

# Climatic Change and Manufacturing Industries A Case Study of Tuticorin plant, Vedanta Ltd.

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## ABSTRACT:

*This article focuses on the climatic change which is happening across the globe which has been caused by the manufacturing industries such as Vedanta Ltd. with specific reference to India. A case study has been conducted through empirical research in the regions of Tuticorin where mining and copper smelter plant has been shut due to the environmental and climatic threats they were posing. The article starts off with the conventions relating to climatic changes at the global platform and the obligations they impose on the signatory parties. The article also focuses on the need of a sustainable development in a way that it does not hamper the development of the nation in parallel to the current needs.*

*The article then specifically addresses the issue of climatic change in Tuticorin caused by Vedanta Ltd. and how it is affecting the local residents. The researcher has given a few recommendations as to what can be a feasible way to curb this issue and ensure that the balance of the nature is not disturbed.*

**Keywords:** Sustainable development, Climatic Change, International Conventions, Environmental Protection, Vedanta Ltd.

## I. INTRODUCTION

Even The Earth's climate has been changing throughout the times when the earth came into existence. In last 650,000 years, the earth's cycles have changed seven times from glacial advance and retreat to the abrupt end of the last ice age about 7,000 years ago marking the beginning of the modern era climate- the human civilization.<sup>1</sup> Climate change is a crucial problem which impacts all the spheres of life which is caused by a numerous factors however increased emissions taking the lead. Climatic change is evident from a number of sources such as rise in global temperature, melting of glaciers, warming oceans, rise in sea level, shrinking ice sheets, extreme events such as uneven rainfalls<sup>2</sup> and ocean acidification<sup>3</sup>. Global warming has become an issue of grave importance however barely people are aware of small ways in which they are contributing to this global crisis apart from the huge manufacturing industries.

The issue of climatic change was recognised in 1979 during the first World Climate Conference.<sup>4</sup> However, the onset of the revolutionary era was marked with the adoption of UNFCCC at the Rio Earth Summit in 1992.

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<sup>1</sup> Global Climate Change, *Climate Change: How do we know*, <https://climate.nasa.gov/evidence/>

<sup>2</sup> Kunkel, K. et al, *Probable maximum precipitation and climate change*, Geophysical Research Letters, (12 April 2013) DOI: 10.1002/grl.50334

<sup>3</sup> PMEL Carbon Program, *Ocean Acidification*, <https://www.pmel.noaa.gov/co2/story/Ocean+Acidification>

<sup>4</sup> Albert Mumma, *Designing a Global Post-Kyoto Climate Change Protocol*, Georgetown int'l envtl. Law Review 619.

## II. UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE

UNFCCC was one of the three conventions adopted at the Rio Earth Summit and has been ratified by 195 countries to the date.<sup>5</sup> It was joined by the countries in the year 1992 to take initiatives to control increased global temperature and to cope up with the impacts of changed climate. However, it was realised in the year 1995 that the measures proposed under the said agreement were inadequate to deal with such a vast issue of grave importance and therefore in 1997 Kyoto Protocol was adopted with a better framework and binding set of rules.

## III. KYOTO PROTOCOL

Kyoto Protocol was an international agreement entered into by the countries to reduce the disparity between the developed and the developing nations. It committed to setting up internationally binding emission reduction targets on the signatories. The protocol placed a heavier burden on developed nations under the principle of "common but differentiated responsibilities."<sup>6</sup>

## IV. MARRAKESH ACCORDS AND COP 7

The Marrakesh Accords were adopted at COP7 in 2001 detailing the rules for implementation of the Kyoto Protocol, setting up new funding and planning instruments for adaptation, and establishing a technology transfer framework.<sup>7</sup>

## V. BALI ROAD MAP

With growing difficulties and a need for better framework, it was agreed that a new agreement should be introduced which can work in harmony with the Kyoto protocol and replace it eventually.<sup>8</sup> At COP13, the parties agreed with Bali Road Map. However, by 2009, an agreement introduced was the Copenhagen.

## VI. COPENHAGEN

The major setback of the Kyoto protocol was lack of proper organisation along with the fact that the protocol failed to negotiate with the targeted countries such as New Zealand, Russia and certain other developed nations like Canada and USA who did not even ratify to the conventions. In 2009, the Copenhagen happened and all the states committed towards reduced emission levels.

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<sup>5</sup>The Council of EU, *International Agreements on Climate change*, <http://www.consilium.europa.eu/en/policies/climate-change/international-agreements-climate-action/>

<sup>6</sup> Annalisa Savaresi, *The Paris Agreement: A New Beginning?* Journal of energy & natural resources law (January 2015).

<sup>7</sup> <http://www.un.org/climatechange/towards-a-climate-agreement/index.html>

<sup>8</sup> AutriSaha, *India's Response to Climate Change: The 2009 Copenhagen Summit*, 3 NUJS L.Rev (2010).

## VII. BRUNDTLAND REPORT

The aim of the Brundtland Commission was to unify countries in order to persuade them to step on the path of sustainable development together. The report released by the commission was called Our Common Future and a meeting was held in Rio where a comprehensive action plan called Agenda 21 was laid down.

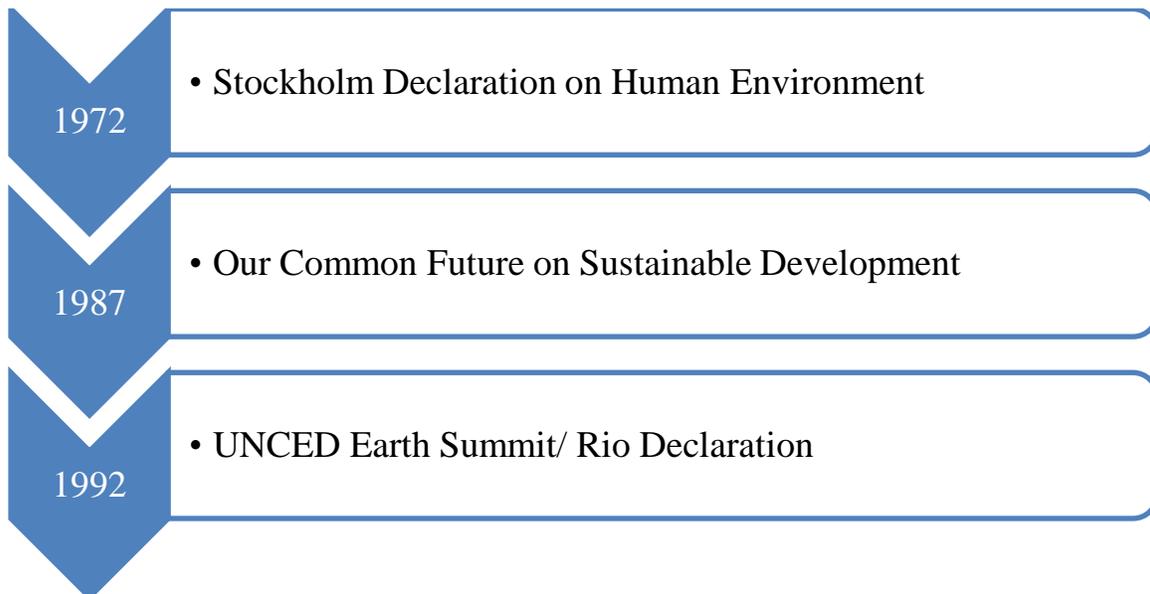
## VIII. PARIS AGREEMENT

The Paris Climate Conference took place in the year 2015 to implement an action plan to limit global warming. All the EU countries ratified the agreement.

## IX. SUSTAINABLE DEVELOPMENT AND FLOURISHING BUSINESSES

Sustainable development is an approach to economic planning that seeks to promote economic growth while preserving the quality of the environment for future generations.<sup>9</sup> Contemporary evolutionary process of the principles of sustainable development law started with the 1972 Declaration of the United Nations Conference on the Human Environment in Stockholm. In which the relationship of the man and its environment was defined as “Man is both creature and moulder of his environment, which gives him physical sustenance and affords him the opportunity for intellectual, moral, social and spiritual growth.”<sup>10</sup> The figure below provides for the evolutionary process of International sustainable development law:

## X. INTERNATIONAL SUSTAINABLE DEVELOPMENT LAW



<sup>9</sup> See the Report of the World Commission on Environment and Development: Our Common Future, 1987, United Nations, available at <http://www.undocuments.net/our-common-future.pdf>

<sup>10</sup> See, Stockholm Declaration, The United Nations Conference on the Human Environment, Stockholm, 1972, available at <http://www.unep.org/Documents>



Sustainability of the Indian economic growth remains largely threatened due to the adverse impact of climate change (Prime Minister’s Council on Climate Change—India). While India struggles with increase in carbon emissions and seasonal anomalies, limited availability of domestic finance confines avenues of environmental amelioration. Simultaneously, high population growth and lack of public participation constrain the effectiveness of policy initiatives. The 26 principles and 109 recommendations of Stockholm declaration marks the benchmark for how any industry should function to ensure that the goal of sustainable development is met properly.

When the concept “sustainable development” was first articulated in the Brundtland Report, the emphasis was clearly anthropocentric. In face of increasing evidence that planetary systems vital to life-support were under strain, the concept of sustainable development is constructed in the report to encourage certain globally coordinated directions and types of economic and social development.

It contains within it two key concepts:

- The concept of “needs”, in particular the essential needs of the world’s poor, to which overriding priority should be given; and
- The idea of limitations imposed by the state of technology and social organization on the environment’s ability to meet present and future needs.

The concept of sustainable development has been—and still is—subject to criticism. What, exactly, is to be sustained in sustainable development? It has been argued that there is no such thing as a sustainable use of a non-renewable resource, since any positive rate of exploitation will eventually lead to the exhaustion of earth’s

finite stock. This perspective renders the industrial revolution as a whole unsustainable. It has also been argued that the meaning of the concept has opportunistically been stretched from conservation management to economic development and that the Brundtland Report promoted nothing but a business as usual strategy for world development, with an ambiguous and insubstantial concept attached as a public relations slogan.

In regards to manufacturing industries, *Principle 6 of the Stockholm Declaration*<sup>11</sup> is an essential principle to be followed as it states that pollution should not exceed the environment's capacity to clean itself. Alongside, *Principle 8* of the declaration holds that development is needed to improve the environment. It is pertinent to note that developing is a part and parcel of life and it is impossible to maintain the environment without development. Industries play a vital role in development by means of providing employment opportunities and other relevant necessities and thus cannot be eliminated from the environment.



## XI. LITERATURE REVIEW

The Researcher has gone through various papers which focus on the pollution problem in Tuticorin due to the Sterlite Smelter plant. The researcher has depended upon them for certain facts and figures. Apart from this, headlines of various newspapers have revealed that the sterlite smelter plant in Tuticorin has been in controversy since its very inception. There has been a gradual change in the climate of Tuticorin due to continuous air and water and soil pollution caused by the smelter plant. It has also been indicated that the local residents are not very happy with the functioning of smelter plant and have tried their best to bring it down.

<sup>11</sup> Declaration of the United Nations Conference on the Human Environment, [https://www.soas.ac.uk/cedep-demos/000\\_P514\\_IEL\\_K3736-Demo/treaties/media/1972%20Stockholm%201972%20-%20Declaration%20of%20the%20United%20Nations%20Conference%20on%20the%20Human%20Environment%20-%20UNEP.pdf](https://www.soas.ac.uk/cedep-demos/000_P514_IEL_K3736-Demo/treaties/media/1972%20Stockholm%201972%20-%20Declaration%20of%20the%20United%20Nations%20Conference%20on%20the%20Human%20Environment%20-%20UNEP.pdf)

Certain petitions have been filed to close the plant a lot of legal actions have been initiated to bring down the plant. Locals in and around the plant have for long been protesting demanding the closure of Vedanta's copper smelter unit on the ground that it allegedly caused pollution, a charge rejected by the company. In a massive movement similar to the 2017 'Jallikattu Protest', thousands of people in Tamil Nadu's Thoothukudiare unanimously protesting on the streets, demanding the closure of the Sterlite Copper Smelter. The Ministry of Environment and Forests is yet to even consider the proposal for framing Terms of Reference (ToR) for the second unit of the copper smelter plant of Vedanta Limited at the SIPCOT Industrial

## **XII. RESEARCH METHODOLOGY**

The researcher has chosen empirical form of research where primary data has been collected by the researcher herself, through surveys conducted. The research is a combination of qualitative as well as quantitative data. The researcher focused on the residents of a particular area as the sample, since the issue being considered and analysed is at its peak in that area. The researcher wants to understand the plight of the residents as well as the outlook of those people towards environment protection. Therefore, empirical form of research was chosen.

## **XIII. CLIMATE CHANGE AND INDIA**

India is a country of varied climate ranging from tropical in south to alpine in north. Climate change has been extensively discussed in academic as well as in political domain. As per Indian report, India's expenditure on adaptation measures was exceeded to 2.6 percent GDP of 2006-07. The flood, drought, disaster and urban chaos have started to occur frequently. All these needed strong adaptability capability both at individual and public agencies level. Adaptation is not the ultimate solution but a reaction measures, the solution lies in Greenhouse Gas (GHG) reduction to optimum level. It is expected that climate change will increase both mean minimum and maximum temperature by 2-4° C which implies mean surface temperature rise by 3.5-5° C by the end of this century. Climate projections for India suggest that impacts of climate change in India are likely to be varied, with some regions experiencing intense rainfall, flood, and storm risks,<sup>12</sup> while other regions will encounter sparser rainfall and prolonged droughts. The impacts of climate change are likely to affect food production, water supply, coastal settlements and deltas, forest and mountain ecosystems, health, and energy security. Adaptation is particularly important in India because, as in most developing countries, the adaptive capacity of Indian communities likely to be impacted by climate change is low.<sup>13</sup>

Release of Green House gases in the atmosphere leads to pollution and depleting of ozone layer. Industries play a major role in increasing water, soil and air pollution particularly because of the nature of work they are

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<sup>12</sup>Jayant Sathaye et al., Climate Change, Sustainable Development, and India: Global and National Concerns, 90 CURRENT Sci. 314, 318-19 (2006).

<sup>13</sup>Sathaye, Suora note 12, at 318.

involved in. Change in climate is projected to occur over this century and continue till the next one. Certain impacts of climatic change in India can be witnessed across the country. Floods in Chennai, Kerala, Orissa and draughts in regions of Haryana and Rajasthan shows the uneven distribution of rain across the country.

#### XIV. CLIMATE CHANGE IN THOOTHUKUDI

For the sake of this paper however, the researcher has placed special emphasis on the change in climate of Tuticorin because of the Smelter plant set up by Vedanta Ltd. Thoothukudi is traditionally known as the “Pearl City” on account of the prevailing Pearl fish in the past. It is a coastal district and is bounded by the districts of Tirunelveli to the north, the districts of Virudhunagar and Ramanathapuram, to the east and by Gulf of Mannar to the south-east and by Tirunelveli district to the west and south-west. The district enjoys a hot tropical climate. The annual mean minimum and maximum temperature are 23°C and 29°C respectively. The climate is conducive for Agricultural and Horticultural crops. Average temperatures of January is 27°C, February is 27°C, March is 29°C, April is 31°C, May is 31°C. Tuticorin District is basically an agrarian district. However the quantity and quality of agricultural operations and crop production depend upon monsoons.



Sterlite Copper, previously called Sterlite Industries, is part of Vedanta Ltd, which is a subsidiary of the UK-based metal conglomerate, Vedanta Resources. Locals, as well as environmental rights groups, say that the unit is a major source of local groundwater and air pollution and that the smelter has caused severe environmental damage to the area. Ever since its set-up, the smelter plant at Tuticorin had faced severe hardships. Initially the

setup of plan was rejected by three states of India before it was finally established at Tamil Nadu, Tuticorin.<sup>14</sup> As per the data, Tuticorin Sterlite Copper plant accounts for 40 per cent of country's copper.<sup>15</sup> Sterlite's operation causes wide spread environment related problems irrespective of being an important industry. In 2008, the Department of Community Medicine, Tirunelveli Medical College submitted a report titled "Health Status and Epidemiological Study Around 5 km Radius of Sterlite Industries (India) Limited, Thoothukudi." The study covered a population of 80,725 people and compared the health status in villages around Sterlite with the average health status prevailing in the state and two other locations that did not have any major industries. The health report is a well-kept secret because of what it found. At the time of the study (2006 and 2007), Sterlite had been operating at a far lower production capacity of between 70,000 and 170,000 tonnes of copper anode per annum (tpa). It was only in 2005 that it was permitted to manufacture at an expanded capacity of 300,000 tpa.

"Since 2007, Sterlite has been operating a 400,000 tpa smelter, nearly six times larger than what it began with in 1996." The findings of the study revealed:

1. Iron content in the groundwater in Kumareddiapuram and TherkuVeerapandiapuram, the site of the ongoing protests, were 17 and 20 times higher than permissible levels prescribed by the Bureau of Indian Standards for drinking water. Chronic exposure to iron through drinking water could result in chronic fatigue, joint pain, and abdominal pain.

2. At 13.9%, respiratory diseases were significantly more prevalent in the areas surrounding the factory than in areas without industry and this was much higher compared to the state average. The incidence of asthmatic bronchitis is 2.8%, more than double the state average of 1.29%.

Bronchitis is an inflammation of the airways lining caused by long-term exposure to environmental irritants such as tobacco smoke, dust or chemicals. Asthma is a condition where the muscles around the airways get tight resulting in the narrowing of the airways. Asthmatic bronchitis is a condition where asthma and bronchitis occur together.

The report finds that "The increased prevalence rate of asthma and respiratory infections are due to the air pollution caused by industries and automobiles in the area."

3. The study also found that there were more people suffering from Ear, Nose, Throat (ENT) disorders near the factory. Among the ENT diseases, pharyngitis and sinusitis were very high. "Climatic conditions and atmospheric pollution could be the cause for the prevalence of ENT morbidity," the report concluded.

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<sup>14</sup>Rakhi Bose, Tuticorin's Sterlite Plant No Stranger to Controversy, Had Faced Closure Once,

<https://www.news18.com/news/india/tuticorins-sterlite-plant-no-stranger-to-controversy-had-faced-closure-once-1756619.html>

<sup>15</sup> <https://indianexpress.com/article/india/tuticorin-sterlite-copper-plant-to-shut-down-40-per-cent-of-countrys-copper-will-hit-800-units-and-jobs-5194969/>

4. Myalgia, or general body pain, was another widely reported symptom in the study area closer to the factory.

5. “Women in the [study] area had more menstrual disorders, like menorrhagiae and dysmenorrhagiae. . .it needs an in-depth study,” the report stated.<sup>16</sup>

This study has disturbing findings, since the high incidence of respiratory diseases found in 2007 was at a time when Sterlite was running at less than half its current production levels. Respiratory diseases are an indicator of air pollution which has been identified as the “world’s largest single environmental health risk” by the World Health Organisation. WHO reports that in 2012, around 7 million people died – one in eight global deaths – as a result of air pollution exposure.

### XV. DATA DESCRIPTION

For the sake of research, the researcher has tried to collect some data from the local residents of Tuticorin by the medium of an online survey where a few questions were asked by the researcher to check the awareness level of the residents along with their personal opinion about the smelter plant. Following are the results of such survey:

#### Sample size and description

For the purpose of survey, a sample of 25 people was taken and the residents were asked 4 questions mentioned below with the analysis of their results. The people here belonged to Tuticorin so that the researcher could get the personal approach of the native people of Tuticorin and their views about the same.

Do you feel the factory set up by Vedanta Ltd. is the reason for increased pollution level in Thoothukudi ?  
25 responses

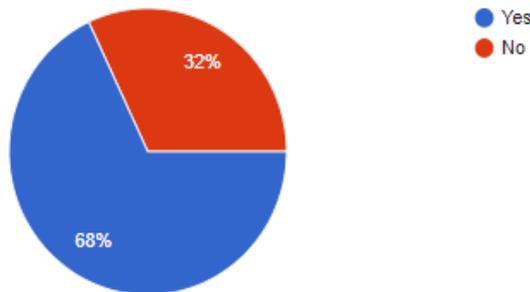


Figure 1:

<sup>16</sup>Health Status and Epidemiological Study Around 5 km Radius of Sterlite Industries (India) Limited, Thoothukudi.” Department of Community Medicine, Tirunelveli Medical College, 2008

As can be seen from Figure 1, it is apparent that 68% of the people from a sample of 25 believe that the change in climate and increased pollution levels is due to the setup of the smelter plant and not naturally because of any other factor.

Do you feel due to the change in climatic conditions, local residents have become prone to more diseases such as asthma, bronchitis etc.?

25 responses

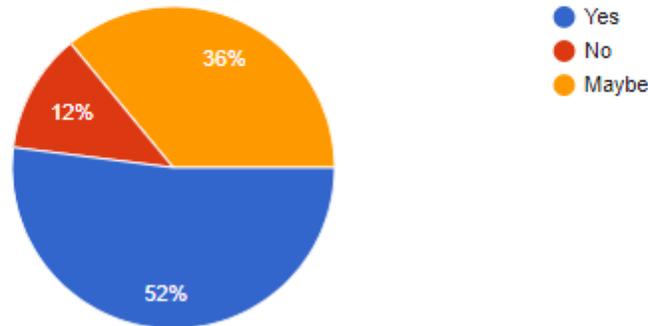


Figure 2

It is pertinent to note that 36% of the population is not certain whether the respiratory diseases are being caused because of the smelter plant set up by Vedanta or any other purpose. However, 52% of the population believes smelling such dangerous gases have led to an increment of such diseases. It can be seen there still are people who are not aware about their surroundings and things which are affecting their lifestyle but certain number of people the idea and proper knowledge about the same.

Do you feel due to the change in climatic conditions, the local business of fishers is also being affected

25 responses

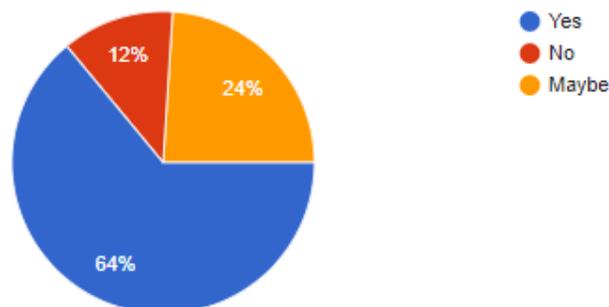


Figure 3

After the analysis of the third question, the researcher came to know that fishermen are being affected from the water pollution being caused by the smelter plant. Surprisingly, not much attention has been paid to this issue but the fishermen in the area do get affected because of the manufacturing industries in that region and Vedanta plant in particular. Due to water pollution, acid rains have also become a frequent phenomenon which destroys the crops as well and due to water contamination fishes die thus affecting the business of local fishermen.

### Do you feel Vedanta Smelter plant in your region should be shut down?

25 responses

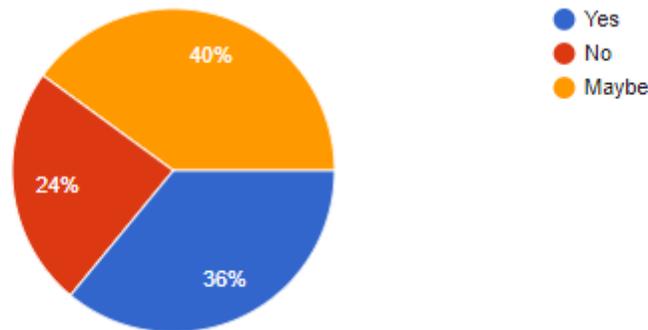


Figure 4

This question has got very mixed responses and it cannot be interpreted perfectly what is the firm stand of the residents on this question. Majority of them think maybe however 24% still feel that it should not be shut. Legal proceedings are going on before the NCLAT regarding the closure of Smelter plant and the researcher after this research is of the firm conclusion that the answer to this question should be left upon the NCLAT where experts under proper surveillance will get on to a conclusion which is beneficial overall for everyone.

The judiciary has played a vital role in deciding of this issue and it is still under observation. The High Court of Tamil Nadu, Hon’ble Supreme Court of India, NCLT and finally now NCLAT ais looking into the matter and the hearings for the same are still going on whether as to the permit to continue the plant should be granted or not.



## XVI. RECOMMENDATIONS AND CONCLUSION

The researcher would like to recommend certain measure which can effectively tackle the pollution in Tuticorin in order to ensure the functioning of Smelter plant in harmony with the needs and expectations of the local residents. Some suggestions have been taken from the survey conducted. Some suggestions have a legal outlook keeping in mind India's international obligations with regards to climate change and sustainability.

To reduce the impact of climate change there can be two approaches: one is mitigation and the second is adaptation to climate change. Mitigation efforts attempt to prevent hazards from developing into disasters altogether, or reduce the effects of disasters when they occur. At present, 62–63% of electricity is generated using fossil fuels and coal. It is important therefore to move away from coal and instead generate renewable energy using other sources such as solar energy, wind energy, etc. Migration of coastal population, increasing public transportation and forestry are the main adaptations that India can opt for. As accepted by the State Government of Maharashtra, one third or 33% of land needs to be covered with forests. At present, however, forest land is only around 20%; so the challenge here is to find more land, which can then be converted into forests. Today, the forests present are covering only 12% of land. Policy makers in India either do not know about, or do not take seriously, the economic, health-related and environmental impacts of climate change. This is largely because they feel no pressure from the public to deal with the problem. It is therefore important to make sure that the local government representatives understand this threat and feel pressure from the 13 people to take action. Urban and rural communities should pressurize their representatives to take up the issue with the state and central government, and develop strategies at three levels:

- At the local level, steps should be taken to minimize the impacts of global warming on communities, and to build adaptive capacities where possible. For instance, constructing sea walls can reduce the threat of coastal flooding. Crop varieties tolerant to saline water should be developed for regions likely to suffer salt-water intrusion in their aquifers.
- At the national level, a wide section of the Indian civil society, including economists, scientists and legal experts, should be involved in understanding the threats from global warming to the country, and in developing strategies to deal with them. In particular, scientists should be encouraged to further study the impacts of climate change, to better understand the nature of the impacts and take preventive action where possible.
- At the global level, India should demand that industrialized countries, largely responsible for causing global warming, should reduce their emissions of harmful gases and pay for the damage they have already caused. The positions taken by the Indian government on climate change at global meetings should be made public, and Indian civil society should be allowed to participate in their formulation.

These are just a few recommendations by the researcher. There are many other ways in which the pollution levels which cause the climatic changes can be combatted. On a concluding note, the problem of climate change has to be effectively addressed by thenation states. India has to start from the basic problems like the pollution problem in metropolitan cities and cities like Tuticorin where there is a tussle between development and prevention of traditional culture and environment. Taking a step towards solving each problem will eventually realise the objective of the various conventions on climate change.



## **XVII. BIBLIOGRAPHY**

### **News Channels/ newspapers**

- The Hindu
- The Times of India
- The Times Express
- News 18
- The News Minute
- The Hindustan Times
- The Indian Express
- Business Line

### **Websites**

- Vedanta ltd.
- Shodhganga
- NASA: Climate Change and global warming
- SSRN
- India Environment Portal
- Firstpost
- UNFCCC
- MoEF

### **Online database**

- Jstor
- Hein Online
- Manupatra
- SCC Online