

# Consumer's Perception about Use of Recycled Water for Urban Agriculture

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## Abstract

*Urban agriculture could provide a complementary strategy to reduce urban poverty, food insecurity and enhance urban environmental management. Use of typical urban resources could include labour, organic waste and urban waste water for irrigation. However before implementing such a project, the view point of consumers needs to be considered. This study carried out in urban Punjab attempts to understand consumers' perception about use of waste water for promoting urban agriculture. The study reveals that over 80 per cent of the respondents in urban areas are willing to use recycled water provided quality of treated water is assured. In addition, proper education of the consumers and transparency about quality of waste water will lead to sure success of the project.*

## Introduction

The state of Punjab came into limelight in 1960's after ushering in green revolution which helped the country move from a food deficit to a food surplus state. However, now it is reeling under negative water balance mainly due to intensive cultivation. The state at present faces a total shortfall of 1.43 m ha m (million hectare metre) as a result of more and more underground water being pumped out. The over exploitation of underground water resources led to annual fall in water table up to 75 cm. In some of the over exploited development blocks in central districts the fall in water table is up to 100 cm. In this scenario the conservation of water becomes a primary agenda for the state. The rural population has already felt the pinch when a couple of years ago the centrifugal pumps stopped yielding water and farmers had to go for submersible pumps. The installation of submersible pumps involved heavy expenditure and high energy input to pump out water. At present over 30 per cent tubewells are already drawing water from a depth of more than 200 metres.

With increase in total population the demand for food is increasing. At the same time increase in income of urban population is creating a demand for quality food, which includes fruits, vegetables, milk, meat etc. Thus leaving mass food

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production to the countryside, there is a scope for production of high value food in urban areas. Urban agriculture activities may take place on the homestead (on-plot), on the terrace of the house in specially designed pots/tubs etc. or on land away from the residence (off-plot), on private land, on public land (parks, conservation areas, along roads, streams and railways), or semi public land (schoolyards and hospitals etc). Urban agriculture could be a means to transform urban waste to healthy food. Use of typical urban resources could include labour, organic waste as manure and urban waste water for irrigation. Thus urban agriculture could provide a complementary strategy to reduce urban poverty, food insecurity and enhance urban environmental management.

Theoretically the reuse of water is very important and it is the need of the hour to conserve our natural resources for posterity. However, from the consumer's point of view, use of waste water is a very sensitive matter particularly its door to door supply for kitchen gardening and landscape. Thus the consumer's view point is very important and needs to be considered before implementing such a project. Keeping this objective in view a systematic study was carried out in urban Punjab to know the consumer's perception about use of waste water for promoting urban agriculture.

## **Methodology**

The study was conducted in Punjab state. Five cities and towns were selected viz., Ludhiana, Jalandhar, Faridkot, Gurdaspur and Bhatinda from five agro climatic zones based on the quantity of rainfall and availability of underground water. Quota sampling technique was used in selecting a representative sample for the study. The population of five cities was divided into three strata on the basis of household size, small (plot size <200 sq m), medium (plot size 200-400 sq m) and big (>400 sq m). In addition to the plot size it was also ensured that locations categorized as high, middle and low level on the basis of infrastructure development are also represented. All respondents were living within the municipal limits. The data are collected from primary sources through a structured pre tested questionnaire from 100 respondents from each city. Data has been analysed using simple percentages.

## **Findings and Discussion**

The results are discussed here.

## 1. Perception about Use of Fresh Water

The opinion of the respondents was elicited on whether it was right to use fresh water for agriculture particularly kitchen garden, flower beds and lawns. The respondents living in small households varying from 16 to 81 percent reported that fresh water should not be used for agricultural purposes. In the medium category households the number of respondents who were against the use of fresh water for irrigating lawns were 41 to 80 per cent and in bigger households the corresponding figure varied from 48 to 80 per cent. On an average 58 per cent respondents were not in favour of using fresh water for irrigating lawns (Table 1). however the difference in response from various cities and household size varied.

**Table 1: Percentage of Respondents who are against the use of Fresh Water for Irrigating Lawns and Kitchen Gardens**

|                   | City |     |     |     |     | Mean |
|-------------------|------|-----|-----|-----|-----|------|
|                   | LDH  | JAL | GSP | BTI | FDK |      |
| Small households  | 60   | 16  | 48  | 81  | 59  | 53   |
| Medium households | 45   | 41  | 68  | 80  | 55  | 58   |
| Big households    | 52   | 71  | 48  | 80  | 59  | 62   |
| Mean              | 52   | 43  | 55  | 80  | 58  | 58   |

The same question was repeated for crops i.e. whether it was right to use fresh water for cultivation of crops. The response was almost fifty-fifty. However, there were no marked differences within households size-wise or city-wise (Table 2). Consumer needs greatly influence their behaviour. Needs are the internal motivational states that are aroused by external and internal stimuli. Sources of external stimuli can be social, for example a friend, new information or a new experience. Thus the use of recycled water will depend upon the consumer's need for water. If he is not able to meet his entire demands from a fresh source of supply he will certainly shift to recycled water wherever it can be used. The second factor is the difference in the cost. If the recycled water is free or cheaper than fresh water, the consumer will be motivated to use it.

**Table 2: Percentage of Respondents who are against the Use of Fresh water for Irrigation of crops.**

|                   | City |     |     |     |     | Mean |
|-------------------|------|-----|-----|-----|-----|------|
|                   | LDH  | JAL | GSP | BTI | FDK |      |
| Small households  | 59   | 14  | 42  | 41  | 61  | 43   |
| Medium households | 33   | 41  | 50  | 54  | 40  | 44   |
| Big households    | 55   | 71  | 56  | 80  | 44  | 61   |
| Mean              | 49   | 42  | 49  | 58  | 48  | 49   |

## 2. Willingness to use Recycled Water

The opinion of respondents on the use of recycled water was also elicited. The question put to the respondents was, whether they were actually prepared to use the recycled water for urban agriculture which included kitchen garden and lawns. The respondents in different categories of households willing to use recycled water varied from 59 to 100 percent with an average value of 83 per cent (Table 3). However there was little variation in the response between cities and plot sizes.

**Table 3: Percentage of Respondents who are in favour of using Recycled Water for Irrigating Lawns and Kitchen Gardens**

|                   | City |     |     |     |     | Mean |
|-------------------|------|-----|-----|-----|-----|------|
|                   | LDH  | JAL | GSP | BTI | FDK |      |
| Small households  | 86   | 100 | 83  | 89  | 90  | 90   |
| Medium households | 59   | 100 | 79  | 80  | 82  | 80   |
| Big households    | 70   | 100 | 65  | 95  | 69  | 80   |
| Mean              | 72   | 100 | 76  | 88  | 80  | 83   |

Respondents were asked whether they would use recycled water for irrigation of kitchen gardens and lawns, if the corporation supplied recycled water free and charged for fresh water. As may be seen in Table 4, 79 per cent respondents opined that they would use the recycled water. However the variation in response between city to city and household size was not very high.

**Table 4: Percentage of Respondents who prefer to use Recycled water for Irrigating Lawns and Kitchen Gardens if it is free and fresh water is charged**

|                   | City |     |     |     |     | Mean |
|-------------------|------|-----|-----|-----|-----|------|
|                   | LDH  | JAL | GSP | BTI | FDK |      |
| Small households  | 73   | 97  | 93  | 86  | 84  | 87   |
| Medium households | 61   | 100 | 76  | 78  | 56  | 74   |
| Big households    | 76   | 100 | 52  | 74  | 83  | 77   |
| Mean              | 70   | 99  | 74  | 79  | 74  | 79   |

It is desirable to think of water supply, sanitation and waste-water in an integrated manner especially in big cities, linking it to urban agriculture.

## Conclusion and Recommendations

The study shows that urban consumers (58 per cent) were against the use of fresh water for irrigating lawns and kitchen gardens. The number of respondents who were against the use of fresh water for crops varied from 42 to 58 per cent in different cities. It was observed that urban consumers were aware of water recycling and a majority of them opted for reuse of waste water after treatment. The number of consumers who opted for use of treated waste water for urban agriculture varied from 69 to 100 per cent in different cities with a mean value of 83 per cent. In a nutshell it can be concluded that more than 80 per cent respondents in urban areas are willing to use recycled water provided quality of treated water is assured. In addition, proper education of the consumers and transparency about quality of waste water will lead to sure success of the project.

Since setting up water treatment units for supply of recycled water involves investment which individual households cannot afford, hence it is suggested that municipal corporations, town municipalities may have to take up this project possibly on a public-private partnership mode to help conserve and use the water efficiently and also promote urban agriculture.

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