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Case Study on Cow Dung

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Abstract - Cow Dung is the most important source of bio-fertilizer and is used for energy production in many developing countries. It is a very effective alternative to chemical fertilizers, which in the long-term increases' productivity, maintains soil health and increases microbial populations. Cow dung and compost increase soil organic matter, which improves water infiltration and water retention and increases cation exchange capacity. It is one of the renewable and sustainable energy sources through manure or biogas, which replaces the dependence on charcoal, firewood, firewood and fossil fuels, etc. In addition, proper and economical use of cow dung can also increase crop productivity also reduces the probability of pathogenic bacterial and fungal diseases. Therefore, improper use of cow dung should be stopped and used as organic fertilizer to maintain a productive and sustainable agricultural system. Introduction: Cow dung is the main source of bio fertilizer, but at the same time, cow urine, cow horn and cow body can be used to make effective bio fertilizer. Animals can play an important role in energy production, either in a negative way, where livestock farming contributes to the loss of forests in large parts of the forest area, or in a positive way, for example by changing the energy of plants into useful work. or providing manure for fuel through manure cakes. or biogas to replace charcoal, firewood, firewood, etc. Most livestock production in mixed farming systems comes from animals fed on local resources such as pasture, crop residues, forage trees and shrubs. We practiced agriculture and farming according to the traditional, ancient system, when manure was, among other things, cow dung. In agriculture, there are various products made from cow dung and cow urine that can be used as fertilizer and pest control, respectively. These products are very popular and are used every day. Low soil fertility is one of the most important biophysical constraints to agroforestry crop production worldwide (Ajayi, 2007).

***Key Words*:** Cow Dung, Compost, Biogas, Vermicompost

1. INTRODUCTION

In the 2022-23 periods, a survey was carried out across various villages in Dhar, Madhya Pradesh, to explore the practicality of implementing cow dung composting systems as a sustainable waste management solution. This survey evaluates the economic, social, technical, and environmental factors to assess their viability and offers recommendations for successful implementation. Therefore, by doing identification in Dhar Madhya Pradesh villages there some types of breeds such as Nimari, Malvi, Dangi, Gaolao these types of breeds daily 15 to 25 kg residue per day. Cow dung can be defined as the undigested residue of consumed food material being excreted by herbivorous bovine animal species. The Composition of cow dung is about 80% water and supports a matrix of undigested plant material that is rich in nutrients, micro-organisms, and their byproducts. Cow dung contains around twenty-four minerals like potassium, nitrogen, fewer quantities of Sulphur, calcium, magnesium, manganese, cobalt etc. Being a mixture of feces and urine in the ratio of 3:1, it mainly consists of lignin, cellulose and hemicelluloses. The green coloration of the cow dung is due to the presence of the bile pigment called biliverdin. More than sixty bacterial species, hundreds of species of protozoa and yeasts are present in the cow dung. Generally, if any organism consumes any toxic substances by any chance, the same will be distributed throughout the body and the excretory products (in any form) will have the portion of the consumed toxins. The above concept is not applicable in the life of cow. The cow does not let or releases the toxins, in any of their products like urine, dung or milk, even in minute amounts and hence proving cow dung are pure, without toxins.

2. PRACTICES:

2.1 CULTURAL PRACTICES : According to a Hindu belief "Whatsoever sins or any diseases present in my body starting from the skin to the entire bones, Panchagavya (the five products that are obtained from cow, which include cow's urine, milk, ghee, curd and dung.) kills the diseases like the fire destroying the fuel while burning. The ancient scriptures affirm about the "suryaketu". It says that this suryaketu nerve has the capability to absorb dangerous radiations that holds the power to cleanse the air. Some of the evidences have revealed that cow dung is considered as a reward of life cycle for an organism to die and reborn for the sake of growth once again. In Ayurveda, most of the medicinal preparations are cow dung patties. These cow dung patties play a significant role for the therapeutical property of Ayurvedic medicines. There is a technique in Ayurveda called "swedana". It is a technique used for the purification of ativisha. This purification method of ativisha uses the juice obtained from the cow which results in removing the impurities from the human body and detoxifies the system.

2.2 RELIGIOUS AND CULTURAL SIGNIFICANCE: Cow dung has been used in various cultural and religious practices throughout history. In Hinduism, it is believed to have purifying properties and is used in religious ceremonies and rituals. In some traditional medicine practices, cow dung is believed to have healing properties and is used as a remedy for various ailments.

2.3 NUTRITIONAL CONTENT: Cow dung is composed of mainly undigested plant material, along with some water, minerals, and microorganisms. It is not considered a nutritious food source for humans.

3.METHODOLOGY

Study area: Dhar is well known for historical places lies between **22.601292**, and the longitude is **75.302467**. **Dhar,**

Madhya Pradesh, India is located at India country in the Cities place category with the gps coordinates of 22° 36' 4.6512" N and 75° 18' 8.8812" E part of the Madhya Pradesh.

Data Collection: In the present study we have performed the survey among the 50 household of 4 villages of Dhar District. We have prepared a questionnaire, for the survey purpose and try to get answer of all 11 questios from each family under investigation.

Questionnaire

1. Name of person?
2. Name of village?
3. Number of family members?
4. How many domestic animals they have?
5. How many animals used for labour?
6. Which fuel is used by them for cooking?
7. For which purpose do they use cow dung?
8. Are they having the facility of compost?
9. How do they maintain the composting ?
10. Are they satisfy by using composting?
11. Do they conserve energy by using gobar gas?

4. FINDINGS:

4.1 Availability of cow dung: In this survey we got some exciting result average every household have 5 to 7 animals in these survey approximately 80kg to 100kg cow dung are found we simply calculated our survey record in 500 household 50000kg per day.

4.2 UTILIZATION:

In our survey of 500 household we distributed their uses in some categories such as some household uses of cow dung as a fuel other side some peoples are uses directly as a fertilizer dumped in agriculture field and some peoples are used rituals and festival and major finding in these survey are remaining are dumped in open area.

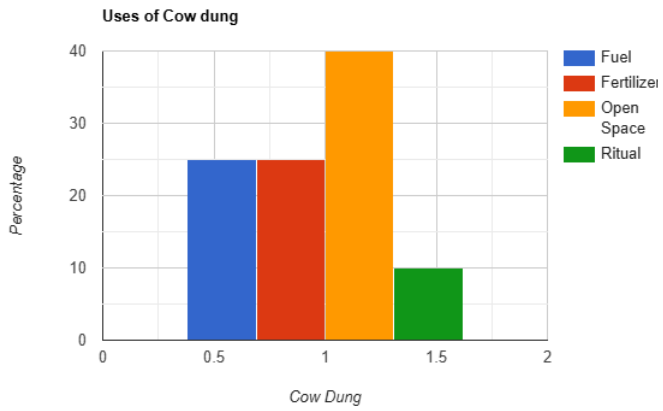

Chart -1 Uses of Cow dung

5. CURRENT PRACTISES

5.1 Direct Use: In this survey many household using cow dung as composting but they are directly dumped or sprayed in their agriculture field so majority of households prefer direct application of fresh or dried cow dung to fields. Shortage of fuel wood is a major problem which forces the rural people to use a cow dung for their fuel purpose, which effects on the productivity status of cultivated land. Cow dung is a good resource for maintaining the productivity status and enhance the beneficial microbial population of soil. Soil provides numerous essential ecosystem services such as primary production (including agricultural and forestry products); regulation of biogeochemical cycle (with consequences of the climate); water filtration, resistance to diseases and pests and regulation of above ground biodiversity (Jhariya and Raj, 2014). Soil fertility depletion is the single most important constraint to food security. Manure is an important input for maintaining and enhancing soil fertility. As per Fulhage (2000) manure contains the three major plant nutrients, nitrogen, phosphorus and potassium (NPK), as well as many essential nutrients such as Ca, Mg, S, Zn, B, Cu, Mn etc. That, in addition to supplying plant nutrients, manure generally improves soil tilth, aeration, and water holding capacity of the soil and promotes growth of beneficial soil organisms.

5.2 Waste Disposal: Improper disposal in open areas is common, leading to methane emissions and unsanitary conditions. Cow dung is very effective's manures for reducing the bacterial and fungal pathogenic disease. It showed positive response in suppression of mycelial growth of plant pathogenic fungi like *Fusarium solani*, *F. oxysporum* and *Sclerotinia sclerotiorum* (Basak and Lee, 2002). Similarly as per Mary *et al.* (1986) cowdung extract spray was also reported to be effective for the control of bacterial blight disease of rice and was as effective as penicillin, paushamycin and streptomycin. As per Pammel (1889) cowdung as organic manure increase vigour of plant and reduce the disease incidence of root rots in cotton caused by *Phymatotrichum omnivorum*. Similar investigation was done by Abawi and Widmer (2000), Akhtar and Malik (2000) and Gamiliel *et al.* (2000) and reported that organic manure reduce disease incidence caused by a wide range of plant pathogens including bacteria, fungi, and nematode species. Therefore, application of cow dung in proper and sustainable way can enhance not only productivity of yield but also minimizing the chances of disease.

5.3 Composting: In our survey less than 15% of households are familiar with controlled composting methods. Human population is increasing worldwide giving rise to intensive farming system and unsuitable cropland management that ultimately results in reduced soil fertility (Onwudike 2010; Bedada et al. 2014). Extensive use of chemical fertilizers is suggested to overcome the nutritional deciencies to increase crop yield. Chemical fertilizers uses have many drawbacks include increase in soil acidity, mineral imbalance and soil degradation (Kang and Juo 1980; Ayoola and Makinde 2008). Farmers are also aware about the harmful effects of chemical fertilizers nowadays (Bedada et al. 2014). Through absorption, chemical fertilizers easily enter in the life cycles of humans, plants and animals (Adams et al. 2014). It is already reported that cow dung contains such microorganisms (Acinetobacter, Bacillus, Pseudomonas, Serratia and Alcaligenes sp.) which have capacity of degradation of chemical pollutants (Adebusoye et al. 2007; Akinde and Obire 2008; Umanu et al. 2013); whereas some present microbes shown antagonistic effect against plant pathogens such (Rupela et al. 2003; Somasundaram et al. 2007; Radha and Rao 2014).

6. Awareness and Willingness

6.1 Awareness: In our study 60% of respondents are unaware of the environmental benefits of composting.

6.2 Interest: In our study 70% expressed willingness to adopt composting if provided with training and support.

7. Environmental Benefits

7.1 Reduction in Methane Emissions: Composting can significantly reduce methane emissions compared to open decomposition. The soil productivity is also related to available nutrient source in either through manures (dung) or chemical fertilizers (superphosphate etc). Dung increased pH, CEC, total N, organic C, loss on ignition, and exchangeable Mg and Ca. It decreased sulphate sorption. Moreover, cow dung manure plays a significant role in maintaining the nutrient status of the plant. Vermi composting of cow manure using earthworm species *E. andrei* (Atiyeh *et al.*, 2000b) and *E. foetida* (Hand *et al.*,1988) favored nitrification, resulting in the rapid conversion of ammonium-nitrogen to nitrate-nitrogen. Therefore it improves the nutrient cycling and helping to convert unavailable nitrogen in available forms to plants. The soil biological attributes are also responsible for determination & maintenance of physical properties of soil. The physical properties of soil in its own turn control not only the quantum of chemical properties, but also the rate of their release and availability to plants essential for metabolic processes. Thus, it may be said that soil biology is the door to maintenance of soil health (Kumari *et al.* 2014). As per Dinesh *et al.*, (2000) there is a positive relationships between relevant soil properties and enzyme activities and suggested that addition of organic matter increased microbial activity/ diversity and turnover, which subsequently leads to greater enzyme synthesis and accumulation in the soil matrix. The effects of cattle dung on soil microbial biomass are also studied and compared to controlled condition of soil (no any dung application).

Fig -1 Cow dung converting compost

7.2 Soil Health: Compost improves soil fertility, reducing reliance on chemical fertilizers.

8. CONCLUSION:

In our survey various research studies and literature from the past four years (2018-2021) were reviewed, but no notable deviations were observed from the baseline scenario. Cow dung has been used for centuries as a natural resource for various purposes, including as compost, fuels, fertilizers, and medicines. While there are some benefits to using cow dung for these purposes, there are also potential harmful effects that must be considered. It is important to prioritize food safety and hygiene practices to prevent the spread of disease and protect public health. A study conduct by World Health Organization Care of the Umbilical Cord, A review of the evidence. Geneva, has reported that cow dung is applied externally as an antiseptic on the stump of the cord immediately after the delivery and/or even some of the days after their delivery, the patients discharged from the health centers after the cord procedures were counseled to take proper precautions. As a fuel source, cow dung can be used to produce biogas and bio fuels, which can be a sustainable source of energy for rural households. This can reduce dependence on non-renewable energy sources and reduce carbon emissions. However, exposure to cow dung dust can lead to respiratory problems, such as bronchitis and asthma, which can pose a risk to human health. As a fertilizer, cow dung can provide essential nutrients to crops and improve soil fertility. This can increase crop yields and reduce the need for chemical fertilizers, which can have harmful effects on the environment. However, cow manure used as fertilizer can lead to the contamination of groundwater with nitrates, which can be harmful to human health. As a medicine, cow dung has been used in traditional practices for various purposes, such as treating skin diseases and boosting immunity. However, there is limited scientific evidence to support the use of cow dung as a medicine, and direct consumption of cow dung can lead to serious health risks, including infections and liver abscesses. Finally, direct consumption of cow dung is not recommended, as it can contain harmful bacteria, parasites, and viruses that can cause diseases such as E.coli, Salmonella, and Cryptosporidium. While there are some cultural practices that involve the use of cow dung in food preparation, this is not based on scientific evidence and can pose a serious risk to human health. In conclusion, while there are some benefits to using cow dung for various purposes, such as fuels, fertilizers, and medicines, it's important to consider the potential harmful effects as well. Proper handling and processing of cow dung can reduce the risk of exposure to harmful bacteria and other pathogens. It's important to consult with experts and follow appropriate safety guidelines when using cow dung for any purpose. Due to increasing prices of chemical fertilizer and non-efficient role in long term to sustainable production, there is a need of application of organic manure including cow dung for enhancing maximum productivity in sustainable way with better soil health. Cow dung is of similar importance due to its use as primary source of energy notably for cooking. Rural farmers are keen to use dung as a source of energy due to unavailability of other sources which affect the productivity. It can be also productively used for basic energy, biogas, electricity and fertilizer and has a strong socioeconomic dimension. The effective use of dung would contribute to

increase energy security and reduce environmental degradation and greenhouse gases.

REFERENCES

1. Adeyemo, M. A., Akinbami, A. A., & Adetosoye, A. I. (2013). Antimicrobial susceptibility pattern of bacteria isolated from cow dung in Lagos State, Nigeria. African Journal of Biotechnology, 12(29), 4615-4619.
2. Baruah, P., Bag, N., Rakshit, A., & Mukherjee, A. (2019). Effect of cow dung and poultry manure on soil properties, plant nutrient content, and yield of maize crop in eastern Himalayas. Communications in Soil Science and Plant Analysis, 50(21), 2703-2716.
3. Dar, F.A., Lone, P.A., Khan, N.A., Sheikh, M.A., & Dar, Z.A. (2017). Influence of Different Organic Fertilizers on Growth, Yield and Quality of Amaranthus (Amaranthus hybridus L.) under Temperate Conditions of Kashmir. International Journal of Current Microbiology and Applied Sciences, 6, 192-202.
4. Das, S. S., Awasthi, M. K., & Verma, A. K. (2017). Antimicrobial activity of cow dung extract on foodborne pathogens. Veterinary World, 10(6), 643-647.
5. David, M. B., Sharpley, A. N., & Lightle, A. R. (2001). Nitrate Contamination of Groundwater from Animal Feeding Operations: Occurrence and Management. Journal of Environmental Quality, 30(2), 320-326.
6. Davis, R., Johnson, K., Siegel, M., Murphy, L., & Fei, T. (2016). Opportunities for biogas and biomass utilization at swine and dairy farms in the United States (Technical Report No. NREL/TP-7A40-65361).
7. Desai, N. R., Patel, T. C., Gandhi, P., Desai, M. N., & Dikshit, R. K. (2017). Cow dung: a risk factor for infections in Ayurvedic practice. Journal of Ayurveda and Integrative Medicine, 8(2), 110-114.
8. Garg, S., & Kumar, A. (2016). Biogas production from cow dung and food waste. International Journal of Scientific Research in Science, Engineering and Technology, 2(3), 158-162.
9. Gupta, K. K., Aneja, K. R., & Rana, D. (2016). Current status of cow dung as a bioresource for sustainable development. Bioresources and Bioprocessing, 3(1), 1-12.
10. Gupta, R. K., Singh, M. K., Kumar, R., & Bali, S. (2013). Antihyperglycemic activity of cow urine extract in streptozotocin-induced diabetic rats. Pharmaceutical Biology, 51(8), 946-950.
11. Kansal, S.K., & Kansal, S.K. (2011). Therapeutic value of cow urine and dung: A review. Journal of Scientific and Industrial Research, 70(5), 361-365.
12. Keneni, G., Kebede, F., & Abdulkerim, J. (2017). Effect of cow dung manure on soil fertility, soil properties, and maize growth in the central highlands of Ethiopia. International Journal of Agronomy and Agricultural Research, 10(2), 117-124.
13. Raja, M. K. M., Manne, R., & Devarajan, A. (2021). Benefits of Cow Dung-A Human Ignored Gift. Journal of Natural Remedies, 21, 189- 202.
14. Shamsudin, M. N., Mohd Radzuan, N. A., Sulaiman, M. N., Baharuddin, M. R., Syed Abdul Rahman, S. M. S., & Mat Isa, N. (2018). Respiratory Health Hazards Among Workers Handling Cattle, Swine, and Poultry in Farms in Malaysia. Journal of Environmental Science and Health, Part B, 53(9), 631-637.
15. Tandon, V. (2018). Liver abscess following cow dung ingestion. Journal of Clinical and Experimental Hepatology, 8(1), 114-115.
16. Yimer, H. K., & Eik, L. O. (2016). Livestock manure as a source of crop nutrients and potential environmental pollutant in Ethiopia: A review. African Journal of Agricultural Research, 11(31), 28
17. Abawi, G.S. and Widmer, T.L. (2000) Impact of soil health management practices on soil borne pathogens, nematodes and root diseases of vegetable crops. Applied Soil Ecology 15: 37-47.
18. Ajayi, O.C. (2007) User Acceptability of Sustainable Soil Fertility Technologies: Lessons from Farmers' Knowledge.Attitude and Practice in Southern Africa. Journal of Sustainable Agriculture 30: 21-40.
19. Akhtar, M. and Malik, A., 2000 Roles of organic soil amendments and soil organisms in the biological control of plant – parasitic nematodes, a review. Bioresource Technology 74: 35-47.
20. Aremu, M.O. and Agarry, S.E (2012). Comparison of Biogas production from Cow dung and Pig dung under Mesophilic condition. International Refereed Journal of Engineering and Science (IRJES) 1(4): 16-21.
21. Atiyeh, R.M., Subler, S., Edwards, C.A., Bachman, G., Metzger, J.D. and Shuster, W. (2000b) Effects of vermicomposts and composts on plant growth in horticulture container media and soil. Pedobiologia 44: 579–590.
22. Bargali, S.S. (2004) Cow Dung Burning is a Threat to Sustainable Agriculture. National Seminar on Ecology and Environment Management: Issues and Research Needs, Department of Botany, Kurukshetra Uniersity, Kurukshetra.
23. Basak, A.B. and Lee, M.W. (2002) In vitro inhibitory activity of cow urine and cow dung of Fusarium solani f. sp. Cucurbitae. Microbiology 30: 51-54.
24. Bekele, K., Hager, H. and Mekonnen, K. (2013) Woody and non-woody biomass utilization for fuel and implications on plant nutrients availability in the Mukehantuta watershed in Ethiopia. African Crop Science Journal 21(3): 625-636.
25. Brouwer, J. and Powell, J.M. (1995) Soil aspects of nutrient cycling in manure experiment in Niger. In: Powell, J.M., Fernandez- Rivera, S., Williams, T.O., Renard, C. (Eds.), Livestock and Sustainable Nutrient Cycling in Mixed Farming Systems of Sub-Saharan Africa. Technical Papers, Vol. II. Proceedings of an International Conference, Addis Ababa, Ethiopia, November 22–26, 1993. ILCA, Addis Ababa, Ethiopia, pp. 211–226.