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### Modified loading *Rickshaw* and its acceptability among scrap collectors

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#### Abstract

Scrap or waste collectors of India, the unsung environmental heroes collect scrap/ waste from individual households, sort and process the scrap, and sell the materials to larger recyclers for very small amounts of money (Drake, 2018). This paper showed the acceptability of the modified 'LR' (GSLR) among Scrap Collectors. The main aim of this research was to identify the problems of scrap collector and as per the problems, to make changes in current 'Loading *Rickshaw*' that help to make their work more effectively with less expenses. Findings of the present study revealed that majority of the respondents (43.00%) belonged to 30-35 years of age were educated up to primary class (55.00%) present study further revealed that 52.00 percent respondents' monthly income was Rs. 10000-14000. The present study revealed that majority of scrap collectors collected 50-100 kg of scrap on an average per day (53.00%). It was found that 93.00 percent respondents felt discomfort and sweating due to scorching heat in the summer season. Regarding health problems faced by the scrap collectors, 64.00 percent of respondents reported tiredness and fatigue, followed by body pain (61.00%). As per the problem faced by scrap collectors modifications in 'LR'. It was found that modifications in 'LR' "removable roof shade/canopy" and "change in drive gear in *rickshaw*" were medium to highly acceptable in terms of comfortability, suitability, compatibility followed by "partitions in the cart provided". For the modification of the Loading *Rickshaw*, locally available materials were used so that modification could easily be done by the *Raddiwalas / Kabadiwalas*. Existing Loading *Rickshaw* was modified named as Gahlawat Sehgal Loading *Rickshaw* (GSLR). It was a low- cost technology.

**Keywords:** Scrap, acceptability, canopy, scrap collector, chain drive gear, GSLR

#### Introduction

India has a vibrant recycling industry with 56.00 percent of its recyclable waste being recovered. As per a study conducted by Columbia University in 2012, India also has one of the highest recycling rates for plastic PET bottles, at 70 percent. This dynamic and surprisingly efficient system of waste management stands solid on the shoulders of scrap collectors who belong to the informal sector (Walani, 2017) [2].

According to Admin (2018) [3] collecting scrap was not without its risks. Scrap collectors should always wear/use basic safety equipment like gloves, goggles, work boots and should bring a first aid kit with them during collection of scrap and should wear protective kit. All these can help to protect their eyes and fingers from accidents.

Agarwal *et.al.* (2015) [4] revealed that one of the good things about household waste was that not all of it was waste. If we would have been more careful with this and think before tossing something in the garbage, this could drastically reduce the amount of waste. Many recycling programs accept paper, glass, bottles, cans, and numerous other items which could be broken down and reused. Light bulbs, batteries, and household cleaners on the contrary were actually hazardous waste. It was important to handle them safely and ensure that they were disposed of properly so that

they do not cause any harm.

#### Objective

- Modification of Loading *Rickshaw*.
- To study the acceptability of the modified Loading *Rickshaw*.

#### Methodology

For the first two objectives, the sample comprised of 100 scrap collectors from four districts Hisar, Fatehabad, Bhiwani and Dadri who were selected by snow ball technique (25 respondents from each district). For the 3<sup>rd</sup> objective, two districts i.e. Hisar and Dadri were randomly selected. So, out of 50 respondents, 30 respondents were purposively selected from Hisar and Dadri (15 from Hisar and 15 from Dadri) who were found to be having low to medium knowledge and were interested and willing to cooperate for undergoing the study on acceptability of the device modified by the researcher.

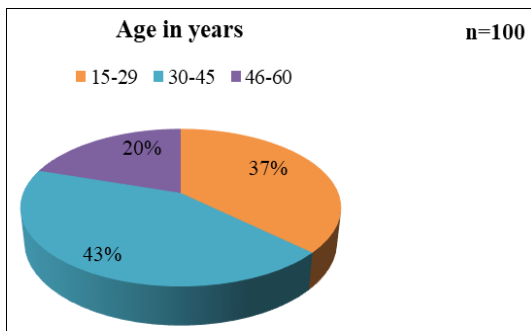
#### Tools and techniques of data collection

Data were collected through a well-structured and pretested interview schedule, comprising of different sections as per the objectives of the study.

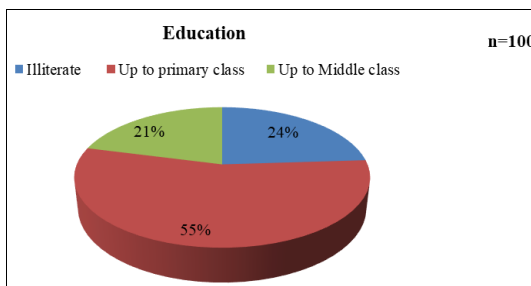
**Results**

**Background profile of the respondents**

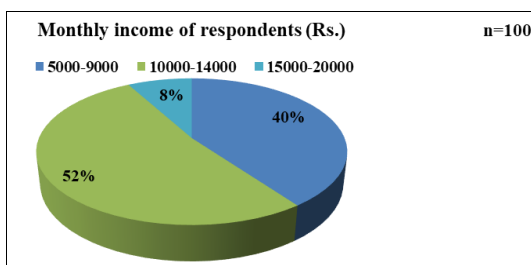
The data showed that majority of the respondents (43.0%) belonged to the age group 30-45 years followed by age group 15 to 29 years i.e. 37.0 percent and only 20.0 percent were in the age group of between 46 to 60 years of age (fig. 1). In terms of education majority of the respondents i.e. 55.0 percent were educated up to primary class followed by 24.0 percent who were illiterate and 21.0 percent of the respondents had studied up to middle class showed in (fig. 2) and monthly income of the respondents was between Rs. 10000-14000/- (52.00%) followed by between Rs. 5000-9000/- (40.00%) and only 08.00 percent of the respondents had monthly income between Rs. 15000-20000/- (fig. 3)



**Fig. 1: Age of the respondents**

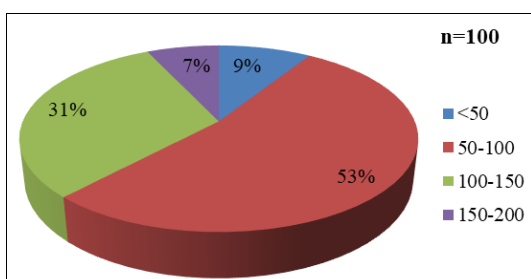


**Fig 2: Education of the respondents**



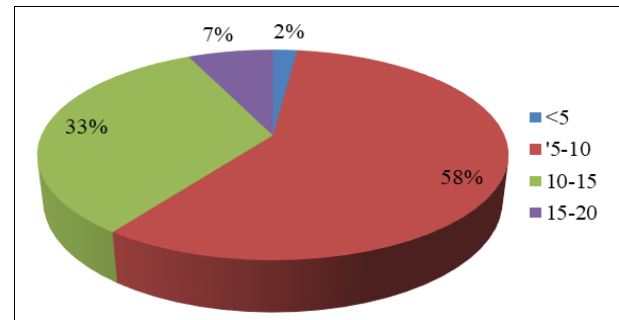
**Fig 3: Monthly Income of the respondents**

**Work pattern of the respondents**



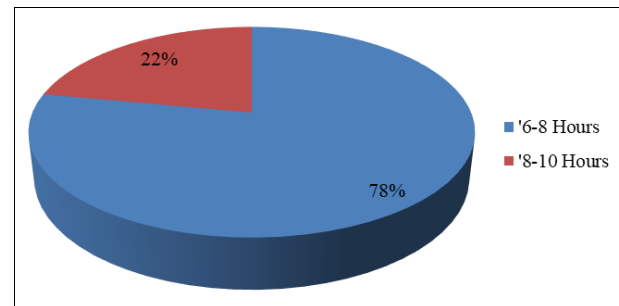
**Fig 4: Average weight of scrap collected per day (kg)**

The data regarding work pattern of the respondents showed that 53.0 percent of the respondents collected 50-100 kg of scrap on an average per day followed by 31.00 percent who collected 100 to 150 kg of scrap whereas 9.0 percent of the respondents collected less than 50 kg of scrap per day and only 7.0 percent of the respondents collected 150-200 kg of scrap per day (fig. 4).



**Fig 5: Average distance covered per day for scrap collection**

Data regarding average distance covered per day revealed that more than half of the respondents (58.0%) covered total 5 to 10 kilometers distance per day for the scrap collection followed by 33.0 percent that travelled 10 to 15 kilometers, 7.0 percent of the respondents travelled 15 to 20 kilometers per day and only 2.0 percent of the respondents travelled less than 5 kilometers per day for scrap collection (fig. 5).



**Fig 6: Average time spent per day for scrap collection**

Data regarding average time spent per day by respondents for scrap collection depicted that 78.0 percent of the respondents on average worked for 6-8 hours followed by 22.0 percent who worked for 8 to 10 hours per day (fig. 6). Data in table 1 reflected that 93.0 percent respondents felt discomfort and sweating due to scorching heat in the summer season. Regarding health problems faced by the scrap collectors, 61.00 percent of the respondents reported body pain, 63.0 percent had felt tiredness and fatigue followed by skin irritation/allergy and eye irritation respectively.

**Table 1: Problems faced by the scrap collectors**

| Sr. No. | Physical/ Health problems   |       |
|---------|---|-------|
| 1.      | Skin irritation/ skin allergy   | 34.00 |
| 2.      | Eye irritation  | 20.00 |
| 3.      | Body pain   | 61.00 |
| 4.      | Tiredness/ fatigue  | 63.00 |
| 5.      | Too much discomfort and sweating due to scorching heat in the summer season | 93.00 |

**Modifications done in existing Loading Rickshaw**

Existing Loading *Rickshaw* was modified named as Gahlawat Sehgal Loading *Rickshaw* (GSLR). Under objective 1, based on the major problems faced by the scrap collectors and as per their suggestions, following modifications were done in the existing ‘Loading *ricksshaw*’ being used by the scrap collectors.

1. Provision of detachable roof/canopy (made of fibre sheet covered with jute cloth) for protecting them from scorching heat in summer season. Plate 1, 2 and 3 showed roof shade/canopy in modified Loading Rickshaw (GSLR). The material used to make the roof/canopy is easily available. Material used can be easily found out of scrap collected by them which make it cost effective.



**Plate 1, 2 & 3:** Pictures of Roof shade/Canopy in Modified Loading *Rickshaw* (GSLR)

Plate 4, 5 & 6 showed adjustable and detachable canopy which was easy to install by scrap collector themselves secondly height of canopy can be adjusted according to the height of the scrap collectors that was necessary part of modification because every person have different height.



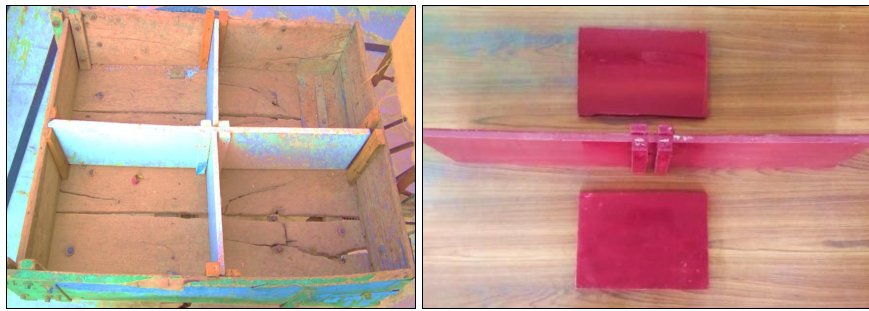
**Plate 4, 5 & 6:** Pictures of adjustable and detachable canopy

2. Provision of four partitions in cart (detachable and made of plywood) for making it easier for scrap collectors to segregate scrap. These plywood partitions can be removed and placed back if required). Plate 7 and 8 showed the partitions in cart of modified Loading *Rickshaw* (GSLR)



**Plate 7:** Partitions shown in cart of Modified Loading *Rickshaw* (GSLR)





**Plate 8 & 9:** Pictures of detachable partitions of cart

3. Change in drive wheel/gear of rickshaw (number of teeth reduced from 43 to 31) for avoiding their fatigue and body pain. Plate 10 and 11 showed the comparison of existing and modified chain drive gear last up gradation in Loading Rickshaw. It also helps scrap collectors to drive loading rickshaw easily.



**Plate 10:** Comparison of existing and modified Chain Drive Gear



**Plate 11:** Modified Chain Drive Gear (Number of teeth reduced from 43 to 31)

**Acceptability of the modified ‘LR’ (GSLR)**

Acceptability was taken in terms of comfortability, suitability, relative advantage and compatibility of ‘GS Loading Rickshaw’. It was showed in table 2, that the perceived acceptability in terms of comfortability of the technology was maximum in case of “useful in the scorching heat” and “Less force as compare to old gear” (WMS = 2.86) followed by “easy in pulling loading rickshaw” (WMS=2.33). Table further indicated that perceived acceptability in terms of suitability of the technology which was maximum in case of “Driving rickshaw causes less fatigue now” (WMS=2.83) followed by “Able to cover more distance per day now” (WMS=2.76). The perceived acceptability in terms of relative advantage was maximum in case of the “partition provided are useful” (WMS=2.23) followed by “Saves time in handling (managing) scrap” (WMS=2.10).

Data in table further indicated that modifications in ‘LR’ recommended to others it was found that “removable roof shade/canopy” and “change in drive gear in rickshaw” were highly acceptable (WMS=2.90 and WMS=2.83 respectively) followed by “partitions in the cart provided” (WMS=2.26). Additionally data depicted perceived acceptability in terms of compatibility and it was found that technology was compatible in terms of “based on need and interest” (WMS=2.36) followed by “can be adopted independently” (WMS=2.30) and “according to existing technology socially acceptable” (WMS=2.26).

**Table 2:** Acceptability of the modified ‘LR’ (GSLR) (n=30)

| Sr. No.   | Acceptability   | Most acceptable | Acceptable | Not at all Acceptable | WMS | MS   | Rank | Acceptability |
|-----------|---|-----------------|------------|-----------------------|-----|------|------|---------------|
| <b>1.</b> | <b>Comfortability</b>                                 |                 |            |                       |     |      |      |               |
| i.        | Useful in the scorching heat (shade provided)         | 26 (78)         | 4 (8)      | -                     | 86  | 2.86 | II   | High          |
| ii.       | Comfortable in pulling rickshaw due to shade provided | 10 (30)         | 20 (40)    | -                     | 70  | 2.33 | VII  | Medium        |
| iii.      | Less force as compare to old gear                     | 26 (78)         | 4 (8)      | -                     | 86  | 2.86 | II   | High          |
| <b>2.</b> | <b>Suitability</b>                                    |                 |            |                       |     |      |      |               |
| i.        | Driving rickshaw causes less fatigue now              | 25 (75)         | 5 (10)     | -                     | 85  | 2.83 | III  | High          |
| ii.       | Able to cover more distance per day now               | 23 (69)         | 7 (14)     | -                     | 83  | 2.76 | IV   | High          |
| <b>3.</b> | <b>Relative advantage</b>                             |                 |            |                       |     |      |      |               |
| i.        | Partitions provided are useful                        | 10 (30)         | 17 (34)    | 3 (3)                 | 67  | 2.23 | IX   | Medium        |
| ii.       | Saves time in handling (managing) scrap               | 6 (18)          | 21 (42)    | 3 (3)                 | 63  | 2.10 | X    | Medium        |
| <b>4.</b> | <b>Recommend to others</b>                            |                 |            |                       |     |      |      |               |
| i.        | Removable of roof shade/canopy provided               | 27 (81)         | 3 (6)      | -                     | 87  | 2.90 | I    | High          |
| ii.       | Partition in the cart provided                        | 10 (30)         | 19 (38)    | -                     | 68  | 2.26 | VIII | Medium        |
| iii.      | Chain in drive gear in rickshaw                       | 25 (75)         | 5 (10)     | -                     | 85  | 2.83 | III  | High          |
| <b>5.</b> | <b>Compatibility</b>                                  |                 |            |                       |     |      |      |               |
| i.        | Social acceptability                                  | 14 (42)         | 13 (26)    | 3 (3)                 | 71  | 2.36 | VI   | High          |
| ii.       | Based on need and interest                            | 13 (39)         | 17 (34)    | -                     | 73  | 2.43 | V    | High          |
| iii.      | Can be adopted independently                          | 11 (33)         | 16 (32)    | 3 (3)                 | 68  | 2.26 | VIII | Medium        |

Range- 0-1.66 (LOW), 1.67- 2.33 (Medium), 2.34- 3.0 (High)

### Approximate cost of modified LR (GSLR)

The approximate costs of LR (GSLR) were depicted in the table 3. The data showed that for the GSLR items were used for modification of Roof shade/Canopy was Rs. 500/- four detachable partitions of cart cost was Rs. 250/- and chain drive gear cost was Rs. 250/-, that's why total cost of modified Loading *Rickshaw* named GSLR were Rs. 1000/- For the modification of LR, locally available material was used and so the modification could easily be done by the *Raddiwalas / Kabadiwalas*. It was a low- cost technology. Also, it was easy to use and durable.

**Table 3:** The approximate cost of modified LR (GSLR)

| Sr. No. | Category                           | Price (Rs.) |
|---------|------------------------------------|-------------|
| 1.      | Roof shade/ canopy                 | 500         |
| 2.      | Four Detachable partitions of cart | 250         |
| 3.      | Chain drive gear                   | 250         |
|         | Total                              | 1000        |

### Discussion

It was found that maximum number of the respondents felt discomfort and sweating due to scorching heat in the summer season, more than half of the respondents reported tiredness, fatigue and body pain due to pulling *rickshaw*. In the present study, it was found that the perceived acceptability in terms of comfortability of the roof shade/ canopy was maximum in case of “useful in the scorching heat.” Saini (2015) <sup>[6]</sup> also supported the present study by reporting that proper shed for *rickshaw* pullers can protect them from scorching heat of sun. For the modification of loading *rickshaw* locally available material were used mainly from scrap collected by scrap collectors themselves in daily routine, it was very easy to repair by themselves like canopy and partition so the modification could easily be done by the scrap collectors. It was a low cost technical upgrade.

### Summery and Conclusion

Based on the major problems faced by the scrap collectors and as per their suggestions, modifications were done in the existing device i.e., ‘Loading *Rickshaw*’ used by the scrap collectors. Regarding acceptability of the modified ‘Loading *Rickshaw*’ named ‘Gahlawat Sehgal Loading *Rickshaw*’ (GSLR) was found medium to highly acceptable among the scrap collectors. Canopy was made with the material which is easily available and acceptable by the scrap collectors. It is a low cost upgrade, easy to use and install by scrap collector themselves and change of chain drive gear was one time investment that made easy to pull ‘Loading *Rickshaw*’ than earlier and reduce fatigue and body pain of scrap collectors.

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