Building an Ecological Civilization in China: Towards a Practice Based Learning Approach

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Abstract: The adoption by the 18th Congress of the Communist Party of China in November 2012 of a policy on ecological civilization is a landmark event for the nation and the world community. China’s vision for building an ecological civilization is comprehensive, multi-sectoral and systemic and is intended to direct and balance progress among ecological, economic, social, cultural and political dimensions of change. Some on-going efforts and potential future activities that meet China’s vision of an ecological civilization are described. Establishment of dedicated ecological civilization areas for experimenting with legal, regulatory and administrative incentives that would facilitate the march towards the ideal is encouraged. Chinese biosphere reserves which are designated with the explicit aim of building harmony between humans and nature would be suitable candidates for designing and developing such dedicated ecological civilization areas.

Key words: Ecological, civilization, experimental, learning, biosphere.

1. Introduction

The commitment to build an ecological civilization has emerged strongest, and is now government policy in China, the country with the largest (about 19%) of the world’s population. China cherishes its memory of more than 5,000 years of living relationship between its people, land and the environment. At the same time it is a nation where the pace of industrial progress and economic growth over the last three decades has compressed changes that spanned centuries in other industrialized nations of the world. China has been referred to as a civilizational state, in contrast to nation states that spearheaded the industrial civilization two centuries ago, by Chinese [1] as well as western [2] scholars.

Felipe Fernandez-Armesto [3] defines civilization as a relationship to the natural environment. The civilizing impulse is driven by an ambition to re-engineer the natural environment to meet human demands. He points out that civilization is a relationship between a single species, i.e. Homo sapiens sapiens, and the rest of nature. Kai [4] writing in Qiushi, the organ of the Central Committee of the Communist Party of China noted that the term “ecological pertains to the state in which nature exists, whereas the term civilization refers to a state of human progress. Thus ecological civilization describes the level of harmony that exists between human progress and natural existence in human civilization.” In China there is growing concern at the highest levels of the leadership that the balance between the ecological and material dimensions of civilization may have tilted sharply against the ecological.

Like civilization, ecology is a relational term; it is the study of the relationship between living things and their environments. The German zoologist Ernst Haeckel (1834-1919) coined “ecology” borrowing from the Greek oikos—a house, dwelling place or habitation, and logos—“logical” or persuasion...
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through the use of reason, respectively. Since the first human landing on the moon and the rapid rise in the number of satellites circling planet earth we are increasingly aware of the “wrongs” we have inflicted upon nature. But, as the impasse in international climate change negotiations in recent years has shown, our ability to “right” our “wrongs” is a challenging task even when nations agree, in principle, on the urgency for action.

The aspiration-achievement gap is common to programs and initiatives that attempt to address and solve environment and development problems at global and national scales. A synthesis of more than 60 national reports prepared for the Rio+20 Summit on Sustainable Development convened in Brazil in June 2012 by UNDP (United Nations Development Program) and UNDESA (UN Department of Economic and Social Affairs) noted: “Today’s challenge is chiefly implementation. The evidence from the reports is overwhelming that a gap exists between stated commitments to sustainable development and the reality of implementing sustainable development policies and programs in all countries and regions reviewed” [5].

China is a country with a governance system whose evolution is time-tested and continuing. The last 3 decades of rapid economic growth and progress in industrial, science and technology development has made China a society with significant inequalities in social, economic and environmental wellbeing of its people. There are large tracts in western China that aspire towards the economic prosperity already attained by the eastern provinces. China’s commitment to an ecological civilization faces the challenge of convincing a vast majority of its people and administrators that the growth model of the past three decades that pulled millions out of poverty and made China the second largest economy in the world must now be exchanged for an alternative whose contours remain vague and demands changes that have not been tested elsewhere at scales appropriate to a vast and populous country as China.

In this paper, we advocate a practice based approach that will promote experimentation and learning in the construction of an ecological civilization in China. Although the strategic vision is national, experimentation and learning must begin at local and context-specific scales. China may consider establishing a number of special areas, similar to those dedicated to free trade, exclusive economic development etc., that have been part of China’s drive for rapid development over the last three decades, dedicated for experimenting with regulatory, policy and market measures for guiding institutional and behavioral adaptations for the transformation towards an ecological civilization. A pilot network of places chosen from the CBRN (Chinese Biosphere Reserve Network) (Fig. 1) could constitute such a set of dedicated areas for supporting the emergence of an ecological civilization. CBRN includes sites that are part of the World Network of Biosphere Reserves of UNESCO (United Nations Educational Scientific and Cultural Organization) and thus would attract interested individuals and institutions from other parts of the world that are keen to engage with, contribute to and learn from the bold endeavor that China has embarked upon.

2. An Overview of China’s Vision for an Ecological Civilization

Gaoli [6] provides a comprehensive view of China’s vision in promoting ecological progress leading to the emergence of an ecological civilization. We have summarized six principles and related guidelines as well as important facts and issues that must be addressed to promote ecological progress as envisaged by Gaoli [6] (Table 1). The author stresses: “Building an ecological civilization does not mean that we must abandon industrial civilization and return to primitive ways of living. Rather, it means building a civilized society with developed production, affluent standards of living, and sound ecological environments
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Fig. 1 A map showing the distribution of biosphere reserves that are part of the CBRN (Chinese Biosphere Reserve Network) as of 1 January 2015. 32 of them marked in red squares are recognized by UNESCO’s Man and the Biosphere (MAB) Program as world biosphere reserves.

in accordance with the goals of realizing sustainable development and achieving a state of balance between nature and humans.” This view resonates with other policy prescriptions of multilateral financial institutions for China; for example, in its vision for China 2030 [7], the Bank urges China to “grow green”; “instead of considering environmental protection and climate change mitigation as burdens that hurt competitiveness and slow growth…green development could become a significant growth opportunity.” Building an ecological civilization is hence a challenge in engineering and sustaining harmony among economic, social, environmental, cultural and political trajectories of change.

In adopting the notion of ecological civilization at its 18th Congress in November 2012, the CPC (Communist Party of China) placed ecological progress on par with economic, political, cultural and social ones and formulated an agenda to develop socialism with Chinese characteristics [6, 8]. There is some parallel between CPC’s visioning of an ecological civilization and international emphasis on economic, environmental and social pillars of sustainable development adopted by nation states at the World Summit on Sustainable Development convened in Johannesburg, South Africa in 2002. Since then, organizations, such as the UCLG (United Cities and Local Governments) have built on UNESCO’s Universal Declaration on Cultural Diversity [9] and the Convention on the Diversity of Cultural Expressions [10] and called for the recognition of culture as a fourth pillar of sustainable development [11]. To
Table 1 Progressing towards an ecological civilization in China (summarized and adapted from Ref. [6]).

<table>
<thead>
<tr>
<th></th>
<th>Six basic principles of ecological progress</th>
<th>Important guidelines for attaining the principle</th>
<th>Facts and issues linked to the principle and guidelines for ecological progress in China</th>
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<tbody>
<tr>
<td>1</td>
<td>Optimizing spatial planning on the basis of functional zones.</td>
<td>Firm commitment to a strategy of functional zoning; make urbanization more intensive, intelligent, green and low carbon; China to become a leading maritime nation.</td>
<td>In the “years ahead” more than 100 million people are expected to leave the countryside and take up residence in urban areas; the four “red-lines” of ocean development—no damage to ecological balance, no undermining of ecological functions, no changes to basic properties and no further deterioration of already damaged ecosystems.</td>
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<td>2</td>
<td>Effectively reducing pressure of economic activities on resources and environments through efforts to adjust and optimize industrial structures.</td>
<td>Dissolving excess production capacity; transformation and upgrading of industries; underpinning the role scientific and technological improvements in promoting ecological progress; devote significant efforts to develop circular economies.</td>
<td>Prohibit approval of new projects that will increase production capacity in industries where there is serious excess capacity; some sectors should be suppressed and others allowed to grow; ecological transformation of agricultural, industrial and service sectors; devotion of greater efforts to research and development; reduction, reutilization and recovery with emphasis on reduction; “Ten-Hundred Thousand” schemes to showcase circular economies through a series of demonstration projects.</td>
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<td>3</td>
<td>Comprehensive enhancement of resources conservation in order to transform the way resources are utilized.</td>
<td>Conserve energy, reduce emissions, and lower consumption; step-up efforts to use water, mineral and land resources economically.</td>
<td>Non-negotiable target of cutting emissions of ammonia nitrogen and nitrogen oxides by 10%; “10,000 Enterprises Energy Efficiency and Low Carbon program”; three “red-lines” in the use of water—controlling exploitation; controlling efficiency of use; and prevent pollution; improve mineral recovery rate by 20% to reach international standards; maintain the minimum of 120 million hectares of arable land to guarantee food security and step up efforts to deal with idle land and use every inch of land economically.</td>
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<td>4</td>
<td>Strengthen efforts to control pollution in order to improve the quality of ecological environments.</td>
<td>Firm action to control air pollution; significant efforts to address water and soil pollution; practical steps to protect ecosystems; mount an active response to climate change.</td>
<td>All local governments and departments are required to conscientiously implement major decisions of the central Government; revert farmland back to forest and grazing land to natural grasslands; lower CO₂ emissions by 40-45% by 2020 (compared to 2005 level); increase proportion of non-fossil fuel energy in primary energy consumption by 15%; increase forest area coverage by 40 million hectares and forest volume by 1.3 billion cubic meters relative to 2005 coverage and volume, respectively.</td>
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<td>5</td>
<td>Improving laws and regulations and creating innovative systems and mechanisms to underpin ecological progress.</td>
<td>Strengthen existing laws and regulations to promote ecological progress; systems to assess and appraise current modes of economic development; further improvements to market mechanisms and economic policies.</td>
<td>Establishment of an ecological civilization requires revolutionizing the way the country produces, lives, thinks and the values it cherishes; institutional arrangements and reform of administrative systems as a means to protecting ecological environments; life-long accountability system for ecological damage for leading cadres; polluter pays and trans-ecological compensation system; systems for trading energy savings, carbon emission rights, pollutant discharge rights and water usage rights.</td>
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<td>6</td>
<td>Green and low-carbon consumption in order to create a sound social atmosphere for ecological progress.</td>
<td>Accelerate efforts to raise awareness of ecological progress; advocate green life-styles; make effective use of public oversight.</td>
<td>Ingrain the notion of ecological progress deeply within the conscience and actions of the public; establish ecological progress as mainstream value and spread it to all corners in all respects; and develop a moderately prosperous society in all respects.</td>
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In opting for “ecological” (instead of “environmental”) as an adjective for “progress” and “civilization”, Chinese leaders have chosen to emphasize analytical, system-based thinking and action. Changes that China must undergo to execute inter-linked, multi-sectoral and system-wide changes...
described in Table 1 require knowledge and wisdom as well as long-term commitment to action, experimentation and learning. Hardin [12] believed that what engineers called “system analysis” and biologists referred to as “ecology” were similar approaches to understanding and knowledge development. In the five-pronged approach (i.e., cultural, ecological, economic, political and social) to build an ecological civilization the rates of change Chinese planners and administrators can influence in each of the five domains will vary over space and time. Relative stability in cultural and political domains can facilitate accelerated rates of changes in ecological, economic and social spheres. Within the vast landmass that is China the specific mix of the five prongs in particular places and over given periods of time will create a patchwork of regions and localities that are advancing at varying rates towards the goal of ecological civilization. Norgaard [13], in his reflections on the discourse on ecological civilization initiated by China imagined it to be a “patchwork quilt of co-evolving ecological societies”. Earlier on Ref. [14] he had introduced co-evolution as a central concept in re-visioning future societies.

3. Glimpses into the Emergence of an Ecological Civilization in Practice

China’s appetite for fish and its impact on global fish-stocks are frequent causes for alarm among environmentalists. But the efforts of some Chinese scientists and business-people to reinvent China’s aquaculture [15] are perhaps less known. They have adopted IMTA (Integrated Multi-Trophic Aquaculture), tested in Canada, Scotland, US and Norway and scaled it up to create “ocean ranches” as well as 18,400 sq.km of fishponds, that in the words of a reputed Norwegian fisheries expert is “a completely different thing than what we are doing.” IMTA transfers the logic of circular economy to fisheries ecology: multiple species recycle each other’s excrements (or nutrients). IMTA in Canada’s Bay of Fundy is a series of neighboring cages with nutrients flowing down-current with water. The Chinese version in Zhangzi and neighboring Islands has transformed islands into in-situ cages; while Fundy produces 200 tons of kelp and 300-400 tons of mussels per year, islands around Zhangzi produce 60,000 tons of kelp, 200 tons of sea-urchins, 300 tons of oysters, 700 tons of sea-snails, 2,000 tons of abalones and 50,000 tons of scallops each year.

Vance’s [15] description of the on-going revolution in China’s aquaculture is a clear illustration of the application of ecological knowledge to address and solve interlinked problems of the environment, food security and economic growth. The emphasis is clearly on learning through doing, i.e., practice. The effort is based on an intimate study, knowledge and tinkering of ocean currents and water flows and their modeling to simulate flow of nutrients. Artificial reefs are built and sustained to recover ecosystem health in coastal areas. Scientists from the CAS (Chinese Academy of Sciences) collaborate with fish businesses and fish farmers to experiment in particular contexts in order to generate tangible benefits for the stakeholders concerned. Vance [15] quotes the same Norwegian fisheries expert referred to earlier on with regard to the Chinese approach: “They are mastering these challenges. Not to perfection—no way—but much better than anywhere else.”

Practical experimentation on terrestrial ecosystems is equally critical. While only 12% of China’s 9,560,900 km² (1,147,308 km²) is arable, China has committed to sustain 1,200,000 sq.km of agricultural land to ensure food security and the efficient use of every inch of land (see facts and issues linked to principle 3 in Table 1). At the same time the country has ambitions to revert farmland back to forest (see fact and issues linked to principle 4 in Table 1). In China a majority of initiatives for reducing carbon emissions are concentrated in industrial and energy sectors; the 7 pilots for experimentation with ETS (Emission Trading Schemes) are almost entirely
dedicated to these sectors in 5 cities and 2 economically prosperous provinces in the east of China [16]. But a mix of improved agricultural practices, afforestation/reforestation and rural energy efficiency and development options have the potential to contribute not only to food production and security goals; but also to reducing ammonia and nitrous oxide linked emissions by 10%, lower CO₂ emissions by 40-45% by 2020, and create “10,000 Enterprises Energy Efficiency and Low Carbon Program” (see facts and issues of principles 3 and 4 in Table 1).

In China’s Shanxi Province, 50% reduction in fertilizer use has been linked to 4%-15% increase in farmer household incomes [17, 18]. China is a world leader in biochar research [19]; biochar has proven potential for minimizing green house gas emissions by decreasing the need for nitrogen based fertilizers. Each unit of nitrous oxide emission is nearly 300 units of CO₂ emissions. Biochar is known to increase crop-yields by several folds particularly in arid and semi-arid soils that dominate China’s Western Provinces. It has the capability to improve quality of poor and degraded soils. Manufacture of biochar can be accompanied by syngas and biofuels for use in rural energy and transport and for stimulating rural enterprise and employment opportunities [20]. China recently issued a ban on straw burning, a major source of green house gas emissions in the agricultural sector. The ban has stimulated small businesses for the collection of farm residues at the local level and their delivery to factories that produce a mix of biofuels, biochar and bioenergy for rural development. The Nanjing Agricultural University and its industrial and business partners have cooperated in the production of a number of biochar based fertilizers that are now available in the market. However, their wider use and application requires raising awareness of local authorities and farmers with regard to the mix of ecological, social and economic benefits that the use of biochar products can generate [21].

If China is to sustain a minimum of 1,200,000 km² of land for ensuring food security and at the same time be able to revert farmlands to forest and natural grasslands (facts and issues linked to principle 4 in Table 1), then it not only must strive to “use every inch of land economically” (see facts and issues linked to principle 3 in Table 1). It should launch programs to recover land degraded by mining and other industrial operations and find ways of improving productivity of marginal lands where soil quality is poor. Biochar and other green agricultural technologies and tools have a significant potential to contribute towards the development of green and low-carbon agriculture as part of China’s ecological civilization experiment.

Since 2000, China’s NFPP (National Forest Protection Program) and SLCP (Sloping Land Conversion Program) have increased China’s forest cover by more than 60 million hectares making China one of the world’s leading nations implementing afforestation schemes [22, 23]. It is rather ironical that carbon credits generated through such a massive rehabilitation program could not be part of emission trading schemes that developed under the Kyoto Protocol and came into effect after 2005. Kyoto linked emission trading schemes, focusing almost entirely on energy, industrial and power sectors have ignored the potential for bringing land use change into carbon equations and for linking industrial and land use sectors in innovative ways to encourage simultaneous emission reduction and carbon sequestration actions. A critic of the Kyoto Protocol, Victor [24] observed that “the more credit awarded for CO₂ that plants and trees are already absorbing, it is easier for nations to comply with Kyoto targets…. “ China’s vision for an ecological civilization must extend beyond its international obligations for mitigating and adapting to climate change. It can create opportunities to interlink emission reduction targets in the industrial and power sectors to land use change based carbon sequestration schemes and restoration of natural and agricultural ecosystems.
Globally, the potential for trading carbon credits generated by land use changes has improved in recent years with greater recognition of the importance of IFM (integrated forest management) and SALM (sustainable agricultural land management) for mitigating climate change [20, 25]. Chandler Van Voorhis, managing partner of “Green Trees” reported a study which showed that “if reforestation/afforestation is scaled to its maximum across the globe, we can sequester 5.5 billion tons of CO₂ globally a year, which is about 15% of the reductions that we need. By 2100 this would reduce the temperature curve by 10% or by 0.2 °C”. He further adds: “…a tree has no economic value until it is cut down…What happened when carbon came along is it started to have some economic value. When you start adding other ecosystem values like water and biodiversity, you start creating a capital stack” [26]. Environmental (biodiversity, water, soils), social (job-creation, building schools, hospitals and other infrastructure in rural and remote areas) and economic (increased revenue generation; attracting private sector investment interests) co-benefits are sought after by project developers who focus on land-based emission reduction schemes because a “carbon reduction is relatively intangible” [27] for ordinary citizens to perceive or appreciate.

Land use change based carbon emission reductions have become a significant component of voluntary carbon markets worldwide and co-benefits are given significant importance by investors and offset-buyers who are engaged with such markets [28]. As the infrastructure for carbon markets begins to take shape in China, it is worth considering a greater role for voluntary market transactions that can generate multiple ecosystem benefits across the nation. Currently the trial Beijing Emissions Offset Management Measures for carbon-intensive entities allows the use of CCERs (China Certified Emission Reductions) to offset only 5% of their total allowance [16]. However, as Gaoli [6] has noted (see facts and issues linked to principle 5 in Table 1): “Establishment of an ecological civilization requires revolutionizing the way the country produces, lives, thinks and the values it cherishes; institutional arrangements and reform of administrative systems as a means to protecting ecological environments; life-long accountability system for ecological damage for leading cadres; polluter pays and trans-ecological compensation system; systems for trading energy savings, carbon emission rights, pollutant discharge rights and water usage rights.” Trans-ecological compensation systems may link developed and developing regions as well as spatially distant urban, rural and the natural ecosystems within the country through a mix of market and public sector institutional arrangements. And if emerging trading schemes are to encourage stacking together energy savings and carbon emission rights with other benefits linked to clean water, biodiversity, soil productivity and other ecosystem benefits then China may learn as much or more from the global voluntary carbon markets compared to what it can based on its experience with the Kyoto Protocol which has suffered significant set-backs in the international arena since 2009. As China embarks upon decades, if not even centuries-long, experiment to build an ecological civilization it must be creative in adapting lessons learnt from the implementation of international conventions and protocols. It can create institutional arrangements and linkages between different development sectors that can take full advantage of its own cultural strengths and governance system.

4. Ecological Civilization Area—A Network of Places for Experimentation and Learning

The eco-civilization experiment in China cuts across all sectors and regions. China’s leadership in some aspects of renewable energy, the determined shift away from coal to natural gas to supply electricity to major cities like Beijing are essential parts of that continuing experiment. However, as
noted by Kai [4] quoted earlier, in the Chinese leaders understanding ecological civilization refers to the “level of harmony that exists between human progress and natural existence in human civilization.” Hence, places in China where opportunities for bringing the interests of human and nature together to demonstrate harmonious way of growth and development must play an important role in promoting ecological progress in China.

Nationally, 15% of China’s surface area is set aside as nature reserves, scenic areas and forest parks [29]. Like in many other parts of the world, areas set aside for nature conservation are much larger in sparsely populated and low (agriculturally) productive regions; according to Ref. [30], eight large reserves in the five western provinces cover an area that is roughly equal to 2,000 of the remaining 2,500 parks and reserves in other parts of China. CBRN (Fig. 1) includes more than 150 of these sites; 32 of them are part of the World Network of Biosphere Reserves of UNESCO.

The origin and the evolution of the concept and practice of biosphere reserves have been analyzed elsewhere [31, 32]. Designated under UNESCO’s Man and the Biosphere (MAB) Program, biosphere reserves have an explicit goal of promoting a harmonious relationship between humans and nature. Conventional national park models use legal definitions, boundaries and tools to protect and conserve nature. But biosphere reserves, despite the fact that all of them include one or more legally protected core zones where nature and biodiversity conservation are the primary concerns, also include buffer and transition zones where people live, agriculture, forestry and other economic sector activities are practiced and at times even include urban areas. The presence of resident communities and human enterprise is a necessary condition for biosphere reserve status; a strictly protected nature reserve with no people residing in it will not qualify as a biosphere reserve. As such they bring together the two essential components, i.e., people and nature, of the ecological civilization imagination in China. Furthermore, coordination of Chinese Biosphere Reserve activities are directly under the CAS (Chinese Academy of Sciences) facilitating collaboration between scientists, administrators and resident communities that is critical to the building of an ecological civilization.

In some biosphere reserves of China, authorities have succeeded in improving economic and social benefits arising from tourism management and their distribution among local villages and communities. In the 106,000 ha, Jiuzhaigou Valley Biosphere Reserve (JVBR) in Sichuan Province, which includes the 72,000 ha, Jiuzhaigou Valley Scenic Area and World Heritage site, authorities introduced drastic measures to minimize negative environmental and social impacts when the number of visitors to the area grew by 68% between 1998 and 2000. Hotels inside the core zone of the reserve were shut down and construction of new hotels halted; a joint stock company where residents were shareholders was created to take away incentives for uncoordinated construction of new hotels and for providing employment opportunities for those whose livelihoods were adversely impacted due to the changes introduced. Entering the reserve in private vehicles was banned and the administration operated buses for taking groups of visitors into the reserve. Income distribution among three villages studied changed from 4.3:4.6:1.0 during 1993 to 2001 to 1.9:2.5:1.0 in 2004 [33].

Harris [30] and Yeh [34] have observed that in many Chinese nature reserves communities tend to be resident even within the core zones. Relocating people from within the core zone is a task that requires careful planning and constant negotiations between administrators and resident communities. The administration in the Wudalianchi Biosphere Reserve in Heilongjiang Province in the northern extreme of China used a process of consultation and engagement to resettle residents from the core and buffer zones to
a new “eco-city” developed to promote tourism in the biosphere reserve. People were relocated to an area where infrastructure for schooling, health, sports and recreational activities were developed and which could never have been made available to them within the core zone (Fig. 2). For the future, the Wudalianchi administration has identified “green agriculture” in buffer and transition zones as a socially and ecologically beneficial land use option that could help to diversify income generation and wealth creation opportunities from a singular dependence on tourism that is characteristic of many parks and reserves throughout the world.

In the construction of an ecological civilization China’s leaders expect to introduce administrative reforms that will hold leading cadres responsible for ecological performance throughout their working life (see fact and issues related to principle 5 in Table 1). At the same time, as underlined in facts and issues linked to principle 6 in Table 1, ecological progress is to be ingrained as a mainstream value within the conscience and actions of the public at all levels in all respects. Hence, the process of the construction of an ecological civilization must engage planners and administrators as well as citizens. Opportunities for deliberative planning and learning through civic action and engagement of planners and the public in joint definition of problems and their solutions [35] must be created and promoted. Biosphere reserves, with their essential mix of people and nature provide the best laboratories for experimenting with such collaborative planning, action and engagement for learning lessons and sharing them within China and internationally. They can become the “patchwork quilt of ecological societies” within China, as imagined by Norgaard [13] referred to previously; and at the same time raise awareness and stimulate other “patches” to emulate, experiment, learn and join the progress towards an ecological civilization.

However, planning as well as other design professions that impact public spaces and people is “deeply and inevitably political” [35]. Chinese planning and governance model, which appears centralized and top-down to external observers nevertheless can and does encourage considerable negotiations and deliberations amongst context-specific stakeholders at the local level. Since deliberations occur in the Chinese language, outsiders without the language proficiency who would like to learn from specific cases in China require considerable patience and commitment to stay engaged.

International engagement with China and its efforts to build an ecological civilization must be based on an acknowledgement and respect for China’s cultural and political specificities and reasonable expectations. In the nature conservation arena, claims that the national park presented a “new model” of conservation [34] through the establishment of China’s first national park (Pudacuo National Parks in northwest Yunan) for using market based methods to combine conservation and community benefits through tourism revenues have been disappointing. In our view they were not needed given the fact that experience in doing so have already been gained in places like JVBR referred to earlier. The national park model started with Yellowstone in the United States in 1872 and is about to commemorate 150 years of practice in 2022 and does not qualify as a new approach. Until about the early 1970s application of the national park model prevented local people access to resources with main uses of the area being scientific, educational and recreation and leisure for those who visited the parks. The biosphere reserve approach was introduced in the early 1970s partly as an alternative to the national park model in practice at that time; biosphere reserves, from very early days, explicitly prioritized the need to recognize and cater to the interests of local communities [31, 36].

Assumptions about introducing market based methods that ignore the reality of the dependence of local Governments and administrations of China’s nature reserves and scenic areas on tourism and the
hospitality sector for income generation fail the test of pragmatism. As Yeh [34] has observed implementation of several payment-for-ecosystem services (PES) schemes in developing countries, including China’s SLCP scheme referred to earlier in this paper do not satisfy free-market model assumptions and continue to be hybrid-schemes combining public and private sector financing and inputs. Pirard and Lapeyre [37] analyzed a sample of 106 peer-reviewed articles and questioned the validity of the widespread use of the term, Market Based Instruments (MBIs), since in practice most cases had strong public sector financing and in-kind contributions. The drive towards an ecological civilization will be one where public and the private sectors and Government and market instruments are innovatively mixed to deliver desired results within the constraints and opportunities offered by China’s specific cultural and political characteristics. As Forester [35] has wisely observed, “Astute practice in messy, highly politicized settings provides important intellectual challenges to planning theory, and to social and political theory more generally. Tacit practice can lead written theory.” It is important that in the efforts to build an ecological civilization, cultural and political realities on the ground must be duly acknowledged as such and measures introduced to drive economic, social and ecological change in a balanced and preferred direction. Too much reliance on purely theoretical approaches is bound to disappoint.

Last but not the least, the use of biosphere reserves that combine conservation and socio-economic growth and expansion in different zones allows Chinese planners and managers to develop applied knowledge and experience for “optimizing spatial planning on the
basis of functional zones” (see principle 1 in Table 1). At the national level discussions on functional zones tend to focus on the urban-rural divide. But at the level of a specific place such as the Wudalianchi Biosphere Reserve, spatial planning, benefiting from space, air and ground based sensing technologies and other advanced science and technology practices can enable and facilitate participatory planning and learning by both administrators and citizens for jointly defining the distribution of ecologically, economically, socially and culturally important land use patches within their own space of life and work. The creation of special ecological civilization areas in some biosphere reserves that are part of CBRN will help make the learning linked to addressing and resolving the intellectual and practical challenges of building an ecological civilization more systematic and shared.

5. Conclusions

Fang and Kiang [38] noted that “China’s extraordinary rate of economic development makes it a historically unique grand scale socio-economic and ecological experiment. No one knows what the future holds, but there is no doubt that the experiment will have an unprecedented impact not only on the country’s own environment and that of its neighbors but on the world as a whole.” Nearly six years after this observation was made by two of China’s leading ecologists the Government of China declared its commitment to build an ecological civilization. The commitment has significantly expanded the world’s interest on China’s pragmatic and experimental approach to development and future.

Deutscher [39], a linguist, observed that “English speakers rely on their language as a fallback strategy when they are required to solve a vague task for which there does not seem to be a clear answer.” The future of our earthly home, in the light of our growing awareness of the ills we have, and continue to impose on climate and nature, is a question for which we now have only vague answers. It is not surprising that “sustainable development” has often been criticized as an oxymoron even though it has become a rallying vision for the nations of the world to collectively discuss remedies for the earth’s environmental problems and the search for new directions of socio-economic development [40]. Ecological civilization as an idea gives expression to the commitment of China to seek alternative development pathways that will benefit its own and the world’s ecology. Contributing towards its realization is a challenging and worthy venture.

However, intellectual clarifications of the notion of ecological civilization alone will not ensure that the dream becomes a reality. The task requires experimentation in real-life circumstances engaging scientists, planners and administrators and citizens and the public to come together and share knowledge, experience and learning. Scientific research must engage with the messy, disorderly reality of the world and grasp opportunities for other actors in society to become collaborators and data providers. Encouraging the practice of such “science in the wild” [41] would require changes in reward and incentive schemes currently offered to Chinese scientists.

The dawn of ecological civilization over a vast land mass such as in China will inevitably be patchy. But experimentation, learning, sharing and emulation can be encouraged by promoting and incentivizing legal, regulatory and administrative changes in dedicated areas for facilitating the transformation towards an ecological civilization. We have proposed that the places included in CBRN could provide candidates for establishing such dedicated ecological civilization areas, paralleling free trade and similar zones that have been set up for China’s rapid economic growth over the last three decades. Continuous experimentation to create conditions for the emergence of an ecological civilization in context-specific, local geographies will also enable citizens and public to engage in the national agenda and better understand the meaning and implications of
changes needed for themselves now and in the future. In building an ecological civilization it is hence important to not merely “think ourselves into a new way of acting” but also “act ourselves into a new way of thinking” [42].

References


