

Verge of Collapse? Survival of Civilization in the Anthropocene

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Are we on the verge of a collapse of civilization (global, western and Chinese) in the age of the Anthropocene? The Anthropocene is a term described by ecologist Eugene Stoermer and independently by Nobel Prize recipient Paul Crutzen. The term considers how human behavior (man) influences the earth and environment.²

The necessary demands of humanity affect our earth, environment and ultimate survival. China and the United States both have environmental standards and complex environmental problems. Comparing the two systems of environmental protection in this paper is but one step regarding actions being taken.

Some are calling the world's current environmental condition an unprecedented emergency where sustainability is challenged with overpopulation, development, and increased consumption and is showing clear signs of overall degradation, water pollution and air pollution. When the air in China and parts of California's central valley, and many other places, are so thick with pollution that children and adults are warned to stay indoors; when major life activities are affected; when regional water sources are rendered toxic for thousands of people, undrinkable, and unsafe for their populations, governments are challenged to enact and implement effective laws, policies and enforcement. *Effective* is another word for actionable and something that can be accomplished with and for society. They must do this in order to protect the people, civilization, and society, and to protect the environment on which we are interdependent for continuous and healthy survival.

Is One Big Idea Possible?

There has yet to emerge the "one big idea" alone that would enable countries and governments to solve today's environmental challenges and threats to sustainability. The world may be too complex for a single solution. Yet, many are working to solve different parts of the problem. They do so within the context of their own experiences and wisdom. They do so understanding the context of their governmental laws and regulations; challenging existing barriers and working across real and imagined barriers. They do so independently and in partnerships. They also do so knowing the global economy and our survival depend directly on the natural resources and systems (weather, water etc.) of the earth. Populations are placing ever-increasing demands on existing resources that, without planned or even unplanned adjustments, the demands of society will ultimately exceed the capacity of finite resources.

China and the U.S. have different systems of using laws to protect the environment. In October 2013, I met with Professor Dongbangjun, Chairman of the Academic Committee of the Criminal

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² Jan Zalasiewicz. Are we now living in the Anthropocene? GSA Today. February 1. 2008.
<http://www.mindfully.org/Heritage/2008/Anthropocene-Zalasiewicz-GSA1feb08.htm> . Retrieved 2015.01.15

Justice School at Zhongnan University, School of Economics and Law along with Dean Xia Yong. Dongbangjun is charged with developing a new section of Environmental Law at the university. He told me that although some laws have been promulgated in China, such as new environmental law, water protection law, and a special section in criminal law for the environment, there are few specific regulations for investigation standards, forensic and operating procedures to implement environmental law effectively.

In Dean Xia's large conference room at Zhongnan University we discussed collective and individual work in support of the environment and how or even if it is possible to make a difference to the health and survival of our civilization(s).

China knows it may be the proverbial canary in the coal mine. The air was thick with smog in Wuhan, and the blue sky and clouds were not to be seen during my visit there. It was a perfect opportunity to explore the theme of a conference I was planning to attend for the International Society for the Comparative Study of Civilization (ISCSC): *Can Collective Wisdom Save Civilization?* Both the United States and China have large populations, a plethora of natural resources and economies that depend on development and consumerism. Environmental issues are forcing governments to collaborate internally and externally. In this sense, we are not independent from one another but interdependent.

Regional and National Boundaries Ignored

Environmental issues do not respect regional or national boundaries. The gaps between China and the United States are wide enough to drive a Mack truck or camel caravan through because of our different types of governments, cultural and societal conditions, population-levels, legal and regulatory structures. Yet, within these gaps are determined and innovative people hoping to influence better outcomes than the current conditions. If mankind cannot innovate to make collective wisdom prevail through the Anthropocene, the environment may decide to modify civilization on its terms, not ours. The effort requires cooperation by natural and social science experts, politicians, community members, the media, et.al.

Responding on his website to a report published in the Proceedings of the Royal Society B, by Paul and Anne Ehrlich on how the collapse of civilization has in the past, been caused by the degradation of nature, HRH The Prince of Wales said "We do, in fact, have all the tools, assets and knowledge to avoid the collapse of which this report warns, but only if we act decisively now. If, though, in our evermore interconnected and complex world, we are to succeed, real leadership and vision is required. It is just possible that we can rise to this challenge, but to do so we will need to adjust our world view in a profound and comprehensive way. We have to see ourselves as utterly embedded in Nature and not somehow separate from those precious systems that sustain all life. I have said it before and will say it again – our grandchildren's future depends entirely on whether we seize the initiative and prevaricate no further."³

Dr. Andrew Targowski, President Emeritus of the ISCSC (2007-2013) asked if indeed, we will see the end of contemporary civilization in the 21st century, in an article titled *State of Civilization: Where are we Heading?* His illustration, (*Figure 1. The Targowski Model*) shows how Western and other civilizations including China, link to global civilization and global

³ Prince of Wales and Duchess of Cornwall Government Media: <http://www.princeofwales.gov.uk/media/our-view/comment-hrh-the-prince-of-wales-royal-society-report-can-collapse-of-global> Retrieved 2015.06.20

economies. He links these to the development of technology, super-consumerism, and population growth leading to an ecological *bomb*; in turn leading to cultural crisis, resource depletion, climate warming and ultimately the end of current civilization. There are points in his article with which I agree but also differ. But, as Targowski states, the years of mass applications enabled by the Internet have promoted a global civilization and in turn, to an accelerated depletion of the strategic resources of our small planet, Earth.⁴

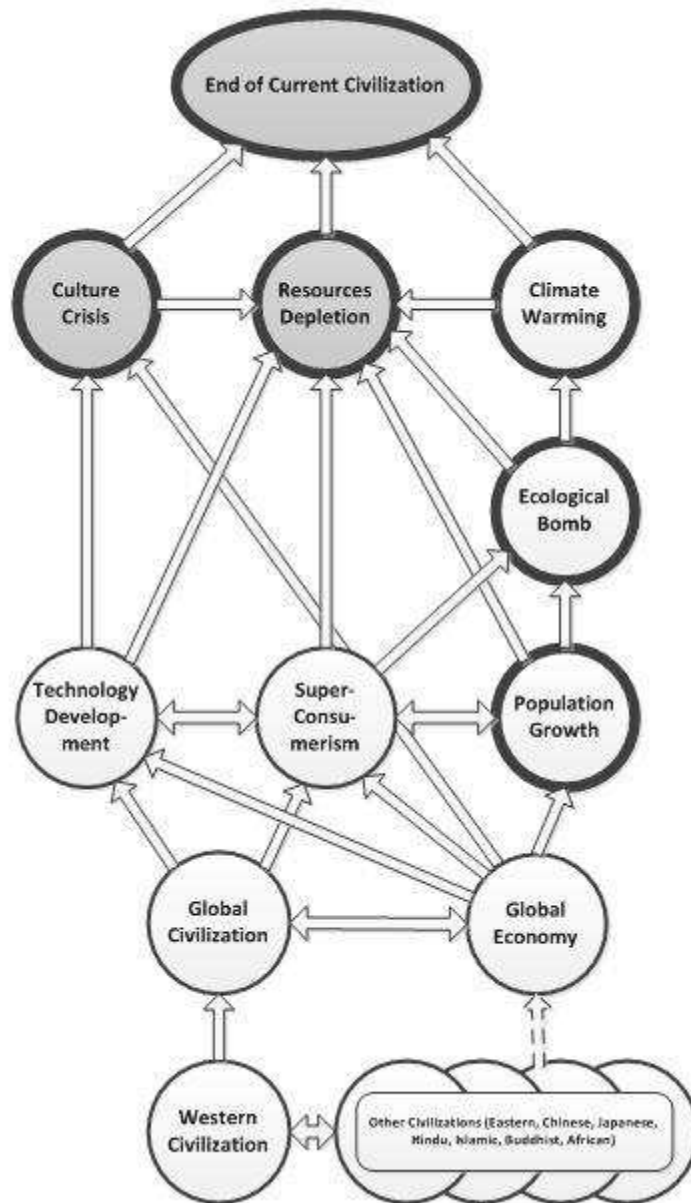


Figure 1. The End of the Contemporary Civilization to Come in the 21st Century?
Andrew Targowski 2014

⁴ Andrew Targowski, President Emeritus ISCS (2007-2013). State of Civilization: Where are we Heading? The ISCS Newsletter Winter 2014 Vol. 53 No.1 International Society for the Comparative Study of Civilizations. p. 2.
www.wmich/iscsc

I believe there is an alternative; that modern technology will actually help to cause an increased capacity and development of the human mind. It is such additional capacity and development that is critically needed as humankind more fully realizes the age of the Anthropocene with heightened awareness of its strengths, weaknesses, threats and opportunities.

Ecological Civilization?

In comparison to the Targowski Model there is room for a new “Ecological Civilization” model that, if realized by enough people, could influence an outcome different than the “End of Current Civilization”. It could lead to the survival of current civilization as an Ecologically Compatible Civilization. (*Figure 2. The Rhodes Model*).

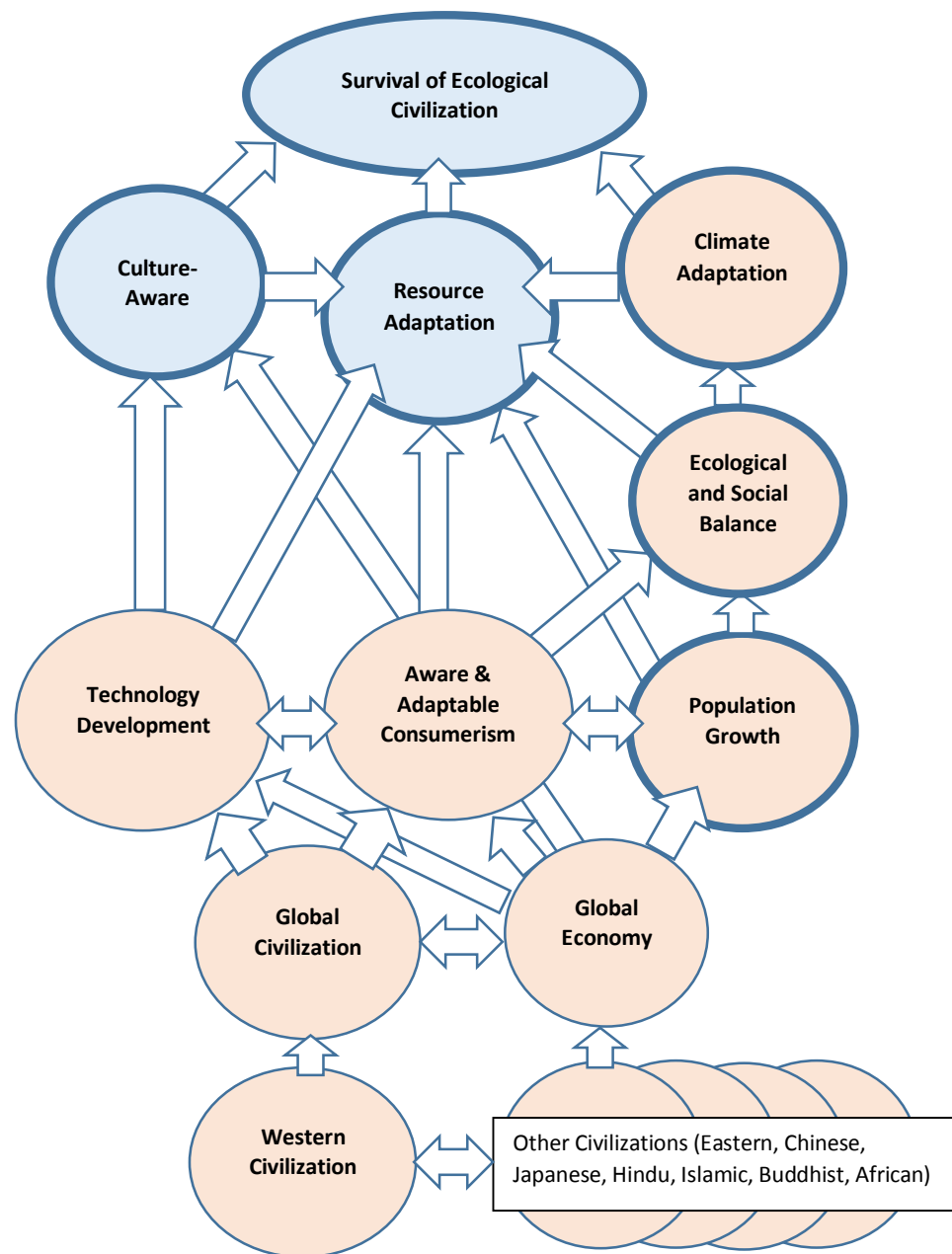


Figure 2. Survival of the Ecological Civilization in the 21st Century. L. Rhodes 2014

With education and cooperation, shifting the top 5 categories in Targowski's model to the *Rhodes' model* concepts could alter the outcome from the End of Current Civilization to the Survival of an Ecological Civilization.

Incremental Progress

Most governments are working within their formal, legal and environmental protection systems to try and address these issues.

China's Minister of Environmental Protection (MEP), Zhou Shengxian, announced in February 2014, a reformation of the system of eco-environmental protection and administration. His announcement is referred to as the "Decision". Minister Shengxian, is in charge of China's air, water, and land from pollution and contamination. The MEP is directly under the State Council and is empowered and required by law to implement environmental policies and enforce associated laws and regulations. In addition to its regulatory role, it funds and organizes research and development. It also serves as China's nuclear safety agency. The MEP replaces what was formerly called the State Environmental Protection Administration (SEPA).

On March 5, 2014 Chinese Prime Minister Li Keqiang commented, in essence, at the opening of the National People's Congress, that the environmental situation in P.R. China was very difficult and the condition was putting negative or downward pressure on the economy. He stressed the problem of pollution; a condition that has worsened over the past few years. Li said "We will declare war against pollution and fight it with the same determination we battled poverty. Smog is affecting larger parts of China, and environmental pollution has become a major problem which is nature's red-light warning against the model of inefficient and blind development."⁵

According to Mr. Li 50,000 "small coal-fired furnaces" would be shut down in 2014. Coal-burning power plants with production capacity of 15 million kilowatts will undergo "desulphurization," and plants with a production capacity of 180 million kilowatts will undergo "dust removal." Over 6 million older high-emission vehicles will be removed from the roads and he promised stringent energy conservation measures to help improve conditions. "Governments at all levels and the whole society should act more vigorously to protect the land our lives depend on," Mr. Li said.⁶

Similarly, on June 2, 2014, President Obama, using executive authority, issued a new USEPA⁷ rule to cut pollution from U.S. coal and power plants 30% by 2030. It is the first time a U.S. president has moved to regulate carbon pollution from power plants – one of, if not, the largest single source of carbon dioxide emissions.

Dynamics of Sustainability

Having a clear direction stated by the head of a government is one thing. However, implementing change on a grand scale will be a long process. Steps must begin at all levels to solve prominent environmental problems and strengthen ecological systems.

⁵ The New York Times March 5, 2014 Didi Kirsten Tatlow

⁶ *ibid*

⁷ United States Environmental Protection Agency

The procedures of using law for social and environmental protection in China, like in the U.S. are multi-faceted. The fact that China's lawmakers are planning to improve their Environmental Protection Laws along with high level political support from the prime minister and leading legislators and reforms, lends weight to implementation.

For the most part China began to build a new legal system about 1979 and passed their early Environmental Protection Law. The preceding few decades saw the earlier system essentially deteriorate. The Environmental Protection Law of 1979 grew to include many statutes, regulations, standards and documents for guidance. Commonly known laws include the Water Pollution Prevention and Control Law, and the Air Pollution Prevention and Control Law and the disparately used Environmental Impact Assessment Law. Environmental laws now cover everything from forestry, fisheries, marine areas, wildlife protection, solid waste and traditional areas of air and water.

At times, both Chinese and U.S. legal cases, are subject to pressure, intervention, and influence by local governments, financial interests, and other entities which often conflict with a reasoned, and delicate balance between environmental protection, sustainability and development interests. As with all laws and regulations, the capacity to implement, safeguard and enforce these systems and laws, require vigilance and participation by the citizenry, the courts, the media and other factors contributing towards sustainability. (*Figure 3.*)

The Three Spheres of Sustainability

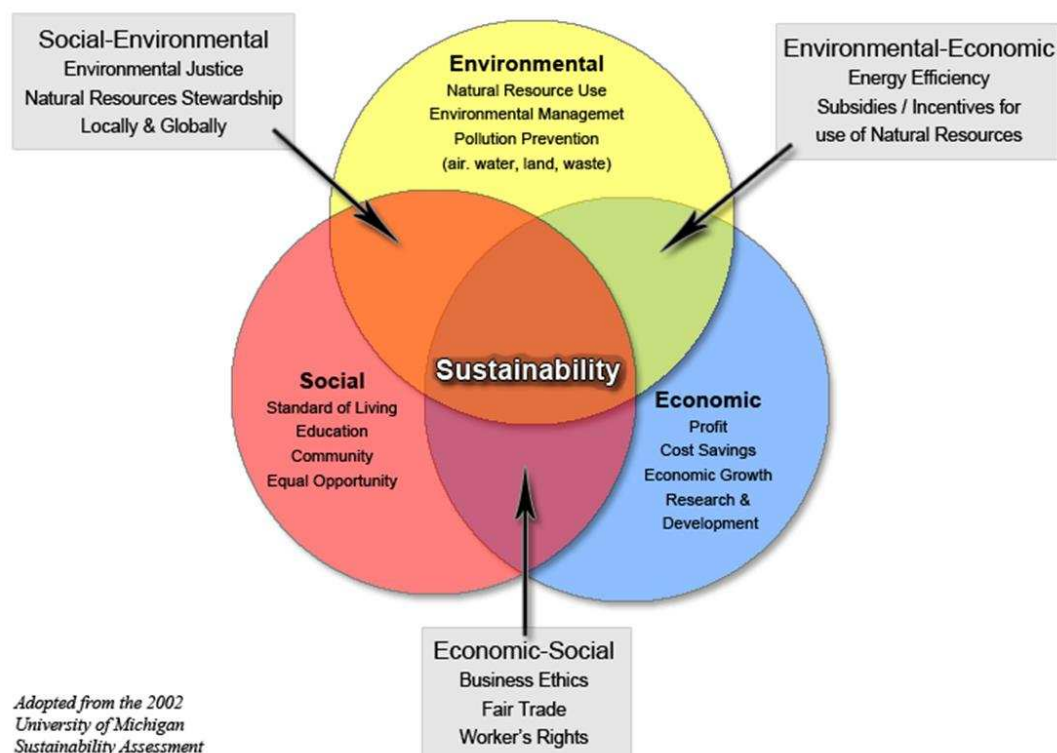


Figure 3. Additional Sustainability Factors

China has a socialist system of law vs. the capitalist system in the U.S. The Constitution of the PRC reads: "The People's Republic of China is a socialist state under the people's democratic

dictatorship led by the working class and based on the alliance of workers and peasants. The socialist system is the basic system of the People's Republic of China. Sabotage of the socialist system by any organization or individual is prohibited." Conversely, the Constitution of the United States does not reference its own social system per se, but references the freedom of its people. It is in context of the two different frameworks that progress, however incremental, must occur, with varying authority, capacity and will. The Constitution is the highest law in both nations. It is under a nation's laws that environmental protection becomes enabled and enforced.

With distinct types of executive, legislative and judicial powers, the two countries must approach their lawmaking and enforcement differently. Distinctions are prevalent with legal application of the two countries. The PRC uses primarily a civil law system. Dean Xia Yong (Xia 2002), wrote of administrative punishment as a means of social control and described how administrative penalties are determined at different levels in conjunction with public security. The administrative cases for public security are grouped into thirteen categories. Encroaching upon public or private property, seizing, extorting or damaging said property is included in one of the categories. Deliberately defacing or damaging cultural relics, scenic spots or historic relics; or deliberately damaging, destroying or removing them without approval is another.

Judicial (criminal) decisions are issued by the Supreme People's Court and the Supreme People's Procuratorate⁸, and advisory opinions and instructions issued by the State Council and other administrative agencies. The key sources of Chinese law should include judicial interpretation made by the People's Supreme Court and the Supreme People's Procuratorate. Although steps are being made towards inclusion, most do not include such interpretations and do not build a body of what is referred to as case-law in the United States.

The United States Constitution protects an individual's ownership of lands. There is a consequential difference in the PRC. The Constitution of the PRC states: "Article 10. Land in the cities is owned by the state." Additionally, the natural resources in the PRC are controlled by the government and described in the Constitution. "Article 9. Mineral resources, waters, forests, mountains, grassland, un-reclaimed land, beaches and other natural resources are owned by the state." Property in the PRC is considered to be owned by all of the people while primary industry, transportation, power supply, and telecommunications, are run by the government. Privatization of industry in the US is encouraged by the government and in a system of capitalism, private businesses are allowed and either selectively or at-large, encouraged to contribute to national industry.

In accordance with China's transition into a market economy and the U.S. policy to aid modernization, China began to re-develop its legal system, which it had abandoned in the 1950's. In doing so, China commenced many ideological and social changes. Moreover, China's recent economic growth and introduction into the global economy has also enhanced China's economic relationship with the United States. These changes have also caused unprecedented Western influence.⁹ Western influence is also causing China to adopt certain aspects of a

⁸ Supreme People's Procuratorate is the highest agency at the national level responsible for both prosecution and investigation in the People's Republic of China. Hong Kong and Macau

⁹ See EAST-WEST CENTER "China's Capitalist Transition": Capital Investors Sway China's Leaders; Clamor for Political Reform Growing, (Aug. 24, 2004), <http://www.eastwestcenter.org/research/research-projects/chinas-capitalist-transition-inactive-project> Chris McNally, specialist at East-West Center China. Retrieved 2014.04.27

Western-style economic legal system.¹⁰ In June of 2014 China's Ministry of Justice encouraged Chinese lawyers to promote rule *of* law in a country whose legal model is one ruled *by* law.¹¹

A study by Carlos Wing-Hung Lo, Department of Management Hong Kong Polytechnic University, Hong Kong, (Wing-Hung Lo, Fryxell, van Rooij) looked at changes in regulatory enforcement styles among environmental enforcement officials in China. The studies, using data collected in 2000 and 2006 showed significant shifts from what is known in China as "rule by man" to "rule by law". Rule *by* law is significantly distinct from "rule *of* law" in the United States. The five styles examined were: 1) external influence, 2) prioritization, 3) education, 4) formalism, and 5) coercion. Two significant shifts were found in interactions among five different enforcement styles studied. The report indicated that by 2006 a coercive style in absence of an educational style of enforcement was less effective and that also by 2006 external influence as an enforcement style appeared to be more effective in combination with a prioritization style than had been found in 2000.¹²

Over the past several decades, environmental protection has been a continuous theme in China even though it has remained largely in the background. Recently however that has changed with the promulgation of stronger environmental laws and regulations and public declarations of the war on pollution. The consequences of widespread environmental injustices resulting from heavily polluted air and diminishing potable water, along with escalating wealth polarization and illegal land seizures, has Beijing justifiably concerned about social stability (World Bank and SEPA 2007).¹³

Every five years, China issues a new 5-year Environmental Protection Plan. The 10th Five-Year Plan described by Zhu Rongji, then Premier, was written for implementation in 2001. It was then that a general movement of new thinking about environmental enforcement was energized. According to the plan, improvements were expected related to better environmental improvements in concert with improvements in industrial productivity. Clean industry and production, clean production methods, and incorporation of the cost of expected environmental benefits, as part of decision-making processes, were emphasized.

In 2007, I meet Professor Mingqing You of the Environmental and Resources Law Institute, Zhongnan University of Economics and Law, at a conference in Wuhan. In 2006, You had just published his annual review of Chinese environmental law developments. You described how the most important developments in China in 2006 were national policy changes, the most notable of which was the Central government's promotion of resource conservation and

¹⁰ Robb M. LaKritz. Taming a 5,000 Year-Old Dragon: Toward a Theory of Legal Development in Post-Mao China. 11 Emory Intl. Review 1997. pp. 237,252.

¹¹ Law Info China <http://www.lawinfochina.com/Search/DisplayInfo.aspx?lib=news&Id=12736> retrieved 2014.06.25

¹² Wing-Hung Lo, Carlos, Fryxell, Gerald E and van Rooij, Benjamin. Changes in Regulatory Enforcement Styles Among Environmental Enforcement Officials in China. EU-China BMT Working Paper Series No. 003. EU China Business Management Project. Pp. 2. <http://www.ceibs.edu/bmt/images/20090409/16119.pdf> retrieved 2015.01.15

¹³ World Bank Press Release. <http://www.worldbank.org/en/news/press-release/2007/07/11/statement-world-bank-china-country-director-cost-pollution-china-report> . Retrieved 2015.01.15

environmental consciousness.¹⁴ In The Conference on Population, Resources, and Environment, held by the Central Committee of the communist Party of China on March 12, 2005, Hu Jintao, president of the PRC and secretary general of the Communist Party of China, remarked that China should develop a resource-conserving and environment-friendly society. He emphasized that to effect a comprehensive sustainability plan to reduce pressure on population, resources, and the environment, scientific development as well as economic adjustments would be necessary. Future economic development should occur in partnership with efficient use of resources, reduction of environmental pollution, and emphasis on quality and efficacy.¹⁵

In the Sixth National Environmental Protection Conference, April 2006, then Premier Wen Jiabao spoke of the “Three Changes.” The first change required China to begin to prioritize environmental protection along with economic growth. The second emphasized the current improvement of the economy and the environment. The third added legal, economic, and technological tools to enhance environmental protection to tools already being used.¹⁶ The essence of these changes is that environmental protection and economic development should be emphasized equally, and that all appropriate and necessary measures, including legal measures, should be taken to achieve this goal. (Mingqing You 2007). Premier Jiabao’s “three changes” are consistent with *Figure 3. Three Spears of Sustainability*.

In 2011, China began its 12th Five-Year Plan (2011-2015). The Plan includes new and revised rules and goals for environmental protection and management. This Five-Year Plan forcefully addresses environmental protection laws. It highlights the development of services and measures to address the environmental and social imbalances, setting targets to reduce pollution, to increase energy efficiency, to improve access to education and healthcare, and to expand social protection. The Plan’s annual growth target of 7 percent importantly signals the intention to focus on quality of life, rather than pace of growth. (World Bank 2014).

By reinforcing the Five-Year Plans, efforts are underscored in order to support China’s environmental law enforcement. The first citizen allowed to file a lawsuit against a local government agency over air pollution has triggered debate on effectiveness of current environmental protection law.¹⁷ Allowing room for and encouraging open public debate on the matter is evidence that high-level, government support for environmental protection is moving forward and the support for public awareness is gaining momentum with an engaged population and media coverage.

Since its creation in 1970, the United States Environmental Protection Agency (EPA), has generally been responsible for ensuring enforcement of environmental law in the U.S. This responsibility has traditionally involved monitoring compliance by those in the regulated

¹⁴ Mingqing You. Annual review of Chinese Environmental Law Developments: 2006. Environmental Law Institute, Washington D.C. ELR News & Analysis. November 2007. <http://www.epa.gov/ogc/china/you.pdf> . Retrieved 2015.01.19

¹⁵ Ju Jintao Emphasizes to Implement Environmental and Resources work and Put Social and Economic DevelopmKent in a Benign Circle, Xinhuanet, March 13, 2005. http://news.xinhuanet.com/newscenter/2005-03/13/content_2689920.htm Retrieved 2014.04.28

¹⁶ Implement the Scientific Outlook on Development in an All Around Way and Accelerate the Construction of an Environment-Friendly Society (Statement by Wen Jiabao, Premier St. Council. April 17,2006. St. Council Gazette. Issue 16, Serial No. 1195. http://www.gov.cn/gongbao/content/2006/content_303476.htm Retrieved 2014.04.28

¹⁷ Reuters. <http://www.reuters.com/article/2014/02/25/us-china-pollution-idUSBREA1J18E20140225> Retrieved 2014.05.01

community (such as factories or businesses that release pollutants into the environment or use hazardous chemicals), ensuring that violations are properly identified and reported, and ensuring timely and appropriate enforcement actions are taken against violators when necessary.

Individual states in the U.S. historically had the lead responsibility to address environmental pollution and many states were dissatisfied with the enforcement powers Congress granted to the EPA. In the 1970's relationships between the EPA and the state governments were considered uneasy and cumbersome. For the most part, the states felt they were making considerable progress for environmental protection and did not like nor respect the role of the federal government in what they considered the states' affairs.

In 1988 a comprehensive management review of EPA was conducted by the Government Accountability Office (GAO) and reported that some progress had been made with the state and federal relationships and environmental enforcement, policies and regulations. There continues to be a push-pull relationship between the federal and state oversight of environmental enforcement.¹⁸

The EPA can authorize a state to conduct day-to-day program management and at the same time, environmental statutes allow EPA to withdraw authorization if a state fails to meet certain conditions, including maintaining the capacity to effectively manage the program and adopting and properly exercising the legal authorities to enforce program compliance consistent with federal laws and regulations. In essence, EPA's ability to directly manage state programs is limited because of budgetary constraints, staffing levels and other resources. Limits of states' ability to effectively oversee environmental regulations continue to be evident. Two cases in 2014 highlight individual states' capabilities or lack thereof:

In one case, regulators in the U.S. state of North Carolina reported that Duke Energy illegally pumped 61 million gallons of contaminated water from a coal ash pit into the Cape Fear River. The case is being investigated by several different agencies and regulators have cited Duke Energy.¹⁹ In another case a chemical spill occurred in January 2014 when a chemical known as methylcyclohexanemethanol (MCHM) leaked from a storage tank next to the Elk River in the U.S. state of West Virginia. The spill rendered over 300,000 nearby residents in nine counties without potable drinking water for weeks. State regulations and political will in both cases were insufficient to prevent or fully monitor the situations. Better response and regulatory measures are being sought at both the state and federal levels.²⁰

The U.S. EPA's role in these and similar situations is undergoing re-evaluation. The EPA has a well-defined enforcement program. Yet, coordinating with and intervening in state environmental regulations require exceptional communication, norms, and cooperation. The EPA's current enforcement process is summarized by their enforcement compliance section. It consists primarily of the following steps: 1) Environmental problem is identified. 2) Congress passes laws to address environmental problems. 3) EPA issues regulations to implement the

¹⁸ 1988 Government Accountability Office Management Review of USEPA.

<http://www.epa.gov/oig/reports/2006/20060816-2006-P-00029.pdf> . retrieved 2015.01.15. pp. 17-20

¹⁹ David Zocchino. LA Times March 20, 2014. <http://www.latimes.com/nation/la-na-duke-coal-ash-20140321-story.html> . retrieved 2015.01.15

²⁰ Cati Kozacek. Circle of Blue February 28, 2014. <http://www.circleofblue.org/waternews/2014/world/west-virginia-chemical-spill-reflects-dramatic-weakness-u-s-resolve-enforce-drinking-water-safety/> . retrieved 2015.01.15

laws. 4) Compliance assistance helps the regulated community to understand and comply with regulations. 5) Compliance monitoring assesses compliance through inspections and other activities. 6) Enforcement actions are initiated when the regulated community does not comply or cleanup is required. 7) Protection of the public health and the environment is accomplished.

The EPA uses both civil and criminal enforcement depending on the circumstances. Civil enforcement protects human health and the environment by taking legal action to bring polluters into compliance with the law. Criminal enforcement investigates and assists in the criminal prosecution of deliberate or egregious violations of environmental laws or regulations and any associated violation of the U.S. criminal code. The difference between criminal and civil enforcement lies in legal standard and burden of proof.

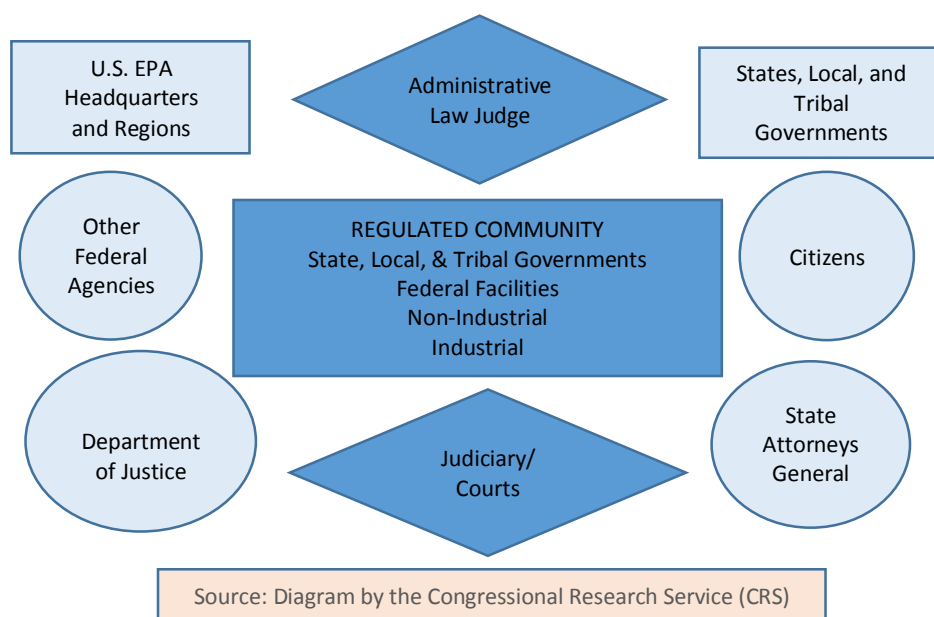


Figure 4. Key Players in Enforcement of Pollution Control Laws

Many of the local, state, tribal, federal and other stakeholders that make up the U.S. environmental pollution control enforcement/compliance framework and organizational setting are illustrated in *Figure 4*.

The regulating authorities in both China and the U.S. apply a diverse set of regulatory methods and enforcement tools to bring about compliance. Rule of law, rule by law, government structures, political will, development, scientific knowledge, and cultural norms will continue to lead to variability in applying regulations, how they are interpreted and how they are applied. Both countries have regulatory agencies and governmental structures that change over time in response to evolving responsibilities, regulations and laws.

In November of 2014, knowing the United States and the People's Republic of China have consequential roles to play in combating threats and impacts to the environment, U.S. President Barack Obama and China's President, Xi Jinping, reaffirmed the importance of strengthening bilateral cooperation. They agreed to adopt a protocol, an agreed outcome with legal force under the Convention applicable to all Parties at the United Nations Climate Conference in Paris in 2015. Both countries have committed to reaching a 2015 agreement that reflects the principle of common but differentiated responsibilities and capabilities, in light of different national

circumstances. Their joint actions are part of a long range effort to transition to low-carbon economies. The US intends to reduce emissions by 26%-28% below its 2005 level in 2025 and to make best efforts to reduce emissions by 28%. China intends to achieve the peaking of CO₂ emissions around 2030 and to make best efforts to increase the share of non-fossil fuels in primary energy consumption to around 20% by 2030. Both sides stated their intention to continue to improve over time.²¹

Role of Citizens

The role of citizens and private individuals provide a crucial role in environmental protection and enforcement laws. In the U.S. citizen participation, specifically authorized by Congress in many of the federal pollution control statutes, occurs in several ways. Individuals can identify and report violations of the laws, provide comments on settlements that are reached between the federal government and violators of the environmental laws in enforcement cases, and initiate enforcement proceedings directly in response to alleged violations. In addition, individuals may bring actions against EPA for failing to execute nondiscretionary duties required under federal environmental laws.²² (Robert Esworthy 2013).

A larger population of environmentally interested citizens is now working individually and collectively. They employ new tools, new enabling legislation and “permissions” to be engaged in effective environmental protection. Exchanges of students, scholars and interns are formally encouraged, by agreement,²³ to lend their skills and learn new ones from working across national boundaries and to help keep the imploding civilizational tipping point (Targowski’s Ecological Bomb) at bay.

Civilizations Past and Present

Air pollution has always accompanied civilizations. Pollution started in prehistoric times when man created the first fires. According to a 1983 article in the journal *Science*, “soot found on ceilings of prehistoric caves provides ample evidence of the high levels of pollution that was associated with inadequate ventilation of open fires.”²⁴ In ancient cultures, metal forging appears to be a key turning point in the creation of significant air pollution levels outside the home. Core samples of glaciers in Greenland indicate increases in pollution with Greek, Roman and Chinese metal production,²⁵ occurring at a time when cumulative pollution was relatively small and could be absorbed by nature.

Some civilizations recognized when they were facing environmental trouble. In his book, *Collapse*, author Jared Diamond references how some of the early societies, realizing they were

²¹ US White House Press Office. U.S.-China Joint Announcement on Climate Change. November 11.2014. <http://www.whitehouse.gov/the-press-office/2014/11/11/us-china-joint-announcement-climate-change> . Retrieved 2015.01.15.

²² Although not strictly speaking “enforcement,” citizens may also petition for review of agency actions under a program statute or the Administrative Procedure Act.

²³ Office of Educational Affairs of the Embassy of P.R.China in the USA. <http://www.sino-education.org/english/Agreement.html> Retrieved 2014.05.01

²⁴ Spengler, John D.; Sexton, K. A. (1983). "Indoor Air Pollution: A Public Health Perspective". *Science* 221 (4605): 9–17 [p. 9]

²⁵ Hong, Sungmin; et al. (1996). "History of Ancient Copper Smelting Pollution During Roman and Medieval Times Recorded in Greenland Ice". *Science* 272 (5259): 246–249 [p. 248].

in trouble, were able to change their ways in time to avoid decline and collapse. Six centuries ago, for example, Icelanders realized that overgrazing on their grass-covered highlands was leading to extensive soil loss from the inherently thin soils of the region. Rather than lose the grasslands and face economic decline, farmers joined together to determine how many sheep the highlands could sustain and then allocated quotas among themselves, thus preserving their grasslands. The Icelanders understood the consequences of overgrazing and reduced their sheep numbers to a level that could be sustained. Their wool production and woolen goods industry continues to thrive today.²⁶

Environmental balance, compliance, and enforcement is complex. The reality of a degraded environment, rendered unsustainable, is galvanizing ordinary citizens, lawmakers, and national leaders. Our capacity to act, even incrementally may be the steps of common wisdom that helps save civilization.

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²⁶ Jared Diamond, *Collapse: How Societies Choose to Fail or Succeed*. New York: Penguin Group, 2005.

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