

Exploring the
Avenues for Plastic
WASTE
MANAGEMENT



ACKNOWLEDGMENTS

With the increase in consumption of Fast-Moving Consumer Goods (FMCG) and the use of plastic products in daily life, plastic waste management has been a crucial issue in Nepal. In this context, the study entitled 'EXPLORING THE AVENUES FOR PLASTIC WASTE MANAGEMENT' has attempted to explore how urban municipalities and plastic production companies have been working to manage plastic waste.

This study commissioned by the United Nations Development Programme (UNDP), was conducted by Smart Solutions and Bikash Udhyami which includes the group of experts Mr. Tulasi Nepal, Mr. Santosh Gartaula, Mr. Bipin Sinjali and Ms. Sajani Lama. The research was conducted in close supervision and technical guidance from Ms. Purnima Shakya Bajracharya, Head of Exploration and Mr. Bisam Gyawali, Head of Experimentation of UNDP Accelerator Lab Nepal.

Apart from the study design team from UNDP Accelerator Lab Nepal, Smart Solutions and Bikash Udyami, this study would not have been possible without the joint effort from the enumerators, representatives from the local governments and private companies.

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ABBREVIATIONS

ADB	Asian Development Bank
BORDA	Bremen Overseas Research and Development Association
CSR	Corporate Social Responsibility
EPA Act	Environment Protection Act 2019
EU	European Union
FMCG	Fast Moving Consumer Goods
JICA	Japan International Cooperation Agency
LGO Act	Local Government Operation Act 2015
NGOs	Non-government Organizations
SNV	SNV Netherlands Development Organization
SWM Act	Solid Waste Management Act 2011
UNICEF	United Nations Children's Fund
WASH	Water, Sanitation and Hygiene
WB	World Bank

EXECUTIVE SUMMARY

Context of the study

With the rapid urbanization and the growing consumption of fast-moving consumer goods, along with the increasing import of plastic products, the cities of Nepal have been facing growing problems of plastic waste management. Several studies have estimated that the share of plastic waste falls somewhere between 11 to 16 percent of the total solid waste in Nepal.

The ubiquitous practice of dumping plastic waste has caused environmental pollution and thus threatened the existence of living species and the livelihood of people. If it is further coupled with unplanned urbanization, cities have to face increasing threats of flooding, waterlogging, and water contamination. It also threatens to human health due to spread of diseases, land/ soil pollution, and air pollution. Keeping these issues in mind, the federal Government of Nepal has enacted the Solid Waste Management Act (SWM) 2011 and Solid Waste Management Rules 2013 to maintain a clean and healthy environment by reducing the adverse effects of solid waste. Similarly, Local Government Operation Act 2015 (LGO Act) also gives a mandate to local governments to manage solid waste efficiently and effectively. As mandated by these laws, the local governments should be accountable for the services they deliver.

Apart from the policies of governments, the role of the private sectors who use/ produce plastic is paramount to manage plastic waste. Though there is no direct path to how they can contribute, the provision of corporate social responsibility (CSR) in the Industrial Enterprise Act 2016 (IEA, 2016) provides a window for them to contribute to plastic waste management. The IEA makes it mandatory for the industries to allocate at least one percent of the annual profit to be utilized for CSR. In this context, the study tried to explore and map the priorities of the private sectors and urban local governments on managing plastic waste.

Methodology

This study has been carried out at two levels: 1. Local Government, particularly focusing on urban municipalities; and 2. Private Sector, particularly the companies generating plastics products. It focuses on the priorities and practices of plastic waste management at these two diverse levels. In line with the objectives of the study, respondents have been selected based on purposive and convenience sampling technique. Data has been collected from 285 out of targeted 293 urban municipalities. Online surveys and Key Informant Interviews with the relevant officers of the municipalities were executed to collect the information required for the study.

Though the target of the study was to reach 100% urban municipalities, 97.3% has been covered. The remaining other municipalities had either no current plans on plastic waste management or the issue related to plastic waste was at the incipient stage.

Summary of Finding

Overall Waste Management

The study found that priorities of urban municipalities greatly varied on municipal waste management. The survey showed that 150 urban municipalities (52%) have plans/policies to tackle the overall waste problem. Similarly, 121 municipalities (42%) reported that they have manual/ directives in line with their plan/policy to manage. Their policy was found to be primarily focused on the collection and segregation (44.7%) of municipal waste, followed by 17% on collaboration with different agencies. Similarly, almost 64% of municipalities reported that they have people ranging from 1 to 10 to work in waste management mechanisms. It has been found that out of 280 municipalities; more than 69% of them manage their waste themselves. Only 17% of municipalities reported that their waste is managed by the private sector. The survey result indicates that there is a growing trend of allocating budget to waste management, but the amount allocated appears to be minimal for most of the municipalities. More than 75% of municipalities have a practice of allocating budget for waste management.

Plastic Waste Management

Though most of the municipalities are interested in plastic waste management, the practice was found to be dismal. The study revealed that 217 municipalities (76%) do not have separate policies/programs for managing plastic waste. Additionally, out of 285 municipalities, only 12 (4%) of them have allocated budget for the same. This situation could potentially make plastic waste management quite a bit difficult.

The study found that the practice of following 3R (Reduce, Reuse, and Recycle) in managing plastics is in an infant stage in the municipalities. It has been found that public awareness is on the top of priorities of almost 35% of municipalities, followed by recycling (25%), reduce (23%) of plastics. Three out of four municipalities reported that they still do not segregate the plastic waste before they reach disposal areas. The study revealed that about 39% of municipalities have put their effort to discourage people from using plastic materials. When it comes to encouraging people to reuse plastic, only about 14% of municipalities have policy/ practice in this direction. More than half of the municipalities who practiced segregation reported that they have placed

separate bins for plastic waste collection and practiced segregation at the time of waste collection. About 22% and 17% of municipalities segregate plastic waste after collection and at landfill sites respectively. The survey showed that only 109 out of 285 municipalities have conducted some kind of activities to discourage people from using plastics. It appeared that providing awareness (93.6%) comes at the top of municipalities' strategy followed by providing an alternative of plastic for daily uses (26.6%). Similarly, around 27% of urban municipalities have provided alternative materials against the daily plastic uses. The survey revealed that only 40 municipalities have partnered with other sectors to recycle plastic waste.

Only a few municipalities have found to be practicing controlled dumping of waste or disposal of waste in landfill sites. The study showed the practice of open dumping (50%) in its various forms is prevalent in urban municipalities. Only a few municipalities practiced controlled dumping of waste or disposal of waste in landfill sites. About 38% of municipalities stated that they don't have a suitable disposal site nearby. Similarly, the lack of public awareness on plastic use (24%) and inadequate budget (22.8 %) are among the major problems reported by municipalities.

Collaboration for Waste Management

The study tried to explore the collaboration of urban municipalities with other stakeholders while managing waste and found a tenuous collaboration with them. Only about 4% of municipalities reported that they are working or potentially can work with these agencies to manage plastic waste. The survey also showed that only about 3% of municipalities have worked or have plans of working with the companies/industries that use/produce plastic waste to manage plastic waste.

Priorities of Plastic User/Producer Companies and Use of CSR Fund

It has been found that plastic production companies are found to be reluctant to participate in plastic waste management. About 53% of companies reported that they buy the plastic product, either for raw materials or as final products, from domestic third parties, and almost 38% of companies purchase from foreign third parties. The survey result revealed that 70% of private companies appeared to be unwilling to use alternatives of plastic in their needed operation. Though the study did not explore why they are unwilling, the growing demand for plastic, high cost and difficulty in transforming one mode of production to another, and no provision of compensation for shutting down factories could be few reasons, among others, for this. The reluctance to use alternatives by a large proportion of the surveyed companies may pose a big challenge to policymakers while managing plastic waste.

Similarly, the survey reported that most of the plastic producers/ user companies did not place the CSR mechanism in their operation. Out of 53 companies, only 15 (28%) have CSR mechanisms in operation. Among the 15 contributors to CSR, almost half of the companies contribute about NPR 100,000 annually. The study showed that only 8% of the plastic user/ producer companies have allocated their CSR fund explicitly for the management of plastic waste.

I. INTRODUCTION

1. Background of the study

With the rapid urbanization and the growing consumption of fast-moving consumer goods, along with the increasing import of plastic products, the cities of Nepal have been facing growing problems of plastic waste management. Several studies have estimated that the share of plastic waste falls somewhere between 11 to 16 percent of the total solid waste in Nepal. An assessment carried out by the World Bank (WB) estimated that Nepal produces about 4,900 tons of solid waste every day, of which 13 percent is plastic waste¹. Similarly, the Asian Development Bank (ADB) in 2013 estimated that plastic waste comprises 13 percent of total municipal waste². And, a prominent English newspaper of Nepal, Nepali Times, reported in 2018 that 204 tons of plastic wastes are generated in Nepal every day, of which 131 tons end up in garbage piles and dumping sites³. It has also been estimated that Kathmandu valley—the biggest urban area of Nepal—uses around 4,700,000 to 4,800,000 plastic bags every day⁴.

A study by the WB in 2020 reported that out of the 293 urban local governments; only six have constructed landfill sites and the remaining dump their waste in open areas. Given the number of urban local governments and the exponential increase in waste, the number of landfill sites looks staggeringly low. Similarly, a study by the Asian Development Bank (ADB) in 2013 found out that the landfill sites did not follow the scientific procedure of waste disposal.

The ubiquitous practice of dumping plastic waste causes environmental pollution and thus threatening the existence of living species and the livelihood of people. If it is further coupled with unplanned urbanization, cities have to face increasing threats of flooding, waterlogging, and water contamination. It also threatens to human health due to spread of diseases, land/ soil pollution, and air pollution. Keeping these issues in mind, the federal Government of Nepal has enacted the Solid Waste Management Act (SWM) 2011 and Solid Waste Management Rules 2013 to maintain a clean and healthy environment by reducing the adverse effects of solid waste.

¹ World Bank. (2020). Assessment of SWM Services and Systems in Nepal. Washington DC, USA: World Bank Group

² Asian Development Bank. (2013). Solid waste management in Nepal: Current status and policy recommendations. Mandaluyong City, Philippines: Asian Development Bank.

³ <https://www.nepalitimes.com/from-the-nepali-press/a-plastic-republic/>

⁴ <https://www.icimod.org/article/a-plastic-world/>

Under the Plastic Bag Regulation and Control Directive 2011, the production of plastic bags below 20 microns has been prevented. The directive also identifies the responsibilities of the plastic producers, importers, sellers, and users, and tries to make them accountable for the plastic they produce/use. The directive has provisioned a monitoring system under the ministry of environment⁵. Similarly, in 2019 the federal government has introduced the National Environment Policy and Environment Protection Act 2019 (EPA) to mitigate adverse environmental impacts on the environment and biodiversity.

As stated in the Constitution of Nepal (2015), the management of solid waste is the concurrent issue of the federal and provincial governments. Similarly, the constitution accords equal powers to the provincial governments to have province specific legal and regulatory framework for sanitation, including solid waste management, though provincial governments are not actively involved in the SWM. Similarly, the SWM Act and Local Government Operation Act 2015 (LGO Act) give a mandate to local governments to manage solid waste efficiently and effectively. As mandated by these laws, the local governments should be accountable for the services they deliver. The WB study reported that the institutional capacity of the local level governments for effective solid waste management appeared to be weak⁶. It resulted in the absence of long-term planning or budgeting practices, poor project development and execution, and absence of service monitoring and efficient contract management.

Meanwhile, few urban municipalities have tried to discourage the use of plastic. Municipalities of Nepal like Byas, Hetauda, Ilam, Damak, Palpa, and Pokhara, despite several efforts to ban plastic bags and initiate ideas on reusing plastics, the results on achieving plastic waste management still has a long way to go.

Apart from the policies of governments, the role of the private sectors/ companies who use/produce plastic is paramount to manage plastic waste. Though there is no direct path to how they can contribute, the provision of corporate social responsibility (CSR) in the Industrial Enterprise Act 2016 (IEA, 2016) provides a window for them to contribute to plastic waste management. The IEA makes it mandatory for the industries to allocate at least one percent of the annual profit to be utilized for CSR. Though prior approval from the government authorities is not required, the fund for CSR is to be allocated in the prescribed sector based on their annual

⁵ Ministry Forest and Environment. (2011). Plastic Bag Regulation and Control Directive 2011. Kathmandu: Ministry of Forest and Environment, Government of Nepal

⁶ World Bank. (2020). Assessment of SWM Services and Systems in Nepal. Washington DC, USA: World Bank Group

plans and programs. In this context, the study tried to explore the answers to the following four major research questions.

- How much plastic waste, depending on the chemical composition, is generated by private companies?
- What are the waste generators doing as a part of their Corporate Social Responsibility on managing plastic waste?
- What are the priorities of the local governments on managing municipal plastic waste?
- What options of plastic regeneration/ reuse are planned or taken up by the local governments?

2. Objective of the Study

The overall objective of this study is to explore and map the priorities of the private sectors and urban local governments on managing plastic waste.

3. Sampling Technique

This study has been carried out at two levels: 1. Local Government, particularly focusing on urban municipalities; and 2. Private Sector, particularly the companies generating plastics products. It focuses on the priorities and practices of plastic waste management at these two diverse levels. In line with the objectives of the study, respondents have been selected based on purposive and convenience sampling technique. Purposive sampling technique has been used to select urban local governments, whereas both purposive and convenience sampling techniques have been used to select private sectors' companies. While selecting the private companies, emphasis was given to the large production companies that have higher share on plastic packaging

4. Nature of Data

Data has been collected from 285 out of targeted 293 urban municipalities. Online surveys and Key Informant Interviews with the relevant officers of the municipalities were executed to collect the information required for the study. Most of the data collected from the survey are categorical and numerical in nature. The categorical data reflects the preference of how the municipalities and private companies responded to the questions being asked in the survey. Similarly, how the municipalities quantify their practice of managing plastic waste has also been enumerated.

Table 1: The number of surveyed urban municipalities

SN	Province	Total number of urban municipalities	Surveyed urban municipalities	Coverage %
1	Province 1	49	49	100
2	Province 2	77	77	100
3	Bagmati Province	45	43	95.6
4	Gandaki Province	27	22	81.5
5	Lumbini Province	36	36	100.0
6	Karnali Province	25	24	96.0
7	Sudoorpashchim Province	34	34	100.0
	Total	293	285	97.3

A total of nine enumerators, belonging to all seven provinces, were trained on the online survey method and KoboToolBox. They approached the officers and recorded the information.

Though the target of the study was to reach 100% urban municipalities, 97.3% has been covered.

Declining to be part of the study reflected one or more of the following major reasons:

- There is no vision on plastic waste management
- Plastic waste is not a big issue and concern at the moment
- Issues of waste management are in the incipient stage

List of urban municipalities that declined the survey:

<p>Bagmati Province: Suryabinayak Municipality and Kirtipur Municipality</p> <p>Gandaki Province: Madhya Nepal Municipality, Devchuli Municipality, Kushma Municipality, Bhimad Municipality and Palungtar Municipality</p> <p>Karnali Province: Chhedagad Municipality</p>
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The same approach has been used to collect data from the private sectors. Altogether 53 private companies were surveyed based on purposive and convenience sampling. The details of the surveyed companies have been presented in ‘Role of Plastic Producer/Users in Plastic Waste Management’ section. The survey started on 8th November 2020 and ended on 14th December 2020.

5. Questionnaire

Two sets of questionnaires were designed to capture the priorities and practices of urban municipalities and private companies on plastic waste management. The former is more inclined

towards policy, strategies, priorities and practices while the latter focuses on two aspects: plastic production and their contribution towards its management.

6. Method of Analysis

Descriptive statistics such as frequency distribution, mean, median and standard deviation have been used to analyze the data. Since the study is primarily a situational analysis, we keep from establishing causality between/among the variables we use during the study. The results are presented in the form of pie-charts, diagrams, and tables. (Note: In the subsequent analysis, 'n' is used to refer the number of observations.)

7. Limitations of the study

- Since there is no availability of a complete list of all plastic production companies, the result obtained from the selected companies may only reflect the general idea of how seriously they have taken the issue of plastic waste management and the issue of managing CSR fund for waste management.
- In the case of the survey with private companies, only 53 companies have been studied. Therefore, including a greater number of companies may vary the results of this study.
- During the survey, the authenticity of the information, provided by both types of respondents, has not been examined. Therefore, the responses may be bias or inaccurate.
- The study is more about situational analysis; therefore, the study may not be useful to the study of causality between/among variables.

8. Ethical Considerations

- Prior permission of respondents has been taken to conduct the survey with them.
- All the information provided by the respondents has been protected under Nepal's existing laws.
- The personal identity of the respondents has not been used or disclosed during the analysis.

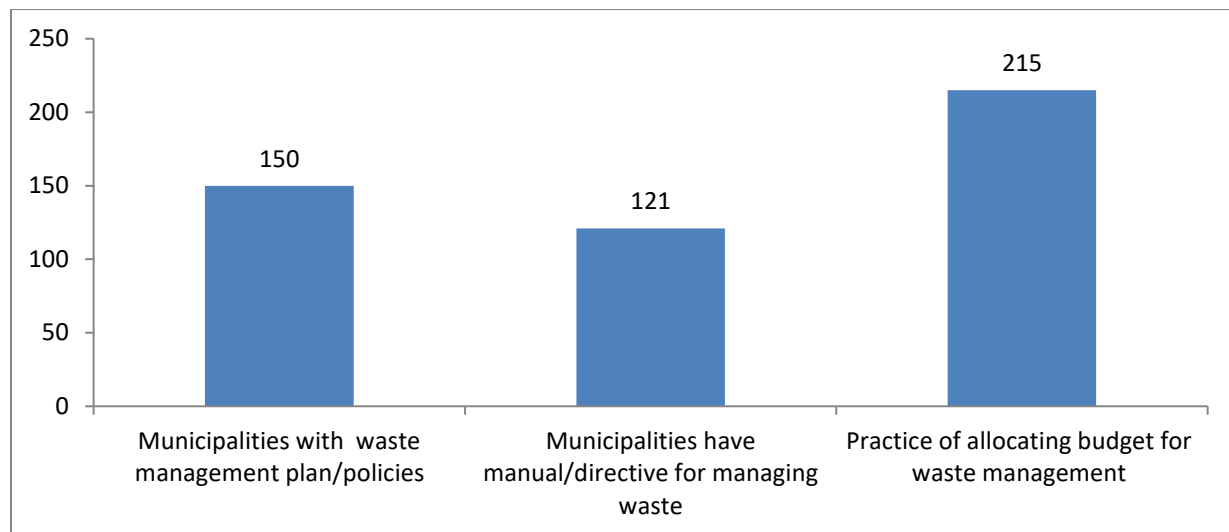
II. OVERALL WASTE MANAGEMENT SYSTEM

This chapter deals with the current practice, policies, plans, and priorities of waste management in urban municipalities. It reflects whether the municipalities have devised policy/ plan or have arranged mechanisms to administer waste management activities.

1. Municipality's Plan and Policy for Waste Management

Waste management plans and policies of the rural municipality play a pivotal role in managing waste. It comes at the top of all other efforts on managing waste. With waste management policies and planning, municipalities can introduce effective and suitable waste management programs, focusing on waste minimization, reuse, recycle, energy recovery, and disposal. Moreover, the policy also provides avenues to work and engage with private sectors, community organizations, donors, and other stakeholders.

Figure 1: Existence of Policy / plan (municipalities in number)

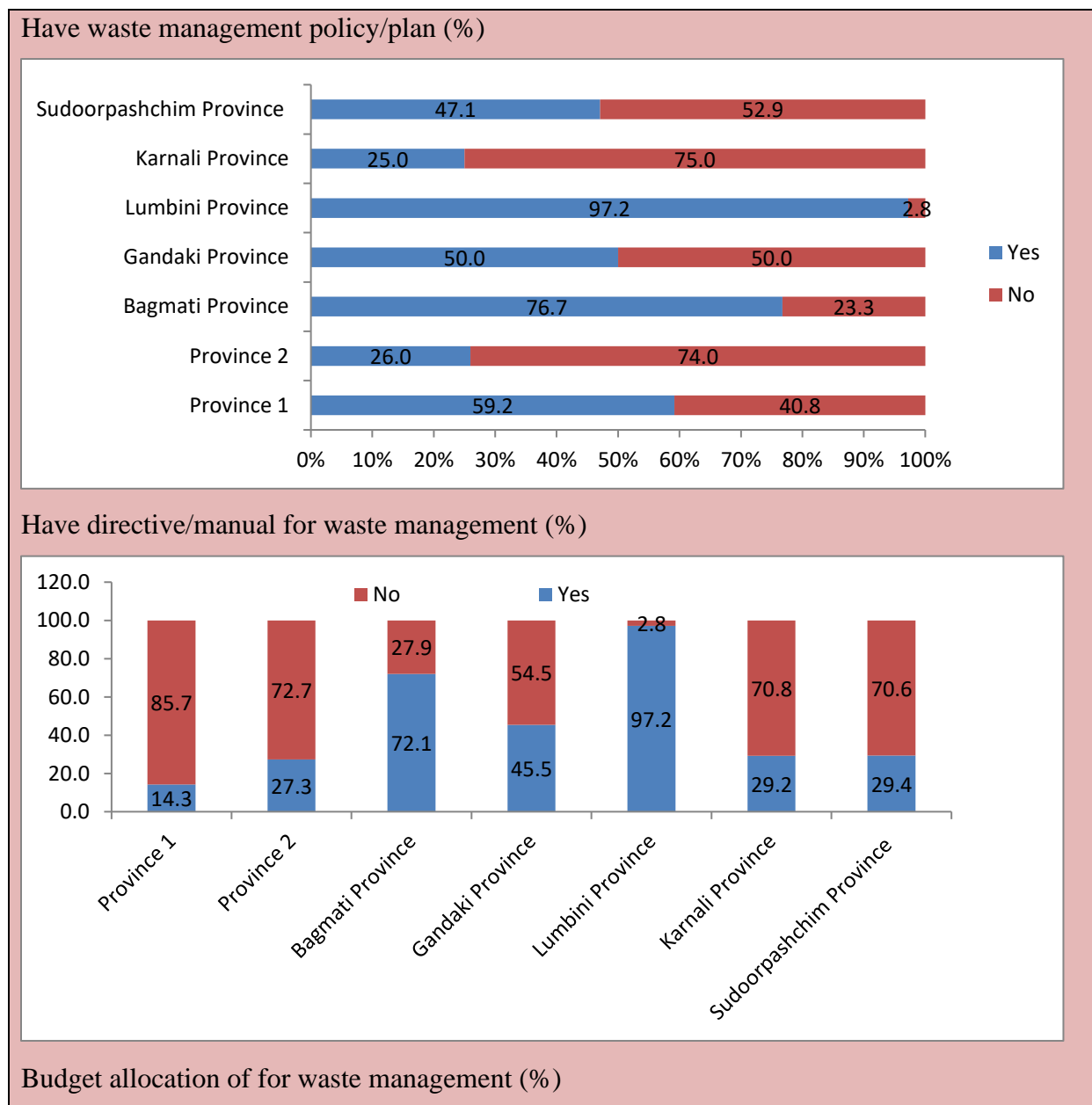


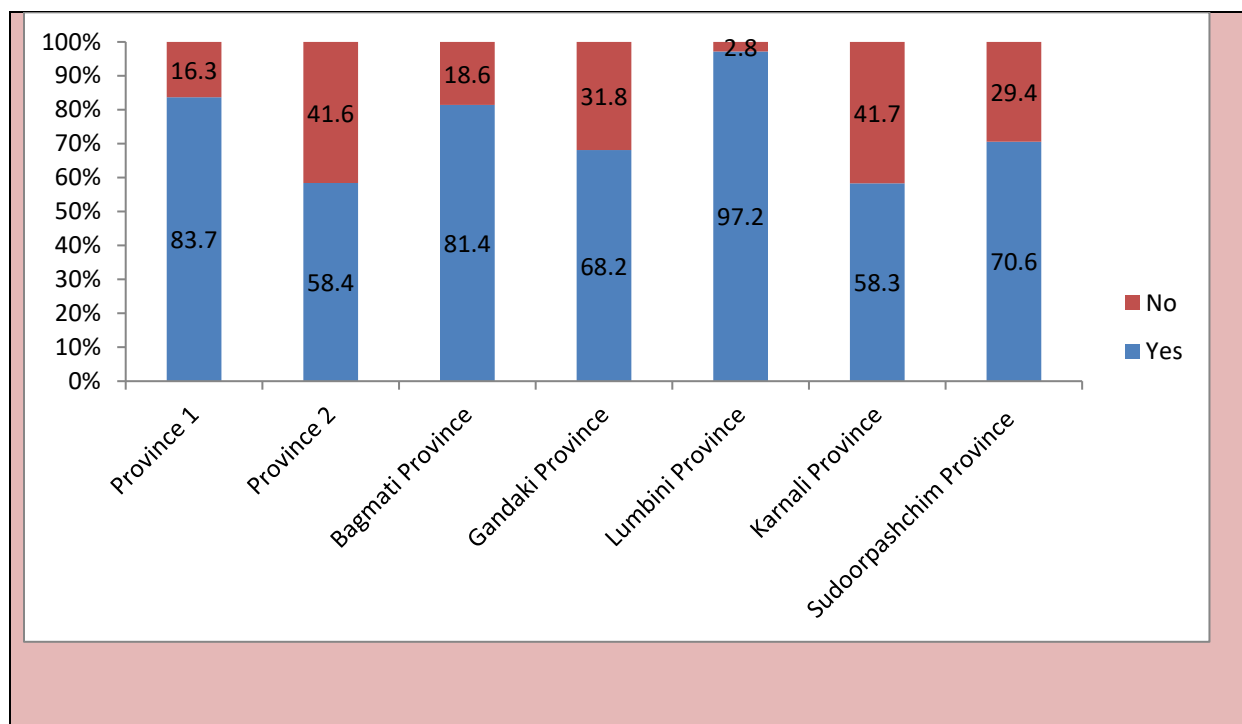
The survey showed that one in two urban municipalities have developed plans/policies to tackle the issue of solid waste. Similarly, 121 municipalities (42%) reported that they have manual/directives in line with their plan/policy to manage solid waste. The analysis revealed that the most crucial factor affecting the overall waste management is the allocation of budget. About 75% of the surveyed municipalities have already placed a practice of allocating separate budget head for waste management. This practice indicates the growing seriousness of municipalities regarding waste management, and such seriousness significantly varies at the province level.

Without proper planning, there will be a possibility of inefficient execution of the budget. As about 50 percent of municipalities still do not have a plan/policy for waste management, there

seems that municipalities have to devise a plan/policy at first to make efficient execution of budget and other waste management related programs.

Figure 2: Waste management policy/plan at province levels

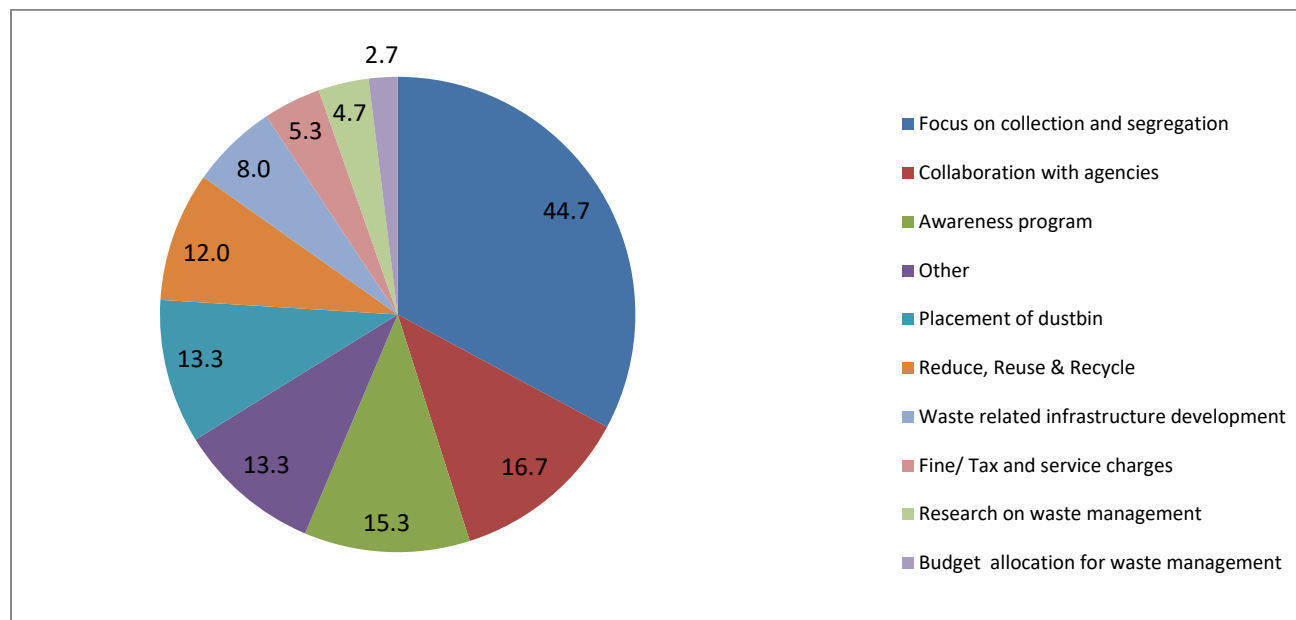




The study showed that Lumbini Province has given comparatively higher importance to waste management in terms of devising policy/directives and allocating budget for waste management. The survey also revealed that, though municipalities haven't developed policy/plan and directive/manual, most of the municipalities, of all provinces, have allocated budget for waste management.

The study discovered several attributes of the plan/ policy the municipalities have devised. Their policy primarily focuses on the collection and segregation (44.7%) of municipal waste. The survey results also showed that nearly 17 % of the plan/policy emphasis collaboration with different agencies. Likewise, awareness program, placement of dustbin, development of waste-related infrastructure, fine /tax and service charges, etc. are other features reported in the survey as major features of their plan/policy. Similarly, about 5% of the municipalities have kept waste-related research and study in their waste management plan.

Figure 3: Major features of waste management policy/plan (Percent of cases, n=150)



Effective and efficient waste management policy/plan ultimately rests on how municipalities prioritize it. The survey showed that out of 285, only 53 municipalities have given high priority to waste management. Similarly, 32 of them did not give priority at all. The number of municipalities that have given low priority is 50. Likewise, 150 municipalities have given moderate priority to waste management.

Table 2: Priority given to waste management and effectiveness of policy/plans

Priority given to waste management	Number of municipalities	Effectiveness of management policies/plans	Percent of responses (n=150)
High Priority	53	Not effective at all	0.7
Low Priority	50	Less effective	6.7
Moderate Priority	150	Moderately effective	45.3
No priority at all	32	Effective	44.0
Total	285	Highly effective	3.3

As discussed earlier, 52% of municipalities have prepared plans/policies related to waste management. The result in the table explains whether management policies/plans were effective or not. Among 150 municipalities, 45% of them have reported that their plan/ policy are moderately effective, whereas 44% of them rated it as effective plan/policy. Only about 3% of

municipalities stated that their policies/plans are highly effective to manage waste. A small proportion of municipalities reported that their policy/plan are not effective or less effective.

Table 3: Correlation between priority and effectiveness (Municipalities in number)

Priority	Highly effective	Effective	Moderately effective	Less effective	Not effective at all	Don't have policy/plans	Total
High Priority	5	23	10			15	53
Moderate Priority		43	51	2		54	150
Low Priority			7	8	1	34	50
No priority at all						32	32
Total	5	66	68	10	1	135	285

The study revealed that those municipalities that have given high priority to waste management have found more effective in their policy/plan. Out of 38 municipalities who have policy/plan and given high priority, 28 of them found their policy/plan either highly effective or effective. Similarly, those who have given moderate priority found their policy either effective or moderately effective. In a similar way, 16 municipalities, who have policy/plan and given low priority, have experienced their policy/plan moderately effective or less effective.

2. Institutional Mechanism for Waste Management

The institutional mechanism that deals with waste management in municipalities is a key to achieve effective waste management. The survey found that approximately 75% of municipalities have developed certain mechanisms as per the local need and requirements.

Table 4: Institutional mechanism developed in municipalities to manage waste

	Number of municipalities	Percent
Don't have any mechanisms	73	25.6
Waste management department	58	20.4
Environment management department	85	29.8
Other mechanisms	69	24.2
Total	285	100

Apart from using the terms like ‘Waste Management Department’ and ‘Environment Management Department, few other institutional mechanisms that are in place are listed in the table below:

Table 5: Other institutions for waste management

SN	Name of Other Institution	SN	Name of Other Institution
1	Environment and Disaster Department	11	Development and Environment Department
2	Health and Social Development Department	12	Waste Management Committee
3	Health & Sanitation Department	13	Physical Infrastructure and Environment Department
4	Department of Infrastructure	14	Administrative and Planning Department
5	Health Department	15	Garbage and Environment Department
6	Garbage Resource Management Center	16	Disaster Management Department
7	Development Department	17	Planning Department
8	Department of Environment and Sanitation	18	Urban/Environment Development Committee
9	Department of Energy and Environment	19	Urban Development Department
10	Forest and disaster Management Department		

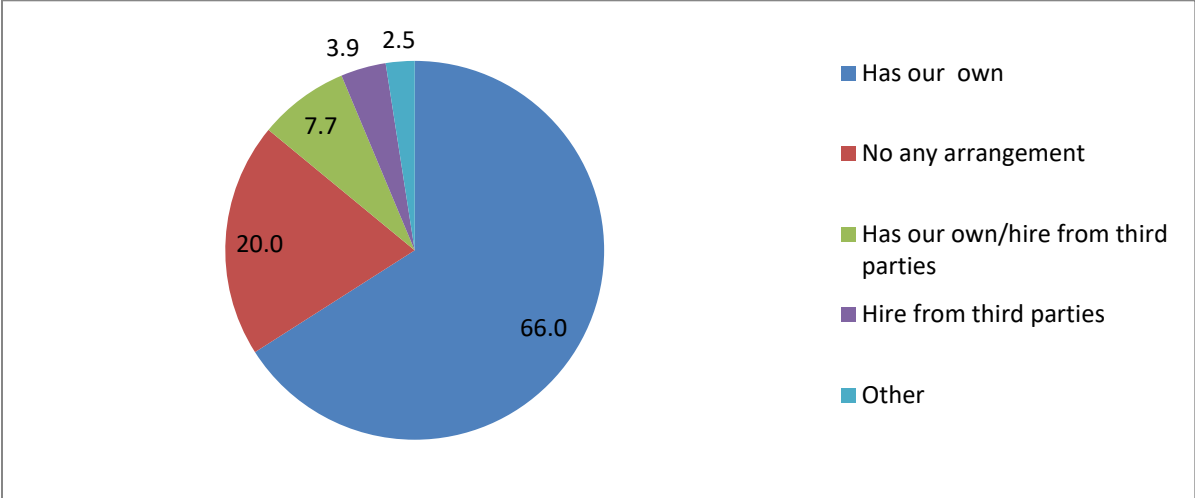
The study showed that most of the municipalities (64%) have hired 1 to 10 staff for these institutions. Altogether 3,358 employees, on an average 12 for each municipality, were working within these mechanisms.

Table 6: Regular employees to work with these mechanisms

Number of regular employees	Number of municipalities	Percent
1 to 10	182	63.9
11 to 20	25	8.8
21 to 50	28	9.8
51 to 100	10	3.5
More than 100	3	1.1
No workers	37	13.0
Total	285	100.0

In almost 64% of municipalities, 1 to 10 staff were regularly working. Likewise, 21 to 50 staff were assigned for about 10% of municipalities. Moreover, there are only 1% of municipalities where more than 100 workers work with these mechanisms. The survey also reported that there are no workers in 13% of municipalities. Out of 37 municipalities who don't have workers, 6 have waste management mechanisms but don't have any workers; rest of other doesn't have both mechanism and workers too.

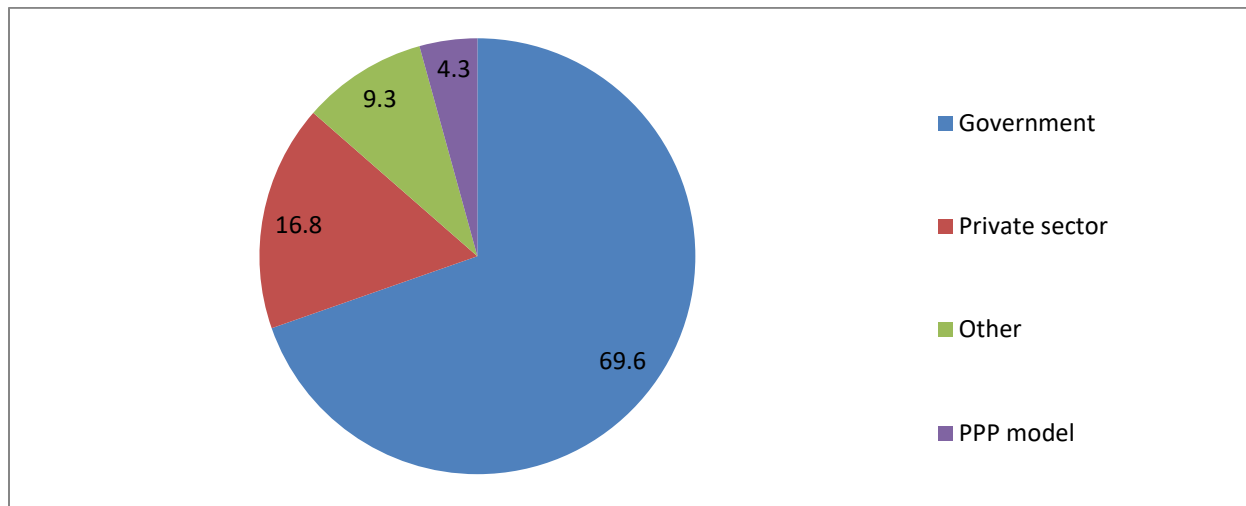
Figure 4: Vehicles to pick up waste (% of municipalities)



The survey confirmed that majority of the municipalities have their own vehicles (66%) to pick up the garbage. About 8% of municipalities reported that they use both: their own and hired from third parties. A small proportion of the municipalities use vehicles hired from a third party alone. Similarly, 20% of municipalities have no arrangement of vehicles to pick up the waste. Since about 9% of municipalities reported that they do not have waste to manage, and about 6% haven't prioritized waste management, it is reasonable to think that a few municipalities may not have vehicles to pick up their waste.

The survey found that most of the municipalities manage waste themselves. Only a few of them reported that private sector manages overall municipal waste.

Figure 5: Who manages waste? (Percent of Responses, n=280)



It has been found that out of 280 municipalities; almost 70% of them manage their waste themselves. Only 17% of the municipalities reported that their waste is managed by the private sector. Besides, in only 4% of the municipalities, there existed the public private partnership model. The overall result gives a sense that local governments seem reluctant to work with other agencies when it comes to managing waste.

3. Practice of Allocating Budget for Waste Management

The survey indicated that there is growing trend of allocating budget for waste management, but amount allocated appears to be minimal for most of the municipalities. More than 75% of municipalities have a practice of allocating budget for waste management. Out of which, 85.6% allocates less than 5 percent, 8.1% allocates between 5 to 15 percent and 6.2% allocates more than 15% of the total budget. And, 13% of municipalities do not have a practice of allocating budget for waste management.

They cited several reasons for not allocating the budget for waste management. About 36% of them reported that they do not have waste to manage. Similarly, 30% of municipalities stated that they do not have a budget to allocate. Even though waste management is one of the essential functions of municipalities, 22% of them did not prioritize waste management in their budget.

Table 7: Budget for waste management

Practice of allocating budget for waste management	Number of Municipality
No	76
Yes	209
Percent of budget allocated for waste	
	Percent of responses (n=209)
Less than 5 percent	85.6
5 to 15 percent	8.1
More than 15 Percent	6.2
Reasons for not allocating budget	
	Percent of responses (n=72)
No waste to manage	36.1
Not prioritized waste management	22.2
No resources to allocate	29.2
Other	12.5

III. PLASTIC WASTE MANAGEMENT SYSTEM

In this chapter, the results of the survey regarding plastic waste management are discussed. In line with the research questions and objective, this chapter explores the major priorities and plans of the urban municipalities on managing plastic waste.

1. Policy, Plan for Plastic Waste Management

The federal policies and existing laws treat municipal waste uniformly irrespective of their composition. In this context, the survey tries to find out whether urban local governments have their own waste management policy that exclusively includes separate provision for plastic waste management.

The survey showed that 268 municipalities (94%) thought plastic waste management should be dealt with separately. This understanding of municipalities could be helpful to devise a plan/policy related to plastic waste management. As 217 municipalities (76%) do not have separate policies/programs for managing plastic waste, it contradicts with their understanding regarding the need for separate policy/plan. To have efficient plastic waste management, the result implies that there is a need for separate policy or an exclusive plan to guide local governments further.

Table 8: Plastic waste related policy/program

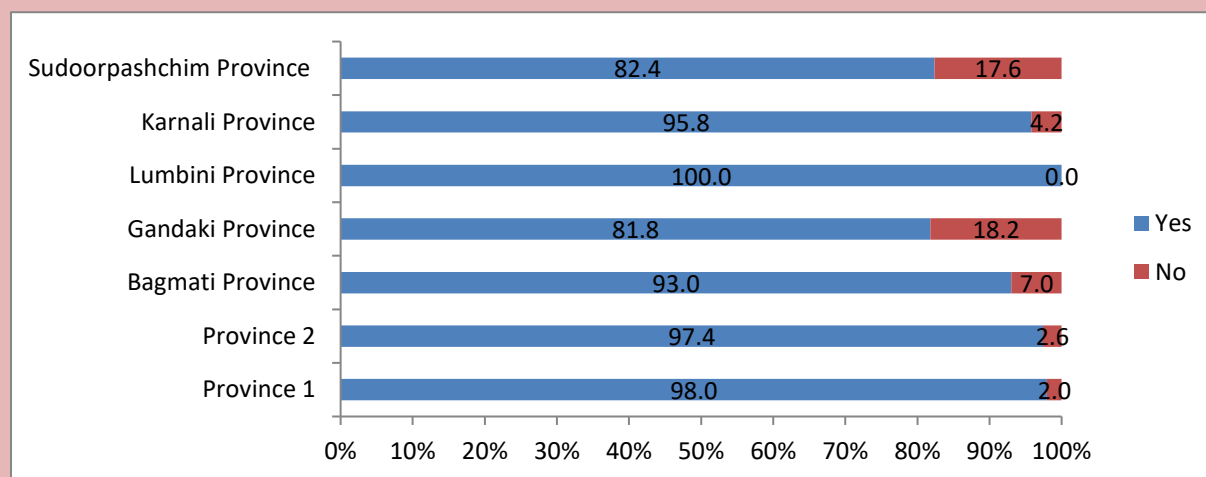
	Responses with 'Yes'	Responses with 'No'	Total
Plastic waste management should be dealt separately	268	17	285
Local governments have separate policy/program for managing plastic waste	68	217	285
Budget allocated for plastic waste management	12	273	285

Furthermore, out of 285 municipalities, only 12 (4%) of them have allocated a budget for plastic waste management. This situation could potentially make plastic waste management more difficult. Not allocating budget for plastic waste management may further exasperate the hazardous impact of plastic on the environment and living creatures. With these findings, it can

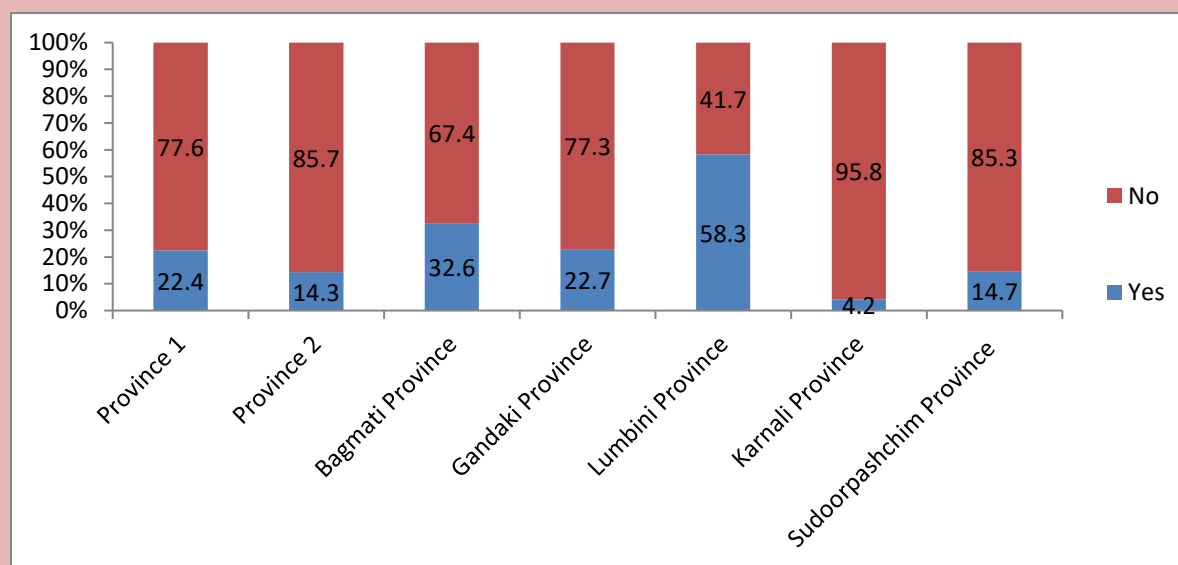
be understood that urban municipalities, if they want to control plastic waste, have to take necessary steps to start allocating budget for plastic waste management.

Figure 6: Plastic waste management policy/plan at province level

Thought plastic waste management should be dealt separately (%)



Local governments have separate policy/program for managing plastic waste (%)



Budget allocated for plastic waste management (Municipalities in number)

Province	'Yes' Response
Province 1	2
Province 2	4
Bagmati Province	1
Lumbini Province	2
Sudoorpashchim Province	3

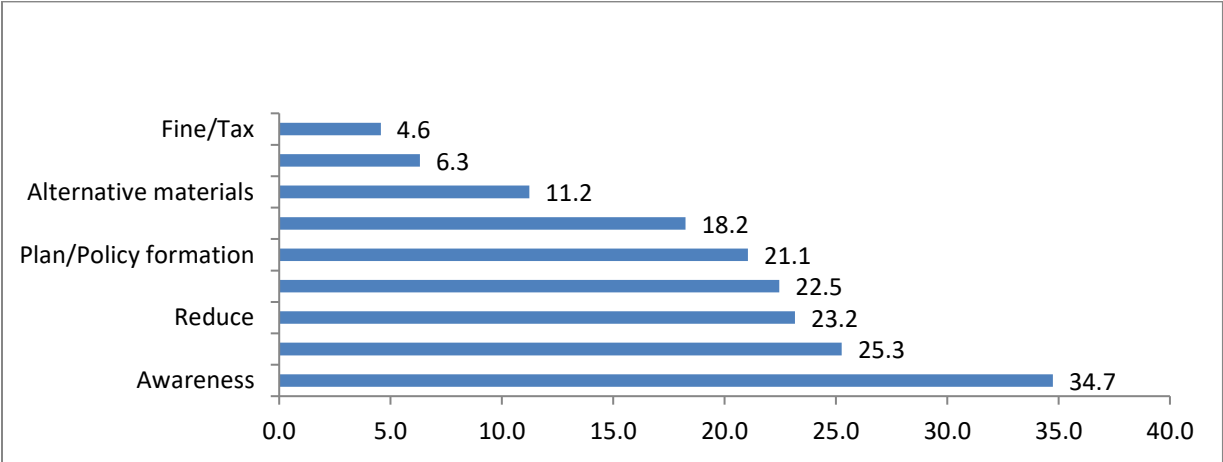
More than 80% of the municipalities in each province think that plastic waste should be managed separately. In Lumbini Province, all the municipalities reported that they think plastic waste is to be dealt separately from the overall waste management, followed by Province 1 and Province 2.

The study also found that the highest proportion of the municipalities in Karnali Province, in comparison with others, have no separate plastic waste management policy/plan, followed by Soodurpaschim Province and Province 1. Comparatively, more proportion of municipalities in Lumbini has developed separate plastic waste management policies/plans in comparison with others.

1. Priorities of Local Governments to Manage Plastic Waste

The survey indicated that the issues of plastic waste management are being gradually incorporated into policy regimes, prioritizing various activities. Among such activities, awareness is the most prioritized one (34.7%), followed by recycling (25%), reducing (23%) plastic waste.

Figure 7: Major priorities of the local governments to resolve the issues of plastic waste (Percent of cases, n=285)

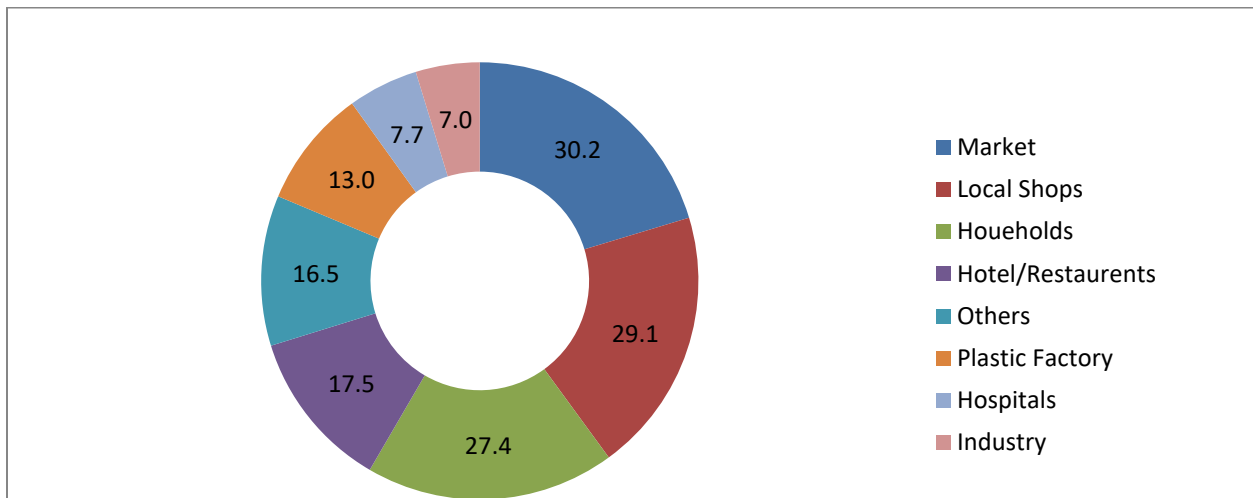


Similarly, about 21% of them prioritized formulating plans and policies concerning plastic waste management, followed by reuse and encouragement to plastic alternatives. Imposing fine/tax (5%) for using plastics is at the bottom of the municipalities’ priority. Since there is great debate pertaining to what can be done to effectively manage plastic waste, these findings give ample scope for policymakers to discuss and sort out more effective and productive options.

2. Sources and Magnitude of Plastic Waste

The surveyed municipalities reported several sources of municipal plastic waste. Among them, market (30.2%) followed by local shops (29.1%) and households (27.4%) are found to be the major ones. Hotel/ restaurants, plastic factories, hospitals, and industries were also reported as other sources of plastic waste. The multitude of sources of plastic waste indicates that policymakers, at all tier of government, should pay careful attention to this varied nature of sources. Targeting a particular source may not be sufficient to deal with this complex issue.

Figure 8: Major sources of plastic waste (Percent of cases, n=285)

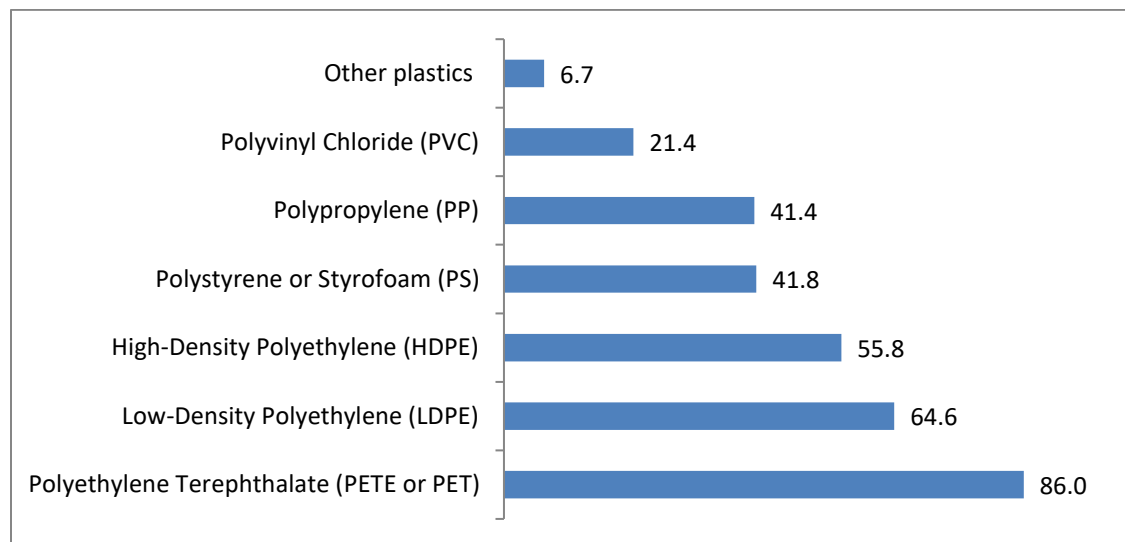


Plastic Waste Generation

The survey revealed that the urban municipalities (285 out of 293) altogether generate approximately 350 tons of plastic waste every day.

The survey also tried to explore the composition of these plastic wastes. Municipalities reported that they have several categories of plastic; almost 9 in 10 municipalities have Polyethylene Terephthalate (PETE or PET, like soft drink and mineral water bottles, juice container) in their plastic waste followed by Low-Density Polyethylene (LDPE, like plastic bags) and High-Density Polyethylene (HDPE, like milk jugs, shampoo bottles, detergent packaging). Also, more than 2 in 5 municipalities found Polypropylene (PP, like luggage, toys, plastic bottle caps), Polystyrene, or Styrofoam (PS, like drinking cups, takeaway food containers) in their plastic waste. As the nature of plastic waste markedly differs so do ways of plastic waste management. Hence, it requires municipalities to track these categories and utilize them accordingly.

Figure 9: Types of plastic waste composition (Percent of cases, n=285)



3. Plastic Waste Management: Reduce, Reuse, Recycle, and Energy recovery

Local governments are mandated by the SWM Act to take necessary steps to promote 3R principle (reduce, reuse, and recycle), including segregation of municipal waste at its source. By focusing these principles, municipalities can minimize plastic waste in an efficient and effective way. How these methods have been used at the urban municipalities have been investigated and discussed in the subsequent headings.

The study found that some of the municipalities have followed the principles of 3R to manage plastic waste. But, a large number of the municipalities haven't yet incorporated these principles in their waste management policy/plan, though SWM Act encourages them to promote it.

Table 9: Practice of Reduce, Reuse, Recycle and Energy Recovery

	Number of responses with 'Yes'	% of responses with 'Yes'	Total respondent
Efforts to discourage plastic users to use plastics	109	38.8	281
Policies/practices of encouraging plastic reuse	49	17.2	285
Practice of recycling plastic waste	40	14.0	285
Practice of recovering energy from plastic waste	21	7.5	280
Any problems in managing plastic waste?	171	60.0	285
Have system of recording data on waste generation and management	47	16.5	285

3.1 Reduce

In the plastic waste management options, reduction in the use of plastic is among the most favored options. Since plastics are non-biodegradable and stick around for a lot longer, it causes degradation of the environment and endangers living beings. Therefore, reducing the use of plastic would be an ideal step to manage plastic waste. In this context, municipalities can play a leading role, initiating civic awareness, placing tax/fine, among others. About 39% of the municipalities reported that they have been discouraging people from using plastic materials by educating people, imposing fine/taxes on plastic use.

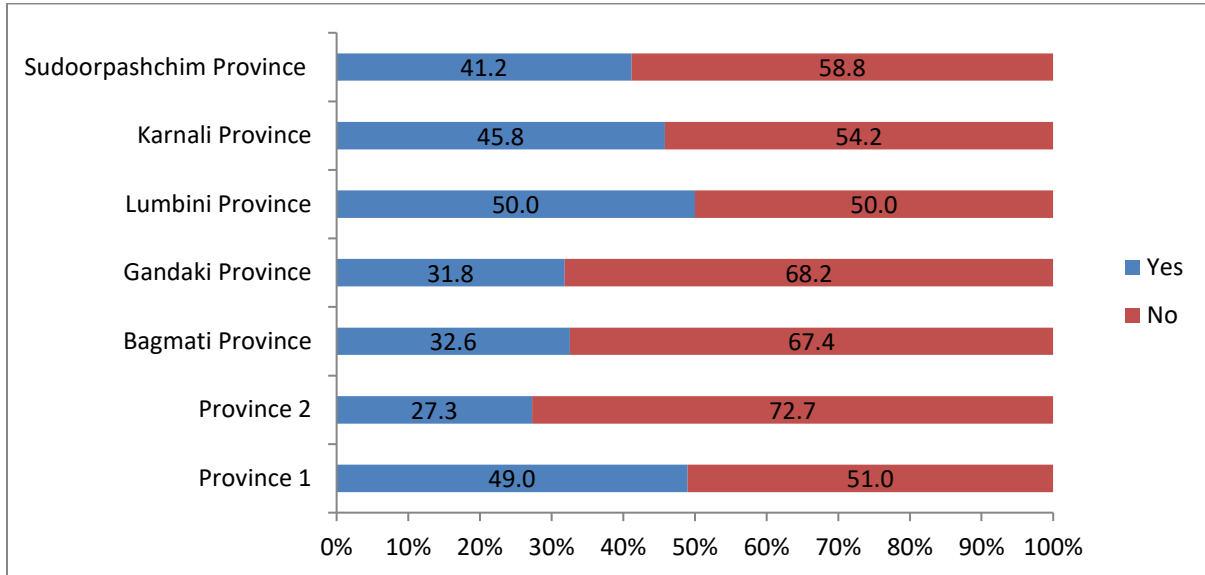
Table 10: Ways of discouraging plastic use

	% of cases (n=109)
Have started educating people to use less plastics	93.6
Have provided alternative to plastics for daily uses	26.6
Have placed fines/taxes for using plastics	9.2
Other	2.8

Effective plastic waste management always comes up with initiations that discourage people and its user to use plastics. The survey showed that only 109 out of 285 municipalities (38%) have conducted some kind of activities to discourage people from using plastics. It appeared that providing awareness (93.6%) comes to the top of municipalities' strategy followed by providing an alternative of plastic for daily uses (26.6%). Only a few municipalities' have introduced fines/taxes (9.2%) against plastic use.

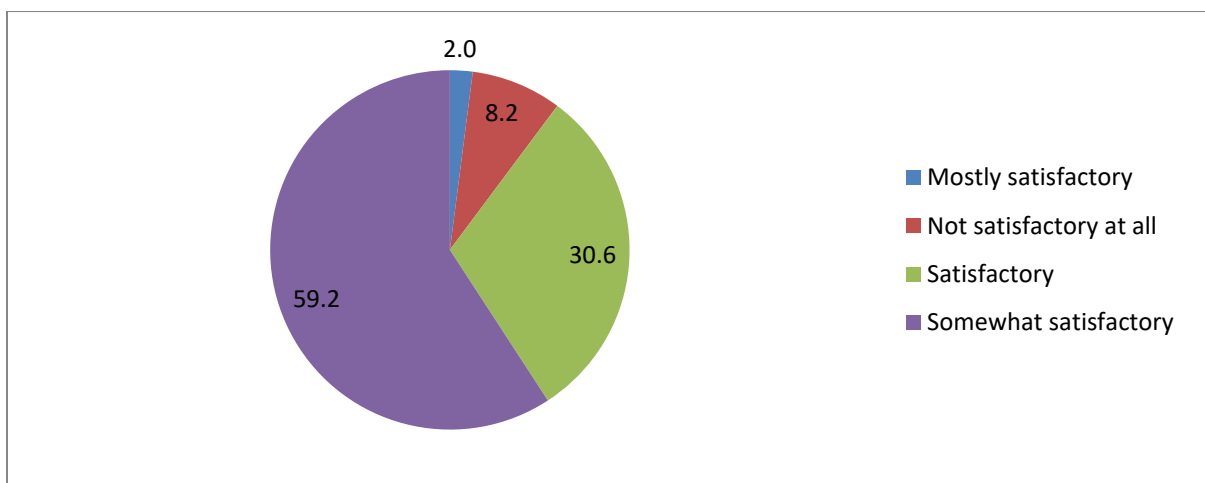
Lumbini Province and Province 1 came out at the top when it comes to putting efforts to discourage people from using plastics, followed by Karnali and Sudoorpashchim provinces. The result showed that Province 2, Bagmati Province and Gandaki Province lagged behind in such efforts.

Figure 10: Efforts to discourage from using plastics (%)



However, most of the municipalities (59%) stated that they are only somewhat satisfied with their effort of discouraging people. About 3 in 10 municipalities rated that their efforts are satisfactory. Only 2% of 109 municipalities reported that they are mostly satisfied in their efforts.

Figure 11: Satisfaction over the effort of discouraging people in using plastic (Percent of Response, n=109)



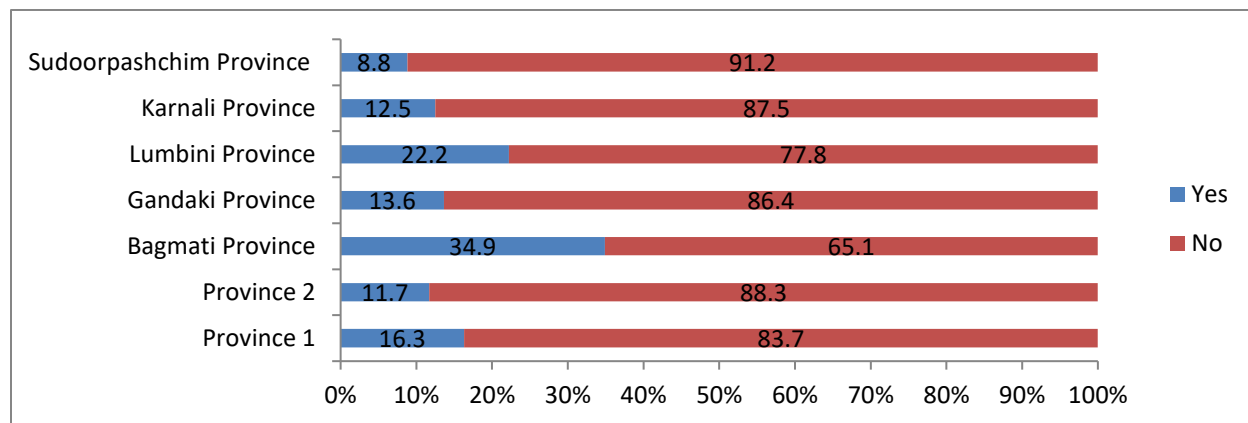
3.2 Reuse

Reuse of plastic works in two different ways. On the one hand, it reduces the use of plastic, and on the other, it diverts plastic and takes the pressure off the recycling activities. The survey found

the laxity of municipalities in encouraging people to reuse plastic. Only about 14% of municipalities have policy/ practice in this direction.

Comparing at the province level, the more proportion of Bagmati Province’s municipalities have encouraged people to reuse plastic, followed by Lumbini Province and Province 1. In this context, Sudoorpaschim Province remains at the bottom, with only about 9% of municipalities have worked to promote reusing plastic.

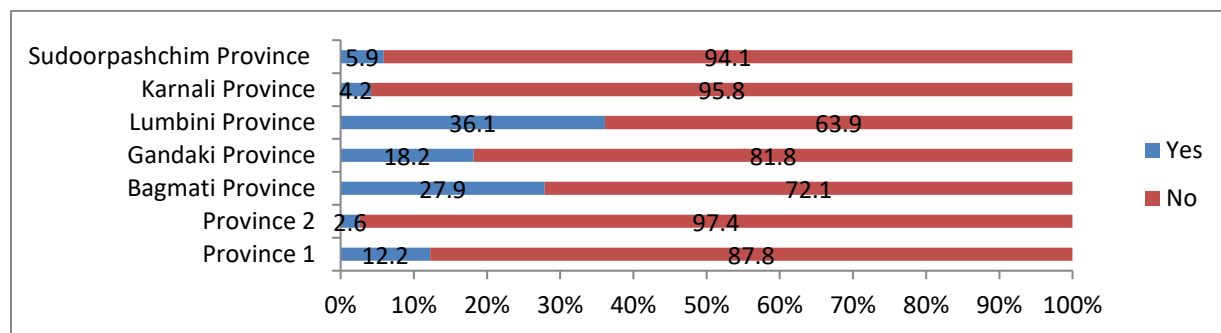
Figure 12: Practice of reusing plastic (%)



3.3 Recycling

Recycling of plastic is a process of recovering plastic waste and reprocessing them to make useful plastic products. The practice of recycling of plastic waste helps to reduce plastic pollution, making new useable and functional products from the waste and helps to divert plastics from landfills and other disposal places. The study found that about 14% of municipalities report to have practiced recycling of plastics wastes. Practicing recycling by a small fraction of the municipalities does not stand up with the mandate the Solid Waste Management Act (2011) has provided to the municipalities.

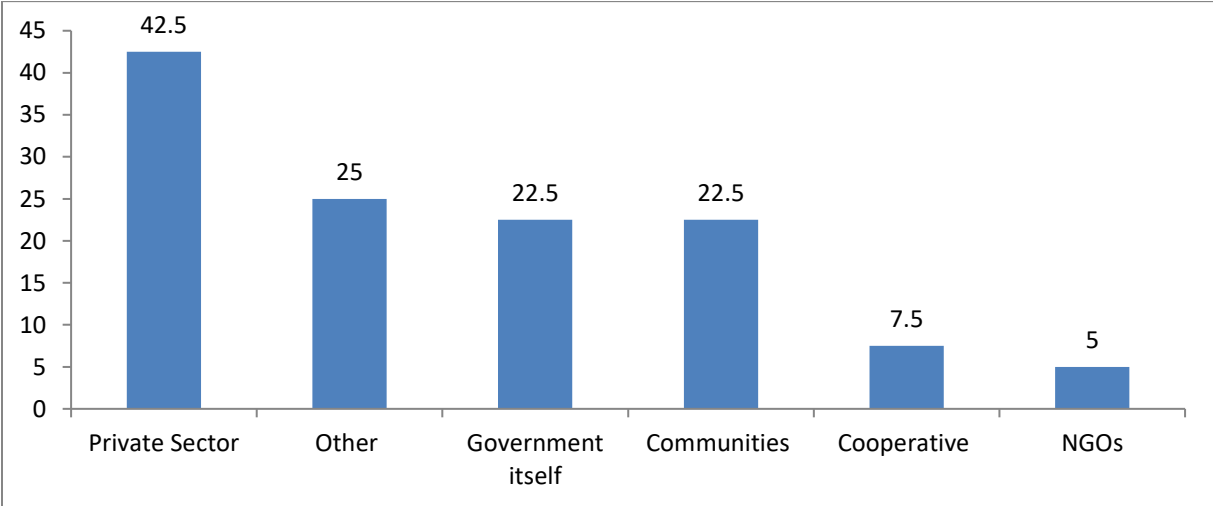
Figure 13: Recycling practice at province level (%)



It can be seen from the study that more than 1 in 4 municipalities of Bagmati and 1 in 3 in Lumbini Province have practiced recycling of plastic waste. This practice seems insignificant in Province 2, Karnalrai and Sudoorpaschim Provinces, with 2.6%, 4.2%, and 5.9% respectively.

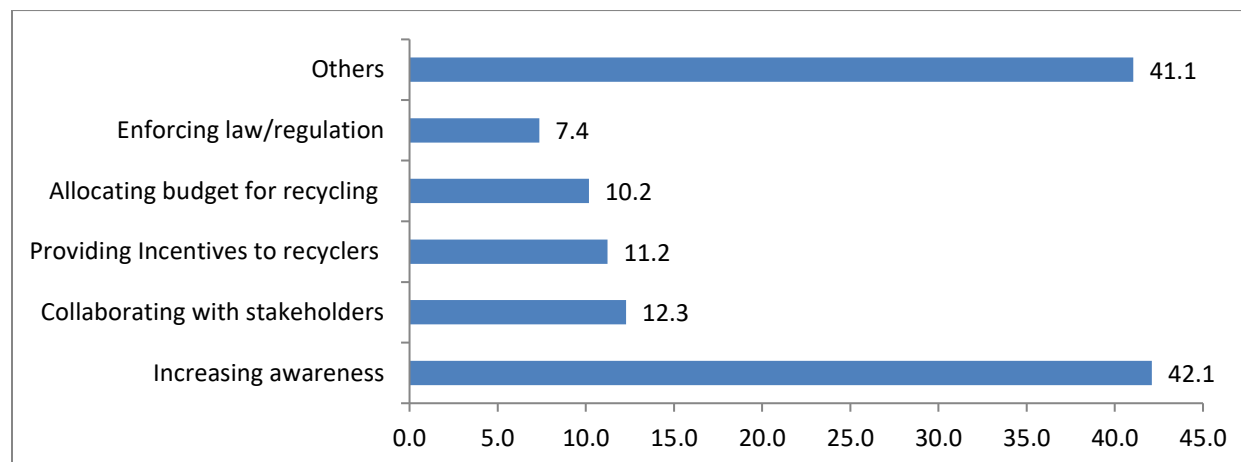
The survey confirmed that only 40 municipalities (14%) have partnered with other sectors to recycle plastic waste. Interestingly, these municipalities have partnered not only with a single organization; they have also worked simultaneously with several other partners. Most of them preferred to work with the private sector followed by communities. Out of these 40 municipalities, 23 percent recycles plastic waste themselves or with other government organizations. The result showed that only a very few municipalities partnership with NGOs while recycling plastic waste.

Figure 14: Partnership of local government to recycle plastic waste (Percent of cases, n=40)



The result showed that municipalities have mulled over several options simultaneously for promoting recycling. A large proportion of them opted for increasing public awareness (42%) about the recycling of plastic waste, followed by collaboration with stakeholders (12%) and incentivizing recyclers (11%), and budget allocation (10%). However, it is not clear from the study what sort of awareness the municipalities want to promote recycling. Among others, encouraging people to make usable things like mat, rope and decorative materials are also reported by the municipalities to promote recycling.

Figure 15: What can be done to encourage recycling of plastic waste? (Percent of cases, n=285)



3.4 Recovering of Energy from Plastic Waste

Another aspect of plastic waste management is to recover the energy stored in the residual plastic materials. When it comes to the practice of recovering energy a very small number of urban municipalities have started doing this. The survey reported that about 7.5% of municipalities have such a practice. Keeping Province 2 aside, the number is staggeringly low in other provinces. In Gandaki and Karnali Province, there are no practices of recovering energy. Refer annex 2 for the list of municipalities focusing on energy recovery from plastic waste.

Table 11: Practice of recovering energy

	Yes
Province 1	3
Province 2	12
Bagmati Province	3
Lumbini Province	1
Sudoorpashchim Province	2
Total	21

3.5 Landfills and Waste Segregation Practice

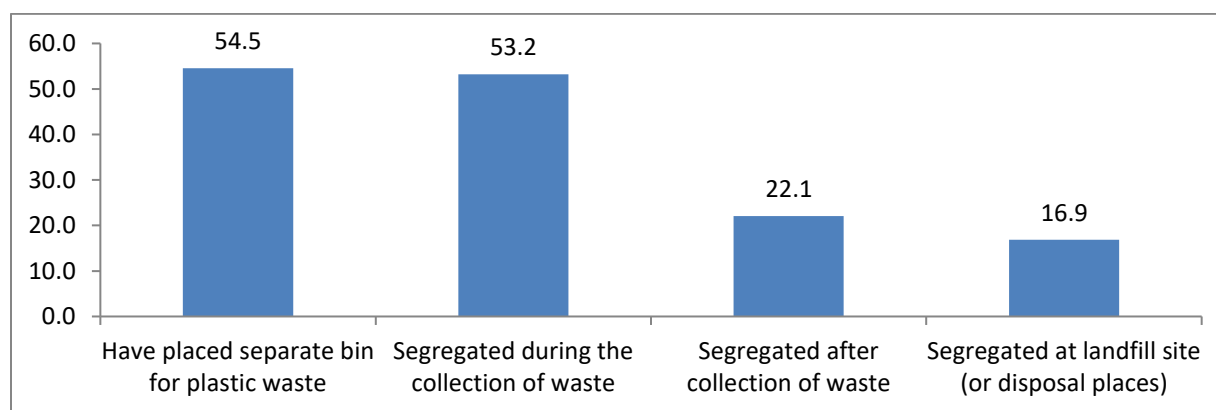
The survey showed that only about 27% of urban municipalities segregate plastic waste from municipal waste. In other words, three out of four municipalities still do not segregate the plastic waste before they reach disposal areas.

Table 12: Segregation of plastic waste

	Number of responses with 'Yes'	% of responses with 'Yes'	Total respondent
Policies/practices to segregating the plastic waste from other waste	77	27	285

The finding confirmed that municipalities have adopted several approaches to disaggregate the plastic waste. More than half of the municipalities who practiced segregation reported that they have placed separate bins for plastic waste collection and practiced segregation at the time of waste collection. About 22% and 17% of municipalities segregate plastic waste after collection and at landfill sites respectively.

Figure 16: Practices of segregating plastic (Percent of cases, n=77)



Landfill is the least favored options of plastic waste management, where wastes are disposed safely in a number of ways. However, the practice of unscientific disposing plastic waste is rampant in urban area of Nepal. The survey found out that the practice of open dumping (50%) in its various forms is prevalent in urban municipalities. Only a few municipalities practiced controlled dumping of waste (21%) or disposal of waste in landfill sites (14%). The study also showed that few municipalities that practice controlled dumping or use landfill sites also use other forms of disposal methods such as open dumping, riverside dumping. Only about 10% of municipalities practice landfill site but no other as a waste disposal places. Similarly, 14% of urban municipalities do not have any waste disposal system, which is highly alarming since the amount of waste generated is exponentially increasing.

Table 13: Waste disposal method and problems of plastic waste management

Waste disposal method	Percent of cases (n=275)	Major problems to manage plastic waste	Percent of cases (n=171)
Open dumping	50.0	Lack of suitable disposable site	35.7
Controlled dumping	20.9	Inefficient waste management	26.3
Open dumping and riverside dumping	19.4	Lack of public awareness	24.0
Riverside dumping	14.7	Inadequate budget	22.8
Sanitary Landfill	14.0	Collection and Segregation of waste	17.5
No municipal disposal system	14.0	Lack of Plan/Policies	17.5
Roadside dumping	6.1	Other	15.8
Incineration	1.8	Unmanaged urbanization	15.8
Other	4.0	Lack of skilled human resources	12.9

The surveyed municipalities highlighted several problems that they have to face while dealing with plastic waste. About 38 percent of municipalities stated that they don't have a suitable disposal site. Similarly, the lack of public awareness on plastic use (24 %) and inadequate budget (22.8%) are among the major problems reported by municipalities. A significant number of municipalities also noted collection and segregation of waste, lack of plan/policy, unmanaged urbanization, and lack of skilled human resources as other major problems of plastic waste management.

IV. ENGAGEMENT AND COLLABORATION WITH STAKEHOLDERS

The SWM Act has several provisions that encourage the local body to collaborate with the private sector, community organizations, and NGOs to manage municipal waste. The act has clearly identified the scope of work that the local government can work with other non-governmental agencies. These scopes include enhancement of public awareness on solid waste management that ranges from reduction to collection, transportation; reuse, recycle or processing of solid waste, followed by disposal and end management.

The survey also delved into how municipalities are working with donors, private sectors, companies who produce/use plastics. However, the result showed a tenuous collaboration with them; only about 4% of municipalities reported that they are working or potentially can work with these agencies to manage plastic waste.

Table 14: Engagement and collaboration with stakeholders

	Percent responses 'Yes' response	of Total with respondent
Supported by development agencies and donors to manage the municipal waste	9.8	285
Have worked or have plans of working with the companies/industries that use/produce plastic waste	2.5	285
Know any organizations who is partner or potentially be partners that collect and recycle plastic waste	3.2	280

The survey showed that only about 3% of municipalities have worked or have plans of working with the companies/industries that use/produce plastic waste for its management. It clearly indicates that there is ample scope for municipalities to work with private sectors and non-government agencies.

Development Agencies and Donors Supporting on Waste Management

Harek Shanti Abhiyan, UNICEF, ADB, BORDA, Japan's RDC, WB, EU, JICA, ADB, WB, NGOs, ADB, WB, Sana Sahakari, UN Habitat, UNICEF, WASH Nepal, UNICEF, SNV, Nepal, Good Neighbors International, NGOs, Local Community Organizations

The study also revealed sizable municipalities have been receiving supports from development agencies and the donor community to manage plastic waste.

Table 15: Number of municipalities engaged and collaborated with stakeholders (at province level)

	Province 1	Province 2	Bagmati	Gandaki	Lumbini	Karnali	Sudoor pashchim
Supported by development agencies and donors to manage the municipal waste	2	5	6	3	10	1	1
Have worked or have plans of working with the companies/industries that use/produce plastic waste	0	0	1	0	5	0	1
Know any organizations who is partner or potentially be partners that collect and recycle plastic waste	1	0	3	2	2	0	1

V. ROLE OF PLASTIC PRODUCER/USERS IN PLASTIC WASTE MANAGEMENT

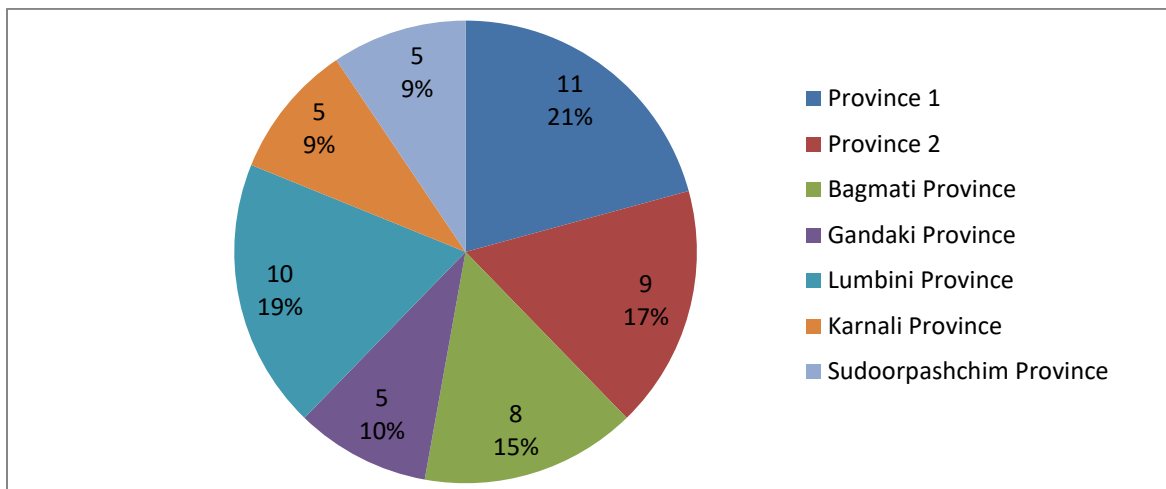
Apart from governments' role, the role of the private sector's companies who use/produce plastic is paramount to manage plastic waste. Though there is no direct path to how they can contribute, the provision of corporate social responsibility (CSR) in the Industrial Enterprise Act 2016 (IEA, 2016) provides a window for them to contribute to plastic waste management.

In order to measure the magnitude of plastic production/use by private companies and to know how the waste generators doing as a part of their Corporate Social Responsibility on managing plastic waste, a survey with to with private companies who produce/use plastic for their operation has been conducted. For this, a separate set of questionnaires was developed and used to collect data from them.

1. Characteristic of Plastic Producer/User Companies

During the survey, 53 private companies who use/produce plastic have participated out of which 21% (11) were from Province 1, followed by 19% (10) from Lumbini Province.

Figure 17: Number of surveyed companies by province



From Karnali and Soodurpaschim Province, five such companies were interviewed for each province. Initially, 20 companies were targeted for interviews from Bagmati Province, only 8 companies responded to the survey questionnaire, resulting into the lesser number participation of the companies in the survey.

Table 16: Nature of companies and product types

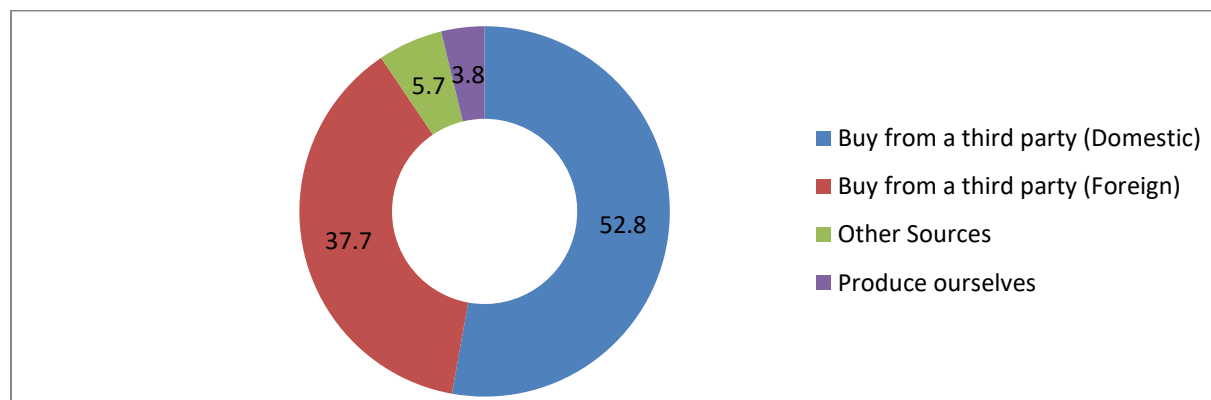
The nature of a company/industry	Total respondent	Percent of Respondent	Product types	Total respondent	Percent of Respondent
Manufacturing	29	54.7	Accessories	19	35.8
Packaging	13	24.5	FMCG	24	45.3
Wholesale/retailing	7	13.2	Bottler	5	9.4
Health Service	2	3.8	Others	3	5.7
Hotel and Restaurant	1	1.9	Cement	2	3.8
Other	1	1.9			
Total	53	100.0	Total	53	100

Among the surveyed companies, more than 54% of them are from manufacturing, and 24% of them are from the packaging sector. Similarly, 13% of them belong to the wholesale/retailing sector, followed by 4% to health services, and nearly 2% to the hotel and restaurant sector. Similarly, almost 36% of the companies produce accessories from plastic, whereas 45% of them use/produce plastic for fast-moving consumer goods (FMCG). Likewise, they produce/use bottles (9.4), cement (3.8) as well as other (5.7) types of products.

2. General Practices and Priorities

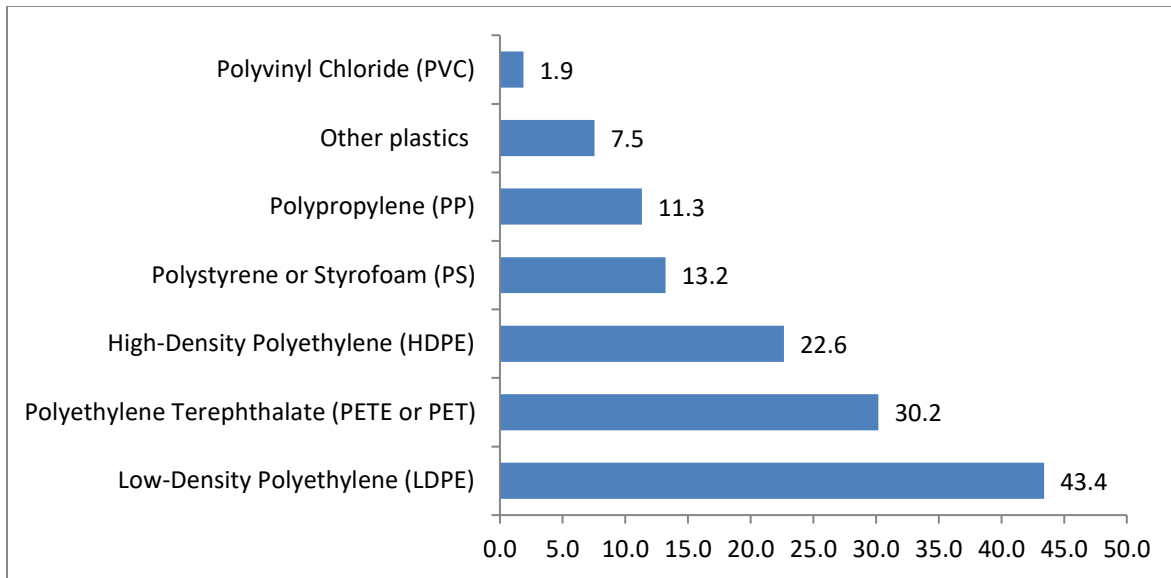
The study revealed that the surveyed companies purchased plastic from various sources. About 53% companies bought plastic products, either for raw materials or as final products, from domestic or foreign companies. A small number of companies (3.8%) produce plastic themselves for their products.

Figure 18: Sources of getting plastics for the use/production (Percent of response, n=53)



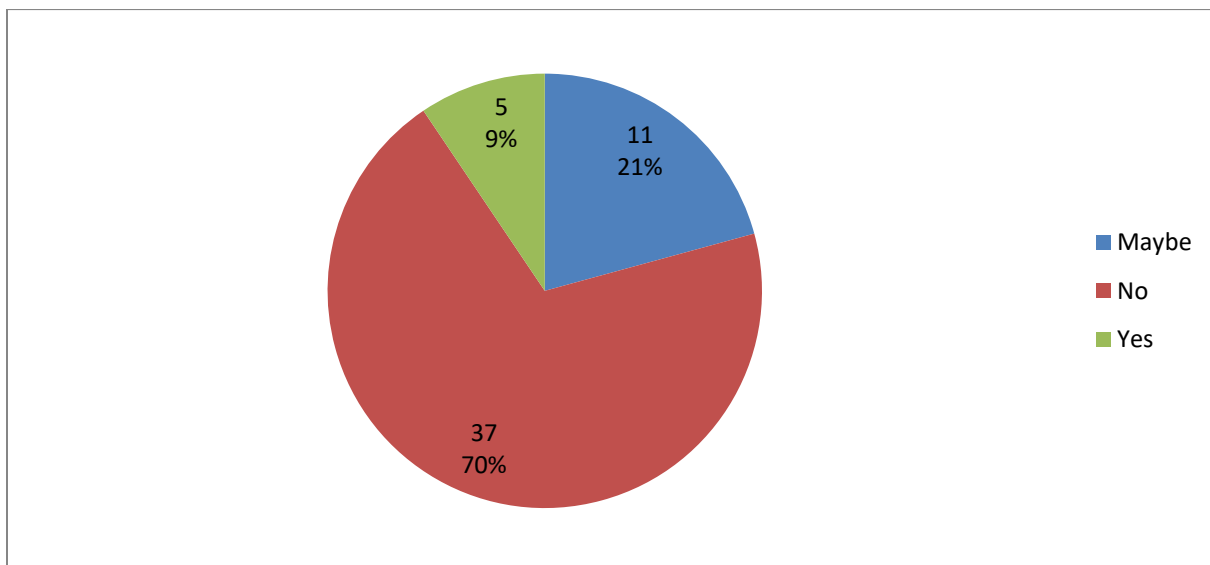
It was also found that the composition of the plastic that the companies produce/use were particularly LDPE (43.4%) followed by PETE (30.2%) and HDPE (22.6%).

Figure 19: The composition of plastic use/produce (Percent of cases, n=53)



In other words, companies produce/use the composition of either one or more than one type of plastic in their operation.

Figure 20: Possibilities of using other materials than the plastic for needed operation (Percent of response, n=53)

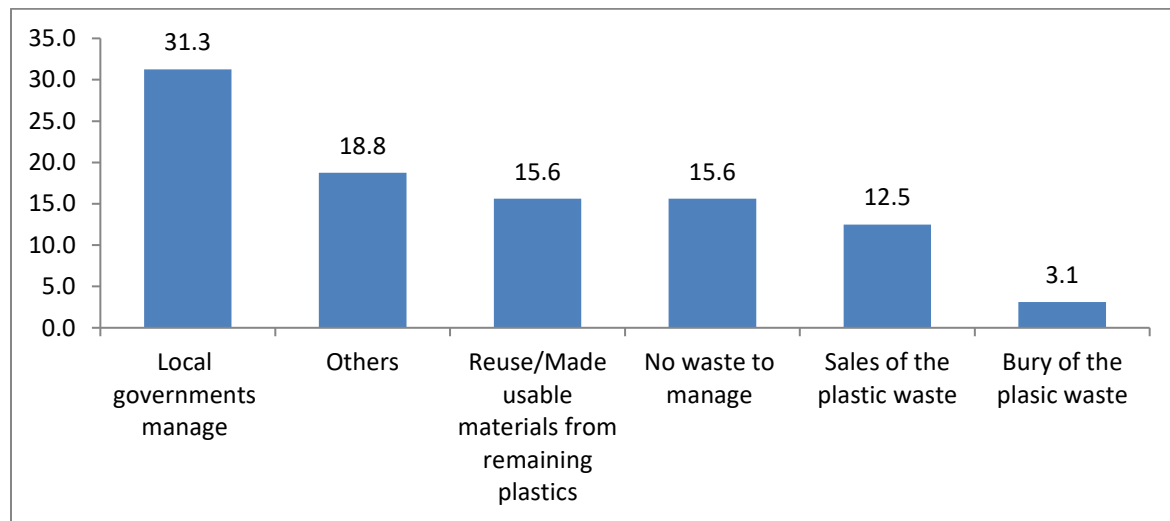


The survey result revealed that 70% of private companies appeared to be unwilling to use alternatives of plastic in their needed operation. The reluctance to use alternatives by a large proportion of the surveyed companies may pose a big challenge to policymakers while managing plastic waste. This finding also suggests devising policies and program which encourage companies to use plastic alternatives. Almost 3 in 10 companies reported that they see the possibility of using other materials instead of plastics. Cotton /paper bags, paper packaging, and reusable tiffin box are some of the alternatives that these companies have suggested instead of using plastic. Though this proportion seems to relatively small, a policymaker can start from here supporting and encouraging these companies to use plastic alternatives in their operation.

Daily plastic use/production and plastic waste generation

The surveyed companies reported that they produce/use altogether 25 tons of plastic per day, which ranges up to about 3 tons for a particular company. Surprisingly, these companies, as reported by them, only generate 2 tons of plastic waste every day, which is equivalent to 7% of plastic they produce/use daily.

Figure 21: How the companies are managing plastic waste? (n=51)

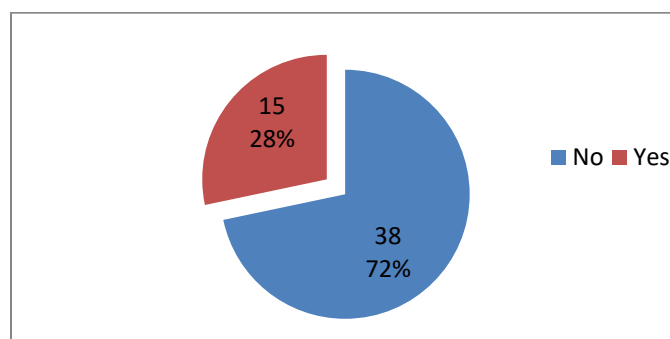


Three in ten companies reported that their plastic waste is being managed by the local government. Similarly, 15% of the companies either reuse or make other usable things from remaining plastics and 12% sell plastic waste to third parties. It was also found that only 2% of the companies bury their plastic waste. However, 15% of the companies reported that there is no generation of waste from plastic production/uses.

3. Practice of Allocating CSR Funds for Waste Management

The survey reported that most of the plastic producer/ user companies did not place the CSR mechanism in their operation. Out of 53 companies, only 15 (28%) have CSR mechanisms in operation. The study showed that, in general, relatively big plastic users/producers tend to have CSR mechanisms compared to the small users/producer. The Industrial Enterprise Act 2016, enacted by the federal government, provisioned that medium and large scales industries⁷ should allocate at least 1 percent of their annual profit for CSR fund. This law is also applicable to small and cottage industries if their turnover exceeds NPR 150,000,000.

Figure 22: Companies who have CSR mechanism



The study showed that contribution through CSR varies from companies to companies. Among the 15 contributors to CSR, almost half of the companies contribute about NPR 100 thousand annually. The survey also finds a whopping NPR 50 million contribution to CSR by a company. These 15 companies altogether contribute about NPR 58 million annually for CSR. Since the study has been carried out with a limited number of private companies, surveying with a large number may give a more accurate estimation for the CSR. With this finding, we see the possibility of effectively bringing in CSR mechanism for resolving complex development issues.

Table 17: Size of Companies (by daily plastic production/use)

	Has CSR mechanism (% of companies)	Number of companies
Less than 100 KG	25.7	35
100-500 KG	27.3	11
More than 500 KG	42.9	7

⁷ Medium industries: industries having investment in fixed capital exceeding NPR 100,000,000 but less than NPR 250,000,000 and large industries: industries having investment in fixed capital exceeding NPR 250,000,000).

The study found that a higher proportion of the companies who produce/use more plastic daily in comparison with others have a CSR mechanism.

Table 18: Amount allocated for CSR funds

Number of Companies	Amount allocated for Corporate Social Responsibility (Rupees in thousand)
7	100
1	200
2	400
1	500
1	700
1	1000
1	5000
1	50000

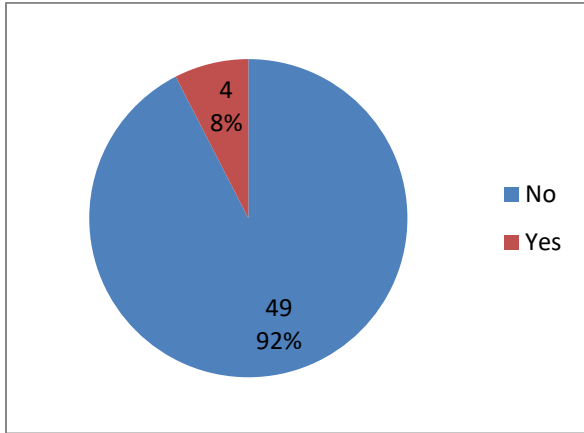
The study also showed that these companies like to work with their own mechanism to use CSR funds rather than providing it to others. Moreover, the result revealed that companies do allocate their fund in several ways simultaneously, without sticking to a particular one.

Table 19 : Ways and areas of utilizing CSR funds

Ways of Utilization of CSR	Number of companies	Areas of using CSR fund	Number of companies
Through NGOs	1	Education	5
Others	1	Charity-work	5
Independently	9	Environment	6
Youth Organizations	5	Awareness	3
Development Partners	2	Health	9
Community clubs	3	Other	1

The companies reported that they have allocated their CSR fund in several works, including health, environment, education, and so on. Nine companies have used their CSR funds for the health sector, whereas six companies, out of 15, have allocated CSR funds for the environment, followed by education and charity work.

Figure 23: Practice of allocating CSR fund explicitly on the plastic waste management



The study showed that only 8% of the plastic user/ producer companies have allocated their CSR fund explicitly for the management of plastic waste. If we compare the number of companies' allocated funds for plastic waste management with the companies having the provision of CSR funds, about 27% (4) companies have allocated CSR funds for plastic waste management. Though the number of companies used for this study are not sufficient enough to generalize the companies behaviors, it indicates the plastic user/ producer companies are willing to allocate their CSR fund for plastic management. Out of these 4 companies, 2 have no mechanism in their companies for utilizing CSR funds.

VI. CONCLUSION

The major objective of this survey was to explore and map the priorities and plans of the private sectors and urban local governments in plastic waste management. It also delved around the practice of allocating CSR funds for waste management by private companies. Similarly, the study gathered factual information on the priorities of urban municipalities in the state of plastic waste management. For this, 285 urban municipalities and 53 private companies that produce/use plastic have been surveyed.

Major Findings

Overall Waste Management: The survey showed that 150 urban municipalities (52%) have plans/policies to tackle the overall waste problem. Similarly, 121 municipalities (42%) reported that they have manual/directive in line with their plan/policy to manage. Their policy was found to be primarily focused on the collection and segregation (44.7%) of municipal waste, followed by 17 % of the on collaboration with different agencies. Similarly, almost 64% of municipalities reported that they have people ranging from 1 to 10 to work in waste management mechanisms. It has been found out that out of 280 municipalities; more than 69% of them manage their waste themselves. Only 17% of municipalities reported that their waste is managed by the private sector. The survey result indicates that there is a growing trend of allocating budget to waste management, but the amount allocated appears to be minimal for most of the municipalities. More than 75% of municipalities have a practice of allocating budget for waste management.

Plastic Waste Management: The study revealed that 217 municipalities (76%) do not have separate policies/programs for managing plastic waste. Additionally, out of 285 municipalities, only 12 (4%) of them have allocated a budget for plastic waste management. This situation could potentially make plastic waste management quite a bit difficult.

It has been found that public awareness is on the top of priorities of almost 35% of municipalities, followed by recycling (25%), reduce (23%) of plastics. Three out of four municipalities reported that they still do not segregate the plastic waste before they reach disposal areas. The study finds that about 39% of municipalities have put their effort to discourage people from using plastic materials. When it comes to encouraging people to reuse plastic, only about 14 percent of municipalities have policy/ practice in this direction More than half of the municipalities who practiced segregation reported that they have placed separate bins for plastic waste collection and practiced segregation at the time of waste collection. About 22

and 17% of municipalities segregate plastic waste after collection and at landfill sites respectively. The survey showed that only 109 out of 285 municipalities have conducted some kind of activities to discourage people from using plastics. It appeared that providing awareness (93.6%) comes to the top of municipalities' strategy followed by providing an alternative of plastic for daily uses (26.6%). Similarly, about 94% of municipalities of 109 have started educating people to use less plastic materials in their daily life. Around 27% of urban municipalities have provided alternative materials against the daily plastic uses.

The survey revealed that only 40 municipalities have partnered with other sectors to cycle plastic waste. It has been found that these municipalities altogether generate approximately 350 tons of plastic waste every day. The study showed the practice of open dumping (50%) in its various forms is prevalent in urban municipalities. Only a few municipalities practiced controlled dumping of waste or disposal of waste in landfill sites. About 38% of municipalities stated that they don't have a suitable disposal site in their nearby. Similarly, the lack of public awareness on plastic use (24%) and inadequate budget (22.8 %) are among the major problems reported by municipalities.

Collaboration for Waste Management: The study tried to explore the collaboration of urban municipalities with other stakeholders while managing waste. The result showed a tenuous collaboration with them; only about 4% of municipalities reported that they are working or potentially can work with these agencies to manage plastic waste. The survey also showed that only about 3% of municipalities have worked or have plans of working with the companies/industries that use/produce plastic waste to manage plastic waste.

Priorities of Plastic User/Producer Companies and Use of CSR Fund: To explore the priorities of plastic user/producer private companies in managing plastic waste, the survey tried to capture various dimensions associate with private sector's effort of managing plastic waste. About 53% of companies reported that they buy the plastic product, either for raw materials or as final products, from domestic third parties, and almost 38% of companies purchase from foreign third parties. The survey result revealed that 70% of private companies appeared to be unwilling to use alternatives of plastic in their needed operation. Though the study did not explore why they are unwilling, the growing demand for plastic, high cost and difficulty in transforming one mode of production to another, and no provision of compensation for shutting down factories could be few reasons, among others, for this. The reluctance to use alternatives by a large proportion of the surveyed companies may pose a big challenge to policymakers while managing plastic waste. Similarly, the survey reported that most of the plastic producer/ user companies did

not place the CSR mechanism in their operation. Out of 53 companies, only 15 (28%) have CSR mechanisms in operation. Among the 15 contributors to CSR, almost half of the companies contribute about NPR 100 thousand annually. The study showed that only 8 percent of the plastic user/ producer companies have allocated their CSR fund explicitly for the management of plastic waste.

VII. RECOMMENDATIONS

Based on the survey outputs, several recommendations have been made to effectively manage plastic waste in the urban municipalities of Nepal. In addition, how plastic production companies can contribute to managing plastic waste has also been suggested.

- Urban municipalities should have separate policies/plans for plastic waste management, as the result showed a very few municipalities have placed such policy/plans.
- Since only 4% of surveyed municipalities have allocated a budget for plastic waste management, the practice of allocating budget for it has to be expanded to all the municipalities.
- The practice of discouraging plastic use and encouraging reuse and recycle has to be promoted to manage plastic effectively.
- The survey result showed that more focus has been given to increase people's awareness, but there still exists a lack of awareness. This could be due to the lack of behavioral change of people. Therefore, in order to understand this behavior, a separate study is to be conducted.
- The collaboration with the private sector and other stakeholders such as I/NGOs, community organizations, donors needs to be scaled up at the municipality level.
- Since majority of private companies are reluctant to use plastic alternatives for their needed operation, governments at the local level are suggested to work with them and to provide an incentive for using/producing plastic alternatives.
- Municipalities should encourage practices of recovering energy from waste or any other methods which could help treat waste as resource such as construction of plastic roads, conversion to pellets/ granules that could then be generated into new products.
- The practice of allocating CSR funds from plastic production companies is to be encouraged and regulated as enshrined in the laws.

VIII. REFERENCES

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ANNEX

1. Municipalities allocated budget for plastic waste management

SN.	Municipality	Province
1	Chaudandigadhi Municipality	Province 1
2	Rangeli Municipality	Province 1
3	Gadhimai Municipality	Province 2
4	Nijagadh Municipality	Province 2
5	Paroha Municipality	Province 2
6	Sukhipur Municipality	Province 2
7	Kirtipur Municipality	Bagmati Province
8	Butwal Sub-Metropolitan City	Lumbini Province
9	Tansen Municipality	Lumbini Province
10	Kamal Bazar Municipality	Sudoorpashchim Province
11	Melauli Municipality	Sudoorpashchim Province
12	Sanphebagar Municipality	Sudoorpashchim Province

2. Municipalities practiced energy recovery from plastic waste

SN.	Municipality	Province
1	Dhankuta Municipality	Province 1
2	Diktel Rupakot Majhuwagadhi Municipality	Province 1
3	Itahari Sub-Metropolitan City	Province 1
4	Barahathawa Municipality	Province 2
5	Birgunj Metropolitan City	Province 2
6	Gujara Municipality	Province 2
7	Jitpur Simara Sub-Metropolitan City	Province 2
8	Kalaiya Sub-Metropolitan City	Province 2
9	Manara Shisawa Municipality	Province 2
10	Pacharauta Municipality	Province 2
11	Parsagadhi Municipality	Province 2
12	Pokhariya Municipality	Province 2
13	Rajbiraj Municipality	Province 2
14	Rajdevi Municipality	Province 2
15	Simroungadh Municipality	Province 2
16	Bharatpur Metropolitan City	Bagmati Province
17	Chandragiri Municipality	Bagmati Province
18	Lalitpur Metropolitan City	Bagmati Province
19	Ghorahi Sub-Metropolitan City	Lumbini Province
20	Budhiganga Municipality	Sudoorpashchim Province
21	Dhangadhi Sub-Metropolitan City	Sudoorpashchim Province



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