



Plastic Pollution and Sustainable Waste Management in Khamhariya Village, Durg District, Chhattisgarh, India: Field Photographic Assessment

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Plastic pollution is an important environmental concern associated with the widespread use of plastic products and their improper disposal. This article is prepared from the supplied NSS project report, which discusses the sources and types of plastic waste, its environmental, health and economic implications, sustainable waste-management principles, relevant Indian initiatives, and the role of the National Service Scheme (NSS). The report also provides a profile of Khamhariya village in Patan block, Durg district, Chhattisgarh. According to the village information reproduced in the report, Khamhariya covers 777.39 ha, including 450.18 ha of cultivated land, and has a reported present population of 2,480 (1,285 males and 1,195 females). These figures provide local context for discussing community participation in environmental management. The report identifies household, commercial, industrial, agricultural and medical activities as sources of plastic waste and highlights problems associated with littering, open dumping, open burning and inadequate segregation. It recommends source segregation, reduction and reuse of single-use plastics, recycling, public awareness and participation by NSS volunteers. However, the supplied report does not present a quantified plastic-waste audit, a structured community survey on plastic practices, or measured awareness scores for Khamhariya. Consequently, the article is a descriptive, report-based synthesis rather than a quantitative field study of plastic pollution.

Keywords: plastic pollution; sustainable waste management; 5Rs; community participation; National Service Scheme; Khamhariya; Chhattisgarh

Introduction

Plastic is widely used because it is lightweight, durable, relatively inexpensive and adaptable to many applications. Its use in packaging, households, agriculture, healthcare, construction and transport has increased the amount of plastic material entering the waste stream. When plastic products are discarded carelessly, dumped in open spaces or burned, they can contribute to pollution of land, water and air. Larger plastic items may fragment into smaller particles, including microplastics, and plastic litter can harm wildlife and habitats. The supplied project report presents plastic pollution as a concern that requires prevention as well as appropriate collection, segregation, reuse and recycling. It refers to Indian policy initiatives including the Plastic Waste Management Rules, 2016, restrictions on identified single-use plastic items, the Swachh Bharat Mission and Mission LiFE. It also emphasizes the contribution of educational institutions and NSS volunteers in promoting environmental awareness and responsible waste practices (Central Pollution Control Board 2022). Khamhariya village, located in Patan block of Durg district, Chhattisgarh, is included in the report's village profile. The local profile can help situate the discussion of community-based waste management, but the report does not provide direct measurements of plastic waste

generated or discarded in the village. The present article therefore summarizes the report's documented content and local context without presenting unmeasured village conditions as observed results (Government of India 2016).

Objectives

To summarize the causes and major sources of plastic pollution described in the supplied project report.

To describe the environmental, health and economic concerns associated with improper plastic-waste management.

To present the sustainable waste-management approaches and government initiatives discussed in the report.

To discuss the potential role of NSS activities and community participation in improving plastic-waste practices.

To identify the evidence gaps that should be addressed before making quantitative claims about plastic pollution in Khamhariya.



Figure: Community service and waste management activities carried out by NSS participants

Materials and approach

Study Design and Photographic Documentation

This study adopted a descriptive approach to document visible plastic pollution in Khamhariya village, Chhattisgarh, India, through field observations and photographic documentation. Field visits were conducted by the author, Ranu, to observe plastic waste in the study area, and photographs were taken to document its visible occurrence and accumulation in the surrounding environment. These photographs were used as visual evidence to support the descriptive assessment of plastic pollution. Relevant published literature and secondary sources were consulted to discuss the sources, environmental impacts, and sustainable management of plastic waste. The study did not involve laboratory experiments, systematic waste sampling, quantitative measurements of plastic waste, or statistical analysis. Therefore, the study is presented as a qualitative, photograph-based descriptive assessment supported by published literature.

Local context: Khamhariya village

The supplied report identifies Khamhariya as a village in Patan block, Durg district, Chhattisgarh. Its village profile reports a total area of 777.39 ha, cultivated area of 450.18 ha and non-cultivated area of 56.60 ha. The population is reported as 2,480, comprising 1,285

males and 1,195 females. The report also lists two schools, three Anganwadi centres, one Panchayat Bhawan and 20 self-help groups. These details indicate the presence of local community and institutional settings that could be involved in environmental-awareness and waste-management activities. demographic and institutional figures are reproduced from the supplied report and are not independently verified here. They do not, by themselves, establish the amount or composition of plastic waste generated in Khamhariya. A village-specific assessment would require primary information such as household waste audits, waste collection records, observations of littering sites and/or a documented questionnaire.

Indicator reported in the project	Reported value
Village	Khamhariya
Block / district	Patan / Durg
Total village area	777.39 ha
Cultivated area	450.18 ha
Non-cultivated area	56.60 ha
Reported present population	2,480
Male population	1,285
Female population	1,195
Schools	2
Anganwadi centres	3
Panchayat Bhawan	1
Self-help groups	20

Sources and types of plastic pollution

The report identifies five broad sources of plastic waste. Household sources include carry bags, bottles, food containers, disposable plates and cups, and packaging. Commercial sources include waste from shops, restaurants, supermarkets and delivery services. Industrial sources include plastic scraps, packaging and manufacturing residues. Agricultural sources include mulch films, irrigation pipes, fertilizer bags and pesticide containers. Medical sources include syringes, gloves, intravenous bags and medicine packaging; such waste requires appropriate handling and disposal. The report distinguishes visible macroplastics, microplastics smaller than 5 mm, and single-use plastics designed for short-term use. It also lists common polymer categories and uses: PET for water and soft-drink bottles; HDPE for milk and detergent containers; PVC for pipes and cables; LDPE for bags and wrapping films; PP for food containers and bottle caps; PS for disposable cups and expanded polystyrene; and other plastics for mixed or multilayer packaging. These examples are descriptive categories from the report, not a measured inventory of waste found in Khamhariya.

Environmental, health and economic concerns

Environmental concerns

The project report describes soil, water and air pollution as key consequences of inappropriate plastic disposal. Plastic litter may remain in the environment for long periods, obstruct water movement, and fragment into smaller pieces. Waste entering rivers, lakes and drainage systems can affect aquatic habitats. Open burning is identified as a source of air pollution, while ingestion and entanglement can injure animals and birds. The report also notes that damage to habitats and food chains may threaten biodiversity United Nations Environment Programme. (2018).

Human-health concerns

The report raises concerns about exposure to smoke from burning plastic, potentially harmful chemicals in some plastic products, and the presence of microplastics in environmental media and the human body. It also notes that poorly managed waste may provide breeding or shelter sites for disease vectors. These points are presented here as concerns discussed in the source

report; the report itself contains no clinical data or local health measurements for Khamhariya.

Economic concerns

According to the report, plastic pollution can increase collection and disposal costs, reduce the attractiveness of public and tourism locations, affect fisheries and contribute to problems in agricultural land. No economic-loss estimates are provided for Khamhariya, so the local magnitude of these impacts cannot be quantified from the supplied material.

Sustainable waste-management approaches

The report presents sustainable waste management as a sequence of reducing waste generation, separating waste at source, collecting it appropriately, reusing products, recycling suitable materials and managing residual waste safely. It describes the 5Rs as Refuse, Reduce, Reuse, Recycle and Recover. Refusing unnecessary disposable items and reducing consumption prevent waste before it is generated; reuse extends product life; recycling returns suitable materials to production; and recovery may be considered for residual materials where appropriate facilities and safeguards exist United Nations Environment Programme. (2021). Source segregation is highlighted as a first step. The report separates biodegradable waste, non-biodegradable waste and hazardous waste into broad categories. In practice, local systems should follow the applicable municipal or rural local-body collection rules, and hazardous or biomedical waste should not be mixed with ordinary household plastic waste. The report also recommends reusable cloth bags, steel bottles and containers, stronger collection and recycling facilities, public education, and reduced reliance on single-use products.

Indian policy initiatives described in the report

The project report discusses the Plastic Waste Management Rules, 2016, including the principle of Extended Producer Responsibility; restrictions on selected single-use plastic items effective from 1 July 2022; the Swachh Bharat Mission; and Mission LiFE (Lifestyle for Environment). These are presented as policy and public-participation frameworks relevant to reducing plastic waste. Before journal submission, the legal and policy details should be checked against the latest official notifications and amendments, because this manuscript follows the supplied report and is not a legal update.

Role of NSS and community participation

The report identifies NSS as a platform for promoting environmental responsibility through cleanliness drives, plastic-free campus campaigns, rallies, street plays, posters, seminars, household-level segregation awareness, and the promotion of reusable alternatives. It also emphasizes collaboration among local government, educational institutions, industries, community organizations and citizens. In the Khamhariya context, the schools, Anganwadi centres, Panchayat Bhawan and self-help groups listed in the report are potential channels for awareness activities and community dialogue. This is a practical implication of the institutional profile, not evidence that these organizations conducted plastic-management activities or achieved measurable outcomes. The supplied report does not provide participation counts, pre- and post-awareness scores, or measured changes in plastic use.

Key evidence gaps and recommendations

The main limitation of the supplied material is that it discusses plastic pollution generally and provides village demographic information, but it does not quantify plastic waste in Khamhariya. It does not report a sampling frame, number of surveyed households, questionnaire, daily or weekly waste quantities, polymer-wise composition, recycling rates, disposal pathways or statistical analysis. Therefore, no numerical conclusion about local plastic generation, awareness, behaviour or the effectiveness of NSS activities can be drawn from the source document. Conduct a documented household survey and state the number of households, selection method, survey date and questionnaire items.

Measure or record plastic waste by source and category over a clearly defined period; report units and measurement procedures. Document disposal pathways, including collection, reuse, recycling, open dumping and burning, without assuming that any pathway occurs unless observed or reported. Assess awareness and practices using clearly defined questions and report denominators, percentages and any statistical methods used. Record NSS or community activities with dates, participation numbers and verifiable outcomes if the article is intended to evaluate interventions. Verify village-profile figures and current policy references from original official sources before journal submission.

Conclusion

The NSS project report highlights plastic pollution as a consequence of widespread plastic use and improper disposal, emphasizing waste reduction, reuse, segregation, recycling, public awareness, and community participation as important strategies for sustainable waste management. The profile of Khamhariya village provides local demographic and institutional context for promoting community-based environmental education through NSS activities. However, the report does not provide a quantitative assessment of plastic waste generation or plastic-related behaviour in the village. Therefore, the findings remain descriptive and highlight the potential role of community institutions and NSS initiatives in promoting environmental awareness and responsible waste management. Further village-specific research based on primary data collection and a clearly defined methodology is needed to quantify plastic waste generation, assess community practices, and evaluate the effectiveness of awareness programmes.

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