

TO STUDY THE SOLID WASTE POLLUTION IN AND AROUND KOHIMA

A project submitted in partial fulfillment of the requirement of
degree Bachelors of Arts (Environmental Studies).



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Acknowledgement

I express my sincere gratitude to Ma'am Imkongyanga Sebasa, who gave me the golden opportunity to do this knowledgeable assignment on the topic, 'Solid Waste', which helped me to learn a lot in the research and course of completion of this assignment.

I feel to acknowledge my indebtedness to all the kind local street vendors, shopkeepers and pedestrians, whose active participation in the survey and answering the questionnaire has helped me to draw appropriate conclusions on solid waste management.

Last, but not the least, my good friend and classmate, Divakar Thapa from the Department of Sociology, who accompanied me during the survey. His companionship certainly made going to different colonies on a chilly January a lot more fun and memorable.

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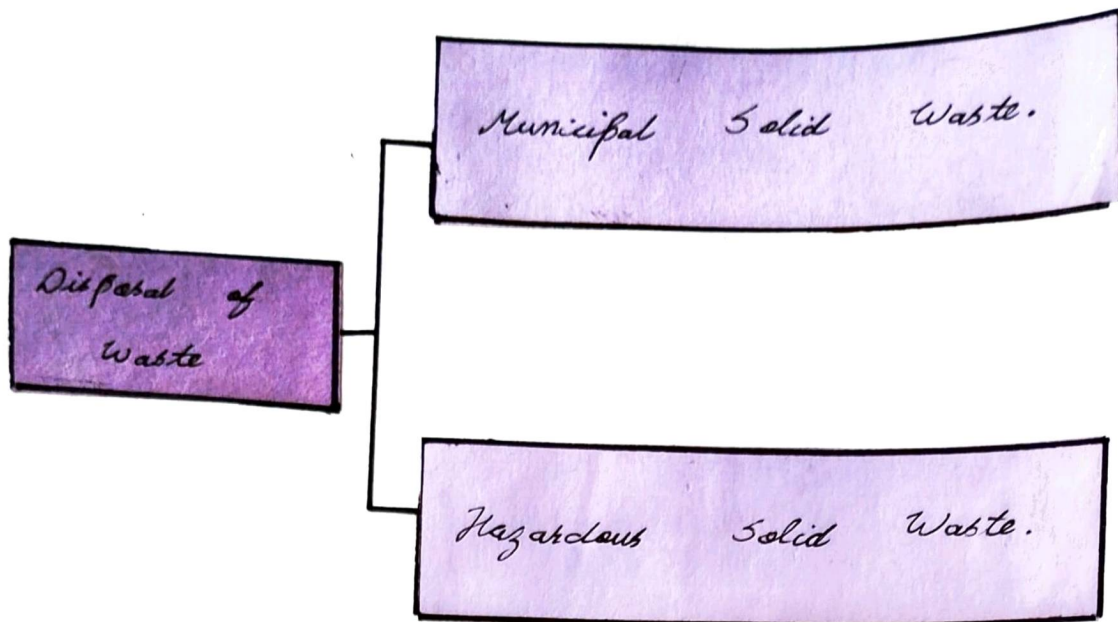
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Introduction:

'Solid waste' means any garbage or refuse, sludge from a wastewater treatment plant, water supply treatment plant, or air pollution control facility and other discarded material, resulting from industrial, commercial, mining, and agricultural operations, and from community activities. It is important to note that the definition of solid waste is not limited to wastes that are physically solid. Many solid wastes are liquid, semi-solid, or contained gaseous material.

The improper disposal of solid waste poses a serious threat to environment as well as for the public health. The huge heaps of garbage decay and makes it a breeding spot for disease-causing insects and organisms. Thus, proper waste management is the need of the hour.

In India, the disposal of waste management is done according to the source of solid waste. They can be classified as:



• **Municipal Solid Waste** : It includes biodegradable, recyclable and hazardous domestic wastes. The biodegradable waste includes rotten food, vegetable peel and mostly wet kitchen waste. Recyclable waste includes plastic and hazardous waste include bulb, batteries, etc.

• **Hazardous Solid Waste** : It includes wastes generated from chemical factories, medical waste from hospitals.

Landfills are the most common method of disposing of solid wastes. Modern-day landfills are designed by taking care of various environmental factors and types of wastes, so as to minimize pollution and health risks.

Background:

In order to procure in-depth information about solid waste management in Kohima, I visited three localities, where I interacted with the business owners, shopkeepers & pedestrians to get the required information. The three areas were, namely :-

Location One

-DCP GATE

• It was located in the midst of a highway. The area had a small local vendor market and a fairly neglected living space.

Location Two

-NEW MARKET (SECTOR 2)

• Sector 2 had more commercial dwellings such as metal workshops and a few shops in the vicinity of Naga Hospital.

Location Three

- NEW MARKET (SECTOR 3)

• New Market's Sector 3 housed mostly of shops and one delivery service center (Expressies).

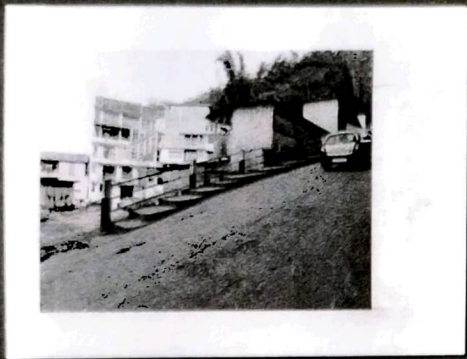
→ The findings from the survey in all three locations are given in the following pages.

Objectives:

To study the solid waste pollution in and around Kohima.

- A questionnaire consisting of ten questions was asked to 4 persons each in all three locations.
- With the aid of the survey using the questionnaire, a concrete conclusion on the source of waste, effect of the waste and control measure was derived for all three locations.
- The detail analysis of the survey in Location 1, Location 2 and Location 3 have been prepared in the following pages.
- It is also to be noted that all file charts, graphs and data arranged are on the basis of the response of the survey done in all three locations.

Location One
-DCP GATE



Response 1

Solid Waste in and around Kohima
-Questionnaire by Supolpeden Kichu , SJC(A).

1) How would you evaluate the state of solid waste collection in your area?
a) Good b) Fair c) Not good

2) What type of wastes comes out from your household/locality?

Ans: *Leftover foods, plastics, etc.*

3) How often is the waste container emptied?

Ans: *Thrice a week.*

4) Where do you usually put away the collected wastes?

Ans: *Outbins*

5) Are there any public bins near your house?

a) Yes b) No

6) Do you separate biodegradable and non-biodegradable wastes?

a) Yes b) No

7) Do you recycle your wastes? If yes, how?

Ans: *No.*

8) Are wastes regularly collected by the Kohima Municipal Council?

a) Yes b) No

9) Have you ever heard about solid waste management?

a) Yes b) No

10) Are there any waste management issues in your locality?

Ans: *No.*

Response 2

Solid Waste in and around Kohima
-Questionnaire by Supolpeden Kichu , SJC(A).

1) How would you evaluate the state of solid waste collection in your area?

- a) Good b) Fair c) Not good

2) What type of wastes comes out from your household/locality?

Ans: *plastics, vegetable leftovers.*

3) How often is the waste container emptied?

Ans: *2 times in a week.*

4) Where do you usually put away the collected wastes?

Ans: *In an open garbage dumping area.*

5) Are there any public bins near your house?

- a) Yes b) No

6) Do you separate biodegradable and non-biodegradable wastes?

- a) Yes b) No

7) Do you recycle your wastes? If yes, how?

Ans: *NO.*

8) Are wastes regularly collected by the Kohima Municipal Council?

- a) Yes b) No

9) Have you ever heard about solid waste management?

- a) Yes b) No

10) Are there any waste management issues in your locality?

Ans: *Yes, since the garbage collectors comes once in a while.*

Solid Waste in and around Kohima
-Questionnaire by Supolpeden Kichu , SJC(A).

Response 3

1) How would you evaluate the state of solid waste collection in your area?

a) Good b) Fair c) Not good

2) What type of wastes comes out from your household/locality?

Ans: Plastic packaging

3) How often is the waste container emptied?

Ans: Once a week.

4) Where do you usually put away the collected wastes?

Ans: A collecting bin in the neighbourhood, where the garbage truck comes to pick it

5) Are there any public bins near your house?

a) Yes b) No

6) Do you separate biodegradable and non-biodegradable wastes?

a) Yes b) No

7) Do you recycle your wastes? If yes, how?

Ans: Yes, we have a kitchen compost pit and we recycle old newspapers and metals.

8) Are wastes regularly collected by the Kohima Municipal Council?

a) Yes b) No

9) Have you ever heard about solid waste management?

a) Yes b) No

10) Are there any waste management issues in your locality?

Ans: Just the inconsistency in the common bin. in cleaning

Response 4

Solid Waste in and around Kohima
-Questionnaire by Supolpeden Kichu , SJC(A).

1) How would you evaluate the state of solid waste collection in your area?
a) Good b) Fair c) Not good

2) What type of wastes comes out from your household/locality?

Ans: *Municipal waste*

3) How often is the waste container emptied?

Ans: *Sometimes (monthly)*

4) Where do you usually put away the collected wastes?

Ans: *Open area*

5) Are there any public bins near your house?

a) Yes b) No

6) Do you separate biodegradable and non-biodegradable wastes?

a) Yes b) No

7) Do you recycle your wastes? If yes, how?

Ans: *Yes. Collection of empty bottles and jars to contain various items*

8) Are wastes regularly collected by the Kohima Municipal Council?

a) Yes b) No

9) Have you ever heard about solid waste management?

a) Yes b) No

10) Are there any waste management issues in your locality?

Ans: *Yes. Open dumping of garbage resulting in unhygienic environment.*

Source:

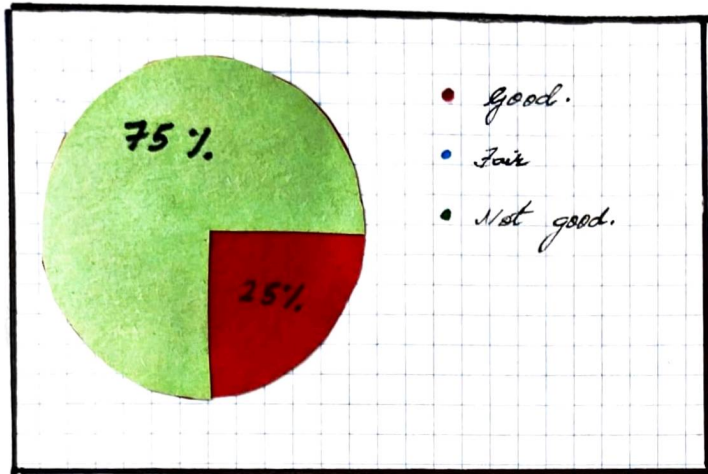
→ Based on the observation of Location 1, the following are the main sources of solid waste :-

- Houses (around 5 in number)
- Market place.
- Construction work
- Shops.

→ Also, on the basis of the 4 responses of the questionnaire in Location 1 (DLP Gate), the following were the most common types of wastes generated :-

- Leftover foods, plastics, etc.
- Plastics, vegetable leftovers.
- Plastic packaging.
- Municipal waste.

Effects:

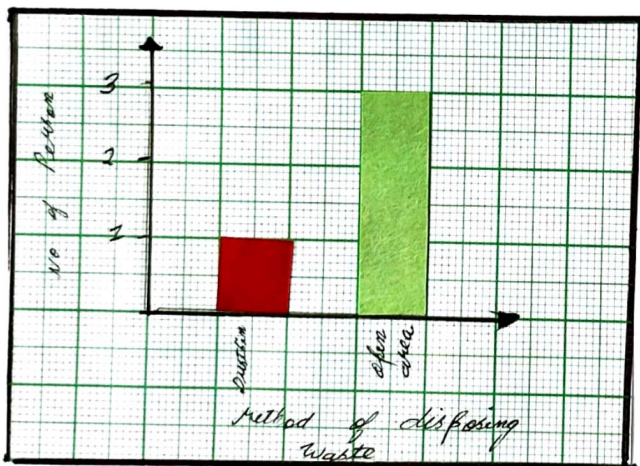


How would you evaluate the state of solid waste collection in your area?

a) Good b) Fair c) Not good

Fig 1

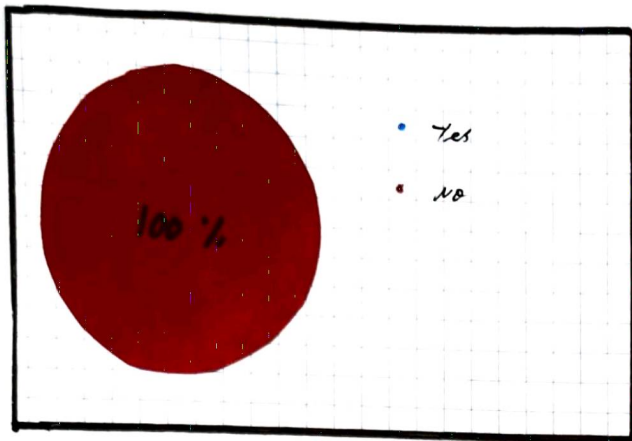
Based on the above pie chart, 75% (3 out of 4 people) agree that waste management is not good in Location 1.



Where do you usually put away the waste collected?

Fig 2

With reference to the graph in Fig 2, it is clear that three households dump their waste in the open area which results in the unhygienic living condition of Location 1.



Are wastes regularly collected by KMC?

Fig. 3

Out of the 4 responses obtained, all 4 participants reported that the wastes are not being collected by Kohima Municipal Council.

Problems faced IN LOCATION 1 :

On the basis of the responses recorded from the questionnaire, the following are the core waste management issues in DLP Gate area :-

- Garbage collection comes only once in a while.
- Inconsistent clearing of the common bin.
- Open dumping of garbage.

Control Measure

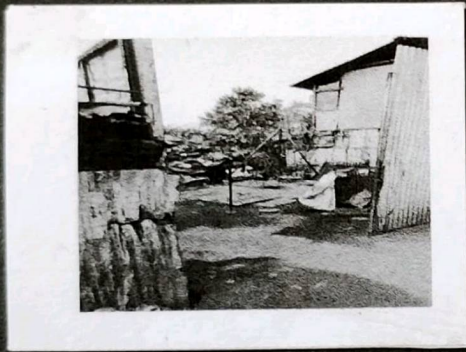
• The colony chairman or the colony youth organization can assemble together and request the Hokima Municipal Council to regularly come and collect the garbage.

• A specific dumping area with well-built walls in a corner will benefit the colony so as to avoid littering of the streets.

• Street vendors and shopkeepers should substitute plastic bags with newspaper wrap-pings as plastics are non-biodegradable.

• Monthly mass social work could be implemented so as to keep the surrounding area tidy, especially since DCP gate is located around the busy corner of Hokima.

Location Two
- NEW MARKET (SECTOR 2)



Solid Waste in and around Kohima

-Questionnaire by Supolpeden Kichu , SJC(A).

Response 1

1) How would you evaluate the state of solid waste collection in your area?
a) Good b) Fair c) Not good

2) What type of wastes comes out from your household/locality?

Ans: Metal scrap wastes and spare car parts.

3) How often is the waste container emptied?

Ans: Almost everyday.

4) Where do you usually put away the collected wastes?

Ans: It is usually piled up in a corner.

5) Are there any public bins near your house?

a) Yes b) No

6) Do you separate biodegradable and non-biodegradable wastes?

a) Yes b) No

7) Do you recycle your wastes? If yes, how?

Ans: I try to sell the metal scraps to Loha Tina
(~~the~~ metal collectors)

8) Are wastes regularly collected by the Kohima Municipal Council?

a) Yes b) No

9) Have you ever heard about solid waste management?

a) Yes b) No

10) Are there any waste management issues in your locality?

Ans: No issues.

Response 2

Solid Waste in and around Kohima
-Questionnaire by Supolpeden Kichu , SJC(A).

1) How would you evaluate the state of solid waste collection in your area?
a) Good b) Fair c) Not good

2) What type of wastes comes out from your household/locality?

Ans: *Biodegradable and non-biodegradable wastes.*

3) How often is the waste container emptied?

Ans: *About twice a week.*

4) Where do you usually put away the collected wastes?

Ans: *In a dumping bag.*

5) Are there any public bins near your house?

a) Yes b) No

6) Do you separate biodegradable and non-biodegradable wastes?

a) Yes b) No

7) Do you recycle your wastes? If yes, how?

Ans: *We utilize vegetable peels as compost, use newspapers to wrap things, reuse old clothes as aprons, and mittens.*

8) Are wastes regularly collected by the Kohima Municipal Council?

a) Yes b) No

9) Have you ever heard about solid waste management?

a) Yes b) No

10) Are there any waste management issues in your locality?

Ans: *None so far.*

Response 3

Solid Waste in and around Kohima
-Questionnaire by Supolpeden Kichu , SJC(A).

1) How would you evaluate the state of solid waste collection in your area?
a) Good b) Fair c) Not good

2) What type of wastes comes out from your household/locality?

Ans: *Regular domestic wastes.*

3) How often is the waste container emptied?

Ans: *Twice a week*

4) Where do you usually put away the collected wastes?

Ans: *The municipal waste truck.*

5) Are there any public bins near your house?

a) Yes b) No

6) Do you separate biodegradable and non-biodegradable wastes?

a) Yes b) No

7) Do you recycle your wastes? If yes, how?

Ans: *No, we don't recycle wastes.*

8) Are wastes regularly collected by the Kohima Municipal Council?

a) Yes b) No

9) Have you ever heard about solid waste management?

a) Yes b) No

10) Are there any waste management issues in your locality?

Ans: *Not regularly. However, sometimes residents do incinerate their wastes.*

Response 4

Solid Waste in and around Kohima

-Questionnaire by Supolpeden Kichu , SJC(A).

1) How would you evaluate the state of solid waste collection in your area
a) Good b) Fair c) Not good

2) What type of wastes comes out from your household/locality?

Ans: kitchen wastes and plastic/paper wrappers.

3) How often is the waste container emptied?

Ans: Once a week.

4) Where do you usually put away the collected wastes?

Ans: we put the waste in the backyard until the day the garbage truck comes.

5) Are there any public bins near your house?

a) Yes b) No

6) Do you separate biodegradable and non-biodegradable wastes?

a) Yes b) No

7) Do you recycle your wastes? If yes, how?

Ans: No.

8) Are wastes regularly collected by the Kohima Municipal Council?

a) Yes b) No

9) Have you ever heard about solid waste management?

a) Yes b) No

10) Are there any waste management issues in your locality?

Ans: Since there is no proper dumping area in our locality, we can dispose off our wastes only once every week, which becomes a problem on days when there is an increase in the amount of wastes generated.

Source :

→ Based on close observation of Location 2, the main sources of solid wastes are listed as follows :-

- Metal workshops.
- Carpentry workshop
- Grocery stores
- Common dumping area.

→ Also, on the basis of the 4 responses of the survey in Location 2 (New Market Sector 2), the following were the most common types of waste :-

- Metal scrap wastes and spare car parts
- Biodegradable and non-biodegradable wastes.
- Regular domestic wastes.
- Kitchen wastes and plastic paper wrappers.

Effects :

Do you separate biodegradable and non-biodegradable wastes ?

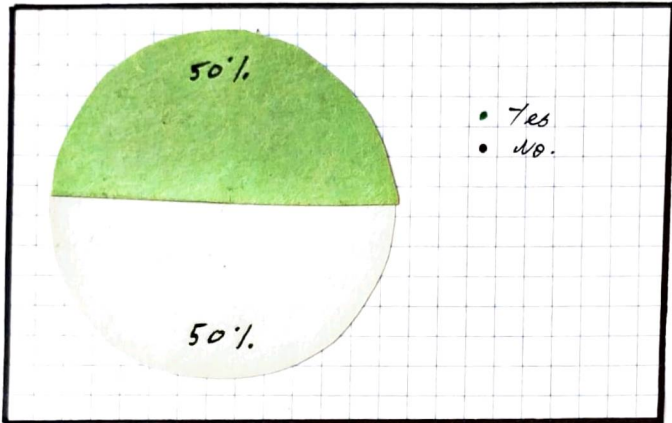


Fig. 1

Fig 1 shows that 2 out of 4 separate their waste, while an equal 2 out of 4 do not separate biodegradable and non-biodegradable wastes.

Where do you usually put away the waste collected ?

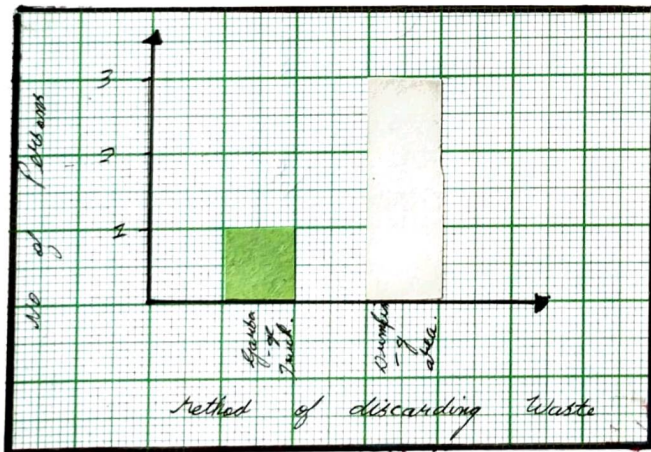
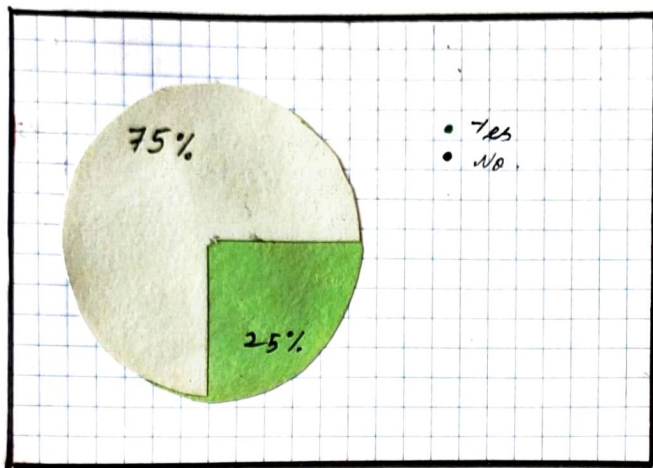


Fig. 2

Fig 2, statistically shows that 3 out of 4 discard their wastes in the open dumping area which results in the unclean condition of location 2.



Have you ever heard about solid waste management?

Fig. 3

In fig 3, only 1 person had knowledge about solid waste management, while 3 of them had no idea about it.

Problems faced

IN LOCATION 2 :

On the basis of the response recorded in location 2, the following are the main waste management problems :-

- Sometimes residents incinerate their wastes which adds to air pollution.
- There is no proper dumping area and KMC comes only once a week and it becomes a problem when there is a huge amount of wastes generated.

Control Measure

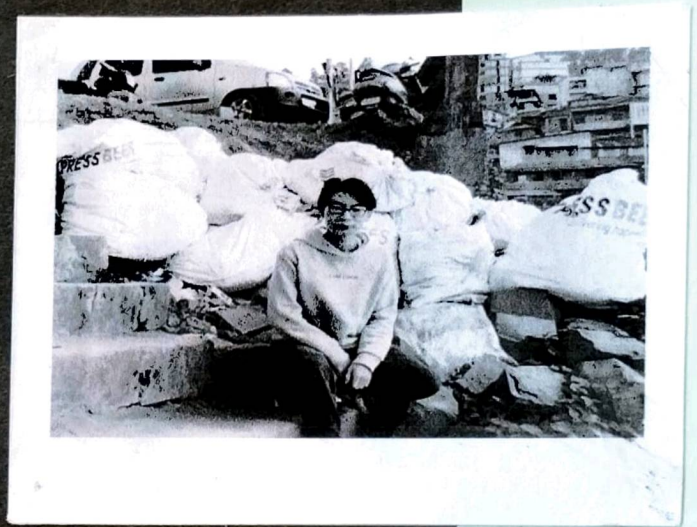
- Separate bins for biodegradable and non-biodegradable wastes should be more strictly emphasized.

- The biodegradable wastes such as vegetable peels can be used as manure or can even make a compost pit.

- Since New Market (Sector 2) is located around Naga Hospital and it is a frequently visited area, it will be a wise idea to put up a billboard with graphic illustrations on how to rightly manage solid waste.

- Wastes should be more vigorously collected by KMC like 2 times a week and a proper common dumping area should be made.

Location Three
- NEW MARKET (SECTOR 3)



Response 1

Solid Waste in and around Kohima
-Questionnaire by Supolpeden Kichu , SJC(A).

1) How would you evaluate the state of solid waste collection in your area?
a) Good b) Fair c) Not good

2) What type of wastes comes out from your household/locality?

Ans: *Mostly paper and plastic waste.*

3) How often is the waste container emptied?

Ans: *1-2 times a week.*

4) Where do you usually put away the collected wastes?

Ans: *In a common dust bin.*

5) Are there any public bins near your house?

a) Yes b) No

6) Do you separate biodegradable and non-biodegradable wastes?

a) Yes b) No

7) Do you recycle your wastes? If yes, how?

Ans: *No.*

8) Are wastes regularly collected by the Kohima Municipal Council?

a) Yes b) No

9) Have you ever heard about solid waste management?

a) Yes b) No

10) Are there any waste management issues in your locality?

Ans: *There are a few. Like people throwing garbage on the roadsides and such.*

Response 2

Solid Waste in and around Kohima
-Questionnaire by Supolpeden Kichu , SJC(A).

1) How would you evaluate the state of solid waste collection in your area?

a) Good b) Fair c) Not good

2) What type of wastes comes out from your household/locality?

Ans: *Biodegradable and non-biodegradable.*

3) How often is the waste container emptied?

Ans: *Once in a week.*

4) Where do you usually put away the collected wastes?

Ans: *Deposit it in colony dustbin pickup.*

5) Are there any public bins near your house?

a) Yes b) No

6) Do you separate biodegradable and non-biodegradable wastes?

a) Yes b) No

7) Do you recycle your wastes? If yes, how?

Ans: *Upcycling plastics to crafts / reusable items.*

8) Are wastes regularly collected by the Kohima Municipal Council?

a) Yes b) No

9) Have you ever heard about solid waste management?

a) Yes b) No

10) Are there any waste management issues in your locality?

Ans: *Yes, waste segregation.*

Response 4

Solid Waste in and around Kohima
-Questionnaire by Supolpeden Kichu , SJC(A).

1) How would you evaluate the state of solid waste collection in your area?

- a) Good b) Fair c) Not good

2) What type of wastes comes out from your household/locality?

Ans: *Both biodegradable and non-biodegradable.*

3) How often is the waste container emptied?

Ans: *Once a week.*

4) Where do you usually put away the collected wastes?

Ans: *Just bins and biodegradable containers.*

5) Are there any public bins near your house?

- a) Yes b) No

6) Do you separate biodegradable and non-biodegradable wastes?

- a) Yes b) No

7) Do you recycle your wastes? If yes, how?

Ans: *No.*

8) Are wastes regularly collected by the Kohima Municipal Council?

- a) Yes b) No

9) Have you ever heard about solid waste management?

- a) Yes b) No

10) Are there any waste management issues in your locality?

Ans: *No.*

Source:

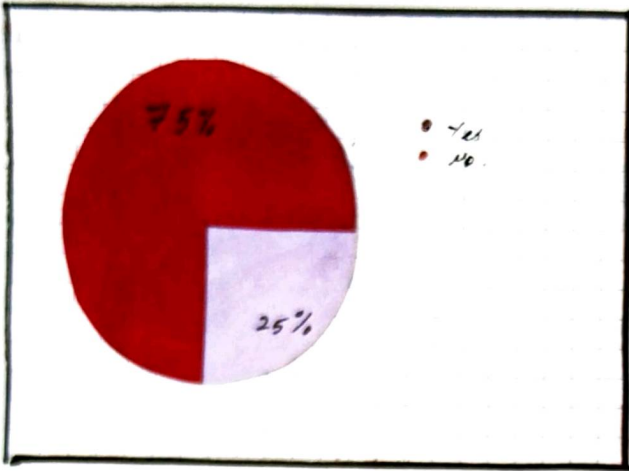
→ Based on the observation of location 3, the following are the main sources of solid waste :-

- Express Beer Delivery Centre.
- Shops
- Households
- Poultry and meat shops.

→ Also, on the basis of the 4 responses of the questionnaire in Location 3 (New Market: Sector 3), the following are the common wastes found :-

- Mostly paper and plastic waste.
- Biodegradable and non-biodegradable.
- Kitchen and household wastes.
- Carton boxes and wrappers.

Effects :



Are there any public bins around your house?

Fig. 1

Based on Fig 1, 75% (3 out of 4) responded that there are no public bins around their homes which results in the littering of the streets.

How often is the waste container emptied?

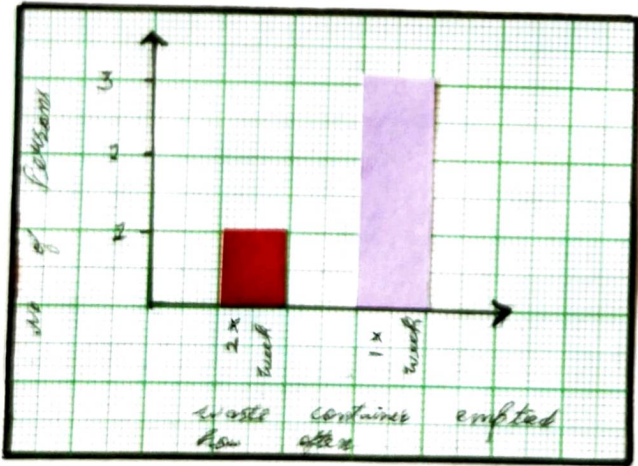


Fig. 2

Fig 2 indicates that 3 persons empty their wastes only once a week as the visits by the KMC is not regular.

Do you recycle your wastes? If yes, how?

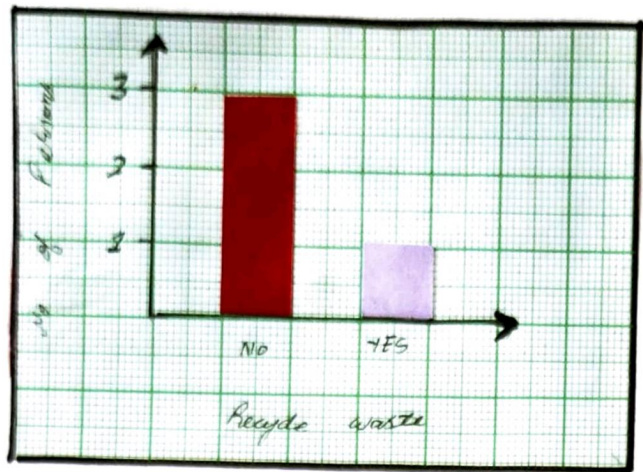


Fig. 3

In fig 3, only one person out of 4 persons recycle their wastes by upcycling plastic to crafts or other reusable items and 3 out of 4 do not recycle their wastes.

Problems faced

IN LOCATION 3:

On the basis of the responses recorded in location 3, the following are the leading waste management issues :-

- Due to unavailability of public bins, garbage is being thrown on the roadsides
- The problem of waste segregation is also common.
- No regular KMC service.

Control Measure

• Provision of public bins in strategic locations will ensure that the wastes from the shops or nearby slave-ellings do not litter the roads.

• Old newspapers, books, cartoons, or unused metal scraps or spare car parts can be sold to the scrap collectors.

• In order to reduce the amount of plastic usage, carrying a tote bag or cloth bag is a good idea as it is both reusable and sustainable in the long run.

• Old clothes can be collected and donated to orphanages. Crafts on how to recycle wastes can also be taught in schools. Also, existing legislations on solid waste management should be more stern and actively followed.

Conclusion:

Through the assignment on the topic of 'Solid waste in and around Kohima', I was able to rattle out from my comfort zone and explore new locations in Kohima so as to procure legitimate information about solid waste management and pollution in Kohima. By and large, this assignment gave me a new perspective on the realities of solid waste pollution in Kohima. Though Kohima is a big town, through my survey, I realised that the problems faced in all three locations of my survey were more or less the same. The need of the hour is consistent and diligent efforts on the part of the localities' head. As we are heading towards a more sustainable planet, not only the 3 B's (Reduce, Reuse and Recycle) but also the 3 C's (Communication, Creativity, Cooperation) is required to ensure a better dwelling place for all to live.

Referency:

- Goyal & Lal Prakashan, Environmental Education for Class 12, 2018, Goyal Brothers Prakashan, New Delhi.
- <https://byjus.com/biology/solid-waste-management/>
- <https://www.epa.gov/hw/criteria-definition-solid-waste-and-solid-and-hazardous-waste-exclusions>
- Location 1 Questionnaire : Response 1, 2, 3 and 4.
- Location 2 Questionnaire : Response 1, 2, 3 and 4.
- Location 3 Questionnaire : Response 1, 2, 3 and 4.