Chapter 6

VALUATION OF ENVIRONMENTAL IMPACT OF NEO-INDUSTRIALISATION IN DURGAPUR

We have already noted in the previous chapters how the industrial scenario in Durgapur region has unfolded over the recent past. The benefits of neo-industrialisation, especially the post-2000 expansion, have also been noted earlier. We have also noted that many of these industries are polluting in nature and it seems from the trend in air pollution in the locality that their expansion is most likely to have increased damages to the local environment. Hence, we have conducted a Primary Survey in the region to arrive at an estimate of the value of damages caused due to environmental degradation. In this chapter we discuss results of our survey on environmental valuation.

COVERAGE & DESCRIPTIVE FEATURES

After careful study of the industrial and residential locational pattern in the study area, the survey was conducted in eight locations situated within the Durgapur Municipal Area (Map 6.01). They are situated in 8 different wards of the Durgapur Municipal Corporation. The wards were selected purposively so that areas that have seen expansion of industrial activities in the last 10 years are covered. From each ward, 10% of the households were randomly selected and surveyed. A simple random sampling without replacement method was used using house-listing number as obtained from the DMC as identifiers.
Map 6.01
New Industries and Survey Location in Durgapur

Agricultural / Fallow
Cut Forest
Unplanned Residential
& Commercial
Industries
Planned Townships
Buffer Green Zone
PS & MC Boundary
Railway Line
Roads
National Highway
River (Damodar)
Post-2001 Industries
Survey Locations

Actual Land Use Map of Durgapur - 2010

Source: Asansol Durgapur Development Authority, 2010; Land Use Map, and author’s drawings
In all, 1504 households were surveyed – 732 were asked the WTA questions while 772 were asked the WTP questions so as to rule out bias in response. Broad descriptive statistics of the sample is provided in Table 6.01.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Respondents for WTA</th>
<th>Respondents for WTP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Respondents</td>
<td>732</td>
<td>772</td>
</tr>
<tr>
<td>Gender - Males</td>
<td>504</td>
<td>524</td>
</tr>
<tr>
<td>Females</td>
<td>228</td>
<td>248</td>
</tr>
<tr>
<td>Educational Status -</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illiterate</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>Literate below 10th Standard</td>
<td>372</td>
<td>382</td>
</tr>
<tr>
<td>12th Standard Passed</td>
<td>331</td>
<td>341</td>
</tr>
<tr>
<td>Graduate &amp; Above</td>
<td>29</td>
<td>39</td>
</tr>
<tr>
<td>Staying at -</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Owned Home</td>
<td>422</td>
<td>432</td>
</tr>
<tr>
<td>Company Quarters</td>
<td>227</td>
<td>237</td>
</tr>
<tr>
<td>Rented House</td>
<td>83</td>
<td>103</td>
</tr>
<tr>
<td>Occupation -</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Businessman</td>
<td>136</td>
<td>150</td>
</tr>
<tr>
<td>Small Shopkeeper</td>
<td>285</td>
<td>300</td>
</tr>
<tr>
<td>Service/Casual Worker</td>
<td>310</td>
<td>322</td>
</tr>
<tr>
<td>Family Size -</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 3</td>
<td>223</td>
<td>233</td>
</tr>
<tr>
<td>4 - 5</td>
<td>451</td>
<td>461</td>
</tr>
<tr>
<td>6 - 7</td>
<td>41</td>
<td>51</td>
</tr>
<tr>
<td>8 and more</td>
<td>17</td>
<td>27</td>
</tr>
</tbody>
</table>

Source: Field Survey during 2008

**Education Status**

It is observed that educational status of the sample population is better than the state or national average and all of them have some education. While half of those surveyed have education level up to 10th Standard, about 45 per cent have completed 12th standard, while 4 per cent are Graduates. Most of the respondents live in their own home while about 30 per cent live in Quarters provided by the organisation where they
work. Family size is generally small, with more than 90 per cent households having 5 or less members. As regards occupational group of the respondents, about 42 per cent are Regular / Casual workers in the various factories or institutions in and around Durgapur. Another 18 per cent are medium or large businessmen while about 40 per cent are small shopkeepers. As befitting with the characteristic of the area, there are no agricultural households.

**Income Status**

The study area is frequented by both high income wage earners and businessmen as well as middle and low income workers and shopkeepers (Table 6.02). The average monthly per capita income level of the respondents is Rs3698. This average is lowest in Gopalpur and highest in Rabindra Pally. Income distribution shows that most of the respondents are in the Rs. 2000-3000 monthly per capita income group. Only about 25 per cent respondents have monthly per capita income more than Rs4000. This income distribution is different across locations - maximum number of people is in the income group of less than Rs2000 in Gopalpur, Karangapara, and Sukanta Pally; in the income group of Rs3000-4000 in DCL More, Maya Bazar, and Sagarbhanga; in the income group of Rs3000-4000 in Angadpur; in the income group Rs5000-6000 in Khatpukur; and in the income group Rs6000-7000 in Rabindra Pally. Only in Rabindra Pally and Sagarbhanga there are some people earning Rs8000 & above.
<table>
<thead>
<tr>
<th>Map</th>
<th>Location</th>
<th>Total Nos</th>
<th>Percentage of Population in Income Groups (Rs)</th>
<th>Avg Income (Rs)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Below 2000</td>
<td>2000-3000</td>
</tr>
<tr>
<td>A</td>
<td>Angadpur</td>
<td>228</td>
<td>14.3</td>
<td>28.6</td>
</tr>
<tr>
<td>B</td>
<td>DCL More</td>
<td>119</td>
<td>20.5</td>
<td>45.5</td>
</tr>
<tr>
<td>C</td>
<td>Maya Bazar</td>
<td>367</td>
<td>21.4</td>
<td>57.1</td>
</tr>
<tr>
<td>D</td>
<td>Gopalpur</td>
<td>87</td>
<td>20.0</td>
<td>0.0</td>
</tr>
<tr>
<td>E</td>
<td>Khatpukur</td>
<td>75</td>
<td>14.3</td>
<td>21.4</td>
</tr>
<tr>
<td>F</td>
<td>Sagarbhanga</td>
<td>151</td>
<td>54.5</td>
<td>27.3</td>
</tr>
<tr>
<td>G</td>
<td>Karangapara</td>
<td>131</td>
<td>41.2</td>
<td>17.6</td>
</tr>
<tr>
<td>H</td>
<td>Rabindra Pally</td>
<td>137</td>
<td>7.1</td>
<td>21.4</td>
</tr>
<tr>
<td>I</td>
<td>Sukanta Pally</td>
<td>209</td>
<td>36.0</td>
<td>20.0</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>1504</td>
<td>23.7</td>
<td>30.0</td>
</tr>
</tbody>
</table>

Source: Field Survey, 2009-10
POLLUTION AND ASSOCIATED PROBLEMS – PEOPLE’S
PERCEPTION

Pollution Trends

It has already been mentioned in the earlier chapter that according to data obtained from the regional office of the West Bengal Pollution Control Board, the level of Respirable Suspended Particulate Matter (RSPM) in Durgapur is constantly increasing and way above the national standard.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Respondents for WTA</th>
<th>Respondents for WTP</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Level of Pollution</strong></td>
<td>Number</td>
<td>Proportion</td>
</tr>
<tr>
<td>Unbearable</td>
<td>207</td>
<td>28.2</td>
</tr>
<tr>
<td>High but Tolerable</td>
<td>517</td>
<td>70.6</td>
</tr>
<tr>
<td>Moderate</td>
<td>8</td>
<td>1.1</td>
</tr>
<tr>
<td><strong>Pollution over last year</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Has Increased</td>
<td>710</td>
<td>96.9</td>
</tr>
<tr>
<td>Remained Same</td>
<td>22</td>
<td>3.1</td>
</tr>
<tr>
<td><strong>Doors/windows closed due to pollution</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Morning 6 am to 9 am</td>
<td>103</td>
<td>14.1</td>
</tr>
<tr>
<td>Night 9 pm to 6 am</td>
<td>463</td>
<td>63.3</td>
</tr>
<tr>
<td>Whole Day &amp; Night</td>
<td>166</td>
<td>22.6</td>
</tr>
</tbody>
</table>

Source: Field Survey, 2008

This has been reflected in the perception of the respondents regarding levels, trends, and behavioural impacts of pollution (Table 6.03). It is seen that while 28 per cent of the respondents report the pollution level as Unbearable, 70 per cent are of the opinion that the pollution level is high but tolerable. However, almost all respondents argue that the pollution level has increased over the last year. Thus, it is quite conceivable that the problems will go on to become intolerable in the times to come.
The concentrations of pollutants were also observed to be different across locations, which is quite natural and expected. While areas closer to industrial units are more prone to SOX and NOX, the market areas like Benachity may have higher SPM and RPM levels due to vehicular pollution. However, surprisingly enough, areas like Angadpur that are closer to the old industrial sites (near to Durgapur Steel Plant, Alloy Steel Plant, and Durgapur Chemicals) have lower pollution levels than the areas like PCBL More that are closer to the new industrial units.

Table 6.04 Distribution of Respondents into Monthly Medical Expense groups by Location

<table>
<thead>
<tr>
<th>Map</th>
<th>Location</th>
<th>Total Number</th>
<th>% of population in Expense Groups (Ra)</th>
<th>Average Medical Expense (Rs per person)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Angadpur</td>
<td>228</td>
<td>Less than 500: 25.0 500-1000: 75.0 1000-1500: 0.0 1500-2000: 0.0 Above 2000: 0.0</td>
<td>729</td>
</tr>
<tr>
<td>B</td>
<td>DCL More</td>
<td>119</td>
<td>0.0 100.0 0.0 0.0 0.0 0.0</td>
<td>730</td>
</tr>
<tr>
<td>C</td>
<td>Maya Bazar</td>
<td>367</td>
<td>0.0 100.0 0.0 0.0 0.0 0.0</td>
<td>527</td>
</tr>
<tr>
<td>D</td>
<td>Gopalpur</td>
<td>87</td>
<td>18.2 81.8 0.0 0.0 0.0 0.0</td>
<td>970</td>
</tr>
<tr>
<td>E</td>
<td>Kharpur</td>
<td>75</td>
<td>0.0 60.0 0.0 40.0 0.0 0.0</td>
<td>823</td>
</tr>
<tr>
<td>F</td>
<td>Sagarbhangar</td>
<td>151</td>
<td>28.6 50.0 7.1 14.3 0.0 0.0</td>
<td>494</td>
</tr>
<tr>
<td>G</td>
<td>Karangapara</td>
<td>131</td>
<td>29.4 70.6 0.0 0.0 0.0 0.0</td>
<td>1200</td>
</tr>
<tr>
<td>H</td>
<td>Rabindra Pally</td>
<td>137</td>
<td>14.3 42.9 14.3 28.6 0.0 0.0</td>
<td>1000</td>
</tr>
<tr>
<td>I</td>
<td>Sukanta Pally</td>
<td>209</td>
<td>32.0 68.0 0.0 0.0 0.0 0.0</td>
<td>840</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>1504</td>
<td>15.8 76.8 1.7 5.7 0.0 0.0</td>
<td>540</td>
</tr>
</tbody>
</table>

Source: Field Survey, 2008

Medical Expenses

One of the foremost impacts of increased pollution level is on the health of the residents. Though it is difficult to ascertain what part of ill-health is due to pollution and what part is due to other factors (e.g. characteristics intrinsic to the respondents), some idea can be had from the medical expenses incurred by the respondents. It is observed that most of them spend ₹ 500-1000 per month as medical expenses (Table 6.04). The expenses range from ₹ 494 in Karangapara to ₹ 1200 in Rabindra Pally, the average being ₹ 540.
EVALUATING THE ENVIRONMENT

Willingness to Accept

How do the residents value their environment? It has already been noted earlier that we can directly ask people to state what sum of money they are willing (demanding) to accept to tolerate the pollution level at the current level. This would give us the Willingness to Accept (WTA) values.

Table 6.05
Distribution of Respondents into Bands of Willingness to Accept (yearly)

<table>
<thead>
<tr>
<th>Location</th>
<th>Sample Size</th>
<th>Less than 6000</th>
<th>6000-12000</th>
<th>12001-18000</th>
<th>18001-24000</th>
<th>Above 24000</th>
<th>Average (Rs per person)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Angadpur</td>
<td>112</td>
<td>25.0</td>
<td>75.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>4068</td>
</tr>
<tr>
<td>DCL More</td>
<td>57</td>
<td>0.0</td>
<td>100.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>3000</td>
</tr>
<tr>
<td>Maya Bazar</td>
<td>181</td>
<td>0.0</td>
<td>100.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>4632</td>
</tr>
<tr>
<td>Gopalpur</td>
<td>41</td>
<td>18.2</td>
<td>81.8</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>3156</td>
</tr>
<tr>
<td>Khatpukur</td>
<td>35</td>
<td>0.0</td>
<td>60.0</td>
<td>40.0</td>
<td>0.0</td>
<td>0.0</td>
<td>4200</td>
</tr>
<tr>
<td>Sagarbhanga</td>
<td>73</td>
<td>28.6</td>
<td>50.0</td>
<td>7.1</td>
<td>14.3</td>
<td>0.0</td>
<td>1452</td>
</tr>
<tr>
<td>Karangapara</td>
<td>64</td>
<td>29.4</td>
<td>70.6</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>3312</td>
</tr>
<tr>
<td>Rabindra Pally</td>
<td>66</td>
<td>14.3</td>
<td>42.9</td>
<td>14.3</td>
<td>28.6</td>
<td>0.0</td>
<td>2568</td>
</tr>
<tr>
<td>Sukanta Pally</td>
<td>103</td>
<td>32.0</td>
<td>68.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>2592</td>
</tr>
<tr>
<td>Total</td>
<td>732</td>
<td>15.8</td>
<td>76.8</td>
<td>1.7</td>
<td>5.7</td>
<td>0.0</td>
<td>2484</td>
</tr>
</tbody>
</table>

Source: Field Survey, 2008

It is observed that the monthly WTA values for most of the respondents fall within the ₹ 500-1000 band, the average being ₹ 207 per month (Table 6.05). However, Khatpukur and Rabindra Pally seem to be outliers in this regard as there are substantial numbers of respondents in these two areas (40 per cent and 29 per cent respectively) who demand ₹ 1500-2000 per month to accept the current levels of pollution. The average figures are quite high for Maya Bazar and Angadpur too. This may be a reflection of higher pollution levels in these two areas, or may be determined by the characteristics of the respondents therein.

It should be mentioned that about 7 percent of the respondents have mentioned that they do not want any compensation as they are not ready to barter environment with money. Their WTA values are thus Zero.
Willingness to Pay

In contrast to WTA, Willingness to Pay (WTP) elicits from the respondents the monetary value they are willing to pay to appropriate authorities either for protection of good environment or removal of pollution. In our study the hypothetical situation posed to the respondents was –

a) Minor improvements in environmental situation (going back to previous year’s level) through imposition of stricter rules on the polluting units by the Durgapur Municipal Corporation for which they would be charged a sum; and,

b) Major improvement in environmental situation (going back to the environmental situation of 2000 AD) through relocation of polluting units for which the respondents would be charged a higher sum.

The WTP figures are obtained and reported in Table 6.06 and Table 6.07. It is observed that most of the respondents are willing to shell out not more than ₹ 300 per year, or about ₹ 25 per month for minor changes in environment situation, the average being ₹ 171 per year (Tables 6.06). Only at Angadpur, DCL More and Mayabazar there are some people willing to shell out more for improvement in environment.

If we consider major changes and reverting back to a situation existing 8 years back, people are willing to pay more and most of the respondents have a WTP within the band of ₹ 300-500 (Tables 6.07). The average WTP is ₹ 495 per year for major changes. There are however substantial number of respondents who are willing to pay ₹ 500-1000 or ₹ 1000-1500 per year for major improvements in the environmental situation and reduction in pollution levels. None of the residents are however willing to shell out more than ₹ 1500.
### Table 6.06

<table>
<thead>
<tr>
<th>Map</th>
<th>Location</th>
<th>Sample Size</th>
<th>% of population willing to pay (Rs) per year</th>
<th>Average (Rs per person)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Angadpur</td>
<td>116</td>
<td>67.9 32.1 0.0 0.0</td>
<td>241</td>
</tr>
<tr>
<td>B</td>
<td>DCL More</td>
<td>62</td>
<td>78.6 0.0 21.4 0.0</td>
<td>217</td>
</tr>
<tr>
<td>C</td>
<td>Maya Bazar</td>
<td>186</td>
<td>79.5 0.0 20.5 0.0</td>
<td>222</td>
</tr>
<tr>
<td>D</td>
<td>Gopalpur</td>
<td>46</td>
<td>100.0 0.0 0.0 0.0</td>
<td>140</td>
</tr>
<tr>
<td>E</td>
<td>Khatpukur</td>
<td>40</td>
<td>90.0 0.0 0.0 0.0</td>
<td>130</td>
</tr>
<tr>
<td>F</td>
<td>Sagarbhanga</td>
<td>78</td>
<td>92.9 7.1 0.0 0.0</td>
<td>114</td>
</tr>
<tr>
<td>G</td>
<td>Karanapara</td>
<td>67</td>
<td>94.1 5.9 0.0 0.0</td>
<td>170</td>
</tr>
<tr>
<td>H</td>
<td>Rabindra Pally</td>
<td>71</td>
<td>85.7 14.3 0.0 0.0</td>
<td>135</td>
</tr>
<tr>
<td>I</td>
<td>Sukanta Pally</td>
<td>106</td>
<td>88.0 12.0 0.0 0.0</td>
<td>168</td>
</tr>
</tbody>
</table>

Total 772 83.6 9.6 6.8 0.0 171

Source: Field Survey, 2008

### Table 6.07

<table>
<thead>
<tr>
<th>Map</th>
<th>Location</th>
<th>Sample Size</th>
<th>% of population willing to pay (Rs) per year</th>
<th>Average (Rs per person)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Angadpur</td>
<td>116</td>
<td>60.7 35.7 3.6 0.0</td>
<td>516</td>
</tr>
<tr>
<td>B</td>
<td>DCL More</td>
<td>62</td>
<td>71.4 28.6 0.0 0.0</td>
<td>510</td>
</tr>
<tr>
<td>C</td>
<td>Gopalpur</td>
<td>46</td>
<td>81.8 18.2 0.0 0.0</td>
<td>327</td>
</tr>
<tr>
<td>D</td>
<td>Karanapara</td>
<td>67</td>
<td>82.4 17.6 0.0 0.0</td>
<td>344</td>
</tr>
<tr>
<td>E</td>
<td>Khatpukur</td>
<td>40</td>
<td>40.0 20.0 0.0 0.0</td>
<td>725</td>
</tr>
<tr>
<td>F</td>
<td>Maya Bazar</td>
<td>186</td>
<td>70.5 27.3 2.3 0.0</td>
<td>520</td>
</tr>
<tr>
<td>G</td>
<td>Rabindra Pally</td>
<td>71</td>
<td>50.0 21.4 21.4 0.0</td>
<td>628</td>
</tr>
<tr>
<td>H</td>
<td>Sagarbhanga</td>
<td>78</td>
<td>64.3 14.3 14.3 0.0</td>
<td>503</td>
</tr>
<tr>
<td>I</td>
<td>Sukanta Pally</td>
<td>106</td>
<td>76.0 16.0 4.0 0.0</td>
<td>384</td>
</tr>
</tbody>
</table>

Total 772 67.8 24.9 5.7 0.0 495

Source: Field Survey, 2008

It is again observed that residents of Khatpukur and Rabindra Pally are willing to pay significantly higher amount relative to others for major improvements in environment. This confirms our earlier notion that either pollution level is worst in these locations or residents herein value the environment more than others. If we consider the fact that residents of these locations did not have high WTP values for minor changes, it
emerges that they want major changes in environment and supports the notion of high pollution in these localities.

Another significant observation was the presence of "Protest Zeros" during the survey. It is observed that about 2 per cent of the respondents are not willing to pay for improvement in environment because they don’t believe that the situation will change and feel that the environment will go from bad to worse. They are also of the opinion that such hypothetical situation with DMC, a local self-government organisation, at the helm of affairs will never succeed in controlling pollution as non-action by West Bengal Pollution Control Board is responsible for the environmental mess in Durgapur.

**Occupational Background and Environmental Valuation**

We can also explore how people from different occupational background value their environment. Since we had earlier categorised our sample respondents into three broad Occupation groups – Businessman, Small Shopkeeper, and Service / Casual Worker, we can report their mean WTA and WTP (Table 6.08).

<table>
<thead>
<tr>
<th>Occupation Groups</th>
<th>Yearly WTA</th>
<th>Yearly WTP for Minor Changes</th>
<th>Yearly WTP for Major Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Businessmen</td>
<td>3483</td>
<td>178</td>
<td>348</td>
</tr>
<tr>
<td>Small Shopkeepers</td>
<td>2363</td>
<td>196</td>
<td>444</td>
</tr>
<tr>
<td>Service / Casual Workers</td>
<td>3860</td>
<td>201</td>
<td>593</td>
</tr>
</tbody>
</table>

Source: *Field Survey, 2008*

It is observed that respondents engaged in service or as casual workers have the highest WTA and WTP, indicating that they value the environment more than others. WTP is lowest for the Businessmen. This may be associated with the profile of the occupational groups – whether they are Risk-lovers or Risk-averse. The working class are basically risk-averse and therefore they are more concerned about the damages caused
by pollution to their health. They are also exposed to pollution everyday during their work or during commuting. Consequently, they have highest WTA and WTP. The Businessmen are by nature Risk-lovers and therefore they do not consider their future in as high esteem as others. Also they have higher valuation for money, and thus have lowest WTP. The small shopkeepers are in between these two, and have medium WTP and low WTA.

Factors affecting Environmental Valuation
How respondents value the environment as reflected by the WTA and WTP figures may be dependent on their background or other characteristics like – Educational Status, Income Level, and Family size. Educational Status can be represented by completed years of formal schooling; Income level by Annual per capita income; and Family size by total number of family members (including children). The interlinkage between these variables and the WTA and WTP values may be explored through Correlation Coefficients.

<table>
<thead>
<tr>
<th>Background Variables</th>
<th>Yearly WTA</th>
<th>Yearly WTP for Minor Changes</th>
<th>Yearly WTP for Major Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Educational Status</td>
<td>0.161*</td>
<td>0.052</td>
<td>-0.008</td>
</tr>
<tr>
<td>Family Size</td>
<td>0.243**</td>
<td>0.282**</td>
<td>0.166*</td>
</tr>
<tr>
<td>Income Level</td>
<td>0.014</td>
<td>-0.074</td>
<td>0.235**</td>
</tr>
</tbody>
</table>

Note: * and ** indicates significance at 1 per cent and 5 per cent levels respectively.
Source: Field Survey, 2008

The results indicate that family size and educational status are closely and positively related to WTA (Table 6.09). More educated persons and respondents from large family have higher WTA. Large family size also leads to higher WTP, indicating that valuation of environment is higher for these families, perhaps because of concern for their children. On the
contrary, WTP is not affected by educational status, indicating perhaps a perception among educated respondents that once the environment is polluted there are no real chances of improving it irrespective of how much they are ready to pay. This cynicism among the educated is a major cause of worry for the local civil society.

On the other hand, income does affect WTP for major changes, and respondents with higher PCI are willing to pay more for substantial improvement in the environment.

<table>
<thead>
<tr>
<th>Table 6.10</th>
<th>Estimates of Environmental Cost of Industrialisation in Durgapur – WTA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicator</td>
<td>Value</td>
</tr>
<tr>
<td>WTA Method</td>
<td></td>
</tr>
<tr>
<td>Average Willingness to Accept (A) (Rs per person per year)</td>
<td>Rs. 2484</td>
</tr>
<tr>
<td>Total Population of DMC Area (projected) (P)</td>
<td>550000</td>
</tr>
<tr>
<td>Estimated Valuation of Environment (A) X (P) (Current)</td>
<td>Rs. 1366 million</td>
</tr>
</tbody>
</table>

Source: Field Survey, 2008
Notes: a – Population of Durgapur Municipal Corporation area as per Census 2001 was 492996; As per District Magistrate’s Office of Bardhaman district, projected population growth rate during 2001-2009 has been about 1.7 per cent per annum.

ENVIRONMENTAL COST OF INDUSTRIALISATION IN THE REGION

Our earlier discussion led us to believe that the residents of Durgapur Municipal Corporation area are quite aware of the problems caused by pollution from the present phase of industrialisation in the locality. Following the WTA philosophy, they are willing to accept the current environmental situation, knowing consciously that the present situation is substantially inferior to the one at the year 2000AD. But for this they demand monetary compensation, as revealed by the WTA figures. If we consider this as a valuation of the environmental impact of the current
The industrialisation process, it comes out to be a staggering Rs. 1366 million per year – more than 10 per cent of the total monetary benefits (salaries due to employment generated and profits accrued) that is generated in the local economy! If such high amounts are indeed to be paid from out of the profit share of the manufacturers, most of the units would become unviable, putting up a question mark against the sustainability of the industrialisation process itself.

It is sometimes argued that WTA is not a true reflection of the valuation of damages by the people and the WTP method should be preferred. As discussed in detail earlier, it is based on the postulate that people value their environment and are willing to pay to protect / clean the environment. From this, some indirect valuation of environmental costs of industrialisation in the locality can be obtained. The sum, represented in Table 6.11, provides us an estimate of total environmental cost of industrialisation in the region as obtained from the WTP method.

<table>
<thead>
<tr>
<th>Table 6.11</th>
<th>Estimates of Environmental Cost of Industrialisation in Durgapur – WTP</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Indicator</strong></td>
<td><strong>WTP Method</strong></td>
</tr>
<tr>
<td>Average Willingness to Pay for minor changes (B) (Rs per person per year)</td>
<td></td>
</tr>
<tr>
<td>Average Willingness to Pay for major changes (C) (Rs per person per year)</td>
<td></td>
</tr>
<tr>
<td>Total Population of DMC Area (projected) (P)</td>
<td></td>
</tr>
<tr>
<td>Estimated Valuation of Environment (B) X (P) (Current)</td>
<td></td>
</tr>
<tr>
<td>Estimated Valuation of Environment (C) X (P) (reverting back to pre 2000 situation)</td>
<td></td>
</tr>
</tbody>
</table>

Source: Field Survey, 2008
Notes: a – Population of Durgapur Municipal Corporation area as per Census 2001 was 492996; As per District Magistrate's Office of Bardhaman district, projected population growth rate during 2001-2009 has been about 1.7 per cent per annum.
It emerges that the estimated valuation of environment in the Durgapur Municipal Corporation area using the WTP method comes out to be around Rs94 million, if the residents seek to protect current environmental standards. If however, we are concerned about the environmental damages caused by neo-industrialisation in the last decade, i.e. if the residents want to go back to the situation prevalent prior to the year 2000AD, then the cost comes out to be a whooping Rs272 million. Compared to the monetary benefit generated by the industries annually, this is not a large sum – about 2 per cent of the total benefits (salaries due to employment generated and profits accrued) from the industrialisation process.

It must however be kept in mind that the WTP are always underestimates of the people's true valuation of the environmental damage and the actual value of environmental cost of the post-2000 industrialisation in the study region lies between the value obtained from WTP method and that obtained from the WTA method. Thus, though precise estimates cannot be obtained, this study is a pointer to the fact that we must look at environmental damages and their costs before embarking on further industrialisation process in the region to protect ecological / environmental balance and keep the system sustainable.