

Participatory Communication for Environmental Conservation: A Case Study of

'Dhauladhar Cleaners' in Himachal Pradesh

Abstract

Participatory communication serves as an effective tool to promote community engagement for environmental sustainability and the wellbeing of future generations. Dharamshala, Himachal Pradesh's first smart city and a favorite Himalayan destination for tourists, is facing significant challenges including solid waste accumulation, sewage issues, landslides, cloudbursts, global warming, altered monsoon pattern and climate change. This research investigates into the communication strategies employed by an environmental conservation volunteer group named Dhauladhar Cleaners, focusing on their efforts to engage the community in preserving and cleaning the environment through an inclusive approach in the Indru Nag area of Dharamshala city, situated in the Kangra district of Himachal Pradesh, India. The group conducts clean-up drives under the motto "If Mountains have POLLUTION we have a SOLUTION," which reflects their dedication to addressing environmental degradation. Using a mixed-methods research approach incorporating participant observation, secondary data analysis and survey research, this study shows that through participatory communication, Dhauladhar Cleaners have effectively raised awareness and induced behavioral change among community members. These changes contribute to enhancing waste management practices, reducing the effects of climate change, and ultimately promoting sustainable development. The present study provides valuable insights for the implementation of effective participatory communication strategies involving grassroots level organizations like Dhauladhar Cleaners, as essential components of realizing the vision of 'Swachh Himachal Swasth Himachal' (Clean Himachal, Healthy Himachal). Further, the research also emphasizes the need for construction of waste treatment facilities in the state to comprehensively address the issue of waste disposal.

Keywords

Dhauladhar Cleaners, environmental sustainability, participatory communication strategies, sustainable development, waste management.

Introduction

Sustainable development in mountainous regions necessitates a comprehensive understanding of the intricate interplay between human activities and the mountain environment (Klein et al., 2019; Knight, 2022; Payne et al., 2020). Mountain ecosystems are currently facing critical challenges due to the escalating impacts of climate change, landslides, altered rainfall patterns, glacier retreat, and declining water resources. Haphazard disposal and incineration of solid waste, especially plastics, and hazardous materials that emit greenhouse gases, exacerbates global warming and climate change, with serious consequences for both ecosystems and human well-being. "Climate change is making millions of people sick or more vulnerable to disease all over the world and the increasing destructiveness of extreme weather events disproportionately affects poor and marginalized communities" (Ghebreyesus, 2022).

Solid waste management (SWM) is a crucial global concern with direct effects on the environment (air, water, and soil) and public health (Debrah et al., 2021; Sharma et al., 2023). The United Nations Secretary-General, Antonio Guterres, has emphasized the urgency of addressing climate change, stating, "Climate change is advancing more rapidly than we are; we must heed the warnings of our planet's foremost scientists". Participatory communication plays a pivotal role in enhancing awareness, education, and institutional capacity to combat

climate change, a goal explicitly outlined in the United Nations Sustainable Development Goal 13, Climate Action.

The Intergovernmental Panel on Climate Change (IPCC) in its AR6 Synthesis Report: Climate Change 2023, forecasts that despite various policies and laws related to climate mitigation, it is “likely that warming will exceed 1.5° C during the 21st century”. This report emphasizes the imperative need to control temperature rise to prevent many parts of the planet from becoming uninhabitable in the coming decades (IPCC, 2023).

The Himalayan region is predominantly vulnerable to these impacts. Climate trends in the state of Himachal Pradesh have indicated a declining trend of rainfall and conversely an augment in maximum and minimum temperatures in the hilly state (Rana et al., 2012; Devi et al., 2024), which has been substantiated by farmers’ perceptions that clearly describes change in climatic parameters and increase in vulnerability in climate dependent agricultural systems (Rana et al., 2013). The degradation of mountain glaciers worldwide, largely attributable to global warming, profoundly affects mountain landscapes, ecosystems, and human communities (Knight, 2022). Depletion of water resources due to melting of glaciers caused by changes in climatic conditions in the mountains during the last three decades has been reported (Rana et al., 2014). With global temperatures projected to exceed a 1.5°C increase within the next two decades (IPCC, 2018), the region anticipates further climate-related consequences, including prolonged warm seasons, changes in precipitation patterns, and increased frequency of extreme weather events (Sharma et al., 2024).

Increasing the number of landfills and dumping waste indiscriminately in these landfills is not a sustainable solution for waste management as it creates various environmental and health risks. The World Bank has reported that on an annual basis, the world yields 2.01 billion tonnes of municipal solid waste, which deeply influences every person around the world. Due to speedy urbanization and population increase, global waste production will surge to 3.40 billion tonnes each year by 2050 (Kaza, et al., 2018). India alone produces a huge amount of waste, with municipal solid waste production estimated at approximately 150,000 tonnes daily (Banerjee, 2023). Tourism, once considered a harmless industry with limited environmental impact, now poses significant environmental challenges, particularly in the Himalayan region. The rise in tourism has generated substantial environmental issues in Himachal Pradesh. “Tourism has brought economic prosperity to the Himalayan region, but the environmental cost has been catastrophic” (Gopinath & Sharma, 2022).

Widespread deforestation in mountainous regions has led to flooding in lowlands while intensifying traffic pollution and unmanaged tourist waste have presented dominant challenges. The mountains are already experiencing severe impacts of climate change, and the pressure from tourism, which heavily relies on natural resources, exacerbates the situation (Steiger et al., 2022). In the year 2022, Himachal Pradesh experienced a significant surge in tourist arrivals, around 1.28 crore tourists, including 28,232 foreigners, visiting the state (Livemint, 2022). This influx has gradually degraded the ecosystem, with popular tourist destinations like Shimla, Kullu, Manali, and Dharamshala are now facing heightened climate change risks due to excessive tourist waste.

According to the Himachal Pradesh State Disaster Management Plan (HPSDMP) on climate change, the average surface temperature in the state has increased by about 1.6 degrees Celsius over the last century, compared to one degree in the plains. The region has seen fluctuations in rainfall and temperature patterns, resulting in events such as river flash floods,

droughts, avalanches, cloudbursts, landslides and wildfires. Around 246 people had died due to landslides, cloudbursts and floods in the state in the 2021 monsoon season (Kajal, 2021).

Global warming causes increased frequency and altered patterns of rainfall, which in turn affects the long-term stability of mountain slopes (Chaithong et al., 2017). Himalayan region has seen fluctuations in rainfall and temperature patterns, resulting in river flash floods, droughts, avalanches, cloudbursts, landslides, and wildfires. For instance, during July 2021, the Kangra district witnessed heavy downpours leading to flash floods, erosion, and landslides, causing severe devastation (Randhawa et al., 2021). Further, state has seen extensive rainfall, landslides, and flash floods which destroyed constructions, buildings, roads, bridges, and other infrastructure leaving 238 people dead in the month of August, 2023 (Nandi, 2023).

Dharamshala, a favorite tourist destination, is facing issues related to solid waste, sewerage problems, landslides, cloudbursts, pollution, and global warming. Himachal Pradesh has lost 4.82 kilo hectares of forest and tree cover from 2001 to 2021. Data indicate that over 80,000 trees have been cut to accommodate tourists and build infrastructure, including transportation routes, hotels, and power plants. Dharamshala generates approximately 25 tonnes of waste annually, with waste management being a significant challenge (Gunthey, 2023). Tourism contributes to the economic development of the local community but it has adverse effects on the Himalayan ecosystem and leads to environmental degradation (Barbhuiya, 2021; Gupta & Chomplay, 2021; Kamal & Khan, 2020).

Specific communication strategies can provide information, build knowledge and change people's behavior to adapt sustainable practices for waste disposal. For effective community participation, there is a need of participatory communication. "Over the past thirty years, public participation has taken center stage in the play of influences that determine how society will manage and protect the environment" (Beierle & Cayford, 2002, p. 1).

The participatory approach situates people in the center of development with binary fundamental approaches; first is interactive pedagogy and the second includes concepts of access, participation and self-management (Servaes & Malikhao, 2005). Walker (2007) has focused on pluralistic public participation by involving people through participatory communication approaches, strategies and tools. Participatory communication can promote social learning and social change, leading to the necessary actions to preserve the environment and build resilience against climate change. "Contrary to the elitist theory, participation of people in the decision making has the utmost value in participatory democracy" (Mishra, 2009, p. 809).

Volunteerism is a dominant instrument that unlocks different ways for larger participation of people in the environmental sustainability of their communities (United Nations, 2014). Volunteers work at the grassroots level within the community, and they play a vital role in community building to conserve the environment and combat climate change. "While climate activists play a vital role in raising awareness and pushing for policy change, a shift in focus towards hands-on volunteering is becoming increasingly crucial" (Mohd, 2023). The most appropriate example is the *Swachh Bharat* Mission (SBM), which is an initiative of the Government of India with a vision of a clean India. "The Solid Waste Management (SWM) component of the SBM envisages to become a '*janandolan*' (people's movement) with participation from a wide range of stakeholders" (Basu & Punjabi, 2020).

Social media creates environmental activism that promotes community-led waste management initiatives using participatory communication (Schmidt & Maier, 2021; Yadav

& Chaudhary, 2022; Kumar & Gupta, 2023). Mobilizing community resources and expanding capacity through volunteers' participation can play a significant role in solid waste management by creating awareness, generating new knowledge and taking action. Volunteering is a significant expression of our culture that places people at the center of the development activities and supports inclusive and sustainable development (UN Volunteers, 2011).

Non-governmental organizations play a crucial role in environmental conservation by emphasizing the participatory involvement of local communities. A study by Sandhu and Arora (2012) demonstrates that certain environmental NGOs significantly engage local communities in addressing pressing environmental issues of climate change. Local volunteers operate at the grassroots level within their communities, as they possess a deeper understanding of local dynamics. They are instrumental in community building efforts aimed at conserving the environment and combating climate change. Additionally, a study by Akkucuk and Sekercioglu (2016) highlights the activities of volunteers and NGOs in successful environmental preservation. This research focuses on how the KuzeyDoga Society, a Turkish conservation non-governmental organization, conserves the environment through the community participation. These community based initiatives can benefit our society by changing people's behavior towards climate conservation. However, they require collaboration with government, media, corporate entities, and local communities to develop a long-term sustainability plan. A study by Aldashev and Vallino (2019) emphasizes that NGOs committed to environmental conservation must broaden their mission to adopt a more holistic approach.

Spreading awareness among people about waste management, a voluntary group of youth calling themselves Dhauladhar Cleaners collects garbage on the hills in Dharamshala on every Sunday morning in the Indru Nag region. They run a clean-up drive with a motto "If Mountains have POLLUTION we have a SOLUTION". They are creating awareness, educating local people, shopkeepers and tourists for waste management and disposal. Dhauladhar Cleaners currently has 115 members working with a vision to make a greener and cleaner tomorrow (Dhaultadhar Cleaners, n.d.).

The study envisioned to develop sustainable mountainous comprehensive strategies to address the complex interplay between human activities and the environment. Effective waste management, participatory communication, and grassroots volunteerism are critical components in mitigating the adverse impacts of climate change and promoting environmental sustainability.

Materials and methods

This study used a mixed methods research involving participant observation, secondary data analysis and survey research. First part of the research involved qualitative participant observation method to study the communication strategies of Dhaultadhar Cleaners in Indru Nag area of Dharamshala city in Kangra district of Himachal Pradesh. The voluntary group Dhaultadhar Cleaners, established in 2019, has been raising awareness and educating local people, shopkeepers, and tourists about waste management and disposal. Researchers' active participation in a community clean-up drive organized by Dhaultadhar Cleaners provided insights into how communication unfolds in real-time scenarios.

This innovative initiative illustrates the role of grassroots volunteerism in community development efforts aimed at environmental conservation and climate change mitigation. To find out various communication strategies, the secondary sources including the organization's

web sites, publications, social media presence were examined. To draw the inferences, various previous research studies and reports showing the conditions of solid waste and environmental conditions in Himachal Pradesh have also been taken. By combining participant observation with a comprehensive review of existing literature and secondary sources, this research approach allowed in-depth understanding of Dhauladhar Cleaners' communication strategies and their impact on community engagement and environmental protection initiatives. The triangulation of data from different sources enhanced the validity and reliability of the research findings.

Also, a random sample of 40 respondents was taken to study about the participatory behavior of volunteers of Dhauladhar Cleaners for environmental conservation and waste management. Primary data was collected by using survey method. Through a questionnaire having both open-ended and close-ended questions, in-depth information about the participatory behavior of volunteers of Dhauladhar Cleaner was collected.

Results and discussion

This research study observed how Dhauladhar Cleaners communicates its goals, involves people and takes action in cleaning and preserving the environment through an open community approach. It explored various communication strategies of Dhauladhar Cleaners to engage volunteers and promote their initiatives for waste management and environmental protection. Further, this study delineates the participatory behavior of volunteers of Dhauladhar Cleaners for environmental conservation and waste management.

1. Participatory observation in community clean-up drive with the Dhualadhar Cleaners

This participatory observation was focused on the Dhauladhar Cleaners, an environmental protection voluntary group that involved volunteers in cleaning and conserving the environment in the Indru Nag area of Dharamshala city in Kangra district of Himachal Pradesh. In this investigation, locals participated in a clean-up drive with the Dhauladhar Cleaners. The Dhauladhar Cleaners consisted of local people, tourists, and collaborators from hotels, the panchayat, NGOs, and other social organizations. They organize regular clean-up drives in tourist spots. Every Sunday, Dhauladhar Cleaners organizes cleaning programs in various tourist spots in Dharamshala, with the primary focus on the Indru Nag area. The researchers came across an Instagram post inviting volunteers for a clean-up drive in the Indru Nag area by the Dhauladhar Cleaners. After the clean-up, there was a picnic program in the Indru Nag area of Dharamshala. The scheduled time for the cleaning operation was 11 am, so researchers reached the spot on time. Two core team members and ten volunteers, who were local residents and a few tourists, were already there. Hence, a total of sixteen members including four researchers were present for the cleaning operation.

Everyone introduced themselves for a while. Meanwhile, Arvind Sharma, one of the core team members, brought sacks and gloves for everyone. Then, all the volunteers proceeded towards the cleaning area, where a huge amount of garbage was scattered. There were many empty liquor bottles, tin cans, plastic bottles of juice and other beverages, plastic bags, and other solid waste. The core team members, along with some experienced volunteers, instructed us on waste segregation and formed separate teams to collect different types of waste, such as glass, hard plastic, soft plastic, and other solid waste. The researchers worked with three members to collect glass waste. All team members started collecting garbage while talking to each other and learning about garbage separation. They also discussed the impact of solid waste on the environment. During the entire drive, a volunteer captured pictures of

the volunteers collecting garbage for social media. After an hour, the entire team collected the assigned waste and returned to the spot. All team members placed the garbage bags in the designated area. A volunteer asked how this waste would be disposed of. Arvind Sharma, founder of the project, replied that currently there is no garbage disposal plant in Dharamshala city, so the sanitation workers of Dhauladhar Cleaners keep the garbage in a designated area, from where the Municipal Corporation Dharamshala picks it up. Sometimes, Dhauladhar Cleaners also send this segregated waste to NGOs like Waste Warrior and the Sidhbari-based NGO Nishtha. He also mentioned that Dhauladhar Cleaners group mainly focuses on environmental awareness and garbage collection in the area.

All members gathered at the designated place and put their gloves and other garbage collection equipment in a sack for washing. After this, they all went to Earthbound Cafe for a picnic as scheduled. They ate food, took selfies, pictures, chatted, hung out, and enjoyed each other's company and the ambiance of the cafe. Most importantly, they discussed the day's clean-up, and each volunteer shared their experiences and what they learned from it. They talked about how they would implement cleanliness and waste segregation methods in their lives and homes, and raise awareness among people in their respective areas. The researchers also discussed with other volunteers and core team members about the problems of solid waste management in both tourist destinations and residential areas in Dharamshala city and its detrimental effects on the environment.

2. Various communication strategies of Dhauladhar Cleaners to engage volunteers and promote their initiatives for waste management and environmental protection

Participatory observation in community clean-up drive with the volunteers of Dhualadhar Cleaners and secondary data analysis reveals that effective communication strategies can mobilize communities towards environmental sustainability. These communication strategies not only address immediate local environmental concerns but also contribute to building a culture of responsibility, awareness, and proactive engagement in creating a more sustainable future. This research study found that the Dhauladhar Cleaners group employs various communication strategies to engage volunteers and promote their initiatives for waste management and environmental protection as follows:

2.1 Participatory clean-up drives for community building and story sharing

Dhauladhar Cleaners employed various channels like social media, community events, workshops, posters, pamphlets, and other communication tools to inform people about upcoming clean-up drives. Volunteers also utilized their personal networks to encourage friends, family, and other individuals to participate through word of mouth, emphasizing their voluntary work to protect the environment. During the clean-up drives, volunteers used participatory communication techniques to interact with others, facilitating learning about waste segregation and environmental protection. The group encouraged participants to share their stories, ideas, and thoughts, fostering a sense of community. After each clean-up drive, they posted updates on social media, using reels and creative posts to engage the community and motivate more people to join.

2.2 Awareness and community engagement through various media

Dhauladhar Cleaners used various media to inform and raise awareness about their clean-up and environmental conservation efforts, building a sense of community among volunteers. They organized events like Nukkad Natak with a global warming theme, creatively engaging the community and highlighting important environmental issues such as rising temperatures,

poor waste management, and deforestation, particularly focusing on the impact of climate change in the Himalayan region.

2.3 Plantation drives for climate communications and behaviour change

Dhauladhar Cleaners used posters and social media posts to invite people to participate in plantation drives. They collaborated with panchayats and mahila mandals to provide free saplings to participants. Using a participatory approach, they engaged volunteers in properly planting the saplings, encouraged each other, and communicated the importance of such drives. Volunteers were invited to share their input or questions, and they were encouraged to discuss the importance of plants, forests, and the environment with their friends, family, and broader community.

2.4 Collaboration for clean-up drives and waste management

Dhauladhar Cleaners used various communication techniques to engage with local authorities, businesses, panchayats, mahila mandals, hotels, NGOs, and other community organizations to address waste management and raise environmental awareness. They initiated dialogues through community meetings, using clear and significant language to explain the importance of waste segregation. Social media platforms were used to share informative posts and reels, aiming to raise awareness about clean-up drives and waste management. Collaborating with hotels, they provided training to hotel staff on effective waste management and used posters, flyers, and notice boards in hotels and wards to ensure widespread awareness.

2.5 Collaboration for garbage disposal and recycling

The government has provided a dumping site for Dhauladhar Cleaners in the Indru Nag region, but they opted not to use it. Instead, they sent their segregated waste to the Dharamshala Municipal Corporation, NGO Waste Warriors, and other NGOs such as the Sidhbari-based NGO Nishtha, which works on recycling and waste disposal.

3. Participatory behaviour of volunteers of Dhauladhar Cleaners for environmental conservation and waste management.

Dhauladhar Cleaners group uses different communication approaches to promote awareness, education and behavior change among people for participation in sustainable environmental practices. A random sample of 40 respondents was taken to study the participatory behavior of volunteers of Dhauladhar Cleaners. Primary data was collected by using survey method through a questionnaire as a research tool having both open-ended and close-ended questions. In-depth information about the participatory behavior of volunteers of Dhauladhar was collected and following factors are taken into consideration to objectively measure the aspects of participatory behavior of volunteers of Dhauladhar Cleaners towards environmental protection and waste management practices. These are:

- 3.1** Sources of information for volunteering with Dhauladhar Cleaners group and its initiatives for environmental conservation and waste management
- 3.2** Motivations of volunteers behind joining of Dhauladhar Cleaners group
- 3.3** Volunteer's level of participation in environmental conservation activities with the group
- 3.4** Methods utilized by volunteers of the Dhauladhar Cleaners to raise awareness about environmental issues
- 3.5** Participation of the volunteers in specific environmental conservation activities with the Dhauladhar Cleaner group

- 3.6 Extent of increase of knowledge of solid waste management practices after volunteering with Dhauladhar Cleaners
- 3.7 Effectiveness of the Dhauladhar Cleaner group in addressing environmental conservation issues in the region.
- 3.8 Level of collaboration and teamwork among the volunteers in the Dhauladhar Cleaner group

3.1 Sources of information for volunteering with Dhauladhar Cleaners group and its initiatives for environmental conservation and waste management

Data presented in Table 1 shows the sources of information for volunteering with Dhauladhar Cleaners along with their respective frequencies, percentages and ranks. Social media has emerged as the most prominent source of information for volunteering with Dhauladhar Cleaners group with 30 respondents, which is 75% of the total respondents, taking the first position. Word of mouth follows closely behind, taking second place as source of information, stated by 18 respondents, representing 45% of total respondents. Community events are the third most prevalent source of information about volunteering, mentioned by 16 respondents, making up 40% of the total respondents, and holding the third rank. Media coverage ranks last as a source of information, with 10 mentions from respondents, accounting for 25% of the total responses.

Table 1: Sources of information for volunteering with Dhauladhar Cleaners group and its initiatives for environmental conservation and waste management

S. No.	Source of information	Frequency	Percentage	Rank
1.	Social media	30	75	1
2.	Word of mouth	18	45	2
3.	Community events	16	40	3
4.	Media coverage	10	25	4

Certainly, the diverse mix of communication channels with a strong emphasis on social media platforms is a successful modern approach of the Dhauladhar Cleaners group in engaging with potential volunteers and promoting their environmental conservation and waste management initiatives. Social media platforms provides a dynamic and interactive way to connect with individuals specially youth fostering a sense of community among them. Complemented by word of mouth, community events, and media coverage, this multifaceted communication approach maximizes outreach, attracts diverse volunteers, and effectively communicates the group’s dedication to environmental preservation and waste management.

3.2 Motivations of volunteers behind joining of Dhauladhar Cleaners group

Data in Table 2 indicated that a large majority of individuals were motivated to join Dhauladhar Cleaners because of their concern for environmental issues (90%). This high percentage indicates that the main driving force behind their participation in the volunteering initiative is a deep awareness and concern for environmental issues and a genuine desire to protect, respect and preserve the environment from further degradation.

Table 2: Motivations of volunteers behind joining of Dhauladhar Cleaners group

S. No.	Motivation of volunteers	Response	Percentage
1.	Concern for environmental issues	36	90

2.	Desire to make a positive change	28	70
3.	Love for nature	28	70
4.	Community involvement	24	60
5.	Personal interest in waste management	20	50

Also, a substantial percentage of respondents expressed their motivation to join the initiative stemmed from their desire to make a positive change (70%). This underscores the intrinsic motivation of individuals to actively engage in activities that contribute to the betterment of their surroundings and community. A similar percentage of respondents indicated that their love for nature (70%) motivate them to join Dhauladhar Cleaners group. This sentiment reflects a personal affinity towards the natural environment and a commitment to preserving its beauty and integrity. Community involvement (60%) emerged as another driving force motivated by their desire to be actively engaged in their community's well-being. Moreover, personal interest in waste management (50%) as a motivating factor to join as volunteer in Dhauladhar Cleaners group view their participation in the initiative as an opportunity to apply and enhance their knowledge in this domain. Consequently, it is found that motivations of volunteers behind joining of Dhauladhar Cleaners group are primarily grounded in their concern for the environmental issues (90%), followed by their desire to make a positive change (70%), love for nature (70%), community involvement (60%) and personal interest in waste management (50%).

3.3 Volunteer's level of participation in environmental conservation activities with the group.

Data presented in Table 3 on the Volunteer's level of participation with the Dhauladhar Cleaners group shows that 75% of volunteers are highly engaged, 40% always participate and 35% participate frequently in environmental conservation activities. This mix of consistent and occasional participation highlights a robust and dedicated volunteer base, capable of sustaining and driving the group's initiatives effectively.

Table 3: Volunteer's level of participation in environmental conservation activities with the group.

S. No.	Level of participation	Response	Percentage
1.	Always	16	40
2.	Frequent	14	35
3.	Sometimes	10	25

This high level of consistent involvement suggested a strong commitment among the majority of the volunteers to the group's environmental conservation activities. On the other hand, 25% of the volunteers participate occasionally, indicating that while these individuals may have other commitments, they still contribute when possible.

3.4 Methods utilized by volunteers of Dhauladhar Cleaners to raise awareness about environmental issues

The organization has adopted a multifaceted approach to disseminate their message effectively. Data in Table 4 shows various methods employed by the volunteers of Dhauladhar Cleaners to raise awareness about environmental issues.

Table 4: Methods utilized by volunteers of Dhauladhar Cleaners to raise awareness about environmental issues

S. No.	Methods utilized by volunteers	Response	Percentage
1.	Social media campaigns	40	100
2.	Collaborations with NGOs, businesses, panchayats, environmental agencies, mahila mandals, hotels, other community organizations	37	92.5
3.	Awareness and community engagement through various media	31	77.5
4.	Public awareness events	26	65
5.	Information dissemination through pamphlets, brochures, posters, flyers, informational materials and notice boards	17	42.5
6.	School and college engagements	14	35
7.	Engaging with tourists	12	30

The methods utilized by volunteers of the Dhauladhar Cleaners group to raise awareness about environmental issues demonstrate a diverse and comprehensive approach. Social media campaigns are the most universally adopted method, with 100% of the volunteers participating, reflecting the effectiveness and broad reach of digital platforms.

Collaborations with NGOs, businesses, panchayats, environmental agencies, mahila mandals, hotels and other community organizations, are also highly popular, with 92.5% of the volunteers engaging in such partnerships, indicating a strong network-based approach. Awareness and community engagement through various media are utilized by 77.5% of the volunteers, showcasing the importance of multimedia outreach. Public awareness events, used by 65% of the volunteers, further highlights the group's emphasis on direct community interaction.

Information dissemination through pamphlets, brochures, posters, flyers, informational materials and notice boards is adopted by 42.5% of the volunteers, while school and college engagements, and interactions with tourists are less common, involving 35% and 30% of the volunteers, respectively. This data illustrates the group's multifaceted strategy, combining modern digital tools with traditional methods and direct engagement to effectively raise environmental awareness.

3.5 Participation of volunteers in specific environmental conservation activities with Dhauladhar Cleaner group.

Table 5 reflects the participation of volunteers of Dhauladhar Cleaners group in specific environmental conservation activities. The volunteers of Dhauladhar Cleaners group have predominantly engaged in waste collection and segregation (100%) activities with full participation. This signifies the group's primary focus on managing and reducing waste in the region.

Table 5: Participation of volunteers in specific environmental conservation activities with Dhauladhar Cleaners group.

S. No.	Specific environmental conservation activity	Response	Percentage
1.	Waste collection and segregation	40	100
2.	Tree plantation and afforestation	27	67.5
3.	Awareness campaigns and workshops	24	60
4.	Recycling initiatives	12	30

Also, 67.5% of volunteers participated in tree plantation and afforestation activities, highlighting their strong commitment to increasing green cover and promoting reforestation. Awareness campaigns and workshops were conducted by 60% volunteers, showing the group's dedication to educate the community and fostering environmental consciousness. Recycling initiatives saw participation from 30% of the volunteers, indicating that this is a growing area of focus. This data reflected the group's strategic vision, which emphasized educating people about waste management, while also working towards increasing green spaces and promoting recycling practices.

3.6 Extent of increase of knowledge about the solid waste management practices after volunteering with Dhauladhar Cleaners

The data presented in Table 6 shows the extent of increase of knowledge of volunteers about the solid waste management practices after volunteering with Dhauladhar Cleaners.

Table 6: Extent of increase of knowledge of volunteers about the solid waste management practices after volunteering with Dhauladhar Cleaners

S. No.	Extent of increase of knowledge about the solid waste management practices	Response	Percentage
1.	Significantly increased	36	90
2.	Moderately increased	4	10
3.	Slightly increased	0	0
4.	No change	0	0
5.	Decreased	0	0

The respondents were asked to assess the extent to which their knowledge had increased as a result of their participation. It is evident from the Table 6 that after volunteering with Dhauladhar Cleaners, majority of respondents have significantly increased (90%) their knowledge of solid waste management practices, followed by moderately increased (10%), suggesting a substantial positive impact from their volunteer involvement. This underscores the effectiveness of the volunteer program in contributing to improved awareness and expertise in sustainable waste management practices. No respondents reported slightly increased, no change, or a decreased, indicating that the volunteers' engagement with Dhauladhar Cleaners had exclusively positive effects on their familiarity with solid waste management practices.

3.7 Effectiveness of the Dhauladhar Cleaner group in addressing environmental conservation issues in the region.

From Table 7 the data portrayed that most of the respondents found the Dhauladhar Cleaners group had been extremely effective (80%) in its efforts to address environmental conservation issues in the Indru Nag region of Dharamshala city in Kangra district of Himachal Pradesh. Furthermore, only 20% of the participants perceived the group's effectiveness as moderately effective. No participants rated the Dhauladhar Cleaners group as somewhat effective or ineffective.

Table 7: Effectiveness of the Dhauladhar Cleaner group in addressing environmental conservation issues in the region.

S. No.	Options	Response	Percentage
1.	Extremely effective	32	80
2.	Moderately effective	8	20
3.	Somewhat effective	0	0
4.	Ineffective	0	0

3.8 Level of collaboration and teamwork among the volunteers in the Dhauladhar Cleaner group

The data presented in Table 8 indicated a notably excellent level of collaboration and teamwork among the volunteers in the Dhauladhar Cleaner group. This is evident from the fact that a significant majority of respondents (87.5%) rated the collaboration and teamwork among the volunteers as excellent. A smaller percentage (7.5%) considered it to be good. Merely 2.5% of respondents found the collaboration to be at a satisfactory level, and only 2.5% perceived that there was room for improvement. Notably, none of the respondents rated the collaboration as poor.

Table 8: Level of collaboration and teamwork among the volunteers in the Dhauladhar Cleaner group

S. No.	Options	Response	Percentage
1.	Excellent	35	87.5
2.	Good	3	7.5
3.	Satisfactory	1	2.5
4.	Needs Improvement	1	2.5
5.	Poor	0	0

In summary, the data suggested that the volunteers in the Dhauladhar Cleaner group had established a robust and effective level of collaboration and teamwork, as evidenced by the overwhelmingly positive responses in the excellent category.

Conclusion

This research study found that effective communication strategies mobilized communities towards environmental sustainability, creating a culture of responsibility, awareness, behavior change and proactive engagement. Dhauladhar Cleaners group has been successful in communicating, involving people and taking action for solid waste management in community clean-up drive in the Indru Nag area of Dharamshala city in Kangra district of Himachal Pradesh. Social media has emerged as a key digital media platform, along with other conventional media and direct engagement, being used by Dhauladhar Cleaners to

address environmental protection issues and foster a strong, collaborative volunteer network. The Dhauladhar Cleaners employed various communication strategies like regular clean-up drives, social media campaigns, awareness and community engagement through various media, community events, workshops, and collaborations with local organizations to raise awareness and community participation for waste collection, segregation, recycling and waste disposal. However, to change the situation of waste disposal and realize the dream of 'Swachh Himachal Swasth Himachal', construction of waste treatment plants is necessary in the state along with the implementation of comprehensive strategies to manage, treat, and dispose of waste in an environmentally sustainable and socially responsible manner.

Disclaimer (Artificial intelligence)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

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