International Journal of Applied and Universal Research **E-ISSN No: 2395-0269**
Volume X, Issue II, March – April 2023 **Available online at: www.ijaur.com**
Impact Factor- 5.937

SUSTAINABLE WASTE MANAGEMENT CAMPAIGN AT REWA CITY (M.P.)

Dr. Sangeeta Tiwari
Asst. Prof. Centre for Biotechnology and Microbiology Studies
A.P.S. University Rewa (M.P.)

ABSTRACT:- Waste management is required to manage wastes from different resources to its final disposal to maintain a sustainable society. This includes collection of wastes from different resources, transport, scientific treatment and disposal of wastes with proper recycling, reuse and reduces the wastes. Wastes are of mainly solid, liquid, or gaseous in state and each type has specific ways of disposal and management. Wastes can harm the human health caused by extraction and processing of raw materials at different industries that are the resources of all three types of wastes. The authors have organized this waste management programme at Rewa, Madhya Pradesh and made awareness campaign to all the local people to differentiate types of wastes viz. organic or biodegradable and inorganic or non-biodegradable wastes and to manage these scientifically. Different hands-on-training programme, seminars and workshops were organized to the students and teachers nearby the place to manage wastes in both domestic and work places. The local panchayat also been insisted to arrange separate bins at different sites of villages to maintain a proper hygienic condition at local areas. The authors planning to develop more innovative and scientific protocols for the resource management of wastes at this area to make this place as a model village for solid waste management and pollution free nature.

KEYWORDS:- Biodegradable Wastes, Non-biodegradable Wastes, Resource management, Solid Waste Management Awareness Campaign.

INTRODUCTION:-

Waste, a common word has integrated very depth in our daily life. Wastes mainly comprise all types of refuses and garbage that are generally unwanted and/ or useless things. Wastes are some unwanted substances that are discarded by living organisms in the form of urea and sweat. Management of wastes may be defined as an operation that may lead to resource recovery, recycling, reclamation, and reuse in alternative ways. Globally, various types of wastes are being generated daily due to changing lifestyles, differential consumption patterns, affluence, rapid economic growth, rapid urbanization, increasingly heterogeneous nature of modern products and rapid population growth (Dangi *et al.,* 2017; Malinauskaite *et al.,* 2017). Now-a-days the wastes which are being generated are not properly managed or disposed (NeffaGobbi *et al.,* 2017; Mmereki, 2018). In day-to-day life it is often observed the wastes generation at homes and surroundings and the process of waste disposal. Waste disposal has been done in a haphazard manner in both villages and towns. But today waste generation and management has become a matter of concern to control environmental pollution and threats. Solid and liquid wastes are the basic two types of wastes, where all plastic materials, foams, metals, glass, etc. are solid wastes and chemicals, oils, domestic industrial waste water, etc. are liquid wastes. On the basis of the properties of wastes there are two types of wastes- bio-degradable and non-biodegradable wastes. Bio-degradable wastes like paper, wood, fruits, etc., can be degraded and non-biodegradable wastes like plastics, bottles, old machines, cans, Styrofoam containers, etc. cannot be degraded. On the basis of effects on human health and on environment, wastes again of two types viz., hazardous and non-hazardous wastes. Substances that are unsafe to use and have corrosiveness and toxicity are called hazardous wastes. Non-hazardous wastes are the substances that are safe to use. These substances usually create disposal problems. Municipal bio-medical wastes, solid wastes, agricultural wastes, industrial wastes, radioactive wastes, fishery wastes, e-wastes, etc., are some waste varieties on the basis of their origin.

Now-a-days, Construction and Demolition wastes are also a major source of solid waste refers to the waste materials including building material wastes, debris, and

rubble generated from any construction activity, demolition and repair work of civil structures such as houses, bridges, roads, dams, large building structures, and other infrastructure (MoEFCC, 2016). This CandD waste usually comprises inert and non-biodegradable material such as concrete, brick aggregates, tiles, plastic, wood, glass, metals, excavated soil and rock particles, etc. (CPCB *et al.,* 2017, Faruqi *et al.,* 2020). A rapid improvement in technology changes lifestyle which has consequences in the fast-growing e-wastes (nearly 41.8 million metric tons (MT) every year) stream worldwide (Balde *et al.,* 2015; Li *et al.,* 2015; Fowler, 2017). Currently, India generates approximately 1, 641 metric kilo tones of e-waste annually (StEP, 2017). According to the United Nations Environment Programme (UNEP) (2009) report discarded computers will increase up to five times more and mobile phone had increased 18 times in 2020. India and other Asian countries will face more increasing amount of environmental damage and health problems incoming future, if e-wastes are not properly managed (Porte *et al.,* 2005; D Shinkuma and Managi, 2010; StEP, 2010; Wivedy and Mittal, 2010a, 2010b, 2012; Sthiannopkao and Wong, 2013, Awasthi *et al.,* 2018).

IMPACTS OF WASTES ON ANIMALS AND AQUATICS LIFE:-

There are different impacts of wastes including gases on environment in a regular basis. CO_2 is emitted by the burning of fossil fuels, wood products, solid wastes, etc., easily mixed in air and hampers the living organisms. CH_4 is produced by the decomposition of organic wastes, livestock, coal mines, natural gas, and oils harm our environment. Different research works reported that US emitted about one-fifth of total global heavy gases in 1977. In recent years there has been increasing concern on environmental sustainability, which has resulted in development of strategies to reduce wastes and improve the waste recovery, resource recycling of wastes (Friedrich and Trois, 2013), and diversion of waste from landfills for a sustainable living environment (Zhuang *et al.,* 2008; dos Muchangos *et al.,* 2015; Mmereki, 2018). There are so any instances of wastes that are highly toxic and make some serious hazards in the life cycles of animals living in both aquatic and terrestrial environments. The increment of mercury level in fish due to throwing away of mercury in both rivers and seas. Plastic found in oceans ingested by birds caused different disorders and also affects their fertilization capacity. Metals regularly mixed with different water resources resulted in high algal population in rivers and sea. Wastes also degrade the water and soil quality regularly. Open garbage is a common sight in the market, streets or in the vicinity of our homes that emits a foul disturbs our respiratory process. The garbage that is dumped for a long time attracts flies, cockroaches, rats and street dogs. The moist garbage generated by kitchen waste is a perfect breeding place for flies that contaminated our consumable food also. We are affected by different water and food borne diseases like cholera, dysentery and other gastroenteritis that are transmitted by flies.

WASTE MANAGEMENT:-

Managing the waste is a prime target today to protect our family members and the neighbors against dangers that come with poor handling of waste materials. The waste that is disposed of or recycled ethically helps to reduce the negative impacts on environment. Management of wastes also conserves the resources and energy. It reduces water and air pollution and saves landfill space. For successful waste management we should follow three Reuse, reduce and recycle. Reuse by prolonging a product‘s usable life and by repairing items, selling them or donating them to the charity. Reuse by using durable rather than disposable items (i.e. reusable shopping bags, metal spoons). Reuse of channeled moving boxes internally, reuse the office furniture and supplies including official envelopes, file and folders, paper and other regular usable wastes materials. Reuse daily used towels, napkins, cups and dishes, tablecloths and glasses for different purposes. Reuse incoming packaging materials for outgoing shipments. It is a common duty to everyone to encourage family members, employees, neighbors to reuse domestic and office materials rather than purchase new ones. We have to reduce wastes by reducing daily used office papers unnecessarily by implementing a formal policy to use all daily required documents like training manuals, personnel information, etc. electronically. We have to improve the product designs to use less material. We should redesign the packaging process to eliminate excess materials and

have to work with customers to redesign to implement a new frame of packaging return program. On the other hand, recycling is the process of to convert the waste materials into newly formed usable objects. This recycling process can inhibit the waste of highly useful materials and thus reduce the consumption of fresh raw materials. This practice ultimately can control energy usage, air pollution and water pollution.

WASTE MANAGEMENT PROGRAMME AT REWA:- The campaign for management of wastes started from the class rooms at A.P.S. University Rewa in which one of the author worked as a teacher. Class room cleaning and management in a regular basis is the prime duty for each teacher, students and non-teaching staffs. Both the laboratories and class rooms of each of the departments were equally cleaned and all wastes were managed scientifically. Every week they have arranged a separate class to demonstrate managing wastes in the area they live. All the students of different semesters are equally involved, separated in different groups to divide their cleaning works. Inside the university campus, the bio-degradable and non-degradable wastes are collected in two different coloured waste bins like green for biodegradable and blue non-biodegradable wastes (Fig 1). The campaigning was started from the university to surroundings of Rewa. All the teachers and students of Environment Department, A.P.S. University Rewa was involved for this campaigning programme for waste management.

They went to the local hospitals, carpenter shops, tea shops, grocery shops, garages, etc. to observe how the common wastes are managed or wasted. The journey started at Rewa Hospital where the sanitations were not clean and were not properly managed. They have also visited the OPDs, patients' staying rooms, labour rooms, and other utility places and met the hospital staffs also to insist about maintaining the bio-degradable and non-degradable wastes separately in the hospital. In the local shops, the team has demonstrated how to manage bio-degradable and non-degradable wastes separately in a regular basis.

There are some bins supplied by local panchayats to manage the wastes, but the local people did not obey the proper rules and regulations rather stored the wastes to the road sides and even in local ponds or lakes. This makes too much pollution in soil and water, its visible by algal blooms in the road side ponds. The team counseled the local people and sellers about the waste management and also demonstrated the side-effects of wastes. The team said the example by cleaning all the road sides nearby areas by wearing gloves and gave a practical demonstration to all the local people to manage wastes properly.

Figure 1: Degradable and Non-Degradable Waste Disposals at University Campus

DISCUSSION:-

This paper provides some practical experiences of students and teachers in a college campus and its surroundings to manage wastes by some regular practices and offers a conceptual framework for overcoming the current gaps in waste recovery. It discusses that the transition of solid wastes containing cities into zero-waste sustainable cities requires four inter-related primary strategies like waste avoidance, upstream waste partition, waste collection on time, and proper reuse and management of collected wastes. The aim is to think about the perfect design and development of this waste management framework for smart and sustainable cities with particular emphasis on connecting waste management practices to the whole product life-cycle. More scientific work in future will definitely improve this framework by taking a closer look at the

effects of other factors such as regulation, policy, product design strategies, and technology on waste management. In addition, the proposed framework has taken a broad look at waste management and the issues emerging in this field. However, different waste types have different characteristics and management systems, sometimes not compatible with each together.

Furthermore, the proposed framework needs to be validated with different locality-based case studies to test the value of having access to product lifecycle data in solving waste generation and recovery issues in different regions and countries. Traditional views to manage wastes, largely focus on improvement of waste collection efforts, but fail to comprehensively consider the complete product lifecycle and the circular economy opportunities exist over the entire product lifecycle. Waste management efforts should be focused on identifying value chains rather than waste removal chains. The purpose of waste collection and recovery infrastructure should not only be focused on automatizing existing processes, but rather on implementing best practices with the aim of creating values. Therefore, accessing the city needs and requirements is a required step before making a decision about the type of technology that should be adopted (Esmaeilian *et al.*, 2018).

CONCLUSION:- In the A.P.S. University Rewa and surrounding area the authors have noticed the wastes are not disposed properly. The waste sources are mainly hospitals and local shops. The team of Environment Department, A.P.S. University Rewa have maintained the proper campaigning weekly and made some strict rules and regulations for waste management. After a month of this campaign, a survey has been taken again at the same local area including hospital, local shops, ponds, lakes and road sides. There was a good improvement and the local people started disposing biodegradable and non-degradable separately as per the guidelines. The objective of the waste management campaign was really fruitful and solved the purpose in a greater way.

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