Appendix - I

Survey on Urban Water Management

SECTION - 1 - YOUR RESIDENCE AND LOCALITY

1. Is the interviewee the head of the household?  
   Yes  No

2. For how long have you been residing in this city?
   - Less than 1 year
   - 2) years
   - 5) years
   - More than 5 years

3. Have you changed your residence within the city?  
   Yes  No

4. You changed your residence because you: (in case you have)
   a. Wanted to shift where the schools and colleges for children are closer
   b. Wanted to shift where offices are closer
   c. The previous place was too noisy, polluted, unsafe, unhealthy
   d. Supply of electricity was poor
   e. Supply of water was poor in quality/quantity
   f. Area of the previous residence was insufficient
   g. Constructed own house or bought a flat and shifted
   h. Other reasons (please specify)

Do you stay in a rented house?  
   Yes  No

5. What is the approximate area of your residence? (in Sq. Ft.)
   a. (500 – 750), or less
   b. (750 – 1000)
   c. (1000 – 1500)
   d. (1500 – 2000)
   e. (2000 – 2500)
   f. (2500 – 3500). If more, please specify

6. Do you consider your locality to be:
   a. Very posh
   b. Not very posh but people are well-to-do
   c. Middle-class locality
   d. Residential area for the lower-middle class

7. How far is the bus stand (or other forms of public transportation) from your place?
   a. Few yards
   b. 1 km
   b. 2 – 3 kms
   c. nearly 5 kms
   d. If more, please specify

8. For how long do you suffer a power cut in your locality?
   a. No power cuts
   b. 1 – 3 hours, a week
   c. 3 – 6 hours, a week
   d. 1 – 3 hours per day
SECTION – 2 – YOUR HOUSEHOLD

9. How much do you (not your family) drink per day? Choose UNIT =>

<table>
<thead>
<tr>
<th>a. 5, or less</th>
<th>e. 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>b. (5 – 10)</td>
<td>f. 5</td>
</tr>
<tr>
<td>c. (10 – 15)</td>
<td>g. 6</td>
</tr>
<tr>
<td>d. (15 – 20)</td>
<td>h. If more, please specify</td>
</tr>
<tr>
<td>e. (20 – 30)</td>
<td></td>
</tr>
<tr>
<td>f. If more, please specify</td>
<td></td>
</tr>
</tbody>
</table>

10. How many buckets of water do you use to wash clothes per day?

<table>
<thead>
<tr>
<th>a. less than 1</th>
<th>e. 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>b. 1</td>
<td>f. 5</td>
</tr>
<tr>
<td>c. 2</td>
<td>g. 6</td>
</tr>
<tr>
<td>d. 3</td>
<td>h. If more, please specify</td>
</tr>
</tbody>
</table>

11. If you have a washing machine, how often do you use it, in a week?

<table>
<thead>
<tr>
<th>a. Once, or less</th>
<th>e. (5 - 6)times</th>
</tr>
</thead>
<tbody>
<tr>
<td>b. Twice</td>
<td>f. Once daily</td>
</tr>
<tr>
<td>c. Thrice</td>
<td>g. Twice daily</td>
</tr>
<tr>
<td>d. 4 times</td>
<td></td>
</tr>
</tbody>
</table>

12. How many buckets of water do you require daily for housecleaning?

<table>
<thead>
<tr>
<th>a. 1 or less</th>
<th>e. 5 – 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>b. 2</td>
<td>f. More than that</td>
</tr>
<tr>
<td>c. 3</td>
<td>g. Prefer vacuum cleaning</td>
</tr>
<tr>
<td>d. 4</td>
<td>h. Other means</td>
</tr>
</tbody>
</table>

13. If you use a dishwasher to clean utensils, how much water it requires, per day? (in buckets)

<table>
<thead>
<tr>
<th>a. Less than 1</th>
<th>e. 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>b. 1</td>
<td>f. 5</td>
</tr>
<tr>
<td>c. 2</td>
<td>g. 6</td>
</tr>
<tr>
<td>d. 3</td>
<td>h. If others, please specify</td>
</tr>
</tbody>
</table>

14. In case you wash utensils by hand, how much water do you require, daily? (in buckets)

<table>
<thead>
<tr>
<th>a. Less than 1</th>
<th>e. 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>b. 1</td>
<td>f. 5</td>
</tr>
<tr>
<td>c. 2</td>
<td>g. 6</td>
</tr>
<tr>
<td>d. 3</td>
<td>h. If others, please specify</td>
</tr>
</tbody>
</table>

15. Your mode of transport is:

<table>
<thead>
<tr>
<th>a. 2-wheeler</th>
<th>c. 4-wheeler</th>
</tr>
</thead>
<tbody>
<tr>
<td>b. 3-wheeler</td>
<td>d. Others, please specify</td>
</tr>
</tbody>
</table>

16. How frequently do you wash your vehicle(s) (if you own one)?

<table>
<thead>
<tr>
<th>a. Twice a week or more</th>
<th>d. Once a month</th>
</tr>
</thead>
<tbody>
<tr>
<td>b. Once a week</td>
<td>e. Less than that</td>
</tr>
<tr>
<td>c. Once a fortnight</td>
<td></td>
</tr>
</tbody>
</table>
17. In case, you wash your vehicle paying money from outside, how much do you spend per wash?
   a. Rs. (20 – 30)  
   b. Rs. (30 – 50)  
   c. Rs. (50 – 75)  
   d. Rs. (75 – 100)  
   e. Rs. (100 – 150)  
   f. More, please specify

18. How many bathrooms are there in your house?
   a. 1 bathroom  
   b. 2 bathrooms  
   c. 3 bathrooms  
   d. 4 bathrooms

19. Which of the below do you prefer to for bathing?
   a. Take a shower  
   b. Use a bathtub  
   c. 1 bucket of water  
   d. 2 buckets  
   e. 3 buckets  
   f. 4/5 buckets

20. In general, how many times do you/any member of your family, bathe? (in summer):
   a. Once a day, or less  
   b. Twice a day  
   c. Thrice a day  
   d. 4 times

21. In general, how many times do you/any member of your family, bathe? (in winter):
   a. Once in two days or less  
   b. Once a day  
   c. Twice a day  
   d. Thrice a day

22. When at home, nearly how many times do you (not your family) use the water flush in a day?
   a. 5 times or less  
   b. 5 – 8 times  
   c. 8 – 12 times  
   d. 12 – 16 times  
   e. 16 – 20 times

23. If you don’t use a flush, how many buckets of water do you use for toiletry purposes per day?
   a. Less than 1  
   b. 1  
   c. 2  
   d. 3  
   e. 4  
   f. 5  
   g. 6  
   h. 7 – 10  
   i. If more, please specify

24. If you have a pet, how much water is spent for drinking/bathing/others, per day? (in buckets)
   a. Less than half  
   b. Half  
   c. 1  
   d. 1 – 2  
   e. 2 – 3  
   f. More than that

25. What is the difference in water consumption across seasons (i.e., in case, you and your family spend more in summer and less in winter) (in buckets)
   a. Nil  
   b. Nearly half  
   c. 1 – 2  
   d. 3 – 5  
   e. 5 – 8  
   f. 8 – 12  
   g. If more, please specify.
SECTION – 3 – MUNICIPALITY WATER

26. Do you have a permanent municipality water pipeline at your residence?  
   [Yes] [No]

27. For how many hours per day do you get municipality water supply?  
   Uninterrupted
   a. 10 – 12 hours, a day
   b. 5 – 10 hours, a day
   c. 3 – 5 hours a day
   d. 1 – 2 hours a day
   e. 1 – 2 hours every alternative day
   f. If less than that, please specify

28. Do you have a separate water meter based on which you pay water charges?  
   [Yes] [No]

29. How much do you pay for municipality water supply per month?  
   a. Rs.(10 – 25), or less
   b. Rs.(25 – 50)
   c. Rs.(50 – 75)
   d. Rs.(75 – 100)
   e. Rs.(100 – 150)
   f. Rs.(150 – 200)
   g. Rs.(200 – 300)
   h. More than that (please specify)

30. If you stay in a rented house, please mention whether:
   a. You pay your water charges
   b. Your landlord pays it, and you pay him a lump some amount

31. If you pay the house-owner a lump some amount for the total use of water, it is:
   a. Rs.(100 – 200)
   b. Rs.(200 – 300)
   c. Rs.(300 – 400)
   d. Rs. (400 – 500)
   e. If more, specify

32. Does this include drinking water, as well?  
   [Yes] [No]

33. If no, what is (are) the source(s) of drinking water?  
   a. Municipality water
   b. Packaged water
   c. Water tankers
   d. Bore well water

34. If you use municipality water for drinking purposes what is the quality?  
   a. Like packaged drinking water
   b. Just drinkable
   c. Tiny suspended particles are visible
d. Unsuitable for drinking and other uses
e. Bad smell
f. Others (please specify)

35. How do you drink the municipality water?

Don't drink Direct Using Filter Boiled

36. If the municipality water is not sufficient to meet your drinking requirements, you?

a. Buy bottled water
b. Buy from public sources (e.g., tankers)
c. Buy from other unorganized sources
d. Drink bore well water
e. Share with your neighbors
f. Others, please specify

37. Approximately, how much of municipality water supply do you utilize?

a. Use totally
b. \( \frac{3}{4} \) th of the supply
c. Half of it
d. \( \frac{1}{4} \) th of it
e. Less than that
f. Can't say

Is that sufficient? Yes No

38. If no, it is because:

a. Timing is inconvenient
b. Low pressure (less water for upper floors)
c. Supply is insufficient
d. You use too much
e. Quality is poor
f. Other reasons (please specify)

39. In case the municipality takes care of your total water needs do you think that there should be two different sources of water – one for drinking and the other for general uses?

Yes No Can't say

40. If yes, would you like to change your consumption pattern of water for general uses?

Use more Use less Unchanged
SECTION – 4 – BORE WELL AND PUMPS

41. Do you use bore well (tube well) water?  
   Yes [ ]  No [ ]

42. If yes, is bore well water available throughout the year?
   a. Yes
   b. Not available in the summer months
   c. I don’t use bore well water
   d. Others

43. In case, you use bore well water, do you drink it?
   Don’t have one  Yes, but never drink  Yes, Direct  Yes, use filters  Yes, boil it

44. Do you use a pump to store water in a reservoir / tank?  
   Yes [ ]  No [ ]

   a. how much of maintenance charges do you pay (including electricity)?
      500 – 450), or more  e. Rs.(300 – 250)
      450 – 400)  f. Rs.(250 – 200)
      Rs.(400 – 350)  g. Rs.(200 – 150)
      Rs.(350 – 300)  h. If less, please specify

45. What is the capacity of your water tank?  
   _______ Litres/Gallons

   a. Once in 2 days, or less  d. (3 – 4) times, a day
   b. Once, every day  e. More than that
   c. twice, every day

SECTION – 5 – TIME AND COST

47. How much time do you spend on procuring water (overall) from other sources, if:
   • Municipality water is insufficient
   • You don’t own a bore well
   • You don’t have a pond or any other free and close access to other water sources
48. Under the abovementioned conditions, how much do you spend per month for your family to procure drinking water?
   a. Rs. (800 - 600), or more
   b. Rs.(600 - 500)
   c. Rs.(500 - 450)
   d. Rs.(450 - 400)
   e. Rs.(400 - 350)
   f. Rs.(350 - 300)
   g. Rs.(300 - 250)
   h. Rs.(250 - 200)
   i. Rs.(200 - 150)
   j. Rs.(150 - 100)
   k. If less, please specify

49. Under the same conditions, how much does water cost you per month? (other than drinking)
   a. Rs. (800 - 600), or more
   b. Rs.(600 - 500)
   c. Rs.(500 - 450)
   d. Rs.(450 - 400)
   e. Rs.(400 - 350)
   f. Rs.(350 - 300)
   g. Rs.(300 - 250)
   h. Rs.(250 - 200)
   i. Rs.(200 - 150)
   j. Rs.(150 - 100)
   k. If less, please specify

50. Even after exhausting all the sources do you witness any further shortage?  
   Yes  
   No

51. If yes, how do you tackle this deficit (other than drinking water)?
   a. Nearby deep bore well
   b. Pond, river, etc.
   c. Buying from public water tankers
   d. Share with neighbors
   e. Others, please specify

SECTION – 6 – WATER PROBLEMS: FUTURE SOLUTIONS
(Bidding game)
[With rapid urbanization, industrialization, population growth and weak infrastructure, 
city-dwellers in India are facing an acute water crisis. The demand for water is increasing 
at a fast pace with supply remaining unchanged or decreasing. The groundwater levels 
are falling and the pressure on the existing sources of water supply is increasing by 
leaps and bounds. The state governments and municipalities are finding it increasingly 
difficult to supply water at subsidized rates, as well. While today the problem may not 
appear grim, days are not far when water will become a scarce resource, if not managed 
prudently and efficiently. At this backdrop, based on your valuable responses, it could be  

303
possible for the municipality/state govts. to implement appropriate urban water management and manage the crisis ahead.]

52. Under the abovementioned circumstances, if the municipality plans to make necessary arrangements to meet your complete water requirements (for both drinking and general uses) are you willing to pay for this improved service in the future?

53. Would you prefer a:
   a. Fixed charge  
   b. Metered bill

54. If the municipality supplies you with clear, pure and safe water for 4 hours in the morning and 4 hours in the evening daily how much would you be willing to pay per month?

| a | Rs.(4000 - 3500) | Yes | No | m | Rs.(500 - 450) | Yes | No |
| b | Rs.(3500 - 3000) | Yes | No | n | Rs.(450 - 400) | Yes | No |
| c | Rs.(3000 - 2500) | Yes | No | o | Rs.(400 - 350) | Yes | No |
| d | Rs.(2500 - 2000) | Yes | No | p | Rs.(350 - 300) | Yes | No |
| e | Rs.(2000 - 1750) | Yes | No | q | Rs.(300 - 250) | Yes | No |
| f | Rs.(1750 - 1500) | Yes | No | r | Rs.(250 - 200) | Yes | No |
| g | Rs.(1500 - 1250) | Yes | No | s | Rs.(200 - 150) | Yes | No |
| h | Rs.(1250 - 1000) | Yes | No | t | Rs.(150 - 100) | Yes | No |
| i | Rs.(1000 - 800) | Yes | No | u | Rs.(100 - 75) | Yes | No |
| j | Rs.(800 - 700) | Yes | No | v | Rs.(75 - 50) | Yes | No |
| k | Rs.(700 - 600) | Yes | No | w | Rs.(50 - 30) | Yes | No |
| l | Rs.(600 - 500) | Yes | No | x | Rs.(30 - 15) | Yes | No |

55. If the municipality provides you with uninterrupted supply of clear, pure and safe water throughout the year with adequate pressure, how much would you be willing to pay per month?

| a | Rs.(4000 - 3500) | Yes | No | m | Rs.(500 - 450) | Yes | No |
| b | Rs.(3500 - 3000) | Yes | No | n | Rs.(450 - 400) | Yes | No |
| c | Rs.(3000 - 2500) | Yes | No | o | Rs.(400 - 350) | Yes | No |
| d | Rs.(2500 - 2000) | Yes | No | p | Rs.(350 - 300) | Yes | No |
| e | Rs.(2000 - 1750) | Yes | No | q | Rs.(300 - 250) | Yes | No |
| f | Rs.(1750 - 1500) | Yes | No | r | Rs.(250 - 200) | Yes | No |
| g | Rs.(1500 - 1250) | Yes | No | s | Rs.(200 - 150) | Yes | No |
| h | Rs.(1250 - 1000) | Yes | No | t | Rs.(150 - 100) | Yes | No |
| i | Rs.(1000 - 800) | Yes | No | u | Rs.(100 - 75) | Yes | No |
| j | Rs.(800 - 700) | Yes | No | v | Rs.(75 - 50) | Yes | No |
| k | Rs.(700 - 600) | Yes | No | w | Rs.(50 - 30) | Yes | No |
| l | Rs.(600 - 500) | Yes | No | x | Rs.(30 - 15) | Yes | No |

56. If you want an additional piped connection for meeting general purposes (i.e., other than drinking), how much you would be willing to pay per month?

<p>| a | Rs.(4000 - 3500) | Yes | No | m | Rs.(500 - 450) | Yes | No |
| b | Rs.(3500 - 3000) | Yes | No | n | Rs.(450 - 400) | Yes | No |
| c | Rs.(3000 - 2500) | Yes | No | o | Rs.(400 - 350) | Yes | No |
| d | Rs.(2500 - 2000) | Yes | No | p | Rs.(350 - 300) | Yes | No |
| e | Rs.(2000 - 1750) | Yes | No | q | Rs.(300 - 250) | Yes | No |
| f | Rs.(1750 - 1500) | Yes | No | r | Rs.(250 - 200) | Yes | No |</p>
<table>
<thead>
<tr>
<th></th>
<th>Rs.(1500 - 1250)</th>
<th>Yes</th>
<th>No</th>
<th>s</th>
<th>Rs.(200 - 150)</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>g</td>
<td>Rs.(1250 - 1000)</td>
<td>Yes</td>
<td>No</td>
<td>t</td>
<td>Rs.(150 - 100)</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>h</td>
<td>Rs.(1000 - 800)</td>
<td>Yes</td>
<td>No</td>
<td>u</td>
<td>Rs.(100 - 75)</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>i</td>
<td>Rs.(800 - 700)</td>
<td>Yes</td>
<td>No</td>
<td>v</td>
<td>Rs.(75 - 50)</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>j</td>
<td>Rs.(700 - 600)</td>
<td>Yes</td>
<td>No</td>
<td>w</td>
<td>Rs.(50 - 30)</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>k</td>
<td>Rs.(600 - 500)</td>
<td>Yes</td>
<td>No</td>
<td>x</td>
<td>Rs.(30 - 15)</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

**SECTION – 7 – FAMILY AND WATER**

57. What is your mother tongue?

<table>
<thead>
<tr>
<th>Tamil</th>
<th>Telugu</th>
<th>Bengali</th>
<th>Kanadi</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

58. What are your hobbies?

- a. Reading books
- b. Watching TV
- c. Gardening
- d. Maintaining aquarium
- e. Others

59. Age **Distribution** of your family:

<table>
<thead>
<tr>
<th>Age Group</th>
<th>0-4 yrs</th>
<th>5-17 yrs</th>
<th>18 to 60 yrs</th>
<th>Above 60</th>
<th>No. of Female members</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Persons</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

60. What is the educational background of your family (elders), in general?

- a. Illiterate
- b. Literate
- c. Graduates / Postgraduates / Doctorates

61. Where do you send your children (if any) for **education**?

- a. Public schools / colleges
- b. Private schools / colleges
- c. Best in the city
- d. Others

62. How much of **electricity bill** do you pay per month? *(excluding water bill, if any)*

- a. Within Rs.150
- b. Rs.(150 - 300)
- c. Rs. (300 - 500)
- d. Rs. (500 - 800)
- e. Rs. 800 or more

63. How many times *(approx.)*, a month, do you (and your family) **visit a doctor** or dispensary?

- a. (1 – 2) times, or less
- b. (3 – 4) times
- c. Between 5 to 10 times
- d. More than 10 times

64. How much do you spend on **medical expenses**, per month?

- a. Within Rs.200
- b. Rs.(200 – 400)
- c. Rs. (400 – 800)
- d. Rs. (800 – 1500)
- e. Rs. 1500 or more
65. For **general illness** do you would prefer visiting:
   a. The doctor, nearby
   b. A Multi-specialty Dispensary
   c. Hospitals like Apollo
   d. Others, pl. mention

66. How much money do you **safe per month** for your future **(including insurance)**?
   a. Rs.100, or less
   b. Rs.(100 – 250)
   c. Rs. (300 – 500)
   d. Rs. (500 – 1000)
   e. Rs.(1000 – 2000)
   f. Rs. 2000 or more

67. How frequently do you **visit a hotel / restaurant**?
   a. Less than once a month
   b. Once / twice a month
   c. Once a week
   d. Twice a week, or more

68. The **average MONTHLY income** of your family is:  
   Rs.________ approx
   (in case not willing to quote the exact figure)
   a. Below Rs.5,000
   b. Rs.(5,000 – 10000)
   c. Rs.(10,000 – 20,000)
   d. Rs.(20,000 – 30,000)
   e. Rs.(30,000 – 50,000)
   f. Rs.50,000 and above

69. Compared with the existing expenditure, as a **proportion of your total income**, what is the maximum you can **afford** on the total requirement of water by your family?
   a. 5 %, or more
   b. (5 – 4) %
   c. (4 – 3) %
   d. (3 – 2) %
   e. (2 – 1) %
   f. (1 – ½ ) %
70. When the new project starts and if piped water is supplied you would like to go for:
   a. 4 + 4 = 8 hours of supply per day  
   b. 24-hours supply per day

71. With the start of the new project, and your responses given above, if tariff rates are re-fixed you would look for a connection (for total water usage) and be ready to pay a bill for:

   (Please go for the bidding game)

<table>
<thead>
<tr>
<th></th>
<th>Rs.(4000 - 3500)</th>
<th>Yes</th>
<th>No</th>
<th>Rs.(500 - 450)</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>Rs.(3500 - 3000)</td>
<td>Yes</td>
<td>No</td>
<td>Rs.(450 - 400)</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>b</td>
<td>Rs.(3000 - 2500)</td>
<td>Yes</td>
<td>No</td>
<td>Rs.(400 - 350)</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>c</td>
<td>Rs.(2500 - 2000)</td>
<td>Yes</td>
<td>No</td>
<td>Rs.(350 - 300)</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>d</td>
<td>Rs.(2000 - 1750)</td>
<td>Yes</td>
<td>No</td>
<td>Rs.(300 - 250)</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>e</td>
<td>Rs.(1750 - 1500)</td>
<td>Yes</td>
<td>No</td>
<td>Rs.(250 - 200)</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>f</td>
<td>Rs.(1500 - 1250)</td>
<td>Yes</td>
<td>No</td>
<td>Rs.(200 - 150)</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>g</td>
<td>Rs.(1250 - 1000)</td>
<td>Yes</td>
<td>No</td>
<td>Rs.(150 - 100)</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>h</td>
<td>Rs.(1000 - 800)</td>
<td>Yes</td>
<td>No</td>
<td>Rs.(100 - 75)</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>i</td>
<td>Rs.(800 - 700)</td>
<td>Yes</td>
<td>No</td>
<td>Rs.(75 - 50)</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>j</td>
<td>Rs.(700 - 600)</td>
<td>Yes</td>
<td>No</td>
<td>Rs.(50 - 30)</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>k</td>
<td>Rs.(600 - 500)</td>
<td>Yes</td>
<td>No</td>
<td>Rs.(30 - 15)</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>l</td>
<td>Rs.(500 - 450)</td>
<td>Yes</td>
<td>No</td>
<td>Rs.(25 - 15)</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

72. Any other comments:

Thank you very much for spending your time on the survey

Details of the interviewee: (*Optional / **Compulsory)
*Name:  *Phone No.:  **Locality:  **City:
Appendix - II

Interpretation of a few terms used in the study

Let us now consider the interpretation of R-squared, F-statistic and DW Statistic for the four endogenous variables, $Q_7$, $Q_{15}$, $Q_{13}$ and $Q_0$. R-squared indicates how well a particular combination of the exogenous variables explains the variation in the endogenous variable. Its values range from 0 to 1. A value of 0 means that the model does nothing to explain the variation in the endogenous variable. A value of 1 indicates that the model is a perfect fit. A value of 0.75 or more would imply a fairly acceptable model. R squared assumes that the data set pertains to the entire population and not a sample. So, when we deal with sample data the value of R squared may be less than expected simply due of sampling errors.

R-bar-squared measures the proportion of the variation in the endogenous variable accounted for by the exogenous variables. Unlike R squared, it allows for the degrees of freedom associated with the sums of the squares. Therefore, even though the residual sum of squares decreases or remains the same as new exogenous variables are added, the residual variance does not. For this reason, R-bar-squared is generally considered to be a more accurate goodness-of-fit measure than R squared. If R-bar-squared is significantly lower than R squared, this normally means that some exogenous variable(s) are missing. With them, the variation in the endogenous variable is not fully measured.

The Durbin-Watson statistic or the DW-statistic is a measure of first order autocorrelation, i.e., of autocorrelation in time series where exogenous variables are not lagged. A DW-statistic lies between 0 and 4. A value of 2 or nearly 2 indicates that there is no first-order autocorrelation. An acceptable range is 1.50 to 2.50. Where successive error differences are small, DW is low (less than 1.50); this indicates the presence of positive autocorrelation. Where successive error differences are large, DW statistic is high (more than 2.50); this indicates the presence of negative autocorrelation. However, this is not particularly common. If the DW statistic is greater than R squared, it is likely that autocorrelation exists. Autocorrelation indicates that the forecast model could be improved on.
The F distribution is a ratio of two independent Chi square distributions divided by their respective degrees of freedom. The F value is calculated by dividing the mean square for the model by the mean square for error. The obtained value of F statistic provides a test for the statistical significance of the observed differences among the means of two or more samples.

**A few terms used in the logit analysis**

**Goodness of fit**: measures the proportion of outcomes correctly predicted by the model where fitted values are greater than ½ are treated as predicting a 1 and values less as predicting a 0. Here 70 percent are correctly predicted.

**Pseudo-R-Squared**: The conventional measure of goodness of fit, R-squared is not particularly meaningful in binary regressand model. A measure, similar to R-squared, called pseudo-R-squared is available and there are a variety of them (Long, J. Scott, 1997). In our analysis, pseudo-R-squared compares the fit of the model measured by the maximized value of the log-likelihood. It is possible to use the pseudo-R-squared in a likelihood ratio test for testing the relevance of the endogenous variables.

**R-Bar-Squared**: As we have seen in the case of R-squared that R-bar-squared ≤ R-squared, showing that the former penalizes for adding more regressors. Unlike R-squared, R-bar-squared will increase only if the absolute t value of the added variable is greater than 1. for comparative purposes, therefore, R-bar-squared is a better measure than R-square. However, the regressand must be the same for the comparison to be valid.

**Akaike Information Criterion**: The idea of imposing a penalty for adding regressors to the model has been carried further in the AIC criterion, which is defined as:

\[
AIC = \exp\left(\frac{2k}{n}\right) \sum \hat{u}_i^2 = \exp\left(\frac{2k}{n}\right) \frac{RSS}{n}
\]

where, \(k\) is the number of regressors (including the intercept) and \(n\) is the number of observations. For mathematical convenience, the above equation is written as:

\[
\ln AIC = \left(\frac{2k}{n}\right) + \ln\left(\frac{RSS}{n}\right)
\]
where \( \ln AIC = \) natural log of \( AIC \) and \( 2k/n = \) penalty factor. As seen in the formula, \( AIC \) imposes a more stringent penalty that \( \bar{R}^2 \) (R-bar-squared) for adding more regressors. In comparing two or more models, the model with the lowest value of \( AIC \) is preferred. One advantage of \( AIC \) is that it is useful for not only in-sample but also out-of-sample forecasting performance of a regression model.

**Schwarz Information Criterion:** Similar to the spirit of \( AIC \), the \( SIC \) criterion is defined as:

\[
SIC = n^{k/n} \sum \frac{\hat{u}^2_i}{n} = n^{k/n} \frac{RSS}{n}
\]

or in log form:

\[
\ln SIC = \frac{k}{n} \ln n + \ln \left( \frac{RSS}{n} \right)
\]

where \( \lfloor (k/n) \ln n \rfloor \) is the penalty factor. It is to be noted here that \( SIC \) imposes an even harsher penalty than \( AIC \), as is obvious from the equations given in \( AIC \) with \( SIC \). Like \( AIC \), lower the value of \( SIC \), the better the model. Again, like \( AIC \), \( SIC \) can be used to compare the in-sample or out-of-sample forecasting performance of a model.

**Log-likelihood Function:** Suppose we have a random sample of \( n \) observations. Letting \( f_i(Y_i) \) denote the probability that \( Y_i = 1 \) or 0, the joint probability of observing the \( n \) \( Y \) values, i.e., \( f(Y_1, Y_2, ..., Y_n) \) is given as:

\[
f(Y_1, Y_2, ..., Y_n) = \prod_{i=1}^{n} f_i(Y_i) = \prod_{i=1}^{n} P_i^{Y_i} (1 - P_i)^{1-Y_i}
\]

where \( \prod \) is the product operator. The joint probability density function can be written as a product of individual density functions because each \( Y_i \) is drawn independently and each \( Y_i \) has the same (logistic) density function. Taking natural logarithm of the above equation, we have:

\[
\ln f(Y_1, Y_2, ..., Y_n) = \sum_{i=1}^{n} \left[ Y_i \ln \left( \frac{P_i}{1 - P_i} \right) \right] + \sum_{i=1}^{n} \ln(1 - P_i)
\]

As \( \ln \left( \frac{P_i}{1 - P_i} \right) = \frac{1}{1 + \exp(\beta_0 + \beta_1 X_1 + ... + \beta_n X_n)} \)
We can write:

\[
\ln f(Y_1, Y_2, \ldots, Y_n) = \sum_{i=1}^{n} Y_i (\beta_0 + \beta_1 X_i + \ldots + \beta_n X_n) - \sum_{i=1}^{n} \ln[1 + \exp(\beta_0 + \beta_1 X_i + \ldots + \beta_n X_n)]
\]  

(7)

As we can see from equation (7), the log likelihood function is a function of the coefficients, since \( X_i \) are known. In maximum likelihood estimation our objective is to maximize the log likelihood function (L.L.F.), that is, to obtain the values of the unknown coefficients in such a manner that the probability of observing the given \( Y \)'s is as high (maximum) as possible.