

## **PERCEPTIONS OF RURAL WOMEN ABOUT VALUATION OF RENEWABLE NATURAL RESOURCES IN KANDI AREA OF PUNJAB**

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**Abstract:** Women are primary users of natural resources. However, they remain largely excluded from participating in decision-making about resource management, which is clearly a missed opportunity. It was against this backdrop that the present investigation 'Perceptions of rural women about valuation of renewable natural resources in *kandi* area of punjab'. *Kandi* area was specifically selected due to its rich biodiversity and involvement of women in management of natural resources. Simple random sampling technique was employed to draw a sample of 100 women. The data analyzed by using of frequencies, percentages, range, cumulative cube root method and regression coefficient in different socio-economic status categories of respondents. Its analysis is based on CVM method which provided respondents an opportunity to make decision on their willingness to pay for these resources. Willingness to pay for water is more than fuel and fodder. The results revealed that willingness to pay for water, fuel and fodder was significantly affected by socio economic status.

**Keywords:** *Kandi* Area, Renewable Natural Resources, Rural Women, Valuation.

### **Introduction**

The free availability and use of natural resources without any pricing policy is the major factor that has contributed to unsustainable use and degradation of natural resources. In a perfect market scenario with complete information on risks and uncertainly, the prices would undoubtedly determine the value of resources and benefits. But, in case of natural resources where there are missing markets or distorted markets, the valuation of the resources poses peculiar problems<sup>1</sup>. So, no current pricing policy for use of natural resources is one of the major factors, contributing to unsustainable use and degradation of natural resources. Though, it is now possible to handle use values, option values and non use values of natural resources by use of natural resources accounting, the problem of non-economic valuation however, cannot be handled by this method.

The close association between women and NRs is valid primarily in rural context especially among women of rural areas<sup>2-4</sup>. For such women, the association exists because of their social and economic role which over generations has required them to provide food, water, fuel,

fodder and income from surroundings resource base<sup>5</sup>. Traditional practices and bureaucratic factors often prevent them access to NRs development and management<sup>6-8</sup>. Consequently, we are facing the dilemma of involving women in managing the wealth of natural resource in a better and effective manner. There is need therefore to study management of RNR from the perspective of women and their micro environment and generate data on their present perceptions about valuation of renewable natural resources.

## **Materials and methods**

### **Locate of the study**

The study was conducted in *kandi* area of Punjab. *Kandi* area falls in sub mountainous undulating zone which stands along eastern border and lies between Chandigarh, Hoshiarpur, Dasuya, Mukerian road and the Shivalik foot hills of Punjab. The area has been selected because of its rich biodiversity, rainwater resource, suitability for forestry etc. Besides, women in this area enjoy an intimate relationship with agriculture and animal husbandry operations and participate in a huge way in these operations. Out of this area Nawanshahr (Shaheed Bhagat Singh Nagar) district was selected by application of simple random sampling technique. There are total five blocks in this district i.e. Aur, Nawanshahr, Balachaur, Saroya and Banga. One block from this district i.e. Balachaur was selected randomly shown in Fig. 1. From the selected block, *Takarla* village was purposively selected due to its large size, easy access to socio-economic and ecological conditions and availability of natural resources to rural women.

### **Selection of respondents**

From the selected village sample of 100 women who were actively engaged in managing and utilizing the natural resources at household level was drawn through simple random sampling technique.

### **Data collection**

Data was collected through primary and secondary sources of information. Primary source were include information collected through interview schedules as well as PRA techniques. The secondary sources were including literature, scientific information as well as revenue records of the village.



**Fig. 1: Locale of the study**

### **Data Analysis**

All filled up interview schedules was transferred to master tables, tally sheets and frequency tables and then analysis was carried out. The data was analyzed with the help of common statistical tools such as frequencies percentage, range and cumulative cube root method.

### **Results and discussion**

#### **Valuation of natural resources**

This section deals with user's willingness to pay (WTP) for the crucial renewable natural resources viz, water, fuel and fodder. Its analysis is based on CVM method which provided respondents an opportunity to make decision on their willingness to pay for these resources. These resources form the basis of sustenance of rural people and their household economy depends heavily upon these resources. Firstly, user's willingness to pay for the three resources was seen in relation to their socio-economic status and then the quantitative and qualitative factors affecting the WTP for these resources have been discussed.

#### **Willingness to pay for water**

The data in Table 1 indicated that the average willingness to pay (WTP) for assured and regular supply of water at their door step was Rs. 117 per month. The low socio-economic

status respondents quoted WTP at Rs. 79 per month followed by medium status respondents at Rs. 134 per month and high socio-economic status respondents were willing to pay Rs. 151 per month for this crucial natural resource. The distribution of the low socio-economic status respondents as per WTP for improved water supply revealed that majority were willing to bid for Rs. 51-100 per month (42.11%) followed by those willing to bid Rs. 101-150 (28.95%), Rs. 50 (18.42%) and Rs. 150 and above (10.53%). Most of the respondents with medium socio-economic status (42.4%) were willing to bid Rs. 150 and above per month followed by these prepared to bid for Rs. 101-150 (39.3%), Rs. 51-100 (15.1%) and up to Rs. 50 (3%). Majority of respondents (48.2%) of high socio-economic status were willing to bid for Rs. 101 to 150 followed by these who were prepared to bid for Rs. 150 and above (44.8%) and Rs. 51 to 100 (6.9%). The difference between the average willingness to pay is Rs. 55 from low to medium and Rs. 72 from low to high. Between medium to high the difference is Rs. 17. Overall willingness to pay bid was Rs. 101-150 (38%) followed by Rs. 150 and above (31%), Rs. 51-100 (23%) and up to Rs. 50 (8%) so the difference between the overall average willingness to pay was lower by Rs. 38 among low socio-economic respondents while it was towards higher side by Rs. 17 and 34 for medium and high socio-economic status respondents, respectively.

**Table 1: Frequency distribution of the respondents as per WTP (willingness to pay) Bids for improved water supply**

Socio economic / Bid (Rs./ month)	Frequency	Percentage	Cumulative frequency	Cumulative percentage	Average WTP (Rs.)
<b>Low</b>					79
0-50	7	18.42	7	18.42	28
51-100	16	42.11	23	60.53	61
101-150	11	28.95	34	89.47	108
Above 150	4	10.53	38	100.00	160
<b>Medium</b>					134
0-50	1	3.03	1	3.03	32
51-100	5	15.15	6	18.18	71
101-150	13	39.39	19	57.58	128
Above 150	14	42.42	33	100.00	170
<b>High</b>					151
0-50	0	0.00	0	0.00	0
51-100	2	6.90	2	6.90	76
101-150	14	48.28	16	55.17	137
Above 150	13	44.83	29	100.00	178
<b>All</b>					117
0-50	8	8.00	8	8.00	21

51-100	23	23.00	31	31.00	69
101-150	38	38.00	69	69.00	123
Above 150	31	31.00	100	100.00	169

These variations reflect the requirement of water use across the different socio-economic categories of the respondents and also the economic conditions prevailing across the different category of respondents. Obviously, irrespective of socio economic status of families the selected households were not paying any money for water consumption. But certainly the respondent, with high socio- economic status were spending some money to manage the resource at household level such as use of motor for getting water with full flow and force, using private tanker to bring water at times. The requirement of more water for daily activities might have motivated them to quote more bidding amount for this resource.

#### **Willingness to pay for fuel**

The average WTP for fuel is Rs. 112 per month by all respondents. The high socio economic status respondents were ready to pay Rs. 150 per month on an average. The medium status respondents were ready to pay Rs. 118 per month and the low socio economic status respondents were ready to pay Rs. 78 per month for regular and assured fuel wood supply (Table 2). The high socio economic status respondents were ready to pay bid for Rs. 150 and above per month (48.2%) followed by 44.8% respondents who were ready to bid for Rs. 101-150 and (6.9%), who were willing to bid for Rs. 51-100/-. The medium socio-economic status respondents (51.5%) were ready to pay Rs. 101-150 per month followed by 24.2% who were willing for Rs. 150 and above and 15.1% for Rs. 51 to 100 and 9% for up to Rs. 50/-. The low socio economic status respondents (47.3%) were ready to bid Rs. 51-100 per month followed by 23.6% who were willing to bid for Rs. 101-150 and 18.4% for up to Rs. 50 and 10.5% for above Rs. 150/-. The average WTP bid worked out to be Rs. 101-150 per month for 30% of respondents followed by Rs. 150 and above by 26% respondents and Rs. 51-100 by (25%) and up to Rs.50 by 10% of respondents. When compared to the average WTP, the high socio-economic status respondents were ready to pay Rs. 38 per month more. While the medium socio-economic status families respondents were ready to pay Rs. 6 more than the average whereas low socio-economic status respondents were ready to pay less by Rs. 34 per month than the average WTP.. This may be due to the fact that the high socio-economic status families were already paying some money for this natural resource in the form of LPG, kerosene and electricity bill.

**Table 2: Frequency distribution of the respondents as per WTP Bids for improved fuel supply**

Socio economic / Bid (Rs./ month)	Frequency	Percentage	Cumulative frequency	Cumulative percentage	Average WTP (Rs.)
<b>Low</b>					78
0-50	7	18.42	7	18.42	20
51-100	18	47.37	25	65.79	66
101-150	9	23.68	34	89.47	110
Above 150	4	10.53	38	100.00	165
<b>Medium</b>					118
0-50	3	9.09	3	9.09	28
51-100	5	15.15	8	24.24	70
101-150	17	51.52	25	75.76	124
Above 150	8	24.24	33	100.00	171
<b>High</b>					150
0-50	0	0.00	0	0.00	30
51-100	2	6.90	2	6.90	80
101-150	13	44.83	15	51.72	129
Above 150	14	48.28	29	100.00	180
<b>All</b>					112
0-50	10	10.00	10	10.00	27
51-100	25	25.00	35	35.00	71
101-150	39	39.00	74	74.00	120
Above 150	26	26.00	100	100.00	171

**Willingness to pay for fodder**

The respondents considered fodder availability as natural resource. The respondents were ready to pay Rs. 110 per month for assured and regular supply of fodder. The high socio-economic status family respondents were ready to pay Rs. 156 per month followed by Rs. 131/- month by medium socio-economic status family respondents and Rs 55/- by the low socio- economic status families (Table 3). The high socio-economic status families (58.62%) were ready to bid Rs. 150 and above followed by (31.03%) Rs. 101-150 bid and (10.34%) Rs. 51-100 bid. The medium socio economic families were ready to pay bid Rs. 101-150 per month (45.45%) followed by bid Rs. 150 and above (33.3%) and bid Rs. 51-100 per month (21.2%). The low socio economic status respondents were ready to pay bid Rs. 51-100 per month (47.3%) followed by bid upto Rs.50 (39.4%) and bid Rs. 101-150 per month (13.1%). On an average the respondents were ready to pay bid Rs. 101-150 per month (29.0%) followed by bid Rs. 150 and above per month (28.0%), Rs. 51-100 per month (28.0%) and upto Rs. 50 bid (15.0%).

**Table 3: Frequency distribution of the respondents as per WTP Bids for improved fodder supply**

Socio economic / Bid (Rs./ month)	Frequency	Percentage	Cumulative frequency	Cumulative percentage	Average WTP (Rs.)
<b>Low</b>					55
0-50	14	39.47	15	39.47	22
51-100	16	47.37	33	86.84	64
101-150	5	13.16	38	100.00	123
Above 150	0	0.00	38	100.00	167
<b>Medium</b>					131
0-50	0	0.00	0	0.00	30
51-100	7	21.21	7	21.21	72
101-150	14	45.45	22	66.67	128
Above 150	11	33.33	33	100.00	173
<b>High</b>					156
0-50	0	0.00	0	0.00	32
51-100	3	10.34	3	10.34	78
101-150	9	31.03	12	41.38	134
Above 150	16	58.62	29	100.00	182
<b>All</b>					110
0-50	14	15.00	15	15.00	28
51-100	26	28.00	43	43.00	71
101-150	28	29.00	72	72.00	128
Above 150	27	28.00	100	100.00	173

It is obvious from the above findings that high socio economic status respondents were paying more of the average WTP by Rs. 46. While the medium socio economic status respondents were paying Rs. 21 more and low socio economic status families were ready to pay Rs. 55 less than the average willingness to pay. These trends in results may be due to the fact that high and medium status families were have to show fodder on their farm thereby for going some land under fodder cultivation, which could be put under remunerative crops. The users of this resource had the basic fact in their mind while they put a value for this crucial resource. It is a well proven fact that one cannot maintain livestock economically unless one has regular supply of fodder from own farm since rearing livestock by purchasing fodder from open market has been considered a loss occurring ventures.

In conclusion we can say that on an average all respondents were ready to pay more for fodder Rs. 110 per month followed by fuel Rs. 112 and Rs. 117 per month for assured and regular supply of water resource. This may be due to the fact that respondent gave importance to water than fuel and fodder at household level.

### Percentage expenditure on various items and WTP bid for water, fuel and fodder to total house hold expenditure

The ability to pay by the respondents was examined in terms of household expenditure on various items like food, education, health and others (Including clothing, recreations and social functions). The results regarding the expenditure pattern reveal that the respondents with high socio economic status were spending 40.5 percent of their income on food followed by other (22.48%), on health (19.15%) and on education (17.82%). The users were willing to pay 0.5 per cent of their total expenditure for water, 0.5 per cent for fuel and 0.5 per cent for fodder (Table 4).

**Table 4: Percentage expenditure on various items and WTP Bid for water, fuel and fodder**

Resource	Socio-economic Status	Food (%)	Education (%)	Health (%)	Others (%)	WTP (%)
<b>Water</b>	Low	62.25	7.25	10.15	20.35	1
	Medium	42.25	15.35	12.75	29.65	0.75
	High	40.55	17.82	19.15	22.48	0.5
<b>Fuel</b>	Low	62.25	7.25	10.15	20.35	1.25
	Medium	42.25	15.35	12.75	29.65	1
	High	40.55	17.82	19.15	22.48	0.5
<b>Fodder</b>	Low	62.25	7.25	10.15	20.35	0.75
	Medium	42.25	15.35	12.75	29.65	0.5
	High	40.55	17.82	19.15	22.48	0.5

Across the medium socio economic status respondents the average expenditure on food was found to be more (42.25%) followed by others (29.65%), education (15.35%) and health (12.75%). They were willing to spend 0.75 per cent for water, 1 per cent for fuel and 0.5 per cent for fodder out of their total expenditure. The respondent with low socio economic status were spending more than fifty per cent of their expenditure on food (62.25%) followed by other (20.35%), health (10.15%) and education (7.25%). They were ready to spend 1 per cent on water, 1.25 per cent on fuel and 0.75 per cent for fodder. The results indicate that on an average major portion of the income across all the socio economic status respondents go for food followed by other aspects.



### Factors affecting willingness to pay water, fuel and fodder

In order to study the relationship between independent variables and willingness to pay for water, fuel and fodder, the correlation co-efficient workout, presented in Table 5.

#### *Water*

The willingness to pay for water was significantly affected by socio economic status, family type and family size. Rest of the variables showed no significant affect on willingness to pay for water. All these variables taken together for the study with  $R^2$  values of 0.6325 at 0.05 per cent level of probability could explain 63.25 per cent variation in willingness to pay for water by the respondents. This showed the significance of this variable carried out this type of study.

#### *Fuel*

Socio economic status and family size were significantly associated with willingness to pay for fuel. Rest of the variables indicated no significant affect on this variable.  $R^2$  value of 0.5735 for fuel at 0.05 level of probability indicated 57.35 percent variation in willingness to pay for fuel, if all other variables are kept constant.

#### *Fodder*

The result pertaining to willingness to pay for fodder revealed that socio economic status and herd size were found to have significantly affecting the variable. Age, family type, family size, education level and land holding showed no significant affect on willingness to pay for fodder. These variables to gather explained 55.73 per cent variation in willingness to pay for fodder with  $R^2$  value of 0.5573 at 0.05 level of probability. The results thus showed that if all other variables are constant than a unit change in these variables can bring about a unit change in willingness to pay for fodder.

**Table 5: Multiple regression of factors influencing WTP for water, fuel and fodder**

Factors	Regression coefficient		
	Water	Fuel	Fodder
Age	2.132	3.243	0.448
Family type	0.022*	0.334	0.124
Family size	0.025*	0.011*	0.244
Education level	0.225	0.471	0.245
Land holdings	1.325	0.532	0.335
Herd size	2.221	1.542	0.022*
Socio economic status	0.035*	0.066*	0.049*
$R^2$	0.6325	0.5735	0.5573

## Conclusions

- The factors affecting willingness to pay for water were socio-economic status, family type and family size. Willingness to pay for fuel was found to be significantly affected by socio economic status and family size. Socio-economic status and herd size of the respondents were significantly affecting the willingness to pay for fodder.
- The willingness to pay for the natural resources was found to be low among respondents with low socio-economic status. Interestingly, irrespective of socio-economic status, respondents were not ready to spend even 5 per cent of their budget to get water, fuel and fodder at their doorsteps. The low socio-economic status respondents were not willing to spend even one per cent of their total budget on water, fuel and fodder.
- The respondents were willing to pay more for the safe and assured supply of water than fuel and fodder.

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