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ASSESSMENT OF AGRO BASED INDUSTRIAL POLLUTION ON HUMAN HEALTH AND ENVIRONMENT IN VINDHYAN REGION (M.P.)

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ABSTRACT
For evaluation of potential impact of agro based industrial pollution on environment, Environmental Impact Assessment is a widely used tool. The present study focuses on the impact of agro- based industrial pollution on health and environment in the Vindhyan region of Madhya Pradesh, where there exist a several agro-based industries and some other industries. For study samples were collected from 2 areas (Satna distric and Sidhi district). The findings revealed that in the experiment area maximum people are suffering with diseases like arthritis, skin diseases and gastric problems etc. whereas in control group the numbers of sufferer are less.

KEYWORDS: Agro-based industry, Assessment, chemical fertilizers, Human health, Environment.

INTRODUCTION
Nature has been beneficial for all living organisms since ancient times. Human really organized to local areas while they were dealing with agricultural activities, and for a long time they applied the agricultural technical without corruption to the balance of the nature.[1]

Agricultural practices effects on environment through global flowing of greenhouse gases. The main reason for the destruction of forest land is to obtain agricultural land. As a result of agricultural land obtaining, greenhouse gases are created at the same time. Forests collect carbon 20 or 40 times more than agricultural lands and most of the carbon is released into atmosphere when forests has been destroyed to open agricultural land.[2,4] Methane gas can also occur sometimes in agriculture. Paddy cultivation worldwide is responsible for 40% of global methane emission.[5] High microbial decay of organic materials emits methane into the atmosphere where rice grows in low-oxygen environment. Animals digest the cellulose and release methane gas into the air.[6] N_2O which is another greenhouse gas is closely related to agriculture. Nitrogen fertilizers led to %0.1 - %1.5 of the natural N_2O oscillation. Different application in agriculture is affecting the spread of greenhouse gases. Fossil fuels are used more in areas of intensive agriculture.[7,8] Environment pollution occurred by irregular and rapid industrialization, urbanization, organic and inorganic wastes that left in environment, using of pesticides and chemical fertilizers, irrigation, tillage, plant hormone applications are some of the wrong applications, unintended usage of agricultural lands and wrong agricultural applications and also stubble burning, planting without rotation and inappropriate animal wastes are assumed as mistakes.[9,10] The objective of the present study focuses on the impact of agro- based industrial pollution on health and environment in the Vindhyan region of Madhya Pradesh, where there exist a several agro-based industries and some other industries.

MATERIAL AND METHODS
Selection of Study Area
The present study was carried out in two different areas of Vindhyan of Madhya Pradesh. These areas are Satna and Sidhi have different socio economic backgrounds as well as different ecological environment. The progress of a nation is also calculated by its industrial progress. Country will be physically powerful when it is industrially superior. Agriculture has its own significance because it provides the basic supplies of life. The modern device used by farmers is also shaped by industries. Satna district is consists of a large number of materials including agricultural based factory as well as cement factory. Most of the areas were inhabited by the people including tribal. They are also working these industries. It has resulted in water pollution, land contamination, noise pollution, air pollution which has become absolutely unhygienic a place for the poor to live in. Where Sidhi district a non industrial area.[11]

Sampling

For present study samples were collected from two areas (Stana district industrial area and Sidhi district non industrial area) 110 households in the experimental area (industrial area Satna district) and 64 households in the control area (non-industrial area Sidhi district).[12]

Tools and Technique

Based on the review of literature and expert consultation a semi-structured questionnaire was designed for the present study. The final questionnaire was prepared with 27 items. For data collection people of the both area were conducted. The semi-structured questionnaire captured both the qualitative and quantitative information regarding the participant's environment and health status.[13,16]

Data Collection

The present study was based on primary data, collected from each household, relating to various parameters of health status and environment, through well designed questionnaire and interviews.[17]

Data Analysis

The data were analyzed both quantitatively and qualitatively. Percentages were calculated for various questions and graphical reports were prepared. Interview data were also analyzed qualitatively and incorporated along with quantitative reports.[18,19]

RESULTS AND DISCUSSION

The results of the present study are based on the information obtained by taking help of questionnaire, focus group discussion and observation, from two different areas, one is control area which is a non-industrial area, and another is experimental area which is an industrial area. Results revealed that the two different areas are having different health and environmental problems.

Table 1: Showing total number of interacted persons in Satna district and Sidhi district study area.

No. of interacted persons	Satna district (Experimental area)	Sidhi district (Control area)
Male	385 (68.75%)	164 (65.07%)
Female	175 (31.25%)	88 (34.92%)
Total no of interview	560	252

From the Table- 1: So far as the distribution of males and female participants of the study is concerned, an 68.75% percentage of males and 31.25% females have participated in the Satna district study area where 65.07% percentage of males and 34.92% females have participated in the Sidhi district study area of Madhya Pradesh.

Table 2: Showing total number of interacted persons in Satna district and Sidhi district study area.

No. of interacted persons	Satna district (Experimental area)	Sidhi district (Control area)
SC	89 (15.89%)	33 (13.09%)
ST	175 (31.25%)	62 (24.60%)
OBC	156 (27.85%)	73 (28.96%)
General	140 (25%)	84 (33.33%)
Total no of interview	560	252

From the table 2. Showing participants of the study is concerned, an 15.89% percentage of SC, 31.25% ST, 27.85% OBC and 25% General have participated in the Satna district study area where 13.09% SC,24.60% ST, 28.96% OBC and 33.33% General have participated in the Sidhi district study area of Madhya Pradesh.

Industrial Pollution and its Impact on Environment & Health

Agro-based wastes particularly the food industry generates large amount of solid, liquid and gaseous wastes, which emerge not only from processing operations but also from their treatment and disposal. The composition and quantity of agro-industrial wastes depends very much on the source of raw materials, as well as the nature of the products, operations and processing steps.

For normal and healthy living a favorable environment is required by all living beings, including humans, livestock, plants, micro-organisms and the wildlife. The favourable unpolluted environment has a specific composition. When this composition gets changed by addition of harmful substances, the environment is called polluted environment and the substances polluting it are called pollutants. Environmental pollution can, therefore, be defined as any undesirable change in the physical, chemical or biological characteristics of any component of the environment (air, water, soil), which can cause harmful effects on various forms of life or property.

Table 3: Table showing the differences of environment between Satna district (experimental area) and Sidhi district (control area).

S. No.	Description	Satna district	Sidhi district
1	Name of the area	Satna district study area	Sidhi district study area
2	Type of area.	Industrial area	Non industrial area
3	Distance from the factory/ industry	Approx 5 Km near to agro-based industry	Approx 20 Km near to agro-based industry
4	Solid waste material disposal by agro-based industry and other industry	Production of large quantities of solid material as a byproduct recovered as fertilizer. Highly putrescrible waste from peeling and trimming which can not be stored for long periods of time approximate 2 meters from people residence and decreased with distance	No waste material is disposed.
5	Drainage of waste water to the area	Highly organic effluents, high in suspended solids and floating materials, highly biodegradable effluents, high concentrations of fat, oil and greases; BOD suspended solids Waste water drain in between the area which is very near to people residence	No waste water drainage in the village
7.	Vehicle emission due to which air pollution get more exceed	Four wheeler vehicles such as truck and dumper are frequently running in that area because of loading and loading of ash dumping	Very less number of vehicles, that to mostly two wheelers and three wheelers only

The above table on the distinctive features of Satna district experimental and Sidhi distric control area report the type of area, distance from the industries, population, solid waste management system, drainage system, vehicular emission and availability of natural resources in both areas. The data clearly shows that the experimental area is more prone to pollution as a result of which people living in Satna district suffer more from diseases like asthma, skin diseases, gastric and joint pains than people from Sidhi district study area.

Table 4: Showing the people having different sources of water.

Source of water	Satna district (Experimental area)	Sidhi district (Control area)
Hand pump	99%	95%
Well	1%	5%

Table 4 represents that in both the groups maximum people are using water from hand pump. In experimental group, 99% people use hand pump, and rest 1% use well, for source of water. In Control group, 95% people use hand pump, and 5% people use well, for source of water.

Table 5: Showing the people suffering from various diseases in the study area.

Diseases	Satna district (Experimental area)	Sidhi district (Control area)
Skin disease	34%	26%
Diabetes	5%	3%
Gastric problem	24%	21%
Arthritis	47%	31%

Table 5 showing that in Satna district study area number of skin diseases patient are more as compare to the control group. In experiment group 34% people have skin disease, 5% people have diabetes, 24% people have gastric and 47% people have joint pain. In Sidhi district study area -26% people have skin diseases, 3% people have diabetes, 21% people have gastric and 31% people have arthritis.

Though the present study is having some limitations discussed above, this is an eye-opener for both public and the industries on the long term effects of industrialization on environment and health. Prior to setting up an industry, the welfare of the environment and people surrounding the industry should be carefully studied. Awareness camps regarding protection of environment and a healthy living should happen regularly in industrial belts, so as to prevent and detect something unusual ahead of time. Industrialization is essential for development, but should not happen at the cost of environment and health. Therefore effective environmental management programmes and activities must be implemented in those polluted areas if we desire to make valuable changes and improve the present situation. As for suggestions, we can go for changes in improvement in the capital intensive techniques, use of

green technology, adaptation of proper waste management.

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