

A Comparative Study on Environmental Development and Issues between India and China

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This study comparatively analyzes the environmental development and issues between India and China. The analysis of types of pollution of both the countries were discussed like causes of air pollution and steps to be taken by both the countries for the development issues etc., are investigated and compared with quantitative economic indicators. The comparisons show that environmental degradation in both the countries, in the long run, was closely related to economic growth. However, when compared to Japan, the tempo of environmental policy development in China and Korea has been faster than that of their economic growth. It is proposed to constantly improve legislations and regulations to properly handle the interests of the state, enterprises and individuals, and to enhance the cooperation with all countries in the world to jointly cope with environmental issues at international level. The components of the natural environment are used as a resource however it is also exploited by the human being in order to fulfil some basic physical needs and purpose of life. It should not challenge our natural resources and stop putting so much pollution or waste to the environment and value natural resources and use them by staying under the natural discipline (Singh, 2013).

INTRODUCTION

Environment means all the natural surroundings such as land, air, water, plants, animals, solid material, wastes, sunlight, forests and many other things. Healthy environment maintains the nature's balance as well as it helps in growing, nourishing and developing all the living things on the earth. Now a days, some manmade technological advancement spoiling the environment in many ways which ultimately disturbs the balance or equilibrium of nature. Our lives danger as well as existence of life in future on this planet. In recent passing years mankind's consciousness has been aroused very strongly about the need for environmental protection and ecological preservation.

Human impact and management of the natural environment and concerns for maintaining biodiversity are emphasized throughout. The rapid growing population and economic development is leading to a number of environmental issues in India because of the uncontrolled growth of urbanization and industrialization, expansion and massive intensification of agriculture, and the destruction of forests. Major environmental issues are forest and agricultural degradation of land, resource depletion (water,

mineral, forest, sand, rocks etc.), environmental degradation, public health, loss of biodiversity, loss of resilience in ecosystems, livelihood security for the poor.

India tops the world in pollution relates deaths-accounting for 2.5 million of the total 9 million deaths attributed to pollution worldwide in 2015, according to a recent report by the Lancet Commission on Pollution and Health. China was second on the list, with 1.8 million total fatalities due to pollution.

It is estimated that the India's population will increase to about 1.26 billion by the year 2016. **The projected population indicates that India will be the first most populous country in the world and China will be ranking second in the year 2050.** India having 18% of the world's population on 2.4% of world's total area has greatly increased the pressure on its natural resources. Water shortages, soil exhaustion and erosion, deforestation, air and water pollution afflicts many areas. The condition of the environment is a worldwide issue (Bisgrove and Hadley, 2002). Air and water pollution do not recognize borders; poor soil conditions in one nation may reduce another country's food supply.

In China, Protecting the environment needs innovative spirit, and many proprietary technologies to continuously create high-quality products in economically productive activities. However, the development history is twists and turns, therefore, there is a lot of benefit game in the environmental problems, and the "Nash Equilibrium" usually exists in a variety of situations (Trejo, Clempner and Poznyak, 2017).

China apply the game theory to discuss in detail the influence of distribution of interests and the theoretical analysis of "Nash Equilibrium." China then analyze some cases that cause environmental deterioration by pointing out some domestic causes of such incidents. At the same time, the **international market technology** barriers represented by the three EU directives are particularly referred to. Finally, we propose some suggestions to solve the problems by stressing on continuous formulation and **improvement of the laws and regulations** to judiciously handle the disputes of interests among the state, enterprises and individuals, ultimately scoring the objective of protecting the environment through unremitting efforts for this (Ceparano and Quartieri, 2017). China's environmental protection is not only related to the domestic factors, but it is also related to the international environmental. In the complicated international climate change negotiations, **China must continue to play its role as a responsible large country in international climate change negotiations remaining within the framework of the UN.**

TYPES OF ENVIRONMENTAL POLLUTION IN INDIA AND CHINA

Pollution exists in many forms and affects many different aspects of earth environment. Point source pollution comes from specific, localized, and identifiable sources, such as sewage; pipeline or industrial smoke stacks. While non point source pollution comes from dispersed or uncontained sources, such as contaminated water, run off from urban areas or automobile emissions. The effects of these pollutants may be immediate or delayed. Here, primary effects of pollution occur immediately after contamination occurs, such as the death of marine plants and wild life after an oil spills at the sea while secondary effects may be delayed or may persist in the environment into the future perhaps going unnoticed for many years. This is the contamination of air, land and water that may harmfully affect life. The four main classified substances are; air, land, water and noise pollution. The pollutants when injected into the biosphere in greater quantities affect the functioning of the ecosystem and exercise adverse effects on plants, animals and man. Much of what we know of our society comes from the waste they left behind (W.H.O, 1985).

The magnitude and severity of pollution increased as humans developed new technologies in the society (Taura, Fagalawa, and kakafi, 2005). Pollution had evolved from many localized problem to one of global consequences in the environment, but changed atmospheric and climatic conditions interfere with human health, the quality of life or the natural causes, such as volcanic eruption, mostly caused by human activities (Dauda and Obi 2000). Pollutants can be classified into two categories such as biodegradable pollutants such as sewage which can rapidly be decomposed by natural processes. These pollutants become problem when added to the environment faster than they decomposed while non-

degradable pollutants are materials that either do not decompose or decompose slowly in the natural environment –once contamination occurs, it is difficult or impossible to remove the pollutants from the environment.

The types of and the source of pollutants are grouped into two. They are:

- A. Natural sources; global rock decay and weathering products of regional core deposit, Local Ocean; ground water and surface water.
- B. Anthropogenic sources; this includes industrial emission, burning of fossil fuels and other liquids effluents and gases as discharge (Taofeek, 2014).

Causes of Disorder in the Environment

Earthquakes

An earthquake is a tremor of various intensity in the earth's surface caused by the action of the end genetic forces of the earth. It causes immense damage to life and property of the region if its intensity is measured over 7 on the Richter scale. Studies have shown that over 60% of the country's area comes under the moderate and high seismic zones. In the past a number of devastating earthquakes have been caused of which the memories of Koyna (1967), Latur (1993) and Bhuj (2001) are fresh in our mind. Tsunamis-Earthquake measuring more than 7 on Richter scale in the sea bed may produce high sea waves called tsunamis. Such tsunamis caused due to the earthquake near Sumatra coast on 26th Dec. 2004 led to a loss of more than 1.5 lakh people in Indonesia, Sri Lanka and India.

Floods

The submergence of land through a temporary rise in river, lake or sea levels is called flood. It may be caused by increased rainfall, snow-melt, and high tide coinciding with a storm surge, the collapse of a dam or by movement of the land. According to Rashtriya Barn Ayog (National Commission on Floods) about 40 m. ha. Of the country's area comes under flood prone area (cf. 25 mha in 19603 and 34 mha in 1978). Major part of this area is affected by river floods mainly spreading over the Ganga basin, the Brahmaputra basin (comprising the Barak).

Cyclones

Cyclones, mostly tropical cyclones/disturbances, cause immense damage to life and property of the coastal areas of Orissa, Tamil Nadu, Gujarat, Andhra Pradesh and West Bengal. These cyclones are developed in the open seas of the Bay of Bengal and the Arabian Sea and are more frequented during pre and post monsoon periods.

Droughts and Famines

Drought is basically a distress situation caused by the failure of rainfall. This failure may be due to insufficient rain or due to wide gap between two or more spells of rains. Droughts are of three types. A meteorological drought is a situation when the actual rainfall is significantly less than the climatologically expected rainfall over a wide area. Here the rains do not arrive in time and are not received in adequate quantity. Such droughts are mainly concentrated in the areas falling between arid and semiarid zones of the country and are characterized by high variability of rainfall (Pawar, 2016).

THE BIGGEST PROBLEM-AIR POLLUTION

The primary cause is air pollution. In 2015, 1.81 million or 28% of the 6.5 million air-pollution-linked deaths worldwide occurred in India. China saw 1.58 million deaths. The report illustrated that globally, air pollution accounts for twice the number of deaths than those linked to AIDS, tuberculosis and malaria combined, and for nearly 15 times as many deaths as war and all forms of violence. The majority of air pollution-linked deaths are due to non-communicable diseases such as heart disease, respiratory tract diseases, chronic obstructive pulmonary disease and lung cancer.

Major contributors to bad air quality include auto emissions due to increasing urban traffic congestion, fossil fuel powered heavy industry, construction, and the burning of agricultural land post harvests.

FIGURE 1
INDIAN POLICEMEN PROJECT THEIR FACES WITH MASKS
AMID HEAVY SMOG IN NEW DELHI



Poor Children are the Most Vulnerable

The study found that nearly 92% of pollution-related deaths occur in low and middle-income countries. Children face the highest risks because small exposures to chemicals even during pregnancy and in early childhood can result in lifelong disease, disability, premature death, as well as reduced learning and earning potential.

India and China are among the Worst Hit

According to the WHO, PM 2.5 levels should not exceed 25 micrograms per cubic meter over a 24-hour period and 10 micrograms per cubic meter on average over a year. But in cities like Delhi and Beijing, there are days when PM 2.5 levels surge to almost 1,000, which is so high that it's literally off the scales of many pollution monitoring devices.

PM 2.5 refers to fine particulate matter -- microscopic particles that are less than 2.5 micrometers in diameter, minuscule enough to be absorbed right into the lungs and blood. Sustained exposure to high levels of PM 2.5 can cause respiratory diseases like bronchitis, asthma and inflammation of the lungs, and even heart attacks and strokes.

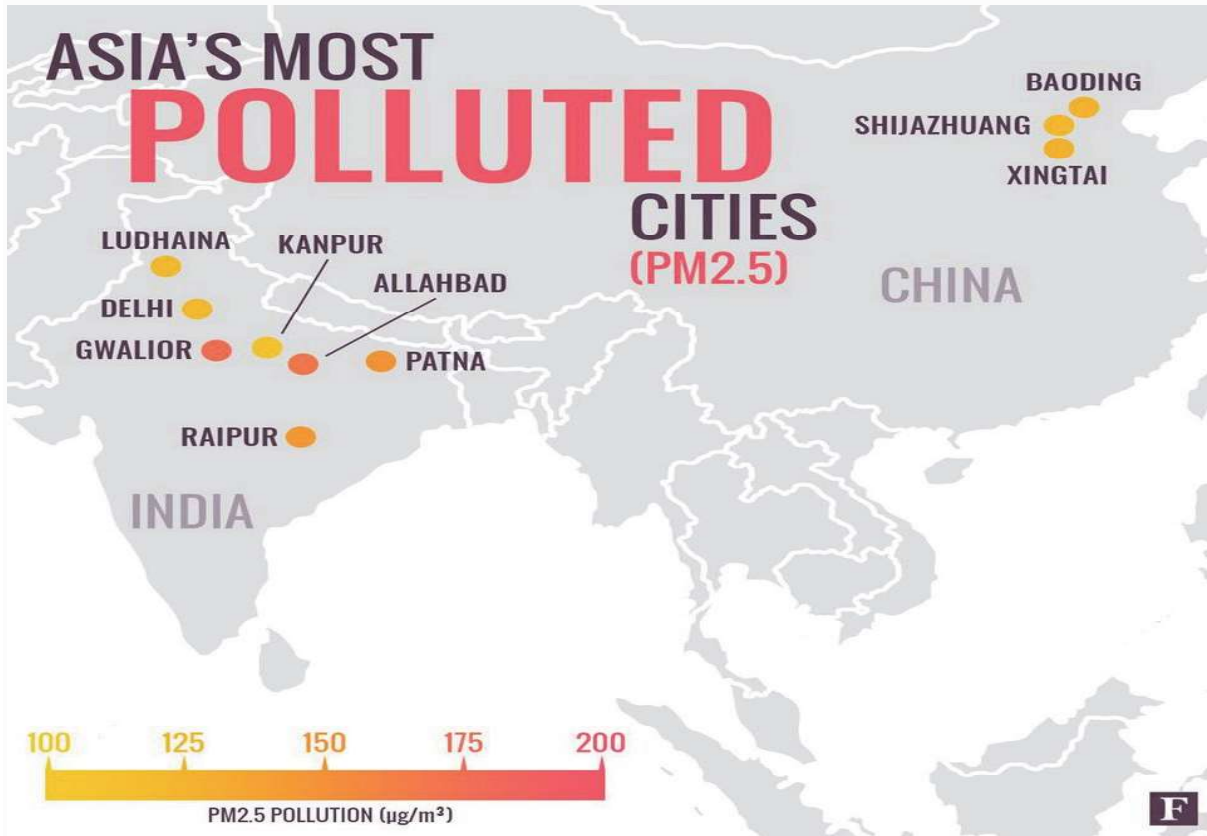
India hasn't yet seen state efforts of a scale that can revolutionize pollution control (although this Diwali, India's Supreme Court banned the sale of fireworks in an effort to preserve air quality -- despite resistance from Hindu religious groups and citizens alike). China on the other hand, woke up to its pollution problem some years ago. According to analyses of NASA satellite data, the levels of fine particulate matter got worse across India by 13% between 2010 and 2015, while China's fell by 17%. Delhi's average annual PM 2.5 concentrations are in the vicinity of 150 $\mu\text{g}/\text{m}^3$, compared to about 60 $\mu\text{g}/\text{m}^3$

for Beijing. Overall, Delhi's PM 2.5 tends to about three times the Beijing mean and 15 times the WHO guidelines.

FIGURE 2
TRAFFIC IN DELHI, INDIA



FIGURE 3
ASIAs MOST POPULATED CITIES



MAJOR LEADING CAUSES OF POLLUTION IN INDIA AND CHINA

FIGURE 4
COAL BURNING CAUSES THE MOST AIR POLLUTION DEATHS IN CHINA



Sorting through coal at a mine in Shanxi, China, last year. Coal is responsible for about 40 percent of the deadly fine particulate matter known as PM 2.5 in China's atmosphere, a study found.

BEIJING — Burning coal has the worst health impact of any source of air pollution in China and caused 366,000 premature deaths in 2013, Chinese and American researchers said on Thursday.

Coal is responsible for about 40 percent of the deadly fine particulate matter known as PM 2.5 in China's atmosphere, according to a study the researchers released in Beijing. While in India, the national capital has shared its borders with Haryana and Uttar Pradesh. One of the main causes of increasing levels of air pollution in Delhi is the crop burning by the farmers in these states. Farmers burn rice stubbles in Punjab, Haryana and Uttar Pradesh. It is estimated the 35 million tons of crops are set afire by these states. The wind carries all the pollutants and dust particles, which have got locks in air.

The researchers also found that transportation was a major cause of mortality related to PM 2.5, with 137,000 deaths attributed to it in 2013. In recent years, Chinese scientists have said that motor vehicle emissions are a leading source of air pollution in cities, although not as great as coal burning. Vehicle ownership is rising fast in China, and officials, carmakers, and oil and gas companies have quarrelled over setting emissions standards.

China consumes almost as much coal annually as all other countries combined, and coal burning in the country is the biggest source of both air pollution and greenhouse gas emissions, the leading cause of climate change. Chinese cities are among the most polluted in the world. Provinces in northern China, where steel, cement and power plants are common, have the highest concentrations of PM 2.5 in the country

Some of the other major causes of air pollution in India are as follows:

1. Industrial chimney wastes
2. Thermal power stations
3. Automobiles.

Air pollution results from gaseous emissions from mainly industry, thermal power stations, automobiles, domestic combustion etc.

TABLE 2.1
GASEOUS POLLUTION FROM A 200 MV THERMAL POWER PLANT
(COAL CONSUMED $6.67 \times 200 = 1334$, IE., 1400 TONNES A DAY)

Components	Emission factor Kg/tonne of coal	Emitted quantity (tonnes a day)
Aldehydes	0.0025	0.0035
Carbon monoxide	0.25	0.35
NO _x	0.01	0.14
Oxikdes of suphur (0.5% S)	19(s)	13.30
Particulate matter (33% ash)	8(A)	369.60
Ash	2(A)	92.40

(A) - Ash content in coal in per cent.

(S) - Sulphur content in coal in per cent.

Table 2.1. shows various gaseous pollutants form a 200 MW thermal power plant in India.

The study was a follow-up to a Global Burden of Disease study examining deaths in 2013, which estimated that PM 2.5 contributed to 2.9 million premature deaths worldwide, with 64 percent of those **in China, India** and other developing countries in Asia. Premature deaths due to PM 2.5 exposure were also high in Eastern Europe. A larger study on 2013 deaths was published last year by The Lancet, a British medical journal.

That study estimated the number of premature deaths in China in 2013 related to PM 2.5 exposure at 916,000, out of a population of 1.4 billion. Researchers found that outdoor air pollution was the fifth leading cause of premature deaths in China, behind high blood pressure, smoking, high consumption of sodium and low consumption of fruit. Household air pollution was the sixth leading cause.

An earlier Global Burden of Disease study that examined health figures for 2010 found that outdoor air pollution contributed to 1.2 million premature deaths, nearly 40 percent of the global total. Exposure to ambient particulate matter that year was the fourth leading cause of premature deaths in China.

In 2013, the Organization for Economic Cooperation and Development, based in Paris, warned that “urban air pollution is set to become the top environmental cause of mortality worldwide by 2050, ahead of dirty water and lack of sanitation.” It said that as many as 3.6 million people could end up dying prematurely from air pollution each year, mostly in **China and India**.

DEVELOPMENT ISSUES BETWEEN INDIA AND CHINA

On economic growth rates that is. The Indian economy is expected to grow at an annual rate of 7.4% in 2018 and 7.8% in 2019, according to a recently released IMF Economic Outlook. India’s economy is “lifted by strong private consumption as well as fading transitory effects of the currency exchange initiative and implementation of the national goods and services tax,” notes the report. “Over the medium term, growth is expected to gradually rise with continued implementation of structural reforms that raise productivity and incentivize private investment.”

India’s projected 2018-19 growth rates are well above **China’s 6.6% and 6.4%** over the same period. And things could get even worse for Chinese economic growth over the long-term, due to the continued rise of the country’s nonfinancial debt. “Over the medium term, the economy is projected to continue rebalancing away from investment toward private consumption and from industry to services, but nonfinancial debt is expected to continue rising as a share of GDP, and the accumulation of vulnerabilities clouds the medium-term outlook,” notes the IMF report.

GDP annual growth rate in India averaged 6.13% from 1951 until 2017, reaching an all-time high of 11.40% in the first quarter of 2010 and a record low of -5.20% in the fourth quarter of 1979, according to Tradingeconomics.com.

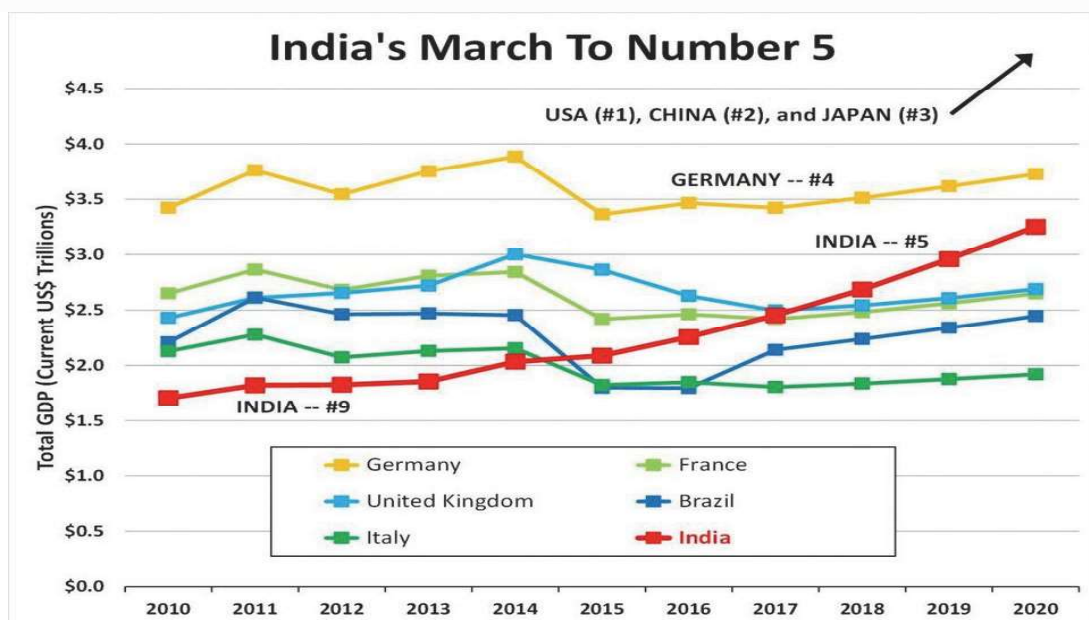
To be fair, India's economic growth begins at a low level of resources utilization. Therefore, it can raise GDP growth by the better employment of excess resources with existing technologies. China's economy, by contrast, begins at higher resource utilization levels. Therefore, it can no longer raise GDP growth by using existing technologies. It must innovate, and that isn't easy given China's current economic structure where most of its economic sectors are under direct or indirect government control.

That could explain why India is beating China in another metric: competitiveness. In the last four years, India gained 20 points in the World Economic Forum's (WEFR) Global Competitiveness rankings, while China's ranking remained roughly unchanged. India has been inconsistent in following through with economic reforms, with one government reversing the policies of other governments. Besides, India has long way to go before catching up with China in a host of crucial economic and social indexes -- like per capita GDP, human development, and entrepreneurship.

And it will eventually encounter the very same problems China is encountering once its excess resources are exhausted.

According to Developed countries of the world, compared to China, India has far greater wealth disparity. (Forbes)

**FIGURE 5
INDIA'S MARCH TO NUMBER 5**



India is projected to surpass Britain to become the world's fifth largest economy in 2018

STEPS TO BE TAKEN BY INDIA AND CHINA TOWARDS ENVIRONMENTAL AND DEVELOPMENTAL ISSUES

India-China Cooperation Vital to Save Environment

Water Availability Could Be a Challenging Issue Facing the Two Countries

Much greater cooperation between China and India, the world's emerging economic giants, is essential for tackling pressing environmental issues, says a group of scientists who have research programmes in one or both countries.

The two fast-growing countries, which are also the world's most populous, “will play a significant, perhaps a dominant role in shaping the environmental outcomes for our planet this century,” observed the scientists in a commentary published in this week's issue of the journal *Science*. Cooperation between the two will be vital for curtailing biodiversity loss, mitigating climate change and reducing deforestation.

With both countries witnessing tremendous economic growth, there is growing stress on environmental resources. Water availability could be an increasingly challenging issue facing the two countries and one that will require careful cooperation, observed Jiangquo Liu, Distinguished Professor of Fisheries and Wildlife at the Michigan State University, U.S.,

“Water is a huge issue,” said Dr. Liu in a press statement issued by the university. “It's being discussed extensively. We need to make people aware of the benefits of cooperation. It's more than just **China and India** that will be affected if these two countries don't work together. The environmental impacts will be felt around the world, including in the United States.”

The two countries were also enlarging their ecological footprint in Asia. This included import of large quantities of wood, which would contribute to deforestation-driven greenhouse gas emissions and biodiversity loss in Asia, the paper pointed out. Although several agreements have been signed since 1988, collaboration and coordination between **China and India** in dealing with environmental challenges has so far been limited, it noted.

Considering the magnitude of the environmental issues, the two countries need to work together much more closely. They could share knowledge. Besides, coordinated action would be more effective in tackling such problems.

AMENDMENTS MADE BY INDIA AND CHINA: ENVIRONMENTAL PROTECTION LAWS IN CHINA

**FIGURE 6
BEIJING STILL RANKS IN THE TOP FIVE WORST POLLUTED
PROVINCIAL REGIONS IN CHINA**



China will enact two new environmental protection laws at the start of 2018 -- one to formalize the emissions discharge fee into a tax collected from industrial polluters, and the other to combat water pollution more effectively.

For the first time in years, China made amendments to the **country's environmental protection laws** in April last year as part of its efforts to tackle the increasingly worsening pollution problem. On January 1, China's amended Environmental Protection Law or EPL took effect. It significantly strengthened environmental enforcement provisions, most significantly introducing uncapped fines assessable daily for each day of non-compliance.

More than three decades of industrialization and rapid economic growth have led to deteriorating air, water and soil quality in the world's second largest economy. However, according to a recently released analysis, air quality in China's coastal regions and cities has modestly improved over the past 12 months thanks in part to strict air pollution control policies.

The Greenpeace report found that while Beijing still ranked in the top five worst polluted provincial-level regions in China, the capital's PM2.5 concentration improved more than 13 percent compared to the first quarter of 2014, and industry-heavy Hebei province, just outside of Beijing, also improved 31 percent.

In a DW interview, David Yang, China expert at the global analytics firm IHS, says that despite the new measures, maintaining economic growth will continue to be the top priority in many regions. He adds that although foreign-based businesses face only moderate risks of selective enforcement, they appear likely to receive more severe penalties when sanctioned.

According to the Environmental Protection Tax Law of China -- which goes into effect on Jan. 1 -- air pollution, water pollution, solid wastes and noise are the four major categories of taxable emissions. While the levied items are to remain the same as the previous fee system, the law designates the local tax bureaus as collators of the new environmental protection tax.

Furthermore, local government will decide on the tax rate for the levied items within a range specified by the central government. However, the entire amount of the tax collected will now become part of the local tax revenue, whereas 10 percent of the defunct emissions discharge fee used to go to the central government.

The law was passed during the 25th session of the 12th National People's Congress in December 2016. It will become the first tax law enacted since the third plenary session of the 18th CPC central committee. As a major act to promote the construction of ecological civilization through taxation, the introduction of the environmental protection tax aims to further improve China's "green taxation" system and contribute to the country's environmental protection.

As implementation draws near, the preparation for the collection and management of new tax is underway. Local governments in Beijing and provinces such as Hebei and Shandong have made announcements on their respective local tax rates for air and water pollutants. Beijing has applied the highest tax rate on emissions.

Also on Jan. 1, China will enact the newly revised Water Pollution Prevention and Control Law, which includes expanding on a successful regional pilot of the river chief system to cover the whole country. Under this system, leading officials at various government levels will assume responsibility for addressing water pollution, including resource protection, waterline management, pollution prevention and control, and ecological restoration.

The system first successfully piloted in Wuxi, Jiangsu Province ten years ago to address the water pollution in Taihu Lake caused by algae, and has been rolling out in recent years across the country as part of a broader effort to combat water pollution.

Tong Weidong, an official of the Commission of Legislative Affairs of the Standing Committee of China's National People's Congress, explained the system as such: Under the innovative system, the CPC and government officials are expected to pool efforts together, which in the past fall within the remit of various agencies and departments. Besides, the leading officials will be accountable for enhancing water environment as the river chiefs, and the outcomes will affect the evaluation of their personal performances.

The law also adds stipulations in rural areas, where water pollution is severe but lacks effective treatment. The law states, among other things, that the country supports the construction of sewage and

waste treatment facilities in the rural area, and that the standards in producing fertilizers and pesticides should comply with the requirement of protecting the water environment.

In addition, the revised law increases the penalties for breaking the law. For example, illegal discharging of pollutants by companies can be subject to a maximum fine of 1 million yuan (about US\$150,000) under the newly revised law. Environmental authorities expect the river chief system and the heavy penalties will effectively enhance China's water environmental management system and the national water security.

The new laws are coming on the heels of similarly strict legal measures that have effectively curbed air pollution in previously heavily polluted areas such as Beijing and Hebei Province. Lawmakers are expecting the new measures to help carry forward China's achievement and momentum in environmental protection in recent years.

FIGURE 7
LOCAL RIVER CHIEFS WORK IN JIANGSHAN CITY, ZHEJIANG PROVINCE



Impact of these New Measures on the Current Pollution Situation in China

Maintaining economic growth will continue to be the top priority in most locales. However, in key metropolitan centers such as Beijing and Shanghai, the new measures should have some substantial impact on local sources of pollution. The problem, however, is that pollution is not a local problem.

Strict enforcement in Beijing will only have limited impact if factories in Inner Mongolia, for example, continue to pollute. The pollution situation in Shanghai should see some significant improvement, precisely because of a concerted effort by surrounding provinces and provinces upstream along the Yangtze River to crack down on pollution.

Recent patterns suggest that enforcement will continue to be the strictest in eastern coastal provinces, around major population centers such as Beijing, Tianjin, Henan, and along the Yangtze and Pearl Rivers. Sectors such as coal and other coal-fuelled industries, chemicals, steel and cement will also receive extra scrutiny.

ENVIRONMENTAL PRODUCTION LAWS IN INDIA

Environmental Protection Act

India is vulnerable to various natural hazards, particularly cyclones and annual monsoon floods and various combination of poverty, population growth, increasing individual consumption, industrialisation, infrastructural development, poor agricultural practices and resource maldistribution have led to substantial human transformation of India's natural environment. An estimated that between 4.7 and 12 billion tons of topsoil is lost annually from soil erosion (Library of Congress, 2004). The main hurdle confronting the environmental protection in India today is that there is a lack of scientific knowledge and desire to act in this direction. A great national effort has been directed towards environmental awareness through the enactment of various Acts viz., National Forest Policy, 1952; National Committee on Environmental Planning and Coordination, 1972; Water Pollution Control Act, 1974; Wildlife Protection Act, 1974; Forest Conservation Act, 1980; Prevention and Control of Air Pollution Act, 1981; Environmental Protection Act, 1986 etc. Unfortunately, due to lack of proper implementation of all these policies as well as strict enforcement of acts, the degradation of forest and environment continues unchecked.

As developing nations move closer to First World status, the accompanying growth in industry could also affect the environment, especially through the emission of greenhouse gases. The global warming agreement reached in Kyoto, Japan, in December 1997 exempted developing nations such as China, India, and Mexico from requirements to reduce their emissions. But according to the United Nations, countries exempted from the agreement will create 76% of total greenhouse gas emissions over the next 50 years. The exemptions in the Kyoto agreement (which must be approved by 55 nations but as of this writing has not been submitted to the U.S. Senate for ratification) raise the question of whether developed and developing nations should utilize the same methods in order to conserve the environment. If the environment truly is a worldwide issue, then the solutions may also be universal. However, international agreement on environmental issues is often difficult to achieve because countries are not at equivalent stages of social and economic development (Anand, 2013). In contrast, a system in which the government owns all the land or imposes strict command-and-control regulations on people and businesses is seen as ineffective. The poor environmental condition of communist nations is often cited by these observers as evidence of the inability of government regulations to conserve the environment. As developing nations grow and become more economically self-sufficient, industrial solutions may become more viable in those countries.

The ozone layer performs a critical function of filtering ultra violet radiation reaching the earth; but for it, the radiation would have a drastic effect on human life and health and on terrestrial plant life and aquatic eco-systems. The Montreal Protocol on Substances that Deplete the Ozone Layer, 1987 mandates Parties to take measures to control the production and consumption of, and trade in, substances that can deplete or otherwise modify the ozone layer. A footnote provides that the Parties will be deemed to be in compliance with the substantive obligation if they implement their obligations under the Protocol. The Protocol has been signed by 191 countries including India. India has already ratified and implemented the treaty.

The Environment (Protection) Act

Under the Environment (Protection) Act, 1986, the Government of India notified the Ozone Depleting Substances (Regulation and Control) Rules, 2000. These rules not only set the deadline to phase out various ozone depleting substances but also regulated the production, consumption and trade in such substances and products containing these. The rules have been amended in later years, including in 2014 to facilitate the phase out.

In India, the Wildlife (Protection) Act, 1972, is a comprehensive legislation that provides for the protection of wild animals, birds and plants. It prohibits hunting of animals listed in Schedules I, II, III and IV of the Act, except when permitted for specified reasons, such as education, scientific research and scientific management and other bona fide purposes. Similarly, the Act prohibits the picking, uprooting,

etc., of specified plants listed in Schedule VI of the Act, which are the six plants of Indian origin included in CITES Appendices. Wild life, animal articles, trophy or meat derived from any wild animal and ivory are the property of the state or central government. Dealing in animals, trophy and animal articles is either prohibited or is subject to licensing and even possession of a trophy is allowed on the basis of a certificate of ownership issued by the Chief Wild Life Warden.

The Wildlife (Protection) Act, 1972, also envisages the declaration of sanctuaries by the state government, if it considers that such area is of 'adequate ecological, faunal, floral, geo-morphological, natural or zoological significance' for the purpose of 'protecting, propagating or developing wildlife or its environment'. There is a similar enabling provision for the declaration of a national park by the central government.

The Foreign Trade (Development & Regulation) Act, 1992, enables the Government of India to regulate the import and export of all goods. Under the Act, all wild animals, whether mammals, reptiles, birds of prey, or in the "other" category, or bees and other insects, as defined in the Wildlife (Protection) Act, 1972, including their products and derivatives, excluding those for which ownership certificates have been granted and those required for education, scientific research or management, are prohibited for export. Likewise, import of wild animals (including their parts and products), as defined in the Wildlife (Protection) Act, 1972, with the same exceptions as in the case of export, is prohibited.

As India is a Party to the CITES and has implemented its obligations through the Wildlife Protection Act, 1972, and through the regulation of imports and exports under the Foreign Trade (Development & Regulation) Act 1992, the obligations relating to CITES embodied in the TPPA do not pose a problem for us (Hoda and Rai, 2017).

Many nations institute comprehensive regulations designed to repair the past damage of uncontrolled pollution and prevent future environmental contamination. In the United States, the clean Air Act (1970) and its amendment significantly reduced certain types of air pollutions, such as sulphur (IV) oxide emission. The clean water Act (1977) and Safe Drinking Water Act (1974) regulated pollution discharge and set water quality, standards. Also the Toxic substances control act (1976) and the resource - conservation and recovery Act (1976) provided for the testing and control of toxic and hazardous wastes.

International agreements have also played a role in reducing global pollution. The Montreal protocol on substances that deplete the ozone layer (1987) set international target dates for reducing the manufacture and emissions of chemicals, such as CFCS, - known to deplete the ozone layer. Here the Basal convention on the control of Trans-boundary movements of hazardous waste and their Disposal (1989) serves as frame work for the international regulation of hazardous waste and disposal. Since 1992, representatives from more than 160 nations have met regularly to discuss methods to reduce green house emissions (Taofeek *et al*, 2014).

Environmental Regulations in India

Indian government has shown some foresight in the area of environmental concerns by enacting legislations meant to protect the environment. India has about two hundred laws dealing with environmental protection (www.cpreec.org). India's environmental regulations date back to the 1970s. The first important regulation enacted was the Water Act of 1974 followed by the Air Act of 1981. These acts created the Central Pollution Control Board (CPCB) responsible for data collection and policy enforcement. It also developed detailed procedures for environmental compliance at the central government level. Simultaneously second control board at the state level called State Pollution Control Board (CPCB) was also established to collect data and for policy enforcement at the state level. These were followed by other regulations meant to protect the environment. India's key policies relating to environmental protection are governed by:

- The national forest policy, 1988;
- Policy statement for abatement of pollution, 1992; and
- National conservation strategy and policy statement on environment and development, 1992.

Hence, it is clear that the current environmental problems in India are not due to a lack of legislation, but there appears to be other factors that are contributing to the current situation.

CONCLUSION

The rapid economic growth experienced by India and China is resulting in adverse and harmful environmental conditions that are affecting the people as well the wider global population. In the case of India, this is further exacerbated by the high population density and growth rates. The existing environmental laws, although cover a wide spectrum of environmental concerns, they seem to be ineffective due to lack of enforcement, the lack of resources, and technical challenges faced by a large number of Indian companies, especially the SMEs. Under these conditions, India has to adopt some sustainable actions that need to address the myriad issues facing the country including environmental degradation in order to sustain its prospects for continued economic growth (Ranganath, 2015).

In China, innovation is the source of momentum for social progress. Innovation is also full of twists and turns. It is a fact that China's environmental pollution is serious. To solve this dilemma is to rely on innovative guidelines. The level of China's industrialization development currently belongs to the second half of the mid-industrialization period. Environmental problems are particularly prominent. Some mass-caused environmental incidents have caused serious problems. Therefore, it is of great significance to apply the game theory and so on to analyze the real problems in depth. Thinking from the perspective of competition in the international market, looking for ways to solve these problems and making an analysis of the future direction are the core concepts. The environment protection undertaking is full of tensions in the transition and the game of interests. China's environmental situation is at a crossroads during the implementation of the Thirteenth Five-year Plan (2016-2020). Therefore, China must deal with the different objective requirements of the government, residents and enterprises or balance different tendency of interests. Looking forward, **there is a bright future for China and India in environmental protection and economic construction.**

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