CHAPTER - IV
MATERIALS AND METHODS

This chapter is divided into two sections. Section-I gives a brief outline of socio-economic environment of study area. Section-II presents the sampling design and analytical tools used in the study.

Section-I

Socio-economic profile of study area

Socio-economic profile of Cuttack District

Location of the district

Cuttack district is situated in between 84°58' to 86°20' east longitude and 20°03' to 20°40' north latitude. It is surrounded by Dhenkanal and Jajpur district in north, Khurda district in south, Nayagarh district in north-south and Jagatsinghpur and Kendrapada district in east. The geographical area of the district extends to 3733 sq.km. in the year 2000, which is 2.52 percent of total geographical area of the State.

Administrative set up

For administrative convenience, the district is divided in 3 subdivisions, 11 Tehasils, 14 Community Developed Blocks, 342 Gram Panchayats, 34 Police Stations, 2 Municipalities, 2 Notified Area Councils. Besides, the district has 1865 census villages comprising 1763 inhabited villages and 102 uninhabited villages. The total numbers of households in the district are 5,35,225.

2. Census of India, 2001
Human Resources:

Cuttack is the second most populous district in the state of Orissa. According to 2001 census its population is 23.41 lakhs as against 3.67 crores of the State. Thus, the district accommodates 15.68 percent of state's population. The density of population in square km is 595 as against 236 of the state. Of the total population of the district, the rural and urban population constitutes 72.58 percent and 17.42 percent respectively. The male and female population of the district comprises 12.07 lakhs and 11.32 lakhs respectively. The sex ratio works out to be 938 per 1000 males. The literacy rate of the district is found to be 76.13 percent. Among the literates male constitutes 85.46 percent while female 66.19 percent. In the district there are 5,35,225 households out of which 70.05 percent belongs to rural area and rest 29.95 percent in urban area. The household below poverty line of the district is 41.71 percent and rest 58.29 percent belong to above poverty line.

Occupational structure

Total number of workers in the districts as per the 2001 census comes to 79.41 lakhs of which main workers are 61.39 lakhs and marginal workers are 18.02 lakhs. The work force participation rate in the district is 33.9 percent of which male work force participation rate comes to 80.56 and female participation rate is only 19.44. As per 2001 census it is found that of total main workers 20.17 percent are cultivators, 22.96 percent are agricultural labourers, 4.66 percent work in household industries and rest 52.2 percent are other workers.

Climate and Rainfall

The district lies within the tropical belt and is characterized by a hot summer, high humidity nearly all the year round. The maximum and

minimum temperature of the district range from 41.1°C to 10°C in the year 2001. The period between June and September is the monsoon season while October and November is the post-monsoon transition period. The monsoon generally sets in the district by about third week of June and ceases in mid-October. More than 65 percent rainfall is received during the month of June to September. The normal monthly rainfall varies from a minimum of 130 mm to a maximum of 550 mm in the district. In the year 2001 the total actual rainfall was 1892.5 mm.

**Distribution of landholding and operated area**

In the district as per the Agricultural Census 1995-96, there are 73,112 numbers of operational holding in marginal class, 39,922 of small holdings, 15,904 semi-medium holdings, 2,923 medium and 2,683 large holdings. So far as operated area is concerned, there are 36,147 hectares (23.77%) with marginal classes, 54,378 hectares (35.76%) with small classes, 42,157 hectares (27.72%) with semi-medium classes, 15,384 hectares (10.12%) with medium and 3985 hectare (2.62 percent) with large classes. In aggregate there are 1,52,051 hectares of operated area is the in the district.\(^5\)

**Irrigation facility**

Cuttack district is covered with sizable network of irrigation system. 45.07 percent of the net cropped area is irrigated in the district as compared to 23.99 percent for state as a whole. Among the different sources of irrigation (such as canals, minor irrigation projects, lift-irrigation points, tube wells, dig wells etc) canals constitute the main source of irrigation. In the year 1998-99, 1,22,990 hectares and 68,860 hectares of Kharif and Ravi areas are irrigated in the district. Of the total Kharif irrigated area 70.71 percent is irrigated through major/ medium irrigation projects, 13.41 percent through minor irrigation project and rest 15.88 percent through lift irrigation. Similarly of the total Ravi area 78

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5. Directorate of Statistics and Economics, Govt. of Orissa.
percent, 29.27 percent and 17.02 percent are irrigated through major / medium, minor and lift irrigation systems respectively.  

*Land utilization pattern*

In the district of Cuttack 50.38 percent of total land area constitutes the net area sown. Of the rest area 6.87 percent is forest area, 4.24 percent current fallows, 3.73 percent permanent pasture and grazing land, 3.65 percent culturable waste, 3.32 percent tree crops and groves, 20.2 percent put to non-agricultural uses, 3.36 percent barren and uncultivable land and rest 4.25 percent other fallows.  

*Infrastructure facilities*

Development of basic infrastructure is essential for accelerating the pace of economic growth. The district has a well-developed transport and communication system. Total length of road in the district during 2000-2001 is 6,607 kms. Out of which 64 kms are National Highway. Besides major district roads, Cuttack district is well connected with 4,859 kms of forest, Gram Panchayat, classified village and village roads. Nearly 98 percent of total villages in the district have been electrified by the end of the year 2000-2001. By the year 2001, there were as many as 333 post offices, 60 telephone exchanges having 87,605 exchange capacity and 67,454 working connections in the district. There are 100 medical institutions (allopathic and homeopathic) operating in the district.

There are a quite good number of financial institutions in the district. In the year 2001 there were 171 reporting offices of scheduled commercial banks, 45 offices of Regional Rural Banks. Besides, 18 branches of co-operative banks are also operating in the district.

Public Distribution System in Cuttack District

The district is well served by a network of Public Distribution System. In the district there are 1,738 number of Fair Price Shops (FPSs) of which 68.12 percent (1,184) is operating in rural area and rest 31.88 percent (554) in urban area. All these retail shops are distributing PDS commodities to 5,35,225 households, out of which 70.05 percent (3,74,907) live in rural and 29.95 percent (1,60,318) in urban locations. Details regarding the number of FPSs and beneficiaries of different categories in rural and urban area is presented in Table 4.1.

In aggregate there are 5,35,225 households covered under the safety net of PDS in the district of which 58.29 percent are APLs, 32.52 percent are BPLs, 8.43 percent are Antodyoyas and rest 0.76 percent are Annapurna beneficiary households. It is revealed from the Table 4.1 that 70.05 percent and 29.95 percent of beneficiary household belongs to rural and urban area respectively. In rural area 49.09 percent of total beneficiary households are APL, 39.69 percent are BPL, 10.37 percent are Antodyoya and 0.85 percent are Annapurna beneficiary households. Corresponding figures for urban areas of district works out to 79.79 percent, 15.76 percent, 3.91 percent and 0.54 percent respectively.

**TABLE 4.1**

CATEGORY WISE NUMBER OF BENEFICIARY HOUSEHOLDS AND FPSs IN RURAL AND URBAN AREA OF CUTTACK DISTRICT DURING THE YEAR 2002-03

<table>
<thead>
<tr>
<th>Area</th>
<th>Number of FPSs</th>
<th>Number of beneficiary households</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>APL</td>
</tr>
<tr>
<td>Rural</td>
<td>1184 (68.12)</td>
<td>184056</td>
</tr>
<tr>
<td>Urban</td>
<td>554 (31.88)</td>
<td>127910</td>
</tr>
<tr>
<td>Total</td>
<td>1738 (100)</td>
<td>311966</td>
</tr>
</tbody>
</table>

(Figures in parentheses indicate percentage)
Source: Directorate of Statistics and Economics, Govt. of Orissa.
Socio-economic Profile of Tangi-Choudwar C.D. Block

Geographical situation of the Block

Tangi-Choudwar block comes under the jurisdiction of Cuttack sub-division. Its geographic area is 324.78 sq.kms. It is surrounded by the district boundary of Jajpur and Dhenkanal in North, Athagarh Block in west, Cuttack Municipality in South and Salipur CD Block in east. The block has 18 Gram Panchayats, 177 revenue villages with 30,042 households of which 62.02 percent are above poverty line and 37.98 percent are below poverty line.

Land use pattern and principal crops grown

Of the total geographical area of the block, the net sown area constitutes 39.24 percent, land put to non-agricultural use 12.93 percent, forest covers 10.6 percent, culturable waste - 8.77 percent, barren and uncultivable lands - 9 percent, current fallows - 5.37 percent, permanent pasture and other grazing land - 6.44 percent, miscellaneous tree and groves etc. 5.24 percent and other fallows 2.4 percent. The principal crops grown in the block are paddy, pulses, vegetables, and jute. Most of total gross cropped area has been used for the cultivation of paddy.

Irrigation facilities

Canal constitutes the dominant source of irrigation in the Block. Besides, there are lift-irrigation points, dig wells, tube wells etc. operating as minor irrigation sources in the block. The net irrigated area of the block constitutes 85 percent of the sown area.

Demographic features

The total population of the block as per 2001 census is 1,41,798 constituting of 72,731 (51.37%) males and 69,067 (48.7%) females. The density of population per square kilometer is 436 and 68 percent of total population are literate in the block.
**Occupational distribution**

As per 2001 census, the total number of workers taking all social groups comes to 56,027, out of which the main workers constitute 80.05 percent and marginal workers 19.05 percent. Male worker constitutes 85.46 percent of the total population and 14.64 percent are female workers. In total there are 1,22,815 non-workers in the block. The work participation rate is worked out to 31.33 percent. Of the main workers, 16.98 percent are cultivators, 17.63 percent agricultural labourers, 2.35 percent workers are in household industries and 63.04 percent are other workers.

**Public Distribution System in Tangi-Choudwar C.D. block**

In the block, the network of Public Distribution System is operating through 66 Fair Price Shops (FPSs). The total number of beneficiary households covered under PDS comes to 30,042, of which 61.14 percent are APL, 30.16 percent BPL, 7.85 percent Antodyoya households and rest 0.85 percent are Annapurna beneficiary households (Table 4.2).

**TABLE 4.2**

<table>
<thead>
<tr>
<th>Particular</th>
<th>Number of FPSs</th>
<th>Number of beneficiary households</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>APL</td>
</tr>
<tr>
<td>Number</td>
<td>66</td>
<td>18368</td>
</tr>
<tr>
<td>Percentage</td>
<td>100</td>
<td>61.14</td>
</tr>
</tbody>
</table>

Source: District Statistical Office, Cuttack.
Socio-economic profile Athagarh NAC

Geographical situation of Athagarh NAC

Athagarh NAC comes under the jurisdiction of Athagarh subdivision of Cuttack district. It is surrounded by Athagarh C.D. block from all sides. Its geographical area is 10.36 sq.kms. The NAC has 18 wards consisting of 4818 households of which 37.9 percent are above poverty line and 62.1 percent below poverty line.

Demographic features

The total population of the NAC as per 2001 census is 15,850 consisting of 8,140 (51.35%) males and 7,710 (48.65%) females. The density of population per square kilometer is 10.36.

Occupational distribution

As per 2001 census, the total number of workers in the NAC is 4437, out of which 88.93 percent are main workers and 21.17 percent are marginal workers. Of the total workers 88.3 percent are male workers and rest 11.7 percent are female workers. The work participation rate is worked out to 37.37. Of the main workers, 4.37 percent are cultivators, 3.27 percent agricultural labourers, 2.84 percent workers in household industries and 89.52 percent are other workers.

Public Distribution System in Athagarh NAC

In the NAC the network of Public Distribution System is operating through 22 Fair Price Slops (FPSs). Total number of households getting benefits of PDS in Athagarh NAC is found to be 4,818 of which 37.9 percent are APL, 51.1 percent BPL, 10.44 percent Anntodyoya and 0.56 percent are Annapurna beneficiary households. Status of PDS in Athagarh NAC is presented in the Table 4.3 categorically.
TABLE 4.3
CATEGORYWISE NUMBER OF BENEFICIARY HOUSEHOLDS AND FPSs IN ATHAGARH NAC DURING THE YEAR 2002-03

<table>
<thead>
<tr>
<th>Particular</th>
<th>Number of FPSs</th>
<th>Number of beneficiary households</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>APL</td>
</tr>
<tr>
<td>Number</td>
<td>22</td>
<td>1826</td>
</tr>
<tr>
<td>Percentage</td>
<td>100</td>
<td>37.9</td>
</tr>
</tbody>
</table>

Source: District Statistical Office, Cuttack.

SECTION - II

METHODOLOGY

Having discussed the socio-economic environment of the study area of the Cuttack district, Tangi-Choudwar C.D. Block and Athagarh Notified Area Council (NAC) the present section deals with the methodology followed in selecting samples and analytical tools used in analyzing and interpreting data for the study.

Sampling design

A multi-stage random sampling technique is used for the study. The study is based on the data collected from the records of dealers involved in the Public Distribution System and field level data collected from sample beneficiary households selected from Tangi-Choudwar C.D. Block (rural area) and Athagarh NAC (urban area) of Cuttack district.

Selection of district

Previous studies reveal the prevalence of a lot of irregularities and corrupt practices at the grass-root level in the working of PDS. Reliable and accurate data are difficult to obtain at the primary level because of lack of cooperation by the beneficiaries as well as the dealers - the main
stakeholders of the PDS programme. Hence in view of familiarity of investigator with the Cuttack district the said district is purposively selected as the area of study for collecting more reliable and accurate data in the working of PDS at dealer and beneficiary levels.

**Selection of study area**

The present study makes a comparative analysis of functioning of Public Distribution System between rural and urban areas. The fourteen C.D. Blocks of the district are taken as the rural area and 2 Municipalities and 2 NACs as the urban area. In the second stage of sampling one from the fourteen C.D. Blocks and one from the 2 Municipalities and 2 NACs are selected at random as rural and urban study areas. Accordingly, Tangi-Choudwar C.D. Block from rural area and Athagarh NAC from urban area are selected.

**Selection of Fair Price Shop (FPS) dealers**

Having selected the block and NAC, the total numbers of fair price shops under each area are listed separately. It was found that in total 66 fair price shops in Tangi-Choudwar C.D Block and 22 in Athagarh NAC are engaged in public distribution. From among the fair price shops operating in Tangi-Choudwar C.D. Block and Athagarh NAC, 50 percent from each area is selected at random. Thus 33 fair price shops from Tangi-Choudwar C.D. Block and 11 from Athagarh NAC are selected for the purpose of getting data at the dealer’s level.

**Selection of beneficiary households**

All the beneficiary households of the sample fair price shops are listed and classified accordingly to four categories – APL, BPL, Antodyoya and Annapurna. 10 percent of beneficiary households from each category are selected for study. In rural area 70 APL beneficiary households, 37 BPL beneficiary households, 21 Antodyoya beneficiary households and 12 Anapurna beneficiary households were selected. In urban area the
corresponding figures are 60, 23, 12 and 10 respectively. Thus in aggregate 245 beneficiary households are selected out of which 140 households are from rural area and 105 households are from urban area for the purpose of study.

The details of the population and sample of the selected FPS of both rural and urban areas are presented in the Table 4.4.

**TABLE 4.4**

**POPULATION AND SAMPLE BENEFICIARY HOUSEHOLDS FROM SELECTED FPSs DURING THE YEAR 2002-03**

<table>
<thead>
<tr>
<th>Beneficiary Type</th>
<th>Rural</th>
<th></th>
<th>Urban</th>
<th></th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total households</td>
<td>Sample households</td>
<td>Total households</td>
<td>Sample households</td>
<td>Total households</td>
</tr>
<tr>
<td>APL</td>
<td>703</td>
<td>70</td>
<td>596</td>
<td>60</td>
<td>1299</td>
</tr>
<tr>
<td>BPL</td>
<td>374</td>
<td>37</td>
<td>225</td>
<td>23</td>
<td>599</td>
</tr>
<tr>
<td>ANT</td>
<td>213</td>
<td>21</td>
<td>116</td>
<td>12</td>
<td>329</td>
</tr>
<tr>
<td>ANN</td>
<td>124</td>
<td>12</td>
<td>96</td>
<td>10</td>
<td>220</td>
</tr>
<tr>
<td>Total</td>
<td>1414</td>
<td>140</td>
<td>1113</td>
<td>105</td>
<td>2447</td>
</tr>
</tbody>
</table>

Development and pre-testing of interview schedules

Two separate interview schedule (one for FPS dealers and another for beneficiary households) specially designed for the purpose of study was developed for data collection from the dealers and beneficiary households of PDS. Pre-testing of the schedules was conducted to do away with the shortcomings in the questionnaire. The questionnaire was prepared with the consultation of beneficiary households, officials in civil supply department and field staff including dealers involved in the distribution of basic essentials through fair price shops.
Collection of data

Both primary and secondary data were collected for the study. The primary data from ration card holders / dealers and secondary data from the fair price shop dealers were collected. The first sets of data were collected through direct personal interview using well structured, pre-tested interview schedule. Besides, secondary data were collected from the records of the dealers. In addition to it officials of food and civil supply department were also contacted from time to time for clarification of certain information obtained from the dealers and beneficiary households.

Besides, data are collected from various secondary sources like Census Report, 2001, Block Development Office, Tangi-Choudwar, N.A.C. Office, Athagarh, District Civil Supplies Office, Cuttack, District Welfare Office, Cuttack, District Statistical Office, Cuttack, Directorate of Statistics and Economics, Govt. of Orissa, Department of Planning and Coordination, Govt. of Orissa, Department Food Supplies and Consumer Welfare, Govt. of Orissa, Department Panchayati Raj, Govt. of Orissa, Orissa State Civil Supply Corporation ltd., Govt. of Orissa, Department of Consumer Affair and Civil Supply, Govt. of India, Directorate of Consumer Affair & Civil Supply, Govt. of India.

Tabulation of primary data

The respondents response to each of the question in the schedules was first tabulated in a master table. The data were thereafter tabulated to draw meaningful inferences. Thereafter, appropriate tables were prepared keeping in view the specific objectives of the study.

Reference period

The period of study pertains to 1st April 2002 to 31st March 2003.
Definition of some important terms used

**Beneficiary households**

Those who are having ration cards are called beneficiary households of Public Distribution System as per government norm. In the study household whose name is there in the list of beneficiaries and is having a ration card is considered as beneficiary households.

**Above Poverty Line beneficiary Households (APL)**

Beneficiary households whose names are not in BPL list is considered as APL beneficiary households.

**Below Poverty Line Beneficiary Households (BPL)**

All BPL household except Antodyoya and Annapurna beneficiary households are BPL beneficiary households.

**Antodyoya Beneficiary Households (AAY)**

Poorest of BPL beneficiary households are taken as Antodyoya beneficiary households.

**Annapurna Beneficiary Households (ANN)**

Senior citizens who are eligible for old-age pension but not receiving the pension and do not have any supporting person are taken as Annapurna beneficiary households.

**Issue price**

PDS issue price refers to the price fixed by government for essential commodities supplied through FPS.

**Off-take**

Off-take refers to the quantity of direct purchases of PDS commodities from FPS by beneficiaries.
Allotment

Allotment refers the provision of commodities made by the government for beneficiaries households per month.

Tools of Analysis

The following tools are used for the analysis of the data.

Tubular Analysis

Tubular analysis has been used to compare different aspects of socio-economic status of beneficiary households as well as FPS owners, the cost-benefit comparison of operating FPS, benefits received by different beneficiary groups from purchasing different types of item from FPS both in rural and urban area.

Simple average as well as weighted average have been used as per the requirement of the analysis.

Statistical tools used

Multiple regression analysis technique is used to study the influence of different factors associated with quantity off-take of different items from FPS by different beneficiary groups in both rural and urban areas.

As regards the quantity of off-take of commodities from FPS, the variables included in the equation are as follows:

\[ Y = f (x_1, x_2, x_3) \]

Where, \( Y \) = quantity of monthly off-take.

\( x_1 \) = monthly household income in rupees.

\( x_2 \) = proportion of expenditure on essential (food items and kerosene) to total monthly consumption expenditure

\( x_3 \) = ratio of dependents in the family to the total family members.
Household income ($x_1$)

A negative correlation is hypothesised between the size of monthly household income and quantity of monthly off-take from FPS. Lower the monthly households income higher will be the quantity of off-take of commodities by beneficiaries household from FPS and vice-versa.

Proportion on expenditure on essentials to total monthly consumption expenditure ($x_2$)

It is also hypothesised that the proportion of expenditure on essentials to total monthly consumption expenditure has a direct relationship with the quantity of off-take from FPS. Higher the proportion of income spent on essentials, higher will be the dependence on FPS and vice-versa.

Ratio of dependents in the family to the total family members ($x_3$)

It is expressed that the ratio of dependents to total family members is positively related to the quantity of off-take of commodities from FPS. Higher the dependency ratio, higher will be the quantity of off-take from FPS and vice-versa.

The regression model fitted for quantity of monthly off-take is given below:

\[ Y = a + b_1 x_1 + b_2 x_2 + b_3 x_3 \]