

Statement

I hereby certify that I have written this paper independently and have not used any other sources and aids than those indicated.

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List of abbreviations

rs.	Rupees
UCC	Urban Collection Center
UN	United Nations

1. Introduction

A recent boom in tourism has been accompanied by unprecedented growth, becoming one of the world's largest and fastest-growing economic sectors, but at a significant environmental cost, especially in terms of plastic waste. With plastic waste escalating, concerns have been raised about the long-term sustainability of tourism. The purpose of this report is to discuss the issue of plastic waste in tourism, focusing specifically on the Himalayan region, and propose sustainable practice solutions.

While the Himalayas have spectacular landscapes and rich cultural heritage, plastic waste is quickly accumulating there. It is concerning to see increasing levels of plastic pollution in the region, posing significant challenges to the environment as well as local communities. Even though the Himalayas are remote and relatively untouched by human activity, tourism-related plastic waste is now posing a threat to their ecology. (The Science of the total environment vol. 874 ,2023).

It is evident from statistics how serious the problem is. The Himalayan region generates substantial amounts of plastic waste every year due to millions of tourists visiting the region every year. A significant portion of this waste consists of single-use plastic items such as water bottles, food packaging, and disposable bags. It is estimated that more than 80% of the plastic waste generated by tourists ends up in landfills or, even worse, in natural habitats such as rivers, lakes, and forests. (International journal of environmental research vol. 17, 2023)

The impact of this plastic waste on the environment cannot be overstated. Plastic debris not only litters the picturesque landscapes of the Himalayas but also poses a severe threat to wildlife. Animals often mistake plastic for food or become entangled in it, leading to injury or death. Moreover, plastic waste leaches harmful chemicals into the soil and water, contaminating ecosystems and endangering fragile ecosystems and biodiversity. (UN Environment Programme)

In the Himalayas, plastic waste is a problem that affects the local communities as well. For their livelihoods, these communities depend on the region's natural resources, including agriculture, forestry, and ecotourism. It is directly linked to their well-being and economic stability that water sources are contaminated, and the environment is degraded. In addition, plastic waste tarnishes the reputation of these once-pristine destinations, deterring potential tourists and damaging the region's economy.

In order to solve the plastic waste challenge in tourism, a comprehensive and collaborative approach is necessary. Diverse stakeholders, such as tourists, local communities, businesses, and

government agencies, must work together to achieve it. To mitigate the problem, we must reduce the consumption of single-use plastics, implement effective waste management systems, promote responsible tourism practices, and raise awareness among tourists.

Plastic waste can be turned into an opportunity for change, promoting sustainable tourism practices and ensuring the long-term sustainability of the Himalayan region. The purpose of this report is to examine the facts and figures surrounding plastic waste in the Himalayas, analyse the environmental and socioeconomic effects, and make recommendations on how to cope with this pressing problem. The natural beauty of the Himalayas can be preserved for future generations if we transform Plastic Waste tourism into **Plastic-Wise tourism**.

2. Methodology

In the following chapter, the method used to develop a solution for the challenge and problem given within the framework of the EuroTeQ Collider as outlined above is presented chronologically to the process. Since the challenge under consideration is tackling a problem that includes several dimensions, disciplines and subject areas, the problem must be considered as a whole and not only as a composite solution of the individual partial areas to find a solution that solves it sustainably and in the long term in Ladakh. The aim of the chosen method, that is the holistic approach, is to consider all relevant aspects, connections, and interactions to develop a comprehensive understanding of the situation, avoid possible negative side effects and to generate the greatest possible added value for Ladakh and its inhabitants.

As a first step, a brainstorming session was conducted during the design thinking workshop of the module with all ten group members of the challenges. The aim was to collect the first creative and innovative proposal ideas and to assign them to the topic groups in a second step (see Figure 1: Brainstorming).

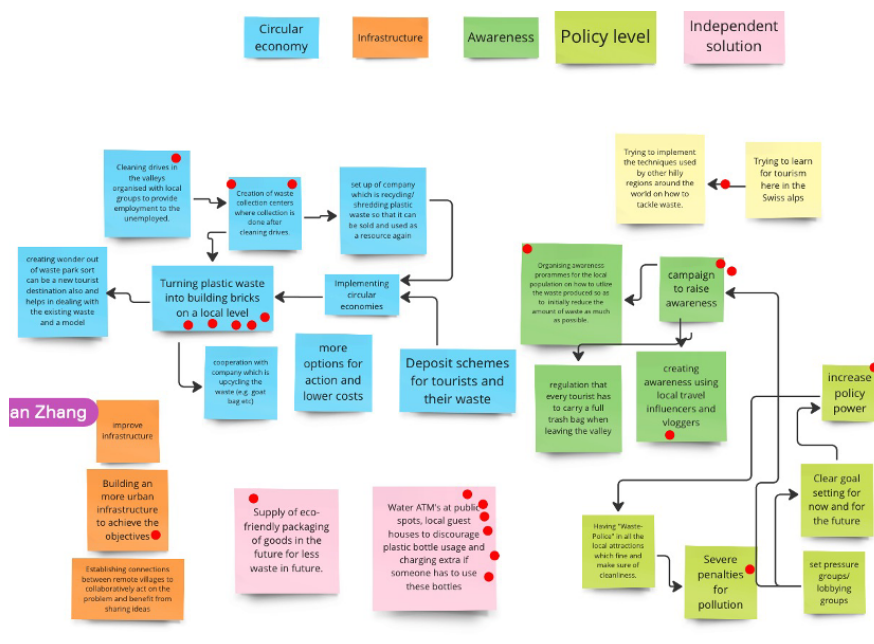


Figure 1: Brainstorming

In the second step, we ranked the importance of the individual proposals with the help of red dots and then discussed which ideas were the most promising ones for solving our challenge. We focused on the creation of bricks out of plastic waste and realized that in addition to this technical solution, a policy solution must be developed that focuses on e collection and reduction of plastic waste as well as on a sustainable awareness change. This resulted in one five-member group with a focus on the technical solution and one five-member group with a focus on the policy and

awareness change solution. This division took place in consultation with the challenge donor. The authors of this report are part of the second group. The aim of this was to approach the challenge from the two directions considered to be the most important and promising ones to achieve a feasible solution. Furthermore, it allowed us to set focus on the working process. Nevertheless, the two groups were to be coordinated in the subsequent solution-finding and ongoing working process to put the important holistic approach into practice.

The following descriptions of the development of the solution took place within the framework of the policy sub-group. Now that the basic idea of the solution, reducing plastic waste with policy and awareness measures, was established, the first literature research was undertaken in two subgroups after consultation with the challenge giver: a three-member policy group and a two-member awareness group. This research aimed to identify necessary measures, gain a basic understanding of the necessary measures, and analyze successful measures in the past, especially from cases in Ladakh or India. By researching best practices and successful solutions in India and around the world we aimed to find solutions that are proven to be impactful and adaptable to the context of Ladakh.

During the working weekend, the individual components of the research were combined, an analysis of the existing approaches and solutions was carried out and the initial feedback from the module's supervisors was considered and incorporated. Due to the limited resources of the group, the focus was set on policies while the achievement of awareness change was placed on future steps outside the framework of this project.

Taking the weekly feedback into account, the final solution was developed, adapted, and optimized. The individual strengths, experiences and skills of the group members and their degree programs such as Politics and Technology, Civil Engineering and Environmental Engineering were considered, and an attempt was made to find solution components with which each group member agreed and was satisfied.

The above process is comparable to a United Nations approach named the Theory of Change (United Nations Development Group, n.d.). It is a method of explaining how interventions should lead to a particular development or change, based on causal analysis using available evidence. It helps identify solutions to effectively address the root causes of problems and make decisions about which approach to take, considering effectiveness, feasibility, and uncertainties that are part of any change process. The approach also assists in identifying the underlying assumptions and risks that are essential to understand and review during the process to ensure that the approach contributes to the desired change (see Figure 2: UNDAF Theory of Change - Steps).

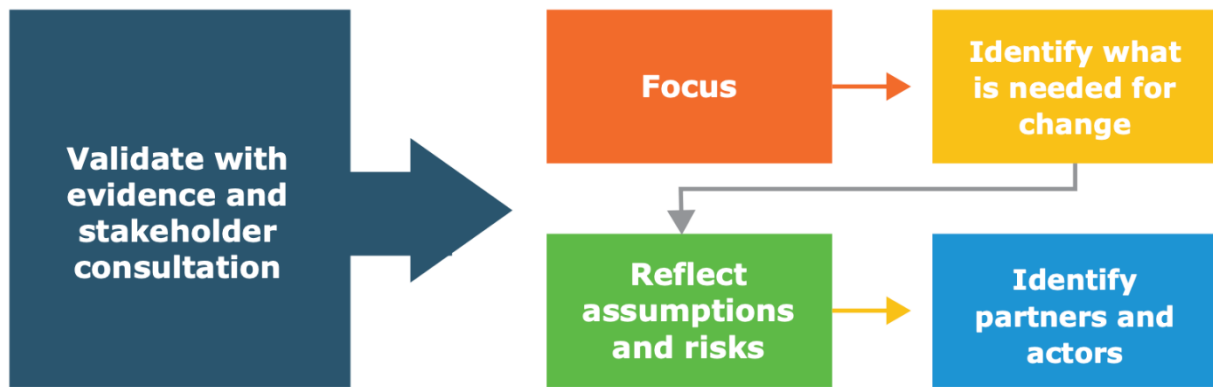


Figure 2: UNDAF Theory of Change - Steps

The guiding principles of the approach are to develop an understanding of all relevant stakeholders, the solution should be justified, tested, and revised based on solid evidence at all stages, and it should support continuous learning and improvement from initial idea to finalization (United Nations Development Group, n.d.).

3. Concept

As described above, the group decided to focus on a policy solution after receiving feedback on the working weekend. We developed three highly interconnected concepts that in sum provide an impactful and feasible solution to the given challenge. The key thoughts behind these three concepts are the following:

- Foster community engagement and participation
- Place financial responsibility on the main producers of waste
- Empower the regional government to develop a scope for action
- Consider all affected stakeholders

With these guidelines, we follow the UN's "Global Strategy for Sustainable Consumption and Production" which follows the UN Theory of Change and identifies stakeholder engagement and collaboration, empowerment of governments and communities, as well as multistakeholder and public-private partnerships as the most promising focus area in order to reach sustainable change and achieve circular economy models (United Nations, 2022). Furthermore, we aligned our solutions with the aims of the "Solid Waste Management Policy, Strategy & Action Plan" which the administration of the union territory of Ladakh passed recently in November 2022 (Administration of Union Territory of Ladakh, 2022).

Based on these principles we developed the following three concepts: A government buyback scheme for plastic waste, a deposit scheme for plastic bottles, and the Waste Wise Fund that finances our projects.

3.1. A Government Buyback Scheme for Plastic Waste

Our first solution is a government buyback scheme for plastic waste. The basic idea is that rag pickers and households are paid a reward for collecting and submitting plastic waste to collection centres. A similar scheme is already implemented in the Indian state of Himachal Pradesh (Government of Himachal Pradesh, 2019). This state calculated the amount of the reward payable by assuming the costs and time for rag pickers to collect one kilogram of plastic waste which is assumed to be 2-3 hours or 75 rs. respectively (ibid., p. 4). Taking the minimum wage for unskilled labour in Ladakh, which is 450 rs. per day (Administration of Union Territory of Ladakh, 2022), into account, we came up with a payable reward of 150 rs. for every kilogram of plastic

waste submitted. Ragpickers and households are supposed to deliver the plastic waste to Urban Collection Centers (UCCs) where they receive the reward. The UCCs are planned to be set up at different places across the cities of Leh and Kargil. The decentralized set-up of the UCCs makes them easily accessible for ragpickers and households. Furthermore, the setting up of small-scale UCCs requires neither much space nor sophisticated architecture which makes it possible to set them up quickly. From the UCCs, the plastic waste will be transported to the processing sites of our sister group “The Himalayan Legos”. This scheme significantly reduces the number of waste collection drives compared to door-to-door collection of plastic waste which increases the short-term feasibility of the project.

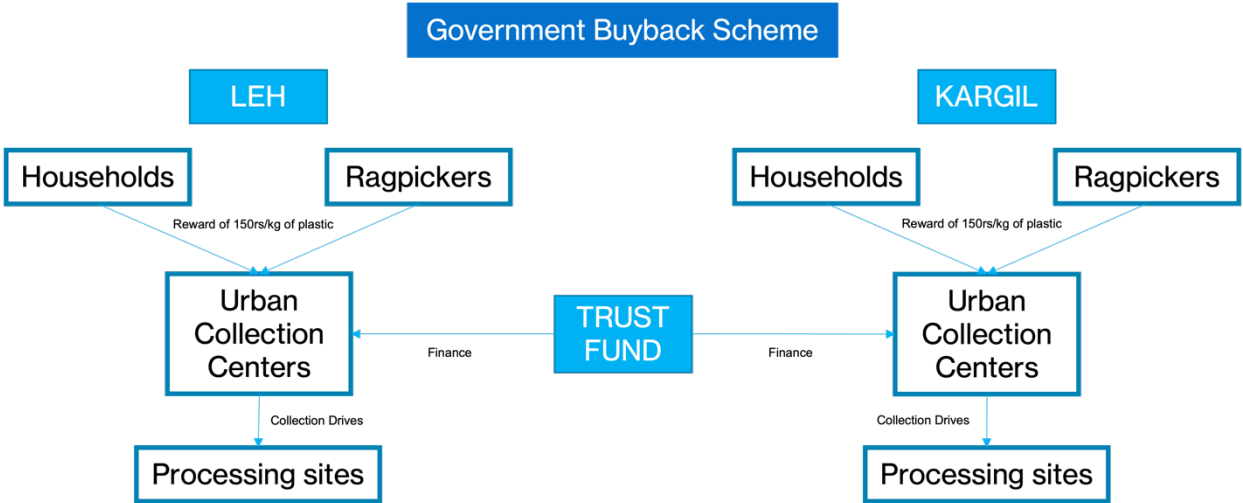


Figure 3: A Government Buyback Scheme for Plastic Waste

In Ladakh, an estimated 1.915 tons of plastic waste is generated every year (Administration of Union Territory of Ladakh, 2022, p. 45). If all this newly generated plastic waste would be returned to the UCCs, this would cost 287.325.000 rs. per year in rewards. This will be financed by the Waste Wise Fund.

3.2. A Deposit Scheme for Plastic Bottles

The second scheme is the deposit scheme for plastic bottles. According to our mentor, plastic bottles are the largest problem in Ladakh. Approximately 30.000 bottles are used every day in the city of Leh alone (Gupta, 2022). We took the German deposit scheme as an example to introduce a similar deposit scheme in Ladakh. The basic idea is that all sellers of plastic bottles charge an additional fee of 10 rs. per plastic bottle sold. In order to achieve a steering effect and to reduce the purchase of plastic bottles, only half of the deposit, namely 5 rs. per bottle, is to be paid back if the bottles are returned to the sellers. The other half of the deposit goes into the Waste Wise Fund. To encourage sellers to recollect the plastic bottles, they are included in the

government buyback scheme for plastic waste where they will receive 150 rs. per kilogram of plastic bottles submitted to the UCCs. This poses an additional income stream.

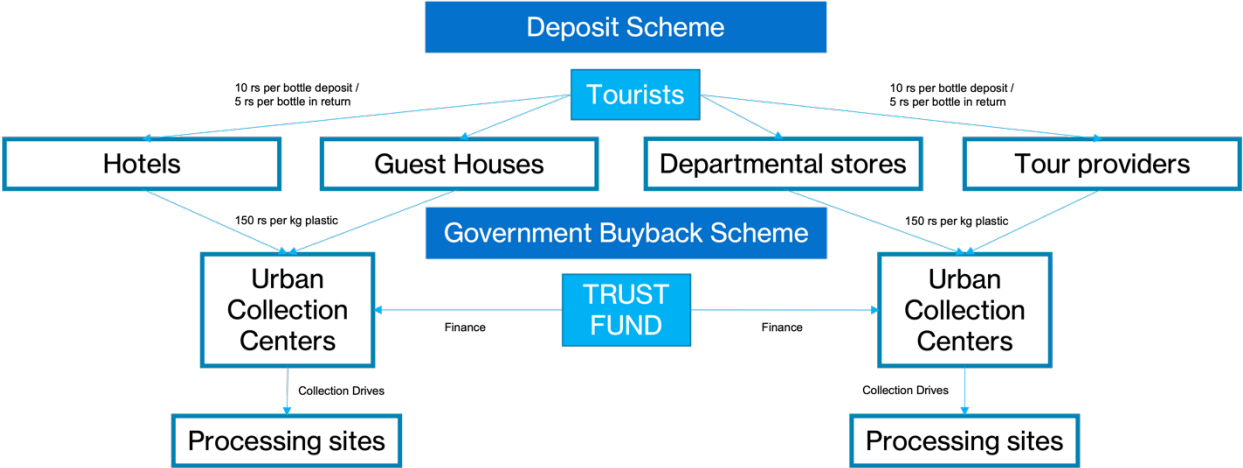


Figure 4: A Deposit Scheme for Plastic Bottles

Adding the estimated number of plastic bottles used in the other major city of Ladakh, Kargil, to the 30,000 bottles of Leh, we calculated an estimated revenue of 82,125,000 rs. per year for the Waste Wise fund.

3.3. The Waste Wise Fund

Our third solution, the Waste Wise Fund, is the key concept where all strings run together. The Waste Wise Fund finances the government buyback scheme for plastic waste and sustainable investments in awareness change, education, infrastructure, and projects in the region. The main income source of the Waste Wise Fund is a special waste tax for tourists of 1,000 rs. which must be paid upon arrival in Ladakh. This concept is the most feasible one because there are just a few entry points into the union territory due to its geographically special location in the Himalayas of India. The entry points are the airport in Leh as well as a few highways where existing road toll stations can be used to collect the tax. In 2021, there were 304,000 tourist arrivals in Ladakh (India Brand Equity Foundation (IBEF), 2022) which would translate to revenue of 304,000,000 rs. for the Waste Wise Fund. Adding the expected revenue from the deposit scheme, we expect a revenue of 386,125,000 rs. per year for the Waste Wise Fund. However, we still expect that initial investments from the government are necessary in the early stages of the implementation to ensure the functioning of all schemes right from the start.

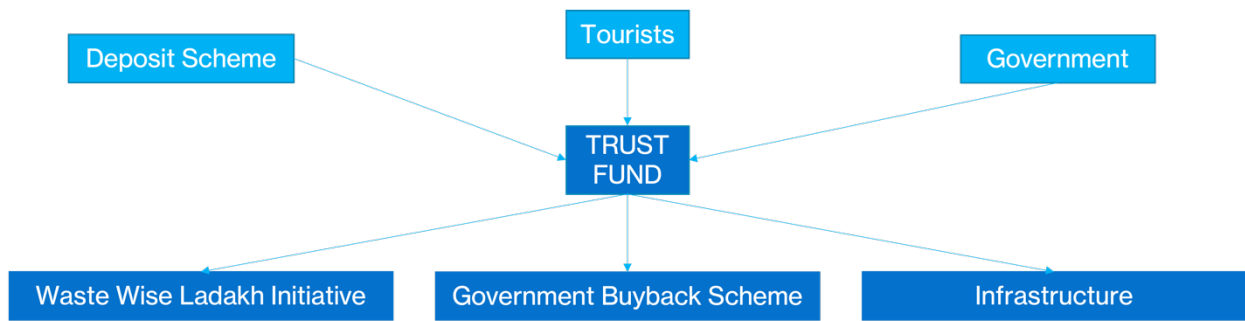


Figure 5: The Waste Wise Fund

The main expenditure of the Waste Wise Fund is the government buyback scheme for plastic waste with an estimated cost of 287.325.000 rs. per year if all newly generated plastic waste would be returned to UCCs. Compared with the revenue, this leaves nearly 100.000.000 rs. per year for other purposes which is very important for three reasons. First, there is a large amount of existing plastic waste in Ladakh which is expected to be returned in addition to the newly generated waste. Second, there is a need to build a solid waste management infrastructure in the region. Third, and this is very important for our goal to achieve sustainable behavioural change in the region, the Waste Wise Fund is able to finance sustainable projects in the region within the Waste Wise Ladakh Initiative. This initiative is planned to support local NGOs, businesses, educational centres, and households with funding for workshops or projects related to waste management or waste reduction purposes. Once running, the Waste Wise Fund will have enough resources to finance all of the above-mentioned aspects.

4. Outlook and Conclusion

The final chapter focuses on the future steps that need to be taken to ensure the feasibility of the proposed concept once it comes into implementation. Raising social awareness and educating the local residents and tourists about sustainable behavior towards plastic waste generated due to tourism in the region would also play a crucial role in making our concept a success in real life. The future steps for our policy solution are outlined below.

4.1. Analyzing Feasibility and Incorporating Stakeholder Suggestions

The three schemes- Waste Wise Fund, Deposit Scheme, and Government Buyback Program, were formulated in such a way as to ensure minimal infrastructure interventions and operational challenges, and adequate monetary incentives for the locals to recycle plastic bottles. The calculation of the reward of 450 rs/kg of recycled plastic waste based on local minimum wages in Ladakh (as explained in section 3.1) is one such example of the points considered so as to ensure initial feasibility. The close collaboration with our sister group “The Himalayan Legos” helps us to ensure proper collection, transportation, and storage of recycled plastic waste and finally convert it into something valuable by processing it into insulated housing bricks, thus completing the value chain.

However, for the long-term success of our solution, it is necessary to assimilate the suggestions of all the involved stakeholders as well. For this, we propose passing an online questionnaire among the local resident groups/ societies, government bodies, and the local NGOs with the help of our challenge collaborator. The questionnaire would comprise basic questions regarding the awareness of the problem, the willingness of the stakeholders to recycle plastic waste in the region, and any further ideas and suggestions they would like to give regarding the proposed steps of our policy solution. This would help us to get an insight into the mindset of the governing bodies and the locals. The results of the stakeholder analysis shall be incorporated into our solution before we start with the final implementation.

4.2. Digitalization of WasteWise

To increase Waste Wise's influence and efficiency, digitalization of the three schemes would be necessary in the near future which will help in eradicating human labor dependency and error, and mismanagement of the Waste Wise fund. Taking inspiration from the German Pfand deposit scheme (refer to figure 6 below), QR code-equipped packaging of plastic bottles and automated recycling machines at the proposed Urban Collection Centres (UCCs) will help us to eliminate the human labor involved in every step of our solution. In addition to this, we can have accurate

data regarding the number of plastic bottles being recycled and the total amount of reward and refund amount that is being distributed to the depositors, thus enabling proper management of funds and increased efficiency. Also, for the plastic waste that ends up in the bins and is not deposited to the UCCs, the installation of digital bins in the major tourist spots in the region can help us in the proper collection and transportation of such waste to the UCCs.



Figure 6: Pfand system in Germany with automated recycling machines (Expactica, 2023)

4.3. Education and Raising Societal Awareness

Our solution would be feasible only when we are able to impact the psychology of the tourists and the local residents and make them aware of the need for plastic waste recycling. Thus, a well-planned education and awareness system is crucial. We propose building an online education platform in the form of a website and collaborating with the local NGOs in the region such as RecycleX and Zero Waste Ladakh to impart quality education to locals regarding the plastic waste generated due to tourism, current steps being taken by the local government and how they can contribute in minimizing and recycling of plastic waste. The locals need to be made aware of the importance of source segregation of waste generated in households and imparted with the necessary skills of upcycling major plastic waste through planned workshops and billboards

along waste bins in major tourist spots. Additionally, the legislators and policymakers in Ladakh need to highlight the critical need for tougher rules and guidelines on the consumption, manufacture, and disposal of plastic waste. In an effort to promote a sense of social responsibility for waste reduction, these programs will target regional communities, educational institutions, and religious organizations.



Figure 7: Sample billboards highlighting waste segregation and recycling (Innocentdrinks, 2003)

4.4. Conclusion

In conclusion, WasteWise works hand in hand with our sister Group “The Himalayan Legos” to provide a holistic solution to the problem of plastic waste generated in Ladakh due to the mass influx of tourists. The Government Buyback Scheme, Deposit Scheme, and Waste Wise Fund will be implemented in Ladakh to promote ethical waste management procedures while funding infrastructure for recycling and upcycling plastic waste. Our solutions contribute to a cleaner environment for future generations and promote sustainable tourism in the region, thus fulfilling our motto of “Turning plastic waste tourism to plastic wise tourism” in Ladakh.

5. Roles

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