local policies. The China dream offers a new model of prosperity that can spark sustainable consumerism in countries around the world.*⁵

Unquestionably, people's behavior and perhaps their values are being drastically reshaped by new needs and aspirations as China transitions into a consumer-oriented largely urban society with a rising middle class and citizens well-connected via social media. These observations suggest that even as transformative structural changes occur in China's economy, it is social change that will require ever more attention.

By comparison to extensive efforts over the past two decades to examine environment and economy re-

lationships, fewer CCICED studies have focused on social and environmental linkages, even though many of the CCICED research teams have made socially relevant recommendations such as the need for greater public participation in environmental decisions. Therefore, it is timely for CCICED to examine how social change will influence environmental progress, and how environmental considerations are likely to influence social development and progress.

The 2013 research studies examine how social development might improve environmental protection, contribute to improved green development and meet expectations for China's Ecological Civilization. The studies also consider the other side of the relationship—how improvements in environment and development can enhance China's social development and related matters such as implementation of the rule of law, health of people, and overall quality of life for citizens. The studies include two task forces (TF) and three special policy studies (SPS):

- China Environmental Protection and Social Development TF.
- Sustainable Consumption and Green Development TF.
- Media and Public Participation Policies on Promoting China's Green Development SPS.
- Corporate Social Responsibility in Green Development in China SPS.
- Promoting Urban Green Travel SPS.

¹ For examples of progress on environmental protection see the Ministry of Environmental Protection. 2012 Report on the State of the Environment Report in China, and China Forum of Environmental Journalists. China Environment Yearbook 2012.

² See Meng Si. 2012. An Insight into the Green Vocabulary of the Chinese Communist Party. in china dialogue (<https://www.chinadiologue.net/article/show/single/en/5339>) for an explanation of various significant environment and development terms including Ecological Civilization; also see the CCICED 2008 Issues Paper. Environment and Development for a Harmonious Society. 26 pp.

³ <https://globalbalita.com/2013/06/12/what-exactly-is-the-china-dream/>

⁴ <http://jucce.org/chinadream>

⁵ Peggy Liu. Guardian Professional Network. 13 June 2012. China Dream: a Lifestyle Movement with Sustainability at Its Heart. <http://www.theguardian.com/sustainable-business/china-dream-sustainable-living-behaviour-change/print>

This Issues Paper⁶ tackles the overarching 2013 CCICED AGM theme of Environment and Society. Much has been written on this topic, with many controversies, including Malthusian views on population growth, the 'Tragedy of the Commons', the 'Environmental Kuznets Curve', and views about human impacts on climate change. Environment and Society is the basis of a variety of discipline and interdisciplinary fields including environmental ethics, environmental health, human ecology, ecological anthropology, and human geography, to name but a few. There are many interesting compilations⁷ including books on environmental history⁸ and much has been written on China and other parts of Asia⁹. However, unifying theory on environment and society is lacking—and perhaps always will be—since the topic is so wide-ranging in scope.

2. INTERNATIONAL SITUATION IN 2013

With the world's economy still in a recovery phase, back-pedaling on environmental ambitions and commitments might seem almost inevitable. However China has expanded its efforts—not only in fields such as water and sanitation improvements, but also for investment in environmental technology innovation and in many other environmental fields—in the expectation that transformative change can occur for

both environment and economy, situating China well for building future competitiveness and for achieving better environmental conditions.

Yet China has garnered considerable international attention with the unprecedented level of smog in a number of cities from January 2013 onward, leading to a considerable outpouring of public concern and the focused attention of the central government, with a ten-point national action plan on this subject issued in September 2013.¹⁰ The smog problem and high levels of awareness about the dangers of PM2.5 crossed a certain line in the bond of trust between the government and citizens in China. This one problem has become symbolic of much broader environmental challenge within China. It is affecting international perceptions of China's efforts on environment and development.

In many parts of the world, despite economic turmoil, there are some grounds for optimism. In many OECD countries, a quiet green revolution is underway as new technologies mature and is entering into many sectors, including more types of hybrid and electrical vehicles, emissions reduction efforts in ocean shipping, power grids capable of accepting more inputs from renewable energy sources, green buildings, and more consumer products with reduced life cycle environmental costs. In Europe¹¹ and the USA¹² pollution

reduction progress continues. But there are important exceptions.

Internationally, greenhouse gas reduction has not seen hoped for breakthroughs, and the slow progress on adoption of carbon tax and carbon emissions trading schemes has been problematic.¹³ As noted recently by the OECD Secretary-General,¹⁴ there is a need for much greater action on pricing carbon in order to achieve zero net emissions from fossil fuels quickly. The arguments relate directly to accommodating 2-3 billion more people on our planet and to protecting the world's ecology. In addition he has noted immediately pressing needs related to local impacts, for example in China on health and environment. The mounting insurance bills and social costs associated with weather disasters and other signs of climate extremes are sending a strong signal in a number of countries.

Globally, preparations for the post-2015 sustainable development agenda are addressing a strengthened focus on poverty reduction and an inclusive approach to sustainable development especially for the poorest, with integrated approaches to environment, economy and social aspects, and with sustainable patterns of consumption and production, as noted in the report of the UN High Level Panel on the Post-2015 Development Agenda.¹⁵ This general approach is also endorsed by the G20 in its development priorities. In addition, the G20 believes an agreed outcome "with legal force" applicable for all Parties to the Climate Change Convention COP should be in place by 2015. The G20 continue to place major emphasis on inclu-

sive green growth focused on energy efficiency, clean energy technologies and energy security, with additional effort towards phasing out of fossil fuel subsidies.¹⁶ A Green Growth Action Alliance has started to bring private investment into the G20 activities.¹⁷ The 2013 Intergovernmental Panel on Climate Change (IPCC) report more definitively than ever has set out warnings regarding future trajectories if sufficient action is not taken.¹⁸

3. A NEW ERA IN CHINA BUT LEGACY ISSUES REMAIN

3.1. Ecological Civilization, Green Development and Environmental Protection

Ecological Civilization is a phrase uniquely Chinese but it has garnered considerable international interest since being mainstreamed into policy discussions this past year. It is discussed widely, with various major conferences¹⁹ in China on the subject, and with research and pilot activities. As noted by Professor Shen Guofang²⁰, it is a term that *has its own rich and in-depth meanings*, that is a *genuine innovation of the Chinese Government and for which there is no precedent in other countries to pay so high attention to ecological conservation and environmental protection*. It is indeed an aspirational goal, but there are already efforts underway to understand how its implementation can occur and how progress towards Ecological Civilization might be measured. Ecological Civilization might be considered a top tier policy subject, even though the thoughts and actions can be

⁶ The Issues Paper is prepared each year by the CCICED Chief Advisors, Arthur Hanson and Shen Guofang with inputs from the Chief Advisors Group and from others.

⁷ See, for example, John Walsh. 2007. Encyclopedia of Environment and Society. Sage Publications. 5 Volume Set, 2105 pp.; Paul Robbins, John Hintz, and Sarah A. Moore. 2010. Environment and Society: A Critical Introduction. Wiley-Blackwell. 312 pp.; Stewart Barr. 2008. Environment and Society: Citizens, Culture and Nature. Ashgate Studies in Environmental Policy and Practice.

⁸ Jared Diamond. 2005. Collapse: How Societies Choose to Fail or Succeed. Penguin Books. 575 pp.; A.W. Crosby. 2004. Ecological Imperialism: The Biological Expansion of Europe, 900-1900. (Studies in Environment and History). Cambridge University Press. 390 pp.; Clive Ponting. 2007. A New Green History of the World: The Environment and the Collapse of Great Civilizations. Penguin Books. 464 pp.

⁹ R.B. Marks. 2011. China: Its Environment and History. Rowman & Littlefield. 464 pp.; Bryan Tilt. 2009. The Struggle for Sustainability in Rural China: Environmental Values and Civil Society. Columbia University Press. 216 pp.; Mark Elvin. 2006. The Retreat of the Elephants: An Environmental History of China. Yale University Press. 592 pp.; Association of Academies of Sciences in Asia (AASA). 2011. Towards a Sustainable Asia. The Cultural Perspectives. Science Press Beijing and Springer. 93 pp.; Ma Jianbo. 2013. The Land Development Game in China. Lexington Books. 267 pp.; Michael J. Hathaway. 2013. Environmental Winds - Making the Global in Southwest China. University of California Press. 272 pp.

¹⁰ http://english.mep.gov.cn/News_service/infocus/201309/t20130924_260707.htm

¹¹ EEA. 2013. Towards a Green Economy in Europe – EU Environmental Policy Targets and Objectives 2010 – 2050. European Environment Agency. <http://www.eea.europa.eu/publications/towards-a-green-economy-in-europe>

¹² <http://science.house.gov/hearing/subcommittee-environment-state-environment-evaluating-progress-and-priorities>

¹³ OECD. 2013. Climate and Carbon: Aligning Prices and Policies. <http://www.oecd.org/environment/climate-carbon.htm>

¹⁴ Lecture by Mr. Angel Gurría, London, 9 October 2013. The Climate Challenge: Achieving Zero Emissions. <http://www.oecd.org/env/the-climate-challenge-achieving-zero-emissions.htm>

¹⁵ A New Global Partnership: Eradicate Poverty and Transform Economies through Sustainable Development. <http://www.post2015hlp.org/wp-content/uploads/2013/05/UN-Report.pdf>

¹⁶ Saint Petersburg G20 Leaders Summit 5-6 September 2013. <http://climate-iiisd.org/news/g20-leaders-adopt-declaration-action-plan/>

¹⁷ <http://www.weforum.org/reports/green-growth-action-alliance-progress-report-first-year-catalysing-private-investment>

¹⁸ IPCC. September 2013. Climate Change 2013. The Physical Science Basis. <http://www.ipcc.ch/report/ar5/wg1/#.UISVDxaQsqg>

¹⁹ A prominent example is the Eco-Forum Global Annual Conference held in Guiyang City, July 2013. The CCICED 2013 Roundtable Forum was held in conjunction with this meeting.

²⁰ Importance shall be attached to the English translation of Sheng Tai Wen Ming. CCICED Chinese Chief Advisor, December 2012.

generated and carried out at any level within society and at local as well as national levels of government.

In his speeches, President Xi Jinping has noted some fundamental observations for building Ecological Civilization. Most importantly, that *economic development determines people's living standard while environmental quality is a prerequisite for man's survival*. The following points provide guidance on key requirements.²¹

- *Respect nature, accommodate nature and protect nature.*
- *Give priority to protection and strive for economic development in the process of environmental protection and protect the environment in the course of economic development.*
- *We must firmly uphold the concept of ecological red line...and prepare a comprehensive scheme for maintaining the ecological red line and pay attention to enforcement.*
- *Explore a new path to environmental protection...learn from developed countries on pollution control...make innovation based on China's national conditions and stage of development and employ new thoughts and methods to conduct comprehensive treatment.*
- *Focusing on prominent environmental problems harming public health...achieve phased results and gradually improve environmental quality...we must also realize this will be a prolonged battle.*
- *Never should we take GDP growth as the biggest achievement...indicators on ecological civilization such as resource consumption, environmental damage and ecological benefits should be included in the social de-*

velopment assessment system and be given more weight.

- *People who have made blind decisions without regard for the environment and caused serious consequences will be held responsible and even for a lifetime.*

It is remarkable how quickly the concept of Ecological Civilization has entered the vocabulary of China's environment and development. It has provided a strengthened opportunity for policy coordination; and the top political attention being given has already resulted in efforts throughout government and society to take this new idea seriously. Within China and internationally there is a sense that Ecological Civilization is an important opportunity for China to develop a unique pathway for development of high value to its own society and to people elsewhere.

There are two other levels of environment and development action that will help to fulfill expectations for Ecological Civilization.²² One level is the wide variety of sectoral actions and governance actions that will enable and enhance China's efforts for green development. These can be linked to global green economy, green growth and sustainable development. This will require enormous effort and fundamental transformations in China's investment directions, urbanization and rural development over the coming decades. Green development is the overarching theme of CCICED for its work during Phase 5.

At yet another level, but of course linked to Ecological Civilization and to green development, is the subject matter of an environmental protection agency and other relevant bodies. China's major efforts to date will require a more integrated approach tied to airsheds and watersheds, urban agglomerations,

industrial sectors, and further improvements in protection for ecological services. It will be essential to stop further degradation and to address legacy issues related to soil pollution, marine and coastal development, and other pressing matters. For some matters, emergency action is needed, for example on regional air pollution for many parts of China. Transformative change related to bringing about a 'New Path for Environmental Protection'²³ has started but is still inadequate in terms of the tools, capacity and, likely, the financing needed to bring about desired results. Inconsistent alignment among various development interests continues to hold back robust environmental protection progress.

3.2. China at a Crossroads for a New Environment and Society Relationship

Society within China is already at the point of achieving 'moderately well off' financial and other goals²⁴ by 2020 or before. For those areas in China not already at this stage of economic achievement, there is expanded economic development producing the very high GDP growth levels seen by richer coastal provinces until 2008. In some poorer areas with fragile ecosystems the accelerated pace of environmental impacts such as groundwater depletion and grassland degradation is troubling. However there are many efforts and progress to reconstruct damaged ecosystems and to create new livelihoods based on tourism or other sectors in provinces such as Guizhou, Xinjiang and Shaanxi.

Within the richer provinces, economic growth rates are falling, generally to below 8% but from much larger bases than 5 or 10 years ago. Yet from an environmental point of view, even these lower rates may still not be sustainable, as environmental issues are

not only related to economic growth rate and scale, but also related to industrial structure, especially rising domestic consumption and lifestyle changes of people. Fortunately, substantial improvement towards education, health care access and other social development efforts are helping to improve economic efforts. Environmental quality has become a major concern since even when targets for pollution reduction are achieved, environmental quality does not improve due to complexity in the environmental pollution situation.

Political support is well enunciated but pathways for success are not well understood or sufficiently implemented, and mechanisms to reduce challenges and policy effectiveness continue to be blocked by special interests, slow movement on enforcement, implementation of important mechanisms and policies such as environmental taxation, subsidy removal, pricing and other economic incentive systems, plus other problems.

In many parts of the China social tensions are on the rise, in part due to perceptions and worries about development directions, and sometimes mixed with other concerns such as local corruption and wealth inequalities. The dramatic increase in social networking and the use of improved electronic communications to highlight what are often legitimate local concerns on the part of citizens is a subject of worry for China's government.

On the one hand, there are clear messages that the government wants to increase the participation of people in decisions affecting their quality of life, and in the supervision of government performance and project planning. As noted by President Xi, *Anyone who exercises power should serve the people, be*

²¹ The observations are prepared by MEP Minister Zhou Shengxian in an article published on the MEP website, 9 February 2013, Towards the New Era of Ecological Civilization—Studying the Important Statement by Comrade Xi Jinping on the Building of Ecological Civilization. http://english.mep.gov.cn/Ministers/Activities/201309/t20130917_260331.htm

²² The three levels, Ecological Civilization, Green Development, and Environmental Protection, highlight different points of emphasis regarding policies and implementation actions. Further explanation is provided in a short paper by Arthur Hanson. January 2013. China and Ecological Civilization.7 pp. CCICED.

²³ http://www.cciced.net/encciced/event/AGM_1/2011agm/speeches2011/201205/P020120524356500627645.pdf

²⁴ The indicators are described in Xu Xianchun. 2009. The System of Xiaokang Indicators: a Framework to Measure China's Progress. Third OECD World Forum.Busan.9 pp.<http://www.oecd.org/site/progresskorea/44120516.pdf>

*accountable for the people and consciously accept supervision of the people.*²⁵ On the other hand, social stability continues to be a major concern, and so, for example, there have been recent efforts to put in place severe penalties for spreading of false information via the Internet.

The right to know—and to use that knowledge constructively; and the need to ensure China's continued effort to create new infrastructure and a modern society should be highly complementary objectives. However at present, it is still a struggle to achieve an optimum situation. China's continued effort to create a scientifically and technologically advanced society provides a great opportunity to expand public inputs into development decisions, but there should not be an expectation that disputes will disappear. There is a need to build stronger risk assessment, dispute resolution mechanisms and environmental rights.

With the new government policy focus on stimulating domestic consumption, urgent action on Corporate Social Responsibility (CSR) and on improved safety and environmental standards for products, are needed. These will assist in reducing excessive and environmentally damaging consumption in government procurement, in business, and in household consumption. China is close to crossing some important ecological footprint thresholds on supplying its needs from resources within the country and perhaps globally.²⁶

Sustainable consumption is largely new territory for policy makers, and indeed for Chinese businesses and consumers. This topic presents a major opportunity for linking Ecological Civilization and green development to purchasing decisions of people, businesses and government, and requires a major focus on green market sup-

ply chains. This aspect also has important implications for China's trade and Going Out efforts since sourcing of products beyond China's borders will require greater attention to full life cycles of products and greater participation in various programs of international certification and green standards. Sustainable consumption should be considered a huge opportunity for green development and for building an Ecological Civilization.

Shifts in approach for environmental protection are urgently required, although difficult to accomplish in terms of demonstrating rapid improvements to environmental quality outcomes. Renewed emphasis has been placed on control of basic air, water and soil pollution. Yet even as progress is made on some issues, new problems emerge, for example, the extent of groundwater pollution, and the changing sources and complexities of air pollution. The unprecedented level of new investments on action plans provides the timing and opportunity to accelerate the transition to the new path of environmental protection, including solutions to the following questions. Will the new investment be efficiently and effectively managed to produce optimal results? Will potential co-benefits be proactively sought and optimized, for example to address greenhouse gases and to ensure public health is actually improved? Will long awaited changes to greater use of market-based instruments and green tax reform be implemented to the fullest extent?

The following issues quite clearly need to be dealt with, and might be considered as near- term and mid-term opportunities for the new administration.

- The targets-based approach to environmental protection needs to be shifted to scientifically substantiated outcomes/improvements based on environmental quality, quality of life, environmental health,

and ecosystem health criteria.

- Another shift should be from reliance on local efforts to greater emphasis on ecologically sound regional efforts (especially air, water and soil pollution).
- New opportunities are required for 'development supervision by the people'; these need to be based on much greater information transparency and participatory approaches, and to be linked to the current drive to eliminate corrupt practices.
- Since environmental damage has reached severe levels and cumulative ecological debt continues to grow, the investment to achieve green development must grow very substantially, probably to 10% or more of GDP when all sources of expenditures are considered, and be based on technical, social and governance innovation and administration.

These points will be considered in more detail at a later point in this Issues Paper.

3.3. Social Factors and Transformative Environment and Development Shifts

Consideration of social factors generally is dominated by the following issues and subjects: people's perceptions and values; ethics; rights and obligations; inequalities; individual and institutional behavior; vulnerability, risk and public safety; quality of life; environment and security in wars and in disasters; poverty reduction; access to livelihoods; access to social benefits; freedom of choice; and fulfillment of 'needs and wants'. Governance is shaped by social factors, with

special emphasis on stakeholder relationships, access to services, transparency in decision-making and performance, perceived levels of honesty and trust, quality of government performance, and freedom from corruption.

This daunting list perhaps explains why the relationship between environment and society remains fraught with difficulties. Also, why tensions exist—not only in China but in most other countries—when it comes to matters such as siting of waste incinerators, environmental health concerns from pollution, or access to natural resource use; and on mechanisms for participation in planning decisions and for fair treatment and resolution of environmental complaints. While there is not full agreement on any single unifying theory²⁷, it is certainly possible to sketch out many of the important components of the environment and society relationship, and to consider and identify actual linkages and feedback loops.

3.3.1. Social Development in China

Social development is an essential element for sustainable development. Within China this relationship has been subject to much study including China Agenda 21, the series of China Human Development Reports, and work by leading Chinese academies and universities. Box 2-1 lists some key achievements in Chinese social development.

Despite the considerable progress in social development over the past several decades, some very important challenges remain. Among them are the following:

²⁵ http://news.xinhuanet.com/english/china/2013-01/22/c_132119843.htm

²⁶ http://www.footprintnetwork.org/images/article_uploads/China_Ecological_Footprint_2012.pdf

²⁷ Among various authors, Prof. Amartya Sen has produced perhaps the most significant theoretical concepts regarding social choice and other aspects of human development that are relevant to environment and society (see, for example, A. Sen. 2009. *The Idea of Justice*. The Belknap Press of Harvard University Press). Prof. Partha Dasgupta has examined the issues carefully in a related but distinctive way, for example, in *Human Well-Being and the Natural Environment*. Oxford University Press, Rev. ed. 2004. Combining theory and experience from various parts of the world, Jeffrey Sachs has played a particularly important role in the Millennium Development Goals, and has worked to highlight key approaches, for example in his 2008 book *Common Wealth: Economics for a Crowded Planet*. Penguin Press.

Box 2-1. Some important Chinese social development achievements

- *Reduced population growth rate.*
- *Success in poverty reduction and many aspects of rural development.*
- *Increased lifespan and better access to health care; improvements to the social security net.*
- *Improvement of quality of life and economic status of most citizens.*
- *China's Opening Up, the loosening of travel restrictions for Chinese to travel abroad for pleasure, business and education, and the recent emphasis on Going Out, sometimes coupled with development assistance.*
- *Relative political stability and other factors that have permitted rapid economic development.*
- *Education and training for both present and future opportunities.*
- *Massive job creation, and opportunities for rural and urban private sector enterprises.*
- *Transportation infrastructure and improved mobility within China for people and for goods.*
- *Public environmental infrastructure including water, sewage and waste management*
- *Relatively successful large-scale urbanization.*
- *Food security.*
- *Improvements in workplace safety.*
- *Disaster prevention and mitigation.*
- *Extensive and partially successful programs for strengthening ecosystem services (forest, grasslands, wetlands) with eco-compensation for rural residents.*

• Social management policies

- o Adjustments to the One Child Policy.
- o Urban residency requirements (*hukou* household registration system).
- o Land ownership and usufructuary resource rights, especially in relation to rural residents and rural-urban migrants.
- o Implications of an aging population.

• Social safety net

- o Basic social security still limited.
- o Public health and access to health care improving but limited measures to deal with environmental health issues, workplace safety, and inadequate monitoring for many concerns.
- o Education and training.
- o Job security and insecurity.

• Information management and institutional freedom

- o State secrecy requirements.
- o State propaganda bureaucracy.

- o Release of information on incidents, development approval processes, environmental decision-making, etc.
- o Media and communications.
- o Social media expansion and wide usage for social and environmental matters.
- o Monitoring and control over civil society organizations; activities of philanthropic and charitable organizations, and role of local and national social and environmental organizations.

3.3.2. Social Factors and Environmental Improvements

Social factors generally are still not well understood in relation to Chinese efforts for environmental improvement. Internationally, the same might be said.

With China's great interest in building a harmonious society, there is a genuine need for deepening the public's knowledge of environmental science and for much greater transparency in decisions and accurate information on the state of the environment. These are

prerequisites for improving public participation in development supervision, and also important in order to find out more from the public about future 'needs and wants' for a good quality of life. The emerging middle class in both cities and in rural areas is most important, for these are the people who may be most influential in creating the levels of consumption and type of lifestyle for a modern, or even post-modern China.

The transformative period ahead in China, with its many transitions such as rapid urbanization and introduction of new technologies, is likely to be messy with regard to social and environmental factors. Inequalities may persist, and possibly worsen in some ways. It cannot be presumed that sustainable consumption will unfold in a smooth way if governed by people's individual and household decisions alone. Already many people, particularly some in cities, are consuming energy and materials at very high levels. Along with many legitimate concerns about development impacts on the environment, there will be strong vested interests continuing to shape decisions locally and sometimes nationally towards their needs and

concerns. NIMBY ('Not In My Backyard') campaigns will likely become more frequent, sometimes driven by perceived risks that may or may not be real. There also will be disputes for which no environmental consensus may be possible, for example, regarding large hydro dams.

These observations are cautionary notes about social and environmental relationships, and raise the question about what level of disagreements and dissent should be recognized as legitimate in a harmonious society? In many countries, including a number of western societies, but also countries such as South Korea, India, South Africa, Costa Rica, Brazil and Indonesia, the threshold for tolerating dissent within the society has become quite high on addressing environmental protection and development concerns.

There are a variety of internationally well-tested approaches for considering social and environmental needs in planning and management, as noted in Box 2-2. China is engaged in most if not all of these approaches but not necessarily in a systemic fashion.

Box 2-2. Social and environmental planning and management approaches Basic Mechanisms

Basic Mechanisms

- *Public Participation in Decision-making*
- *Disclosure*
- *Stakeholder engagement*
- *Consultation processes*
- *Freedom from harassment and retribution*
- *Access to complaint processes, legal remedies*
- *Social communication and media*

Shared Responsibilities in Governance and Management

- *Corporate Social Responsibility (CSR)*
- *Co-management and community-based management*
- *Citizen-based science and monitoring*
- *Reporting and control of illegal activities*
- *Voluntary efforts for environmental protection*

Planning and Assessment

- *Environmental and social impact assessment*
- *Risk management and disaster planning*
- *Integrated urban and rural regional planning*
- *Zoning, including ecological functional zoning*
- *Red lining for food security and for ecological purposes*

Sustainable consumption promotion and analysis

- *Shifts in consumer behavior via incentives, laws and voluntary action*
- *Life cycle analysis of energy and material*
- *Green market supply chains*
- *Green certification*

3.3.3. Successes and Challenges in Linking Environment and Social Development

It may be too early to say that the glass is half full with respect to improvements on addressing environment and social development issues in China. But certainly there are some very good results of initiatives in locations throughout the country. Yet there appear to be systemic issues that make it very difficult to achieve progress on some types of problems. Several examples are provided below.

Examples of successful interventions:

- Capacity of senior leaders to provide a coherent rationale and approach linking environment and social considerations, including Ecological Civilization, scientific development, low carbon economy.
- Circular Economy with changes to behavior of individuals, units of government, communities and enterprises towards resource conserving practices, and with major transformation of global recycling.
- Ecological Construction and Eco-compensation initiatives on reforestation and to a lesser extent for wetland reconstruction and grassland protection. Provision of social benefits to both local farmers and downstream inhabitants, with some biodiversity protection and improvement of upper watersheds and water basin resilience.
- Natural disaster planning and early warning action to reduce human injury and death toll from extreme weather events such as typhoons.
- Introduction of environmental amenities and other quality of life improvements in major cities, including green zones, better public transportation, waterway cleanups, etc., in some cities.
- Programs for cleaner rural energy and installation of biogas stoves and other means to improve indoor air quality in rural homes.

Examples of very challenging problems:

- Environmental enforcement programs have failed for a variety of reasons, but often because they have not provided sufficient incentive for enterprises to shift behavior.
- Programs working at cross-purposes, for example, incentives to purchase private automobiles and to use them extensively, while at the same time having inadequate measures to mitigate or contain the resulting smog and other environmental and social impacts.
- Integrated action plans to address environmental management have been put into place in river basins and in some marine subregions such as the Bohai Sea. However they have not curbed unsustainable practices, leading to a variety of serious pollution incidents (e.g., red tides in coastal areas, green algae in major lakes, loss of important species, such as dolphins in the Yangtze River).
- More efforts are needed to address the variety of problems nationwide related to soil pollution (full compensation, timely restoration).
- Emerging signs of chronic health and environment problems facing the public throughout China.
- Failure to alter sufficiently the 'pollute first, cleanup later' syndrome linked to very high rates of GDP growth.
- Limited success or effort to equip the public with programs providing necessary information and opportunities to take voluntary action for environmental improvements and for sustainable consumption.

3.3.4. Opportunities Ahead for China

A solid mix of opportunities for creating a new Environment and Society relationship exists, as noted in Box 2-3.

Box 2-3. Opportunities for strengthening links between Chinese social development and Ecological Civilization, green development and environmental protection

- *Setting an overall vision for Ecological Civilization and building a relationship to social development aspirations that have been defined for the 12th FYP and beyond.*
- *Setting specific objectives for green development that can be related to social development sectors including public health, primary and secondary education, job training, and in major processes involving transformative change for people's perception and behavior, especially urbanization and displacement of rural communities.*
- *Strengthening public supervision role in overall development directions and for specific programs and projects, including addressing matters such as anti-corruption, poor planning, environment and social monitoring of projects, unjust practices by officials nationally or locally in the design and implementation of new initiatives.*
- *Further opening of public input channels for dealing with environmental and social impacts of development and to have improved mechanisms for addressing public discourse. Social media will continue to grow in significance in terms of their role for both environment and social development matters.*
- *Creating a more transparent information sharing system for environment and social information. The models of environmental and social information sharing in the USA and many other OECD countries can be examined for relevance to China's situation. There is a need for further relaxation of constraints placed upon Chinese media sources in their reporting of environment and social concerns. On occasion, they have shown a high level of competency in bringing forward some important environmental incidences and issues.*
- *Implementing better enabling measures for the creation and operation of Chinese civil society organizations that place a major emphasis on environment and social development concerns. These will take many forms, some with very specific objectives, others more general in nature. The process will be aided by responsible linkages and cooperation with international NGOs and professional organizations.*
- *Fostering CSR practices on the part of Chinese SOEs and private sector enterprises (including SMEs) whether their operations are in China, or include activities abroad through ODI and China's Going Out policy. This effort can be enhanced through enabling measures in laws and regulations, and through various incentives. However, CSR requires direct commitments by enterprises and their associations that should be done on a voluntary basis.*
- *Creating a national framework of certification and other measures such as product and production standards designed to promote sustainable consumption by households, and sustainable procurement practices by public institutions (hospitals, universities), government bodies, and by enterprises of all sorts. Although such efforts are underway within China, they are still nascent and not well backed up by governmental effort.*
- *Utilizing banks or other sources of credit as allies to help screen out initiatives inside and outside of China that are likely to have undesirable social or environmental consequences.*
- *Utilizing environmental improvements to a greater extent in poverty reduction programs, and making these efforts compatible with international post-2015 sustainable development goals, if these prove to be compatible with Chinese interests.*

4. POLICY AND IMPLEMENTATION

ISSUES

4.1. Managing gaps of rising expectations, environmental perceptions and the reality of environmental conditions and problems in China.

Even if China is able to significantly reduce the extent of such visible problems as smog and water pollution during the coming 5 years, which should be possible and certainly desirable, there is likely to be continued public discontent regarding environmental quality and livability within cities. There will be more NIMBY cases, reactions to inevitable environmental accidents and changing environmental conditions, and on-going concern about public health and environmental safety. No matter how much is invested in public education and awareness-raising, significant differences of perception will remain. Perceptual and conceptual differences in approach to environment are a normal part of the human condition as shaped by culture, strongly held values, history and past experiences and various other factors including income level and views about the governance system. For many if not most environmental matters there will be public views split into pro-development, development with restraints and safeguards, and anti-development. Many other countries have successfully dealt with such splits.

For development on the level of complexity, scale and rapidity in China there is no other country in the world that can serve as a comprehensive model for what will be required in the coming two decades and beyond. For this reason it is important for China to invest in an approach that will be unique but that draws upon experience from elsewhere. Ecological Civilization provides the opportunity to build a new approach that is indeed capable of dealing with the inevitable gaps that will persist regarding public understanding of environment and development issues, and the scientific, economic and other expert views shaping policy decisions.

Built into this new approach must be a larger window for the public into sometimes very detailed knowledge of issues, and more encouragement of peoples' participation in decision processes and follow-up monitoring. There is much to be done in the way of environmental education to ensure people are capable of understanding and participating. But given that much of the perceptual problem is tied up in trust-building and in raising credibility of both government and enterprises, there must be considerable tolerance of divergent views; and with dialogue efforts that are seen to be productive by most people.

Many positive environmental actions beneficial to health and quality of life, and to protection of ecological systems and services, are possible. Determining the extent of investment needed should be well backed up by credible analysis in terms that are acceptable to stakeholders and to the public at large. This is a difficult task, as seen in many other countries trying, for example, to come to grips with climate change, or urban development, and where balancing public and private interests appear to clash, especially in the short term. Strong and consistent national approaches such as the Scandinavian countries have developed and applied provide good examples to consider.

4.2. Balancing traditional Chinese values, contemporary social values in China, and outside influences in seeking progress towards Ecological Civilization, green development and environmental protection.

A society changing as fast as China's has during the past 3 decades, demands a remarkable level of resilience, but also can be expected to seek a reasonable balance in what it will desire from old and new. In its opening up, China has taken on board many of the most environmentally damaging approaches to development from abroad, including transportation infrastructure oriented to suburbanization; the tools of advertising that promote overconsumption; and

many industrial enterprises that have not sufficiently respected nature or the health of people. On the other hand, the technology revolution in China has promoted communications and other innovation technologies in unprecedented ways. China also has joined many international accords regarding environment and development and these will help to shape future national action for sustainable development within China.

What is the right balance among these often-competing interests from today to 2020, 2030, and to 2050? The answers to this question are still fragmented, and tilted in favour of strong vested interests both within China and outside that seek either stability of existing but ultimately unsustainable practices such as rising fossil fuel use, or look for dramatically expanding markets for products such as automobiles and other consumer goods following western development patterns. As a result, putting it bluntly, what will differentiate a consumer in Shanghai in 2030 from one in Paris or Houston, or São Paulo?

The ideals from past centuries, including Confucian philosophy will undoubtedly be useful in shaping an improved environment and society relationships, for example, in the period to 2020 for the attainment of a Xiaokang Society. However, it is the shaping of contemporary social values through urban in-migration, education and access to social services, livelihood shifts, and the broadening travel and experience of Chinese citizens as they become wealthier that will likely play a crucial role.

4.3. Making environment and development governance more inclusive, effective and efficient.

It has been pointed out that China's environmental crisis is actually a crisis of governance, since it reflects a falling trust level by people concerning whether government on its own can actually deliver satisfactory improvements in environmental conditions. Governance, of course, is a term that reflects relationships among stakeholders to address problems and

therefore goes beyond the action of government. Thus improvement in governance must rely on mutual trust-building and people's participation, greater sharing of responsibilities, for example between government and enterprises, better value for investment in environmental protection and restoration, and efficiency in the sense of not unnecessarily slowing development as a consequence of environmental improvement. None of these points are new, but they are taking on greater significance with the growing levels of both problems and actions to alleviate them.

Several topics stand out for concerted effort. More attention is needed on how to implement integrative approaches to address cross-sectoral conflict, and to optimize among varying development objectives. Solving the critical issue of local-national disconnects about the priority given to environmental matters compared to economic development is essential. There is no doubt that the concern over corruption and other issues of "clean government" are important regarding environmental matters. Many of these issues are linked to the current model of land transfers associated with urbanization. Environmental impact assessments and other planning efforts for regional development and projects must be done with considerably more transparency and with mechanisms that genuinely allow for peoples' supervision. In the design of new green development, exemplary methods are required in order to build trust. What constitutes exemplary methods is a topic to be worked out jointly by stakeholders.

4.4. Linking transformative economic and social structural change with transformative environment action.

The emphasis on China's economic shift towards tertiary sector dominance, and domestic consumption, plus the accelerated pace of urbanization are very important points. However, they are not fully linked with the transformative change now underway on environmental protection mechanisms, and very likely also not to some aspects of green development.

China's environmental protection is largely based on the feature of strong government intervention, and still does not fully embrace a market-based approach, while the current incomplete policy implementation and inadequate enforcement of command and control measures, throw confusion into the transformative economic and social reforms. Genuine progress towards significant improvement in environmental quality and quality of life will require moving environmental protection to an intersecting track with economic and social structural changes. This point has been made by CCICED a number of times in recent years, for example in its work on green economy and on low carbon industrialization in 2011, and in several studies reported in 2012.

Some good signals have been provided by President Xi Jinping and by Premier Li Keqiang, and in the New Path for Environmental Protection enunciated by MEP Minister Zhou Shengxian. The tasks, however, are complex and appear difficult to be brought forward in a comprehensive way. They include, among others the following key areas: fundamental green tax and subsidy reform; widespread implementation of CSR among industries, the energy sector, the financial sector and other sectors such as information technology, mineral development, tourism and agri-business; a robust approach to green market supply chains including greater effort to build credible certification and effective means of green public procurement; and better options for environmentally-sound consumer choices. Some of these points are amplified in the issues noted below.

4.5. Implementing comprehensive fiscal and tax reform for Ecological Civilization, green development and environmental protection.

Although such reforms have been proposed to China by many groups within China, and by some international organizations such as the World Bank, Asian Development Bank, OECD, and by CCICED, implementation has been slow. The moment never appears to be quite right. Now the stakes are higher. In part this

is a result of better understanding of problems, and the recognition that incentives are required for action. Furthermore, the costs of inaction in terms of health and loss of ecological services are being measured more carefully. As well, there are questions about the efficiency and effectiveness of traditional regulatory provisions that rely upon expensive command and control laws, even though these are still needed.

The most important new point to emphasize is the great opportunity to expand benefits of fiscal and tax reform as a result of dealing with all three aspects, Ecological Civilization, green development and environmental protection in a common framework where there can be co-benefits and greater efficiency using such measures. For example, if there were a shift away from sale and conversion of land as a means of funding current expenditures by city governments, there would be fewer cases of overdevelopment and less suburban expansion, resulting in lower pollution and more habitable cities. If taxes shape purchasing decisions by consumers, they may buy fewer but more durable items and thereby reduce their ecological footprint. Fiscal and tax reform can be designed to address both social development and environmental protection objectives, for example, those related to public health and air pollution reduction.

The highest priorities should include environmental objectives where measurable environmental quality improvements are possible: fiscal and tax measures directly linked to air, water and soil pollution; a strengthened, comprehensive and long-term eco-compensation program of direct benefit to rural people and the environment locally and elsewhere; environmental tax reform to price carbon appropriately and coupled with additional efforts for carbon emissions trading within China; more appropriate pricing of ecological goods and services; reform of urban taxation policy to encourage a move away from large scale land appropriation; and continued efforts to establish price structures for both manufactured goods and resource structures that fully account for externalities. All these measures require renewed

effort to develop an improved system of green accounting, and improved efforts to develop a reasonable benefit/cost approach to environmental reform that takes into account environmental public health and ecosystem goods and services.

4.6. Using the educational system and public awareness raising to move Chinese society towards actions compatible with environmental and social harmony while still enhancing prosperity.

Perhaps it is correct to assume that China is somewhat unique in its capacity to shape views towards sustainable consumption, and other aspects of its environment and society relationship through better use of formal and informal education, and via both traditional and new media mechanisms. However, for a society that is now well exposed to many sources and types of advertising, and to policies that encourage increased consumption, at best there will be many contradictions in the effort to shape lifestyles. Furthermore, knowledge alone is not enough to ensure that green choices will be made. Thus, while improved awareness and education are essential, they cannot be treated as either a responsibility that is for government alone, or even by government plus business. The situation really does demand a 'movement' in which citizens become the critical part of the solution, individually in their lifestyle choices, through their work place, and through the various organizations in which they participate.

How such movements can be fostered is, of course, a matter of debate. One of the most interesting examples is 'Earth Day', particularly in its earlier years from 1969-75. This movement had its roots in universities and with a handful of politicians, but quickly grew to encompass public and private schools, and with

participation from the media, businesses and many others drawn from all sectors.²⁸ Within a few years it became a global event.

In China and some other countries such as the United Kingdom, perhaps one of the most prominent and relevant movements in recent times has been the embrace of Low Carbon Economy as a new and rather integrative approach to energy, climate change, consumption and lifestyle concerns. It has spread through a combination of public awareness and education by governments, mayors of cities, scientists, some enterprises, media and "opinion leaders". Yet in most places, it has slammed into institutional barriers that have not yielded to the new movement. Andrews-Speed has noted that significant or even radical institutional change across the polity, economy, and society in China will be required in order to accelerate the transition to a low carbon economy.²⁹ The point to be made is that for education and awareness-induced movements to actually create substantive change in conditions, behavior and perhaps values in society, there must be concurrent institutional shifts, better policies and improved coordination.

The rise of social media and the global linkages possible via the Internet are dramatically changing the landscape of educational practices and awareness raising. China has shown itself to be very proactive in the dissemination of officially sanctioned information for shaping public opinion, very wary concerning the "spreading of rumours" via social media, and to set significant limitations on information disclosure, for example regarding environmental assessments or other project and planning documents. There are very difficult matters under discussion for example, regarding disclosure and release of government information on such matters as toxic wastes; and also the debate about what constitutes acceptable and

²⁸ Adam Rome. 2013. The Genius of Earth Day: How a 1970 Teach-In Unexpectedly Made the First Green Generation. Hill and Wang, 368 pp.
²⁹ P. Andrews-Speed. 2012. China's Long Road to a Low-Carbon Economy - An Institutional Analysis. Transatlantic Academy Paper Series. 26 pp. http://www.transatlanticacademy.org/sites/default/files/publications/AndrewsSpeed_China'sLongRoad_May12_web.pdf

unacceptable practices on the part of members of the public regarding spreading of opinions (in an age where observations can “go viral” in minutes).

Given that China now probably has the world’s largest digitally-connected population, and many of the most sophisticated users of communications technology of any country, clearly there must be new accords reached to ensure that these technologies support not only educational and awareness needs, but also serve as the basis for improved dialogue between various interests. Only in this way can there be real movement towards genuine public participation. What constitutes appropriate rights, responsibilities and even duties on the part of the public, businesses and government is an issue that is likely to be tested in various ways, just as happens elsewhere in the world. It will be encouraging if China can indeed find ways in which a well-educated public can become among the world’s best monitors of environment and development progress.

4.7.Engaging the full range of Chinese enterprises in Corporate Social Responsibility (CSR).

There are excellent role models for CSR, including many enterprises within China, and there are many types of activities that have been undertaken. These are well documented, and with awards (e.g., Golden Bee corporate award) and other mechanisms to encourage CSR participation.^{30 31}

Progress is still relatively slow in comparison to the needs, and advanced characteristics such as development of green market supply chains leave much to be desired. However, CSR could well become one of the most important bright spots of China’s environment and development relationship during the coming decade. If CSR becomes widespread, including SMEs in

China and in Chinese companies of all sizes engaged in overseas activities, there will be benefits not only for domestic green development but also for other countries.

What is necessary to accelerate the pace of acceptance? In countries such as the USA, CSR has been driven mainly by specific actions of industry associations and individual companies, coupled with dialogue and approaches involving stakeholders. In China, it is likely that government will be more proactive, perhaps using legislation or other “compulsory” mechanisms. In addition, government could use a variety of tools such as economic incentives, education, and involvement of SOEs in the greening of market supply chains. Some multinational companies in China could be called upon to share their experience as well.

Government might also take a sectoral approach, strategically working with sectors such as automobiles, heavy chemicals, agri-food subsectors, etc., in order to improve many of the specific needs such as green certification and standards, implications of CSR in natural resource development, etc. There are important roles in promoting CSR for the government-aligned chambers of commerce and other business and industrial associations.

While it would appear sensible to pursue a broad program of CSR implementation within China, there are definite challenges and issues. One major concern is simply the short-term profit perspective of many businesses. Tied to this are the still low fines or other penalties imposed in some situations of pollution or social problems created as a result of industrial activities. Some other concerns include the limited push from the financial sector to incorporate environmental criteria into their loan approvals, limited interest

on the part of investors in the Chinese stock market to promote CSR, and the limited use of environmental risk criteria on the part of insurance companies. Fortunately there is movement on these concerns. Another issue is the lack of transparency in the operations of many companies—not the necessary level of accurate data and information release on emissions release, monitoring to ensure follow-up to EIAs or other commitments. A major concern has been the local protectionism of local governments regarding the way environmental and social matters are treated. All of these problems are well enough known, but difficult to resolve.

4.8. Addressing shortcomings in agricultural sustainability and impacts on green development.

Food security will always be a major concern for China’s government and society, and fortunately there has been impressive progress in food self-sufficiency. However, several major shifts are now underway with major implications for China’s green development. One is the consolidation of farms and the complex issues surrounding land allocation, rural-urban migration, and aging farm populations. A second cluster of concerns relates to the very substantial and increasing environmental impacts of farm production and processing. With the shift to animal protein in people’s diet, the expansion of aquaculture and feedlots for livestock, and the need to expand agricultural land to supply fodder are creating many pressures. This issue extends to agricultural water demand. Agricultural activities pollute soil, air and water, and issues such as non-point source pollution are very difficult to control. In addition, processing agricultural products have created major pollution in various parts of China.

Rural sustainability is intrinsically and intricately related to China’s biodiversity and the health of ecosystems. Grasslands are under intense pressure as a consequence of the expansion of livestock, and also from alternate uses of land. Despite China’s great commitment to nature reserves and other forms of land and water conservation and protection, management of

social aspects of use, perceived inequalities, illegal harvesting and other problems are working against sustainable use. Functional ecological zoning, and red lining for protection of ecological services are still at an early operational stage. Integrated management strategies for coastal marine areas and for water basins leave much to be desired.

In addition, as recent years of extreme weather demonstrate, there can be no guarantees that China will escape ravages of climate variability and change in the decades ahead. Already a serious and expensive set of adaptations and mitigation efforts is required to lessen the impacts of flood, drought, and severe summer and winter weather in various parts of China. It is a tribute to the resilience of Chinese rural and suburban communities that, even with more intensive use of the natural resource base, there has been considerable progress on disaster planning and management. However, there may be significant tipping points, especially regarding ground water, toxification of agricultural lands, and other ecological concerns including loss of key species such as pollinators.

From a social perspective, the ability to carry on traditional approaches to agriculture is likely to be limited by the outmigration from communities, and through land consolidation and conversion to other uses. Thus China will have to continue innovating, as it is doing by introducing new economic activities such as eco-tourism, wine production, and in some environments such as the desert and semi-arid areas, medicinal crops.

4.9. Aligning New Style Urbanization with Ecological Civilization aspirations and green development needs.

The unprecedented attention being given to urbanization is certainly well justified. It is the most important long-term investment China will make in its stock of built capital and has enormous implications for the environment and people’s future prosperity. The rush to urbanization will peak over the coming 15 to

³⁰ <http://www.csr-china.net/en/second.aspx?nodeid=ddd0b45c-b7c4-4947-b2e3-e20374708733>

³¹ Li-Wen Lin. 2010. Corporate Social Responsibility in China: Window Dressing or Structural Change? Berkeley J. of International Law. 28(1):64-100. <http://scholarship.law.berkeley.edu/cgi/viewcontent.cgi?article=1377&context=bjil>

20 years. However the patterns of infrastructure now being created will set the stage for 50 to 100 years. Thus issues such as option foreclosure associated with design of cities, suburban growth and sprawl, and the choices for interurban transportation and environmental connectivity are extremely important. Most urban citizens now or eventually will perceive themselves as part of China's 'middle class.' They will set the pace for sustainable consumption, NIMBY, and other environment and green development matters. McKinsey and Associates³² estimate that the most important group among consumers will be the 'upper middle class' who in 2012 constituted about 36 million households in urban areas. By 2022 their number may reach 193 million urban households. Their use of disposable income will be extremely important in determining sustainable consumption outcomes, and the demands for a high quality urban lifestyle.

'New style urbanization' is a work in progress led particularly by Premier Li Keqiang. It places central emphasis on putting people at the heart of urbanization ("humanity oriented"), but addressing the realities of cities as the engine of economic growth, and the need to seek both "quality and efficiency" in the layout and operation of urban development. Urbanization must contend with improvements to the largest cities, but also place more attention on medium and smaller cities, and on the rate of development of new cities.

Media reports during the last half decade—when economic stimulus funding was easy to come by—of quickly built "ghost cities"³³ with relatively few inhabitants, present a disturbing picture of poorly timed local planning decisions. The very rapid development of national transportation networks and interurban connections sometimes raises questions about actual

levels of demand. Considerations in infrastructure investment, such as access to water supply, remoteness from markets, and ecological impacts may play second fiddle to local ambitions and showcased physical results of investment. What is clearly required throughout the country is an integrated approach to infrastructure renewal and construction that is based on realistic goals and, as noted by Premier Li, a path that incorporates the ideas of green and efficient growth.³⁴

For New Style Urbanization to properly take hold, the following topics must be well worked into the policies for planning and implementation:

- **Job creation with** an emphasis on the service sector, green industrial parks and manufacturing facilities, and appropriate new activities for migrants.
- **Sustainable life style attributes for urban dwellers** so that people of all levels of prosperity have access to basic services; green transportation; environmentally friendly, safe and clean neighborhoods, the means to live comfortably and sustainably, and with equitable access to social benefits.
- **Shifts in revenue sources to meet the expanding needs of transportation, environmental and social development.** In particular, the land alienation process carried out by local governments is damaging in a number of ways, such as encouraging urban sprawl.
- **Reforming the unfair practice of hukou and other social and economic discriminatory policies against migrants and their families.** Modification or ending of these inequities has been called for by

³² http://www.mckinsey.com/insights/consumer_and_retail/mapping_chinas_middle_class

³³ Ordos, located in Inner Mongolia became the 'poster child' for "ghost cities" after international media coverage including a Time magazine article. Here and in many other spots, empty apartments and unused roads and offices may reflect the time lag between incredibly rapid infrastructure completion, and the sale and occupancy of properties, but the problems appear to be much deeper, including overly ambitious projections of economic growth and poor development planning, corrupt land development practices, and the purchase of multiple properties by individuals or companies but leaving some empty.

³⁴ <http://english.peopledaily.com.cn/90785/8393033.html>

many Chinese experts, but still appears to be difficult to put into practice.

• **A regional approach to urbanization is required in order to address environmental protection concerns and for efficient infrastructure development.**

The inability to handle air pollution, control of floods and other natural hazards, groundwater depletion, and other environmental issues at present is in large measure the consequence of weak regional development planning and monitoring. The problems will expand with climate change and with rapid extensive growth mode. China has made good progress towards linking hinterlands and urban environmental protection through its eco-compensation activities, but these are not operating with optimal efficiency; and financial costs are not being paid by the urban areas receiving the main ecological service benefits.

• **Compact city design and ecological red lining.**

Ring roads encourage sprawl and the proliferation of highways contributes to suburban development and the accompanying commute-by-automobile lifestyle that has now developed around many Chinese cities. Urban sprawl cuts into farmland and sometimes into ecologically sensitive areas. These and other problems suggest a need for much more effort to rethink the design of cities to make them more compact and complete. Anew but not well-implemented idea is ecological red lining so that areas important for food production, water supply, cultural or other purposes are well protected, with significant penalties if they are disturbed. This is particularly important for areas where suburban development would otherwise be likely.

• **Extract lessons learned from eco-cities, low carbon economy initiatives, and other pilot efforts whether from within China or abroad.** A rich base of experience is available from cities around the world and certainly within China on urban sustainable development. While this experiential learning is well advanced in China, it is not being fully inte-

grated into urban and regional planning. In general, integrated approaches are not a strong point, given the breakneck speed of Chinese urbanization and the compartmentalization of functions within municipal governments.

Despite this rather lengthy but still incomplete list of issues surrounding Chinese urbanization, many positive things can be said about progress to date, and about the dynamism and willingness of local governments to address the existing problems. Already, many cities are taking seriously the challenge of green development and experimenting with how to define new paths towards sustainability and ultimately towards Ecological Civilization. What should be clear is that during the coming years improvement of urbanization is a central to achieving a better environment and society relationship.

4.10. Aligning China's environment and development reforms with international accords including major global environmental conventions, other agreements and post-2015 sustainable development goals.

China participates in many international agreements with environmental implications, whether these are part of global UN agreements or via less binding agreements made at the G20 or in other forums. For certain of these commitments, for example on the climate change convention, China has clear goals for greenhouse gas emissions intensity reduction; other obligations will surely follow in the years ahead. As progress is made on defining green growth and green economy, there will be additional opportunities to work cooperatively with other countries in order to achieve necessary transitions. In the UN discussions for a new sustainable development approach, China will certainly wish to have its voice heard and to share experiences regarding green development.

There are many practical concerns regarding each of these points. The metrics for monitoring progress are still relatively weak, and the actual monitoring

processes deserve careful attention to ensure information gathered is internationally compatible. This will be very important for matters such as greenhouse gas emissions reporting, and for agreements such as mercury reduction. On matters such as subsidies for green technologies, China will want to avoid repetition of what happened with wind and solar power international trade actions. Regarding post-2015 sustainable development and poverty reduction goals, it will be to China's advantage to highlight its successful experience during the implementation of the Millennium Development Goals, and to seek ways to build on this experience and to share it with others.

A decade from now, China should be able to demonstrate very clearly how its domestic actions have contributed to improvements in global environment and development. This will require careful analysis and consideration of the institutional strengthening and other advances in order to credibly demonstrate progress. Over the longer-term, as China gains experience in the construction of Ecological Civilization, there should be considerable interest globally and in some other countries in drawing upon this practical experience. As that occurs, China will be well positioned to incorporate key ideas into its Going Out efforts.

5. CONCLUSIONS

There must be a turning point in the complex relation between society and environment in China, whereby acute problems related to air, water and soil are seen to be lessening. Exactly when that turning point can actually be reached is uncertain, but it is an urgent matter in relation to the goals for a "moderately well off society" by 2020. Therefore, performance on environmental protection and green development during the remaining years of the 12th FYP and particularly in the 13th FYP will have to be improved quite dramatically. The shift from pollution emission reduction towards goals based on real environmental quality gains is essential, since targets for individual pollutant reductions alone have not proved sufficient to

achieve overall effective improvement of environmental quality. Furthermore the quality and effectiveness of investments for environmental protection must be examined carefully now that government and industry are increasing spending, and will continue this trend with new action plans.

Chinese society clearly values the environment, expects improved environmental quality, and desires improvements that will reduce environmental risks of various sorts, including issues such as food safety. Expectations for quality of life are definitely on the rise as income levels increase, and as people become more appreciative of the many facets constituting a "good life". At the same time, connections to the land and nature are being lost as millions of rural dwellers leave for cities and new occupations, and as access to electronic gadgets, automobiles and other components of a modern life style shape interests and behavior of populations. Such rapid change presents both challenge for environment and social development concerns and opportunities to redefine what is important to a society, and to reinforce desired pathways. That is the challenge for Chinese society, government, and indeed, governance processes within China.

Citizens express their views in many different ways—in commentary as "netizens", as consumers, and sometimes as angry demonstrators upset about development decisions, corruption, poor regulation of food purity and other issues. This dynamic provides a specific condition that permits government to learn from the people, and—as is frequently noted by high authorities—for the people to supervise the actions of government. The difficulty is setting in place sufficient but not stifling levels of checks and balances. More broadly, it is concern about rights, responsibilities and duties. Also, it is about improved formal public participation in decisions, and transparency through information sharing. Environmental improvement should be a double win when the right circumstances are in place: the improvements have human and ecological benefits that are real and worthwhile for both present and future generations and secondly, more effective

ways of promoting social harmony emerge for problem solving among people and institutions driven by different interests.

What cannot be promised at this stage of China's transformative changes and reform, is certainly regarding the level of success on longer-term environment and development matters such as those related to intensive exploitation of water resources, climate change mitigation and adaptation, biodiversity protection and protection of ecological services. For all these, there remains uncertainty and serious challenges, as they are closely related to various legacies of the past, and difficulties to address and change the demands created by China's increasing population and rising consumption patterns. The longer-term problems are some of the most important to be addressed through construction of Ecological Civilization. They must be dealt with through technology and managerial approaches, but also by more effective restraints on demand, as determined by changes in perspectives, attitudes and behavior, and perhaps shifts

in values. Society must become both more resilient and more adaptive in order to achieve an optimal environmental relationship. This is true not only in China but in other countries and societies as well.

Over the past two decades. China's leaders have set in place an increasingly coherent and well communicated set of concepts to guide the country, its enterprises, and its citizens on the subject of environmental improvement. These ideas have been a balance of home grown thinking such as Ecological Civilization and internationally produced concepts such as Green Growth and Green Economy. Now, with the vision of Beautiful China there is the opportunity to bring focus to a sense of pride not only in what China has achieved, but also an appreciation of its marvelous endowment, and why it is so important to protect and cherish the natural environment, the cultural attributes and remnants of the past, while shaping as perhaps no other nation is capable, a new lifestyle and physical infrastructure compatible with living within earth's limits.

III. FROM TIPPING POINT TO TURNING POINT ¹

1. INTRODUCTION

China has looked into the future and desires change. That point clearly emerged during the November 2013 Third Plenum of the CPC 18th Party Congress. By more aggressively tackling sensitive issues such as corruption, market-based development and environmental improvement, the new leadership of China has laid out a pathway towards continued prosperity, social development and ecological security. The goal is a “Beautiful China” and, ultimately, a shift towards an Ecological Civilization (Shengtai Wenming).

The “Five in One” approach, as articulated during the 3rd Plenum, is to place progress in addressing Ecological Civilization at the same top policy level as the other four key policy themes so that there is adequate progress (jinbu) in dealing with: economic development, social development, political development and cultural matters. Thus Ecological Civilization, a concept that has been discussed since at least 2007 in Chinese government and political circles, will bring new perspectives and priority to environment and development policies and action. Most recently, at a meeting of officials on 2 September 2014, Premier Li Keqiang kicked off planning for the 13th Five Year Plan (2016-2020), indicating that it is “the final dash” to a comprehensive well-off society.² He said that officials should “support initiatives that promoted social de-

velopment, environmental protection and improved people’s livelihood as well as measures to promote fairness and efficiency.”³

2013 was marked by an extreme environmental situation in China, a tipping point in terms of hazardous levels of urban air quality. Unless the environment and development effort is substantially more successful in the years ahead, perhaps even more devastating environmental tipping points could occur. Such tipping points can express themselves suddenly and severely, and cost a great deal to address effectively.⁴ Some possible examples include disasters related to mining sites and tailing ponds, soil and groundwater contamination, effects related to climate change, and disruptive pest and disease situations. Will such a gloomy outlook for China necessarily become an inevitable outcome? Hopefully not.

Many other nations have experienced severe environmental tipping points⁵—where an event crystalizes public fear and anger and makes it essential that government act effectively to address the challenge. In China’s case the response to overtly awful air pollution is a “War on Pollution” declared in March 2014⁶, with a comprehensive Air Pollution Action Plan (2014

to 2017), and the expectation that two other environmental action plans (water pollution, soil pollution) will be initiated in 2014 and beyond.

On this more hopeful note, and with a broad range of commitments (see Table 3-1) being made by China’s top-level leaders, a turning point may be reached, where there is gradual, or perhaps even dramatic shifts toward improved environmental quality, sustainable development and progress made along new pathways towards Ecological Civilization. An obvious concern is to ensure that the current large gaps between national expectations for environmental improvements and local capacity to deliver results are reduced or eliminated. To secure this turning point will require massive effort in the form of a Green Transition and new Green Development patterns. These elements of change will be in line with the current efforts taking place at the global level towards a post-2015 identification of sustainable development goals and action, and other efforts such as those being discussed globally by the United Nations for climate change, biodiversity and other environment and development concerns.

Thus China continues to be at a crossroads: tipping point or turning point on key environment and development issues. China has a window of opportunity right now that may not occur easily again.

This window has occurred in part because of public concern over environmental issues. A recent Pew survey⁷ in some 40 countries of 5 top global threats revealed that a third of the 3,000+ Chinese respondents listed pollution and environment as the leading global threat. This is one of the highest

levels recorded worldwide, and was the largest single concern among the five for Chinese. The focus on governance reform by China’s current administration almost immediately after taking office is a second reason. Third is the widespread recognition of the ecological and environmental damage in relation to quality of life and economic cost. And, fourth, China is paying a reputational price internationally, especially as incident after incident of air pollution and other problems are reported. The impact is on tourism, potentially on China’s ability to stay competitive, and on China’s ability to attract high caliber businesses and expertise needed for the next phase of economic growth.

This year’s CCICED work is related particularly to the institutional innovation and other changes needed to accelerate movement towards Ecological Civilization and Green Development.⁸ Hopefully such changes can lead to good turning points, and to a new environment and economy relationship consistent with the moderately well-off Xiaokang Society desired by 2020, and with better prospects for creating an Ecological Civilization in subsequent decades.

CCICED is well placed to provide inputs during this window of opportunity for policy changes. Indeed, the current work program is directed at identifying policy recommendations that can be implemented swiftly and effectively regarding priorities arising from the 3rd Plenum. The four Special Policy Studies for 2014 particularly address items from the Plenum and subsequent action.⁹ But there is also a need to set out longer-term perspectives consistent with Ecological Civilization. The two 2014 Task Forces are intended to address this major need.

¹ The Issues Paper is prepared each year by the CCICED Chief Advisors, Arthur Hanson and Shen Guofang with inputs from the Chief Advisors Group and from others.

² China Daily, 5 September 2014. Li: Plan to be Driving Force of Economy.

³ South China Morning Post, 5 September 2014. State Council Kicks Off Drafting of Five-Year Plan.

⁴ Environmental tipping points on environmental matters may have one or more of the following characteristics: There is a threshold beyond which an abrupt shift of ecological states occurs, although the threshold point can rarely be predicted with precision; the changes are long-lasting and hard to reverse; there is a significant time lag between the pressures driving the change and the appearance of impacts, creating great difficulties in ecological management. (Observations from Biodiversity Information System for Europe. <http://biodiversity.europa.eu/topics/tipping-points>). Alex Wang, 2012. China’s Environmental Tipping Point. Chapter 5 in China in and beyond the Headlines. Timothy Weston, Lionel Jensen, eds. Rowman and Littlefield Publishers.

⁵ http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2130452

⁶ See examples in the database of the Resilience Network. <http://www.resalliance.org/index.php/database>

⁷ <http://www.reuters.com/article/2014/03/05/us-china-parliament-pollution-idUSBREA2405W20140305>

<http://www.pewglobal.org/files/2014/10/Pew-Research-Center-Dangers-Report-FINAL-October-16-2014.pdf>

⁸ The 2014 CCICED AGM theme is Management and Institutional Innovation in Green Development.

⁹ The 4 CCICED SPS topics are: Performance Evaluation on the Action Plan of Air Pollution Prevention and Control and Regional Coordination Mechanism; Institutional Innovation of Eco-Environmental Redlining; Good City Models under the Concept of Ecological Civilization; and Chinese Environmental Audit System for Government Officials.

The CCICED Task Force on Evaluation and Prospects for a Green Transition Process in China has examined the compatibility of selected economic policy actions taken in the past decade and their impact on pollution so that new, more appropriate economic decisions might be proposed for the future. The Task Force on Institutional Innovation for Environmental Protection in the Context of Ecological Civilization has examined the inadequacies of the current institutional structure in terms of addressing future needs, and has examined key innovations from experiences within China and internationally.

2. A WINDOW OF OPPORTUNITY IN CHINA

This past year will likely be viewed as one of the most transformative periods of China's policy change. A window of opportunity has opened in an unprecedented fashion. Several issues of long-standing social and economic concern are being addressed, such as the hukou system of place of residence restrictions,

introduction of property taxes, softening of one-child family rules, deregulation and market based reforms, action to avoid heavy industry overinvestment, promotion of the service economy, domestic consumption, and a shift to improved urbanization models.¹⁰

The passing of a major revision to China's Environmental Protection Law, slated to come into effect in January 2015, is a major achievement that addresses key concerns such as much more severe punishment for environmental pollution and other actions that damage the environment, improved public participation and transparency in environmental information disclosure, and more effective involvement of enterprises on environmental improvements.¹¹ Over this past year, rarely has a week gone by without important improvements to environment and development policies and actions (see Table 3-1 for examples). The budgets in place or proposed for addressing environmental protection issues continue to rise, sometimes dramatically—as in the case of funding for the Air Pollution Action Plan.

Table 3-1. Selected Environment and Development Initiatives Announced November 2013 – October 2014

- | | |
|--|---|
| <ul style="list-style-type: none"> • <i>NPC approval of revised Environmental Law (March 2014)</i> • <i>"War on Pollution" action including Air, Water Soil Action Plans (Air in March 2014, others pending)</i> • <i>Lifetime accountability for officials' environmental performance (July 2014)</i> • <i>Ecological redlining to serve as a baseline for protecting ecological functions and environmental-</i> | <ul style="list-style-type: none"> <i>ly-fragile areas (December 2013)</i> • <i>Strengthened role of courts and appointment of judges to assist in the court system's capacity development and competency regarding environmental matters (July 2014)</i> • <i>Green procurement through purchase of electric vehicles by government agencies; waiving of 10% purchase tax for EVs; significant government invest-</i> |
|--|---|

¹⁰ See Barry Naughton. July 2014 'Deepening Reform': The Organization and the Emerging Strategy. Hoover Institute. China Monitor No. 44. <http://www.hoover.org/sites/default/files/research/docs/clm44bn.pdf>

¹¹ Numerous articles are available concerning the details of the revised law, including: http://www.npc.gov.cn/englishnpc/news/Legislation/2014-04/25/content_1861275.htm <http://www.chinalawinsight.com/2014/05/articles/compliance/environmental-protection-law-big-changes-in-2014-2> ; http://switchboard.nrdc.org/blogs/bfinamore/new_weapons_in_the_war_on_poll.html ; http://news.xinhuanet.com/english/china/2014-04/24/c_133287570.htm ; <http://asiafoundation.org/in-asia/2014/05/28/chinas-environmental-protection-law-lays-groundwork-for-greater-transparency>

- ment in national network of charging stations for EVs (August-September 2014)*
- *Green Market Supply Chains / Procurement Centers, Tianjin and APEC (May 2014)*
- *Guidelines on Urbanization including environmental protection criteria (December 2013)*

- *State Council Reaffirmation of China's Climate Change Goals to 2020 (September 2014)*
- *First draft Revision of China Air Pollution Act released for comment (September 2014)*
- *National Carbon Market projected to begin in 2016 (August 2014)*

The unprecedented level of attention over this past year to pollution control, green development and ecological construction is quite remarkable, as is the overall governmental attention to Ecological Civilization. This level of attention is driven in part by public concern, but also by a deeply-held belief that past models of Chinese economic development are inadequate for the future, more comprehensive and integrative approaches required for sustainable development. For some issues, the credibility of the CPC is at stake and therefore a matter of concern to the governance system at all levels.

Given the current level of governmental responsiveness, it is a time when swift action is not only possible but also politically desirable. It means that a window of opportunity now exists to implement environment and development ideas that in the past have faced political or bureaucratic acceptance difficulties. Comprehensive changes toward introduction of an environmental tax system would be a potential case. Another is the greater opening of environmental assessments and other planning mechanisms to broader public scrutiny. A third is full participation by the financial sector in assessing environmental risks and performance, such as in the granting of major loans.

The list of needed improvements is actually much longer, and it is fair to imagine that the window of opportunity might continue almost indefinitely. Yet windows open and close in response to many pressures. It is wise to take full advantage while the opportunity is available. Fortunately, the timing is excellent for the 13th FYP in particular. Great advances could be made

during this special period leading up to completion of 2020 goals set up as early as the turn of this century.

There are, however, some important linkages not yet fully made in the current effort on reforms. One is the establishment of a fundamentally stronger relationship between environment and economy. These two topics are now interlocked so that changes in environmental conditions affect the economy and vice versa. Yet the current round of economic reform does not fully recognize or act on these connections. This is particularly the case for the market reform packages now being proposed. Environmental externalities cannot be fully addressed under the current reforms on pricing, corporate sanctions and incentives, and by the current capacity for structural reform in the economy. Thus, economy—whether driven by foreign trade or by greater domestic consumption—is still not anywhere near a harmonious relationship with the environment. Ecological debt load and human health consequences within China are still on the rise to an extent that is rather poorly understood and therefore dangerous.

The second major linkage that needs to be considered more fully is the cross-sectoral environmental impacts that can seriously affect development. This is a long-standing concern, but integrative, comprehensive efforts are still not fully identified. Another way to state this dilemma is that environmental problems cannot be completely solved by environmental agencies since they are so much weaker than powerful sectoral ministries, large SOEs, and other interests.

Third is the need for much greater clarity on the role of ecosystem integrity and ecological services in social, economic and political decision making. This is a concern where China's government is now very active, but in many ways the mechanisms are still inadequate, for example, administration and management of nature reserves, although expectations are very high regarding new mechanisms such as ecological redlining.

Throughout these early years of the new leadership, considerable emphasis has been given to "top-level" guidance. This is understandable, given the emphasis on change, enhanced performance, elimination of corruption and other aspects of China's governance. There has been considerable discussion about the need for strengthening and innovation of environmental institutions as part of this. Perhaps the most notable aspect has been the administrative structure for Deepening Reform¹², which has established a Deepening Reform Leadership Small Group headed by Xi Jinping, with six subsidiary groups including one on Economic System and Ecological Civilization, which for the first time explicitly links economy and environment. The important question is how this leadership effort will be shadowed in organizational reforms that take place at other levels and within government departments and other structures.

The Issues Paper cannot answer this question directly, of course, but it is very clear that a central theme of environment and development reform, and indeed China's overall reform, is how to bring about a more integrated and inclusive approach to governance and development. This is a topic also of concern to post-2015 agendas globally—for new sustainable development goals, climate change negotiations, and efforts directed to green growth and green economy within various countries, and on the part of businesses and

international organizations. The topic of institutional innovation and reorganization will be particularly important as reforms related to Ecological Civilization mature. Given that Ecological Civilization must find space within existing policy debates on four other key themes (the "5 in 1" approach), there will need to be changes in many laws and regulations, adjustments in market reforms, and important matters related to behavioural change of institutions and by individual households and citizens and in decisions made in the governance of their communities. Some of these shifts are examined in the key issues discussed in this paper.

3. INTERNATIONAL TRENDS ON ENVIRONMENT AND DEVELOPMENT

2015 is the target year for some key international negotiations on environment and development, with 2014 serving as a key testing time for countries to determine how far they are prepared to go in moving away from entrenched positions, and to decide collectively they will act to break the impasse on growing problems, especially climate change, and on social matters such as poverty reduction and its relationship with sustainable development efforts.

Regrettably at the national level there have been some serious signs of backpedalling on environment and development, such as the cancellation of the Australian carbon tax, the struggle most European countries are having to reach EU energy and climate 2020 targets¹³, the USA difficulties in bringing about almost any kind of agreement involving Congress on serious environmental matters, and the continuing failure to slow tropical deforestation such as the burning of forests in Southeast Asia for planting of oil palm, rubber and other commodity crops in high international demand. In general, it has not been a good year or two for the environment at this time of

economic struggle and prolonged recovery in many parts of the world. In some instances, there has been substantial retrenchment in expenditure, downsizing and consolidation within environmental agencies, and a lessening of monitoring and other important activities.

One consequence of national level problems has been a rise in the level of environmental initiatives at the local level, especially in cities. This trend is reflected in the heightened contribution of cities and provinces towards achieving important objectives such as reduction in greenhouse gases. This is the case for example in Canada but also in other parts of the world. Much has been made of the potential role of cities as innovators. The C40 Cities network of megacities committed to climate change action is an example, along with networks for eco-cities, and ICLEI (Local Governments for Sustainability) initiatives.¹⁴ These and other urban networks are rising in significance on a number of environmental issues, and their actions and voice will be reinforced in the coming years as urban migration continues to increase in countries throughout the world.

The preparations for the 2015 International Conference on Climate Change in Paris have included the Climate Change Summit organized in September 2014 by the UN Secretary General.¹⁵ This meeting provided an important testing of the waters and highlighted a willingness of countries to listen, but did not lead to any major breakthroughs towards consensus, or full agreement on the part of major greenhouse gas emitters. Just prior to this summit, the Global Commission on the Economy and Climate¹⁶ released an important new report Better Growth Better Climate with a 10-point action plan for low carbon economic

growth. The Action Plan notes that *Decision-makers must integrate climate and other environmental impacts into their core economic, development and investment strategies. Taking a long-term approach, integrating these factors into investment and business decision-making, can reduce investor risk without harming performance.* The key message is that such economic growth will be sustainable—and will indeed prove to be the best way into the future, while reducing the massive destruction and costs from climate change.

The second major item on the international agenda, but with progress still limited, is the development of post-2015 sustainable development goals—the follow-up to the Millennium Development Goals. This is a process-driven effort guided by the Rio+20 outcome document. Many consultations have taken place, based on sectors such as water and on regional concerns. The proposed post 2015 goals are to be submitted to the 68th session of the UN General Assembly.

Not surprisingly, considerable attention is being given to financial aspects of sustainable development. For example, the Intergovernmental Committee of Experts on Sustainable Development Financing has recently completed a report as input to the post-2015 effort.¹⁷ UNEP has initiated an Inquiry into the Design of a Sustainable Financial System.¹⁸ It is intended to provide an understanding of how to fund the transition to a green economy globally. The green economy transition costs are high, and the challenges great, given the precarious state of the global economy. However this work is badly needed since climate change, biodiversity protection and many green economy efforts have stalled due to difficulties on fi-

¹² A useful discussion is provided by Barry Naughton in his article 'Deepening Reform': The Organization and the Emerging Strategy. China Leadership Monitor. No 44.

¹³ Trends and Projections in Europe 2013 – Tracking progress towards Europe's climate and energy targets until 2020. European Environment Agency (EEA). <http://www.voxeurop.eu/en/content/article/4263331-europe-united-failure>

¹⁴ <http://www.iclei.org>; <http://www.c40.org>

¹⁵ IISD. A Summary Report of the 2014 Climate Summit. Climate Summit Bulletin. 26 Sept 2014. <http://www.iisd.ca/download/pdf/sd/crsvol172num18e.pdf>

¹⁶ <http://newclimateeconomy.report/global-action-plan/>

¹⁷ <http://sustainabledevelopment.un.org/content/documents/4588FINAL%20REPORT%20ICESDF.pdf>

¹⁸ <http://www.unep.org/NEWSCENTRE/default.aspx?DocumentID=2758&ArticleID=10698> ; http://www.unep.org/greeneconomy/financialinquiry/Portals/50215/Inquiry_summary_final%20June%202014.pdf

nancing, especially North-South initiatives.

The global business community continues to build a larger stake in green growth and green economy initiatives. In many ways progressive enterprises are showing leadership through their investments, technology development and public-private partnerships. The World Economic Forum released a Green Investment Report at the 2013 Davos meeting¹⁹ suggesting that the private sector would have to raise most of the USD700 billion per year required to address the additional green investment for holding climate change to 2°C. The ratio might be 5:1 private to public funding.

A relatively new concept being explored internationally is green bonds. Largely a tool so far being used on a limited basis by The World Bank and IFC and some other development organizations, the idea is to tap into the huge pool of investors interested in the bond market (\$80 trillion dollars). Green bonds are defined by the World Bank as fixed income, liquid financial instruments that are used to raise funds dedicated to climate-mitigation, adaptation, and other environment-friendly projects. A major push is underway to increase knowledge of their potential value to cities, corporations and countries. And to make them well understood as safe investment options. With considerable publicity in 2014, it is possible that green bonds may reach a level of USD 30 to 40 billion in 2014, mostly for infrastructure, forest, watershed management, clean tech, renewable energy, or other tangible sustainable development projects.²⁰

Another important financial initiative—announced at the time of the 2014 Soccer World Cup in Brazil—is the BRICS Development Bank being established in Shanghai with a capitalization of USD50 billion with equal capital input from each of the five BRIC countries and a contingent reserve arrangement of

USD100 billion, with 41% of this from China.²¹ The aim is to provide additional financing to developing countries for meeting infrastructure and sustainable development needs from the “New Development Bank” and the contingent reserve to be used for members that might have financial difficulties. This is at an early stage and bears watching in terms of its contribution to environmental aspects of sustainable development.

4. FRAMEWORK FOR STRENGTHENING ECOLOGICAL CIVILIZATION POLICIES AND PRACTICES

The concept of Ecological Civilization should, over time, provide strong guidance to the people and institutions of China for development and for other important decisions that will influence production and consumption, and attitudes towards the type of economic growth, social development and political decision-making that will shape China’s future. At this crucial point, two years after this overarching concept was firmly embraced as part of China’s governance model, it is appropriate to think about factors that may affect progress on its implementation. The discussion below is based on many conversations, review of written materials, and also on observations arising from the meetings and materials of CCICED’s research teams.

Some implications of building an Ecological Civilization include the following:

- Building respect for nature throughout society, both rural and urban; on the part of government bodies, enterprises, social organizations, across all sectors, and on the part of media, educators and others entrusted to provide guidance and oversight.
- Recognizing ecological integrity and the maintenance/enhancement of ecological services as a

fundamental requirement for meeting China’s basic needs, quality of life and prosperity, and for contributing to global sustainable development.

- Building cooperative and effective working relationships on environment and development among sectors and institutions at all levels from local to national, regional and global.
- Promoting ecologically and environmentally sound decisions on the part of individuals and households on all matters within their control, and ensuring the enabling policies are in place to allow this to happen.
- Protecting cultural values and recognizing differences in the sustainable development choices made by people depend on their circumstances and needs.

These implications remain consistent with the “putting people first” concept of China. However they also require that protection of environment and ecosystems must also be given high priority. Only then can “putting people first” survive as a long-term priority. Ultimately, Ecological Civilization is a concept that is remarkably different from a society focused on short-term priorities.

Today’s institutions within China and elsewhere generally are ill-suited for constructing an Ecological Civilization. Objectives, operational methods, incentives, or governance are inadequate for the tasks. Other problems include slow-moving action, limited human or financial capacity, and managerial issues. What needs to be done?

A vision of institutional reform for Ecological Civilization to take hold should be built around a number of general and specific points (by no means a complete list):

4.1. General

- Base all planning and environmental management decisions on Ecological Civilization criteria and

monitoring.

- Create a sufficient legal basis for Ecological Civilization implementation.
- Shift towards an ecological-economic approach to development decisions.
- Create an integrated and optimized spatially-implemented approach to planning related to all aspects of environmental management, including urban design, land use, resource development, pollution control industrial development, transportation and disaster prevention. Despite impressive investments and improvements in recent decades, the approaches currently in place are inadequate. Maintain strict observance of ecological red lines, pollution control and environmental standards with swift action when violations occur.
- Carry out institutional framework for environmental protection and management to provide top-level coordination, efficient and trusted action at all levels, and create supervision by the public. Ensure full accountability on the part of government officials.
- Create an institutional framework for providing incentives and other enabling mechanisms for Ecological Civilization innovations and for green development. This aspect will need to be coordinated with market-based economic reforms.
- Transform financial sector institutions by enabling them to: stop making environmentally and socially unsound loans of any sort, but instead give preferential treatment to ecologically and environmentally sound initiatives; adequately address environmental risk reduction, for example, by climate adaptation; foster eco-innovation technology and services; contribute to eco-compensation (insurance, ecosystem restoration).

- Build a strong sense of responsibility on the part of enterprises towards natural and community envi-

¹⁹ http://www3.weforum.org/docs/IP/2013/ENVI/WEF_GreenInvestment_Report_2013.pdf

²⁰ <http://www.worldbank.org/en/topic/climatechange/brief/green-bonds-climate-finance>

²¹ <http://www.economist.com/news/finance-and-economics/21607851-setting-up-rivals-imf-and-world-bank-easier-running-them-acronym>

ronmental conditions, and strengthen their interest and capacity in technological, managerial and investment innovation for Ecological Civilization.

4.2. Some Specific Priorities Needed

- Factor 10 eco-efficiency in manufacturing, production, and natural resource exploitation (including mineral processing, water and fertilizer use in agriculture, fisheries).
- Extreme levels of Circular Economy action.
- Sustainable consumption, green procurement, and green market supply chains.
- Eco-city and low carbon cities.
- Integration of human environmental health objectives into Ecological Civilization objectives and action plans such as those associated with air, water and soil pollution.
- Mountain to sea ecological services planning for water basins and coastal zones.
- Nature reserve and ecological redlining conservation and management.
- Institutional strengthening for meeting very difficult climate change adaptation and mitigation objectives and transformative changes in the energy sector.

A governance system based on Ecological Civilization should be transparent, open and fully accountable to people. The governance framework must recognize the need for capacity development, including how to build new working arrangements between the government and people, and the need to create a much stronger ability of enterprises to take on major responsibilities and provide much of the funding necessary to make Ecological Civilization a reality. Governance of urban areas provides some of the greatest

opportunities for China to realize new paths to green development and therefore for the rapid emergence of Ecological Civilization.

The time period for anything resembling an Ecological Civilization must cover major development transitions: the 13th FYP; the 2015-2030 mid-term green transition period including important energy transitions such as peak coal, peak fossil fuel use, major ramping up of renewable energy use; 2030-2050 for longer term opportunities and actions. Over such a long time span there undoubtedly will be many course corrections, introductions of important new technologies, and other hard to predict challenges and opportunities. Thus Ecological Civilization still needs to be treated as an important organizing concept but one where there is a need to continue seeking answers to key questions about its implementation.

Thus, this section will end with a number of important questions that may be used to clarify what must be considered as feasible for constructing this new approach. These provide a flavor for what may happen in coming years, but the list of questions below is a sample rather than an exhaustive list.

- A key question is how can Ecological Civilization and associated green development transitions be accelerated so they help to avoid environmental tipping points while maintaining economic and social development goals?
- How can fulfillment of Ecological Civilization needs be helped through improved governance, including efforts to stamp out corruption, enhanced models of regulation and market incentives, political reform, and public participation/supervision of development?
- What level of expectations should arise from the “Five in one” approach to policy development? What should be key priorities among the many possible combinations concerning the relationship of Ecological Civilization to the other four? For example, should most of the effort in the coming

several years be devoted to the definition of a new relationship between ecology and economy (as the Brundtland Commission recommended globally in 1987²², but has so far not been fully achieved, whether in China or elsewhere)? Or should it be a more balanced approach involving all four others?

- What is required to genuinely make environmental action an equal to economic development? Despite good intentions it has not happened so far within China, or elsewhere to a desired level.
- Institutional innovation for Ecological Civilization requires coordinated approaches to development, including highest-level guidance, monitoring and to some extent, integrated planning and management. How can super-ministry or other approaches at a national level help with coordination and other needs to ensure comprehensive approaches to planning and management for Ecological Civilization? What is needed in addition to environmental auditing in order to ensure full accountability for Ecological Civilization Progress?
- How can China’s commitment to massive urbanization contribute effectively to realization of an Ecological Civilization?
- Ecological redlining is viewed as an important process to safeguard and improve ecological goods and services, and, overall, to protect ecological and environmental security. However, it is only one element and mechanism for the broad achievement of Ecological Civilization. What additional steps are needed to fully protect ecosystems and their contribution towards an Ecological Civilization approach, especially in relation to behavior of the public, enterprises, community leaders, and government bodies?
- Is there a need for extensive legal reform to en-

sure that a wide array of laws and regulation are updated to take Ecological Civilization needs and approaches into account? And is there a need for a national law on Ecological Civilization in the same way that earlier laws were set in place to guide the development of Circular Economy?

- How much of China’s success on implementing Ecological Civilization concepts is likely to be influenced by perceptions outside of China, for example on matters related to Green Market Supply Chains, energy transitions? How much effort should China put into making Ecological Civilization ideas a key part of its Going Out strategy?

5. KEY ISSUES

In a time of green transition, which inevitably China must embrace in its efforts toward achieving green development, there will be mixed signals about progress. Undoubtedly there will be continued efforts on the part of some vested interests to slow the pace of change. It will be tempting to avoid transformative modes of change that tend to be disruptive. Progress towards an Ecological Civilization will be stalled if that is the case, and environment will not be mainstreamed in development decisions to the extent necessary. Fortunately, the resolve to meet and resolve challenges, and to take advantage of the current window of opportunity appears to be present.

In this section ten major issues are highlighted. All are important, but some stand out for the most urgent attention, especially Issues 1, 5 and 10, the foundation stones of a modern governance system, safeguarding of ecological services, and the critical matter of a green transition that will firmly address the move from tipping points to environmental turning points. The ten issues are clustered into four themes: innovation in governance (Issues 1-4), ecological services (Issue 5), sustainable production and consumption

²² World Commission on Environment and Development. 1987. Our Common Future.

(Issues 6-7), regulations and incentives (Issues 8-9), and trimming green transition times (Issue 10).

5.1. INNOVATION IN GOVERNANCE

ISSUE 1. CREATING A MORE EFFICIENT AND INCLUSIVE GOVERNANCE SYSTEM

Institutional change for environment improvement is lagging behind other societal changes and economic development.

Examples include environmental protection and management enforcement effectiveness, green tax reform, cap and trade for climate change, coordination across sectors and at different levels of government. The current system is one dominated by government rather than a modern governance system in which enterprises and social institutions play a significant role. The governmental administrative system is inadequate in relation to the level of need, both in terms of the number and capacity of personnel available to address critically important matters such as air pollution, the quality and quantity of financing, the worth of current regulatory tools, and long-term strategy to manage the transition towards environmental quality—currently this strategy is a patchwork. Implementation of environmental action generally lags years, or even decades behind China's rapid economic growth and economic development shifts in policy. China is implementing its environmental protection action based on western models from the 1970s rather than models that might be more appropriate to its own circumstances today and for the future.

This issue may be partially alleviated by the more definitive action being proposed or implemented by the current leaders. However the signs of past delays and problems are apparent. For example, only one of the three pollution action plans is fully underway. There have been problems in achieving the more stringent energy and greenhouse gas emission targets of the 12th FYP, and there may well be problems in achiev-

ing air pollution controls such as for nitrogen compounds. These matters are indicative of the need to bring important sectoral players into the tent of pollution control and prevention.

The debate about whether a superministry for environment and natural resources will be a robust or sufficient institutional answer is probably the wrong one to be having. Perhaps more important is whether China can develop a set of robust mechanisms for integrated management at all levels of government in order to break down decision-making silos on environment and development matters. This is a long-standing problem, and it is by no means one found only in China. There is an apparent need for a long-term, top-level coordinating institution that can provide authoritative guidance on matters related to environment and economy.

A second major part of the institutional strengthening problem is the time taken to introduce environmental market based reforms, especially a system of green taxes, improved pricing that takes into account environmental externalities (negative and positive), and modifications to the regulatory framework to provide for sufficient penalties and the enforcement required. The virtue of such an approach is administrative efficiency and coverage across a wide range of targets. Until such a system is in place, cost of environmental action will remain higher and be less effective than it should be.

The broader governance issue is an urgent problem to be tackled since it directly links to social and political concerns such as the model of public and enterprise involvement to be pursued. Public participation is addressed in Issue 2 below. For enterprises the need is to have a much greater, more sophisticated, and more effective role in finding and helping to pay for the solutions to environmental problems related to their money-making activities. Companies large and small need to address environmental risk to their operations in addition to basic legal compliance. Although there are now significant levels of invest-

ment by some businesses towards a green transition, with innovative technologies²³ and management, it is still quite far from what is needed for a green and prosperous business-driven approach. Solutions such as widespread closures of factories, temporarily or permanently can help in the short run, but not for the longer-term.

ISSUE 2. INCREASING SOCIAL GOVERNANCE OF DECISIONS

Important contradictions in policies remain, or are developing, regarding the supervisory role of the public towards environmental performance of government, regarding information disclosure, communications regarding environmental risk assessment, and transparency of decision making on matters related to project approvals, environmental planning and impact assessment.

Building public participation into the governance model has been underway for a time, and the efforts to build the necessary environmental information disclosure, whistle-blower and complaint channels are important but still insufficient measures to guarantee the public's desired role in the supervision of environment and development. Hebei Province recently has drafted regulations on public participation regarding environmental matters. It is a model approach that is very explicit and helpful in many ways.

However there is a sticking point that may always be present in such efforts, and that is the inclusion of clauses regarding responsibility on the part of public participants. Clearly there is a nervousness about public demonstrations, but there is a fine line between those that are poorly informed, or perhaps embarrassing to local officials, and those that are truly dangerous to public safety or other more legitimate reasons to call for punishment of those involved. In

²³ See the China Greentech Report 2014. <http://www.china-greentech.com>

²⁴ China National Biodiversity Conservation Strategy and Action Plan (2011-2030).

other countries it has often taken a considerable level of public courage to turn development away from ecologically destructive towards a more environmentally friendly approach. This point needs to be kept in mind as China builds its expanded public role. The fine line may be adjusted through courtrooms as well as on the streets.

A matter of growing need is to have more well trusted independent platforms (organizations, websites and individuals) that can provide authoritative information and take on a role in making information disclosure work well). For example, full environmental assessments or other planning documents may be lengthy and technically difficult to review and understand. Good "third party" bodies can help to make such information accessible and can also comment on particular types of problems, such as chemical plants, or work locally on environmental improvements.

ISSUE 3. DEVELOPING ADAPTIVE PLANNING AND MANAGEMENT

Ambitious pollution control and other environmental action plans are untested and require an adaptive management approach that is not yet fully worked out. It is important not to take inflexible approaches that may lead to "blind alleys" and limited return on investment.

The danger of short-term action plans is that they will come with high price tags, high expectations, and perhaps untested or poorly integrated approaches. The air pollution action plan is an example. On the other hand, plans with a long time horizon, for example China's Biodiversity Action Plan²⁴, which sets out an agenda until 2030, could be set on a track that is too inflexible for shifting conditions, such as those related to climate change impacts, and could avoid hard decisions by pushing some items into the

future when action should be taken at an early stage. All of the action plans being proposed, or likely to be proposed, are precedent setting, and therefore must be monitored closely for their performance. It should be presumed that implementation efficiency must be constantly improved. They should be adjusted according to changing needs, of course, but these may be hard to determine over short time periods. If plans genuinely are lagging behind serious and rapid environmental degradation, cumulative impacts are likely to expand in size and complexity. This is a concern, for example, with soil pollution or ground water depletion and pollution.

In the case of the air pollution action plan, clearly one of the most difficult aspects is how to bring about robust, cost-effective regional solutions, without which there is very little hope for long-term success. Also, there are political and public expectations of considerable progress within a matter of a very few years. Obviously the problem is so serious that there appears to be little choice other than to articulate such a hope. What is the consequence if the results cannot be delivered on a reliable basis, as may well be the case? The public will be far less interested in average annual declines in key pollutants than in whether there are far fewer days of severe air pollution, such as those that afflicted Beijing in October 2014. Given that it likely will be a 15 to 20 year battle to bring about fully satisfactory conditions for air quality, the preparations and initiatives that will follow the current action plan, the nature of the public dialogue (locally and regionally) and the innovation in financing and other mechanisms that may need to be strengthened deserves considerable attention. Some of the attention needs to be placed on co-benefits and synergies that will help to justify accelerated action and recognition that there may be a broader set of benefits being achieved, even if skies still appear grey.

²⁵ http://www.livingplanetindex.org/projects?main_page_project=LivingPlanetReport&home_flag=1

For initiatives such as the long-term Biodiversity Action Plan, there is an opportunity to link this plan closely to progress on Ecological Civilization. However the Action Plan preceded the current political effort, and therefore the Plan will require updating. Furthermore, while there are some successes, China's biodiversity conservation is facing serious threats, and some life forms have already reached tipping points where local or regional extinctions already have occurred. In the oceans, there is drastic reduction of some species and prospects of further decline. The situation could significantly worsen during the coming decade as a consequence of China's economic prosperity that has lowered the country's natural wealth, and also from the partitioning of habitat through urbanization and transportation infrastructure and from excessive land reclamation in coastal areas. Worldwide the situation is at a crisis point, with a roughly 50% decline in population sizes of some 10,000 monitored populations of animals between 1970 and 2010 according to WWF International.²⁵

ISSUE 4. REDUCING CORRUPTION IMPACTS ON ENVIRONMENT

Environmental impact assessments and other aspects of permitting and regulation are susceptible to falsification, selection among contradictory laws and regulations, cover-ups and many other corrupt practices especially at local levels.

The current campaign against corruption within China has not placed any particular emphasis on environmental matters. There is no published estimate of how much corrupt practices cost in terms of pollution damage or in other environmental damages. Indeed, there are no published studies that comprehensively cover the subject of corruption and the environment in China. Much of the available information is anecdotal, often directed at local officials.

Minister Zhou Shengxian noted in a December 2006 interview with Xinhua News Agency²⁶ concerning reviews of a number of projects that might affect air pollution, fraud in project approval was prominent with many projects passing their environmental assessment without fulfilling the necessary criteria. Other common local problems in the past have included failure of power generation stations and various kinds of manufacturing facilities to run installed pollution control equipment—except sporadically, or when inspections were likely.

In November 2013, after a large-scale review by the Ministry of Environmental Protection of organizations licensed to carry out environmental impact studies, 34 were penalized by MEP for “falsifying documents” or the “poor quality” of environmental reports. Some had licenses revoked for “obtaining qualifications by deception.”²⁷

There are many reported instances of illegally constructed golf courses that depend upon approval at local levels.²⁸ This is one of many types of corruption involving land use. In a Financial Times article²⁹ it is noted that:

Some local governments even use state funds earmarked for green belts, parks or environmental protection and rehabilitation projects to build golf courses, despite the damage they can cause to the environment.

Zhang Jing at Nottingham University China Policy Institute recently wrote that intensive pollution in China is not simply an environmental or economic problem, it also relates to corruption and dereliction of duty.³⁰ Unlike earlier studies by the World Bank and others on the subject of pollution havens, Zhang (2014)³¹ claims that incoming FDI to China is more likely to be

drawn to provinces with relatively weak environmental regulations...I find that the negative impact of FDI would become positive when more effort is put into fighting against corruption... However, the current average anti-corruption effort is too low to compensate the negative environmental impact of FDI.

The range of potential sources and methods of corruption that might destroy the effectiveness of environmental efforts is very large and might be carried out at various scales. Transparency International³² and others have drawn up lists that include falsification of shipping documents in order to bring hazardous waste products into China for reprocessing; fish and other products such as animal parts that have been illegally caught. Products such as ozone depleting substances have been illegally exported from China in the past.

Corrupt practices certainly will undermine Chinese efforts to develop an Ecological Civilization. There is a need for a new, morally solid approach that would not rely only upon investigation and punishment, even though those aspects are important, but more fundamentally on societal functioning in a way that makes environmental crimes and the accompanying corruption abhorrent.

The proposed environmental audit process to be applied as local officials leave their post is an example of at least one approach to help with this transformation. By making this audit and any consequential action a permanent part of their record should help to change behavior. Over the coming years, effective use of new legal sanctions under the newly revised national environmental protection law should provide a powerful new means to root out illegal actions that are fostered by corruption.

²⁶ See Fraud Blamed for Worsening Air Quality. http://www.chinadaily.com.cn/china/2006-08/20/content_669082.htm

²⁷ <http://www.cleanbiz.asia/news/china's-environmental-watchdog-punishes-assessment-agencies#.VEiOp751RLF>

²⁸ Washburn, Dan. 2014. The Forbidden Game. Golf and the Chinese Dream. Oneworld Publications Ltd.

²⁹ <http://www.ft.com/cms/s/0/e514b5cc-74d7-11e0-a4b7-00144feabdc0.html#axzz3FzOXIjWv>

³⁰ <http://blogs.nottingham.ac.uk/chinapolicyinstitute/2013/04/16/environmental-protection-and-anti-corruption-in-china/>

³¹ Zhang Jing 2014. Foreign Direct Investment, Governance, and the Environment in China: Regional Dimensions. Palgrave Macmillan.

³² U4 Anti-corruption Resource Centre www.u4.no

5.2. ECOLOGICAL SERVICES

ISSUE 5. PRESERVING ECO-ENVIRONMENTAL QUALITY AND VALUES

Environmental quality issues are becoming long-term threats to human health and wellbeing, while damage to ecosystems is causing difficult and costly remediation situations that are not being adequately addressed.

The concerns include loss of ecological services, vulnerabilities that can turn into disasters, loss of human and ecological productivity, reputational loss that affects tourism, trade and investment, recruitment and retainment difficulties to get skilled people to live in polluted areas, especially for those with young children. There is harm to older citizens who are highly vulnerable to the levels of pollution found in many cities.

The cumulative environmental and ecological debt found in China today is generally underestimated since it is difficult to monetize all ecological services, and understanding of health impacts is still quite limited. Certainly these factors need to be brought into decision-making much more than at present. Cleanup costs elsewhere in the world, for example, in brownfields and abandoned mine sites can reach levels of a billion dollars or more for a single site. In China there are thousands of sites requiring remediation.

In countries such as Japan—which suffered through high levels of pollution in the 1950s to 1970s—there were well-documented cases, for example the Yokkaichi asthma linked to that city's extensive petrochemical industry started in the mid-1950s. The rates of

COPD, bronchitis and other lung problems resulted in a mortality rate from such diseases 10 to 20 times higher than surrounding areas³³ Similar issues could be found in countries such as Germany in the Rhine River and in various parts of the USA. Public knowledge about these problems is one of the most significant drivers for environmental improvement—just as the various problems with food quality have led to reforms in China. China is still at an early stage of determining how to deal with environmental health in the many legacy sites found throughout the country, and in relation to environmental planning for new industrial developments.

China's ecosystem degradation is to some extent being held in check through massive investment under various eco-compensation schemes. The forestry, grassland and wetland restoration efforts are thought to be the largest such programs in the world today.³⁴ As President Xi Jinping has noted in his new book *The Governance of China*, more effort is needed.³⁵ Ecological redlining plus more attention to the existing designation of ecological functional zoning is intended to be a definitive step forward. All of these efforts are to be praised.

Yet there is considerable concern about whether there will be sufficient monitoring, enforcement and funding to ensure designated areas are respected for their ecological values. Ecological redlining may require setting aside some 35% of China's area for ecosystem protection. There are various points of view about how to deal with peri-urban and suburban areas, since these are also areas that often are sought after by developers.

Also, questions must be asked about adequacy of

³³ Mortality And Life Expectancy Of Yokkaichi Asthma Patients, Japan: Late Effects Of Air Pollution In 1960–70s. *Environmental Health Journal*. (as cited in http://en.wikipedia.org/wiki/Yokkaichi_asthma)

³⁴ Scherr, S.J. and Bennett, M.T. 2011. Buyer, Regulator, And Enabler—The Government's Role in Ecosystem Services Markets: International Lessons Learned for Payments for Ecological Services in The People's Republic of China. Asian Development Bank. <http://www.green-growthknowledge.org/sites/default/files/downloads/resource/adb-buyer-regulator-enabler.pdf>

³⁵ Xi Jinping. 2014. *The Governance of China*. Foreign Language Press. http://www.china.org.cn/arts/2014-09/28/content_33640716.htm

biodiversity conservation in even very large areas where there is also a growing level of tourism and recreation such as ski areas. An example is the internationally recognized Changbaishan Reserve in Jilin Province. This spectacular volcano and alpine lake complex now receives huge numbers of visitors and includes recreational activities such as skiing. As recently as a few decades ago this reserve held numbers of Siberian tigers and other large predators. However numbers have plummeted or reached the point of local extinction for several mammals and perhaps other animals.³⁶

5.3. GREEN PRODUCTION AND CONSUMPTION

ISSUE 6. HIGHER RETURNS FROM R&D INDUSTRIAL INVESTMENT

Getting full value from China's large science and technology investment on clean technology, renewable energy, and other environment and sustainable development initiatives continues to be a significant difficulty since implementation capacity is limited and entrenched interests slow down transformative change efforts.

China's great success related to Circular Economy, solar and wind power, and, hopefully, many other complex transitions to Green Economy and Green Growth options are lessons to others about what can be accomplished. Compared to even a decade ago, China has gradually set a path that places it well along a pathway of innovation regarding environmental, energy and green infrastructure initiatives. However the cost is high and there is a need for more rapid and consistent commercialization of scientific and technological knowledge and discoveries. Perhaps half of the programs now underway through specially designated funding in one way or another have environmental or sustainable development connotations. This is

remarkable. But the trip from lab bench to proving grounds and then to full implementation within society is difficult. Hydrogen economy is an example internationally, and the reception of the EV (electrical vehicle) whether in China or elsewhere in the world demonstrates how the process can take much longer than expected.

Part of the problem is the skewed nature of incentives and of organizational structure. China's continuing high use of coal for electricity generation is an example, where the complex problems of coal pricing, the difficulties of establishing smart grids for transmission optimized for use of wind and solar sources, and various institutional problems have slowed the progress of shifting from coal as the principal source. The peak use of coal could come quickly or be delayed for a decade or more depending on the resolution of the problems of implementing alternatives, as well as on developing stringent demand reductions.

Another side of the science and technology issue is the great opportunity to more quickly bring about the new green economy that is more reliant on the digital revolution, and with higher value-added for most activities, but with extreme reductions in energy and material use in manufacturing and service sectors. The coming agricultural revolution in China must not be based on excessive chemical and water use.

ISSUE 7. SEEKING ENVIRONMENTALLY SUSTAINABLE CONSUMPTION

The shift towards expanded domestic consumption requires much more effort to avoid unsustainable consumption patterns emerging, especially in urban populations.

The stimulus for increasing domestic consumption in China is understandable from a strategic economic

³⁶ http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/SC/pdf/Changbaishan_BR_GLOCHAMOST-2011.pdf

perspective but it is not clear how much of the projected consumption can either help to stimulate a green transition, or indeed be classified as sustainable consumption. The increased flow of CITES-sanctioned wildlife parts such as ivory, rhino horn and many other items into China is linked to the rise in wealth. Changes in Chinese diet to include much more meat has impacts on demand for agricultural lands and water, and with resulting pollution and other environmental impacts both inside and outside of China. The rapid rise of Chinese travellers to destinations within and outside of China has raised serious questions about carrying capacity at parks and other natural areas, and other travel related issues such as greenhouse gases, since the uptake of carbon offsets on travel has not been a major success yet in China, or elsewhere.

Issues such as land and water consumption by golf courses and ski resorts, the proliferation of second, third or more residential properties, and other examples of high consumption lifestyles are widely debated. However existing policies are not fully enforced, or perhaps are even to some extent unenforceable. Projected forward a decade or more, it may be the conspicuous consumption problems created by high incomes are some of the most severe facing China, just as they have in some western countries.

The love for the automobile in China appears no less than in many other countries. Already the larger cities have been given over to the auto. The implications for both environment and energy use are well understood, but still not fully addressed, either in terms of very stringent controls on ownership, use or advanced fuel and pollution control systems. Surely this will come about, but it is happening more slowly than should occur.

Impressive gains in understanding green market supply chains and acting on this knowledge have been made in recent years. An example is the case of Tianjin and its efforts to build its new financial district with specifications related to good environmental planning such as making public transportation very easy to ac-

cess, and ensuring that buildings are constructed with design and material use based on green market supply chains. Similarly inspiration can be seen in some of the advanced efforts of Shenzhen. However these examples are still the exception rather than standard practice.

Overall the challenges of domestic sustainable consumption are daunting and perhaps the most pressing aspect for the people of China to embrace as part of their journey towards green development and Ecological Civilization.

5.4. REGULATIONS AND INCENTIVES

ISSUE 8. LEGAL BASIS FOR AN ECOLOGICAL CIVILIZATION

The current patchwork of environmental law is not a sufficient basis for meeting Ecological Civilization legal needs. Nor is there a strong enough legal basis for market reforms related to environmental management. The revised Environmental Protection Act is a good starting point for a modern approach.

It has taken more than half a decade to reach agreement on the newly revised Environmental Protection Act passed by the National People's Congress in early 2014. This revised Act might best be considered as the wedge that will help to drive changes in attitude and achieve results against recalcitrant polluters, open the way to greater transparency on the part of government and provide various means for people to have a greater voice on environmental matters, including via court action. It likely will require follow-up regulations that may take time to put in place. Further revisions in the environmental protection act may be desirable within a relative short time, perhaps only 3 to 5 years, since there was not agreement on all of the important points that might have been included.

The slow process of legislative reform on environment across key sectors is likely to hold back implementa-

tion progress overall. The thin edge of the wedge is now in place. But many, perhaps most environmental matters have important ramifications in other legislation such as on water, land, industry, energy, urban and rural development. In addition central agencies such as the Ministry of Finance play an important role, for example in green taxes and emissions trading. Changes in the administration of justice through the existing court system is starting to occur, but not at the desired pace. Adequate enforcement policies are not yet in place even though it is now possible to set meaningful fines.

A broader and important issue is to determine the type of legislative base that should underpin new initiatives associated with Ecological Civilization. Would such legislation be primarily to enable such initiatives—or would there be regulatory and punitive aspects? How would legislation on this subject relate to existing economic, social or environmental law, regulations and market based approaches? Perhaps a good starting point would be to define the most relevant existing laws and examine them against Ecological Civilization criteria and expectations. Then consider whether there is a need for reform of the existing statutes, or development of new laws.

The case can be made that rather than draw up too many new laws and regulations, the most important need is to fully utilize existing laws, well enforced, and to improve the capacity of the courts to do a proper job on cases brought either by the state or by individuals and organizations as permitted under the revised environmental protection law. However it is unlikely Ecological Civilization could be made into an operational concept without the backstopping provided by the rule of law, properly applied.

³⁷ http://www.iisd.org/pdf/2014/greening_china_financial_system_en.pdf

ISSUE 9. DEVELOPING A FINANCIAL SYSTEM FOR A GREEN TRANSITION

Level of investment and capacity required to successfully implement Ecological Civilization are not well understood, nor are the funding sources fully identified.

Investment and financing for environment and sustainable development are undergoing considerable scrutiny as noted in an earlier section of this report. Partly this interest is driven by the need to find substantial levels of funding for addressing climate change adaptation and mitigation. However, with the massive needs of infrastructure necessary for quality of life in burgeoning cities, and in a green transition concerning energy, agriculture and transportation trillions of dollars are needed globally, and particularly in the countries of the South.

China is more fortunate than many other nations, in part because its investments over recent decades have laid the groundwork for the even larger challenges ahead. Still China will have a difficult time to raise the roughly USD250 billion needed annually to meet its desired level of investment in green development. The Development Research Centre (DRC) of the State Council and IISD (the International Institute for Sustainable Development) are examining the current capacity of the financial system to understand green economy financial needs and how to support them in an innovative fashion. The preliminary findings in this report³⁷ suggest that the situation is still at an early stage. While there has been considerable progress regarding some mainstream aspects of green development, green finance flows remain far below what is needed, and carbon- and natural resource-intensive

investments continue to rise, in China and elsewhere.

Furthermore, in China: (1) There is not yet a comprehensive understanding of a green financial system, covering definitions and standards, institutions, policies and sequencing for specific contexts. (2) Policies to develop a green financial system can in many instances be advanced at local and national levels, but in some instances need to be established at regional and international levels. (3) Institutional arrangements, and individual and organizational competencies, are currently inadequate, and so need major upgrading to effectively advance a green financial system. All of these problems are found in other countries, so China is by no means unique.

What sets China apart is the scale of possible future action. Quite likely China may become the world's largest investor in green development. This is dictated not only by its sheer size but also for its massive infrastructure needs for rapid green urbanization, energy and transportation networks. In addition there are considerations related to investment in Clean Tech and other new green industrial development.

The transformation towards Ecological Civilization could be expensive, or not. Partly it depends on the accounting, especially in relation to the value of ecological services that can be preserved or enhanced as a consequence of a more robust relationship between ecology and economy, and in the eventual value to human health and ecosystem productivity. Unquestionably, financial investment must also benefit the economy. Then what might otherwise be seen as simply an add-on cost can then be seen as having a positive and substantial return to society and perhaps even to individual and institutional investors. This is the premise of green bonds, for example.

During the next decade the picture of Ecological Civilization approaches to development will become clearer, as will many of the experiments for funding low carbon initiatives, and other "modern" approaches to solving environment and development concerns.

The danger will be if innovation fails and the existing mainstream of conventional high energy and material use once again takes hold whether in China or in other countries. In this regard, China cannot alone be expected to do the job on its own. Investment and trade policies are very important, as is ensuring that new technologies are not kept out of markets by unreasonable barriers. International financing mechanisms and international cooperation are important bedfellows for green development, and undoubtedly, also for China's success with Ecological Civilization.

ISSUE 10. TRIMMING GREEN TRANSITION TIMES

Green transition time frames currently are longer than desired and need to be shortened while not reducing effectiveness.

As China moves into the last phase towards meeting its goal of a moderately prosperous Xiaokang Society by 2020, it should be very apparent that a truly prosperous society depends on environmental objectives keeping up with economic and other development objectives. Clearly that has not been the case, a point made throughout this paper. Transformative change for environmental protection in particular has been much harder to put in place than either social or economic changes.

For the future, it will be essential to trim green transition times substantially. It likely will not help to simply use the guideline that reduced economic growth rates will help a lot. The reason for this statement is related to the overall size and complexity of China's economy now. Even a relative small increase in the economy from year to year results in considerable environmental damage by comparison to past high growth rates of a much smaller economy, even though decreased pollution and energy intensities can help to mitigate this aspect. Environmental damage tends to be cumulative, especially if not dealt with quickly. There also are delayed and recombinant effects (PM2.5 is an example of the latter). If the benefits of accelerated green transition can be reached over five-year

periods rather than 10 or more years, there is hope that the catch-up game of environment and economy could become less serious.

Another important point to be made on this subject is the urgent need to create rapid green transitions in China's urbanization, expected to reach peak levels during the next 10 or 15 years. First, the attention given to environmentally-driven spatial and infrastructure planning could help immensely with meeting all other aspects of urban development, such as energy consumption, and reduction in use of materials such as steel and cement. Overall such planning will be linked to the need to put people first, as desired by Premier Li Keqiang and other senior leaders, since cities will be planned around criteria for quality of life, as well as economic and social considerations. Eco-city and other good city models can provide the basis for this once in a generation opportunity to accommodate in an environmentally friendly way the needs of China's peak in urban migration and development.

In general, the projected turning points and peaking of resource and energy use needed for green transitions in the economy and development should be contained to the period of 2020 to 2030 rather than later.³⁸

6. CONCLUSIONS

Environmental management has lagged behind economic growth—where targets often have been exceeded. Cumulative loads on China's environment are reaching tipping points, or thresholds, where very severe and difficult to remedy conditions become visible. Air pollution is only one of several that may be expected to reach a crisis stage in coming years. Soil and groundwater contamination may present even greater difficulties. Climate change effects may result in other environmental tipping points within China.

³⁸ See, for example, Fergus Green and Nicholas Stern. 2014. An Innovative and Sustainable Growth Path for China: A Critical Decade. <http://www.cccep.ac.uk/Publications/Policy/docs/An-innovative-and-sustainable-growth-plan-for-China-a-critical-decade.pdf>

Given that the damage to ecosystems and to health will require long time frames to fully repair, Chinese people's trust in government may be severely tested. Therefore it is important to reach turning points where it is quite obvious to the general population that problems are being successfully addressed, even if much more time is needed for the solutions to be fully realized. In particular, the "War on Pollution" must turn into a long-term effort that should define and achieve major turning points in the national struggle for adequate environmental protection. This will require time periods that extend well past 2020 in most cases.

The recent actions to Deepen Reform, stamp out corruption, promote Ecological Civilization, and to implement new concepts such as Ecological Red Lining, plus the newly revised Environmental Protection Law, provide a strong foundation for China's future environment and development. What is missing is a coherent medium term strategy for green development. A huge window of opportunity exists to define and put in place such a strategy—a Green Transition Strategy—as discussed in the conclusions noted below. Fortunately in this time of policy flux within China and the concern on the part of both the public and government for reform, there is a very clear window of opportunity to build a sustainable future. China can lead by example, and its efforts will be essential to global green growth.

6.1. Green Transition Strategy

A Green Transition Strategy should span from 2015 to 2030. While the "final dash" to a moderately well-off society can be accomplished via the 13th Five Year Plan, the real environmental marathon has started now but will take at least three five-year plans to secure. In China there are few action plans or other goals related to the environment for this longer time frame.

China will need to accelerate its progress towards an early peak in use of coal and oil during this time frame. Indeed this is a key point for transformative structural change to green development for industry, eco-urbanization, and for truly sustainable forms of expanded domestic consumption. The coming 15 years is the time to take fullest advantage of available green technologies that will shape a substantial part of China's new green economy.

6.2. Pace of Reform

Environmental progress must keep up with other fast-moving reforms. While much has been said about this, it has not actually happened during the last decade. This is a problem not only in China but globally. Ecological debts have been building rapidly, and unsustainable development patterns continue.

The most important aspect is to ensure that market based reforms are recognized more clearly to be an essential part of environmental innovation reforms. Resource pricing policies, green tax reform, and subsidy reform are needed. Innovations such as green bonds for urban infrastructure, and full implementation of national emissions trading systems, including carbon are important.

6.3. Financing

Increases in the rate of investment on environment protection must match or exceed the economic growth rate for some time to come. In part this investment is required to address the ecological debt and environmental shortfall created by past rapid economic growth. But most importantly, it is needed in order to put a halt to continued degradation, and to ensure that the huge new investments in urban infrastructure follow best practices.

While the cost of a green transition will be substantial, these costs can be shared between government and business. Moreover they likely will be much less than the cost of continued environmental degradation. The new economic benefits of a green economy and the social benefits of green development will help in the construction of an ecological civilization. The level of investment for environmental protection should rise to at least 3% of GDP. By contrast, a recent estimate of the cost to GDP of climate change in China is about 12%, highest of any large country.³⁹

A diverse set of green financial mechanisms is required. The elements include: a shift towards a green taxation system with the funds raised put back into environmental improvements; green bonds for infrastructure development especially where fees can be charged to recover costs; accelerated implementation of a carbon emissions trading system; special funds based on the polluter pays principle to cover problems such as brownfield restoration; removal of the right for cities to engage in land sale transactions that result in loss of "greenfield" development, or that are based on land reclamation in coastal areas; and new forms of environmental public-private partnerships.

6.4. Green Market Supply Chains

To achieve substantial environmental dividends from China's promotion of domestic consumption will require a different culture of consumption. The cities will make or break this element of Green Transition. Leading efforts such as Green Procurement in construction of the new Financial District of Tianjin provide important examples of what city administrations and publicly funded projects throughout China should do.

Ordinary citizens still do not have access to trust-

worthy certification of a full range of green products and other information to make environmentally-informed decisions for most of their purchases, including major ones such as appliances, furniture, and building products such as paints, and food items such as palm oil. They must have better awareness of the value of green purchasing habits, good information on the qualities that separate green goods from those that are more damaging to the environment, easy access to suitable products at reasonable prices.

Green market supply chains most often will be international in their nature and extend beyond retail sales to include the whole life cycle from procurement of raw materials, manufacturing to material recovery after use.

Environmentally sustainable consumption will be important for trade competitiveness as well. Green market supply chains should be worked into important new trade linkages being established by China. In particular, the exciting and important commitment to revitalizing the ancient routes of trade through a modern "Silk Road" connection to Central Asia and to Europe, and the "Maritime Silk Road" to other parts of Asia, the Middle East and Africa, is a special opportunity to highlight the need for sustainable development practices. It can be a good means for China to take the concept of Ecological Civilization well beyond its own borders.

6.5. Implementation of Modernized Law

The capacity to fully enforce the elements of a modernized legal framework for environment and development, and to seek fair treatment from a fully informed judiciary is necessary. Weak links in the rule of law, and also corrupt practices affecting the environment must be addressed as quickly and effectively as possible at local levels, especially provinces. Only if these measures are taken can the public play its supervisory role well. Stronger regulations for environmental planning and management require standard setting, long-term monitoring, improvement in data

analysis and communication of results in a relevant and easy to understand way. While there have been improvements, these issues are still dealt with inadequately.

6.6. Protecting Ecological Lands and Strengthening Regional Environmental Management

China is now well aware of the need to protect ecological services and therefore the concept of ecological redlining is a major step forward and builds upon decades of effort to create protected areas. Yet this new initiative may set off major battles between those who wish to protect ecologically fragile areas, and those who wish to do otherwise. Great swaths of land in China are still classified as wastelands, opening their use to almost any economic or social purpose. In reality all lands have some broadly defined ecological services. It would be sensible to eliminate the term wastelands, and to start with the assumption that unless land is already allocated to agriculture or within certain other categories for restricted use, it should be considered as part of China's ecological lands. And then further designate highly significant areas within the category of ecological red lined areas.

Taking a regional approach to addressing environmental management is one of the most important innovations required for ecological civilization. China should move in this direction on a number of concerns ranging from the existing Air Pollution Control Action Plan and other pollution plans yet to be implemented, water basin management, coastal zone and sub-regional ocean planning and management, eco-compensation, and specific regional development efforts such as those in central and western China.

It is now time to consider the entire eastern part of China as a whole for regional environmental management. Within this eastern part there should be unified planning, for example in considering regional air pollution impacts of new projects; and an integrated approach taken for economic and energy restructuring,

³⁹ Global Commission on Economy and Climate. 2014. Better Growth Better Climate. <http://newclimateeconomy.report/#>; <http://www.economist.com/news/briefing/21618682-policies-slow-down-warming-may-be-more-attractive-if-framed-ways-speeding-up-growth-try>

urbanization and mobility. A regional joint enforcement mechanism should be put in place. An integrated system of basic scientific research and monitoring should be set up to meet the regional information needs at national and provincial levels.

6.7. Innovation in Environmental Institutions

Institutional reform requires strategic transformations. Among them: a modernization of relationships between government, market and society into a multi-stakeholder governance system; unified supervision of environmental issues; and a higher degree of accountability through environmental audits. Of these matters, social governance should be given very high priority. All State Council institutions should undergo pressure tests to ensure their capacity and readiness for addressing ecological civilization and green transition priorities.

By design and capacity, or through being overshadowed by economic interests, corrupt practices and by outdated approaches, environmental protection and management administrations have long been in a weak position. They operate without adequate authority, and encounter resistance from various sectors and local governments. The construction of ecological civilization demands even more from the existing network of environmental institutions, with on-going coordination at the top level in order to provide unified supervision.

Pollution prevention and control functions and ecological protection functions that currently are scattered across various departments and administrations should be placed into strengthened bodies nationally and provincially with more adequate authority, plus human and financial resources required to successfully lead the “War on Pollution” and other high priorities for environmental action. One such priority should be a strengthened environmental impact assessment process made less vulnerable to corrupt

practices and with the additional focus of strategic assessment of policies and major plans.

The accountability of officials in this strengthened system should be judged in a fair way based on an environmental audit system that can serve the dual purpose of measuring progress on meeting environmental objectives and on individuals’ performance. The results should be based on independently verified information, and using well tested approaches already available internationally. The results of such audits should be reported to the National People’s Congress in addition to other bodies of government and the CPC. And, of course, they should be accessible to the public.

6.8. China Environment and Development Outlook

The information base currently published through government is not broad enough in scope, especially for some pollutants and for the new efforts that would part of a Green Transition. Furthermore, the information presented is not necessarily in a form that is usable or trusted by members of the public. An Outlook on Environment and Development for China should provide a coherent picture of progress towards achieving an Ecological Civilization. This will require a thorough look at existing, generally inadequate indicators, and determine a robust set of more appropriate ones. It is essential to strengthen the quality of monitoring and analysis in order to provide much more credible information. The technical tools to do so are now much more available than in the past. In particular, spectacular gains have been made on crucial information for spatial planning and management at a very fine-grained level. A properly done national Outlook will have to rely on a combination of modeling and scenario development that has so far not been fully developed in China in relation to topics such as Ecological Civilization, and a comprehensive and finely worked out examination of the relationship for environment and economy.

IV. GREEN GOALS, GOVERNANCE CAPACITY AND INNOVATION – ‘MIND AND BRIDGE THE GAPS’¹

1. INTRODUCTION

We are on the cusp of a new, very pragmatic level of environment and development action globally. The new UN 2030 Agenda for Sustainable Development sets out a challenging set of goals and targets.² Hopefully there will be a strong outcome at the Paris UNFCCC meeting in December. These calls for action are being driven by the emerging green financial sector, leading businesses in fields such as clean technologies and energy innovation, and by the interests and needs of both industrial and developing nations. More than ever before, China is a prominent green development player domestically and internationally. Its commitments include substantial new financial inputs towards South-South Cooperation and China-US commitments on GHG reduction. There are assurances that China’s flagship new international initiatives will be green from their start, including the BRIC Bank headquartered in Shanghai, the Asian Infrastructure Investment Bank (AIIB), and the ‘One Belt One Road’ (OBOR) effort to bolster trade and development along the land and sea ancient Silk Road routes.

Above all, China has signaled very clearly by recent domestic policy announcements and actions that it will show great perseverance in shaping new relationships for an Ecological Civilization, with much more emphasis on integrated and coordinated approaches starting with the 13th Five Year Plan (2016-2020).

Last year CCICED called for better understanding

of the ‘turning points’ that could move China away from tipping points such as the air pollution crisis and towards improved environmental and ecological conditions. The major environmental problems now present within China have become leadership’s key concerns threatening social stability, human health and ultimately the achievement of development goals. Thus it is reasonable at this stage of national development that environmental protection should receive considerably more attention in China than in some other countries.

1.1. 2015: A ‘Blockbuster’ Year for Environmental Initiatives

Indeed, 2015 has been a ‘blockbuster’ year for environment and development reform within China. The revised Environmental Protection Law became effective on 1 January 2015. An Action Plan on Water Pollution has been initiated and the Air Pollution Act has been strengthened and will become effective in January 2016. Each month there have been advances in environment and development policy and practices, often linked in some fashion with the advice provided by CCICED in past years. Details of these advances are provided in the 2015 Policy Progress report tabled at this year’s CCICED Annual General Meeting (AGM). There is evidence that China’s War on Pollution is working, at least with respect to air pollution. And

¹ The Issues Paper is produced for each CCICED Annual General Meeting by the CCICED Chief Advisors, Dr. Arthur Hanson and Prof. Shen Guofang, with inputs from various sources including the Chief Advisor’s Group. This is the 14th such document.

² There are 17 goals and 169 target actions agreed upon by the United Nations General Assembly summit on 25 September 2015. See: Transforming our world: the 2030 Agenda for Sustainable Development. <https://sustainabledevelopment.un.org/post2015/transformingourworld>

there are many other promising signs of change, not the least of which is the remarkable initiative to bring about regional cooperative planning and management in the Beijing-Tianjin-Hebei region (Jing-Jin-Ji) covering almost 10% of China’s population.³ This will help to create more liveable cities and emphasize regional air pollution control.

Increasingly investment regarding the environment is seen to be compatible with, or part of, the rationale for the New Normal of lower economic growth rate but with higher value added and better efficiency. Environmental matters are now anticipated to be one of the key drivers of China’s new, high value economy of the future. The new economy will showcase innovation solutions based on green technology, improved green planning and management across many sectors, and with greater emphasis on the service economy.

The approach towards the process of green development is termed ‘greenization’ by Chinese leaders. The CPC Political Bureau at a meeting chaired by President Xi Jinping on 24 March 2015 introduced a guideline on conservation culture and highlighted greenization of production, the economy and lifestyles—with a focus on lowering resource consumption, boosting

green industries and promoting a low-carbon, thrifty lifestyle.⁴ The Politburo leaders noted that greenization will contribute to “national soft power” and provide “a new advantage in international competition”. This announcement has been followed up with the release of two major documents providing more detailed direction on reform for ecological civilization, also sometimes referred to as ecological progress.

The first document, released in April 2015, was Opinions of the Central Committee of the Communist Party of China and the State Council on Further Promoting the Development of Ecological Civilization⁵ In September 2015 the CPC and the State Council released an integrated reform plan to provide medium-term policy direction (presumably to about 2030) for constructing China’s ecological civilization. This document, which is being provided to all CCICED Members by the CCICED Secretariat, is quite remarkable in its scope and in the magnitude and difficulty of tasks.⁶ It proposes transformative changes of eight key systems (see Box 4-1). The framework of ecological civilization reform should be a potent driver since it provides for a longer term and integrated approach. The strategy can take off quickly if it is well embedded within the 13th FYP,

Box 4-1. Eight systems to be reformed for China’s Ecological Civilization.

The September 2015 Ecological Civilization Reform Plan document identifies eight systems in need of reform and strengthening:

- *Property rights for natural resource assets;*
- *Spatial planning system;*
- *Development and protection of territorial space;*
- *Regulating total consumption and comprehensive conservation of resources;*

³ Introducing China’s Future Megalopolis: The Jing-Jin-Ji <http://blogs.wsj.com/chinarealtime/2014/04/04/chinas-big-ambitions-for-the-jing-jin-ji/>;

⁴ Chinese leaders push for ‘greenization’. http://news.xinhuanet.com/english/2015-03/24/c_134094125.htm

⁵ Sam Geall. July 2015. Interpreting Ecological Civilization. Parts 1 (Vision) , 2 (Policy) and 3 (Standards, Mechanisms and Assessment). <https://www.chinadialogue.net/article/show/single/en/8018-Interpreting-ecological-civilisation-part-one>

⁶ full text of the Integrated Reform Plan for Promoting Ecological Progress is available at: http://english.gov.cn/policies/latest_releases/2015/09/22/content_281475195492066.htm; also see Dimitri de Boer. China’s ‘Ecological Civilization’ Sets China on a Greener Course. <https://www.chinadialogue.net/article/show/single/en/8229-OPINION-China-s-Ecological-Civilisation-sets-China-on-a-greener-course>

- *Payment-based resource consumption and compensation for conservation and protection efforts;*
- *Environmental governance system;*
- *Market system for environmental governance*
- *and ecological preservation; and*
- *Evaluation system for officials’ ecological conservation performance and responsibility for ecological damage.*

These eight systems are described primarily in management reform terms rather than institutional terms, since there is much negotiation and work ahead to prepare for the follow-up institutional changes and reforms.

1.2. Performance Gaps

Despite the policy progress, plus some hopeful signs of ecological and environmental improvement, important gaps between expectations and performance still exist and, for some matters, are worsening. None could match the immediate drama and overt tragedy of the Tianjin chemical warehouse explosion in August 2015.⁷ The cost is high in terms of human loss and economic cost (measured in tens of billions of RMB). Yet the longer-term costs of persistent pollution such as urban air pollution are much higher still.⁸ The costs to Chinese society of climate change and poor land use practices such as soil and groundwater pollution are very high and likely will continue to grow. In fact environmental performance gaps are poorly understood and measured. Likely their full impacts are understated.

The capacity to fulfill environment needs is limited by institutional, financial and human resource shortfalls. Innovation efforts, whether technological, managerial or other forms, must be strengthened. In short, it is necessary not only to ‘mind the gaps’ so that progress on environment is even across a wide range of problems, but also to ‘bridge the gaps’ so that China can fully address its green development goals in a fashion that leads to a value-based, transformative ecological

civilization. Fortunately, this effort is entirely consistent with the new global aims such as the UN Sustainable Development 2030 goals, and a maximum 20°C temperature rise.

The path ahead will depend upon a much greater investment on environment and development, with only a fraction of the funding coming directly from central government revenues. Thus innovative financial mechanisms are needed. The rule of law on environmental matters is still relatively untested, and needs some new laws plus considerable reform of existing sectoral laws. Enforcement must be strengthened and attention given to market based laws and regulations that will be of a more enabling nature. This is a decade(s)-long challenge. Overall, there are many shortfalls in governance capacity.

1.3. 2015 CCICED Theme and Activities

Enabling Governance Capacity for Green Transformation is the 2015 CCICED AGM theme. Green governance requires an interactive relationship among government, enterprises and civil society (social organizations), with full recognition of responsibilities and approaches of each. Enabling conditions are needed so that all sectors/bodies noted above are able to make their full contribution.

⁷ China’s State Council Probes the Tianjin Explosions. <http://thediplomat.com/2015/09/chinas-state-council-probes-the-tianjin-explosions/>

⁸ <http://newclimateeconomy.report>; Feng Tei and Frank Jotzo. 2014 Reaping the Economic Benefits of Decarbonization for China. https://ccep.crawford.anu.edu.au/sites/default/files/publication/ccep_crawford_anu_edu_au/2014-08/ccep1413.pdf

In reality the relationships are still at a formative stage for the most part, with limited precedents for action. Information sharing is relatively limited still, and, as often noted in past CCICED studies, the quality of information remains a limiting factor. The move towards a market-based environmental regulatory approach is far from reality so that incentives are often weak or poorly managed. And in the case of the existing command and control system, enforcement policies are only beginning to be fully functional. Green governance capacity at national and local levels is still limited. Therefore a Task Force (TF) on National Governance Capacity for Green Transformation was tasked with assessing the current situation and recommending improvements. This has turned out to be a very difficult task.

This Task Force has been complemented by two others. The TF on Green Finance Reform and Green Transformation was initiated at precisely the right time, since this issue has received a great deal of attention internationally⁹, and that work has spilled over into China¹⁰. This TF has consolidated existing work and introduced its own ideas in order to provide recommendations that take China’s situation and characteristics into account. A TF on Rule of Law for Ecological Civilization will provide its initial recommendations to the 2015 CCICED AGM. However this activity is the first major effort by CCICED to examine legal reform in a comprehensive way. The task is proving to be very complex. The legal work will continue, with a final report of this TF at the 2016 CCICED AGM.

In addition CCICED has carried out three Special Policy Studies (SPS) this year. These more specific topics are all of high significance at the present time:

Eco-Environmental Risk Management; Soil Pollution Management; and Coordinated Actions for Addressing Climate Change and Air Pollution. All have provided insight into green governance capacity issues and in particular complement the work on Rule of Law, since they identify specific needs for regulatory strengthening.

From June 8-10, 2015, CCICED convened a meeting in Beijing specifically designed to tap into various sources of international experience relevant to the 13th Five Year Plan. This meeting brought together a very senior group of Chinese and international participants, including several CCICED Members. The participants met with CCICED’s Chair, Vice Premier Zhang Gaoli.

The topics introduced above are considered in more detail below, along with nine issues of special note.

2. GREEN GOVERNANCE CAPACITY: CHALLENGES AND PROGRESS

2.1. Challenges

What makes the green governance challenges in China so complex, worrisome to government, and so difficult to resolve? In Box 4-2 examples are provided where reform is needed or is already underway. Such examples provide a partial answer to the question. Reform involves a full set of governance issues in every case: institutional changes, rule of law, better public supervision of development, and accountability for efficiency and effectiveness—full value for the large sums of public and private expenditure that will be spent on environment and development improvements.

Box 4-2. Examples of on-going environmental governance problems in China

- *Magnitude of problems; and slow implementation for Water and Soil Action Plans in the War on Pollution arising from conflicting goals and ‘turf’ wars among ministries.*
- *Obvious problems with environmental risk planning and management; and lack of coherent national or local systems;*
- *Corruption in some environmental decisions such as EIA and inadequate oversight function;*
- *Limited supervisory role of the public, with inconsistent signals from local governments in particular; and ineffective working relationships between enterprises and government on environmental matters; overlapping and unclear mandates of government agencies;*
- *Divergence in environmental objectives between central and lower levels of government;*
- *Inadequate levels of staffing, and mismatched skills within some government units; and*
- *Reliance on administrative measures rather than fully developed Rule of Law.*

There are a number of gaps where considerable attention will be needed in coming years. Notably, the gaps are not always about staffing, although it is certainly difficult to believe that the tasks ahead can be fully carried out without additional staffing in institutions such as Ministry of Environmental Protection (MEP). Even if there is a shift towards use of the market in regulations, and various self-policing efforts, it is essential to build further competencies nationally and at local levels.

What is essential is to recognize that government must work effectively with non-governmental organizations, community and enterprises, plus universities, international bodies, etc., in order to effectively address environmental governance. Much of the effort will have to be directed to creating enabling conditions so that all of the sectors/bodies above are able to make their full contribution.

More generally, capacity gaps are substantial in relation to the following general environmental governance matters:

- Communication;
- Credibility, trust and perceived honesty in environ-

mental transactions;

- Institutional strength and coordination among institutions;
- Self-sustaining green financial mechanisms;
- Knowledge for adaptive planning and management;
- Performance: efficiency and effectiveness, timeliness, comprehensiveness.

There are other items that can be added to this list such as capacity to bring innovative technologies quickly and smoothly to the marketplace; capacity to promote and regulate sustainable consumption; capacity to monitor and control environmental health risks; and, in general carry out integrated regional ecological, natural resource and environmental management. This last problem is of considerable significance when it comes to linked issues such as land-based sources of marine pollution, and planning for urban regions such as Jing-Jin-Ji.

Many of the weaknesses and gaps have their roots in the overall governance system and in the accompanying financial mechanisms and legal framework.

⁹ UNEP Inquiry Report. October 2015. The Financial System We Need. Aligning the Financial System with Sustainable Development. 84 pp. <http://web.unep.org/inquiry>

¹⁰ See IISD 2015. Greening China’s Financial System. <https://www.iisd.org/publications/greening-chinas-financial-system>

Yet, rather than limiting change to patch up existing arrangements, considerable work is needed to identify innovative operational policies and administrative measures that are as much as possible based on transparent and market-based approaches. Such points are often considered most important in China’s economic reform, but they equally apply for environment and development concerns.

2.2. Progress

The good news is that for many issues, progress is being made, and this is making the outlook for green development quite positive. The examples below are indicative of why we should hope for more rapid progress in the coming five years:

- Enormous investment in War on Pollution;
- Strong emphasis on Green Development, Greenization and Ecological Civilization;
- Assurances that in the 13th FYP environment will be given major emphasis and with emerging signs of mid-term strategy;
- Revisions to environmental legislation, with enforcement action strengthened;
- Anticipated peak in coal use, and some indications of possibility for advancement of peak usage dates for other fossil fuels;
- Green development emphasized for China’s international cooperation.

What makes the level of action on environmental matters especially significant this year is that they have taken place during a difficult time economically and administratively for China’s central government. Challenges posed by the need to address a slow-down in economic growth, stock market fluctuations and bureaucratic slowness in dealing with structural changes have not moved the government away from

its focus on environmental improvement.

In reality, arising from moderate economic turbulence and structural adjustment there may be some environmental benefits. The consistent call from leaders for further stimulus of the service economy should reduce energy consumption per unit of GDP. The concern for improved quality of development includes targets related to the environment. Renewed efforts to enhance market-based decision-making can be helpful if they include environmental regulations in the mix. In addition, technology, institutional and management innovation and deepening of economic reform will provide both direct and indirect benefits to environmental management and governance by enhancing efficiency. There also is evidence that the anti-corruption drive is proving to be of value for some aspects of environmental planning and management.

3. BRIDGING THE GAPS BETWEEN GOALS, GOVERNANCE CAPACITY, AND INNOVATION

3.1. Aspirations and Capacity

Given the growing emphasis on green growth and green economy globally, there should be many new possibilities for green innovation that can eclipse the current efforts for Clean Tech and other prominent goals of the past decade. The framework of Ecological Civilization should be a potent driver since it provides for a longer term and integrated approach to unleashing this potential. China can rely on the mutually supportive aspects of a growing and greener domestic consumption market plus increased green international trade opportunities.

China continues to set goals that are intended to solve specific problems, but in the process open new economic and social opportunities for its overall development—the case for low carbon urbanization, circular economy, green chemistry for industrial development, and building environmental cooperation

into its new trade and development plans such as OBOR and the AIIB.

These aspirations continue to be pushed at high levels but governance capacity is still a major issue in their actual implementation. Technology innovations may be moved into commercialization quite quickly as was the case for both solar and wind renewable energy. However this innovation has encountered considerable difficulties since the smart grid technology implementation has proceeded more slowly. And institutionally, there has been foot-dragging on the part of the supply chain operators who prefer to deal with more traditional energy suppliers and specifically coal suppliers. Internationally, China has met trade challenges that have hindered sales abroad of its renewable energy equipment. Thus the reality is that while installed capacity of the most innovative renewable energy sources has increased markedly, their actual contribution to green electricity supply may end up being below projected levels, a blow both to pollution reduction and to GHG emission control. This gap may become even larger as the level of installed capacity grows.

Concerning another green initiative—the widespread use of electrical vehicles (EVs)—the plans to replace government fleets with such vehicles and the subsidies provided for private owners will present major challenges. Recharging stations and their networks will require very careful planning to handle demand adequately. Also there are questions related to vehicle life cycle environmental impacts, especially those related to production and disposal of the massive battery packs. Unanticipated consequences of what may be a remarkably disruptive technology and the appropriate regulatory framework undoubtedly will arise. China has the opportunity to address these issues even if they occur at a scale that few other countries are likely to experience, since the government desires a quite rapid changeover for both environmental reasons, and to ensure that China is a leader in the full implementation of this transformative change.

Other examples could be provided, for example, the various eco-compensation programs in providing adequate safeguarding and improvement of ecological services. China now has the largest commitment of such programs in the world. The institutional framework is not adequate to ensure either optimal efficiency or effectiveness. In particular, there is not an adequate linkage of those receiving ecological service benefits (e.g., downstream cities) with those entrusted with safeguarding the benefits (poor upstream farmers). Similar examples bedevil sustainable management practices in nature reserves throughout China.

Newer programs present particular challenges for example the effort to establish ecological functional zoning and redlining throughout China. This topic was the subject of recent CCICED work and so will not be explored here. Another recent Chinese commitment is to put in place by 2017 a national carbon cap and trade system based on current provincial-level trial efforts. This system may become the largest such national system in the world. The administration will be complex, and potentially open to abuse if not carefully handled at sectoral levels. The point here is that for many of the measures contemplated in China’s future environment and development relationship there are weaknesses and gaps in the overall governance system and in the accompanying financial mechanisms and legal framework. Thus important work is needed to identify innovative operational policies and administrative measures that are, as much as possible, based on transparent and market-based approaches.

3.2. Governance Capacity Criteria

Governance can be examined through many criteria. In Box 4-3 these criteria are clustered into what might be called a ‘standard approach’ that could be applied to any set of capacity concerns and a ‘green alternative approach’, which covers criteria that are more specific to environment and development. Both lists are indicative rather than complete. A mix drawn from both sides of this box is desirable in order to strengthen green governance capacity in China.

Box 4-3. Standard and green alternative approaches to environmental governance issues.

Standard Approach

Law, regulation & compliance
Institutional size and clarity of mandates
Leadership ability and commitment
Skills development
Financing magnitude and distribution efficiency
Other incentives
Technology fixes and innovations

Green Alternative Approach

Development supervision by the people
Collaborative planning & management
Zero impact development
Green taxation
Sustainable consumption and production
Green investment
Integrated and coordinated planning
Sharing Economy

3.3. Environmental Governance 2015-2030

A simple theoretical framework for environment and development capacity is shown in Figure 4-1. It draws together international experience as it has played out in various countries in Europe and elsewhere since the 1970s. In early years emphasis was placed on seeking compliance to detailed regulations, often mainly through command and control laws. This approach is necessary to a point but stifles innovation and certainly can have a dampening effect on those who wish to go well beyond what is specified by government, since there is little incentive, but perhaps uncertainty and even punishment in the marketplace for those who might wish to excel.

The next level is recognition that addressing environmental risk management can produce not only direct benefits, but also win support for new ways of approaching environmental problems. Thus, Responsible Care Programs sprung up around the world for businesses, often with a push from insurance and financial sector bodies who refused to deal with environmentally harmful situations. Within government, through proper environmental assessments, risks are reduced on development projects, and investments made more productive.

At another level, there are enabling measures to

ensure new, non-polluting technologies, renewable energy and many other innovative solutions help to solve environment and development issues in ways that are good for economy and environment.

China is at a stage where all three levels are in play, although as various explosions at chemical plants have demonstrated this past year, the matter of environmental risk planning and management can be very weak—at least for some industrial operations. Furthermore, building an environmental risk system mainly around acute incidents may continue the trend of inadequate attention to cumulative risks. The ability to innovate with sustainable technologies is far from fully functional. And, the ability to monitor and enforce existing environmental laws and regulations is still relatively weak. Thus the great challenge in coming years is to find the right balance among these three interacting macro-strategies.

Presumably over time the value of China’s major investment in innovation will pay off handsomely since it may become much easier to successfully bring new products and methods to the marketplace. Hence China’s national and local governments, its enterprises and, indeed, Chinese society should prepare to go quite far beyond what today might be perceived as difficult or even impossible to achieve.



Figure 4-1. Capacity levels for environment and development success.

Another way to look at governance capacity of a society to address environmental problems at various stages of economic development is through consideration of the Environmental Kuznets Curve (see Figure 4-2). This often-maligned (for good reasons) conceptual tool suggests that at a certain level of GDP or other measure of societal wealth there will be much greater demand for environmental quality. Certainly China is at or close to such a state at present. Thus environmental degradation should start to decline, with various turning points reached in the coming 5 to 15 years. It would therefore be fair to examine how quickly acceptable levels of environmental quality could be reached over each of the coming five year periods to 2030 and what environmental governance measures might accelerate the pace, or would the pace be determined largely by level of per capita income? At best this conceptual approach is likely to be quite crude.

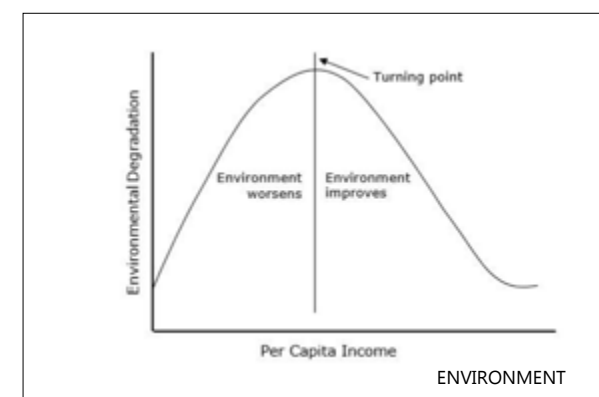


Figure 4-2. Environmental Kuznets Curve

4. 13th FIVE YEAR PLAN CONSIDERATIONS

Most critical over the next five years is how various turning points for environmental improvement can be achieved. This must be done in a credible and enduring way so that people recognize the improvements as real and as contributing to the quality of life. How to fully address the great, still largely unmet need for adequate environmental protection action within all parts of China is a long-term issue. Thus a mid-term strategy is required, certainly from 2015 to 2030, and likely well beyond. Environmental progress made during the 13th FYP will be the opening for this longer-term success. The 13th FYP is a defining moment in the history of New China. A transition towards a modernized, much richer country; well capable of setting out the future its citizens want. By 2020, the aim is for all parts of the country to be ‘moderately well-off’ economically and in other ways.

The 13th FYP will be a time when China’s GDP is projected to rise above USD 10,000 per person. The higher level of income will be spread more evenly. Inevitably comparisons will be made with other countries at that same time in their economic development stage. However China will need to do more than achieve such a benchmark since it is already leaving the stage of being a low-cost workshop for the world, especially along in the provinces along its relatively rich east coast. These provinces, some of which are among the most polluted, need an accelerated path to better environmental quality.

The 13th FYP offers the opportunity to address the downside of its recent past—a legacy of pollution, over-exploited natural systems, and situations of unsustainable development in both cities and countryside. It will be an opportune time for incremental pressures on the environment to be relieved. Currently, the imbalances between environment and the economy in China are perhaps far worse than those experienced in parts of Europe say in the late 1950s and 1960s. Accelerated environmental action during

the 13th FYP implementation could take China well above environmental conditions that many other OECD countries experienced at similar points in their economic development during the 20th century industrial age. This is not a prediction, rather it is a hope or anticipation.

At CCICED’s June 2015 meeting on 13th FYP preparations, participants contributed a wide range of suggestions, including those noted below. The conversations reflected a considerable base of experience covering both international and national experience relevant to China.

Take a Coordinated and Comprehensive Approach

- A ‘whole of government’ approach is needed in order to align action towards green development and ecological civilization. Integrate across government departments and agencies; also strengthen vertical linkages on environmental matters, ensuring local government has better means to successfully implement central government objectives. Set clear national objectives for environment and development rather than depend upon individual departments.
- Environment must be made a core pillar of development and as a stimulus to China’s future growth.
- Ensure environmental issues are tightly linked to, and aligned with, overall deepening of reform.
- Now is the time to seek complex goal integration so that important development agendas do not collide with each other during their implementation. Rather, they should be complementary and synergistic.
- Set “stretched targets” that may be beyond immediate reach, but can take advantage of innovation.
- Establish improved cross-regional cooperation on pollution.
- Ensure binding targets are set for all pollution ac-

tion plans. Overall, set clear milestones for 13th FYP and demonstrate how these can be of value for initiating longer term action.

- Air quality and pollution control should be considered together in order to optimize outcomes in an efficient manner.

Strengthen and Rationalize Institutional Roles

- Match fiscal strength to administrative needs and scale of activities, but avoid overinvestment. Work within fiscal capacity to avoid creating an excessive debt burden, especially at local levels where much environmental infrastructure expenditure must take place.
- Clarify institutional arrangements for separating protection and exploitation aspects of natural resources and environment issues. This is especially important for water, forests, and for marine and coastal issues. Independent supervision of environment and development should be improved.

Accelerate Pace and Efficiency of Implementation

- Focus on implementation effectiveness and efficiency, including zero pollution strategies, great reduction in energy and resource use (“Factor 10” in some instances), a green bottom line for industries, and green market supply chains.
- Move more quickly from ‘pilot project to general practice’ and from ‘practice to habit’.
- Shift from ‘learning to leading’ in general approach and in various innovation efforts.

Link Economy and Environment

- Build into the 13th FYP a new normal model of economics that is respectful of environmental needs. Seek a model that does not trade off either the economy for environment, or environment for economy.

- Focus greater attention on jobs and environment potential. Shift tax burden away from labour and onto environmental polluters.
- Use greenization as a mechanism for change management.

Enhance Natural Capital

- Consider nature as “green infrastructure”, for example coastal wetlands as a frontline defence against storms and for water purification.
- Propose better means to recognize and strengthen role of natural capital in development. Ecological redlining is an important element and should be profiled in the plan.
- Strengthen integrated ecological civilization indicators such as ‘life indicators’ related to people feeling better off.
- Build programs for business, government and the public to understand dependence on their natural capital.
- Focus on ecological restoration and natural resources renewal, including biodiversity.
- Strengthen eco-environmental accounting in national accounts.

Diversify Regulatory Approach

- Develop regulations that cannot be easily avoided, ignored or overruled.
- Enabling legal framework is required in order to encourage citizens and enterprises towards sustainable practices. Strengthen and expand green procurement by all government-sponsored entities. Supporting the best rather than fighting the worst is a way towards successful transformative change.

- Develop market-based approaches to environmental regulation and management, including appropriate mechanisms to address market failure. Recognize the needs of both entrepreneurs (supply) and consumers (demand) in market based regulations and incentives.

- Build cap and trade pollution control initiatives in an adaptive fashion since their institutional arrangements and performance may be poorly understood at the start.

- Continue to strengthen green taxation initiatives. For example, carbon cap and trade is not mutually exclusive from carbon tax needs. They can be used together.

- Extend EIA law and regulations revision to all initiatives, not only construction.

Expand Efforts in Business, Financing and Investment

- Strengthen role of business, whether in production, finance, construction, tourism, or other fields such as environmental technology, as a partner of government for implementing green development.
- Expand use of PPP models (Public Private Partnerships).
- Encourage new green products as well as production efficiency and pollution elimination.
- Establish a green investment forum, a safe place for business and others to formulate advanced approaches for the business community to develop “enlightened self interests” and to uplift their greenization efforts. Could be tied to G20 meeting in 2016.
- Engage leading companies in order to change a whole sector.

- Focus considerable attention on greenization of SOEs but also how through actions of big companies, SMEs can benefit, for example through assistance on establishing green market supply chains.
- Improve procedures for scaling up investments from pilot-level to full implementation; debt financing mechanisms.
- Continue move away from high consumption, high pollution industry rather than transfer such effects to other parts of the country.
- Should enhance the overall thrust of development towards higher productivity and efficiency across the board. Not sufficient just to get rid of the bad, must also foster the good.
- Focus investment more clearly around sustainable green growth opportunities.
- Seek investments and standards that will foster genuine green leaps forward, for example CAFE (Corporate Average Fuel Economy) standards leading to breakthrough technology for lighter automobiles.

Improve Sectoral Action

- Focus greenization attention particularly on three key areas: mobility, buildings, and food.
- Make agricultural modernization a key contributor through: expanding role of green chemistry, improved processing, incentives for retirement of stranded assets such as some older agro-chemical industry.
- Focus greatest attention on newly emerging industries rather than supporting sunset industries.
- ‘Made in China 2025’ should have green goals for product quality and manufacturing improvement. Will require extensive commitment to green certification processes.

- Some areas for special attention include: water investments, energy efficiency, distributed power, housing, natural gas infrastructure, and parks.

“Going Green While Going Global” and “Planetary Partnerships”

- The BRICS Bank, AIIB and One Belt One Road (OBOR) should have state of the art green strategies.
- Seek environmental convergence among partners, for example on circular economy.
- Begin to shrink total ecological footprint of China.
- Innovation strategies will require greater use of international partnerships, CCS (carbon capture and storage) is an example. In some cases such partnerships could be valuable examples of S-S cooperation, for example in desertification.
- Public health and environment deserve to be considered as a higher priority for international cooperation on the part of China and other countries.
- Link Ecological Civilization and Planetary Boundaries as a framework for international cooperation.
- Consider implications for China of the G7 pledge to complete decarbonization of their economies by the end of the 21st Century.
- China should give priority to the 40 to 50 African countries seeking industrialization to foster green industrialization.

During their discussions with Vice Premier Zhang Gaoli on 9 June 2015, participants of the CCICED meeting noted that the opportunities associated with green development eventually will outweigh the challenges faced today. The 13th FYP is therefore a pivotal point in the transformative change towards ecological civilization. It is essential to set ‘stretch targets’ with the longer-term in mind. Green development must be

seen as an important source of new jobs and the new economy. Governance capacity must be built within business and in the whole of society, not only within government. China is to be applauded for intending to make its new international approaches including the AIIB and OBOR compatible with green development.

The Vice Premier noted that “China will never export pollution to other countries” and that there is every reason to want green investment, with future urban development, for example, to be held to a higher standard. Vice Premier Zhao holds high hopes for China’s future environment and development, and for CCICED’s continuing contributions to this effort. He affirmed China’s strong commitment, domestically and internationally for the 13th FYP and beyond, to green development and to low carbon growth —“the right way to achieve national strength and to be accountable to our children’s children”.

5. NINE ISSUES

5.1. Equal status in decision-making needs to be given to environment as to economic and social matters.

CCICED has discussed this matter at the level of the Premier and Vice Premier, and placed it within our recommendations over the past several years. While generally accepted and with many initiatives now underway or planned, signals are still somewhat ambivalent. As an example, adding the word environment in the Five Year Plan subtitle (currently the economic and social development plan) would be a very important signal. It is unlikely that this will occur for the 13th FYP. However this is not the only change that would be helpful, as the examples below illustrate.

- The revised Environmental Protection Law is not a Basic Law and therefore lacks the full weight of some other legislation, by comparison to the fundamental law guiding agriculture, for example.

- Inadequate national and local systems of accounts and indicators. While China’s central government has considered incorporating additional environment and development indicators in its accounting and decision making, plus downplaying to some extent the great significance of GDP as a measure of progress and goal attainment, so far green development measurement remains a patchwork quilt rather than a full green system of accounts and indicators.

- Impacts of environmental degradation in decision-making and in development monitoring are often seriously underestimated or even remain unknown, and therefore not given full recognition by comparison to social, economic and other development factors. Of particular concern are: environmental impacts on human health, full understanding of problems related to groundwater, soil contamination, trans-boundary impacts, and loss of ecological goods and services. Also for many projects during and after their completion.

- Unfunded environmental liabilities (e.g., soil pollution, groundwater depletion and air contamination, legacy mining and industrial sites, and land-based sources of marine pollution) are prevalent throughout China.

5.2. A 2015-2030 national environment and development legal reform plan is needed.

It will certainly take much more than a decade in China to reach a satisfactory level of legal revision to catch up with the efforts of the EU and some countries such as the USA, Germany and Australia on environment and development rule of law frameworks. Meanwhile environmental lawmaking will continue to evolve globally in response to frameworks for climate change, biodiversity protection, Law of the Sea, trade and environment, and various other aspects of sustainable development where China has an interest and that require domestic law adjustments to be compatible.

While China has made some important strides, it has been a slow process since reform of the whole legal system is involved, including the judicial apparatus that will accompany a proper rule of law approach. Legislative bodies such as the NPC are not well equipped in terms of their budgets and capacity to work at the pace needed for producing a whole reform package. In recent times it has taken periods of several years for laws to be passed. For every reformulated or new law regulations are required to make the law enforceable, and often other laws need to be updated. With the recent emphasis on ecological civilization and on market-based reforms, there will be pressure for additional laws and revisions. It will be helpful to have a full plan to address these legal reform needs from a strategic perspective.

The second part of legal reform is the need for a more independent judiciary, and operating procedures to make the system more accessible to China's citizens. Over the past year or two, progress on this effort has taken place, including the initiation of environmental courts, with judges specially trained for such needs. As well, the courts are likely to be much more busy as enforcement measures are tightened under the environmental laws now in place.

A third component of legal reform is to provide enabling conditions for many of the emerging technologies and other aspects of modern business development in China. These needs range from environmental issues related to the many new investment and trade agreements being signed by China, the regulatory aspects related to intellectual property rights to the many new environmental technologies, plus the necessary legal frameworks for such technologies to thrive in China and abroad, for example, in the coming revolution of electric automobiles.

Some examples of specific legal issues include the following:

- By 2020 could there be a basic law on environment and development?

- Finding the right balance and complementarity between existing command and control laws and market-based laws and regulations that will stimulate greater participation in green growth and development by enterprises, the financial sector, and others who respond to incentives.
- The proposed national cap and trade program for carbon emissions is an example of a new type of environmental solution that will require very carefully prepared legal adjustments, and likely a considerable commitment to monitoring performance, potential fraud, and other matters.
- The need for a major effort to harmonize various sectoral laws such as water use with environmental laws; and to harmonize evolving international legal frameworks such as for climate change with national laws and regulations.
- It is essential that the primary goal of protecting public interests such as health and safety, and ecological services not be lost during legal reform. This has happened in a number of instances in some other countries, often due to intense lobbying by vested interests.
- Environmental law thrived in many OECD countries during the 1970s onward because the courts recognized the standing of environmental groups and their lawyers. Especially in the USA, this became an important, even essential element of the environmental regulatory system. China will need to establish where in the spectrum of rule of law and public participation it should place its efforts on opening its courts for citizens concerned about environmental progress and problems.

5.3. Coherent administrative approaches are still lacking for environment and development.

It is possible with the new Reform Plan for Ecological Progress that more rapid strides for administrative reform on environment and development can take

place. However proceeding to do so in an integrated fashion for the eight systems in Box 1 is highly demanding. Especially so, given that there will ‘pushback’ from many existing agencies, all seeking their own strengthening. Administrative reform is not simply consolidating departments and agencies into bigger units, or in establishing a substantial number of new coordinating entities such as leading groups or commissions. The reform requires fundamental effort to ensure that regulating bodies for environmental protection are separated from those tasked with development and exploitation of natural resources. The role of development supervision by local people, especially in areas of sensitive biodiversity and environmental conditions, and where substantial investments in eco-compensation are being made, needs to be strengthened as part of the administrative system. The following examples are among the most critical.

- Need resolution of fragmented vertical and horizontal authority for most types of resource and environmental concerns. It is quite possible to pick and choose among available administrative measures to find the most favourable for specific interests.
- Separation of environmental protection and exploitation functions needs to be secured in government nationally and locally.
- The Ministry of Environmental Protection (MEP) is not well enough positioned or staffed by comparison to environmental protection agencies in other leading countries. This is an important reality that should be addressed urgently so that staffing becomes consistent with level and complexity of responsibilities. If this ministry were to take on the additional responsibilities of green development, the need for a greater range of expertise would be even larger.
- Environmental oversight functions (e.g., for performance auditing, EIA and risk management, environmental health and safety) are scattered throughout

government, and with limited connections between levels of government. This problem will grow in magnitude as more effort is put into the War on Pollution and new programs for Ecological Civilization, etc.

- The current effort to address corruption problems within government and business in China is highly relevant to a system that in the past has relied heavily on administrative measures with a high degree of individual discretion but without full accountability. It is necessary to tackle corruption issues for any number of reasons and certainly for addressing environmental matters. Environmental risks increase with corrupt practices, EIAs become of less value in decision-making, and public skepticism heightens with resulting social concerns. Sometimes corruption is considered the outcome of “alliances of power and money”. Good administrative practices can break such linkages and rebuild confidence in decision processes.

5.4. Streamlining of ‘Greenization’ processes.

This peculiar term—at least in its translation to English—is meaningful in China, since it opens the concept of green development widely across major sectors and into decision-making at all levels. It is a helpful communications means for leaders, businesses of all sorts, urban and regional planners, and also educators. The problem is that there is no standardized backup as to how greenization processes are to work. Therefore, well-meaning efforts, such as bringing new green measures into play during implementation of the 13th FYP, may become very complex and work at cross-purposes, especially among sectors. Streamlining is needed to arrive at conclusions quickly and efficiently. Otherwise green development will not maintain the good reputation that it deserves.

Greenization may be used as an excuse to slow down or stall initiatives unnecessarily. Premier Li Keqiang has noted the following conversation with a mid-level manager in government:

“We need to go through environmental assessment, water resources assessment and assessments on energy, work safety, traffic, geology, earthquakes, heritage, thunder, weather,” Li quoted the manager as saying. “He told me that it would take at least one or two years.” Li said some assessments, including those covering the environment and safety, were necessary, but some local government departments did not have enough professional staff to carry them out swiftly and efficiently. Some authorities ended up outsourcing the tasks to agencies who pocketed money from the deals, he said. “Some intermediary agencies wear the hat of the government, hold the whip to the market and collect money from businesses...”¹¹

The feeling is that by prescribing overly elaborate suites of analyses, some civil servants or cadre may be trying to avoid personal accountability by delaying decisions.

At various levels of government and enterprises, there also is a real danger that what should be a serious reform effort can be transformed into public relations ‘greenwash’ or worse. Thus ‘greenization’ should be subject to real scrutiny and made workable, with constant attention to ensure that the outcome truly does add value above and beyond other processes.

Streamlining could involve combining various types of risk assessments, including EIA. Or selecting simpler screening tools rather than unnecessarily applying full-blown analyses. Obviously these choices require rigorous oversight so that approval processes do not turn greenization into a rubber-stamp exercise.

Another approach deserving attention is to apply the principle of subsidiarity to green approval processes. Subsidiarity places the action at the most appropriate level of government, or of governance.¹² This has worked well in many settings, where a consolidated assessment takes place at the most appropriate level

based on likely impacts and benefits. So, for example, a mine without major national environmental impacts might be assessed at a provincial or perhaps even a lower level.

5.5. Sustainable Financial Mechanisms for Green Development.

China will be among the largest, if not the largest, country-level investor in environmental improvements during the coming 10 years. When green development, including immense efforts to construct environmental infrastructure and new urban development is added in, the sums become enormous, as will be reported by our TF on Green Finance Reform and Green Transformation. Only a modest portion will come directly from government, perhaps only 20 or 30 %. Even that money will come from many sources, including some not fully worked out. Cost sharing with the private sector and SOEs is important, including PPP.

China derives revenues nationally from the improved pricing policies for natural resources, from various environmental fees, and those amounts are likely to increase, although perhaps not at the rate of the recent past. China has not yet set in place property taxes in a fashion that can fuel local development and the running of local government, as happens in many other parts of the world.

Although there are efforts at the national level to identify what might be placed in a green tax system, so far there is no such plan in place. Prospects in the near term for a comprehensive environmental tax system would appear modest. The announcement of a national carbon cap and trade program to start in 2017 may signal an end to the idea for a widely ap-

plied carbon tax.

Nevertheless, funding for environmental purposes will continue to rise, perhaps for some problems, spectacularly so. The War on Pollution is targeted in specific ways and appears to be sufficiently funded for air pollution, and likely also for the water pollution priorities. Soil pollution is a puzzle still since no action plan has yet been announced. If experience elsewhere such as in Europe, North America and Japan provides a guideline, soil cleanups in China will be among the most expensive environmental remediation efforts.

There is an expectation that the polluter will pay in China, as elsewhere. There are various mechanisms for this to happen, including special funds linked to mine approvals, etc. However the systems in place are not that mature, and also subject to many factors of ownership and allocation of responsibility, for example in the Bohai Sea oil rig spill earlier in this decade. The general pattern emerging is to set in place reasonable mechanisms for ensuring full financial responsibility lies with those deriving benefits from the use of the environment. This is obviously wise, but the mechanisms to do so require considerable refinement.

Banks and other financial institutions are now required to undertake due diligence so that loans are not made for initiatives causing undue environmental damage. They can do more such as providing concessional rates for green development. They also are important as a source of funding during the commercialization process for novel environmental technologies or other innovation products. Angel investors and other sources of funds from both Chinese and international investors can appear like magic—or not. Joint ventures on a massive scale have helped to modernize industrial bases and put in place advanced power plants. FDI is an important source for many of the environmentally-advanced production facilities operating in China today.

In the near future it is possible that green bonds, a green development bank and various other excellent

models for funding green sustainable growth will be well established in China. Some of these sources will also support Chinese efforts internationally, for example through the AIIB. The move towards green financial mechanisms will likely come swiftly and therefore build momentum for green development—as long as the playing field is kept level and open, so that wise investment choices are made. These last conditions will depend upon freedom from corruption, cronyism, and special interest tampering, especially by local and other vested interest.

Sustainable green growth in particular will require deeper understanding than now exists in order to ensure large sums are not lost on unsuccessful initiatives. Just as there was overinvestment in wind and solar due to failure to take into account demand side considerations, it will be necessary to pace investment in other green development efforts at a rate determined not by the supply side, but on the absorptive capacity and demand. This is particularly important for the massive urbanization effort underway in China.

What is needed is an integrated approach in the assessment of green development financing needs and performance. This capacity does not exist at the present time, either within the supreme auditing system, the individual departments such as the Ministry of Finance and MEP, and perhaps not within the National Development Reform Commission. It is a highly sectorized system, which often becomes part of the problem, as has been the case with the efforts to reform the national power grid and with public transportation systems, where efforts to modernize and to collect realistic levels of user fees have proved difficult.

The financial problems of sustainable green development become particularly acute when it comes to SMEs, the backbone of the Chinese economy. Smaller manufacturing businesses find it very difficult to undertake green upgrades without costly technical assistance and funds to install and maintain pollution control equipment. This is a problem that has so far not advanced

¹¹ South China Morning Post. 22 April 2015. <http://www.scmp.com/news/china/economy/article/1773314/chinas-premier-blasts-delays-created-big-projects-risk>

¹² “Subsidiarity is an organizing principle that matters ought to be handled by the smallest, lowest or least centralized competent authority. Political decisions should be taken at a local level if possible, rather than by a central authority.” (Wikipedia). The concept is often exercised in EU governance where the broader concept of “most appropriate level” arises.

much beyond the mechanism of closing down such businesses in favour of larger enterprises, and of advocating a service-based economy with lower pollution levels.

In times to come it should be possible to mobilize community-based funding sources for social organizations and other elements needed for greater public participation in environmental problem solving. In many other countries scattered throughout the world this approach has become highly effective. Whether for cleaning up a stream, or building environmental knowledge bases and safeguarding local environmental treasures, these groups become an essential part of the environmental governance capacity of a city, a province and a nation. China has its own local champions for the environment, and they do require a level of financial support that is at present generally much less than what is found in some neighboring countries.

A great advantage is that China can over time find the funds needed to make its development green and sustainable. However at present it is not at the stage where such funds are being allocated optimally, and therefore the outcomes are less likely to fully successful. These problems can and should be tackled vigorously during the coming FYP.

5.6. Integrated Green Innovation.

China will promote Circular Economy, Low Carbon Economy and domestic green consumption in its efforts to build an ecological civilization. China also has invested immensely in S&T education and institution building to support innovation. This is among the most impressive efforts anywhere in the world, but the real test will come during the coming 15 years when the payoff is to materialize. Whether advanced power plants, great boosts to information technology, green cars, or advanced pollution control mechanisms, and better ecosystem management on land, water or sea, there will be a need to deal with whole system problems.

Integrated green innovation requires additional capacity to knit the many individual components of old and new solutions to individual problems into a more effective approach. This is the case for renewable energy options that can contribute, along with use of cleaner coal and greater use of natural gas, to coordinated efforts to reduce air pollution and GHG emissions by control of carbon black and nitrogen compounds from sources such as diesel engines and power plants. Another is the very major problem of substantially reducing non-point source agricultural pollution that affects success in the War on Pollution. A third example is the need to address the growing problems of solid waste accumulation. How can such waste be fully turned into useful resources throughout all parts of China? Is the answer more incinerators on the scale of the one now operating (and expanding in size) in Pudong, Shanghai?

These three examples are only a few among many others requiring integrated green innovation solutions. They are a far cry from earlier Circular Economy and other solutions that served China very well a decade ago, when it transformed recycling worldwide through demand for copper, paper and other commodities.

There are important ways to foster integrated green innovation beyond current efforts. One is to put in place better mechanisms to shorten the time for green innovations to be commercialized. This is essential since integrated green innovation requires all necessary elements to be available when needed. There also is a need for fast-tracking of regulations and approvals so that these do not become obstacles. Of great significance is the regulatory framework for Regional Green Innovation Planning, which currently is experimental and fragmented. A test will be the urban integrated planning for megalopolis areas such as for Jing-Jin-Ji. If successful, the result will be highly beneficial to the War on Pollution, green public transportation, enhancement of ecological services, and other matters that will improve quality of life throughout this large region.

5.7. Data Quality & Credibility.

China continues to suffer from various problems concerning data reliability and also incompatibilities of Chinese and international information. The problems are widespread, certainly not only for environment and development matters. They create credibility issues; and potentially, important decisions may be made based on faulty or incomplete information. Evidence of corruption in data gathering, analysis, and utilization, including “massaging” of information from local levels to higher levels, and in industrial reporting on environmental matters is a further cause for concern. Furthermore, knowledge sharing, while greatly improved, is still subject to many restrictions. A proper ‘scientific development’ approach depends on full data disclosure, transparency & openness concerning methodology.

These problems, unless resolved, will inhibit the success of ecological civilization initiatives and constrain green development efforts. Furthermore, they promote skepticism on the part of the public, meaning a greater chance for a NIMBY reaction, or limitations on public supervision of development.

Given the expansion of academic centres on environmental science, planning and studies in China, with many now operating at provincial or lower levels, there are good capacity development possibilities. Also, environmental monitoring programs are likely to become much more rigorous and valuable sources of up-to-date knowledge. In the coming half-decade, these sources should be brought more closely into decision-making and made more helpful for broadening understanding of environment and development relationships.

What still is in short supply are the capabilities for in-

tegrative approaches to the problems highlighted in this Issues Paper. For policy formulation, assessment of progress, and for the adaptive planning and management of major initiatives, such analysis is essential. It requires teamwork consistent with the broad scope of ecological civilization, but also with the practical implementation insights offered by technical specialists, the public and by business interests.

It is often said that environmental agencies need to think of themselves as science-based organizations. They certainly need access to such skills, but also must have the ability to absorb scientific knowledge and further transform it into forms useful for governance. Organizations such as the US EPA and the European Environment Agency (EEA) have become very skilled at doing so. They are models for China.

5.8. The Need to Explore the Sharing Economy.

The Sharing Economy—now being highlighted in many countries as a consequence of difficult to govern internet-mediated innovations such as ride-hailing operations Didi Kuaidi, Yidao Yongche and Uber—is likely to become an important element of green development. It is anticipated that the concept of creating greater use of assets, whether an apartment, a car, a parking spot in a crowded city, or other underutilized real property, or services is a means to reduce ecological footprint, or planetary resources. The concept is not really new, except perhaps for the role of IT players such as WeChat and Baidu, which provide the connectivity (and sometimes substantial investment in the sharing economy companies) between those with particular needs and those who can supply these needs, often informally and sometimes without exchange of money.

According to Juliet Schor¹³, who heads a research

¹³ Juliet Schor. 2014. Debating the Sharing Economy. http://www.greattransition.org/images/GTI_publications/Schor_Debating_the_Sharing_Economy.pdf

network on the sharing economy, such activities fall into four broad categories:

“Recirculation of goods, increased utilization of durable assets, exchange of services, and sharing of productive assets...Many [sharing] sites advertise themselves as green and present sharing as a way to reduce carbon footprints. It is a truism among “sharers” that sharing is less resource intensive than the dominant ways of accessing goods and services (e.g., hotels, taxis, shopping malls) because of the assumed reduction in demand for new goods or facilities. The actual environmental impacts of the sites are far more complicated...”

In a sense the sharing economy concept is close to China’s long standing model of political economy that involved sharing of land and other resources via agricultural communes. Even within urban hutongs there is a sense of sharing. The concept might be closely aligned to today’s ideals of ecological civilization and green development. Also, for xiaokang, the guiding concept for a moderately well-off society. Another way of thinking about a sharing economy is that it offers ability to do more with less.

Why should sharing economy be profiled on this short list of important issues for China’s future?

First, elements of the sharing economy, and the concept itself are under intensive scrutiny throughout the world, including within China. Undoubtedly it will loom larger in the policy debates of coming years, if for no other reason than the potentially disruptive aspect it may have on existing governance mechanisms for at least some goods and services.

Second, it is not very clear whether the net contribution of a sharing economy to the size of an ecological footprint is positive. As noted by Schor (2014):

“The ecological benefits of sharing are often seen as obvious: secondary markets reduce demand for new goods, so footprints

go down. Staying in existing homes reduces the demand for new hotels just as tool sharing reduces new tool purchases. However, despite the widespread belief that the sector helps to reduce carbon emissions, there are almost no comprehensive studies of its impact...The ordinary assumptions about ecological impacts are generally about the first, visible shifts made by a consumer—purchasing used products rather than new ones, or staying in a private home rather than a hotel. To assess overall ecological impacts, however, we have to consider ripple effects. What does the seller or the host do with the money earned? She may use the money to buy high-impact products. Does the appearance of a market for used goods lead people to buy more new things that they intend to sell later? If travel becomes less expensive, do people do more of it? All of these effects raise ecological and carbon footprints. There is also the question of impacts at the level of the economy as a whole. The platforms are creating new markets that expand the volume of commerce and boost purchasing power.”

Third, as noted by the Economist¹⁴, “The sharing economy is the latest example of the internet’s value to consumers...This emerging model is now big and disruptive enough for regulators and companies to have woken up to it. That is a sign of its immense potential. It is time to start caring about sharing.” The term used to describe this form of use is “collaborative consumption”.¹⁵

Fourth, the sharing economy is an important bridge between environment, economy and social development. It provides an alternative approach for achieving sustainable consumption while at the same time developing new models for social networks, including trust-building between total strangers. As noted by Schor, “the uniqueness of this new sharing economy is that it mobilizes technology, markets, and the “wisdom of crowds” to bring strangers together”. In this sense, it may expand social capital as well as help the environment.

5.9. Taking Ecological Civilization Abroad.

The proactive stance of China towards international

¹⁴ <http://www.economist.com/news/leaders/21573104-internet-everything-hire-rise-sharing-economy>

¹⁵ Colin Shek.2014. No Purchase Necessary. <http://english.ckgsb.edu.cn/sites/default/files/CKGSB201412-Online.pdf>

initiatives during in the past few years has opened unprecedented opportunities to ensure its efforts for a respectful relationship of people and nature can inform the actions of other countries and the international community. Already green guidelines for Chinese enterprises and development initiatives abroad are in place¹⁶, although it is not clear just how well they are operating in practice. At the 2014 APEC leaders meeting held in Tianjin, China a clearinghouse proposal to encourage green market supply chains was agreed upon and efforts are now underway.

New initiatives including the AIIB, BRICS Bank, OBOR and the various bilateral and multilateral trade agreements signed by China require specific operating guidelines on environment. These should be cast in terms of green development where appropriate, and in some instances could be used as the basis for ecological civilization initiatives. Chinese projects and companies operating in countries throughout the world, and particularly those in the countries of the South need to take special care in building local capacity for green development.

Achieving the new UN Sustainable Development 2030 objectives can be helped by China, not only through monies such as the USD 2 billion pledged recently¹⁷ plus loan forgiveness, but also through capacity building and the sharing of experience under mechanisms such as those being pioneered by the UNEP-Chinese Academy of Sciences International Ecosystem Management Partnership (IEMP)¹⁸. China also has committed RMB 20 Billion in its new fund for South-South climate change cooperation¹⁹. The sums announced by China at the September 2015 UN Summit on Sustainable Development will be supplement-

ed in various ways, and are intended to meet sustainable development needs of some of the world’s poorest nations.

These recent Chinese initiatives have been applauded by leaders of many countries and international agencies. They represent new directions for partnerships and significant opportunities for spreading the ecological civilization approach and green development. In a sense they are a challenge to established ways of addressing development assistance. They will draw heavily on China’s own experience of poverty reduction, and on the scientific and other ecological and environmental efforts plus technological innovation now going on in China. They also can draw upon joint efforts with international organizations and other countries.

China also has a good track record of “greening” high profile international events taking place within its borders, including the Beijing Summer Olympics and the Shanghai 2010 World Expo. There are new opportunities, starting with the G20 Summit to be held in the Fall of 2016 in Hangzhou. It is logical to promote Green Financial Mechanisms as a key element for this meeting. In 2022, the Winter Olympics in Beijing can be another green showcase, hopefully focusing global attention on the advanced innovations for ecological civilization that China is implementing on a large scale.

China has taken on a large agenda that will expand its profile regionally and globally over the coming FYP and on into the next decade. It is reasonably prepared in terms of the mutual benefits it would expect to have through enhanced trade and improved relation-

¹⁶ Hu Tao. 2013. A Look at China’s New Environmental Guidelines on Overseas Investments. <http://www.wri.org/blog/2013/07/look-chinas-new-environmental-guidelines-overseas-investments>

¹⁷ Reuters, 26 September 2015. China pledges \$2 billion to help poor states meet U.N. goals. <http://ca.reuters.com/article/topNews/id-CAKCN0RQ0HW20150926?sp=true>

¹⁸ <http://www.unep-iemp.org>

¹⁹ Xinhuanet. 15 October 2015. International Community Lauds China’s Climate Fund for South-South Cooperation. http://news.xinhuanet.com/english/2015-10/15/c_134716775.htm

ships. Just as it must seek effective use of funds and Chinese expertise domestically, so also China must understand and act in accordance with the expectations and needs of its partners in other parts of the world. This will not be an easy task, since the countries and regions involved are diverse and in various ecological, social and economic condition.

6. CONCLUSIONS

6.1 Bridging the Gaps

The recorded voice and omnipresent signs to ‘mind the gaps’ are familiar to those who use subways and trains in many parts of the world. If we ignore the danger, we stand to lose life or limb. Similarly, for country and planet, if tipping points are reached in ecosystems, or if quality of life degrades, human civilization and planetary boundaries are in trouble. That is the essence of where we are heading today globally and in many countries.

However, ‘minding the gaps’ only makes us more aware of the dangers and provides some sense of how to avoid the worst. It is building the capacity to fully address the problems that is essential now. Over the coming decade it is unlikely that, either in China or elsewhere, environment and development needs can be fully reconciled. It will take a longer time for that to occur. That is why in this Issues Paper we talk about ‘bridging the gaps’. We can expect to change directions, see improvements, and open new opportunities using our best powers of innovation, financing and improved governance during this time frame.

A decade more takes us to the quarter century. By then it should be possible to have firmly established the pathway to an Ecological Civilization in China, and to see the influence this idea may have globally, no matter what the concept may be called outside of China. We must keep sight of the ultimate goals such as those set by the UN Sustainable Development 2030 initiative. And we must recognize the perseverance required for success. If we can successfully bridge the

gaps, eventually it will be possible to close the gaps between aspirations and actual results on the ground. On the other hand, if gaps widen between goals and performance, more tipping points will occur, making it hard to achieve satisfactory turning points, and adding to the marginal costs of achieving desired changes.

6.2. Three Important Observations

China’s 13th FYP will be the “Final Sprint” to a ‘Moderately Well-Off Society by 2020’. This is symbolically important since 2021 will be the 100th year anniversary of the founding the Chinese Communist Party. Therefore, considerable emphasis will be given to sustainable growth, jobs, and innovation to achieve this well-off status for all. However unless environmental problems are on track to be solved, the effort cannot be judged to be fully successful. It is for this reason that the 13th FYP must be a green plan. It is not enough only to emphasize environment within a single chapter.

China’s longer-term environmental protection, green development and ecological progress goals will shift in response to both internal and international pressures. The coming three FYPs will perhaps be the most important to set the stage for longer-term environmental improvement, including matters related to peak fossil fuel use and peaking of Greenhouse Gas Emissions. There will be a need for 2030, 2050 and perhaps other plans related to China’s mature stage of economic, social and environmental development. Visions, targets, and implementation strategies must be adaptive, and designed to take full advantage of emerging technologies and China’s changing situation domestically and on the world stage. It is best to move beyond a “comfort zone” at each stage, since to do otherwise will constrain thinking and action to those technologies, management concepts, and perceptions of need of the day rather than for those of the future.

International Cooperation will play a larger role in

China’s future environment and development efforts. Greening of trade and investment will play a larger role in China’s bilateral, regional and multi-lateral affairs. North-South green technology and experience sharing (e.g., China-US; China-EU, bilateral country arrangements, international business linkages, think tank cooperation) will increase in complexity and economic significance. South-South climate change and other topics will open new avenues for innovative cooperation. Global environment and development cooperative initiatives will expand via UN agencies, development banks, international environmental organizations, multinational enterprises, scientific organizations and universities.

6.3. Using Environment and Development Experience in Other Sectors

The experience of working through complex multi-stakeholder relationships and other challenges of environment and development problems likely can be applied to other governance issues found in China, locally, nationally, regionally and globally. In this sense, if environment and development is successful in its green transition, other difficult issues such as health system development, job strategies and transition to sustainable growth will benefit from the experience.

V. CHINA'S ECOLOGICAL CIVILIZATION AND THE WORLD ¹

In today's world, all countries are interdependent and share a common future. We should...create a community of shared future for mankind...We should build an ecosystem that puts mother nature and green development first...All members of the international community should work together to build a sound global eco-environment. We should respect nature, follow nature's ways and protect nature. We should firmly pursue green, low-carbon, circular, and sustainable development. China will shoulder its share of responsibility and continue to play its part in this common endeavor. We also urge developed countries to fulfill their historical responsibility, honor their emission reduction commitments and help developing countries mitigate and adapt to climate change. —Xi Jinping, 28 September 2015 UN General Assembly Speech

https://gadebate.un.org/sites/default/files/gastatements/70/70_ZH_en.pdf

1. INTRODUCTION

In January 2017 CCICED will turn a new page on a story already 25 years in the making. CCICED's new Phase VI (2017 to 2021) will need to consider significant shifts in the storyline. International and national level momentum over the past few years has brought renewed promise of reaching turning points on major environment and development concerns and environmental action is mainstreamed as never before. There is a new green wave of entrepreneurs, and of commitments by enterprises and by elements of the financial sector. The pivotal point for improved green development outcomes is 2030—a middle milestone when many innovations will have taken hold. This is a once in a generation opportunity with many implications for China and other countries. But recent events

such as Brexit, the US election, and other matters related to the wave of populist sentiment around the world suggest that turbulent times may lie ahead. It is therefore timely that CCICED is closing its Phase V work with a focus on China's Ecological Civilization and the World.

We know that even with all the global and regional accords now in place, there is no guarantee yet of adequate ecological security for any country. The national and international green governance frameworks still lag behind the growth in environment and development pressures. Investment and finance continue to be skewed towards unsustainable patterns and legal frameworks are inadequate to meet complex needs. These shortcomings are among the reasons why the 2015 reboot of sustainable development through the UN SD2030 Goals and the 2015 Paris Agreement on Climate Change are so important. It is excellent that China and many other countries have ratified these accords, and taken major initiatives for their implementation.

Globally, however, if the SDG2030 efforts prove inadequate, if the world's oceans are ecologically stressed and resources depleted, and if the worst ravages of climate change are unleashed, then it will be a tough time for all. The main point is that no matter how well China does domestically, unless the rest of the world progresses towards "a sound global eco-environment" as called for by President Xi Jinping, there will be no guarantee of long-term environmental security in China or elsewhere. Indeed, to prevent such a situation, we must promote

¹ An Issues Paper has been produced by the CCICED Chief Advisors for the CCICED AGM each year since 2002. It is intended to draw together key ideas based on the annual AGM theme and on work produced by the various research teams and other sources. The content reflects the views of the Chief Advisors and not necessarily the opinions of CCICED Members or others associated with this Council. Past Issues Papers are available online at <https://www.sfu.ca/china-council/council-documents.html>

much more strongly the means to accelerate progress on environment and development efforts—perhaps through even more far-reaching goals and tighter time-lines than now exist. And, certainly, we need a better capacity to share innovation ideas, capacity and products so that green development is accessible to all, including nations with limited means.

1.1. China's Opportunity

The fundamental issue for this AGM is how China can become a leader on environment and development concerns by accelerating progress on its own green transitions, and by partnering with others. Not only for the long-term benefit to its own future prosperity, but also for the planet and all people. In its modernization during this half-century, China is facing three great moments. The year 2020 will bring attainment of a 'moderately well-off society' (Xiaokang Society) just prior to the 2021 centenary of the Chinese Communist Party. By 2030 China hopes to be among the front-running nations for innovation—with important implications for goals such as peaking greenhouse gas emissions, and fulfilling its national action plan under the Convention on Biological Diversity and China's SDG2030 Implementation Plan². By 2049, the centenary of New China (the PRC), China wishes to be an all-round leading nation, prosperous and very advanced in its capacities including innovation for environmental matters.

Starting with the new and very green 13th Five Year

Plan (2016 to 2020)³, China has set out a 'green is gold' top-level policy path supporting the country's transition to an Ecological Civilization.⁴ This concept is still new enough that it is not well known around the world. But there is interest certainly on the part of some developing countries and UNEP. With China's recent commitments to enhanced South-South Cooperation⁵, new financial institutions such as the AIIB and the New Development Bank⁶, plus the Belt and Road Initiative (BRI)⁷, Ecological Civilization can become a part of China's strengthened 'going out' approach.

1.2. A Global Green Turning Point by 2030

It is reasonable to believe that China can become a more important player in efforts to achieve a global green turning point by 2030 through: (1) good performance in domestic actions, which are significant due to their immense scale, (2) making Ecological Civilization, green growth and green development an essential part of its overseas investments and international aid, and (3) greater and more proactive involvement in global green governance issues and initiatives. The time between now and 2030 will see China go through three Five Year Plan periods. To a time when urbanization and rural development are at a far different stage; when modern transportation networks are in place; and where economic and social reforms have opened new opportunities. Green transitions are a very necessary part. All of this experience may help to shape outcomes elsewhere.

² September 2016 release of the Implementation Plan from China's Ministry of Foreign Affairs http://www.fmprc.gov.cn/mfa_eng/zxxx_662805/W020161014332600482185.pdf

³ See China's Green Growth Roadmap in the 13th Five-Year Period. Global Green Growth Institute and PRCEE. 76 pp. Also see <http://www.chinafile.com/reporting-opinion/environment/how-chinas-13th-five-year-plan-addresses-energy-and-environment>

⁴ Further information on Ecological Civilization is available in: UNEP, PRCEE and CCICED. 2016. Green is Gold. The Strategy and Actions of China's Ecological Civilization. UNEP. 43 pp. http://web.unep.org/greeneconomy/sites/unep.org/greeneconomy/files/publications/greenisgold_en_20160519.pdf

⁵ <http://www.ipsnews.net/2015/11/opinion-chinas-new-south-south-funds-a-global-game-changer/>

⁶ <http://euweb.aaiib.org/html/aboutus/AIIB/?show=0>; <http://ndb.int/our-purpose.php>

⁷ <http://english.gov.cn/beltAndRoad/>

2. CCICED 2016 STUDIES AND ANALYSIS

The following CCICED studies have been completed during 2016:

- Task Force on Rule of Law and Ecological Civilization
- Task Force on South-South Cooperation for Ecological Civilization
- Special Policy Study on China's Role in Greening Global Value Chains

CCICED has initiated a Task Force on Green Transition Outlook, which will provide a progress report and some recommendations to the 2016 AGM, and continue its work during 2017. CCICED in cooperation with the World Economic Forum (WEF) convened a meeting on Sharing Economy in June 2016 providing some results of interest in the context of environment and development. Some Background Papers will be tabled at the AGM: Preliminary Ideas on Greening the Belt and Road Initiative; Theory, Methods and Practices of Benefit Cost Analysis in the United States: A Case Study in PM2.5 Policy Analysis; and a Framework for an Ocean Initiative within CCICED.

This past year has been an extremely active period for the introduction of new green policies within China plus the major G20 meeting hosted by China in September 2016. The Policy Progress Report⁸ prepared by the Chief Advisors Group for tabling at the AGM documents the main points, and therefore this information will not be repeated in the Issues Paper.

Also during 2016, considerable effort has occurred on planning for CCICED Phase VI. Much of this effort is

relevant to this year's AGM theme, since it is recognized that in future there must be considerable attention to China and the World as part of CCICED's work. This draft Prospectus will become available for the information of members and others.

3. OPPORTUNITIES FOR 'A COMMON SHARED GREEN FUTURE'

The need for accelerated progress on commonly held goals such as the SDG2030 agenda and on climate change is quite obvious. Successfully tackling these and other major issues in as short a time as possible will create a snowball effect. The adopted innovations and reform will open space for additional transformative changes. Another way of putting it is that "success breeds success".

3.1. Better Results Sooner?

Is it possible that important targets for 2030 could actually be achieved by 2025 or even sooner? As CCICED members such as Lord Stern have pointed out, in the case of coal and other fossil fuels in China (and by implication elsewhere in the world) early achievement of their peak use would have major value in the race to slow global climate change.⁹ The list of other such efforts could be long. In addition to energy factors, drastically reducing water use in agriculture, greening urban infrastructure, avoiding locked-in effects from overinvestment in highly polluting sectors, plus accelerating the shift to a green financial system will help immensely. The benefits in quality of life, for example by reducing environment health risks, and for employment gains in the new green economy are likely to be lasting and of large magnitude.

Obviously it is not only China that should ask the

question. Indeed, for the developing countries an accelerated pace of change is most urgent. Many look to China for advice and assistance, given the country's rapid economic growth. The accumulated experience of China in addressing the environmental and social impacts of this growth is now highly relevant. The opportunities for richer countries are very diverse but greater levels of international cooperation and partnership are required to maximize benefits. No country on its own can escape the impacts of uncontrolled global warming, loss of ecological services, and effects of pollutants transported in the oceans and atmosphere, or the human dimensions of conflict over natural resource declines. Fortunately, there much room for advanced science and technology collaboration, global green IT implementation, and for improvement in investment patterns and international green governance. But it will take bold strokes to make it happen, as demonstrated by the 2015 agreement between China and the USA on energy and climate change objectives.

Opportunity-driven initiatives are best because they lead to win-win situations. Let us consider some of these opportunities in the context of enhanced achievement of environment and development goals for (1) China, (2) South-South Cooperation, and (3) the Global Community.

3.2. Potential Opportunities for China from Accelerated Progress on Environment and Development Goals

The opportunities and benefits for China are spread rather evenly among the various components in Ecological Civilization, as noted below.

Environmental

- Snowball effect from successful partnerships and increased green investment will accelerate the pace of meeting goals related to War on Pollution, climate change and other environmental protection needs.

- Accelerated green technology transitions will include products and services developed jointly by China and others to satisfy global needs—and, if meeting international and national standards, become important throughout the world.

- Enhanced safeguarding of ecological services and goods in China and in neighbouring regions and countries.

Economic

- Larger domestic and international markets will exist for Chinese green products, technology and services, along with other early adopter advantages.
- Important contribution to green quality standards for manufacturing and other industries as part of Made in China 2025.
- Accelerating the pace of economic reform through green transitions will hasten growth of new jobs and businesses, including within the service sector.

Social and Cultural

- Reduced environmental health risks.
- China's sustainable domestic consumption progress will be hastened, including consumer values and choices.
- Social development through education, awareness-raising, and participation.
- Value shifts towards Ecological Civilization ideals.

Political

- Expanded role for China in global green governance reform and decision-making.
- Build China's international reputation as an environ-

⁸ Progress in Environment and Development Policies in China and Impact of CCICED's Policy Recommendations 2015-2016. Earlier editions of this document are available at <https://www.sfu.ca/china-council/council-documents.html>

⁹ Ye Qi, Nicholas Stern, Tong Wu, Jiaqi Lu & Fergus Green. July 2016. China's Post Coal Growth. Nature Geoscience. 9: 564-566.

mentally responsible country and business partner.

- Create an international perception of taking on responsibilities in line with China's economic size and ecological footprint; and benefitting others by sharing capacity to deal with environment and development issues.

3.3. For Improved South-South Cooperation Success

Many of the world's poorer countries lack the institutional capacity, finance and technical means to fully address the broad range of needs highlighted by the SD2030 Goals and are likely to be among the most significant beneficiaries from partnerships, development assistance and strengthened trade links with China. The tie-in possibilities via the Belt and Road Initiative, the S-S Cooperation funds from China for Climate Change and for SD Goals, plus support for initiatives through the AIIB and other Chinese influenced funding, are significant since these are intended to be dispersed in quick but effective ways, and there are start-up commitments to make them green. However, it is very worthwhile to press for priority to green initiatives. Below are some ways in which accelerated green South-South Cooperation can be a win-win for both sides (China and partner countries).

- China's green experience can influence the green transitions of many other countries, and regional or global development outcomes of various types.
- The ability to build cooperative arrangements with neighbouring countries on matters such as river basin management, ocean conservation, or regional air pollution can avoid conflict and extend development benefits.
- Belt and Road Initiatives offer the possibility of having comparative green experience emerge from within the many countries involved and use this experience throughout major regions such as South-east Asia and Africa.

- Successful, accelerated green development via S-S Cooperation may help to spread understanding and acceptance of Ecological Civilization values beyond China.
- Selling Chinese green goods and services, and therefore increased trade potential are outcomes that can be expected as a consequence of well-managed S-S Cooperation.
- An accelerated pace for green transitions should lead to more rapid poverty reduction rates, improved health and other social benefits in both rural and urban settings of poor countries.
- More rapid transfer of Chinese experience regarding green infrastructure may help many of the developing countries to avoid undesired lock-in effects of poor urban planning, energy or transportation infrastructure, etc.

3.4. For Benefits to the Global Community

A handful of large countries, including China, are absolutely essential participants for progress in securing global environment and development benefits. While these countries will see national advantages in their individual green transitions, their contribution globally should be factored into their decision-making.

- Reaching turning points on the control of environmental threats as quickly as possible will create a global willingness to invest in further action to eliminate the problems. The classic example is the success of the Montreal Protocol in reducing the ozone hole created by CFCs.
- Green procurement through global supply chains will be helped if there is progress from the 10 to 30% level of certified green products commonly found in commodity supply chains. Accelerated efforts are needed for commodities such as timber, fish and agricultural products for soy and palm oil. Also for many types of manufactured products.

- Per capita ecological footprints¹⁰ of most nations could be substantially reduced while likely improving quality of life and improving ecological services. The faster this happens, the more flexibility there will be to accommodate the expected expansion of global population, and to ensure that the poor in the world have sufficient access to necessities.
- As environmentally friendly practices are mainstreamed, they will become the 'new normal' and can provide a more advanced baseline for continuous improvement everywhere. Much can be learned from the global impacts of smart phones. This has led to a virtual revolution regarding information exchange, social media and consumer habits. All in a period of only 15 years.
- The hope is that the ambitious SDG2030 agenda will become universal—sooner the better. If so the conversation on environment and development in 2025 will be far different than now. In fact we can expect the dialogue to be much closer to China's values-based concept of Ecological Civilization. Rapid success with SDG2030 will set the world on a much better path for biodiversity conservation, climate change mitigation and poverty elimination. Key to this happening is attention to inclusiveness.

3.5. Conclusion

We know that actions of leaders can influence laggards, can help those less able to meet their own ambitions, and above all can bring about burden sharing. There is much talk and scepticism about whether all nations are capable of meeting the goals they have set for themselves in response to global commitments. Also of 'free riders' who will draw global benefits, even if they do not contribute as fully as they might, or if they become contrarians on such major issues as climate change mitigation. And, at a practi-

cal level, whether those prepared to contribute to the global good may end up facing competitive threats in trade or other economically challenging ways, especially during prolonged and uncertain transition periods. These challenges may actually be diminished through accelerated action on the part of those nations well situated to make contributions. China certainly falls into this category since it has already made it clear that a steady course is needed on green development and it has the means to bring about change inside and outside the country.

As suggested in this brief review of the need for an accelerated pace towards a 'common shared green future', the expectation is that the resulting benefits for China and other countries will be comprehensive and potentially very widespread throughout the world and of long-term significance. However, there are many challenges.

4. TEN ISSUES

The ten issues noted below are by no means the only ones of concern, and surprises are likely. However these ten points certainly cannot be ignored if China is to fully engage with the world on environment and development issues. Certainly the Government of China is aware of, and is in the process of addressing all of these concerns. Yet much more is needed in order for smooth implementation of green transitions that will support new economies, strengthen social development with better inclusion of all people in decision-making, and lead to a clean environment with healthy ecosystems. There are contributions to be made at all levels from local to global, and there needs to be a strong focus on governance, rule of law and green finance always. The great need is for innovation to take us much more quickly to sustainable solutions that can be swiftly applied and of enduring value.

¹⁰ See http://wwf.panda.org/about_our_earth/all_publications/lpr_2016/

The short accounts under each cannot do justice to the complex topics. They do provide a window into a number of important discussion points.

4.1. Better and faster implementation of China's 13th Five Year Plan green goals

Through successful 13th FYP achievements China will be perceived globally as a leading contributor to environment and development security, especially if the country is seen to be addressing the global agenda adequately through its practices both domestically and internationally.

- This most environmentally promising FYP should enable turning points for all aspects of the War on Pollution, across the board gains on Green Development, and other progress towards Ecological Civilization.
- The current FYP should set the stage for greater gains in the coming 2 plans as well as guarantee the role of environmental contributions to a Xiaokang Society.
- Stronger implementation policies based on adaptive planning and management are needed in key sectors, central agencies and environmental agencies including MEP.

4.2. Strengthening of integrated green governance and institutional change

For transformative change to occur at the pace and scale demanded over the coming decade or more, cross-sectoral, integrated efforts must be strengthened. The AIIB resolve to be "lean, clean and green" should be echoed across other institutions. Institutional arrangements for sustainable development implementation and

the construction of Ecological Civilization remain uncertain, whether in China or other countries. International organizations are struggling to deal with the complexity of decision processes and are certainly in need of innovation to fully implement global agreements.

- Within China and globally environment and development progress continues to be hindered by governance inadequacies, with particular concerns about enforcement and about inadequately focused laws, outmoded institutional arrangements, and financial sector issues.
- A governance framework adequate for an Ecological Civilization in China¹¹ may be on the horizon but is not operative on the ground. This challenge can be met in 5 to 10 years if the political will remains strong.
- Globally, greater Chinese participation and leadership is needed. The example of China-US cooperation on climate change, the AIIB and various other examples exist. However there are gaps and under-performance in many agreements, and new matters emerge every year, for example those involving the sharing economy, and micro-sized plastic particles polluting the oceans.

4.3. Using initiatives for climate change and for SDG2030 implementation to accelerate social development improvements

Seek new opportunities within China and in China's activities abroad for improving social equity within green urban and rural communities, enhancing gender equity, creating solidarity among groups facing similar issues such as climate change adaptation, and strengthening capacity to address social and environmental impacts through education and other means.

¹¹ Pan Jiahua 2015 China Environmental Governing and Ecological Civilization <http://link.springer.com/book/10.1007/978-3-662-47429-7>

The keyword is inclusion.

- Improved public participation along with education and training, plus information sharing remain among the most important elements for improved environmental management and protection, sustainable consumption, and other aspects of creating an Ecological Civilization.
- What is truly remarkable at global level discussions on environment and development is how many social organizations/NGOs from all parts of the world now participate. Their efforts are needed on a much larger scale at local and national levels in order to strengthen and speed up green social development and other environmental matters.
- Improved mobilization of funds for social development is an important part of all environment and development efforts. These funds are needed to address health and safety matters, environmental education, intervenor funding to ensure the voices of poor or displaced people are heard, and to provide benefits such as green village technology. Green financing for these and other social matters must have continuity, including post-project availability. China has some good examples of such effort through its eco-compensation programs. Such examples might provide a good basis for green social endeavors abroad.

4.4. Building a more consistent and comprehensive green growth strategy

Since 2009 the G20 has highlighted the need for removal of fossil fuel subsidies, desirability of green growth strategies at national levels, firm action for low carbon strategies, and most recently in their Hangzhou meeting this September, urged the scaling

up of green finance.¹² In the coming year it will be helpful if China and Germany can work together with leading developed and developing economies at the forthcoming G20 to expand the attention given to green growth and finances, and low carbon economy.

- During the 2016 G20, China pressed for greater effort globally to sustain economic growth. The need is evident, even though limits and challenges exist throughout the world, including China. A green transition in economic growth is essential but how to fully revamp the economic system is still challenging, often controversial. China is making progress but still does not adequately link economic and ecological reform.
- The critical period for this global green transition is 2020 to 2030, when substantial progress on low carbon economy and achieving SD2030 goals is paramount. If China can outperform on its national green economic transition during this time its future will be more secure perhaps for the balance of the 21st Century. In addition, such progress will put China in a better position to assist other developing nations; and to take its place as the world's largest sustainable economy.
- Climate change will be a pervasive element crossing many sectoral boundaries in future green economic development. This reality needs to be factored into many more of the most significant economic and investment decisions. There needs to be almost constant monitoring to determine if this is happening in a way that brings about desired changes as rapidly as possible, and with due consideration of how to maintain public sector and private sector support within China, and certainly also with partner countries in overseas endeavours.

¹² http://www.g20.org/English/Dynamic/201609/t20160906_3396.html

4.5. Implementing integrated green development and Ecological Civilization

Ecological Civilization is a means to link values, key priorities and cross-sectoral cooperation for decisions that affect development within China or in Chinese undertakings abroad. These are not points only for the Government of China but also for Chinese enterprises and investments; and for the many initiatives involving Chinese organizations, financial organizations and other bodies that together shape outcomes for environment and development. The key concern is to move towards integrated development decision-making within the context of an Ecological Civilization umbrella.

- It is of value to build integrated strategies such as BRI, development in the Yangtze and other major rivers and economic development zones in a way that addresses needs such as regional air and water pollution, climate change adaptation, etc. Integrated approaches need to be applied more effectively in future efforts of rural and urban planning, and river basin, coastal zone and marine planning. While this point is reasonably understood at various levels of government, the implementation policies are not so well developed yet.
- China's integrated green development should become a standard approach in its international co-operation, and in its many overseas land and water developments.
- Energy decisions need to become more integrated, with adequate attention to climate change agendas including gender impacts, co-benefits and environmental assessment.
- Giving greater attention to green planning, ecological redlining and various aspects of urbanization and rural development is necessary in order to avoid option foreclosure and undesirable lock-in effects.

4.6. Continuing to expand and accelerate the pace of green South-South Cooperation and enhanced S-S-N action

China is 'Going Out' to the nations of the South in an unprecedented way via multilateral and bilateral commitments. There is sharing of its own experience, skills and technology, and its own approach to ODA, which places emphasis on trade and investment as well as direct financial assistance. China also has signalled its interest in S-S-N joint efforts. Through BRI and new financing, China is making a generation-long effort at an unprecedented scale. Success will change the outlook for growth and quality of life in many partner countries.

- The substantial increases in funding by China for developing nations has the potential to be a major game changer during the coming decade and beyond. There are numerous statements that some of the funds will be channelled to environment and development, and certainly to climate change and for SDG2030 initiatives. However it is early days, and there will be competing priorities. The various ODA envelopes must be well coordinated and operate within robust green guidelines. Also, there should be long-term commitments in order to address ecological and other concerns.
- It is essential that the shift be towards Ecological Civilization, whether or not this term is embraced universally. The need is for sustainable development adjusted to meet the specific conditions of individual countries. China is strong on assessing the supply side. The demand side is less clear, and needs to be addressed quite urgently. Then, adaptive processes are required to ensure mutual interests are served.
- All of China's overseas efforts should be guided by green development goals and standards, and as necessary include green capacity building. Sharing of green technology innovation can and should be part of the package.

4.7. Making certain trade and investment, global value chains and other international economic arrangements fully support efforts to build an ecological civilization with full sharing of the resulting benefits

(a) Ensure trade and investment agreements fully incorporate green development

New regional and bilateral agreements will boost globalization, even as there are some movements towards "deglobalization" in parts of the world. These agreements have flourished in recent years, with many initiated or supported by China. The proliferation is certainly driven in part by the slow pace of WTO negotiations. However, the more fine-grained agreements are also a way to bring in concerns more specific to the priorities of specific countries or regions and those of China. They should, however, always promote and take on board best practices regarding green development.

- The need is to bring consistency in treatment of environment and sustainable development concerns into all new agreements, with adequate monitoring and enforcement mechanisms for green development and environmental effects.¹³ Also, to provide adequate opportunity for green capacity development with partner countries, and, as necessary, avoid any activities that will lead to unsustainable outcomes, or unmitigated environmental impacts, including climate change.
- China's long-term green transition outlook could be bolstered by green trade agreements, since the new greener economy will depend upon favourable

treatment of green products and services. Access to markets will depend upon meeting green standards abroad. And corporate social responsibility of international firms operating in China, and Chinese enterprises operating in other countries will be improved through environmentally sound trade and investment requirements. The concept of Ecological Civilization might be embedded in at least some agreements.

(b) Embrace green standards and systems for trade and commerce

How can international organizations and countries, including China, work more closely together to address the many downstream issues for standards including matters such as enforcement, traceability and other practical needs?^{14 15} Globally, over the past 20 years a very complex web of green standards has emerged, some on a voluntary basis and others linked to trade agreements. These are subject to many constraints, relatively slow acceptance and sometimes lead to trade barriers or disputes. Concerns exist about verification of impacts and of actual compliance to standards. Illegal trade is a major concern.

- While China has progressed on many aspects of this issue, it is still highly vulnerable and has a low level of participation in some important commodity areas. Now at a crucial stage of expanding its domestic consumption and implementing domestic Low Carbon Economy, there are emerging issues about standards, credible reporting and verification. The public is engaged in many of these issues, including both food and environmental safety assurances in products.

¹³ An example of how to examine this issue is provided by the European Commission DG for Trade sustainability impact analysis of a China-EU Investment Agreement <http://www.trade-sia.com/china/wp-content/uploads/sites/9/2016/05/FIE93555-SIA-EU-China-revised-draft-inception-report-12-May-2016-clean.pdf>

¹⁴ http://www.oecd-ilibrary.org/governance/international-regulatory-co-operation_9789264244047-en

¹⁵ See various reports of WWF China and of IISD on some concrete needs, for example: http://awsassets.wwf.cn.panda.org/downloads/wwf_china_trade_report_en.pdf ; <http://www.iisd.org/sites/default/files/publications/sustainability-impacts-chinese-outward-direct-investment-literature-review.pdf>

- Green trade and commerce is a maturing field that requires much more attention from Chinese authorities and business. Making Chinese and international standards compatible, stamping out illegal trade practices, encouraging sustainable consumption and improved consumer choice, greening Made in China 2025, and expanding green procurement are key examples of what must happen.

4.8. Addressing planetary boundaries and ecological footprints

Turning China into an extreme conserver society at the same time as the nation becomes wealthy is a tremendous challenge, but one that must be met for both domestic and global reasons. It is also a part of the “green is gold” paradigm.

- Of special concern are the several components including key geochemical cycles labelled as Planetary Boundaries.¹⁶ For example, excessive nitrogen in the environment (from agricultural fertilizers, automobile emissions and industrial uses) must be brought under control as soon as possible.
- Also of grave concern is the declining state of the oceans including ecological services and climate change impacts. China's Blue Economy¹⁷ is expanding and is certainly not confined only to adjacent ocean space. The Blue Economy, globally and China's, must be reformulated to embrace green development principles and actions in a much more effective way than in the past. Expanded international cooperation is essential, including more effort on the oceans and climate change.
- China's rising consumption as wealth increases is

slipping into unsustainable levels particularly in cities. WWF China's reports on ecological footprints indicate that in various aspects, especially carbon footprint, China now exceeds 'one planet' levels.¹⁸ Such trends must be addressed either through more efficient uses, or through shifts in values on the part of both producers and consumers to reduce demand. While both aspects are underway, progress is still below the rate needed.

4.9. Using the power of disruptive innovations of IT hardware and software to hasten green transitions

China has embraced 'Internet Plus', 'Big Data' approaches and many other leading edge efforts that combine innovative software and technology to provide for environmental, resource efficiency and sustainable development applications. Battery technology, smart grids, and environmental monitoring are among the many examples. Most recently the benefits and costs of Sharing Economy have become a focus.

- The future holds even greater potential to use rapidly advancing IT often in conjunction with other technology innovations from nanotechnology, biotech, and green industrial chemistry and software development to help achieve an Ecological Civilization. This is a prime area for both competition and cooperation, but will require considerable attention to appropriate governance measures applied in a timely and enabling fashion. Also, more attention to social, economic and environmental impacts.
- Certainly future changes will not proceed smoothly or linearly in coming years as new technologies,

software apps, and other innovations are introduced. We can see into the future, but less accurately predict outcomes, especially after 2040 or 2050. Transportation is a case in point. However, the big picture of moving from fossil fuel economy towards renewable sources of energy, tighter management of water, capacity to monitor more carefully environmental risks, and many other concerns such as consumer preferences is becoming clearer with each passing year; and largely due to computational capacity, big data, and the increasing use of very sophisticated remote sensing of the oceans, atmosphere, land use, etc.

4.10. Improving valuation and verification

The basis for decisions and assessment of progress must be highly credible and benchmarked with best practices in China and globally. Indeed the challenge is to move well beyond current best practices, especially via leapfrogging and rapid adoption of new technologies, better means of verification and other tools. Cost benefit based on adequate valuation of ecological services and careful assessment of carbon trading assertions are examples requiring on-going attention.

- China will need to provide transparent and credible information well beyond what currently exists to satisfy both domestic and international audiences. Greater international cooperation is needed in many cases, for example to reduce illegal, unreported and unregulated (IUU) exploitation of fish stocks, international trade in endangered species, and, very likely, in any system involving international carbon trading.
- Generally environmental benefits and ecological services remain unaccounted for in decision-making, and undervalued in national accounts. China is making progress in this area, but the reality is that

much work remains to be done. In China's efforts with other developing countries, the situation is likely to be similar, or sometimes far worse since basic data may not be available. This is a theme that requires steady progress, backstopped by considerable scientific effort.

- The idea of individual green performance accountability of officials at various levels of local government is a new concept. It depends on having good information fairly applied in the performance assessment. This is a model that might have more widespread application, but also needs to be optimized for both impact and fairness.

5. CONCLUSION

This Issues Paper has covered some pressing concerns for the future of our planet and people, and proposes an accelerated pace of action. We must remember however, that the green shifts are only part of a larger picture. The World Economic Forum has identified what it considers to be the 10 biggest global challenges.¹⁹ These include climate change, food security, inclusive growth and creating 500 million new jobs globally, gender equality, future of the Internet, and a regulatory framework sufficient for the long-term improvement of trade and investment. Accelerating progress on green transitions must contribute to the solution of these and other challenges such as demographic shifts in various countries and regions.

Layered above all is a set of concerns such as how to achieve sustainable development and environmental security in the aftermath of violent conflict, or of political dysfunctionality and other governance failures. The persistent question of providing an adequate level of financial transfers (and transfers of technology) from richer to poorer countries lies at the heart of all aspects of global green development. This will require solutions well beyond issuing green bonds

¹⁶ <http://www.greattransition.org/publication/bounding-the-planetary-future-why-we-need-a-great-transition>

¹⁷ See The blue economy – growth, opportunity and a sustainable ocean economy. World Ocean Summit 2015. https://www.oceanprosperityroadmap.org/wp-content/uploads/2015/05/2.-State-of-the-Blue-Economy_briefing-paper_WOS2015.pdf and Developing a blue economy in China and in the USA <https://cdn.americanprogress.org/wp-content/uploads/2015/05/ChinaBlueEcon-report-final.pdf>

¹⁸ <http://www.zujiwangluo.org/ecological-footprint-results/> and http://www.footprintnetwork.org/images/article_uploads/China_EF_Sustainable_Consumption_2014_English.pdf

¹⁹ <https://www.weforum.org/agenda/2016/01/what-are-the-10-biggest-global-challenges/>

and other recent financial innovations, important as they may be. And how to ensure that people can have access not only to the essentials for life, but also the fruits of a prosperous way of life? Global population may rise to a mid-century UN projection of 9.7 billion people²⁰ making sustainability challenges much greater. But equally challenging are the rising consumption demands of newly rich and already wealthy countries.

It may be said that a call for accelerated progress on environment and development beyond the levels so painstakingly worked out in the Paris Agreement or other environment and development accords is futile. But there can be no alternative. We know that the various ratified environment and development agreements still do not add up to a whole that is sufficient to safeguard our planet's future. Currently no country can claim to have reached a sustainable state since we are interdependent and vulnerable to global environmental change.

Acting on this interdependence is a task for all. However, now is China's moment in the sun—over this coming decade and probably for much longer. There is no country in the world that is likely to spend more on green transformation in coming years. And it will

do so for good social, economic and environmental reasons related to its own secure future. Internationally, China has the opportunity to move to the front of the line, not only on innovative technology development and application, but also to demonstrate how to rapidly implement desirable changes and to encourage such action throughout the world.

Hopefully CCICED through its present and future endeavors will contribute to this effort. Certainly two key approaches stand out. One is to create an Outlook approach consistent with meeting urgent and also longer-term policy needs related to innovative green transitions. The other is to support China's considerable efforts with developing nations through expanded consideration of green development in all of China's overseas endeavors.

China is drawing upon its ancient history and values as it constructs an Ecological Civilization. All of us, Chinese and non-Chinese, need to seriously reflect on how this integrative approach might lead us into a better global situation. The coming five years within China should help to prove its worth. If so, then it deserves to be an important component in our global quest for sustainability.

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²⁰ <http://www.un.org/en/development/desa/news/population/2015-report.html>



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