

A Study on “Sanitation and Health, Air, Water Pollution and Health with Reference to Gwalior”

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Abstract

Gwalior a city in northern-most city in the Indian state of Madhya Pradesh and one of the Counter-magnet cities. Gwalior holds a major and a special position in the Indian classical music, art and literature. Gwalior is a well acknowledged place of art, associated with historic as well as contemporary evidence. Gwalior has also being ranked the second most polluted cities in the world according to WHO in terms of air pollution, water and health. Delhi got rid of the tag for being the world most polluted city .According to World Health Organisation The researchers collected air pollution data for their study from nearly 3,000 cities globally between 2008 and 2015. It adds that almost 94 per cent deaths are attributed to non-communicable disease like cardiovascular diseases, stroke, chronic obstructive pulmonary disease and lung cancer. Air pollution also puts the people at risk of contracting acute respiratory infections “Air pollution continues take a toll on the health of the most vulnerable populations – women, children and the older adults.

The leading causes of air pollution include inefficient vehicles and other means of fuel guzzling transports, burning of waste matter, pollution from fossil-fuel powered power plants, and other dirty industries. Although, the report adds not all air pollution is the doing of human activities and that air quality can also be reduced by dust storms releasing particulate matter in the air. Such phenomenon is seen more in arid areas or those close to deserts. In September last year, leader across the world had set Sustainable Development Goals. These goals aim to reduce deaths and illnesses caused by air pollution by 2030. Subsequently, in May this year, the global health body gave the nod to a new “road map” aimed at “accelerated action on air pollution and its causes”. The objective of my study is to identify the effects of air, pollution, water and role of government and private sector in minimising the effects. To understand the role of local community towards pollution control, also to identify the practices and initiatives taken by the local communities. The data collection is based on secondary data. The paper also attempts on various issues like sustainability, practices, strategies and participation of local community. A descriptive analysis will be presented along with appropriate facts and figures. This paper will be useful for organisation, academicians, decision maker and all other stakeholder involved in tourism.

Key Words: Sustainable development, Recycle, Reuse, Reduce, Pollution and control

1.1 Introduction

Gwalior is the city of art a, culture and heritage is a major and the northern-most city in the Indian state of Madhya

Pradesh and one of the Counter-magnet cities. Located 319 kilometres (198 mi) south of Delhi, the capital city

of India, Gwalior occupies a strategic location in the Gird region of India. The city and its fortress have been ruled by several historic northern Indian kingdoms. Gwalior has been selected as one of the hundred Indian cities to be developed as a smart city under PM Narendra Modi's flagship Smart Cities Mission. ^[6] Gwalior is fairly well connected to other parts of Madhya Pradesh and India by national and state highways. It is a historical Indian city located at periphery of Madhya Pradesh state 321 kms away from capital Delhi. Medium and small scale industries are located in this town. The city is home to well know educational institutions. Hence the town supports large number of floating population. As of 2001 India census, Gwalior had a population of 826,919. Males constitute 54% of the population and females 46%. Gwalior has an average literacy rate of 70%, higher than the national average of 59.5%: male literacy is 76%, and female literacy is 63%. The vehicles represent the most important noise source.

It was estimated to about 80% from road vehicles. Road traffic noise is one of the most widespread and growing environmental problems in urban areas. The impact of road traffic noise on the community depends on various factors such as road location and design, land use planning measures, building design, vehicle standards and driver behaviour. Gwalior's public transport system consists of tempos, auto rickshaw taxis. Recently the municipal corporation has launched Gwalior City Bus covering some routes in the city. The tempos and auto-rickshaws are often cited as a cause of pollution and road congestion. Gwalior is well connected via train services to all parts of the country

including 4 metros. Noise is one of the most important factors in producing deterioration of both well-being and quality of life of people in urban areas. Noise produces a series of physiological, psychological, behavioural changes in responses

In the present study, the extent of noise pollution in Gwalior town and the exposure of shopkeepers to noise pollution during peak hours have been assessed. Several noise pollutions studies in different areas are available. All these reported existence of high noise level due to automobiles in those places. No study for Gwalior has been carried so far and hence the present study has been undertaken.

1.2 Air Pollution and Noise Pollution

Clean air is the foremost requirement to sustain healthy lives of humankind and those of the supporting ecosystems which in return affect the human wellbeing. Release of various gaseous emissions and particulate matter (PM) has been on the rise due to rampant industrialized growth. Anthropogenic emissions of various kinds are being pumped into the atmosphere (called primary pollutants) and lead to the formation of new pollutants due to chemical reactions in the atmosphere (called secondary pollutants). These are building up the concern of ambient air pollution (AAP) as a prominent global threat to human health in many ways. For instance, according to the Fifth Assessment Report of the IPCC 'nearly all the non-CO₂ climate-altering pollutants are health damaging, either directly or by contributing to secondary pollutants in the atmosphere'.

1.3 SOLID WASTE MANAGEMENT

Holi is a religious spring festival of India. It is celebrated by Hindu in India and also in other country. It is celebrated at the end of winter, on the last full moon day of the lunar month Phalgun, which usually falls in March, sometimes in late February. Holi celebrations start on the night before Holi with a Holika Dahan where people gather, sing and dance. The next morning is a free-for-all carnival of colors, where participants play, chase and color each other. But now, in modern times Holi festival has become commercialized. And Holi festival creates various environmental pollutions like water, air, soil and noise. The discharge of the toxic colors in the soil and water has a deleterious effect on the water resources, soil fertility. **The Three Main Environmental Concerns around Holi Festival:-**Harmful Effects of Chemical Colors:-

- Effects of Common Holi Colors on Human Health
Colors Chemicals Health Effects
Red Mercury Sulphite Highly toxic can cause skin cancer.
Green Copper Sulphate Eye Allergy, Puffiness and temporary blindness
Silver Aluminium Bromide Carcinogenic
Blue Prussian Blue Contact Dermatitis
Black Lead oxide Renal Failure

1.4 POLLUTION DUE TO IDOL WORSHIP: - The idols of Lord Ganesh and Maa Durga etc. are worshipped with all rituals by Hindu are immersed in water bodies in the months of September and October respectively every year. The time span of festival may vary from one and half day to ten days. When these idols are immersed in water bodies then it create water pollution, and affect the quality of water. During the worship, public also uses of loudspeaker, D.J. and firecracker to enjoy, these all thing create noise

pollution. 3.1 Water Pollution: - Idols are made of many types of materials like plaster of paris wood, bamboo, jute, grass, and clay. To make these idols decorative and attractive they are painted with bright synthetic colors or lead oxide mixed with oils which contain large amount of heavy metals. These chemical paints make the film on the water surface and prevent the entry of oxygen into the water. So D.O. level will be decrease. Due to this fishes, aquatic plant will be affected. The main pollution is caused by the plaster of paris idols. Plaster of Paris is a building material based on Calcium Sulphate Hemihydrates, and is created by heating Gypsum to about 150°C. When these plaster of paris idols immersed in the water, it changes form to gypsum, thus adding a large amount of material to the water that breaks down very slowly, while adding to the hardness of water, both of which deteriorate the life carrying capacity and quality of the water.

Deepawali festival celebrates in the month of October or November. It is celebrated in the honour of Lord Ram return to Ayodhya after fourteen years of exile. Maa Lakshmi Puja is also performed in the evening to seek divine blessings of Goddess of Wealth. Deepawali celebration includes shining of lights on house, temples, and shops and on other buildings. And also include burning of firecrackers on this occasion. In current situations, Deepawali festival has become commercialized. Burning of firecrackers in large amount created huge amount of air and noise pollution and also generate waste. Fireworks affect the human health and also pets and birds.

- **Air Pollution:** - On this occasion, huge amount firecrackers are burned. These firecrackers when burnt can release

various gases like sulphur dioxide (SO₂) and nitrogen dioxide (NO₂), air pollutants such as , oxides of carbon (CO and CO₂) and toxic metals like Ba, Cu, Cd, Pb, Hg, Al to significant quantity and degrades the air quality. Sulphur Dioxide (SO₂) is readily soluble and dissolves in the larger airways of respiratory system. At higher concentrations severe contraction restricts the breathing process. SO₂ adversely affects plant growth and productivity by interaction with different physiological processes. Nitrogen dioxide causes respiratory allergies and also Cause throat and chest congestion. Suspended particulate matter (SPM) level goes up during Deepawali making the air unhealthy to breathe. The increase in level of SPM in the air causes eye, throat and nose problems. The particulate matter may contain some heavy metal, oxide/salts, which get deposited in the lungs causing irreversible damage. Concentration of carbon dioxide (CO₂) increased in the environment due to burning of firecrackers causes of global warming

- **Noise Pollution:** - In this occasion, using firecrackers in large amount cause lot of noise pollution. Firecrackers produce sound which is much higher in decibels tolerable for the human ear and also for animals, pets, and birds. Health effects of noise pollution caused by firecrackers. Hearing loss, high blood pressure, heart attack and sleeping disturbances. Sudden exposure to loud noise could cause temporary deafness or permanent relative deafness. Crackers burst indiscriminately cause long term problems to babies and elderly people. Noise from crackers affects new-born and other patients and even pets.

- But unfortunately they also add even greater load pollutants to our already polluted environment. Simple measures can be taken to ensure that Indian festivals become environment and human friendly. The government, police, pollution control boards are suggesting many alternative ways to celebrate festivals which does not pollute the environment. Some suggestions regarding reduction of pollutions are :

- Celebrate dry Holi. Don't use water.
- Use natural and home- made Holi colors.
- Stone idols are worshipped. Idols made of stone are best as they can be worshipped every year.
- Immerse only those idols which are made of unbaked mud, clay or other biodegradable material.
- Avoiding manufacture and purchase of idols painted with chemical colors or those made with non- biodegradable material (thermocool, plastic, plaster of paris etc).
- Smaller clay idols can be immersed in clean water in a vessel at home. Leave for some time and when clay mixes with water give it to your plants.
- Flowers and other biodegradable material used in worship may be used for mulching by spreading them on the top soil around plants or trees.
- Uses less number of fireworks.
- The manufacture, sale or use of fire-crackers generating noise level exceeding at 4 meters distance from the point of bursting shall be prohibited.

1.5 SANITATION

Laxmanpura is a 150 year old slum located in the heart of the city consisting mostly of the "Jatav" section of the community who

typically make a living through unskilled labour. The sanitation and hygiene conditions of the slum were very poor with most people using the nearby railway tracks for defecation, which at times had led to serious accidents. The main challenge to improving sanitation in this slum was that people were satisfied with open defecation and did not want any change. The campaign was aimed at improving sanitation conditions in the 16 slums and squatter settlements and raising awareness among the slum dwellers to generate demand for improved access to safe water and sanitation. It also engaged with the local community with the aim of enabling them to manage their own water and sanitation facilities.

The campaign also carried out capacity building programmes for the community. Education campaigns were organized and exposure visits were arranged by the NGO to the city of Tiruchirapalli to motivate people regarding community managed sanitary complexes as well as to create and enhance awareness about sanitation and hygiene and its positive impact on health. Tiruchirapalli was an established success in implementing community sanitation. School children were targeted in the programme by introducing water, sanitation and hygiene based programmes in schools and providing training to teachers on the subject. Awareness and mobilization activities were carried out within the slum through the use of various IEC materials including wall paintings and hoardings. In addition, the community was provided with trainings on, among others, water and sanitation management, the use of water testing kits, accounting, masonry, hand pump mechanics.

Each household with no toilet facility was visited by members of the Samiti with project animators to educate and build awareness among people regarding sanitation facilities. It was tough to convince people as they were satisfied with open defecation and did not feel the need for personal toilet facilities.

The average construction cost of an individual toilet was estimated to be between Rs 4000 to Rs 6000. WaterAid gave an incentive of Rs 800 to each toilet while the remaining amount was borne by the beneficiaries. As a result of the project, trained masons are now a major human resource in the slums actively engaged in the promotion of low cost individual household toilets. In total 83 toilets were constructed in the Laxmanpura slum. For households that did not have sufficient space for individual toilets, a community toilet was proposed. It was decided that the existing defunct community toilet would be demolished and a new community toilet constructed at the same place. The Nirmal Samiti took the responsibility to supervise the construction of the toilets and their maintenance after construction.

Sustainability of the initiative Health, Hygiene & Nutrition: Open defecation was a common practice in the slums of Gwalior. With the project initiation, the slum dwellers were made aware of the threats of unhygienic sanitation practices and diseases associated with it. Subsequently, the project was successful in changing the behaviour of people and also ensuring a cleaner environment. Environment & Natural Resources: The objective of this initiative to eliminate open defecation resulted in improvements to the quality of surface water resources and storm water channels in the locality.

Technology & Operation: The project involved local people and enhanced their skills. Trained masons as well as engineers were engaged in the promotion of low cost individual household toilets under the surveillance of local people. **Socio-Cultural & Institutional Aspects:** The project led to the formation of local institutions like SHGs which played an important role in mobilising people to shift

from practising open defecation to using appropriate toilet facilities. Active participation of women also helped in mobilizing people and creating awareness. **Financial & Economic Issues:** The community toilets adopted a system of pay and use which helped to finance the facilities. The majority of the costs (80% - 85%) was therefore borne by the beneficiaries themselves

RESEARCH METHODOLOGY

2.1 Objective

- To understand the negative impact of pollution.
- To analyse the measure practiced to stop pollution.
- To develop awareness about different kinds of pollution.
- To Create awareness about waste management

2.2 Scope of the study

- The scope of the research is it will be helpful for the public /private sector.
- The study also shows the involvement of government and local community in creating awareness about waste management and also focuses on the future problem because of pollution.
- This study is also helpful for the students, stakeholder, and research scholars and for the Government employees.

2.3 LIMITATIONS

- Time constraint
- Insufficient data
- Lack of response from the local community

2.4 RESEARCH GAP

The Gap which is found in the study is there is no proper communication or training given to the local community about solid waste management and pollution control. The local community is unaware of the practices and system in their city or state.

2.5 OPERATIONAL DEFINITION

- **Pollution**-Pollution is the introduction of contaminants into the natural environment that causes adverse change. Pollution can take the form of chemical substances or energy, such as noise, heat or light.
- **Environment**-The surroundings or conditions in which a person, animal, or plant lives or operates. The complex of physical, chemical, and biotic factors (such as climate, soil, and living things) that act upon an organism or an ecological community and ultimately determine its form and survival
- **Reuse**-Reuse, is that you should reuse items as much as possible before replacing them
- **Recycle**-Recycle is that you should ensure that items or their components are put to some new purpose as much as possible.

- **Reduce-** The concept behind the first R, reduce, is that you should limit the number of purchases that you make in the first place.
- **Solid waste management-**solid waste from a community that requires collection and transport to a processing or disposal site is called refuse or municipal solid waste (MSW). Refuse includes garbage and rubbish. Garbage is mostly decomposable food waste; rubbish is mostly dry material such as glass, paper, cloth, or wood.

2.4 SOURCES OF DATA

The data for the study was collected from primary and secondary sources. Primary data was collected by distributing Questionnaires among the target group i.e the local community and PPP. The secondary data and the relevant materials were collected from magazines, internet, article etc.

2.5 SAMPLE SIZE

The sample size used for this research was 100 and my target audience was (50) local community and (50) public sector. A structures questionnaire was constructed based on the objectives framed for the study which was used to collect the required data.

2.6 RESEARCH TOOL

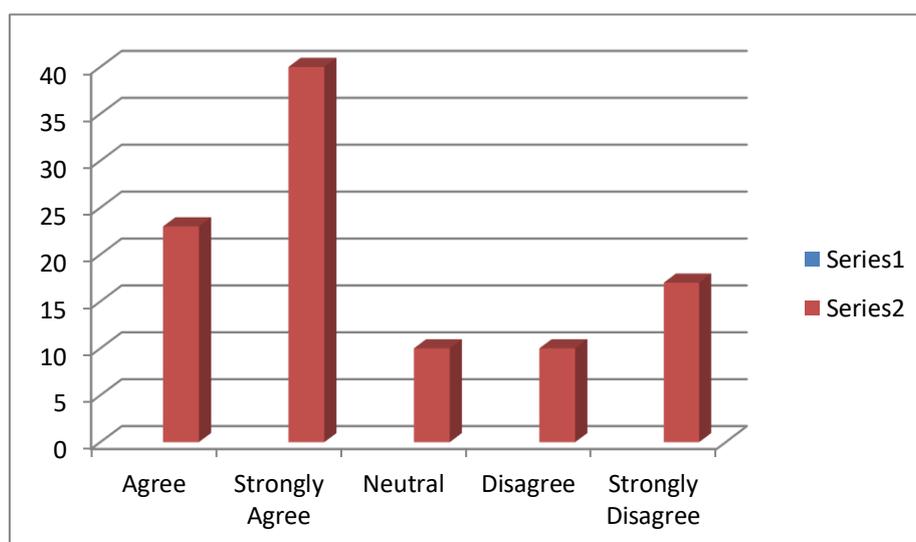
The tools used were the close ended questionnaires and use of excel sheets and analyses are based on primary and secondary data collected.

2.7 DATA ANALYSIS

The collected data was analysed by using both quantitative and qualitative technique. Under the qualitative technique the collected data was converted into numerical format in appropriate tables with percentage and diagrams. Each numerical format was described by using qualitative techniques used in the research.

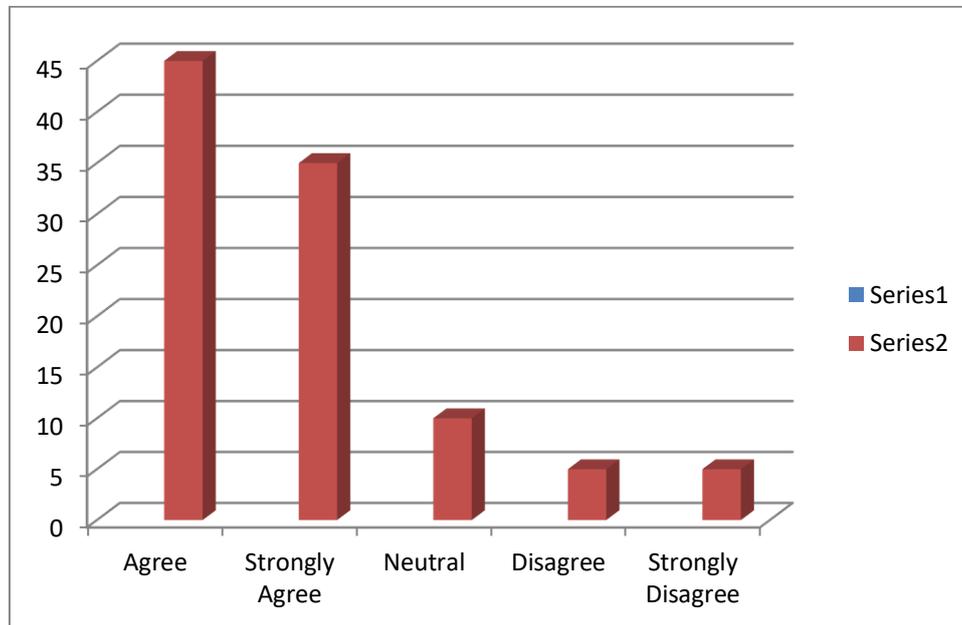
3.1 DATA ANALYSIS AND INTERPRETATION

1. Rapid modernization, industrialization, globalization and population of India are the main factor of solid waste issue.



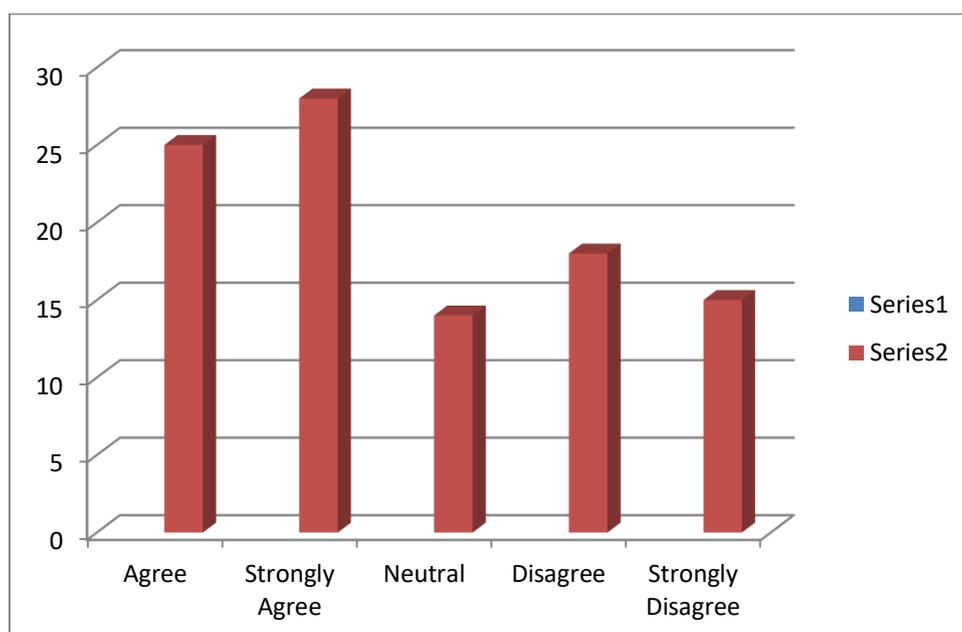
Interpretation: The data shows that the responded strongly believed that due to globalization and population of india are the main factors of solid waste issue and rise of garbage disposal problem.

2. Use of only natural and home-made colors for playing Holi.



Interpretation: The above data shows that use of natural colors during Holi is safe and is advised through friends, relatives and creating awareness about the benefits of these colors

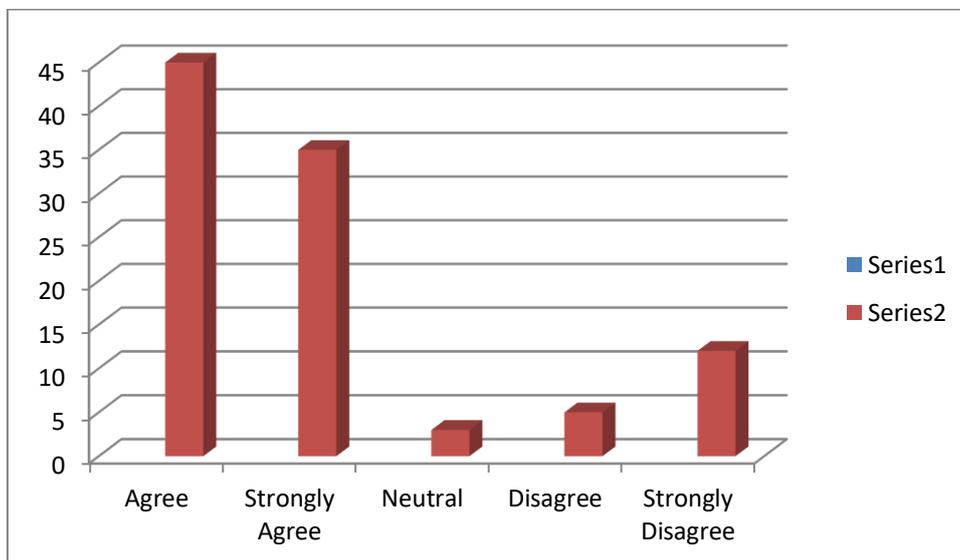
3. People should avoid bursting crackers in the building compounds, narrow lanes, balcony and congested areas use open air to light fireworks.



Interpretation:

The above data shows that firecrackers should be burnt in open air area where no human and animals will be harmed and the smoke generated will not affect the living begin directly.

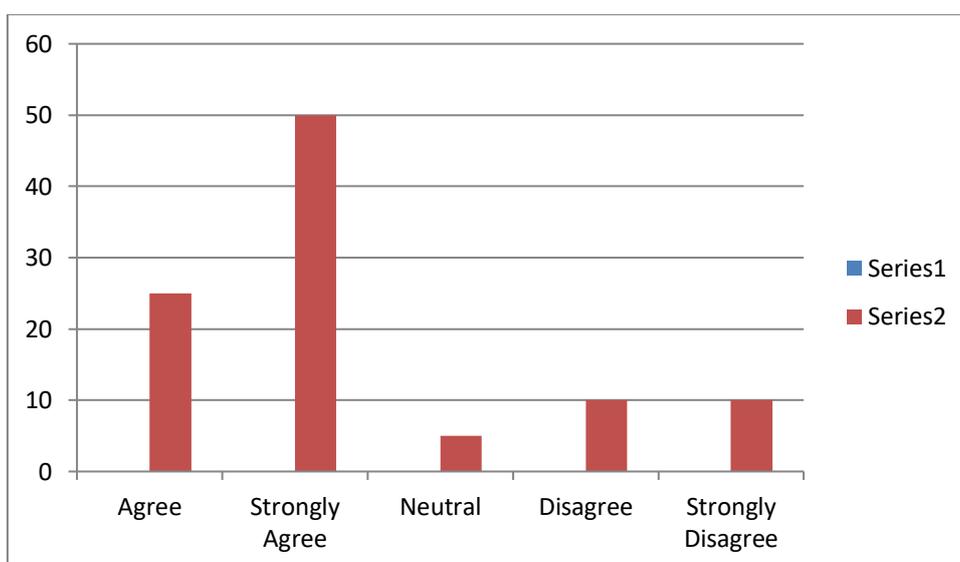
4. The discharge of the toxic colors in the soil and water has a deleterious effect on the water resources and soil fertility.



Interpretation:

The data collected shows that the idols are been disposed in the water bodies which affect the marine life and water quality. And the local community strongly agree with the fact that the discharge of the toxic colors in the soil and water has a deleterious effect on the water resources and soil fertility.

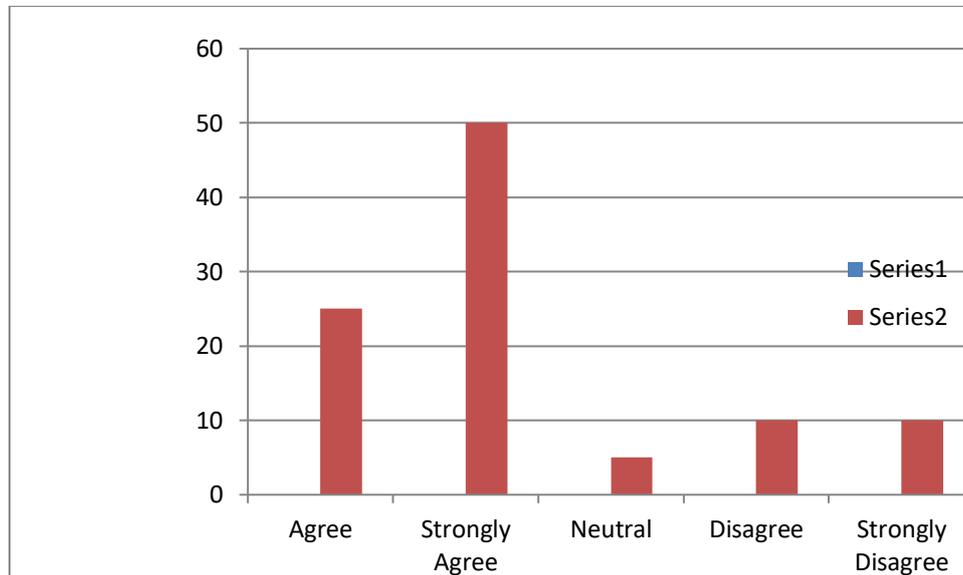
5. Solid waste management is the process which is used in collecting and treating the waste.



Interpretation:

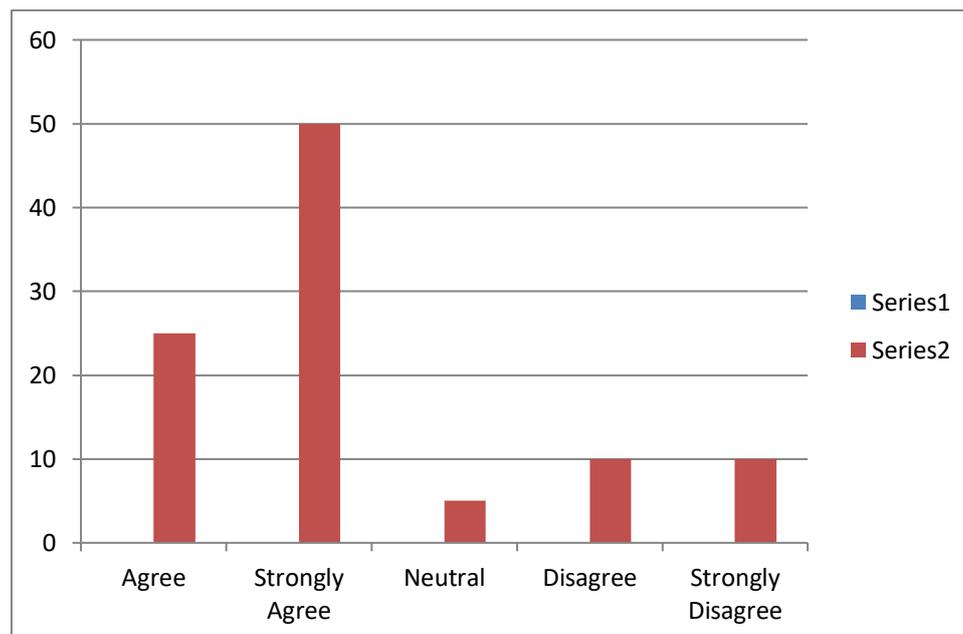
The above data shows that the local community is aware of solid waste management and its practices. Around 25% of respondents believed that solid waste management is beginning to be practiced in their area and around 50% of respondents are aware and happy with the initiative.

.6. The consumption rate is increasing day by day which automatically increases the solid waste materials.



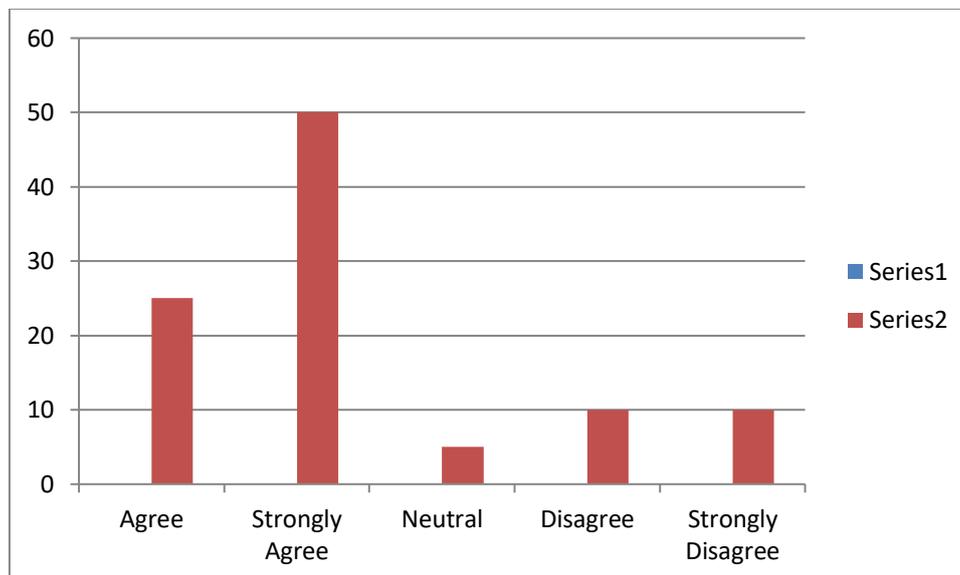
Interpretation: The above data shows that around 50% of respondents strongly agree that the consumption rate is increasing day by day which increases the solid waste material.

7. The children play in these areas so they are affected by this garbage and the complain of many serious and crucial diseases.



Interpretation: The above data shows that around 50% responded believed that the children are beginning affected by this garbage like the foul smell and several health issues like skin and breathing problem.

8. Proper awareness and attention should be given by the public sector towards garbage disposal.



Interpretation:

The above data shows that around 27% local community believe that awareness have to be created by the public and private sector in their states. So that people are being trained to dispose and reduce, recycle and reuse the goods and items.

4.1 FINDING In the studied area there is no place allotted for solid waste materials. People were putting their garbage in the corner of the street. In some part of the Gwalior city the people were putting their garbage in the middle of streets too. This is all due to unavailability of specific place.

- In some part of the Gwalior municipality has provided the bins for garbage. As the population is dense and people consume to much products, so these bins are small According to the residents, the

municipality workers come twice a month but the bins fill in a week.

- Municipality of a city play an important role in the waste management of the city. Unfortunately, Gwalior municipality has failed badly in solid waste management. Due to the short number of workers and lack of control the solid waste management has become a critical problem.
- The garbage and trashes are the sources of viruses and germs. The solid waste materials should be on a distance from the residential areas. But unfortunately in the studied area the waste materials are in the streets. The kids and children play near these trashes and garbage. These germs cause diseases in the children. Due to these waste products the adults are also affected. The residents near to these waste materials are more effected and facing different kind of diseases.

- The water drainage channels have blocked due to poor waste management system. As the waste bins are of small size and they are not clean by municipality workers at time, the people put garbage near the bins. With the passage of time this garbage changes into a trashes mountain. These solid waste materials especially the plastic bags block the water channels .In the studied site the water was flowing in the street instead of water drainage channels.
- Hearing loss, high blood pressure ,heart attack and sleeping disturbances because of noise and pollution
- The discharge of the toxic colors in the soil and water has a deleterious effect on the water resources soil fertility.
- Awareness can be a good solution for a problem. When someone knows about the positive and negative point of a thing then he or she always avoids the negative points. The government authorities should manage awareness programs in the districts. The schools and universities can play a key role in this part.
- The study also shows that the air standard in Gwalior is worst by the world health organization (WHO) report. The major factor towards this is vehicular pollution but we can't ignore the participation of industry, urbanization and rough roads in the air quality status of Madhya Pradesh mainly in Gwalior
- Air pollutants cause inimical effects on physiology and metabolism of plants due to their oxidizing potential Air pollution is a serious environmental concern all around the surroundings.
- In order to control the indoor air pollution through provision of clean

energy access , government has introduced various schemes that would facilitate clean energy access such as the Rajiv Gandhi Grameen Vidyutikaran Yojana, the Village Energy Security Programme, and the Remote Village Electrification Programme.

SUGGESTIONS

- Use of natural and home-made colors for playing Holi.
- Open Dumping -This method is very simple and inexpensive but these open dumping areas are unhygienic and damage to air pollution these areas should be far from water and run off. This is because by air the garbage and trashes can fly and contaminate the water and air.
- Recycling means the removal of materials or items from the waste products and to use it as a raw material in the manufacture of a new product. During this procedure three steps take place. Wastes are sorted and those wastes which can be recyclable are collected, the recyclable are used to create raw materials and then these raw materials are used in a new product.
- Following measures need to be taken to tackle air pollution
- a). Ban on use of horns. b). Proper maintenance of roads c). Removal of road side encroachments d). Planting of recommended plant species e).The public may be educated to abide the rules, so that the frequent use of horns will be avoided. f). The implementation of the technical measures for noise levels.

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