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ENVIRONMENTAL CONCERNS IN INDIA: PROBLEMS AND SOLUTIONS¹

*Dr. Mahesh Chandra**

ABSTRACT

Although India has a rich and long history of environmental laws dating back to the 1970s, it still ranks very low on air and water pollution levels compared to the rest of the world resulting in higher rates of infant mortality and lower life expectancy rates. Poor sanitation conditions and sewage problems compound the problem affecting the health of ordinary citizens in India. The reasons for this disconnect between enlightened environmental laws and high levels of pollution could be traced to lax enforcement of existing environmental laws, discrepancies in the environmental guidelines for businesses to follow between the central government and at the state levels, and the existence of a large number of SMEs who neither have the resources nor the technical skills to adhere to the existing environmental laws.

Using extensive secondary research, this paper suggests a series of steps to help the country achieve safe air and water pollution levels resulting in improved health conditions for its citizens. The cornerstone of the prescription for improvements in the environment is a collaborative arrangement that brings together the various government agencies, the citizens, SMEs, large domestic companies, and NGOs to participate in a collaborative arrangement to educate, streamline effective policies, develop the necessary institutional infrastructure, and provide adequate funding for improving the environment.

INTRODUCTION

In the past two decades, by instituting an open trade policy and improving its financial market development, India has been able to achieve phenomenal economic growth (Agrawal, 2015 and Pradhan, Arvin, and Norman, 2015). The country's GDP growth rate in the past 15 years has averaged 7 percent and in some years exceeded 9% (World Bank Statistics, 2015). Even during the global financial crisis of 2008 to 2011, India's economy averaged growth rates of 7 percent (World Bank Statistics, 2015).

The rapid economic growth experienced by India over the past decade and a half has come with some unwelcome consequences. The rapid industrialization and economic growth has resulted in unhealthy air and water pollution affecting infant mortality rates and life expectancy rates (Striessing, Schöpp, and Amann, 2013). India's efforts to regulate air and water pollution have resulted in only marginal improvements in infant mortality rates in the country. The ineffectiveness of the regulations could be traced to poor institutional settings and lack of enforcement of the regulations (2014). The tension between economic

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development and the imperative to curb greenhouse gas emissions remains the central challenge for India and the rest of the world.

India's major challenges are directly attributable to its extremely high population density, especially the rise in urban centers. Urban India is growing rapidly in terms of population size. The increase in number of large cities with a million plus population is adding to the environmental problems faced by the country. In addition, traditional agricultural practices contribute conjointly to the decimation of the subcontinent's environmental system.

ENVIRONMENTAL CONCERNS AS A GLOBAL ISSUE

India is not the only country facing environmental issues. Definitely air and water pollution and climate change are more global issues that require a concerted effort by all nations to solve. A report by the Intergovernmental Panel on Climate Change (IPCC) in "Climate Change Science Compendium 2009", suggests that the world will be experiencing more of ocean acidification, ice-sheet melting, sea-level rise, and so-called tipping points in climate effects much sooner than ever thought off (Parks, 2009).

Although environmental issues are global in nature, each country is in control of its own environment with jurisdiction over its territory and, hence, should be controlling, monitoring, and enacting regulations in safeguarding its environment. This is true for India too. The Copenhagen Accord makes it clear that it is up to individual countries to devise and enforce the regulations necessary to achieve their national commitments to combat global warming by reducing greenhouse gas emissions.

Because of the country specific role of controlling and monitoring the environment, it is difficult to enforce environmental standards on countries from a global perspective, each country should be willing to consider environmental issues as a probable contributor to the overall global degradation of the environment and participate in controlling it through its laws and participation by its industrial sector. In addition, each country could be part of a worldwide association/organization that uses the global network, technological know-how, and resources to be a contributing partner to this group in helping the environment (like the Kyoto Protocol of 1997 and Copenhagen Accord of 2009 on climate change). When international organizations and non-governmental organizations (NGOs) try to help individual countries on environmental issues, in some instances it creates problems. In a research paper funded and supported by the World Bank, researchers found that in India, the role of international institutions and NGO's often have difficulty matching their interest with that of the state, especially, when it comes to human rights standards (Randeria, 2003).

ENVIRONMENTAL ISSUES FACING INDIA

Some of the major environmental concerns confronting India include:

- Air pollution from industrial effluents and vehicle emissions;
- Energy-related environmental problems such as, chemical & oil pollution and Greenhouse Gas (GHG) emissions (Greenstone and Hanna, 2014);
- Water pollution from raw sewage, the lack of adequate sanitation, and non-potable water throughout the country;

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- Municipal solid waste management (MSWM) remains a challenge for India due to the rising population and the resultant infrastructural needs (Dube, Nandan, and Dua, 2014);
- Over-population and its strain on natural resources; and
- Agricultural factors such as, runoff of agricultural pesticides, overgrazing, short cultivation cycles, slash and burn practices, destructive logging practices, and deforestation of timber reserves for fuel, all contribute conjointly to the decimation of the subcontinent's environmental system (Greenstone and Hanna, 2014).

In particular, municipal solid waste (MSW) collection and disposal is a major urban environmental problem facing India. India is not the only country with this problem, it appears many of the developing countries and a few of the developed countries are also confronted with MSW as an environmental concern. But, in India the critical concern is in the way MSW is disposed. The waste that is collected by municipalities in India is simply dumped on the outskirts of the urban centers (Reddy, 2014). In addition, the MSW release methane and carbon dioxide that increase the effects of greenhouse gases.

On environmental issues and concerns, India carries a heavier burden because it is generally accepted that pollutant concentrations are exceedingly high in many developing countries imposing substantial health costs and shortened lives (Chen, et. al., 2013). Since most of the growth in greenhouse gas (GHG) emissions is projected to occur in developing countries such as China and India, these two countries are probably responsible for the future of this world. In the most recent data available, ambient particulate matter concentrations in India are five times the level of concentrations in the United States and China's are seven times the U.S. level (Greenstone, 2014). Interestingly, in anticipation of the Paris Conference on climate change that is scheduled to start on November 30th, countries have been issuing pledges about how much emission they are willing to cut in coming decades. India and Brazil, probably the two of the most air polluting countries in the world have yet to make commitments to take to the Paris Conference (Gillis and Sengupta, 2015).

Results and effects of environmental issues in India

Many of the current environmental concerns in India such as the air pollution, GHG emissions, chemical and oil pollution, etc., have many far reaching consequences for its people. The two major areas of concerns for policy makers are high infant mortality rates and low life expectancy. As shown in Table 1, for the year 2013, out of 1,000 live births in India about 41 will die before they reach the age of 5. By comparison, in China only 11 die and in Japan and Singapore only 2 will not survive beyond the age of 5. Similarly, India is ranked 139th among 194 countries in life expectancy with people living up to 66 years of age. By comparison, people in Japan on an average live up to 84, in Singapore up to 83, and in China they live up to 75 (Table 1).

The link between environmental concerns, its effects on people, and the resulting consequences on human life and the economy are easily traceable. Higher the environmental destruction greater the health problems faced by the people resulting in both human and economic costs. Figure 1 maps out the link between environmental concerns, effects of these concerns, and the resulting human and economic toll on a country. For example, in 2006 it is

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estimated that inadequate sanitation costs India almost \$54 billion or 6.4% of the country's GDP (Pandve, 2008).

Table 1

Infant Mortality Rates* (2010 and 2013)** and Life Expectancy Rates for Selected Countries – 2013***

Country/Year/Infant Mortality Rates	010	013	Life Expectancy	2013
Canada	5	5		82
China	14	11		75
Denmark	3	3		80
India	46	41		66
Japan	2	2		84
Korea. S	4	3		81
Singapore	2	2		83
United Kingdom	4	4		81
United States	6	6		79

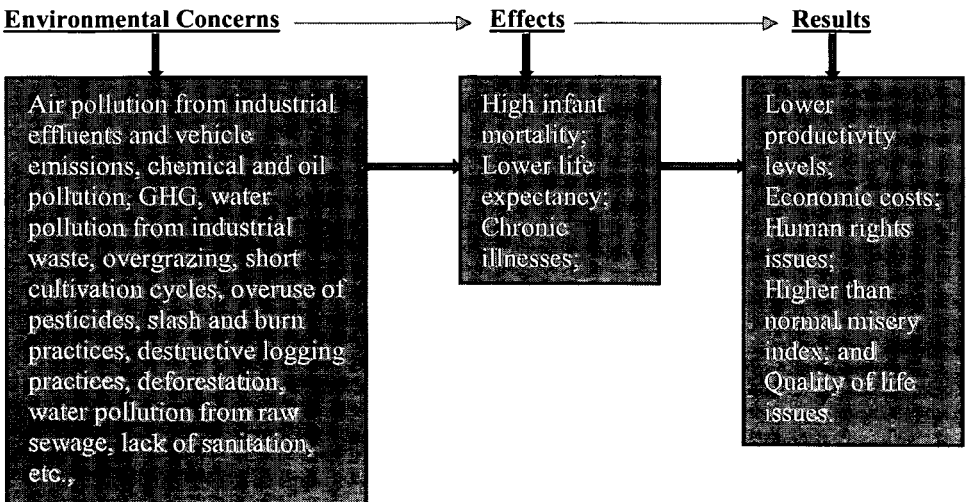
- Mortality rates under 5 years per 1,000 live births

** Source: The World Bank, "World Economic Statistics," Available at <http://www.worldbank.org>. WBSITE/EXRERNAL/DATASTATISTICS (accessed May, 2015).

*** Source: The World Health Organization, Available at <http://www.who.int/gho/mortality> (accessed May, 2015).

Figure 1

A Schematic Representation of the Environmental Issues in India



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Although, there are many factors that affect infant mortality and life expectancy, including poverty, malnutrition and literacy levels, there is definitely a correlation between health and environmental factors.

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, a 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.

The Effectiveness of the Environmental Regulations in India

According to the Kyoto Protocol of 1997 signed by 37 industrialized countries and the European Union, the goal for 2008-2012 was to reduce the GHGs emissions to 5.2% lower than the 1990 level. India, as the third largest producer of GHGs is facing tremendous pressures from the international community to meet these targets. India's extensive environmental laws seem to have very little effect in reducing the harmful effects of pollution, MSW, and GHG emissions. Researchers have concluded that there are many reasons for this, including:

- Government of India is reluctant to enforce its own laws on air and water pollution lest it stop developmental projects that help create jobs and improve the economy (Mejia, 2009);
- Although many of the environmental regulations in India on air and water pollution are similar to those of the existing standards of other industrialized countries, the lack of its enforcement has upset the global business community as it seems to provide Indian businesses an important cost advantage (Ord, 2009);
- In a similar vein, environmental activist Rama Kumar states that enforcement of current laws is patchy and uneven. Effective control has been inconsistent, especially among smaller companies. For example, in Rajasthan industrial effluent discharge into the Bandi river bed seems to be the main source of contamination of ground water in the area resulting in the degradation of

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other natural resources such as land, soil and vegetation creating problems of salinity and sodicity in soils that has resulted in declines in herbal biomass (Khan, 2001).

- Enrico Polastro, vice president and senior industry specialist at global management consultant Arthur D. Little feels that environmental control standards vary between large companies and the small to medium sized companies (SMEs);
- Small businesses are more likely to have out-of-date processes, and curtailing emissions is more costly in comparison with fine-tuning the newer technologies employed by global players. Stringent enforcement of environmental regulations might put these companies out of business creating mass unemployment, something the government of India wants to avoid;
- There is also a reluctance by the government to come down too hard on SMEs that has lifted so many Indians out of poverty;
- Corporations are now in a position to identify and estimate the environmental costs, benefits, investments, assets and liabilities into main stream accounting and reporting practices, for a variety of managerial decisions. These in return have sharpened and improved the global reporting standards on environmental issues. In India, large companies have yet to incorporate these techniques into mainstream reporting (Malarvizhi and Yadav, 2008/2009).

The above discussion sums up the problems faced by the Indian government in enforcing current environmental laws and safeguarding the health of its people.

PRESCRIPTIONS FOR HEALTHIER AND BETTER ENVIRONMENTAL CONDITIONS IN INDIA

In India, the existing environmental monitoring and control has not succeeded in reducing the pollutants, GHGs, etc. There is a definite need for India to explore other approaches in solving the environmental problems. A major concern for developing countries including India is how to safeguard the environment without adversely affecting the country's economic growth and employment levels. According to some researchers there will always be political and economic constraints on most governments in monitoring and controlling the environment and at the same time encouraging industries to be vigilant in reducing air and water pollution (Stuligross, 1999).

For countries with success in addressing the environmental issues an approach that seems to have worked is when the government and the private sector work together as partners. It is important for the government to stress and the industry sector to accept the benefits of safe environmental practices as there are possible financial gains for those firms that adopt such practices. Research has shown that for manufacturing plants in static industries with low entry and exit costs, environmental investments do significantly improve operational performance in terms of cost, quality, and flexibility (Wiengartne, Pagell, and Fynes, 2012).

Regulation alone might not always work if the external factors do not support or assist the industrial sector. Compounding this dilemma is the fact that in the area of environmental issues and the people directly affected by it, it is not clear that everyone understands the role of the government in bringing about change. Many of them feel that their

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livelihoods might adversely affected by the environmental regulations introduced by the government. In such situations it is far better to work through the people directly affected by regulations to bring about necessary changes in habits (Agarwal, 2005). Following are a few examples that demonstrate the limitations of environmental regulations in improving such issues as emissions of greenhouse gas, improving air and water quality, reducing the municipal water waste disposal problems, etc.,

- In a study of the manufacturing sector among the European Union countries researchers found that a European-wide carbon tax would induce an unbalanced burden on industries and countries (Bordigoni, Hita, and Le Blanc, 2012).
- Similarly, in a study by the International Monetary Fund, researchers found that the post-tax energy subsidies at the global and regional levels are dramatically higher than previously estimated resulting in adverse effects on the environment (Coady, et al., 2015).
- In a similar vein, a research study on the wine industry in New Zealand found that firms with a higher commitment to exports (external pressures) were more likely to adopt safe environmental practices (Sinha and Akoorie, 2010).

Policy makers, international organizations, and academicians all have come to the conclusion that regulation alone is not sustainable in stopping or even reducing the environmental degradation of our planet. In addition to regulation, the education and income levels of a country's population seems to have an effect on the environment. In a study of Indian households on environmental concerns, education and income showed significant positive association with people's concerns for the environment (Chatterjee, 2008).

Based on the success of a few countries in managing environmental concerns, it appears that environmental laws alone are less effective, but when the industry and private sector cooperates and shares the responsibility with government agencies they seem to result in a more effective management of the environment. The following studies highlight the usefulness and importance of the cooperative approach in addressing many of the environmental concerns facing the world.

- In a study of the U.S. dairy industry, researchers found that improving the industry's production efficiency including management practices, nutrition given to animals, and reproduction methods, help reduce air quality and water pollution issues (Place and Mitloehner, 2010);
- In a study of the Dutch paper and board industry, researchers found important contributions in the areas of waste water and energy efficiency through the involvement of the industry association (Chappin, et al., 2008);
- Similarly, in a study of the insurer's role among the Nordic countries shows the critical role played by the insurance industry in enhancing development and utilization of environmentally sound technologies by encouraging the industries that they insure to adopt such technologies (Johannsdottir, et al., 2014);
- Even in India, there are a few examples of such joint efforts between the government and the industry. For example, a research study on the issue of energy use efficiency in the Indian cement industry has shown that environmental regulation has a reinforcing effect on energy use efficiency (Mandal, 2010);

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- Concurrent to the government/industry teamwork, the participation of the public sector institutions could play a critical role in reducing some of the environmental problems, especially if they could apply an integrated approach involving key stakeholders such as non-government organizations (NGO's) and the private sector (Cotton, Olley, and Ali, 1999); and
- Also, using econometric modeling, a few researchers have suggested a plan for reducing the GHGs in India by focusing on reducing energy intensity through adopting energy conservation and energy efficiency measures. By doing so, India has also the opportunity of generating additional revenue through trading of carbon credits earned (Agrawal, et. al., 2010).

Based on the success of government and industry partnerships that have shown to improve the enforcement of environmental laws, it is suggested that to improve the air and water quality in India a similar partnership might be more effective. The underlying principle behind the strategy is to develop a symbiotic relationship between the people of the country, the specific government agencies responsible for environmental issues, the industry sector, and NGO's. The key steps in this area are:

1. Bring the environmental issues and concerns to the masses, especially farmers and small businesses. It is critical that the population understands the issues and is educated and informed of the consequences of air and water pollution, effects of runoff of agricultural pesticides, etc., Here the government can use its network to reach out to the people, the private sector can offer its expertise in mass media, and NGOs can provide examples of successful environmental initiatives from other countries.
2. Government ministries such *Commerce and Industry; Environment, Forest, and Climate change; Micro, Small, and Medium Industries; and Rural Development* should first draw up a streamlined and coordinated plan to address the most critical environmental issues faced by the country and have a dialogue with key industry leaders for inputs in monitoring and controlling the identified issues. In addition, the various ministries should ask the assistance of large companies that have good practices in managing air and water pollution to transfer their knowledge to the SMEs.
3. Through discussions with the executives of large Indian companies and NGOs, set certain goals to be achieved in the areas of air and water pollution.
4. Ask for assistance from the industry sector as well as NGO's on technologies, management practices, and funding support to introduce proven practices in managing the environment that results in reduction of pollutants.
5. Offer incentives to industries or individual firms that would like to try proven innovative technologies in reducing GHGs and other pollutants but, especially when these initiatives require major investment to install these technologies;
6. Offer incentives to large firms that would volunteer to assist the SMEs in reducing their carbon footprint;

It is believed that the above series of steps have the potential of steering the country towards a healthier and safer environment for the people of India. Figure – 2 shows the suggested interlink between the various partners in addressing the environmental concerns in India.

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In addition, for municipal solid waste disposal which is also a major problem, India could learn from the experiences of other countries in trying to convert MSW into energy. Researchers have concluded that any proposed solution in converting MSW into energy has to be technologically feasible, socially acceptable, and financially sustainable (Teixeira, et al., 2014). Energy recovery includes any process that converts waste material into energy such as electricity and alternative fuels. The biodegradable waste can be processed by aerobic composting and the non-biodegradable waste such as plastic can be processed for recovering energy (Reddy, 2014). The European Union is pushing for waste valorization – a process that involves sorting at the source combined with material recycling and waste to energy conversion (WtE). Based on the experience of the Portuguese government, it appears that the gasification process has proven to be a workable approach in waste to energy conversion (Teixeira, et al., 2014).

CONCLUSIONS

The rapid economic growth experienced by India is resulting in adverse and harmful environmental conditions that are affecting the people of India 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).

Sustainable development, that is, both a prosperous economy and a healthy environment that in many respects is the goal of diverse interest in the area of environmental issues, is the key for the future of India and the world. Sustainable development implies managing the diverse interests of a prosperous economy and simultaneously maintaining a healthy environment. Based on extensive literature search, we recommend that India undertake a new approach in the fight against environmental pollution. The key element of this new initiative is the shared and cooperative participation of the people, the government, the industrial sector, and NGO's. This type of approach seems to have worked for a few countries and it appears to be a doable solution for India too. A series of steps are recommended that could lead to an improved environment and at the same time prove to be helpful for the Indian population. Furthermore, to reduce the growing MSW problem, it is recommended that India undertake proven waste to energy conversion techniques that have been adopted by the European Union.

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FIGURE – 2

Process for Improving India's Environmental Concerns

