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PLASTIC WASTE MANAGEMENT AND ENVIRONMENTAL CONSERVATION: THE ROLE OF SELECTED SHG FEDERATIONS IN WEST DISTRICT, SIKKIM

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Abstract

Plastic is widely used for its versatility and low cost, but its short life cycle and massive production of over 430 million tonnes annually have resulted in severe environmental challenges, including pollution, ecosystem disruption, and health risks. This study aims to assess the role of Self-Help Groups (SHGs) in managing plastic waste in West Sikkim, while promoting socio-economic empowerment and sustainability. A qualitative, field-based approach was employed across three Gram Panchayat Units Dentam-Begha, Gitang-Karmatar, and Maneyboung to gather precise insights from SHG members. SHGs have contributed significantly by practicing plastic reduction, reuse, reproduce, and recycling, along with creating awareness and activating communities for environmental protection and clean environment. The study highlights SHGs as key grassroots actors in plastic waste management, aligning local efforts with broader Sustainable Development Goals (SDGs).

Keywords: Plastic Waste Management, Shgs, Awareness, Environmental Awareness.

1. INTRODUCTION

Plastic emerged as the significant requirement in every field of human activity today. From basic to specific uses of plastic includes in agriculture, medical, transportation, piping, electrical and heat insulation, manufacturing of household and electronic goods. It's became the most convenient product for daily uses in human society, as it is widely use in packaging industries**,** infact, almost 40% of plastic is used for packaging alone. Benefits of plastic packaging include its lightweight, durable, hygienic, and cost effective (Siddiqui, et.al. 2013). Plastic is valued for being cheap, versatile, and sterile, widely used in packaging, construction, and healthcare **(**United Nations, 2023). The term "plastic" originates from the Greek word *plastikos* meaning "capable of being shaped or moulded to any form. subsequently, the modern usage of plastic emerged in the late 19th century, referring to synthetic materials that is viable to molded into various forms as per requirements (Sierra, A**.** 2024). Plastics are also known as polymers or a "long chains of monomers," which are merged to other indistinguishable subunits to form a polymer. Polymers can be of natural origins, such as cellulose as the basic subunits that make up plant cell walls and helps cells to adapt their functions (S.A. Qamar, et.al. 2020). The first plastic was invented in 1860 and Renowned Belgian chemist Leo Baekeland is credited and invented the first fully synthetic plastic in the year 1907. After the end of World War II, the production and innovation of thousands of new plastic products saw a significant surge. However, industrial development happened in the 1920s, and plastic production expanded in the 1940s. In 1950, plastic production was around 2 million tons, and it was boosted to 368 million tons in 2019 and over 450 million tonnes today (Rafey and Siddiqui, 2021, United Nations, 2023). The widespread adoption of plastic in the mid-20th century led to unprecedented production and consumption levels, resulting in environmental consequences of plastic pollution (United Nations, 2023). Despite of plastic being the more than necessities in today's period, despite of its merits on regular basis it has widespread negative consequences or impact on environment because plastics are non-biodegradable and can remain in the environment for hundred to over a thousand years, depending on circumstances. Impacts on wildlife, over 1,500 species across marine and terrestrial ecosystems are affected by plastic ingestion, entanglement, or suffocation. Plastics contributed 3.4% of global greenhouse gas emissions in 2019. 90% of these emissions were from fossil fuel use in plastic production. Without change, plastic-related emissions may double by 2060, and by 2050, plastics could consume 20% of oil and emit 15% of global carbon (Babaremu, K. O. et. al 2022). Each year millions of tons of plastic waste escape into environment destructing life-threatening habitats, injuring and killing wildlife and hindering essential biological processes and plastic

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pollution effects about 88% marine species (UNDP, 2025). Plastic waste has become a universal problem, as most plastic waste is difficult to degrade naturally/ takes longer duration in degrade. additionally, most developing and under developing countries have no advanced technological facilities and no proper rules and regulations on plastic production, it uses, and waste management (Eze et al., 2021). SHGs concept originated from Bangladesh as pioneer in the field of micro-finance as 'Grameen Bank' in 1975. Whereas, in India SHGs emerged during seventh Five Year Plan (1985-90) as a poverty eradication approach. India implemented these Bangladesh's model in a modified form, where motives behind to alleviate the poverty and to empower women (National Commission for Women. (n.d.). Self-Help Groups (SHGs) the grassroots-level organization play a crucial role in empowering marginalized communities mostly rural poor women, fostering financial inclusion, and promoting sustainable livelihoods. These grassroots-level organizations are built on the principles of mutual aid, self-reliance. The concept focuses on mobilizing people, especially marginalized groups, to take charge of their economic, social, and personal growth. These groups aim to bring about personal and social-economic change for their members and society as a whole. Through face-to-face interaction and shared values, these groups enhance members personal sense of identity as well (Chandrashekar H. M. et. al. 2009, Nichlavose P. R. et. al. 2017). Self Help Group (SHG) is a large group of women mostly (10-20) members in an individual groups, who come together voluntarily to facilitate savings, credit and income generation to ensure that development activities such as economic freedom (Bharti, S. S. 2016). They differ slightly from micro finance institutions, as their sole focus is not on credit and savings, but also on working towards social empowerment, outreach, and capacity building under ideal conditions (Deininger & Liu, 2009).

Plastic waste has become a significant environmental challenge in rural areas due to increased consumption. Gram Panchayats (GPs) are well-positioned to drive awareness and decentralized Plastic Waste Management (PWM) by reducing single-use plastics. Swachh Bharat Mission (Grameen) Phase-II emphasizes Solid and Liquid Waste Management (SLWM), with PWM being a key criterion for Open Defecation Free (ODF) Plus villages. Local-level interventions are crucial for effective plastic waste mitigation in rural India (Swachh Bharat Mission (Grameen), 2021). Whereas, while mentioning that Sikkim was the first Indian state to ban disposal plastic bags in 1998**.** In the year 2016, a single-use plastic in state prohibited packaged drinking water in government offices/events. Banned Styrofoam and thermocol plates and cutlery statewide. Instead of plastic state promoted the alternatives like paper, leaf, bagasse, and areca nut plates. Government offices use filtered water and reusable dispensers (Viji. 2022). West Sikkim is a district of the Indian state of Sikkim. The geographical extent of district is between 27°6' 8.72" to 27°37'10.324" North latitude and 88°2' 6.942" E to 88°20' 42.207" East longitude. Its district headquarter is Geyzing, also known as Gyalshing. Other important towns area includes Soreng, Dentam, Kaluk Pelling and Yuksom-Tashiding. West Sikkim covers total Geographical area of 1,166 km2. West district of Sikkim has 62.44 % percent under forest and tree cover, and it covers its geographical area of 728 km2. According to the 2011 census, that time only have Gyalshing as a district in west Sikkim constitutes the population of 136,435 (census of India, 2011, GOS, n.d).

Plastic has the immense environmental impact as the most plastics do not biodegrade instead, they fragment into microplastics and nano plastics, which persist in ecosystems for longer period of time, remain widespread contamination in oceans, soils, air and even far-reaching places like Arctic and deep seas (Pinto da Costa, J. et. al., 2020). The word "Waste" itself has multiple definition, and meaning different things in different contexts. It is broadly the unintentional by-product of both consumption and production. The waste can be categorized in several key ways to understand its composition. One way is by its material, such as food waste or plastic waste. Another way is by the product type, like electronic waste (e-waste). It can also be categorized by its source, like municipal solid waste (MSW). This report specifically focuses on Municipal Solid Waste (MSW). MSW is generated by households, small businesses, and public services. However, MSW is only a comparatively small portion of all waste produced. Far larger amounts come from construction, industry, agriculture, and healthcare (UNEP, 2024). Important environmental factors leading to health impacts on soil and water pollution where plastics percolate toxic chemicals, contaminating groundwater and degrading soil quality. incineration of plastic waste generates/produces harmful air pollutant gases like dioxins, VOCs, microplastic release into the atmosphere because of incomplete combustion of waste, subsequently became the health hazards to huma beings. Additionally. Human exposure to plastic additives (e.g., BPA, phthalates) linked to cancer, hormonal disruption, and genetic mutations (Fayshal, M. A., 2024).

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2. OBJECTIVES

This study includes the following two imperative objectives such as:

- To access the role of SHGs Federation in plastic waste management initiatives in west District of Sikkim.
- To evaluate the socio-economic environmental impact of SHGs in plastic waste management efforts in the west District of Sikkim.

3. MATERIAL AND METHODOLOGY

The study Area

West district is the second largest district of Sikkim the small State of Indian Union mainly of (1166 sq. km.) in area but in term of population it is the third highest (136,435) with (77.39) per 16 % of literacy rate at the fourth rank in the district level during 2011 census. West district also recorded the third highest proportion of scheduled caste (5,935) and second highest in Scheduled Tribes (57,817) population in this census. The Geographical extension of the study area is between 27°6'8" N to 27° 37' 10" N latitude and 88°2'6" E to 88°20' 42" E longitude. District lies between the altitude of 400 to 2500 m, out of total geographical areas of Sikkim 7096 km^2, west district comprises of 1166 $km^{2.}$, accounted as second largest district of Sikkim, Khecheopalri Lake is considered as one of the sacred lakes of this state both by the Buddhist and the Hindus. Administration set up of the study areas comprises Gyalshing/Geyzing as the district headquarter. However, recently one more district had created/formed by present government namely Soreng now west district of Sikkim have two districts from 2021 onwards. West district of Sikkim is mainly dominated by agriculture and large cardamom farming (cash crop). Large cardamom-based economy in west Sikkim is a major producer and exporter of cardamom, influencing local livelihood and regional trades.

METHODOLOGY

The objective of this study includes that to access the role of SHGs Federation in plastic waste management initiatives in west District of Sikkim. And to evaluate the socio-economic and environmental impact of SHGs in plastic waste management efforts in the west District of Sikkim. As this, study required to employs both a quantitative as well as qualitative data collection techniques. Where both qualitative and quantitative data have been collected from both primary and secondary sources in order to assess aforesaid objectives on role of SHGs in plastic waste management and to evaluate the socio-economic implications of SHGs in the study area. Secondary data were collected from various institutions, and governmental documents likewise NERLM GYALSHING, NRLM (GOVT. OF INDIA). Extensive literature has been reviewed from various published and unpublished books, reports, magazines and journals. The sources of primary data have been generated from the field study and focus group discussion among the SHG heads and active members of selected SHG, by considering the SHGs awareness and participation in waste management and environmental conservation and awareness in west district of Sikkim where, selected SHG give emphasize to the remote villages of district. Total of 105 SHGs around Begha GPU, Gitang-Karmatar GPU and, Maneyboung GPU selected to conduct the primary survey based on their active participation in collection, storing, and management of plastic waste and to understand their socio-economic contribution managing the environment conservation and awareness. Among the 105 SHGs accounting the total member in each SHG was about 1002 members, whereas, only 150 members/ respondents were selected purposively from each group based on their position as head/ active member of each group. For analysis of data collected from the field various statistical techniques were employed like table, percentage, frequency etc. Here, the selected SHG blends the tradition with plastic waste to generate meaningful alternatives to upgrade livelihoods.

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4. RESULTS AND DISCUSSION

SHGs and Plastic waste Management

Presently, plastic pollution has become the huge environmental challenges of the 21st century, impacting widespread damages to ecosystem and human health, while, fossil fuel origins of the most plastic produced have implication for climate change. Even though, plastic remains the integral part of the global economy. As the population is projected to increase by 10 billion by the year 2020, with increase in population the living standard of people also has projected to increase by 2060, with growing population and improving living standard, the Global Gross Domestic Product (GDP) is also projected to surge more than triple between 2019 and 2060. Even though, recycled to plastic are also projected to grow at a faster rate than primary plastic they are still expected to make only up to 12% of the total share of plastic use in 2060 (OECD,2022).

SHGs in India today is a collective mechanism for women development that leads to improvement in their socio-economic conditions and in the long run brings about individual and group empowerment for all women SHG members. Women's Self-Help Groups (SHGs) in Sikkim have emerged as a powerful tool for fostering economic independence, social interconnection, and empowerment among women. These groups, supported by government schemes and non-governmental organizations, enable women to pool resources, access microcredit, and engage in income-generating activities such as agriculture, handicrafts, animal husbandry, and small-scale enterprises. Through regular meetings, skill development workshops, and collective decision-making, SHGs also provide a platform for women to discuss issues, share knowledge, and advocate for their rights. In addition to improving livelihoods, SHGs play a crucial role in building confidence and leadership skills among women, driving community development, and contributing to Sikkim's vision of inclusive growth and gender equality.

TABLE -1: PLASTIC MADE PRODUCTION OUT OF PLASTIC WASTE BY SHGs

Sl. No	Source of Plastic waste	Items/production	Collection of waste
1	Food packaging/Plastic wrapper (chips, readymade noodles, cookies, etc)	Traditional Basket	Dustbin (placed by them) dumping/ landfill,
2	Plastic wrapper (chips, readymade noodles, cookies, etc)	Traditional Pira ()	Dustbin (placed by them) dumping/ landfill,
3	Beverage Containers (Water bottle, cold drinks)	Decorative Items	Dustbin (placed by them) dumping areas/ landfill,
4	Water bottle, cold drinks bottle, waste paper and sweet wrappers,	Garden Decoration	Dustbin (placed by them) dumping/ landfill,
5	Water bottle, cold drinks bottle	Flower Vast	Dustbin (placed by them) dumping/ landfill,

Source: Field Survey, 2024.

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Figure – 1: Depicting SHG Initiatives in Plastic Waste Management (West District, Sikkim)

Source: Field Survey, 2024.

(A) (B) (C)

(D) (E) (F)

(G) (H) (I)

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Figure (A): Flower bouquet crafted from plastic waste and beverage bottles by SHG members.	Figure (B): Flower vase made out of recycled plastic bottles, converted into a value-added product by SHG.	Figure (C): Durable plastic basket produced from assorted plastic waste, managed and repurposed by SHG.
Figure (D): Traditional *Pira* (cushion) created from plastic waste, blended with dry corn husk to give new way of preserving tradition.	Figure (E): Plantation and cleanliness drive carried out collectively by SHG members in their locality.	Figure (F): SHG leaders and members advocating for a sustainable, clean environment and the importance of afforestation.
Figure (G): Daily use of plastic bottles repurposed as water jugs for fetching water from ponds.	Figure (H): SHG-initiated cleanliness drive conducted at a government school in remote village of West Sikkim.	Figure (I): Waiting shed decorated using recycled plastic beverage bottles, set up in front of a Government PHC in West Sikkim by SHG members.

Table – 1: Age Distribution of SHGs Respondents

AGE GROUP	FREQUENCY	PRECENT (%)
20 - 30	20	19.04
30 - 40	30	28.57
40 - 50	25	23.80
50 -60	15	14.28
60 - 70	12	11.42
Above 70	3	2.85
Total	105	100

Source: Field Survey, 2024.

The age distribution of SHG respondents indicates that the majority (28.57%) fall within the 30–40 age group, followed by 23.81% in the 40–50 age group. A smaller proportion (2.86%) of respondents are above 70 years. This suggests that most SHG members are in their economically active age, with relatively fewer elderly participants.

Table – 2: Education Level of SHG Respondents

Education level	No. of Respondents	Percent (%)
0 -5	7	6.66
5 - 8	22	20.95
8 – 12	36	34.28
Graduate	30	28.57
Post-Graduate	10	9.52
Total	105	100

Source: Field study, 2024

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So, here educational background of respondents reveals that most individuals in the study area are relatively well-educated, with a significant proportion (69.89%) having attained at least up to secondary education. This level of literacy suggests a higher potential for awareness, adaptability, and decision-making in relation to livelihood strategies and environmental challenges. The relatively small proportion of respondents with only primary education (6.66%) indicates that illiteracy or low literacy is not a major barrier in the study area. The presence of nearly 28.57% graduates and 9.52% postgraduates further reflect a section of highly educated individuals who could play an influential role in community development and spreading environmental awareness effectively.

Table -3: Awareness and Knowledge of Plastic Waste (n = 105)

Awareness Indicators	No. of Respondents	Percentage (%)
Aware of harmful effects	43	40.95
Practice waste segregation	30	28.59
Sources of awareness: SHG training	12	11.42
Sources of awareness: Govt. campaign	10	9.52
Sources of awareness: Others	10	9.52
Total	105	100

Source: Field Survey, 2024.

The table highlights the respondents' level of awareness and knowledge related to plastic waste management. Out of the total 105 respondents, a majority (40.95%) were aware of the harmful effects of plastic waste, which indicates a reasonably high level of environmental consciousness among SHG members. This awareness can be attributed to increased exposure to training programs, campaigns, and growing discussions around environmental conservation. However, the findings also reveal a gap between awareness and practice. While more than two-thirds of the respondents were aware of plastic hazards, only 28.59% reported practicing waste segregation at the household level. This suggests that despite knowledge, behavioural change in waste management practices remains limited, often due to lack of infrastructure, convenience, or strong enforcement mechanisms. Regarding sources of awareness, SHG training programs emerged as the most significant contributor (11.52%), followed by government campaigns (6.66%). This emphasizes the importance of SHGs as effective grassroots institutions in spreading environmental awareness and mobilizing communities. A smaller proportion (1.66%) gained knowledge through other sources such as schools, social networks, or media and news. These results suggest that training and sensitization through SHGs play a pivotal role in shaping environmental attitudes, but more emphasis is needed on practical demonstrations, incentives, and community monitoring to translate awareness into sustained practices like segregation, recycling, and reduction of single-use plastics.

5. CONCLUSION

As a plastic waste poses a serious threat worldwide even developed countries like USA, UK, Japan had emerged as the top plastic waste generators and contributing pollution to the environment, health, and wildlife. The role of Self-Help Groups (SHGs) in West Sikkim demonstrates how local communities can effectively manage this challenge. By recycling and repurposing plastic waste into useful items, conducting cleanliness drives, and promoting afforestation, SHGs not only reduce pollution but also generate income and awareness. Their initiatives highlight the importance of community participation in waste management. Strengthening such grassroots efforts with policy support and training can further enhance environmental sustainability and set an example for other regions. Moreover, it recommends engaging SHGs to promote sustainable waste management practices such as segregating wastes at source, regulating plastic bag usage,

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advocating behavioural change towards waste generation and protecting the environment. This study proved to the pragmatic solution to tackle plastic waste management at local, community based.

References

1. Fayshal, M. A. (2024). Current practices of plastic waste management, environmental impacts, and potential alternatives for reducing pollution and improving management. *Heliyon, 10*, e40838. https://doi.org/10.1016/j.heliyon.2024.e40838.
2. Pinto da Costa, J., Rocha-Santos, T., & Duarte, A. C. (2020). *The environmental impacts of plastics and microplastics use, waste and pollution: EU and national measures* (PE 658.279). European Parliament, Policy Department for Citizens' Rights and Constitutional Affairs. https://www.europarl.europa.eu/supporting-analyses.
3. United Nations Environment Programme (2024). Global Waste Management Outlook 2024: Beyond an age of waste – Turning rubbish into a resource. Nairobi. https://wedocs.unep.org/20.500.11822/44939.
4. National Commission for Women. (n.d.). *SHG-Maharashtra*. https://ncwapps.nic.in/pdfReports/SHG-Maharashtra.pdf.
5. Viji. (2022, August 7). *Sikkim works to end plastic pollution*. Vikaspedia. https://en.vikaspedia.in/viewcontent/energy/best-practices/sikkim-works-to-end-plastic-pollution?lgn=en.
6. Here's a structured summary of the main points from the Vikaspedia article on Sikkim's efforts to end plastic pollution:
7. StudyIQ. (2023, July 31). *Sikkim's efforts to end plastic pollution*. StudyIQ. https://www.studyiq.com/articles/sikkims-efforts-to-end-plastic-pollution/
8. Babaremu, K. O., Okoya, S. A., Hughes, E., Tijani, B., Teidi, D., Akpan, A., Igwe, J., Karera, S., Oyinlola, M., & Akinlabi, E. T. (2022). Sustainable plastic waste management in a circular economy. *Heliyon, 8*(9), e09984. https://doi.org/10.1016/j.heliyon.2022.e09984.
9. OECD (2022), Global Plastics Outlook: Policy Scenarios to 2060, OECD Publishing, Paris, https://doi.org/10.1787/aa1edf33-en.
10. United Nations. (2023, August 25). *Fast facts – What is plastic pollution?* United Nations Sustainable Development. https://www.un.org/sustainabledevelopment/blog/2023/08/explainer-what-is-plastic-pollution/
11. United Nations Development Programme. (n.d.). *Plastic pollution*. United Nations Development Programme. https://www.undp.org/chemicals-waste/plastic-pollution.
12. Ritchie, H., Samborska, V., & Roser, M. (2023, October 5). *Plastic pollution*. Our World in Data. https://ourworldindata.org/plastic-pollution.
13. Parker, L. (2025, May 28). *The world's plastic pollution crisis, explained*. National Geographic. https://www.nationalgeographic.com/environment/article/plastic-pollution.
14. Siddiqui, J., & Pandey, G. (2013). A review of plastic waste management strategies. *International Research Journal of Environment Sciences, 2*(12), 84–88.
15. Niyitanga, E., Qamar, S. A., Bilal, M., Barceló, D., & Iqbal, H. M. N. (2021). Plastic waste and its management strategies for environmental sustainability. *Case Studies in Chemical and Environmental Engineering, 4*, 100142. https://doi.org/10.1016/j.cscee.2021.100142.
16. The Alliance to End Plastic Waste. (2021, March 22). *The plastic waste problem explained*. Retrieved from https://www.endplasticwaste.org/insights/story/the-plastic-waste-problem-explained.
17. Rafey, A., Siddiqui, F.Z., 2021. A review of Plastic Waste Management in India – challenges and opportunities. Int. J. Environ. Anal. Chem. 103, 3971–3987. https:// doi.org/10.1080/03067319.2021.1917560.
18. Sierra, A. (2024, March 18). *Plastic pollution: Definition, impacts, and solutions*. Plastic Bank. https://plasticbank.com/blog/plastic-pollution-definition.
19. S.A. Qamar, M. Ashiq, M. Jahangeer, A. Riasat, M. Bilal, Chitosan-based hybrid materials as adsorbents for textile dyes–A review, Case Studies in Chemical and Environmental Engineering 2 (2020) 100021.

Cover Page

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Article Received: Reviewed : Accepted
Publisher: Sucharitha Publication, India
Online Copy of Article Publication Available : www.ijmer.in

20. Song, L., Zeng, L., Wang, H., Usman, M., & Hedvicakova, M. (2024). *The effect of waste plastic on environmental degradation: A corporate perspective*. Polish Journal of Environmental Studies, 34(1), 203–211. https://doi.org/10.15244/pjoes/185999.
21. Reddy, M. S., Reddy, P. S., Subbaiah, G. V., & Subbaiah, H. V. (2014). *Effect of plastic pollution on environment*. *Journal of Chemical and Pharmaceutical Sciences*, Special Issue, 28–29. Retrieved from Journal of Chemical and Pharmaceutical Sciences.
22. Pavani, P., & Rajeswari, T. R. (2014). *Impact of plastics on environmental pollution*. Journal of Chemical and Pharmaceutical Sciences, Special Issue 3, 87–93. https://jchps.com/specialissues/Special%20issue3/18%20jchps%20si3%20P.Pavani%2087-93.pdf.
23. OECD (2022), Global Plastics Outlook: Policy Scenarios to 2060, OECD Publishing, Paris, https://doi.org/10.1787/aa1edf33-en.
24. Nichlavose, P. R., & Jose, J. (2017). *Impact of SHG initiatives on socio-economic status of members*. Asian Journal of Research in Business Economics and Management, 7(6), 209–216. https://doi.org/10.5958/2249-7307.2017.00081.0
25. Chandrashekar, H. M., & Lokesh, M. U. (2009). Role of SHGs in socio-economic change of vulnerable poor. *International NGO Journal*, *4*(4), 127–131. https://academicjournals.org/article/article1380899659_Chandrashekar%20and%20Lokesh.pdf.
26. Bharti, S. S. (2016). *Role of SHGs in women empowerment*. *Uttarvarta*, *1*(6), 44–48. https://doi.org/10.5281/ZENODO.3980905.
27. Swachh Bharat Mission (Grameen). June 2021). *Toolkit: Plastic Waste Management*. Ministry of Jal Shakti, Department of Drinking Water and Sanitation. Retrieved from https://swachhbharatmission.ddws.gov.in/sites/default/files/Technical-Notes/PWMtoolkit.pdf.