ORIGINAL RESEARCH PAPER

Economics

CEMENT INDUSTRIES AND ENVIRONMENTAL POLLUTION EFFECTS IN KADAPA DISTRICT, ANDHRA PRADESH, INDIA

KEY WORDS: Cement Industries, Environmental Pollution, Water Pollution and Effects

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ABSTRACT

Cement demand is directly associated to economic growth and many growing economies are striving for rapid infrastructure development which underlines the tremendous growth in cement production. The cement industry plays a major role in improving living standard all over the world by creating direct employment and providing multiple cascading economic benefits to associated industries. Despite its popularity and profitability, the cement industry faces many challenges due to environmental concerns and sustainability issues. The present paper discusses the causes and consequences the respondents in Kadapa District due the environment water pollution from the cement industries.

INTRODUCTION

Cement is a generic term used for all the powdered material which, when mixed with water has a plastic form, but becomes a solid structure within a few hours. The structure gains strength and binding properties with age. Cement is an extremely important construction material used for housing and infrastructure development and a key to economic growth**.** Cement demand is directly associated to economic growth and many growing economies are striving for rapid infrastructure development which underlines the tremendous growth in cement production**.** The cement industry plays a major role in improving living standard all over the world by creating direct employment and providing multiple cascading economic benefits to associated industries. Despite its popularity and profitability, the cement industry faces many challenges due to environmental concerns and sustainability issues. The cement industry is an energy intensive and significant contributor to climate change. The major environment health and safety issues associated with cement production are emissions to air and energy use. Cement manufacturing requires huge amount of non renewable resources like raw material and fossil fuels. It is estimated that 5-6% of all carbon dioxide greenhouse gases generated by human activities originates from cement production. Raw material and Energy consumption result in emissions to air which include dust and gases. The exhaust gases from a cement kiln contains are nitrogen oxides (Nox), carbon dioxide, water, oxygen and small quantities of dust, chlorides, fluorides, sulfur dioxide, carbon monoxide , and still smaller quantities of organic compounds and heavy metals.

REVIEW OF LITERATURE

Rayees Ahmad Magray (2012) opined that the environmental implications associated with aerial discharge from cement factories/kilns are of a major concern in agricultural production systems. The valley of Kashmir, in the recent past, has witnessed a rapid growth in cement manufacturing units owing to the availability of huge deposits of the principal raw materials required for cement production. The present research work was carried out to assess the impact of cement dust pollution on growth performance, yield and quality of three commonly growing vegetable crops of Kashmir valley viz. tomato, radish and knol-khol. The effect of cement dust on nutrient status and heavy metal contamination of soil and crops was investigated.

Syed Sana Mehraj et al. (2013) opined that it is well known fact that air pollution is hazardous to environment and human health. Owing to infrastructure developmental activities cement industry is flourishing and resulting in the environmental deterioration and in turn degradation of the human health worldwide. The gaseous and particulate emissions from cement plants are degrading air quality and thus creating considerable environmental pollution especially air pollution.

Shraddha Mishra and Nehal Anwar Siddiqui (2014) aired that Climate change is considered as major environmental challenge for the world. Emissions from cement manufacturing are one of the major contributors in global warming and climate change. Cement manufacturing is a highly energy intensive process involving intensive fuel consumption for clinker making and resulting in emissions. In this paper, the role of cement industry is reviewed in causing impact on environment and health. It describes the cement production process and its emission sources followed by overview of emissions and their environmental and health impacts. The review study has focused on emission generation from clinker production and excluded the emissions due to indirect energy used for cement operations and reviewed on cement industry and associated emissions and health impacts.

World Business Council for Sustainable Development (WBCSD) (2014) expressed that it is impossible to envisage a modern life without cement. Cement is an extremely important construction material used for housing and infrastructure development and a key to economic growth. Cement demand is directly associated to economic growth and many growing economies are striving for rapid infrastructure development that underlines the tremendous growth in cement production.

Cement Manufacturing Enforcement Initiative, Environment Protection Agency Report (2014) expressed that the main route of entry of dust particles in the body is the respiratory tract or the gastrointestinal tract or both by inhalation or swallowing. When particulate matter (diameter less than 10µm) is inhaled, they penetrate deep into the respiratory system and Pm less than 2.5 µm go on to the lungs and pass into the blood stream. It is determined that short term exposure to particulate matters (PM 2.5) significantly increases the risk for cardiovascular and respiratory diseases. It also causes eye and throat irritation, bronchitis, lung damage, increased mortality rates, increased heart ailments etc.

K.Syamala Devi, V.Vijaya Lakshmi and A.Alakanandana (2017) aired that the climate change is considered as the major environmental challenge for the world. Technological advancement has resulted in cement making companies being able to produce higher volumes compared to the past. Cement belongs to the most often used building materials and its production is immensely increasing the world over. But the cement industry is an energy enormous intensive and products many emissions, odors and noise. It is a major source of emissions such as CO_2, NO_x, SO_x, VOCs, particulate matter etc. The present paper is a review taken from literature, peer reviewed journals, industry sector reports etc.

Amir Shirkhani, Hamed Kouchaki Penchah and Afshin Azmoodeh Mishamandani **(2018)** aired that the cement manufacture is a considerable industrial activity in terms of its volumes and contribution to greenhouse gas emissions. This study appraises the environmental impact of the clinker and Portland cement production in Iran, using life cycle impact assessment. Data used in

the cement manufacture life cycle inventory are based on site surveys of energy consumption, raw material use, and transportation distances. Emissions were estimated based on U. S. EPA emission factors. Most of these pollutants belong to kiln, pre-heater and diesel fuel, respectively. Environmental hotspots in all categories were detected. Production process was identified as a substantial contributor in most of the categories, such as global warming impact category and damage to human health.

METHDOLOGY

Random sampling method has been adopted in the present study and according to the information provided by the office of AP Pollution Control Board, The Kadapa District, there are seven cement plants functioning in the study area. All the seven units are taken up for a detailed study. Random sampling technique is made use of in the selection of respondents. Among 7 units, 25 respondents were selected randomly who are working in the factory and 25 respondents living around the cement factory were selected randomly and compared their health conditions with respect to environmental pollution mainly water and finally total sample comes to 350.

RESULTS AND DISCUSSION

Gender

The gender of the respondents is shown in the table 1.

Table 1: Gender of the respondents

Sl. No.	Gender	Category		Total
		Living around factory	Working in the factory	
1	Male	175	172	347
		100.00%	98.30%	99.10%
2	Female	0	3	3
		0.00%	1.70%	0.90%
Total		175	175	350
		100.00%	100.00%	100.00%

The table shows that the sample comprises 347 males and 3 females and majority of the males are living around the factory and all the females are working in the factory.

Duration of the stay

The stay of the respondents in and around the cement factories has been elicited and the details are presented in the Table 2

Table 2: Duration of the stay

Sl. No.	Staying	Category		Total
		Living around factory	Working in the factory	
1	0-15 years	53	102	155
		30.30%	58.30%	44.30%
2	15-30 years	20	17	37
		11.40%	9.70%	10.60%
3	30-45 years	92	27	119
		52.60%	15.40%	34.00%
4	above 45 years	10	29	39
		5.70%	16.60%	11.10%
Total		175	175	350
		100.00%	100.00%	100.00%

The table shows that 115 respondents (44.30 %) have been staying up to 15 years and 119 respondents have been staying for 30 – 45 years and the number of the respondents staying 15 to 30 years and above 45 years is less.

Water Pollution

The information on whether the respondents have the problem of water pollution has been gathered and the details are presented in the Table 3

Table 3: Water Pollution

Sl. No.	Cause of water pollution	Category		Total
		Living around factory	Working in the factory	
1	Slum water	3	0	3
		1.70%	0.00%	0.90%
2	Industrial smoke dust	158	175	333
		90.30%	100.00%	95.10%
3	Others	14	0	14
		8.00%	0.00%	4.00%
Total		175	175	350
		100.00%	100.00%	100.00%

The table presents that 333 respondents (95.10 %) opined that the industrial smoke and dust are major causes of water pollution, followed by 14 respondents opined other reasons for it.

Water pollution affected problems

The problems faced by the respondents due to water pollution have been shown in the Table 4.

Table 4: Water pollution affected problems

Sl. No.	Water pollution affected problems	Category		Total
		Living around factory	Working in the factory	
1	Typhoid	34	37	71
		19.40%	21.10%	20.30%
2	Diarrhoea	9	18	27
		5.10%	10.30%	7.70%
3	Amoebiosis	0	4	4
		0.00%	2.30%	1.10%
4	Stomach-ache	69	101	170
		39.40%	57.70%	48.60%
5	Skin diseases	51	14	65
		29.10%	8.00%	18.60%
6	Indigestation	12	1	13
		6.90%	0.60%	3.70%
Total		175	175	350
		100.00%	100.00%	100.00%

It is observed from the table that around 49 per cent of the respondents are suffering from stomach ache, a little more than 20 per cent from typhoid, around 19 per cent are suffering from skin diseases.

Impact of industrial pollution on the drinking water

The information on whether there is any impact of industrial pollution on drinking water consumed by the respondents has been presented in the Table 5

Table 5:Impact of industrial pollution on the drinking water

Sl. No.	Impact of industrial pollution on the drinking water	Category		Total
		Living around factory	Working in the factory	
1	Yes	172	170	342
		98.30%	97.10%	97.70%
2	No	3	5	8
		1.70%	2.90%	2.30%
Total		175	175	350
		100.00%	100.00%	100.00%

The table shows that around 98 per cent of the respondents opined that there is impact of industrial pollution on drinking water consumed by them and the remaining respondents opined negatively.

CONCLUSION

Cement is an extremely important construction material used for housing and infrastructure development and a key to economic growth. Cement demand is directly associated to economic growth and many growing economies are striving for rapid infrastructure development which underlines the tremendous growth in cement production. Due to cement pollution in the present study, water pollutants are spread around the cement factories. The results show that around 60 per cent of the respondents are facing the problem of water pollution and majority of them are living around the factory, 95.10 % of the respondents opined that the industrial smoke and dust are major causes of water pollution, around 49 per cent of the respondents are suffering from stomach ache, around 98 per cent of the

respondents opined that there is impact of industrial pollution on drinking water consumed by them

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