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Sustainable Waste Management in Nesari village in Kolhapur District.

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1. Introduction

Soaring demography is one of the prime reason for transcending waste generation rate. Waste attribution incorporating rural waste are endogenous in agricultural and animal waste, medical waste, radioactive waste, hazardous waste, industrial non-hazardous waste, construction and demolition debris, extraction and mining waste, fossil fuel combustion waste, and sewage sludge. Waste management amidst Anthropocene strait & industrial technology transition are framing out great number GHG protocols & policies. "Solid-liquid waste handling" means the storage, collection, transportation, treatment, utilization, processing, and its disposal, incorporating their recovery and recycling source waste generation. Resource efficiency from such wastes or conversion of energy from such wastes to energy are more useful forms or combinations thereof. Today, the rural areas of Maharashtra contributes about to 80,900 tons of solid waste per day, which is equal to about 1.67 kg capita per day varying from 0.15-0.3 kg per capita per day. To the fore in 2025, this amount will raise to

0.2 million tons of waste/day, which becomes 2.1 kg capita per day. These estimates have conjectured the real values in postulated footprints, like as not 1.5 factor of this amount. The collection & disposal of rural solid waste is one of the conundrum issue of rural ecosystem, which have had meant to assume it's significance in the recent past two decade. The citation in Nesari village have an average of 983 KG daily waste, with its composition as: 46.8 % organic waste, Textile 3.8%, Paper & cardboards 8.8%, Plastic 1.4%, Plastic bags 15.5%, Metal 1.4%, Glass 7%, Other 16% Incisiveanalysis of technology for composition of solid waste from various wards of Nesari village, revealed high organic content and moisture content ensuring viable composting. They can be efficiently improved by reducing burden on landfills in tandem contribution towards the sustainable development goals within the total geographical area of village is 575 hectares.

Total population of 6,890 Male population is 3,510 Female population is 3,610.

Literacy rate of Nesari village is 71.91% out of which 78.27% males and 62.78% females are literate.

2.0 WASTE MANAGEMENT

Waste management to maintain the density of waste by reducing the use of resource materials and reusing them to be the most environmental friendly approach. Resource reduction at source dwindles the amount of waste generated and reusing materials to prevent them from entering the wastestream. Thus, waste is not generated until the end of "reuse" phase. Once the waste is generated, it needs to be collected, stored & treated (cradle-to-grave). Reducing and reusing have proven to be the most effective ways to prevent waste proliferation. It is known that as much as 90% of a product's environmental impact occurs before its discard, mostly during its manufacturing and extractionof virgin raw materials which can neither be recycled nor composted and needs to be combusted in RDF or WTE plants to avoid landfilling and generate energy.

Necessity of solid waste management:

1) Due to growth in population & urbanization the generation of solid waste has increase significantly.

2) Though SWM is complex to execute but with modern eco-friendly techniques & disciplinary work.It is possible to achieve needful.

3) Diseases due influenza are the major threats arise due to solid waste.

4) Proper SWM provides facility of collection, segregation, transportation, & treatment of waste.

2.1 Solid waste management

Solid waste management includes any waste that is neither gaseous nor liquid state, however containerized gaseous as well as gaseous waste are also included in the term. The major category of solid waste includes municipal solid waste, agricultural waste, industrial waste, ash from thermal power plant, & hazardous waste. (Sudha Goel, 2008) There are six functional elements of solid-waste-management. Study of these elements illustrates the relationships involved in each element & development of frame work. It has been observed that there are following six elements for SWM.

2.2 On site Handling, Storage and Processing

On site Handling, Storage and Processing of Waste includes activities associated with management of wastes till they are placed in storage containers for collection. Into its liminal activities of loading containers at the point of collection & storage, includes aggregation of waste after generation. There are two kinds of storage modality at source. The first one is temporary storage done at house level and second one is communal solid waste storage system as a part of their hygiene. While processing at source includes activities such as waste composting and splitting-up of solid wastes for reuse & recycling. All of these mechanisms are essential for protection of public health and aesthetics and environment.

2.3 Aerobic composting

Aerobic composting is the decomposition to putrid waste in the presence of oxygen O_2 (air), this activity is perpetrated in presence of CO_2, NH_3, water and heat. This can be used to treat any type of organic waste but, effective. Composting requires the right combination of ingredients and conditions. These include the moisture contents around 60-70% and Carbon to Nitrogen (C/N) ratios of 30/1. Any significant variation inhibits degradation process. Ventilation of waste, either forced or passive is essential.

2.4 Anaerobic composting

Anaerobic Composting is the decomposition of organic wastes in devoid O_2, the products being me-thane (CH_4), CO_2, NH_3 and traces of other gases and organic acids. Anaerobic composting was traditionally used to compost animal manure and human sewage sludge, but recently it is become more common for some compost yards, green waste & bio methanation.

i) Composting

A biological modality to decompose and stabilize organic contents from microbes either in aerobic oranaerobic process seem to be quite efficient process. Thus, depending on the process, frontier conditions and design of the plant are framed. Aerobic composting and anaerobic composting yield methane-rich biogas that is used in electricity generation, cooking and inert residue availing in production of manure also known as methanations. Indigenously, majority of waste generated are garbage and are volatile. As the name suggests, aerobic composting where bacterial conversion of organics in the presence of air yields compost as a final product that is fructified into natural fertilizer. The final product is resisted from stench and pathogens. Apparently, a reduction in waste volume to 45-85% owing to artificial intelligence seems frugal in rural-urban locality, while manually control plants areset in relatively smaller urban townships and georgic zones.

ii) Landfilling

They are the physical facilities framed as per GHG protocols and guidelines, used for the disposal of residual solid wastes on the land surface. Landfilling includes monitoring of the incoming waste stream, placement and compaction of waste, and installation of landfill monitoring and control facilities.

Types of landfill:

- Sanitary landfill: engineered facility for the disposal of municipal solid waste
- Secured landfill: for the disposal of hazardous wastes

3.0 Life Design

Life of a landfill comprises of an active period and a closure and post-closure period. Active period may typically range from 20 to 25 years depending on the availability of land area. Closure and post-closure period, for which a landfill waste will be monitored and maintained, will be 20 years and more after the active period is completed. Keeping the prime moto of Rural Panchayat Raj Samiti amid every province to resilient climate change consequences and attain carbon neutral pathways by maintaining food conversion ratio & high sugar content grass (HSG)in real time policy, helps the administration to attune with CAS & Agricultural Meteorology (CAgM) for landscape enhancement initiative (LEI) and Working Group Numerical Experiment (WGNE) in tandem to Working Groups for Regional Climate (WGRC). As mondial aspiring objectives in unison to twin sustainability, firmly entails a range of ethical dilemmas along relentless adversities interfaced by distinct provinces amidst pandemic epidemic and Anthropocene aspersion. Thus, leaving those developing nations striving to build climate change policy with its ability and capacity building.

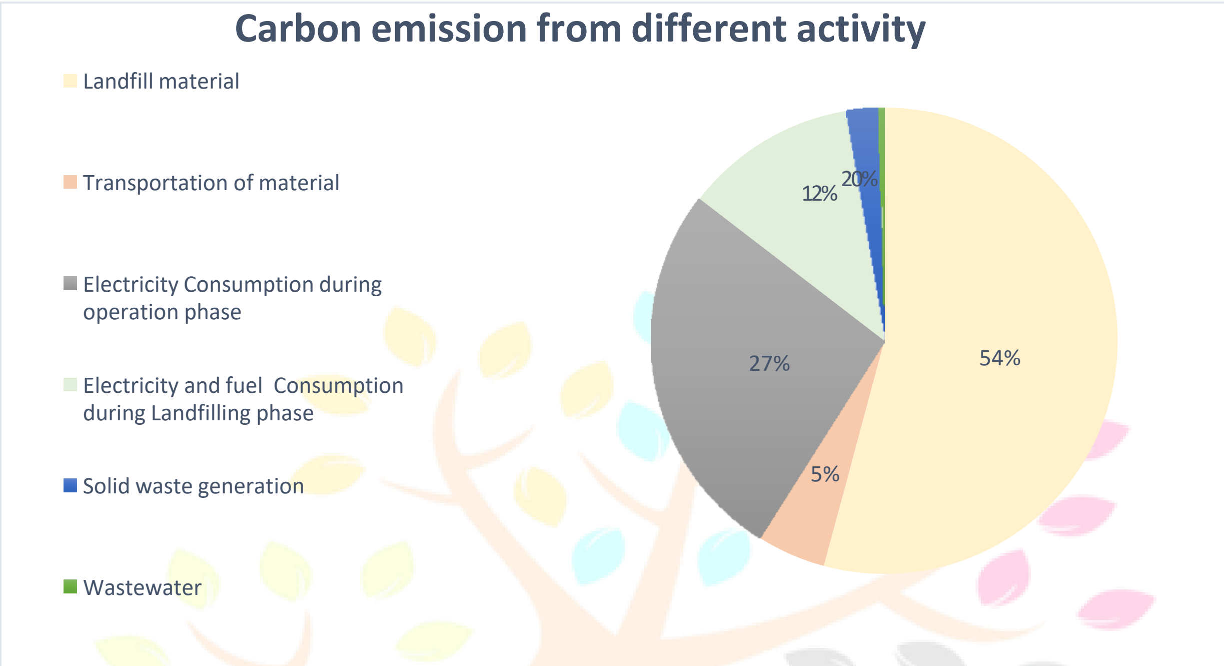

Fig.1 Waste resource circularity as per GHG guidelines.

Mr. Kale Tejas Sunil, Dr. A.C. Attar (2016) concluded on requisite technologies for the processing ofsolid waste on the basis of detailed characterization of solid waste. The adoption of suggested solid waste management plan will keep village campus clean and healthy. This will not only contributes tothe health of communities but also has positive impact on socio-economic conditions. To overcome these problems, they have solid waste samples collected from a dump site analyzed for physical characterization and had proposed to implement Bangalore method of composting in Gotkhindi village, Islampur.

Abduli, M. A., Samieifard (2008), concluded that the main obstacle on recycling program is the unbiased collection of waste in rural area. It is recommended that for the first five year program, source separation includes degradable matter and dry wastes (paper, plastics and metals). Source separation of other components such as wood, rubber, glass and textile can be carried out in the second five-year program. From the economical point of view, incineration with energy recovery cannot be a good alternative for rural waste disposal. Due to the low volume of degradable matter, land availability with low cost and easy access to labor force in rural areas, frugal technology composting is recommended. The quantity of waste generated in each village is not sufficient to be managed separately, thus a regional solid waste management must be defined to include adjacent villages. More- over, agricultural and animal wastes could be composted with these modality too. Because of the seasonal changes, the quantity of agricultural and animal wastes gets modulated, as it is necessary, that the capacity of composting systems and related equipments to be flexible and can absorb fluctuations of waste generation, such that it is preferable in flexible composting facilities in unison.

Kalyani A. Motghare, Ajit P. Rathod , Kailas L. Wasewar , Nitin K. Labhsetwar (2016) concluded the different biomasses from Maharashtra (India) region have been studied to assess their potential as renewable fuel. As, Maharashtra dominantly relied to the agriculture ergo, produces a significant amount of biomass remnant. The aim of research work is to analyze different local biomass wastes for their proximate analysis and calorific value to assess their potential as fuel. From the proximate analysis, it was concluded that cotton waste and leaf have high volatile matter content with low ash content, thereby suggesting their potential to be used in place of fossil fuels. From elemental analysis it is found that all biomass samples contained almost equal amount of carbon (C), but cotton waste possess highest carbon content, low sulfur content. Emissions from such solid fuel combustion to indoor, regional and global air pollution largely depend on fuel types, combustion device, fuel properties, fuel moisture, amount of air supply for combustion and also on climatic conditions. In botheconomic and environment point of view, gasification constitutes an attractive alternative for the use of biomass as a fuel, then the combustion process. A large number of studies have been reported on a variety of biomass and agriculture residues for their possible use as renewable fuels. Considering the area of specific agriculture residues and biomass availability and related transportation cost.

Hiya Dhar, Sunil Kumar, Rakesh Kumar (2017) concluded that waste generation is increasing day-by-day with the growth of population which directly affects the environment and economy. Organic municipal and agriculture sectors contribute towards maximum waste generation in India. The presentpaper mainly focusses on reviewing waste to energy (WtE) potentials, its technologies, and the associated challenges. Field trial of WtE technology should be focused in the near future that attenuates organic WtE can be the sustainable approach to reduce the quantity of wastes.

Vijay Kumar and R. K. Pandit inferred on a dire awareness to concert, educate and entrench firm adaptive majors for collection of waste at source and bestowing them as per the direction of the boardand commune. Robust guidelines over segregation and perpetual receptors are cited. Offenders shouldbe forfeited. There should be legit segregation of non-biodegradable/recyclable waste at sources or at secondary collection points and also methods like waste compositing should be stipulated for biodegradable waste. Thus, urban waste needs an aseptic and thorough containment with proper care on dichotomised approach in the specified regions for further degradation. For commercial areas and hotels, containers not more than 100 litres in size are handled on top or on sides with grime at the base. Biomedical waste from hospitals and nursing homes should be decontaminated from governmental provisions of India, Ministry of Environment Forest and Climate Change.

A.J. Morrissey, J. Browne inferred over the development of MSW management models over the last number of decades has been described in the previous sections. The latest solid waste management models were optimisation models and concerned with specific aspects of the problem. More recent models are compromising models, focused around integrated waste management, with the concept of sustainable waste management becoming central to these models. Three main categories of models have been identified: cost benefit analysis models, life cycle inventory models and decentralised modulation.

Nevertheless, the models described have limitations and none have considered the complete waste management cycle, from the prevention of waste through to final disposal. Most are only concerned with refining the actual modulation technique itself or of comparing the environmental aspects of waste management options (recycling, incineration, and disposal). In addition, while many models recognise that for a waste management model or strategy to be sustainable, it must consider environ- mental, economic and social aspects, no model examined considered all three aspects together in the application of the model and none considered the intergenerational effects of the strategies proposed Ithas been identified in this paper that two important steps in decision making in the area of municipal waste management are the formulation of the problem and the involvement of all relevant stakeholders in the decision making process. These aspects will be included in the methodology developed along with the use of an appropriate decision aid.

4.0 Conclusion

Anthropogenic analysis within phenological transition are presumed to be a prominent requisite pursuant to GHG protocols. Thus, to perpetrate and conform sustainable triangle of development in countryside hamlets, it urges to ingrain first of its kind sustainable adaptive measures. The citation to it have demonstrated its every facet towards enacting conservative environment scenarios Therefore, to build its capacity and infrastructure upholding earlier unfacilitated equity, farm to table and farm to fork are meant to be postulated without negligence. Thus, anonymized assessment evaluates the accruing heralds with respect to adaptations and to its manifestation.

Short term mitigating salutary measures athwarted to those adversary, leads to asymmetric climate resilience affecting major areas with its benefits. Eventually, to overcome setback of unmet assessment consequences, robust business energy and industrial strategy need to be framed.

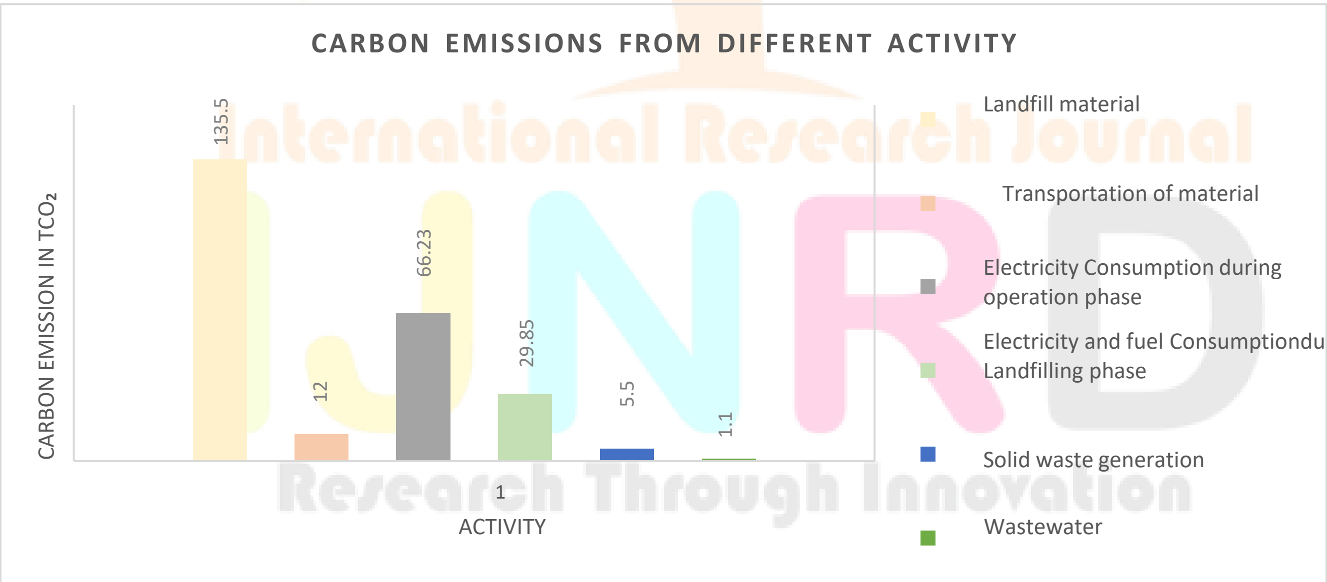

Fig2. Emission Trajectory.

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