

Food Security Atlas of **RURAL ORISSA**



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FOREWORD

Food Security has now taken centre stage in policy discussions around the world. Along with issues of food production there are also clearly issues of access of the poor to food. In India, despite high GDP growth rates over the past decade or so, the record in reducing hunger is not so impressive. This brings to the fore the question of inclusive growth, particularly the inclusion of the most deprived sections of our society and regions of our country into benefiting from the growth process. Increased access to food comes forward as a basic component of inclusive growth.

It is apt that at such a time the Institute for Human Development (IHD) and the UN's World Food Programme (WFP) have produced this set of Rural Food Security Atlases for 8 States of India.

Constructing a Food Security Index (FSI) the authors have tried to identify the districts that fare particularly badly and the factors behind the poor performance of these districts in each of the States. The identification of regions and social groups that are most food insecure should help to draw attention to the regions and social groups that require most attention in order to reduce food insecurity. At the same time, analysis of factors behind poor food security should help direct district-level interventions towards dealing with the factors that seem to be behind poor food security in these districts.

The authors argue while paying attention to increasing food supply, it is critical to pay attention to improving the access of the poor to adequate food. They identify improvements in infrastructure and in the position of women as central to improving food security.

I hope the Atlases will stimulate discussion among policy makers and social analysts on ways of designing district-level interventions that would enable India to reduce hunger as part of inclusive growth.

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Preface

India is home to more than a quarter of hungry people in the world. The effect of climate change on agriculture will adversely affect Indian agriculture, thereby making food availability scarce. The existing production levels barely manage to keep pace with the growing population, a problem that is aggravated by high disparities in resources and purchasing power.

The changing scenario of rising food prices has raised new concerns on food security. It has been estimated that globally 130 million people have become food insecure due to high food prices, in addition to the existing 850 million. Soaring high prices would require providing top priority to ensure access of the most vulnerable to food, which can be achieved through expanded safety net programmes such as the PDS and those programmes which address the nutritional status of pregnant and lactating women, and children less than five years of age.

The prevalence of underweight children in India is among the highest in the world. Over 50 million children under five are malnourished. There are multiple causes of this phenomenon. Looking at the problem spatially, a relatively small number of states, districts, and villages account for a large share of the burden – 5 states and 50 percent of villages account for about 80 percent of the malnutrition cases.

Therefore, the need of the hour is a comprehensive strategy to tackle the growing menace of food and nutritional insecurity. In a country of continental dimensions with vast disparities, it is pertinent that developmental efforts be directed in specific directions and in specific areas for optimum utilization of resources.

To map food insecurity in the country, the World Food Programme had come out with a series of food insecurity atlases in collaboration with the M.S. Swaminathan Research Foundation. The most significant contribution of these atlases was to mainstream the issue of food security, besides identifying their incidence among the major states.

As a corollary to these atlases, on behalf of WFP, the Institute for Human Development has prepared state-specific atlases with comprehensive analysis at district and regional levels. Looking through the lens of prevalence of underweight, and under-five mortality, these atlases help in identifying the districts at various levels of food security within the most food insecure states. This will also help in convergence of complementary programmes of the government in addressing undernutrition and child mortality in the country.

We are deeply indebted to all the members of the Technical Advisory Group (TAG), constituted to provide direction and technical inputs to the report. We would like to express our sincere gratitude to the TAG chairperson Prof. Abhijit Sen, Member, Planning Commission for his encouragement and deep involvement in this project.

Much of the credit for bringing out this publication goes to Dr. Dev Nathan, Professor, and Dr. Preet Rustagi, Senior Fellow, who coordinated the study from IHD; Dr. Sandip Sarkar, who provided the technical advice, especially the construction of the indices; and Dr. Sunil Mishra and Ms. Payel Dutta Majumder who executed the work of calculation of indices and analysing the data. We would also like to express our gratitude to Dr. Minnie Mathew, Head of Programme Unit, WFP-India for providing her guidance to the study; Dr. Nisha Srivastava, who led the project in WFP; and Mr. Bal Paritosh Dash and Mr. Animesh Kumar for providing their critical inputs.

We hope that the atlases will serve as a tool for the government and policy makers to target interventions more effectively and fine tune assistance strategies to most vulnerable groups and areas. An important outcome of this exercise is a systematic and integrated food security information system located within the state governments. Finally, it will enhance advocacy at state level so as to direct policy focus, resources and initiatives to the most food insecure.

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The preparation of food security atlases for eight states would not have been possible without the joint efforts of various organizations, individuals and government officials. The primary input for construction of indices as well as formulation of appropriate indicators is reliable disaggregated sub-state level data, which was collected, collated and mined from secondary sources as well as based on information made available by various state departments and ministries. We wish to thank all of them for their support and assistance. We are grateful to DFID for funding the project through the Global Institutional Support Grant to WFP.

The Chairperson of the Technical Advisory Group (TAG), Prof. Abhijit Sen, Member, Planning Commission and other members of the TAG deserve a special mention for all the deliberations in the meetings held and their expert advice to the research team from time to time. Many of them were also available at short notice to help us resolve problems, provide solutions and show the way forward. We wish to thank them all for their cooperation and support.

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A preparatory workshop was organized on 10th July, 2007 in Bhubaneswar. This was chaired by Dr. Raj Kumar Sharma, IAS, Commissioner-cum-Secretary, Food Supplies and Consumer Welfare, Government of Orissa and was attended by experts from the state government, academia, and civil society organizations. The insights and active participation of a few experts deserves special mention – Shri Aurobinda Behera, IAS, Principal Secretary to Government, Water Resources Department, Government of Orissa; Shri Harsh Mander; Prof. R.K. Panda, Prof. P.K.Dash from Utkal University; Prof. Kameswar Choudhury, Prof. Marothia, from KIIT, Bhubaneswar; Shri Parvat and Shri Nilachal Mishra, from Centre for Youth and Social Development; Shri Suresh Chandra Bisayee, IDE, India; Shri Sudhir Patnaik, Editor, Samadrusti; Dr. Mamata Swain, Dr. R.K. Meher, Dr. P.K.Acharya from NCDS. among many others.

The enthusiasm for the project that was evident at the state consultation have been a source of inspiration for us. We are grateful to all those who gave their valuable inputs and contributed to the shaping of the report.

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List of Abbreviations

ADAPT	Area Development Approach for Poverty Termination
AIDIS	All- India Debt and Investment Survey
APL	Above Poverty Line
ARWSP	Accelerated Rural Water Supply Programme
BMI	Body Mass Index
BPL	Below Poverty Line
CMR	Child Mortality Rate
CSO	Central Statistical Organization
DLHS	District level Household Survey
DPAP	Drought Prone Area Programme
FAO	Food and Agriculture Organization
FCI	Food Corporation of India
FFS	Farmers' Field School
FSI	Food Security Index
FSO	Food Security Outcome
FSOI	Food Security Outcome Index
GoO	Government of Orissa
GSDP	Gross State Domestic Product
HYV	High Yielding Variety
ICDS	Integrated Child Development Services
ICT	Information and Communication Technology
IFAD	International Fund for Agricultural Development
IHD	Institute for Human Development
IIDS	Indian Institute of Dalit Studies
IIPS	International Institute for Population Sciences
IMR	Infant Mortality Rate
KBK	Koraput, Balangir, Kalahandi
LTAP	Long Term Action Plan
MDGs	Millennium Development Goals
MDM	Mid-Day Meal
MMS	Mid-Day Meal Scheme
MPCE	Monthly Per Capita Expenditure
MRP	Mixed Reference Period
MSSRF	M S Swaminathan Research Foundation
NCEUS	National Commission for Enterprises in the Unorganized Sector
NCRL	National Commission on Rural Labour
NFHS	National Family Health Survey
NFSM	National Food Security Mission
NREGA	National Rural Employment Guarantee Act
NREGS	National Rural Employment Guarantee Scheme
NSDP	Net State Domestic Product

NSS	National Sample Survey
NTFP	Non Timber Forest Product
OBC	Other Backward Class
PDS	Public Distribution System
PESA	The Panchayats (Extension To Scheduled Areas) Act
PHC	Primary Health Centre
PMGSY	Pradhan Mantri Gram Sadak Yojana
RLTAP	Revised Long Term Action Plan
RTI	Right to Information Act
SC	Scheduled Caste
SCA	Special Central Assistance
SCP	Special Component Plan
SHG	Self Help Group
ST	Scheduled Tribe
TE	Triennium Ending
TSP	Tribal Sub Plan
UNICEF	United Nations' Children Fund
URP	Uniform Reference Period
WFP	World Food Programme

Executive Summary

Food security is not just a matter of the availability of food, but even more of the access of households and individuals to sufficient nutritious food. The absorption of food as nutrition in the body is further mediated by access to safe drinking water, and hygienic sanitation facilities. Consequently, food security is analyzed along the axes of availability, access and absorption. The importance of entitlements in food security is further underlined by the Supreme Court's judgments validating the Right to Food. As a signatory to the UN's Millennium Development Goals (MDGs), the Government of India and all state governments have an obligation to reduce by half the proportion of people suffering from hunger by 2015.

To contribute to reaching the above goals, the Institute for Human Development (IHD) on behalf of the UN World Food Programme (WFP) has undertaken an analysis of the dimensions of food security at the sub-state or district level, for 8 states of India – Orissa, Jharkhand, Chhattisgarh, Madhya Pradesh, Rajasthan, Bihar, Uttar Pradesh and Maharashtra. The purpose of this exercise is to:

- **Identify the regions and social groups most affected by food insecurity; and,**
- **Suggest policy interventions appropriate to improving food security for those regions and social groups.**

Recognizing that reduction of acute poverty is the key to reducing hunger, the analysis began by choosing the likely variables that affect food security along the three axes of availability, access and absorption. The composite index is based on 12 identified indicators which reflect these three dimensions. The availability related variables considered here are agricultural production in per capita value terms, proportion of forest area, extent of irrigation and rural connectivity in terms of villages with access to paved roads. The six variables considered for the access to food dimension include proportion of agricultural labourers, proportion of Scheduled Tribes (ST) and Scheduled Castes (SC), ratio of working age population, monthly per capita consumption expenditure, casual wage rate of rural persons and female literacy rate. Access to safe drinking water and primary health services are the two variables considered for the absorption index.

The values of districts on each of these 12 variables were combined to develop a composite Food Security Index (FSI), on the basis of which each district was ranked. A Food Security Outcome Index (FSOI) was also developed based on two indicators – under-five mortality and proportion of underweight children. Districts were also ranked on the basis of this index. The FSOI can allow us to rank districts on the basis of nutrition performance, with the caveat that on the whole, nutritional status in India is poor, and therefore, the variation between districts may not be very much. The FSI, on the other hand, also allows us to judge the relative importance of variables in the differences between districts. Thus, the FSI can be understood to be an explanatory index computed to explain the outcomes of food security, as suggested by the FSOI.



Our analysis shows that in the state of Orissa **there is a contiguous zone of acute food insecurity – all the districts of the eastern ghats and the adjoining coastal districts**. Further, within this zone there is a group of four districts that require urgent and sustained attention – the districts of Kandhamal, Malkangiri, Gajapati and Rayagada. This is the ‘geography of hunger’ in the state of Orissa.

Along with the above, there is also a broader group of districts that requires priority attention for enhancing food security, listed in the table below.

Priority Districts for Intervention

Eastern Ghats	Northern Plateau
1. Kandhamal	1. Keonjhar
2. Malkangiri	2. Sundargarh
3. Rayagada	
4. Nuapada	
5. Koraput	
6. Kalahandi	
7. Baudh	
8. Nabarangpur	
Coastal Plains	Central Table Land
1. Gajapati	1. Sonepur
2. Ganjam	2. Bargarh
3. Bhadrak	3. Sambalpur
4. Jajpur	4. Balangir

There is a high proportion of Scheduled Tribe (ST) population in most of these districts. In some, there is also a high proportion of Scheduled Caste (SC) population. These are also areas of high proportion of agricultural labourers and low wage rates. Overall, districts with poor food security also have low rates of women’s literacy, which is taken as a proxy for women’s status. Rural connectivity is poor in the most food insecure districts.

In general, however, the districts of Orissa fare poorly on nutritional outcomes, with only the more urbanized and industrialized districts doing better. Thus, ensuring food security and improving the nutritional status is a challenge for the state of Orissa as a whole. The identification of certain districts for priority action does not mean that either resources or efforts to bring up all districts can slacken, but only draws attention to the need for more inclusive growth efforts and the special efforts needed to bridge the divides between different regions and districts of the state.



The above social and economic characteristics together suggest that food security interventions need to be framed along the following lines:

Policy and enabling measures for **development of livelihoods of hill-forest-based populations**. This itself comprises a number of measures, including:

- Implementation of the Forest Rights Protection Act so as to provide **security of tenure**
- Investment to enable a shift to production of **high value crops**
- Expansion of **irrigation in a manner appropriate to hill and plateau regions**
- Improvement of **rural connectivity**, so as to reduce transaction and transport costs and increase economic opportunities
- **Shortening the chain of intermediaries and promoting value-added processing in non-timber forest products (NTFP)**

The changes in production that would reduce food insecurity require not just improved access, but also enhanced capabilities, through extension and technological development, building on local capacities and knowledge.

Interventions for **Scheduled Castes, other agricultural labourers and small farmers in the plains** include:

- Distribution of **land to the landless (including women)**, large numbers of whom would be from the Scheduled Castes
- Development of **non-farm enterprises and agricultural diversification**, so as to increase absorption of labour
- Given the large proportion of agricultural labourers in these districts, **labour-intensive crops** would have a comparative advantage and would also generate more employment
- Improved **productivity in rainfed crops**

Our analysis shows and it is generally accepted in the development literature, that **reducing gender inequality and empowering women** is a key factor in the improvement of food security. For this, measures include:

- Improvement in women's **literacy**



- Securing women's **right to land** and other productive assets
- Increasing access to **micro-finance**

Micro-finance, through Self Help Groups (SHGs) supported by NGOs, could help

- Reduce the incidence of inter-linked transactions, which result in very low net income
- Improve the food security situation by enabling borrowing for critical needs
- Improve the share of household income under the control of women

The above are medium-term development measures that would have a positive impact on the food access of the poorest. There is an urgent need to **increase the reach and improve the functioning of short-term food access measures**, such as under the National Rural Employment Guarantee Act (NREGA), or the Mid-Day Meals Scheme, and **link them with the above development interventions**. It is through such schemes of employment and schooling, along with the PDS, that the Right to Food is currently realizable. The challenge is also to link schemes of short-term food access with medium-term development interventions, which alone can provide a stable basis for food security. Realizing the Right to Food and improving the functioning of government schemes, however, are not just matters of improving administration but even more of people, women and men, mobilizing to assert their democratic will over the political and administrative processes.

Enhancing capabilities, through rights, access to resources, and training, will open the road for building the **capacity** to aspire – the aspirations for a better life exist, but the means or capacity to realize those aspirations are lacking.

1. Introduction

Headlines across the globe today are echoing the same shrill message: the threat of looming food insecurity. Hunger tops the global agenda. Food riots and protests have spilled onto the streets in several countries. Food stocks are at an historic low while food prices have been aggressively increasing to historic highs. India is not immune from these developments across the world, and rising food prices and low buffer stocks are causing alarm. Not so long ago however, the scene was different. There was almost an ‘embarrassment of riches’ as food stocks piled up to unprecedented levels. However, even then, very insufficient access to food stalked millions of poor households. Complacency cost dearly and within a few years we were importing wheat at steep prices. Substantial dependence on large imports of food is not an option for a country like India, particularly in the context of imperfect food markets and possible political conditions attached to imports.

These vicissitudes bring home the stark truth that food security is a critical and continuing challenge and there is no place for complacency on this front. In 1996, the World Food Summit (WFS) and subsequently the Millennium Development Goals (MDGs) adopted at the UN recognized the importance of achieving food security or, putting it in a more traditional way, eliminating hunger as a goal of the international system. Not quite eliminating hunger, but at least reducing its proportion by half by the year 2015 is now accepted as one of the MDGs.

A 2002 assessment by the follow-up to the WFS, ‘World Food Summit — *Five Years Later*’, as it was called, pointed out that, using the incidence of malnutrition as the measure of the incidence of hunger, there has been a decrease in hunger at the rate of 8 million people per year across the world. But in order to even achieve the goal of reducing world hunger by half by 2015, it is necessary to reduce the incidence of malnutrition by 15 million per year. What this shows is that continuing to implement the economic, political and social policies now in place will not enable the world to reach the goal by 2015. A mid-course correction in economic, political and social policies is needed in order to achieve the stated goals.

Despite India’s recent record of high rates of economic growth, there is a major concern with the failure of that growth to translate into a somewhat proportionate reduction in poverty and malnutrition. The problem of large-scale famine-related starvation deaths seems to have been largely resolved, due to a combination of a vigilant civil society and press. Nonetheless, there are periodic reports of malnutrition and starvation from different parts of the country; particularly affected are the politically marginal social groups, the Scheduled Tribes (STs) and Scheduled Castes (SCs). Besides this problem of hunger among the STs, there is the pervasive incidence of malnutrition, particularly of children and women. Even sustained increases in income have not resulted in commensurate improvements in nutritional status.

The persistence of malnutrition and the reported occurrence of starvation deaths together define the nature of the current problem of food insecurity within a situation of overall adequate availability of foodgrains. The fact that they occur within a situation of adequate foodgrain availability (domestic foodgrain production plus amounts released from government stocks plus imports made possible by



India's burgeoning foreign exchange reserves), serves to underline the importance of framing adequate policies and interventions to secure food security, or access to food, for not just households, but also individuals. It also provides the rationale for this report, prepared by the Institute for Human Development (IHD), on behalf of the United Nations' World Food Programme (WFP).

The UN World Food Programme and the MS Swaminathan Research Foundation (MSSRF) earlier collaborated in analyzing the food insecurity situation in different states in the country. Using chosen indicators to map the relative standing of states with regard to food security, MSSRF and WFP prepared the *Food Insecurity Atlas of Rural India* in 2001. This was followed by the *Food Insecurity Atlas of Urban India* in 2002. The third in the series, the *Atlas of Sustainability of Food Security* was launched in 2004. The atlases raised the bar in the analysis and understanding of food security across states. At the same time, the Atlases posed fresh challenges. They brought into focus the need for analysis at the sub-state level. States in India are typically large and diverse. Intra-state disparities in socio-economic development impact on the food security status of households. For effective policy and focused intervention, identifying and mapping the worst-off areas is important. Following the path-breaking national-level atlases, it was decided to extend the analysis to the district level, the level at which food security interventions are implemented.

The need for such disaggregated analysis is only matched by the dearth of data at such levels. To take only one example, we do not have estimates of an important indicator like poverty for a district. Strengthening planning and performance requires that more data is available at the district level. In this regard, the District Level Household Surveys (DLHS) show welcome progress. These surveys provide valuable demographic data and information relating to reproductive and child health.

The main objectives of this report are to analyze the nature and dynamics of the food security situation at the sub-state level and suggest disaggregated strategies. It is hoped that this Atlas will stimulate action and further analysis. Food security must be brought to the forefront of the development and political agenda not only at the Centre, but in a vibrant federal structure like India's, in the states as well.

1.1 What is Food Security?

What constitutes food security has gone through two phases of understanding or definition. In the 1970s, food security was understood as the 'availability at all times of adequate world food supply of basic foodstuffs...' (UN, 1975). But the 1981 publication of Amartya Sen's '*Poverty and Famines: An Essay on Entitlement and Deprivation*' brought forward a new understanding of the problem of hunger or food security. Rather than just the 'availability' of food, Sen emphasized 'access' to food through what he called 'entitlements' – a combination of what one can produce, exchange in the market plus state or other socially provided supplies.



What Sen posited is that availability or supply of food does not itself create entitlements for food. In a sense, Sen's emphasis on entitlements is similar to Keynes' notion of 'effective demand'. Both entitlement and effective demand are quite different from need. Since Keynes was dealing with a fully capitalist market economy, with only two classes, employers and workers, all effective demand was related to monetary income. But Sen is dealing with a 'mixed economy' with at least three classes, employers, workers and peasants or other own-account producers. For those who produce food, part, if not all, of their entitlement is due to their own production. This portion of the consumption of food is not mediated by the market. Consequently, this is not captured by the market-based notion of effective demand.

What an individual or household can consume or access depends on the individual's or household's entitlements. Entitlements draw attention to the conditions under which people access food, whether from direct production (or exchange with nature), market exchange (income from either goods produced or wage labour) and social security measures. Entitlements also draw attention to the rules that govern intra-household allocation, as a result of which women and girls may face hunger or deprivation even though they are part of households whose general entitlements are sufficient.

Food, of course, is not an end in itself. Food is consumed for nutrition. Instead of focusing attention on the commodity, one can look at the objective for which food is consumed, that is providing nutrition for the body. The purpose of nutrition itself is not just to survive, but to lead a healthy and meaningful life – to be in the state one wants to be (well-being) and to do various things one wants to do.

At one level, some health questions, like the prevalence of intestinal parasites, affect the very ability of the human body to absorb nutrients. Thus, health concerns, focused on the availability of clean water and access to health facilities, are very much part of the very concept of food security itself. At another level, some health questions, like AIDS most dramatically but also endemic malaria, affect the ability of the individual/household to engage in those livelihood activities that could ensure food security. Consequently, in order to deal with food security, it is not sufficient to pay attention to food alone, but also access to, at least, clean water and sanitation, which affect the ability to absorb food, or turn consumption of food into nutrition. It may thus be seen that all these factors affect food security in one way or the other. Hence they can be used as components of elementary well-being needed to lead a healthy and meaningful life.

Entitlements point to the fact that hunger is situated within poverty, rather associated with extreme poverty, as a result of which households and individuals do not have adequate entitlements to food. Thus, the elimination of hunger is the first landmark in reducing poverty.

Capabilities are a combination of two factors – states of well-being (like being well nourished, being healthy, and so on) and activities (achieving self-respect, or being socially integrated). Self-respect and social integration are in themselves goals of a meaningful life. But they are also instrumentally important, in that those without self-respect or the socially marginalized may not be able to achieve



food security. Consequently, achieving self-respect or playing a meaningful part in social life may both be necessary to achieve food security. This leads to the proposition that food security is not just a matter of some external organization, whether the state or society, providing food, but of the enhancement of the agency of the hungry or poor. Thus, some level of complex capabilities, like agency, becomes necessary to reach adequate levels of primary well-being.

Given women's general responsibility for food security in rural areas of developing countries, and given the pervasive gender bias in these societies, enhancement of the agency of the poor translates particularly into the enhancement of the agency of poor women. Consequently, food security approaches increasingly pay attention to the elimination of gender inequality and women's empowerment as important preconditions for food security.

Agency of poor women, or of the poor as a whole, is not only a matter of individual agency (which itself might be dependent on collective mobilization) but also of the poor putting their stamp on economic policies. This is necessary in order to bring about the much-needed political will that is often referred to as missing, in order to bring about adequate attention to food security policies. Without adequate political pressure for reform, proper food security policies are unlikely to be adopted. There can be no question that the political mobilization of the poor is required for such a food security policy to be implemented.

All of the above changes in understanding and context meant that 20 years after the 1975 World Food Summit, there was a substantial shift in understanding the meaning of food security. From the 1975 emphasis on adequate food supply, the 1995 World Food Summit declared '... food security, at the individual, household, national, regional and global levels ... exists when all people, at all times, have *physical and economic access* to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life.' (FAO, 1996, 3, emphasis added). The declaration further recognizes that 'poverty eradication is essential to improve access to food.'

The international discourse on food security has further developed along the lines of the right to food. This right to food (as discussed in greater detail in the Appendix on Right to Food) derives from the 1948 UN Declaration on Universal Human Rights. Through subsequent instruments, the meaning of the right to food has been spelt out. In particular, the 1999 International Covenant on Economic, Social and Cultural Rights clarified the obligations of states in the context of the realization of the right to food. As put forward in General Comment 12, the right to food identifies three kinds of obligations of states: not to adopt measures that would prevent access to food; to adopt measures to ensure that no individuals are deprived of access to adequate food; and to proactively engage in activities that strengthen people's access to food, including means to ensure their livelihood and food security. There is also an obligation of states to fulfil that right directly, when people cannot obtain adequate food through the means at their disposal (or, normal entitlements) (Charlotte McClain Nhalpo, 2004).



In India, following the case filed by the People's Union for Civil Liberties (PUCL), the Supreme Court has passed a number of judgments and orders on realizing the right to food (see Appendix on Right to Food for details). These include orders to implement the Mid-Day Meals Scheme (MMS) in primary schools in all states, the provision of work, etc. Consequently, it is in the context of the international and national obligations, following the acceptance of the right to food, that this Report looks at the ways to realize food security.

Overview of the Report

This report is an effort to provide a district level profile of food security in Orissa. As the country moves towards greater devolution and decentralization, data at disaggregated levels remains a stumbling block. District level data is notoriously inadequate and this report urges that greater attention be paid to data collection and dissemination at sub-state levels. After this introduction, the next chapter – Chapter 2 – provides an overview of the state and places it in the context of other states in the country. In line with the current – and correct – approach that emphasizes outcomes rather than inputs, Chapter 3 derives a composite index of food security outcomes and provides a brief methodological note. It draws a distinction between the Food Security Outcome Index (FSOI) that is based on outcome measures on the one hand, and the Food Security Index (FSI) that is a composite index of the factors that are critical to food security on the other hand. Chapters 4 to 6 analyze the food security situation along the dimensions of availability, access and absorption. Chapter 7 deals with the southern part of the state, infamous for its backwardness – the KBK districts, Koraput, Balangir and Kalahandi - now constituted by 8 districts of the eastern ghats region. The most food insecure districts both in terms of outcomes and in terms of the factors that contribute to it are given in Chapter 8. This chapter also discusses strategies for action that emerge from our analysis, in the context of the broader state and national strategic interventions already in place. This is most significant from the perspective of policy. Chapter 9 wraps up with the final conclusions.

2. A Profile of the State of Orissa

Food security has multiple dimensions and is linked to almost all sectors of the economy. In order to understand and map the food security situation in Orissa, it is only appropriate that we first provide an overview of the socio-economic profile of the state and the important changes that are taking shape in the macro economy. This chapter highlights the geographical features of the state, and then discusses the trends in key areas of the economy.

2.1 Agro-Climatic Regions

Orissa is one the major states of the country. With a total population of 36.8 million, it accounts for 3.6 percent of the total population of the country and 4.2 percent of the rural population. The state has a varied topography, with a wide range of physical features that owe much to its unique geographical location. Based on the agro-climatic conditions, the state can be divided into the following agro-climatic regions (see Map 1).

1. *The Northern Plateau:*

The Northern Plateau borders the southern section of Orissa and has a similar topography, constituting 18.3 percent of the state's area. The region is largely characterized by hill ranges.

2. *The Central Table Land:*

As the name suggests, the region is a generally flat plateau and constitutes 23.9 percent of the state's area.

3. *The Coastal Plains:*

The coastal plains constitute 25.8 percent of the area of the state and largely comprise the deltaic basins of the Mahanadi and Brahmani rivers.

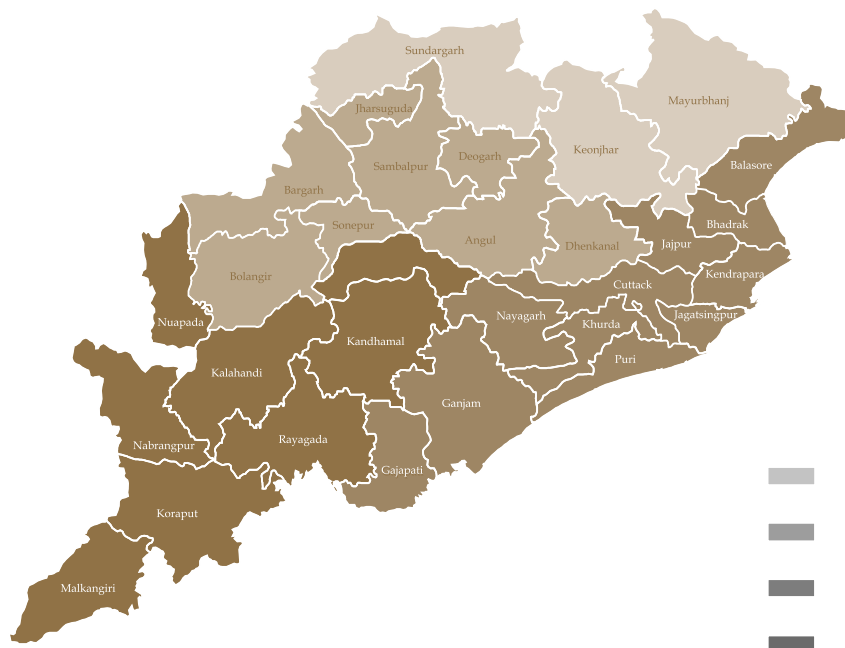
4. *Eastern Ghats:*

The highlands in the western part of the state form the largest natural region constituting 32 percent of the area of the state. The region is dominated by hills with intervening plains and valleys.

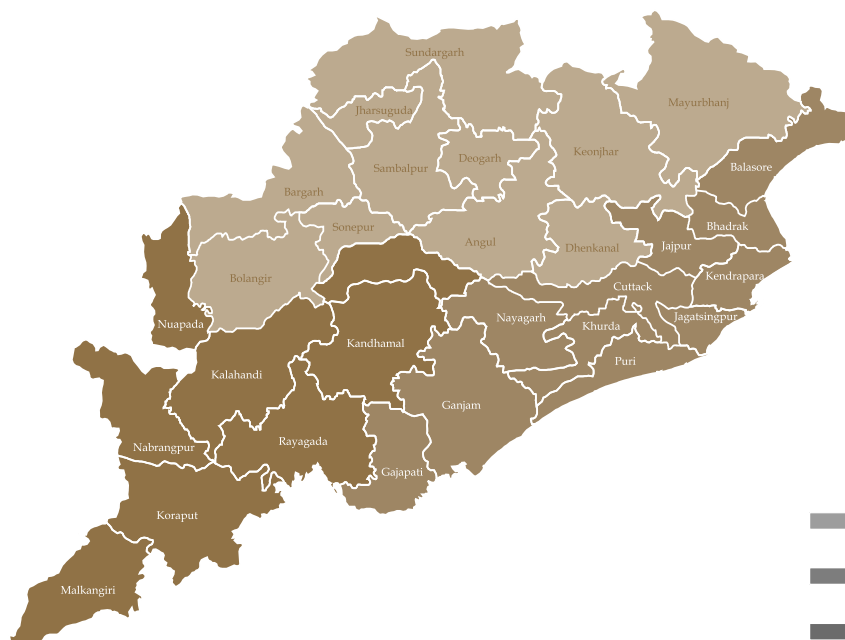
On a macro-scale, the state is divided into two major natural regions – the coastal region and the highland region. The coastal alluvium soils found in the narrow margins of the coast are exceptionally fertile and highly valuable for agriculture, particularly for paddy cultivation. The Mahanadi, in combination with Brahmani and Baitarani, forms an extensive alluvial tract, stretching from the Chilka Lake (in southern Puri) to Balasore district. The coastal districts thus have fertile soils and support extensive paddy cultivation.¹

1. There are three types of paddy that are usually grown in the coastal region – *Sarada (Kharif)* grown in low lands subject to flooding; *Biali* (Autumn) grown in slightly higher lands; and *Dalua* (Summer) that is grown in marshy lands (State Development Report, Orissa).

Map 1: Agro-Climatic Regions in Orissa by District



Map 2: NSS Regions in Orissa by District





The highlands, on the other hand, have a rugged and undulating topography, mainly inhabited by the tribal population. The forests cover most of the area. The predominant type of soil found in the region is lateritic, which is not suitable for agriculture due to its poor nutrient content. Even the central plains mostly contain red soil which is poor for floral life. The black soil is found only in pockets in the central region and is suitable for growing *rabi* crops such as wheat and pulses.

The state receives an average rainfall of 150 cms, with moderate to high variability. However, the KBK districts (Kalahandi, Balangir and Koraput), lying in the south-western part of the state, fall in the rain shadow area of the south-west monsoon and hence receive highly erratic rainfall.

The National Sample Survey (NSS) follows a similar pattern of regionalization of the state, except that the northern plateau and the central tableland have been clubbed together (see Map 2).

2.2 Poverty

The state is generally regarded as one of least developed states in the country. This is well illustrated in Table 1. At Rs. 5985 a year, the per capita income in Orissa is one of the lowest among 17 major

Table 1: Net State Domestic Product and Poverty Status

State	NSDP (TE 2004-05)		Per Capita Income (TE 2004-05)		Poverty Ratio (2004-05)	
	('000 Million Rs.)	Rank	(Rs.)	Rank		Rank
Andhra Pradesh	911	5	11080	8	11.2	2
Assam	181	17	6281	15	22.3	8
Bihar	320	14	3609	17	42.1	15
Chhattisgarh	309	15	7678	12	40.8	14
Gujarat	835	7	14850	4	19.1	6
Haryana	349	13	14897	3	13.6	4
Jharkhand	218	16	7273	14	46.3	16
Karnataka	703	11	12563	6	20.8	7
Kerala	811	9	11565	7	13.2	3
Madhya Pradesh	835	7	7666	13	36.9	13
Maharashtra	2,951	1	15567	2	29.6	11
Orissa	461	12	5985	16	46.8	17
Punjab	723	10	15611	1	9.1	1
Rajasthan	888	6	8788	11	18.7	5
Tamil Nadu	1,511	4	12719	5	22.8	9
Uttar Pradesh	1,876	2	8809	10	33.4	12
W. Bengal	1,705	3	10992	9	28.6	10

Source: NSDP and Per capita Income: Computed from CSO, Various years; Poverty Ratio– Planning Commission Poverty Estimates, Computed from NSS 61st Round, 2004–05.



states. Almost 46.8 percent of the population lives below the poverty line compared to 46.3 percent in Jharkhand, and 42.1 percent in Bihar.

The trend in the poverty ratio over the last three decades in the state is disappointing. The decline in percentage points per year has been much lower than the national average. What is most worrying is the fact that the decline is almost imperceptible in the 1990s. It declined by less than 0.3 percent points in rural Orissa and 0.5 percent points in urban Orissa (Mishra, 2007b). The comparative performance of the state in poverty reduction vis-à-vis the decline in poverty at the national level is shown in the following charts (see Figures 1 and 2).

Figure 1: Poverty Ratio in Orissa

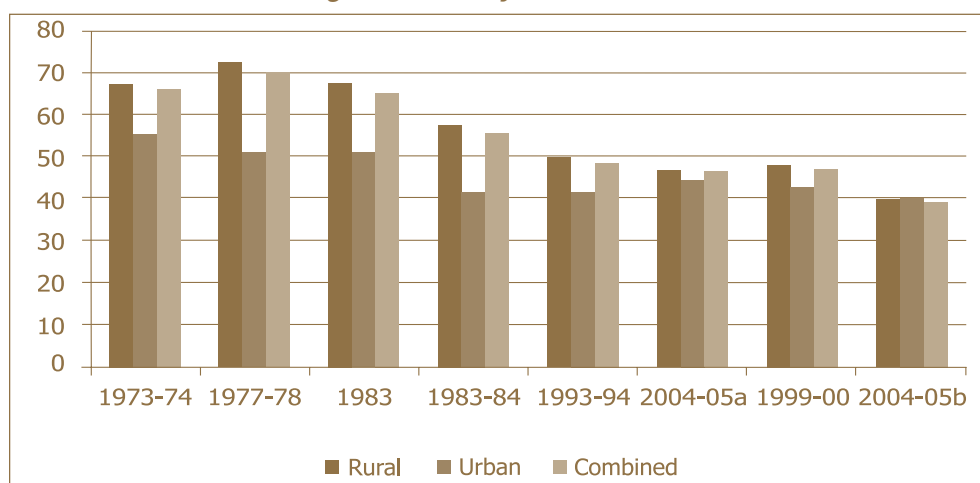
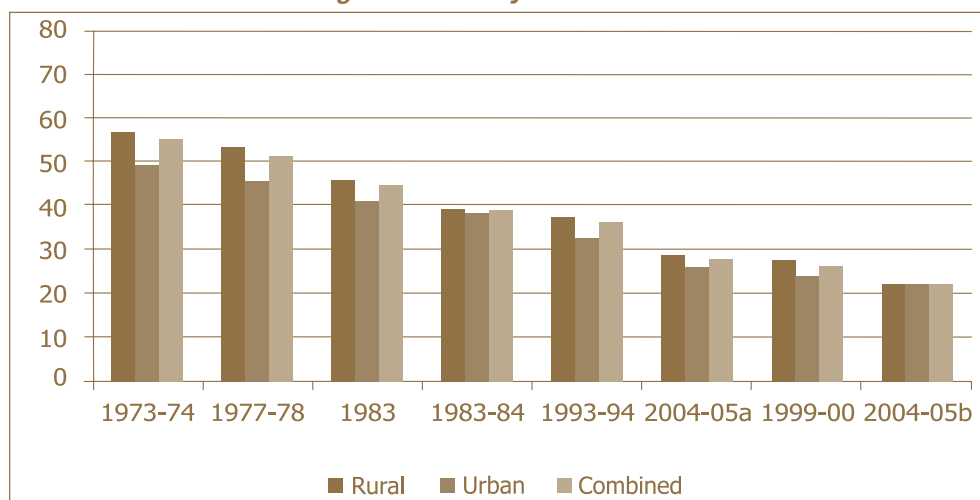


Figure 2: Poverty Ratio in India



Source: Dev, et al. (2004) and Planning Commission (2007), cited in Mishra (2007b). In 2004-05, 'a' estimates are based on uniform recall period comparable with 1993-94 whereas the 'b' estimates are based on mixed recall period and are comparable with 1999-2000.



There is a clear regional concentration of poverty in Orissa. Poverty is highest in the southern region followed by the northern region. In the coastal region, the incidence of poverty at 27.4 percent is actually just below the all-India rural figure of 28.1 percent. Poverty in the NSS northern region (comprising the northern plateau and the central table land) is as much as 30 percentage points higher at 59.1 percent. But it is the southern region (comprising the eastern ghats and adjoining hill areas) that has a massive incidence of poverty of 72.7 percent. Significantly, both of these are the highest for any NSS region in India (see Table 2 and Figure 3).

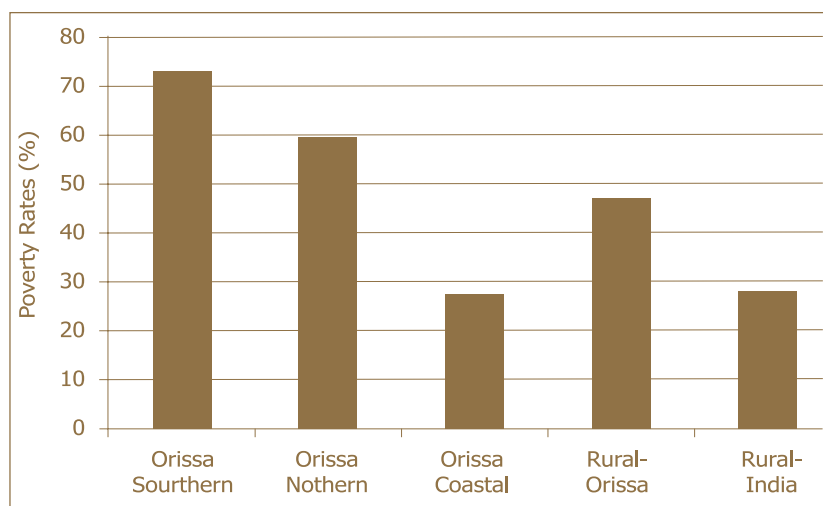
Of the three NSS regions, poverty actually increased between 1993–94 and 1999–2000 in the north and south, while it decreased in the coastal region. Further, the north and south together account for almost 75 percent of the state's poor (Government of Orissa, 2002).

Table 2: Orissa Region-wise (NSS) Trend in Rural Poverty Ratio, 1983-84 to 2004-05

Region	Year				
	1983–84	1987–88	1993–94	1999–2000	2004–05
Coastal	57.90	48.40	45.30	31.80	27.4
Southern	80.80	83.00	68.80	87.20	72.7
Northern	75.20	61.00	45.80	49.80	59.1
Orissa	65.29	55.58	48.56	48.01	46.9

Source: de Haan and Dubey, 2003, for 1983–84 to 1999–2000 and IHD for 2004–05.

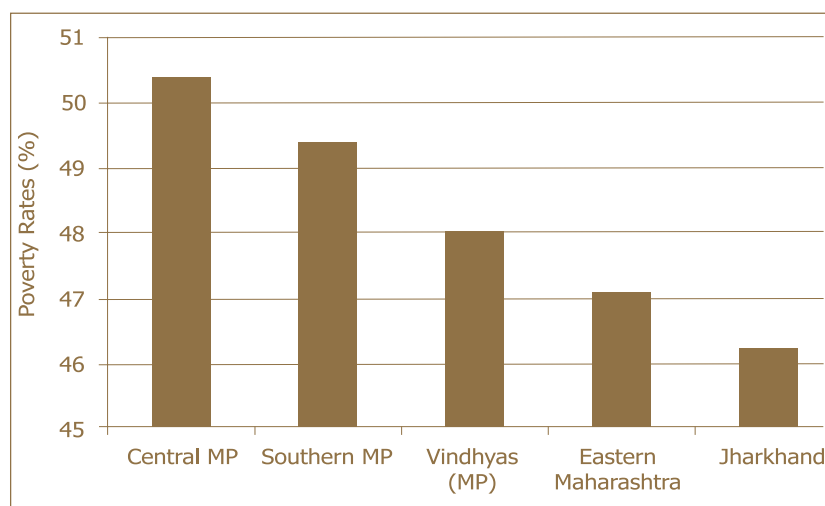
Figure 3: Region-wise Poverty Rates for Rural Orissa (2004–05)



Source: Calculated from Unit Level Data, NSS 61st Round 2004–05, based on Uniform Reference Period (URP).

The only NSS regions in other states which come anywhere near the southern and northern regions of Orissa in terms of the incidence of poverty are Central MP (50.4 percent), Southern MP (49.4 percent), Vindhya (48 percent), Eastern Maharashtra (47.1 percent), and Jharkhand (46.2 percent) (see Figure 4).

Figure 4: NSS Regions with High Poverty Rates (after Southern and Northern Orissa)



Source: Calculated from Unit Level Data, NSS 61st Round 2004-05, based on URP.

But, even within the poorest southern region, it is not as though all social groups of the population are equally poor. In both the southern region and in rural Orissa as a whole, the proportion of STs (Scheduled Tribes) in the poor is much greater than their share in the population. The STs are 28 percent of all rural Orissa households but 43.3 percent of rural poor households. The incidence of poverty among the STs is 75.8 percent in rural Orissa as a whole, and as high as 82.8 percent in southern Orissa. Thus, the regional dimension of poverty is accompanied by a social dimension, with the STs accounting for a large share of the poor and having a high incidence of poverty.

The proportion of the SCs (Scheduled Castes) in rural poverty, 19.0 percent, is a little more than their share in the rural population, 18.2 percent; while the incidence of poverty among the SCs is close to 50 percent. The STs and SCs together account for 62.3 percent of the rural poor, while they account for 46.9 percent of rural households (see Table 3 and Figure 5).

Thus, the regional and social dimensions of poverty manifest themselves in the fact that poverty is highest in the southern region and most prevalent among the STs, with the SCs also doing quite badly overall. In the southern region, even the OBCs (Other Backward Classes) and 'Others' have a relatively high incidence of poverty of 64.7 percent and 44.1 percent respectively.

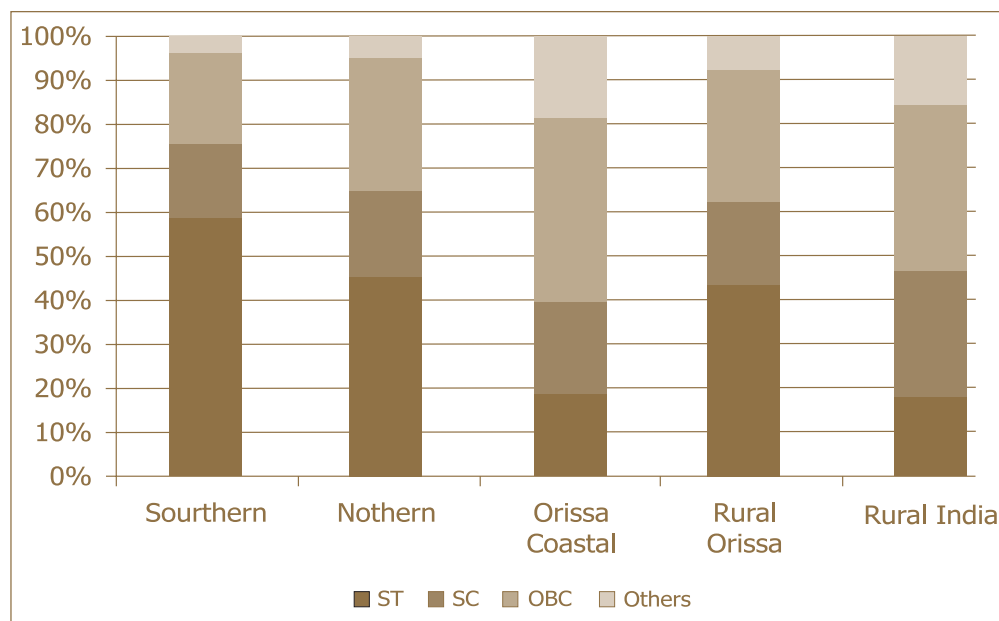


Table 3: Region-wise Poverty Rates by Social Group for Rural Orissa (2004–05) [%]

Region	ST	SC	OBC	Others	All
Southern	82.8	67.2	64.7	44.1	72.7
Northern	72.8	64.4	48.6	33.9	59.1
Coastal	67.7	32.8	24.4	19.0	27.4
Rural Orissa	75.8	49.9	37.1	23.5	46.9
Rural India	44.7	37.1	25.8	17.5	28.1

Source: Calculated from unit level data, NSS 61st Round, 2004-05, based on URP.

Figure 5: Region-wise Percentage Share of Poor Households by Social Group for Rural Orissa (2004–05)



Source: Calculated from unit level data, NSS 61st Round, 2004-05, based on URP.

What is also striking is that the poverty rate is high among STs even for larger land-cultivating groups, showing the low productivity of hill agriculture. At the all-India level, even STs in the highest landowning class (more than 4 hectares) have an incidence of poverty that is as high as 34.85 percent. Similar landowning classes among the rest have much lower levels of poverty, while the 'others' have an incidence of only 4.79 percent in this landowning category (see Sarkar, et al, 2006).

The high incidence of poverty even in the largest landowning category shows the low productivity of ST agriculture, which is largely hill agriculture, compared to plains' agriculture.



Table 4: Poverty among Different Land Size Groups in Rural Areas by Social Groups in 1999–2000

Land Size	ST	SC	OBC	Others	Total
Landless	40.39	36.14	27.36	17.23	28.62
0–0.4 hectares	48.85	37.28	30.70	21.85	31.44
0.4–1 hectares	47.78	34.18	24.82	15.13	26.42
1–2 hectares	38.84	31.25	21.68	12.52	22.16
2–4 hectares	39.62	25.00	16.28	7.80	16.95
> 4 hectares	34.85	17.26	10.74	4.79	10.55
Total	44.45	35.48	25.64	15.90	26.56

Source: Calculated from NSS 55th Round, in Sarkar, et al, 2006, based on Mixed Reference Period (MRP).

While literacy for all persons in Orissa at 62.8 percent is not much lower than the all-India rural rate of 65.1 percent, the difference increases for poor persons. The difference between literacy in Orissa and all-India literacy among the poor is about 5 percentage points.

The depressed southern region is, as we would expect, far worse off in literacy attainment, and is a whole 20 percentage points lower than all-India rural literacy for both the poor as well as for all persons.

2.3 Economic Growth

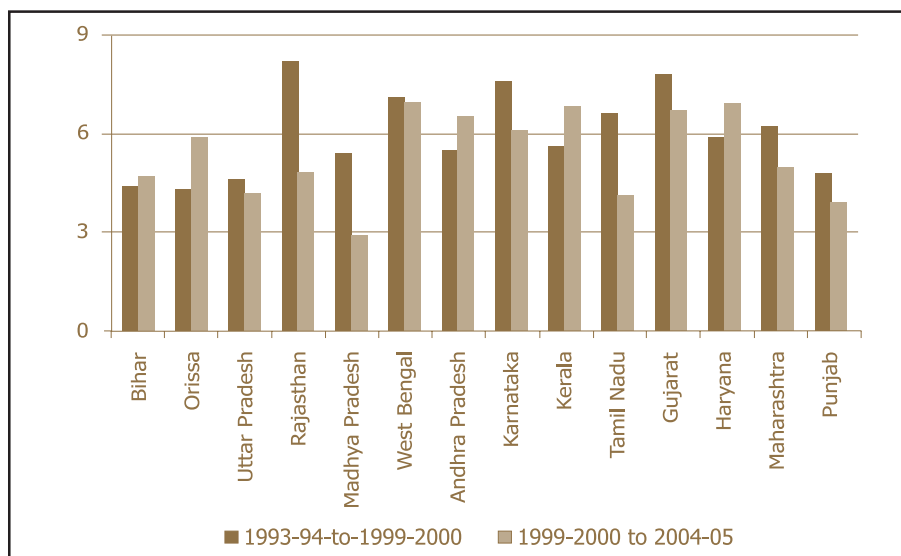
Orissa not only ranks among the poorest states of the country, but the average rate of growth of its economy is also among the lowest. Between 1993–94 and 2004–05, the state economy has grown at a meagre rate of five percent per annum, while states with larger economies have grown at a much higher rate: for instance, in Gujarat, the rate of growth exceeded 7 percent while in Karnataka, the economy grew at 6.9 percent per annum. On the positive side, the growth rate has increased from 4.3 percent in the five-year period ending in 1999–2000 to 5.9 percent in five-year period ending in 2004–05 (Figure 6).

The sectoral composition of the economy is a good indicator of the level of economic development of the state. The performance of the tertiary sector of Orissa is quite fair and it draws almost half of its income from this sector, lying only six percent points below the national average. However, it lags behind in the secondary sector and ranks only above Assam and Bihar, almost 10 percent points below the national average. As in most underdeveloped economies, the bulk of economic activity takes place in the primary sector, which employs almost two-thirds of the total workers of the state, either as cultivators or agricultural labourers.

In an aggregated form, the secondary and tertiary sector combined contribute only 61 percent of the total NSDP of Orissa, while the figure is more than 85 percent for states such as Maharashtra and Tamil Nadu, with a national average exceeding 75 percent (Table 5).



Figure 6: Annual Growth Rate (in percent) of Gross State Domestic Product (GSDP) (1993-94 to 2004-05)*



Source: National Accounts Statistics (*14 major undivided states).

Table 5: Sectoral Composition of NSDP* (TE 2004-05)

State	Primary	Rank	Secondary	Rank	Tertiary	Rank
India	23.33		23.61		53.06	
Andhra Pradesh	28.31	11	20.3	11	51.39	6
Assam	39.27	3	12.57	16	48.16	7
Bihar	43.19	1	9.55	17	47.26	8
Chhattisgarh	35.37	7	24.97	8	39.66	15
Gujarat	20.45	14	34.15	1	45.41	12
Haryana	28.96	10	25.04	7	46.01	10
Jharkhand	39.67	2	32.26	2	28.07	17
Karnataka	21.11	13	25.56	4	53.33	5
Kerala	17.55	15	19.44	13	63.01	1
Madhya Pradesh	34.23	8	23.25	9	42.52	14
Maharashtra	14.27	17	25.31	6	60.42	2
Orissa	38.8	5	14.01	15	47.19	9
Punjab	39.01	4	21.5	10	39.49	16
Rajasthan	29.11	9	25.4	5	45.49	11
Tamil Nadu	14.85	16	28.64	3	56.51	3
Uttar Pradesh	36.86	6	19.56	12	43.59	13
West Bengal	25.36	12	19.09	14	55.55	4

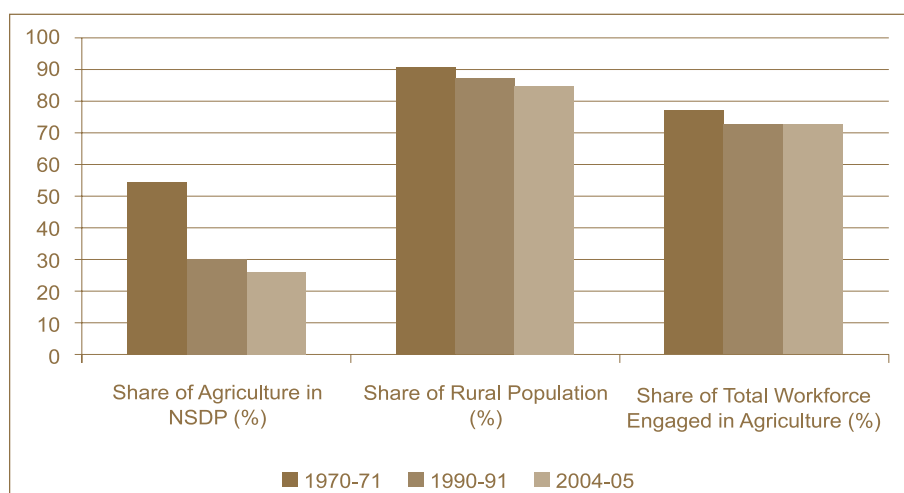
* Net State Domestic Product (NSDP) at Factor Cost at 1993-94 prices.

Source: Computed from Central Statistical Organization (Various Years).



In line with the trends in other states, there has been a decline in the contribution of agriculture to NSDP from 54.6 percent in 1970–71 to less than 30 percent in 2004–05. Again, in line with all-India trends, there has not been a corresponding decrease in the proportion of the population working in agriculture, which declined much less from 74 percent to 72 percent in the same period (Figure 7).

Figure 7: Share of Agriculture in Orissa



Source: Table 4.1, p.104, Orissa Development Report for 1970–71 and 1990–81; Share of Agriculture 2004–05 from CSO; and Share of Total Workforce Engaged in Agriculture from Census, 2001.

The growth rates of agriculture in Orissa only reiterate this story of stagnation in production. In the period 1994–2005, agriculture grew at just 1.83 percent, forestry at 1.90 percent, and fishing at 4.96 percent. Fishing, however, is concentrated in the coastal region. Thus, the only agricultural sub-sector that did grow was in the already better-off coastal region (Figure 8).

The sectors of the state economy that grew substantially were mining in the primary sector, and the overall secondary and tertiary sectors

(Table 6). But this growth is concentrated in urban areas. There would, of course, be spin-offs from this urban development, both in terms of remittances by workers of rural origin, and in terms of increasing employment opportunities and thus also overall wages.

In rural areas, there was a growth in proportion of employment in the secondary sector, from 8.3 percent in 1993–94 to 11.1 percent in 1999–2000. But the proportion of those employed in the tertiary

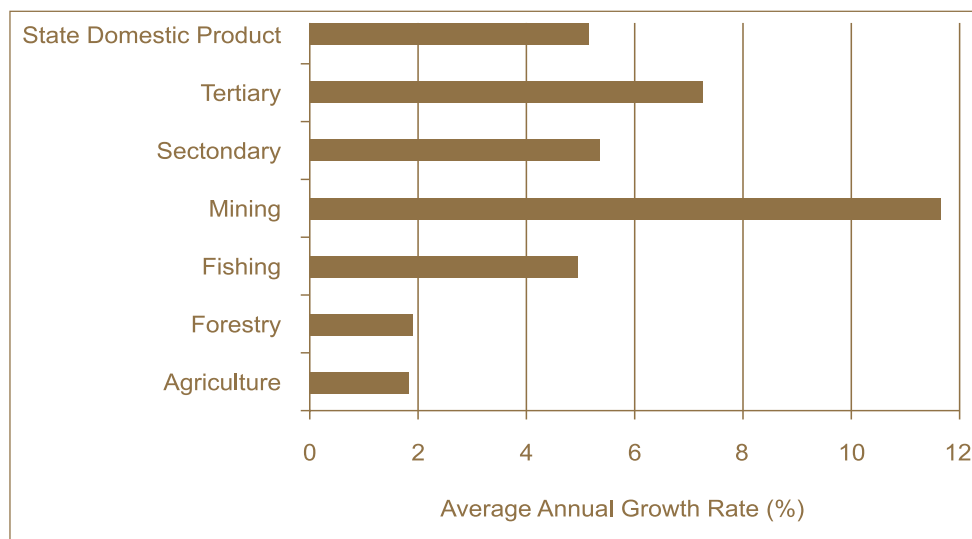
Table 6: Sectoral Composition (percent) of GSDP, at 1993–94 prices

	1993–94	1999–00	2004–05
Agriculture	34.16	24.80	21.43
Forestry	3.47	3.04	2.42
Fishing	2.20	2.22	2.15
Mining	5.12	7.22	9.83
Primary	44.95	37.28	35.83
Secondary	19.78	21.26	19.58
Tertiary	35.27	41.45	44.59

Source: CSO relevant years.



Figure 8: Average Annual Growth Rate of GSDP of Orissa (1994–2005)



Source: Computed from CSO Data.

sector almost stagnated rather declined from 10.7 to 10.4 percent during the same period from 1993–94 to 1999–2000 (Table 7).

Thus, there has been little structural change in the rural economy. The population dependent on agriculture has decreased very slightly. Further, there is a social dimension to this transition. The proportion of rural persons with non-agricultural sources of income is found to be lower among the marginalized communities, particularly the Scheduled Tribes.

Table 7: Percentage Distribution of Usually Working Rural Persons by Industry 1993–94 and 1999–2000

	Primary		Secondary		Tertiary	
	93–94	99–00	93–94	99–00	93–94	99–00
Orissa	81.1	78.6	8.3	11.1	10.7	10.4
Bihar	84	80.5	4.5	8.6	10.9	11
MP	90.4	87.4	4.5	5.8	5.1	6.9
All-India	77.6	75.6	9.9	11.1	12.4	13.3

Source: Government of Orissa, 2004, Table 3.9, p. 92 and Table 3.10, p. 95

Within the agriculture-dependent population too, there has been an increase in the proportion of agricultural labourers. The major change in the share of agricultural labourers in main workforce took place from 1960 to 1970, from 17 percent to 28.3 percent (Government of Orissa, 2004, Table 4.1, p.104). Since then the share of agricultural labourers has remained steady at around 28 percent.



2.4 Health and Nutritional Status

The health status of an individual is directly related to his/ her economic status. Given the fact that a healthy person has a higher capacity to work, the former also has a direct bearing on the latter. The goal of economic activity is human well-being, an important, even elementary, component of which is health. Health and nutritional status can be measured through a number of indicators. While mortality under age one [infant mortality] is an indicator of poor reproductive health facilities and antenatal care, mortality under age five is closely linked with immunization and overall poverty levels. The latter is also useful for assessing both social practices and public policy and can be taken as a comprehensive indicator for the overall quality of life.

The following table shows the comparative mortality as well as nutritional status of children for the states with an under-five mortality figure higher than 80 per 1000 live births. While UP shows the highest figure (96) in terms of under-five mortality, Orissa closely follows with 91, following only MP and Jharkhand. For all malnutrition indicators, the figures for Orissa remain consistently poor, though better than other tribal-dominated states like MP and Jharkhand (see Table 8).

High malnutrition levels, coupled with high mortality among children, also point towards poor feeding practices. Poor access to food emanating from grave economic conditions is the prime reason for such a situation.

Table 8: Mortality and Nutritional Status of Children and Women²

	Under five mortality	Infant Mortality	Underweight Children	Wasted Children	Stunted Children	Anemic Children	Thin Women
India	74.3	57	42.5	19.8	48.0	69.5	35.6
Uttar Pradesh	96.4	72.7	42.4	14.8	56.8	73.9	36.0
Madhya Pradesh	94.2	69.5	60.0	35.0	50.0	74.1	41.7
Jharkhand	93.0	68.7	56.5	32.3	49.8	70.3	43.0
Orissa	90.6	64.7	40.7	19.5	45.0	65.0	41.4
Chhattisgarh	90.3	70.8	47.1	19.5	52.9	71.2	43.4
Rajasthan	85.4	65.3	39.9	20.4	43.7	69.7	36.7
Assam	85.0	66.1	36.4	13.7	46.5	69.6	36.5
Bihar	84.8	61.7	55.9	27.1	55.6	78.0	45.1
Best State	16.3 (Kerala)	15.3 (Kerala)	22.9 (Kerala)	9.2 (Punjab)	24.5 (Kerala)	44.5 (Kerala)	18.0 (Kerala)
Worst State	96.4 (UP)	72.7 (UP)	60 (MP)	35.0 (MP)	56.8 (UP)	78.0 (Bihar)	45.1 (Bihar)

Source: National Family Health Survey, 2005–06.

2. Only those states selected that have under-five mortality higher than 80 per thousand live births.



A brief look at the same states in terms of consumption levels gives an interesting picture for Orissa. It lies above the national average in terms of intake of Vitamin A and iron supplements. Public intervention for mitigating under-nutrition among children, in terms of food supplements under the Integrated Child Development Services (ICDS) program, is much higher in the state as compared to most other states. But Orissa is only marginally below the national average in calorie and protein intake (see Table 9). Yet, in food security outcomes, child mortality in particular, it lies well below the national average. The disjunction between an average level of calorie and protein consumption and a much below-average outcome in child mortality could be explained by a high level of inequality of consumption in the state. As seen earlier, there is a high proportion of ST population in the state and the ST-dominated districts are also those with the poorest nutrition outcomes. Further, Orissa also has a higher proportion of agricultural labourers in the rural population and, with high levels of single-cropping and low agricultural wages, this would lead to poor nutrition outcomes for the agricultural labourers. This points to the importance of paying attention to the condition of the STs and of agricultural labourers, many of whom would be from the SCs, in dealing with ways to improve food/nutrition outcomes in Orissa.

This needs to be combined with attention to gender relations in order to strengthen women's agency in dealing with food security. Taking women's literacy rate as an indicator of gender relations, rural Orissa, as a whole, is at par with the all-India rural women's literacy rate. But, the rural women's literacy rate in Orissa, as we will see later, hides high regional differences.

Table 9: Status of Consumption

	Per capita per day intake of calories (kcal)	Per capita per day intake of proteins (gm)	% given vitamin A supplements in last 6 month (Children < 5yrs)	% given iron supplements in last 7 days (Children < 5yrs)	% Received food supplements under ICDS Program
India	2047	57.0	18.2	4.7	26.3
Uttar Pradesh	2200	65.9	6.1	1.5	14.7
Madhya Pradesh	1929	58.8	14.1	3.5	36.4
Jharkhand	1961	51.2	20.1	3.5	36.5
Orissa	2023	48.3	21.9	5.2	52.5
Chhattisgarh	1942	47.4	9.1	3.1	58.4
Rajasthan	2180	69.6	10.0	1.0	17.3
Assam	2067	52.7	12.9	0.8	28.0
Bihar	2049	57.8	26.4	2.9	4.2
Best State	2240 (Punjab)	69.6 (Haryana)	38.5 (TN)	12.5 (Karnataka)	58.4 (Chhattisgarh)
Worst State	1842 (TN)	44.9 (TN)	6.1 (UP)	0.8 (Assam)	4.2 (Bihar)

Source: Calorie and protein intake from NSSO, 61st Round (2004–05); Rest – National Family Health Survey, 2005–06.



In the Food Insecurity Atlas of Rural India (2001), Orissa ranked second from the bottom; it was the lowest of the ‘severely food insecure states’, with only Bihar (which at that time included Jharkhand) ranked below it as an ‘extremely food insecure state’. Given Orissa’s position at almost the bottom of all states, the task of this report is to identify (1) the regional pattern of food insecurity within Orissa; and (2) the social groups, by caste, ethnicity and gender, that require special attention. Following this identification of regions and social groups, the next step is to identify the major correlates of food insecurity and then provide an analysis of the factors that contribute to food insecurity.

In terms of nutritional status of children, rural Orissa is almost at the all-India level. The percentage of underweight children below the age of three is actually lower for Orissa (45.7 percent) than for rural India as a whole (49 percent). Further, the NFHS III figure is a major improvement over the NFHS II figure of 54.4 percent, i.e. an improvement of almost 10 percentage points (Table 10).

Table 10: Nutritional Status of Children (NFHS I, II, III)

Variable	NFHS III			NFHS II	NFHS I
	Total	Urban	Rural	Total	Total
Orissa					
Children under 3 years					
Stunted (%)	38.3	32.9	39.1	44	44.9
Wasted (%)	18.5	12.6	19.4	24.3	23.4
Underweight (%)	44	33.3	45.7	54.4	52.4
India					
Stunted (%)	38.4	31.1	40.7	45.5	na
Wasted (%)	19.1	16.9	19.8	15.5	na
Underweight (%)	45.9	36.4	49	47	51.5

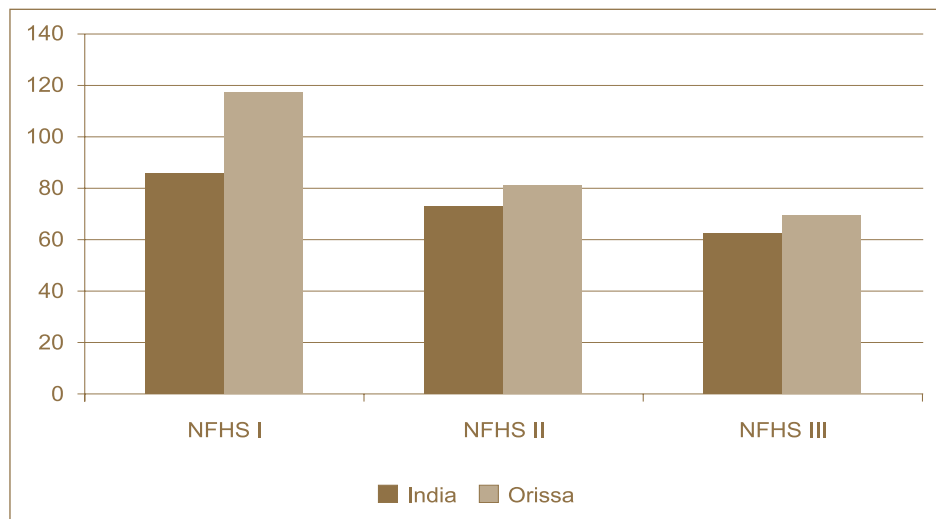
Source: National Family Health Survey I, II, III; 1992-93, 1998-99; 2005-06 respectively.

The improvement in incidence of infant mortality shows a better spread of medical services in the state. At the time of NFHS I, IMR in Orissa at 117 was far above the all-India figure of 85, a difference of 32. But by NFHS III, the difference was only 7, with Orissa at 69 and the all-India figure being 62 (see Figure 9).

However, the above figure does not show the regional pattern within the state. The southern region, in particular, shows a higher rate of infant mortality than the coastal and even the northern region. In fact, the two districts of Mayurbhanj and Jharsuguda have the lowest infant mortality rates (IMR) at 65 and 68 respectively among all districts in Orissa. On the other hand, all the southern districts in the KBK region have an IMR higher than 100 per 1000 live births. Though the two sets of figures are not strictly comparable, the difference between the figures is too huge to ignore. For instance, the KBK districts have a higher IMR than Sub-Saharan Africa and other ‘least developed’ countries. Kandhamal at 119 has the highest IMR figure in the state, which is also one of the highest in the country (see Table 11).



Figure 9: Number of infant deaths per 1,000 live births in the last 5 years (Rural)



Source: NFHS (Various Rounds).

Table 11: Infant Mortality Rate in Orissa (2005–06)

Region	IMR	Region	IMR
Orissa	65	Kandhamal	119
India	57	Gajapati	107
South Asia	83	Rayagada	106
Sub-Saharan Africa	95	Kalahandi	103
Least Developed Countries	90	Malkangiri	103
World	49	Nabarangpur	102
		Koraput	101

Source: Column 1: State of the World's Children, 2008 (Orissa figures from NFHS-3); Column 2: Estimated from Census, 2001 by IIPS.

While infant mortality can be reduced with improvements in access to healthcare, the presence of trained birth attendants etc., reduction in child mortality is more related to improvements in food security and nutritional status. Social and economic factors determining the access to food, food entitlements, safe drinking water, and so on, all come into play. Consequently, for an analysis of food security, child mortality is a more relevant indicator than infant mortality.

3. Analysis of Food Security

Food security is the condition of sufficient nutrition, which is due to a combination of food access of the household and the individual, and of the ability of the body to absorb nutrients. In more detail, food security of an individual is the result of:

1. Food access (or effective demand for food) of the household, which results from own production of food retained for household consumption, plus food purchased from the market through sale of other commodities, whether labour time or products, and any non-production based entitlements to food.
2. The food accessed by the household distributed among household members on the basis of various social norms and/or bargaining positions/gender relations of various members.
3. The food consumed by an individual translated into nutrition on the basis of access to safe water, the absence of parasitic diseases, and the overall health status, all of which would affect the body's capacity to absorb consumed food.

3.1 Measuring Food Security Status

Given this definition of food security, how can its attainment be measured? Food security is a combination of access to food and its absorption by the body, which depends on a number of non-food factors such as sanitation, access to clean drinking water, access to health facilities, and so on. The outcome of food security can be taken to be the nutritional status of the individual, with the understanding that food intake is the basic, though not the only factor that affects nutritional status.

In developing countries, the rural population, particularly children, is vulnerable to malnutrition because of low dietary intake, lack of appropriate care and inequitable distribution of food within the household. The measurement of the nutritional status of children is done through anthropometric methods; these include weight-for-age, height-for-age and weight-for-height. Each of these indices provides somewhat different information about the nutritional status of children. The height-for-age index measures linear growth retardation. Children who are more than two standard deviations below the median of the reference population in terms of height-for-age are considered short for their age or 'stunted'. The proportion in this category indicates the prevalence of 'chronic under-nutrition', which often results from a failure to receive adequate nutrition over a long period of time or from chronic or recurrent diarrhoea (NFHS, 2007).

The weight-for-height index examines body mass in relation to body length. Children who are more than two standard deviations below the median of the reference population for the same index are considered too thin or 'wasted' and this indicates prevalence of acute under-nutrition. Wasting is associated with the failure to receive adequate nutrition in the period immediately before the survey

1. There are three types of paddy that are usually grown in the coastal region – *Sarada (Kharif)* grown in low lands subject to flooding; *Biali* (Autumn) grown in slightly higher lands; and *Dalua* (Summer) that is grown in marshy lands (State Development Report, Orissa).



and may be the result of seasonal variations in food supply or recent episodes of illness (NFHS, *op cit*).

Children who are more than two standard deviations below the reference median on the index of weight-for-age are considered to be 'underweight'. We have opted for the proportion of underweight children as the indicator for capturing malnutrition among children. The primary reason being that weight-for-age is a composite measure that takes into account both chronic and acute under-nutrition. Secondly, while information on stunting and wasting are available at the state-level from the NFHS, the same is not available at the district-level. The Reproductive and Child Health Survey through its District Level Household Survey (DLHS) does give information at the district level but only for the index on weight-for-age. Therefore, we have selected this index as one of the two indicators for measuring food insecurity status.

Malnutrition in children weakens their immune system, making them more susceptible to disease and less able to fight off infection. It has been estimated that a child is almost ten times more likely to die from key diseases if he/she is severely underweight, and two and a half times more likely to die if he/she is moderately underweight, as compared to an average weight child (Black et al., 2008). Given the fact that more than 3.5 million children die globally on account of under-nutrition, it emerges as a major factor leading to child deaths.

Therefore, under-five mortality has been taken as the second indicator for measuring food insecurity. The under-five mortality rate indicates the probability of dying between birth and five years of age, expressed per thousand live births. There are a number of advantages of using the under-five mortality ratio as an indicator of food insecurity. Mortality among children is known to be the 'outcome' of the development process rather than an 'input', such as per capita calorie or protein consumption or access to medical facilities which are means to an end. Child mortality is known to be the outcome of a wide variety of factors, for instance, nutritional status of the child and its mother, food availability in the family, level of immunization, availability of maternal and child health services, economic status, availability of safe drinking water, basic sanitation, and so on (UNICEF, 2005). Thus, under-five mortality encompasses a number of facets, most of which have been used as explanatory indicators, as already enumerated and as discussed later.

The significance of under-five mortality as an indicator lies in the fact that it is less susceptible to the fallacy of averages than, for instance, per capita income. This is because the natural scale does not allow children of the rich to be 1000 times as likely to survive, even if the human-made scale does permit them to have 1000 times as much income. To put it simply, it is much more difficult for a wealthy minority to affect a region's child mortality ratio, and therefore it puts forward a more accurate picture of the health and nutritional status of the children of that region (UNICEF, 2007a).

The UN explicitly mentions reduction of under-five mortality by two-thirds by 2015 as one of its primary MDGs (MDG-4). The interrelation between nutritional status and child mortality can be gauged from



the fact that under-nutrition contributes up to 50 percent of all child deaths (WHO and UNICEF, 2006). Improving nutrition and achieving MDG-1 (eradicate extreme poverty and hunger) would substantially help avert child deaths from diarrhoea, pneumonia, malaria, HIV, or measles. Thus, improving nutritional status is a prerequisite for achieving MDG-4 (UNICEF, 2006).

Box 1: Towards MDG - 4

India accounts for 2.1 million (21 percent) of a total of 9.7 million children dying globally before they reach the age of five. This is despite the fact that child mortality has declined by 34 percent between 1990 and 2006. A study conducted by Save the Children, which compares child mortality in a country to its per capita income, shows that India lags far behind its poorer neighbours like Bangladesh and Nepal, when it comes to reducing child deaths. A new Wealth and Survival Index, which is part of the study, has ranked 41 countries on the criterion of how well they use their resources to boost child survival rates. While Bangladesh and Nepal are listed in the top ten performers, India stands at a low 16th in the index.

This can be elucidated by comparing India and Bangladesh. While India's per capita income (GNI) increased by 82 percent from 2000 to 2006, its child mortality rate declined from 94 to 76 per 1000 live births. As against that, over the same period, Bangladesh saw a much smaller increase in per capita income – only 23 percent – but its child mortality dropped from 92 to 69.

As per the estimates of the Inter-Agency Group for Child Mortality Estimation, only seven of the 60 priority countries with high child mortality can be considered to be on track to achieve the MDG-4 (Bangladesh, Brazil, Egypt, Indonesia, Mexico, Nepal and the Philippines). Thus, the global progress made so far has been found to be insufficient to achieve the goal. To actually achieve the goal, most of the remaining countries have to progress at an average annual rate of reduction of at least 10 percent till 2015. Given the fact that the global rate so far (1990-2006) has just been a little over 1.5 percent, the achievement of this goal seems to be unrealistic.

The *State of the World's Children-2008* suggests early and exclusive breastfeeding for the first six months, appropriate complementary feeding from six months to two years, skilled care at birth and special care for low-birth weight babies as key preventive measures to reduce child mortality. Thus, adequate food security of the child is necessary for its survival beyond the age of five.

Ref: UNICEF (2007b), *Save the Children* (2008).

As many as 60 countries across the globe have been prioritized for urgent action, based on two criteria: countries with more than 50,000 deaths of children under five and countries with an annual child mortality of at least 90 per 1000 live births. In 2005, these 60 countries accounted for 93 percent of all deaths of children under five. India figures prominently among these countries and shares place along with four other South Asian countries. Regrettably, India does not appear to be on track to achieve the MDG-4 (UNICEF, 2006) (See Box 1).

A statistical analysis of the NFHS-3 data across states reveals a significant negative correlation between micro-nutrient intake and proportion of underweight children and under-five mortality, implying thereby that an increased intake of micronutrient, i.e. high food security, significantly reduces the risk of under-nutrition, which in turn, as discussed, contributes to reduction in child mortality (Table 12).



Table 12: Correlation between Micronutrient Intake and Under-nutrition and Mortality Status

	Under 5 Mortality	Underweight Children	Vitamin Intake	Iron Intake
Under 5 Mortality	1.00	0.714**	- 0.501**	- 0.523**
Underweight Children		1.00	- 0.227	- 0.450*
Vitamin Intake			1.00	0.555**
Iron Intake				1.00

** Correlation significant at 0.01 level.

* Correlation is significant at 0.05 level.

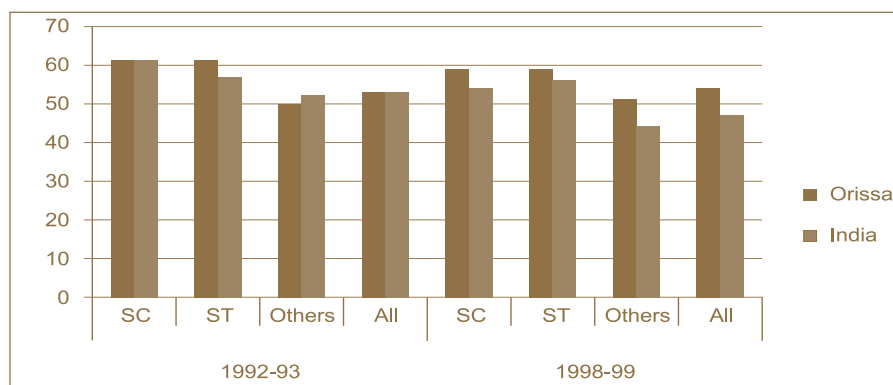
It follows from the preceding discussions, that child under-nutrition status and mortality appear to be an overall outcome of nutritional and food insecurity. It, therefore, makes sense to form a combined index of these two indicators to compute an overall index of food security outcome in Orissa. Districts have been divided into five groups on the basis of this index – extremely insecure, severely insecure, moderately insecure, moderately secure and secure – each category representing the relative severity of the outcome of food insecurity.

3.1.1 Child Under-Nutrition in Orissa

As per NFHS-3, about 41 percent of all children under 5 years of age are undernourished in Orissa by the weight-to-age criterion. This is nearly same as the national average of 42.5 percent. Orissa has shown greater progress in bringing down the percentage of underweight children compared to the national level. While there was a drop of 13.7 percent in Orissa, the reduction was only 4.5 percent nationally in the same period.

However, there are wide disparities between social groups. Data by social group is not at present available for Orissa for NFHS 3, but the comparison for NFHS 2 clearly shows the more disadvantaged situation of SCs and STs in the state. 59 percent of ST children, and 59.4 percent of SC children were underweight compared to the 43 percent children belonging to other groups (see Figure 10).

Figure 10: Proportion of Underweight Children by Social Groups, 1992 & 1998



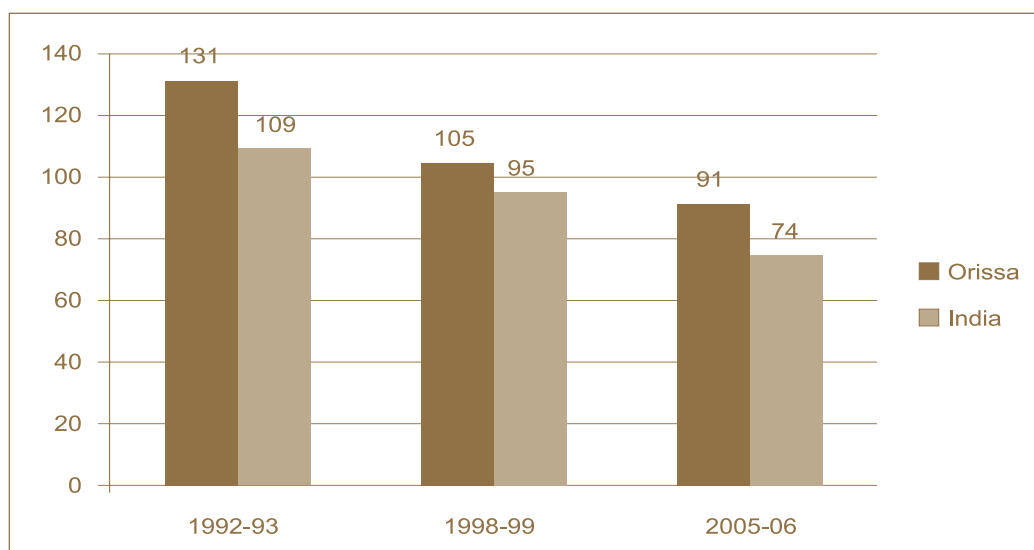
Source: NFHS II.



3.1.2 Under-five Mortality in Orissa

Orissa has one of the highest figures for child mortality in the country. Though the level of under-five mortality has declined by over 30 percent from 1992–93 to 2005–06, the current level (91) is still alarming and is much higher than 83, the average of developing countries or 79 the average of South Asian countries (UNICEF, 2007b).

Figure 11: Trend of Change in Under-Five Mortality in Orissa and India



Source: NFHS (Various Years).

The state-level figures of child under-nutrition and under-five mortality mask large differences across regions and districts. Jharsuguda (9.9 percent) has the lowest percentage of undernourished children while Bargarh (60 percent) has the highest percentage of undernourished children (see Table 13).

Similarly, for under-five mortality, the central district of Kandhamal, lying in the eastern ghats region, has the highest figure of 187 child deaths per 1000, while the northern district of Mayurbhanj has 91. It is only in the industrial and urban centre of Jharsuguda that the performance is seen to be better. In fact, it is only in Jharsuguda and Mayurbhanj that the under-five mortality is less than 100 deaths per 1000 live births. That even the best performing district in the state in terms of nourishment has an extremely high level of under-five mortality in absolute terms speaks of the alarming nature of under-five mortality among children in the state.



3.2 The Food Security Outcome Index

Table 13: Indicators used to Compute Food Security Outcome Index (FSOI)

District	Under Five Mortality		Underweight Children		Food Security Outcome Index	
	Value	Rank	Value	Rank	Value	Rank
Angul	119	9	45.7	14	0.485	12
Balangir	119.6	10	47.8	18	0.467	13
Balasore	116.2	7	31.5	8	0.600	5
Bargarh	109.6	3	59.9	30	0.410	21
Baudh	143.3	22	45.9	15	0.402	22
Bhadrak	130.6	18	50	20	0.414	20
Cuttack	128.1	14	13.9	3	0.692	3
Debagarh	148.5	23	29.9	6	0.504	11
Dhenkanal	130	16	30	7	0.565	6
Gajapati	165.1	29	50.7	23	0.294	28
Ganjam	127.1	13	54.9	25	0.389	24
Jagatsinghpur	117.4	8	27.8	5	0.624	4
Jajpur	125	12	47.4	16	0.452	15
Jharsuguda	95.6	2	9.9	1	0.830	1
Kalahandi	157.4	26	40.6	11	0.395	23
Kandhamal	186.5	30	48.7	19	0.237	30
Kendrapara	134	19	35.9	10	0.508	9
Keonjhar	129	15	50.6	21	0.415	19
Khordha	114	5	44.9	13	0.507	10
Koraput	153.4	24	43.5	12	0.386	25
Malkangiri	158.3	27	56.1	26	0.276	29
Mayurbhanj	90.6	1	47.7	17	0.564	7
Nabarangpur	156.2	25	33.4	9	0.452	14
Nayagarh	130.3	17	10.7	2	0.708	2
Nuapada	135.9	20	57	28	0.344	26
Puri	135.9	20	27.7	4	0.563	8
Rayagada	162.9	28	50.6	21	0.302	27
Sambalpur	122.8	11	52.4	24	0.422	16
Sonepur	109.9	4	58.2	29	0.422	17
Sundargarh	114.9	6	56.4	27	0.418	18

Source: RCH-DLHS (2002–04): Under Five Mortality Rate computed from Census (1991 and 2001) by F. Ram, Usha Ram and Chander Shekhar for 'Strengthening State Plans for Human Development', (IIPS).



Map 3: Food Security Outcome of Rural Orissa

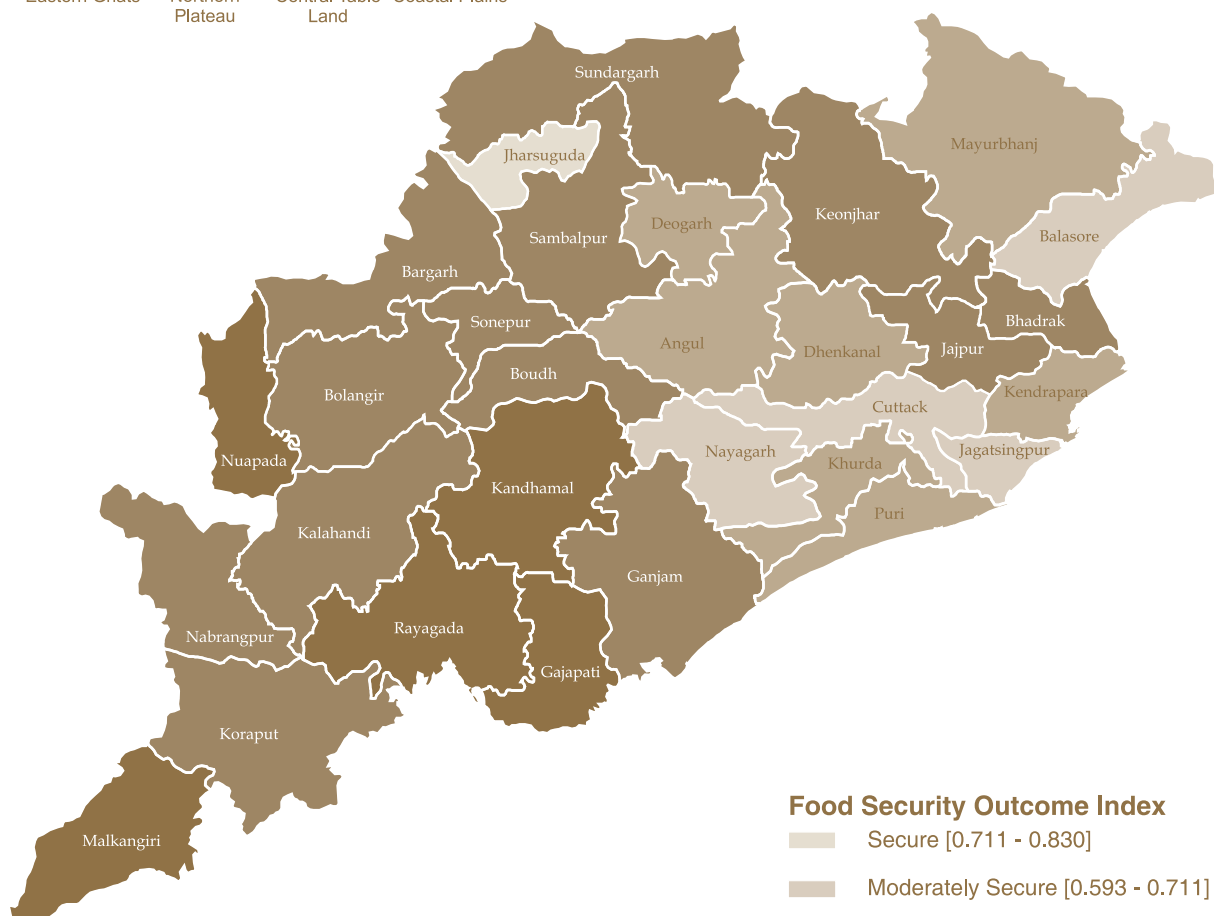
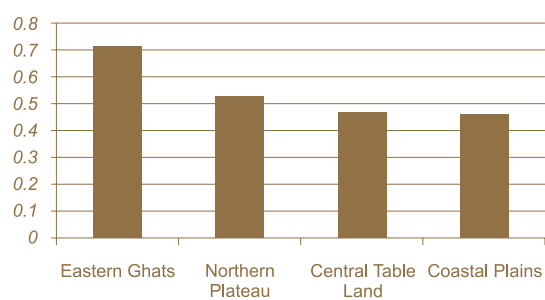




Table 14: Status of Districts in Terms of FSOI

Secure	Moderately Secure	Moderately Insecure	Severely Insecure	Extremely Insecure
Jharsuguda	Nayagarh	Dhenkanal	Balangir	Nuapada
	Cuttack	Mayurbhanj	Nabarangpur	Rayagada
	Jagatsinghapur	Puri	Jajpur	Gajapati
	Balasore	Kendrapara	Sambalpur	Malkangiri
		Khordha	Sonepur	Kandhamal
		Deogarh	Sundargarh	
		Angul	Keonjhar	
			Bhadrak	
			Bargarh	
			Baudh	
			Kalahandi	
			Ganjam	
			Koraput	

A regional analysis of the Food Security Outcome Index (FSOI) presents an interesting picture (Map 3). All the eight districts in the eastern ghats region lie in the most food insecure categories, as also most of the Central Tableland. As we will see later, these are also the districts that have a higher proportion of forests and tribal population. The coastal plains are relatively better-off with only four of eleven districts lying in this category, out of which two are adjacent to the districts from the eastern states. Two of the four districts from the northern plateau region bordering Jharkhand are found in this category, while districts bordering Chhattisgarh also have similar figures. The industrialized district of Jharsuguda has the best outcome (Table 14).

3.3 Explaining Food Security

Taking the under-five mortality and child malnutrition rates as the outcomes of food security, one could rank districts on the basis of this index, as done above. If the objective of the exercise were merely to decide on the districts in which to concentrate food security interventions, then such a ranking would be sufficient. But this would say nothing about the *types* of interventions that should be undertaken in order to improve food security, which is one of the key objectives of the study.

However, food security indicators can draw attention to the factors that distinguish the food secure from the food insecure districts. These indicators can point out the specific areas in which the food insecure districts differ the most from food secure districts. Of course, such association between indicators in an index cannot tell us what the causal relation between them and food security is. For instance, if we find that adult female literacy is consistently higher in food secure districts and



consistently lower in food insecure districts, that only shows a correlation between adult female literacy and food security. Why such a relation holds is something that is a matter for analysis. Whether it is due to an enhanced women's agency contributing to a better utilization of household income, or through literate women having a better knowledge of improved nutritional practices, or some other relation, it is for analysis to bring out these relations. But the indicators can draw attention to the issues for which significant differences exist. It would even be possible to rank these variables, a rank that would point to the extent to which these variables are different between districts. Such an analysis could also point to variations between food insecure districts – the same variables may not contribute the most to the low index in all districts, or some of them may even move in opposite directions.

Food security is the ability of a household to command food (its food entitlements), generally acquired through the net result of its livelihood activities (plus any other non-livelihood-based entitlements), that is crucial in determining food security of the household. These livelihood activities, from the point of view of food security, are valued not only for the food they might directly produce, if at all they produce food, but also from the point of the command over food that they give to the household. It is at this level of effective demand for food (both consumed out of self-production and purchased) that market failures take place, requiring public intervention of different kinds. Food production, or agricultural production more broadly, then enters as a part, even the main part, of rural livelihood activities that provide command over food.

Within a household, it is known that there are gender differences in entitlements. Consequently, it is necessary to deal with not just factors influencing household entitlements, but also those influencing individual entitlements within the household. Factors of gender differentiation and discrimination come into the picture in influencing individual entitlements of women and men, girls and boys. Further, there could be a substantial imbalance between the use of energy and its replacement through food. Given that women generally work longer hours than men and that women also get less nutrition than men, this imbalance could itself be a factor in nutritional shortfalls for women.

Entitlements are not only based on an individual's or household's own economic attainments. There are also government – or community-based – entitlements. Government-organized entitlements have been gaining in importance, while community-based entitlements have been in decline, even among *adivasis*. The operation of various schemes, such as the Mid-Day Meal Scheme in schools, do have some, even substantial, impact on the access of children, girls and boys, to food. The performance of these schemes depends very substantially on demand from below for provision of these services, and also on the involvement of women in local governance. But, the entitlements that come through special interventions have been separated in our analysis from those that provide the 'normal' entitlements to food. Of course, we also try to see whether there is a connection, as there ought to be, between the food security status of a district and the public interventions in that district.



It therefore emerges that there are a number of indicators that influence food insecurity in one way or the other. We have combined these indicators into a set of three broad food security indices:

1. Production factors (at the district level) influencing **availability**;
2. Household and individual **access** to food; and
3. Ability to **absorb** food.

3.3.1 Food Availability

The concern for food availability stems from production and related aspects that sustain a desired level of food production (Box 2). Foodgrains are considered to be of paramount significance for household food and nutritional security, the reason being that cereals and pulses are staple foods and there are no perfect substitutes for them (Chand, 2007). Foodgrains are also the cheapest source of energy compared to other foods and are indispensable for the food security of low income classes (Chand and Kumar, 2006).

Box 2: Agricultural Production and Food Security

It is commonly believed that agricultural production directly affects food security. However, there is more to it than a mere direct link. Rising agricultural productivity increases rural incomes and lowers food prices, making food more accessible to the poor. Improving irrigational facilities and growing drought-tolerant crops reduce income variability by mitigating the impact of drought. Productivity enhancements are key to greater food security for households with limited access to food markets. Nutritionally enriched crops give access to better diets, particularly through biofortification that substantially improves the nutrient content of the crop.

Thus investments in agriculture are important to ensure food security. However, there is an increasing concern about global food security in future, largely consequent upon growing resource scarcity and climate change. In the present world, many countries have diversified their export base, and trade at large stabilizes food availability. However, food availability is still a concern in many agriculture-based countries. Many countries have declining per capita production of food staples. Further, staple crop production in most of these countries is rain-fed and experiences large fluctuations caused by climatic variability.

The increase or even sustenance of the present level of production is limited by a number of factors – land constraints, water scarcity, high energy prices – along with the uncertain effects of climate change, which has been considered to be one of the areas of greatest uncertainties for agriculture. The combined effects of higher average temperatures, greater variability of temperature and precipitation, more frequent and intense droughts and floods and reduced availability of water for irrigation can be devastating for agriculture, particularly in the tropical regions. It has been predicted that agricultural GDP in Sub-Saharan Africa could contract by anywhere from 2 to 9 percent.

Source: World Development Report, 2008.



In our analysis, the following indicators have been chosen to determine a broad picture of food availability:

- 1. *Per Capita Value of Agricultural Production:*** Agricultural output is an indicator reflecting availability of food. Since agriculture is dependent on climate, it is advisable to take an average of three to five years' data of agricultural production to take into account the variability of production. Food and non-food production both would be included since non-food production would contribute to the income of households and therefore have an impact on food security. To account for variations in population across districts, the per capita value of agricultural production has been used.
- 2. *Proportion of Forests:*** Forests are a form of common property resource. Availability of forest area can affect food security as access to forest products provides income and supports nutrition, depending on the type and magnitude of the produce. But there are both legal and geographical restrictions on developing production in forest areas. Thus, it can be assumed that forest area is negatively associated with food security, since it limits the extension of agricultural production.
- 3. *Irrigation Extent:*** Irrigation has a key role in both stabilizing agricultural production and, through an increase in cropping intensity and an associated increase in productivity, improving a district's food security position. It would also provide a better prospect in terms of rural employment.
- 4. *Rural Connectivity:*** Access to paved roads has a big role in development. It reduces transport costs and can reduce transaction costs, with possible positive results on the prices realized by farmers. By improving communication, roads can increase the options available to rural producers, connecting them with larger national, regional and even international markets. Studies of rural roads have shown that they raise the productivity and value of land for poor farmers (Jacoby, 2000). It has been found that government spending on rural infrastructure, besides agricultural research and development, irrigation and rural development programmes targeted to the rural poor, have all contributed to reductions in rural poverty and increases in agricultural productivity. Marginal government expenditure on roads, in particular, has been found to have the largest positive impact on productivity growth (Fan, et al., 1999).

3.3.2 Food Access

Access to food or food distribution has been regarded to be the most important factor determining food security. A household's access to food depends on its own production of food and the food it can acquire through sale of labour power or commodities produced by it. These are linked to what Amartya Sen calls endowment and exchange entitlements: 'A person starves *either* because he does not have the ability to command enough food, *or* because he does not use this ability to avoid starvation. The entitlement approach concentrates on the former, ignoring the latter possibility' (Sen, 1981).



The following indicators have been considered in order to take into account the aspect of food accessibility.

1. **Proportion of Agricultural Labourers:** The total number of agricultural workers in the country has been estimated at 259 million as of 2004–05. Of these, more than one-third are wage workers and almost all of these are casual labourers. Agricultural labourers are characterized by extremely poor physical and human capital and also the highest poverty levels (NCEUS, 2007). Thus, it is expected that the proportion of agricultural labourers will be negatively related to food security, i.e., the more the agricultural labourers in a district, the worse will be the food security situation.
2. **Proportion of Scheduled Tribes and Scheduled Castes:** The ST and SC households are known to be generally more food insecure, largely on account of their economic and social deprivation – the former on account of geographical marginalization and the latter due to historical deprivation and exclusion from mainstream – all resulting in political marginalization. The proportion of ST and SC population in a district has been taken as an indicator of this marginalization. The assumption is that the greater the ST and SC population in a district the less it will be associated with food security.
3. **Proportion of Working Age Population:** The ratio between the productive section of the population to the economically dependent part is a valid demographic indicator at the household level. A ratio higher than unity represents a positive scenario, with more productive population compared to the dependent population.¹ This ‘demographic dividend’, if effectively harnessed, leads to increased production and hence food security (Chandrasekhar, et al., 2006).
4. **Per Capita Consumption Expenditure:** The NSS estimates of per capita consumption expenditure, adjusted for inequality, is a proxy for per capita income reflecting a significant dimension of access to food. This variable accounts for all sources of income, including those which are depicted through availability of food as measured in terms of value of agricultural output. For instance, a district with low value of agricultural output along with a high value of consumption would mean that non-agricultural income, including remittances from migrants, plays a role in enabling consumption to be higher than agricultural production. This is the only way in which we can indirectly bring migration, which is such a crucial component of households’ food security strategies, into the picture.
5. **Wage Rate of Rural Persons:** Casual wage workers constitute about one-fifth of the workers in the unorganized non-agricultural sector while almost all agricultural labourers are casual workers (NCEUS, 2007). Casual workers tend to be the least protected and have the lowest level of earnings. The understanding is that agricultural labour, without the backing of self-produced food, is particularly vulnerable to food insecurity. There is, therefore, a particular concern with the earnings of agricultural labour.

1. One of the traits of any developed economy is a lower fertility rate, which leads to a ‘bulge’ in the working age group, thus improving the dependency ratio (reverse of working age group ratio), making it less than unity.



- 6. Rural Female Literacy:** It is well-known that there are gender-based inequalities in food consumption within a household. Consequently, mere household consumption data or per capita household consumption data would not tell us the story of intra-household distribution of food and related facilities, such as access to medical services, which would affect the nutritional status of females, women and girls. That such gender-based inequalities in household consumption exist is attested to by numerous case studies (see those reviewed in Bina Agarwal, 1994). Further, the very high incidence of anaemia among women and girls shows that females are nutritionally deficient even in households that are not otherwise poor or nutritionally deficient. We have used the rural female literacy rate as the variable to represent gender-based inequality in household consumption. The argument is that a higher literacy rate for women is more likely to enable women to enhance their roles in family decision-making and increase their share of household consumption. At the same time, higher women's literacy is also likely to lead to better knowledge of nutritional systems and improved health practices in the household.

3.3.3 Food Absorption

The ability of the body to translate food intake into nutritional status is mediated by a number of factors, some genetic and others related to hygiene and morbidity.

The following indicators have been chosen to determine a broad picture of food absorption:

- 1. Access to Safe drinking Water:** Reduction of the proportion of people without access to safe drinking water by half has been mentioned as part of the seventh Millennium Development Goal. Polluted and contaminated water undermines the safety and the nutritional well-being of individuals. Studies have shown that water and sanitation accounts for a substantial portion of the difference in infant and child mortality rates experienced by the rich and the poor (Leipziger, et al., 2003). Clean and safe water supply is an essential element for achieving food security and good nutrition.

Though India has taken huge strides in terms of provision of safe drinking water since Independence, the fact remains that more people in India lack this basic minimum necessity now than 50 years ago. This is besides the fact that more people are vulnerable to water-borne diseases (Gujja & Shaik, 2005). Empirical studies have shown that water quality is a big problem in rural areas (Krishnan, et al., 2003). Almost two million children die each year because of lack of clean water and lack of sanitation (UNICEF, 2007c). The availability and quality of potable water is a big factor that affects food insecurity. As there is no direct method for calculating access to safe drinking water, we have considered access to a tubewell, tap and handpump as three ways of acquiring safe drinking water.

- 2. Access to Primary Health Services:** Public health services, which reduce a population's exposure to disease through such measures as sanitation and vector control, are an essential



part of a country's development infrastructure. The health infrastructure prevents the local inhabitants from exposure to diseases, for instance, through assuring food safety, vector control and health education to improve personal health behaviour (Gupta, 2005). In rural areas, all the health services are pivoted around the PHCs, hence we have taken access to them as an indicator determining food absorption.

3.4 Food Security Index (FSI)

The FSI is a composite index covering three dimensions, i.e., Availability, Access, and Absorption factors. Districts having higher index value are considered relatively more food secure compared to districts with lower index values. All variables included in the index are for rural areas, unless otherwise specified.

Besides these three groups of factors, an additional component, i.e. public entitlement, has been used to explain how this influences food security. But the public entitlement factor is not included in the index of food security. The reason is that public entitlements enter to make up for deficiencies in normal, private entitlements. The lower the level of food security, the greater should be public entitlement.

For each of the dimensions, as discussed earlier, some relevant variables have been chosen. All indicators used to calculate the composite index should be positively related to the index. In order to do that, some of the variables have been reversed. Table 15 gives the indicators, source of information and the reference year. (See Appendix 2, Table A2.1 for a description of the variables).

Table 15: Orissa - Indicators Used to Analyze Food Security

Name of Variable	Sources	Ref. Year
(a) Availability		
1. Proportion of net irrigated area to net sown area	Orissa Agricultural Statistics, 2005–06, pp.27–28 Directorate of Agriculture & Food Production, GoO	2005–06
2. Per capita value of agricultural output	Orissa Agricultural Statistics, 2005–06, A Profile on Agriculture in Orissa, 2006 Directorate of Agriculture & Food Production, GoO	2003–04 to 2005–06
3. Percentage of villages having access to paved roads	Census of India, 2001	2001
4. Percentage of forest area to total geographical area*	Forest area to total geographical area- Statistical Abstract of Orissa, 2005, Directorate of Economics and Statistics, Orissa	2005



(b) Access		
1. Percentage of agricultural labour to all labour	Census of India, 2001	2001
2. Proportion of ST and SC population to total population*	Census of India, 2001	2001
3. Ratio of working age population	Census of India, 2001	2001
4. Per capita monthly consumption expenditure (inequality adjusted)	61 st NSS round	2004–05
5. Rural casual labour wage rate	61 st NSS round	2004–05
6. Female literacy rate	Census of India, 2001	2001
(c) Absorption		
1. Percentage of households having access to safe drinking water	Census of India, 2001	2001
2. Percentage of villages having access to PHC (within <5 kms distance)	Census of India, 2001	2001
(d) Public Entitlement		
1. Percentage of midday meal beneficiaries out of total children	Women and Child Development Department, GoO; Downloaded from http://orissagov.nic.in/wcd/activity/Annexure-VII.pdf	Sept 2005–06
2. Percentage of ICDS beneficiaries to total rural population	Women and Child Development Department, Government of Orissa	2006–07

* These variables have been used inversely to have a positive association with food security.

Note: Set (d) pertaining to Public Entitlement variables have been analysed but not included in the construction of the Index.

4. Food Availability

This chapter analyses food availability across a number of component dimensions. Broadly these dimensions are production and productivity, extent of irrigation, proportion of forests, and road connectivity. The effort is to compare the overall situation in Orissa vis-à-vis other states, and then analyze and map the inter-district disparities. The chapter also shows the position of each district with respect to the selected indicators and the composite index and map of availability.

4.1 Agricultural Growth

Reflecting the deepening agrarian crisis in the country, growth in agricultural Gross State Domestic Product (GSDP) in India declined during the decade 1993–94 to 2003–04 as compared to the preceding decade (see Table 16).

Table 16: Growth of Agricultural GSDP and GSDP across States

State	1983–84 to 1993–94 (at 1980–81 Prices)		1993–94 to 2003–04 (at 1993–94 Prices)	
	Agricultural GSDP	GSDP	Agricultural GSDP	GSDP
Andhra Pradesh	3.05	4.58	2.80	5.63
Assam	2.12	3.51	0.51	2.93
Bihar	-0.45 ***	2.69	2.50	5.34
Gujarat	0.84 ***	5.00	1.13 ***	6.19
Haryana	4.86	6.18	1.77	5.96
Himachal Pradesh	3.08	5.89	1.30	6.53
Karnataka	3.54	5.86	3.12	7.10
Kerala	4.40	5.33	-2.00 *	4.85
Madhya Pradesh	2.82 *	5.21	0.23 ***	4.14
Maharashtra	5.39 *	7.42	1.27	4.92
Orissa	-0.57 ***	3.39	0.17 ***	3.96
Punjab	4.62	5.13	2.15	4.13
Rajasthan	3.93	6.19	1.21 ***	5.32
Tamil Nadu	4.43	7.45	-0.60 ***	5.08
Uttar Pradesh	2.8	4.66	2.18	3.76
West Bengal	4.45	4.73	3.45	7.03
India	3.05	5.32	2.19	6.01
CV for States	58.72	25.43	102.88	22.75

Note: Growth is Compound Annual Growth Rate. All growth rates are significant at 5 percent but for * which is significant at 10 percent and

*** which is insignificant even at 20 percent. CV denotes coefficient of variation.

Source: CSO, Gross State Domestic Product, Various Years.



While agricultural GSDP grew at a very slow rate of about 3 percent during the decade 1983–84 to 1993–94, it came down even further to 2.2 percent in the next period from 1993–94 to 2003–04. What is worse, in the same period, the disparities among the states also widened. The coefficient of variation in the growth of agricultural GSDP, that is a measure of the disparities among states, increased significantly from 59 to 103 over the two periods. At the same time, there was a decline in the variation across states in the growth of overall GSDP (Table 16).

Orissa witnessed a negative growth of -0.54 in agricultural GSDP in the decade 1983–84 to 1993–94. This increased very marginally (0.17 percent) in the next decade, but was the lowest in comparison to all other states, except Tamil Nadu and Kerala (where the growth was negative). Some developed states like Punjab, Haryana, Maharashtra, and Tamil Nadu witnessed a decline in their agricultural growth rates (largely on account of a high base).

Table 17: Level of Agricultural Development

State	% of National Production		Foodgrain Yield (TE 2005–06)		Instability in Production ⁱ		Cropping Intensity ⁱⁱ		Irrigation Extent ⁱⁱⁱ	
	(TE 2005–06)	Rank	kg/ha	Rank	(1991–2005)	Rank	(%)	Rank	(%)	Rank
India	100		1714		9.4		134.4		39.6	
Andhra Pradesh	7.1	4	2155	4	18.9	7	121.7	11	38.1	7
Assam	1.8	15	1437	9	6.2	2	143.1	6	6.2	16
Bihar	4.5	9	1498	8	17.1	6	138.8	7	60.6	4
Chhattisgarh	2.8	14	1107	14	66.6	14	116.9	13	23.1	12
Gujarat	2.9	12	1554	7	43.6	13	113.8	16	31.6	10
Haryana	6.3	7	3087	2	6.5	3	177.5	2	84	2
Jharkhand	1.8	16	1265	12	122.4	15	120.3	12	9.3	15
Karnataka	3.6	10	1275	11	28.7	11	116.6	14	24.9	11
Madhya Pradesh	7.1	5	1184	13	23.9	9	128.4	8	33.5	8
Maharashtra	5.4	8	909	16	25	10	127.2	9	16.9	14
Orissa	3.4	11	1334	10	38.5	12	146	5	22.9	13
Punjab	12.2	2	3996	1	5.8	1	185.9	1	95.4	1
Rajasthan	6.6	6	1053	15	229.6	16	123.8	10	33.4	9
Tamil Nadu	2.9	13	1806	6	20.8	8	115.8	15	50.2	6
Uttar Pradesh	19.7	1	2119	5	9	5	153.4	4	73.7	3
West Bengal	7.8	3	2464	3	6.6	4	176.5	3	54.5	5

Notes: i. Instability in production = standard deviation of growth rates of total foodgrain production (1991–2005).

ii. Cropping Intensity = Gross Area Sown/Net Area Sown (expressed as percentage).

iii. Irrigation Extent = Net Area Irrigated/Net Area Sown (expressed as percentage).

Source: Ministry of Agriculture, Government of India (Various Years).



4.1.1 Production

A brief comparison with the major agricultural states of the country¹ sheds light on the poor state of agricultural development in Orissa. The state contributes only 3.4 percent to the aggregate national production. This is a pointer to the low levels of productivity.

The yield levels of foodgrains are low, lying far below the national average. With an average production of only 1334 kgs of foodgrains per hectare in the triennium ending 2005–06, Orissa ranks 10th among the major states. The level of productivity is far below the national average of 1714 kgs per hectare (Table 17).

The state receives an average rainfall of more than 140 cms, which is above the national average (110 cms). However, rainfall is quite erratic and unevenly distributed and in the absence of adequate water conservation and harvesting measures, frequently results in crop failures and in famine or famine-like situations. This is mirrored in a highly unstable growth of foodgrain production in the state over the last one and a half decades. Taking the standard deviation of growth rates of total foodgrain production to measure instability in production, we find that this figure was as high as 38.5 in Orissa compared to only 9.4 at the national level, between the years 1990 and 2005. This also compares very unfavourably with other mainly rainfed states such as West Bengal (6.6), Bihar (17) and Assam (6.2) that have considerably lower instability.

4.1.2 Diversification of Production

Besides low growth in productivity, there has been little diversification of crops away from foodgrains towards higher value, non-foodgrain crops. The state produces only small quantities of sugarcane, cotton and jute. There has not been any perceptible change in the cropping pattern during the last three decades or so. Instead of a diversification in cropping pattern favouring cultivation of more remunerative cash crops, the percentage area under foodgrains increased from 85 percent in 1970 to 89 percent in 1998 (Government of Orissa, 2002: 110). The percentage of area under foodgrains, however, dropped to 79 percent during 2005–06, showing some diversification in agriculture.

Among foodgrains, rice is the most important crop in Orissa. But the average yield in 1998–99 was quite low at 1210 kgs/ha, whereas the all-India average was 1930 kgs/ha. Even in states with similar agro-climatic conditions, such as West Bengal and Andhra Pradesh, it was much higher at 2200 kgs/ha and 2000 kgs/ha respectively. Other than in the more irrigated coastal belt and parts of the central tableland, and particularly so in the uplands, rice production in Orissa is mainly of the non-irrigated, upland variety. With poor irrigation and low use of fertilizers, yields are low. Low yields mean that income per capita from rice is low, whether the rice is self-consumed or sold on the market.

1. States contributing at least one percent to aggregate national production have been considered. The reference to 'major states' in the text should be taken to mean these states. All the states with population above 20 million, except kerala, are included.



As rice is the major crop in the state, it is worth analyzing the productivity levels of rice across districts and agro-climatic zones in the state. It is observed that the northern districts adjoining Jharkhand have the lowest yield levels in the state. The coastal plain districts in general have higher yield levels except Jajpur, Kendrapara and Puri, while only Rayagada and Boudh have higher yield levels in the eastern ghats region. However, both these districts have very low production as compared to all other districts. It is also observed that although some KBK districts like Kalahandi and Nabarangpur have large areas under rice cultivation, rice production is still low (see Table 18, Map 4).

Table 18: Yield of Rice

District	Yield	Rank	District	Yield	Rank
Angul	1679	24	Kandhamal	1757	20
Balangir	1620	25	Kendrapara	1704	21
Balasore	2065	7	Keonjhar	1862	16
Bargarh	2452	1	Khordha	1806	19
Boudh	2077	6	Koraput	1973	9
Bhadrak	2361	2	Malkangiri	1696	22
Cuttack	1810	18	Mayurbhanj	1864	15
Deogarh	1485	28	Nabarangpur	1893	14
Dhenkanal	2042	8	Nayagarh	1828	17
Gajapati	2104	4	Nuapada	1416	29
Ganjam	1923	12	Puri	1692	23
Jagatsinghpur	1937	11	Rayagada	2109	3
Jajpur	1593	26	Sambalpur	2102	5
Jharsuguda	1914	13	Sonepur	1966	10
Kalahandi	1526	27	Sundargarh	1301	30

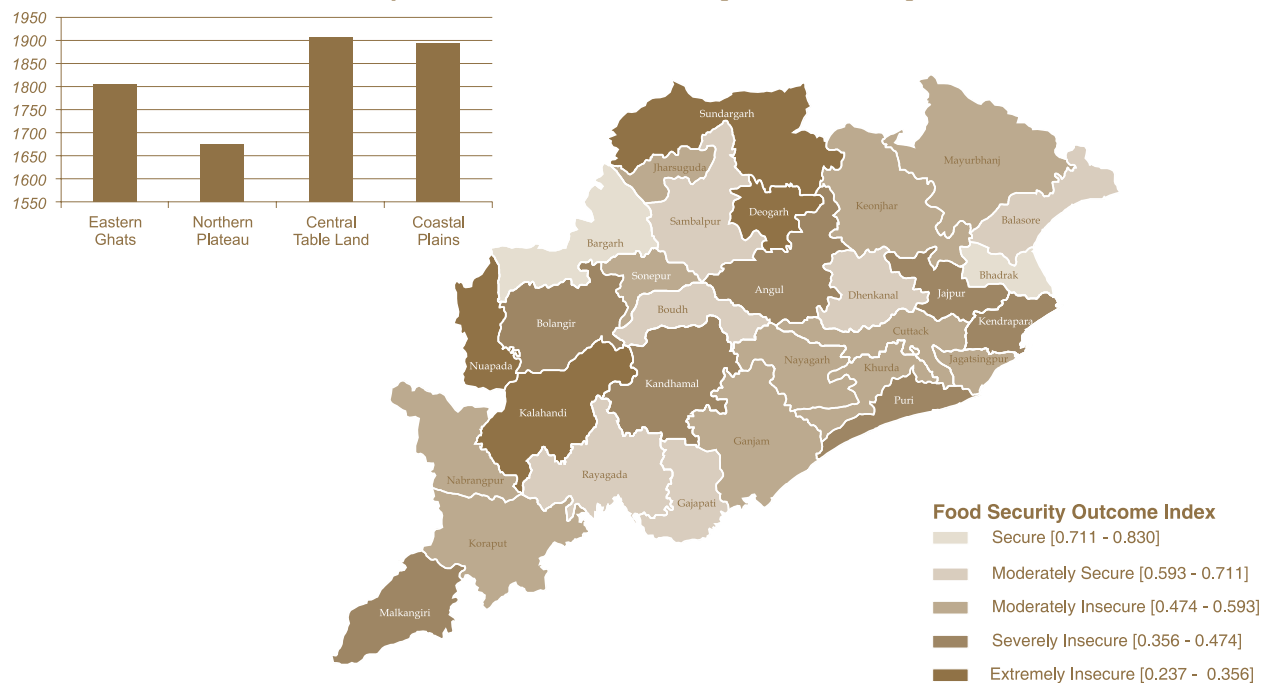
Source: Directorate of Economics and Statistics, Department of Agriculture and Corporation, Ministry of Agriculture (Various Years).

It is likely that a large part of Orissa's rice production is not commercial, i.e. there is subsistence production and it is mainly meant for self-consumption. This might explain the high per capita consumption of cereals (mainly rice) in Orissa compared to other states with higher per capita incomes and higher per capita production of cereals. It also means that there is less diversification of food consumption in Orissa compared to other states.

Per capita agricultural output in different districts of Orissa has been presented in table 19. Bargarh has the maximum per capita agricultural output and has been ranked one among all the districts of Orissa. Malkangiri and Kalahandi also have high per capita agricultural output. On the bottom line lie the districts of Kandhamal, Khurda, Cuttack etc (Map 5).



Map 4: Yield of Rice in Orissa [TE 2005 - 2006]



Map 5: Status of Agricultural Production

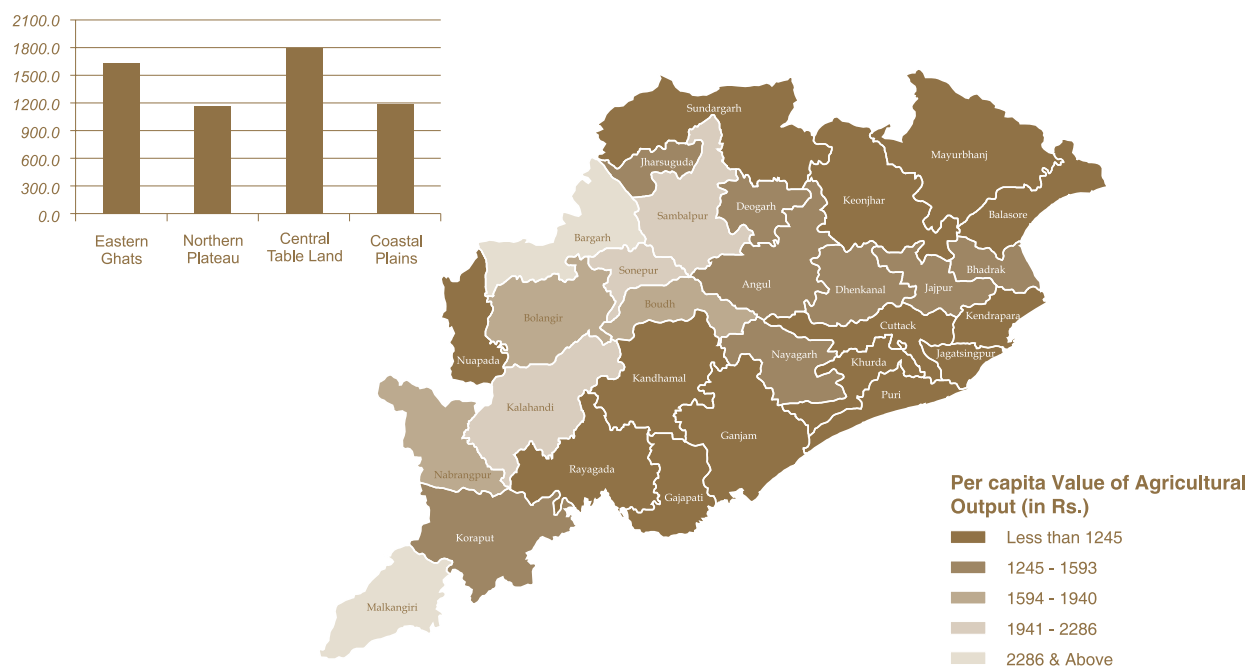




Table 19: Per Capita Agricultural Output

District	Value	Rank	District	Value	Rank
Angul	1275	14	Kandhamal	899	30
Balangir	1679	8	Kendrapara	1233	18
Balasore	1081	27	Keonjhar	1236	17
Bargarh	2633	1	Khordha	911	29
Boudh	1804	6	Koraput	1449	13
Bhadrak	1264	15	Malkangiri	2565	2
Cuttack	1022	28	Mayurbhanj	1152	24
Deogarh	1555	10	Nabarangpur	1752	7
Dhenkanal	1460	12	Nayagarh	1481	11
Gajapati	1194	22	Nuapada	1145	25
Ganjam	1183	23	Puri	1205	21
Jagatsinghpur	1213	20	Rayagada	1219	19
Jajpur	1251	16	Sambalpur	1992	5
Jharsuguda	1562	9	Sonepur	2118	4
Kalahandi	2168	3	Sundargarh	1120	26

Source: As stated in Table 15, Variable a2.

There is little diversification of agricultural output; food crops dominate production (Table 20). There is very little cultivation of cotton. Rice contributes to more than 64 percent of overall production. Oilseeds, pulses and sugarcane have a sizeable contribution. These are food crops but are produced largely for sale. Pulses and oilseeds are crops that do well in the dry districts of the state, which are also the poorer districts. These crops have potential for value-added processing.

4.1.3 Irrigation

The extent of irrigation, represented by the ratio of the net area irrigated to the net area sown, is very low: less than 25 percent. This is more than 15 percent points below the national average of 40 percent. The critical importance of irrigation is evident from a comparison with Gujarat. Large parts of the state are covered by desert and are chronically drought-prone. Despite this, it has higher per hectare yield largely on account of higher irrigation coverage. In Orissa, the low extent of irrigation is concentrated in small pockets of the state. The extent of irrigation in the

Table 20: Proportion of Crops in Total Production in Orissa (TE 2005-06)

Crop	Percentage
Rice	64.14
Maize	1.47
Ragi	0.74
Groundnut	6.68
Cotton	0.45
Sugarcane	2.09
Oilseed	11.29
Pulses	13.14
Total value of production	100.00

Source: Same as Table 19.



coastal plains is twice that in the other two regions. Some of the districts in the eastern ghats in particular have **extremely low** levels of irrigation. Nabrangpur, for instance, has just 6 percent irrigated area, while Kandhamal has less than 15 percent, which is in stark contrast to Jagatsinghpur (78 percent), Puri (65 percent) and Ganjam (64 percent) in the coastal plains (see Table 21 and Map 6).

Table 21: Irrigation Extent

District	Value	Rank	District	Value	Rank
Angul	22.18	23	Kandhamal	13.57	29
Balangir	14.86	28	Kendrapara	21.52	24
Balasore	37.67	9	Keonjhar	22.88	21
Bargarh	44.38	8	Khordha	36.05	10
Boudh	47.43	7	Koraput	30.61	14
Bhadrak	62.37	4	Malkangiri	30.8	13
Cuttack	57.28	6	Mayurbhanj	29.74	15
Deogarh	29.15	16	Nabarangpur	5.8	30
Dhenkanal	27.23	18	Nayagarh	26.31	19
Gajapati	24.54	20	Nuapada	19.24	26
Ganjam	64.11	3	Puri	65.13	2
Jagatsinghpur	78.11	1	Rayagada	22.87	22
Jajpur	28.49	17	Sambalpur	33.92	12
Jharsuguda	20.26	25	Sonepur	58.99	5
Kalahandi	34.51	11	Sundargarh	19.08	27

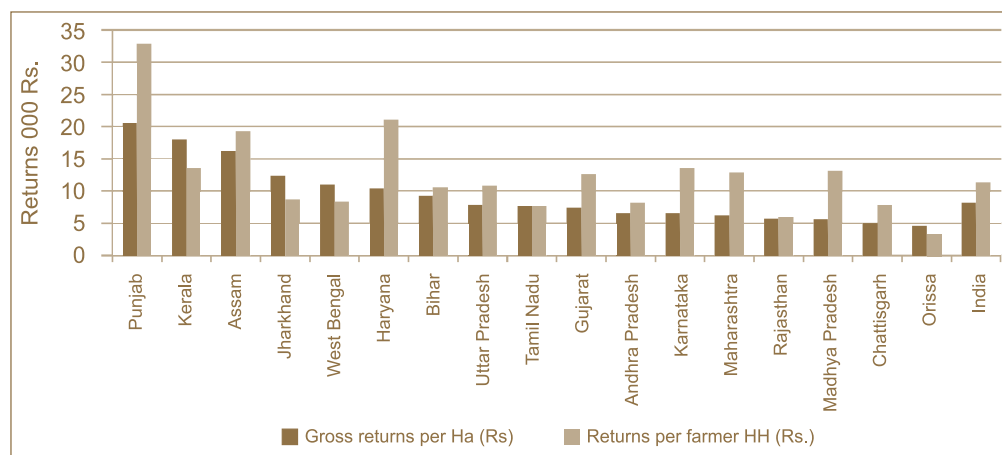
Source: As stated in Table 15, Variable a1.

4.1.4 Returns to Cultivation

Concerned by the plight of farmers and the alarming rise in suicides, the government wanted an in-depth study of the condition of farmers in the country to be carried out. In 2003, the Situation Assessment Survey of Farmers' Indebtedness was released by the National Sample Survey Organization. One of the aspects covered by the survey was the profitability of farming as an occupation. The return to cultivation is a comprehensive indicator of the level of development of agriculture. An examination of returns to cultivation across states reveals the extremely poor status of Orissa. Profitability measured in terms of gross returns per hectare cultivated as well as returns to a farmer household is found to be at a very low level compared to any other state. For instance, the figure in Punjab (Rs. 20,400) is almost five times that of Orissa (Rs. 4,400) when gross return to cultivated area is taken as a measure. The return to a farmer household in Punjab (Rs. 32,800) is ten times what accrues to a farmer household in Orissa (Rs. 3,300) (see Figure 12).

The grim situation in Orissa masks an even more serious situation when we compare regions across the state. An analysis of the returns to cultivation across NSS regions in the country reveals that the

Figure 12: Returns to Cultivation, 2002-03



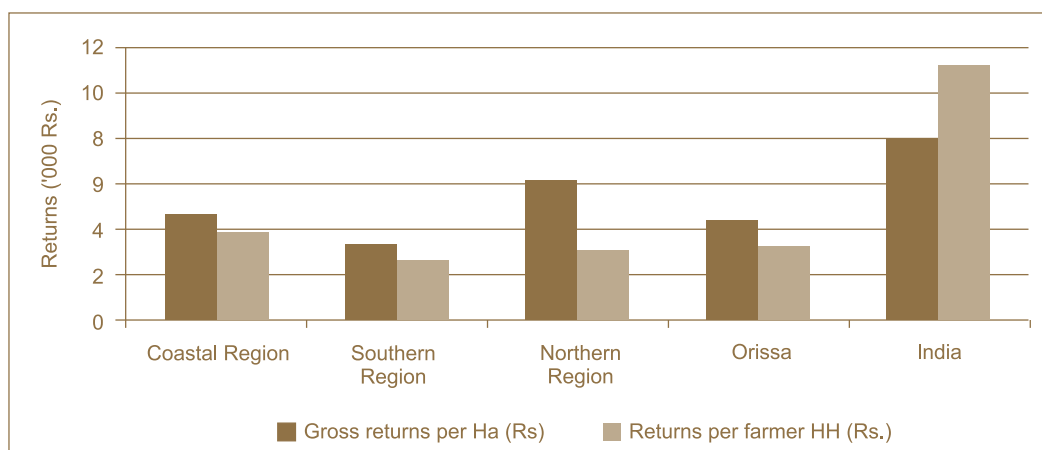
Source: Situation Assessment Survey of Farmers, National Sample Survey, 59th Round, Computed in Mishra (2007a).

regions in Orissa have the lowest returns to cultivation compared to every other region in the country. Of the three regions in Orissa, the southern region in particular has extremely low returns both in terms of the cultivated area as well as in terms of the returns per cultivating household, even though the gross area sown per cultivating household is higher in the southern region than the other two (See Mishra, 2007a) (see Figure 13).

4.2 Forests

The state has a high coverage of forests, almost one-third of its area is occupied by forests. Only Kerala (40 percent), Chhattisgarh (41 percent), and Assam (36 percent) have a higher percentage of

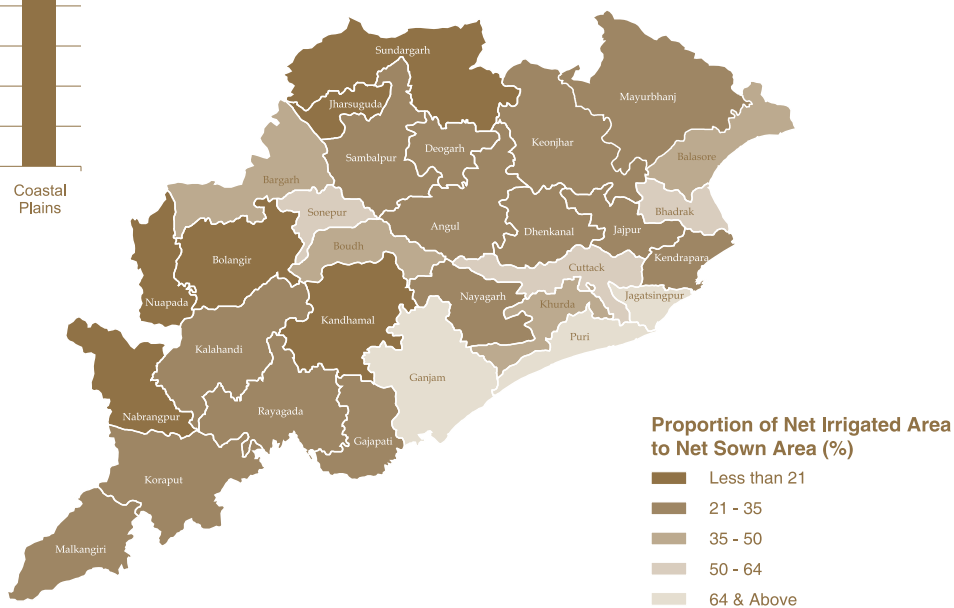
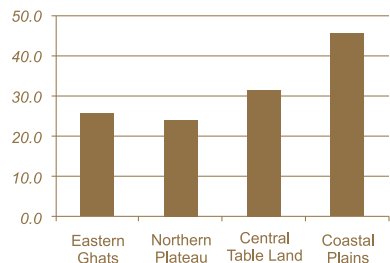
Figure 13: Returns to Cultivation in NSS Regions of Orissa, 2002-03



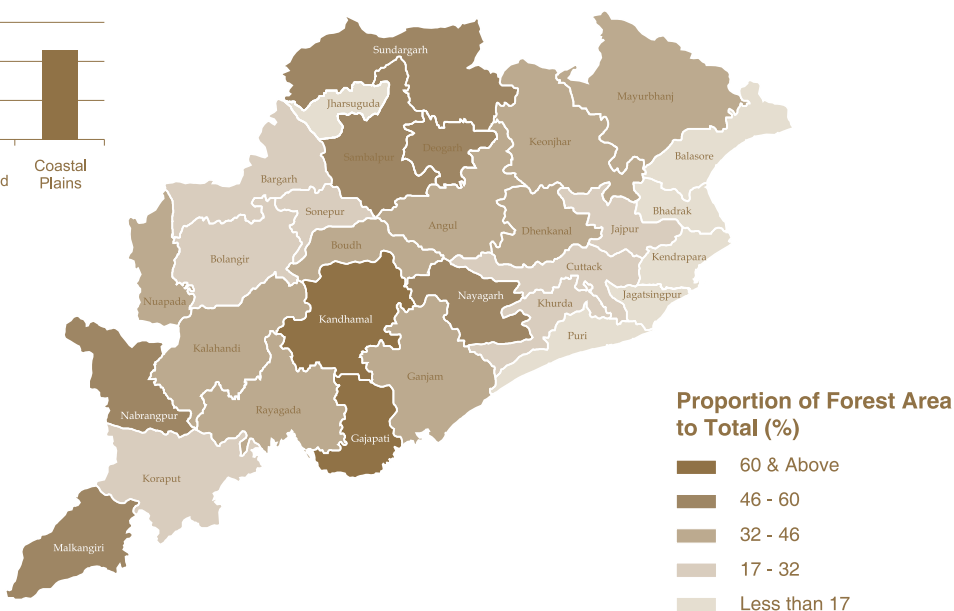
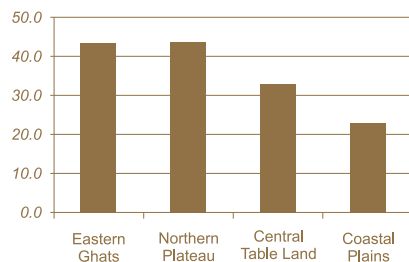
Source: Situation Assessment Survey of Farmers, National Sample Survey, 59th Round, Computed in Mishra (2007a).



Map 6: Share of Irrigated Area



Map 7: Share of Area under Forest





area under forest. In the country on the aggregate, about 22 percent of the total area is under forest cover. However in Orissa, a large proportion of the forests are degraded. Wastelands cover almost 20,000 square kilometers of the total geographical area. Not surprisingly, degraded forests constitute almost 40 percent of the total wastelands. As a result, the extent of net area cultivated is only slightly above one-third of the total area of the state. This too, is far below the national average of 45 percent. Kerala is one state that has shown that there does not have to be a trade-off between the area under forest and the area under cultivation. Not only does it have a high percentage of area under forest cover, but it also has a large proportion of its area under cultivation. This feat, as is evident from Table 22, has been achieved as it has a very small proportion of wastelands.

More than 12 percent of the area in Orissa is wasteland. This is definitely a constraint on increasing cultivation. It also points to the necessity of switching from extensive to intensive methods of cultivation.

Table 22: Environmental Limitations to Agricultural Development

	% of Wastelands to total area		Rainfall Deviation from Norm		Forest Area (%)		Agricultural Extent* (%)	
	2003	Rank	TE 2004-05	Rank	2003	Rank	TE 2001-04	Rank
Andhra Pradesh	16.46	14	-8.3	11	16.2	9	36.62	13
Assam	17.89	15	6.7	1	35.5	15	35.34	14
Bihar	5.78	5	3.0	3	5.9	5	60.90	5
Chhattisgarh	5.61	4	-1.0	4	41.4	17	34.69	15
Gujarat	10.4	9	-4.3	7	7.6	6	50.83	9
Haryana	7.39	8	-6.0	9	3.4	2	80.48	2
Jharkhand	14.01	12	-5.7	8	28.5	13	22.20	17
Karnataka	7.06	7	-16.0	14	19.0	11	52.00	8
Kerala	4.6	2	-18.0	15	40.1	16	56.37	7
Madhya Pradesh	18.53	16	-8.3	11	24.8	12	33.31	16
Maharashtra	16.01	13	-13.7	13	15.3	8	57.04	6
Orissa	12.17	10	-3.0	6	31.1	14	37.08	11
Punjab	2.33	1	-24.3	16	3.1	1	84.38	1
Rajasthan	29.64	17	-27.0	17	4.6	3	43.74	10
Tamil Nadu	13.3	11	-2.0	5	17.4	10	37.05	12
Uttar Pradesh	7.05	6	-8.0	10	5.9	4	68.97	3
West Bengal	4.95	3	6.0	2	13.9	7	62.50	4
Total	17.45		-7.7		20.6		45.30	

Source: Wasteland - Wasteland Atlas, 2003; Forest - State of Forest Report, 2003; Rainfall and Net Area Sown - Ministry of Agriculture.

* Agricultural Extent = Net area sown/Total Reporting Area x 100.



Table 23: Share of Forest Area (in per cent)

District	Value	Rank	District	Value	Rank
Angul	43.66	22	Kandhamal	74.64	30
Balangir	23.44	11	Kendrapara	9.8	6
Balasore	9.09	4	Keonjhar	37.35	18
Bargarh	20.89	8	Khordha	21.45	10
Boudh	37.1	17	Koraput	23.8	12
Bhadrak	3.73	1	Malkangiri	54.12	26
Cuttack	21.18	9	Mayurbhanj	42.13	21
Deogarh	56.12	28	Nabarangpur	46.5	23
Dhenkanal	37.83	20	Nayagarh	49.06	24
Gajapati	64.16	29	Nuapada	36.66	15
Ganjam	36.17	14	Puri	4.59	2
Jagatsinghpur	6.6	3	Rayagada	37.07	16
Jajpur	24.91	13	Sambalpur	54.18	27
Jharsuguda	9.09	4	Sonepur	17.52	7
Kalahandi	37.56	19	Sundargarh	51.08	25

Source: As stated in Table 15, Variable a 4

The area under forests varies greatly within the state. In the eastern ghats and northern plateau, this area is almost 45 percent, that is, it is more than twice that of the coastal plains (see Table 23 and Map 7).

4.3 Connectivity

Roads in rural areas act as feeder roads, serving such areas where agriculture is the predominant occupation, providing them with outlets to urban market centres. These roads also play a significant role in opening up backward areas and accelerating socioeconomic development. Most of the districts in the coastal plains, except Gajapati (which is adjacent to the eastern ghats region) have good rural connectivity, with an average of 50 percent of villages having access to paved roads. Though the figure in itself is not sufficient to ensure rural connectivity, it is much better when compared to districts like Kandhamal and Malkangiri that hardly have 20 percent of such villages (see Table 24 and Map 8).

4.4 Availability

Though Orissa is primarily an agrarian state, the agricultural economy in the state is at a very low level of development. As much as 70 percent of the total cultivated area in the state is acidic. The state has a preponderance of small and marginal farmers comprising 28 percent and 54 percent



Table 24: Rural Connectivity (in per cent)

District	Value	Rank	District	Value	Rank
Angul	28.31	26	Kandhamal	20.53	30
Balangir	40.58	18	Kendrapara	35.24	22
Balasore	41.05	17	Keonjhar	46.49	10
Bargarh	45.15	11	Khordha	64.11	1
Boudh	25.87	27	Koraput	22.2	28
Bhadrak	43.12	14	Malkangiri	21.16	29
Cuttack	62.72	2	Mayurbhanj	42.14	15
Deogarh	60.12	5	Nabarangpur	45.13	12
Dhenkanal	38.8	19	Nayagarh	52.86	7
Gajapati	29.27	25	Nuapada	61.2	4
Ganjam	43.27	13	Puri	49.38	8
Jagatsinghpur	57.30	25	Rayagada	33.54	8
Jajpur	61.93	28	Sambalpur	30.64	7
Jharsuguda	47.08	22	Sonepur	36.34	10
Kalahandi	41.52	15	Sundargarh	38.04	11

Source: As stated in Table 15, Variable a 3.

Map 8: Status of Rural Connectivity

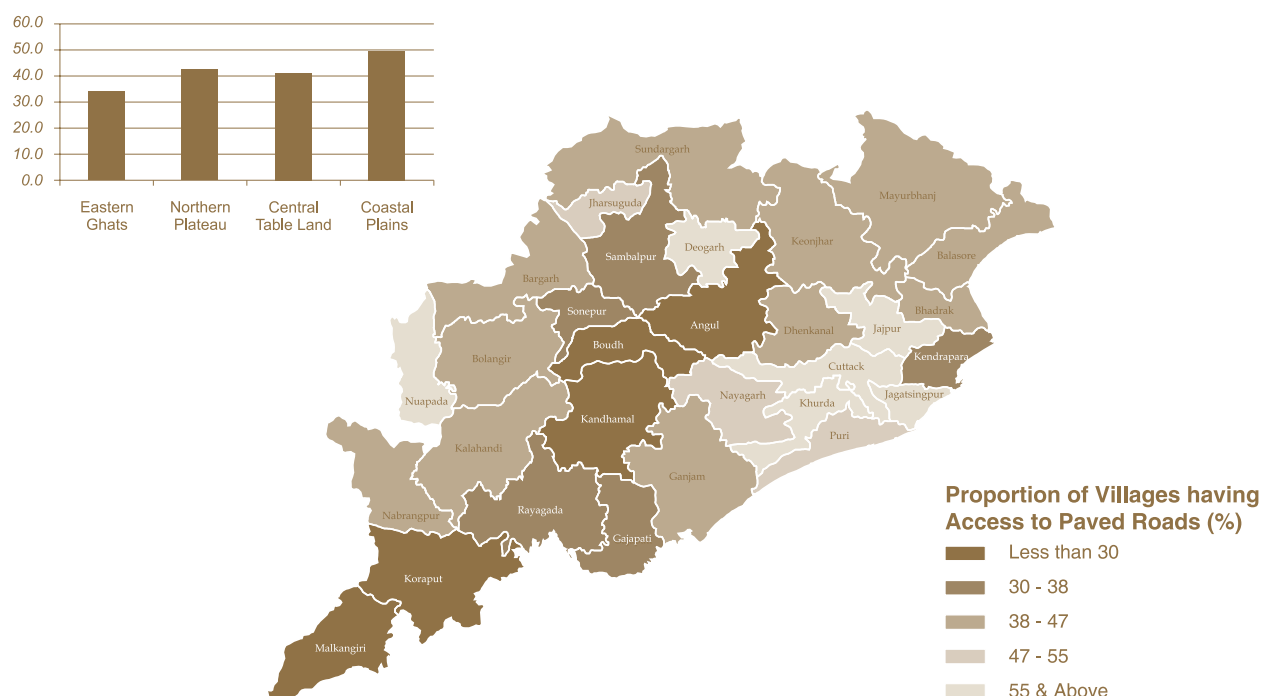




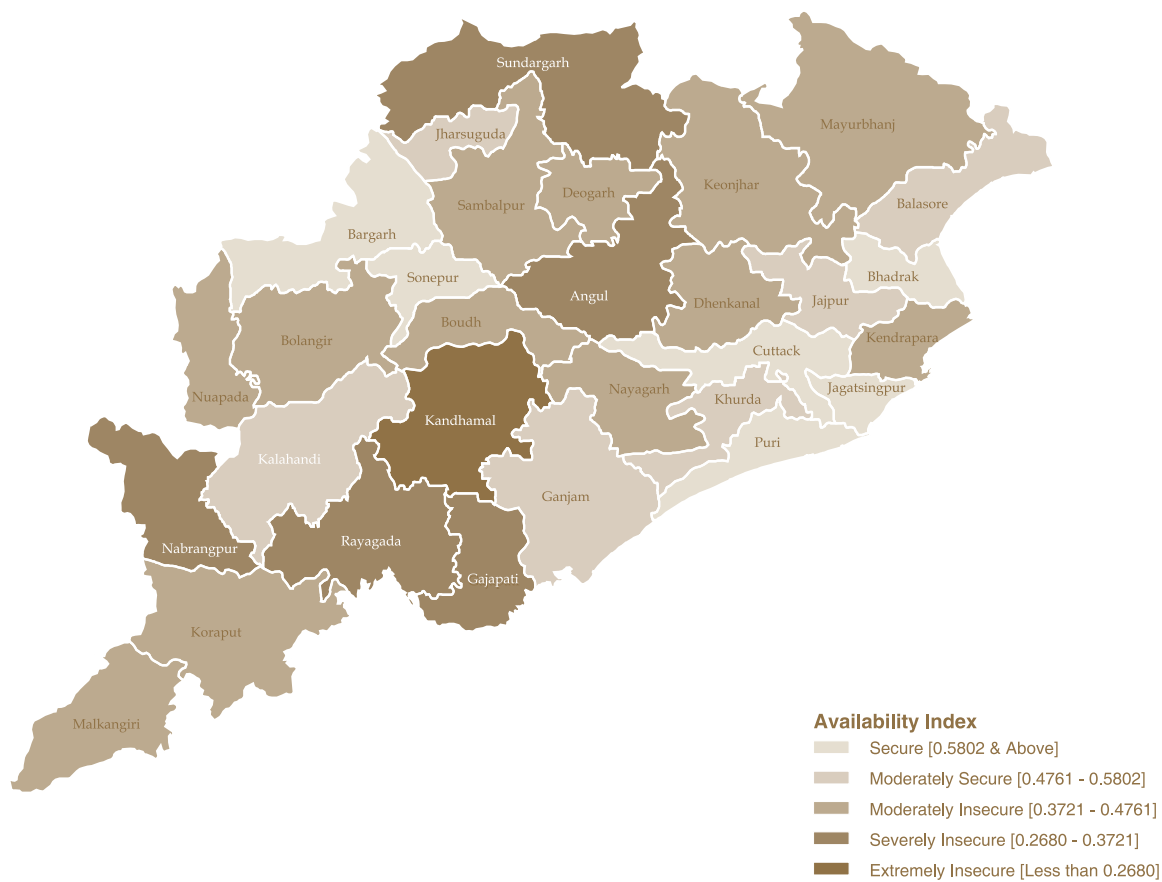
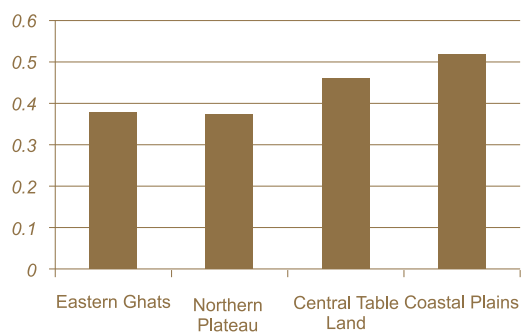
Table 25: Indicators used to Compute Availability Index

Districts	Per Capita Agricultural Output		Share of Forest Area		Irrigation Extent		Rural Connectivity	
	Value(Rs)	Rank	Value(%)	Rank	Value(%)	Rank	Value(%)	Rank
Angul	1275	14	43.66	22	22.18	23	28.31	26
Balangir	1679	8	23.44	11	14.86	28	40.58	18
Balasore	1081	27	9.09	4	37.67	9	41.05	17
Bargarh	2633	1	20.89	8	44.38	8	45.15	11
Boudh	1804	6	37.1	17	47.43	7	25.87	27
Bhadrak	1264	15	3.73	1	62.37	4	43.12	14
Cuttack	1022	28	21.18	9	57.28	6	62.72	2
Deogarh	1555	10	56.12	28	29.15	16	60.12	5
Dhenkanal	1460	12	37.83	20	27.23	18	38.8	19
Gajapati	1194	22	64.16	29	24.54	20	29.27	25
Ganjam	1183	23	36.17	14	64.11	3	43.27	13
Jagatsinghpur	1213	20	6.6	3	78.11	1	57.3	6
Jajpur	1251	16	24.91	13	28.49	17	61.93	3
Jharsuguda	1562	9	9.09	4	20.26	25	47.08	9
Kalahandi	2168	3	37.56	19	34.51	11	41.52	16
Kandhamal	899	30	74.64	30	13.57	29	20.53	30
Kendrapara	1233	18	9.8	6	21.52	24	35.24	22
Keonjhar	1236	17	37.35	18	22.88	21	46.49	10
Khordha	911	29	21.45	10	36.05	10	64.11	1
Koraput	1449	13	23.8	12	30.61	14	22.2	28
Malkangiri	2565	2	54.12	26	30.8	13	21.16	29
Mayurbhanj	1152	24	42.13	21	29.74	15	42.14	15
Nabarangpur	1752	7	46.5	23	5.8	30	45.13	12
Nayagarh	1481	11	49.06	24	26.31	19	52.86	7
Nuapada	1145	25	36.66	15	19.24	26	61.2	4
Puri	1205	21	4.59	2	65.13	2	49.38	8
Rayagada	1219	19	37.07	16	22.87	22	33.54	23
Sambalpur	1992	5	54.18	27	33.92	12	30.64	24
Sonepur	2118	4	17.52	7	58.99	5	36.34	21
Sundargarh	1120	26	51.08	25	19.08	27	38.04	20
Orissa	1381		37.33		33.78		41.38	

Source: As stated in Table 15.



Map 9: Food Availability Map of Rural Orissa





respectively of total farmers. However, these groups own only 29 percent and 21 percent of the cultivated area respectively, which shows the skewed distribution of landownership in the state. The average size of holding in the state is only 1.30 hectares (Government of Orissa, 2007). The coastal plains appear to be far ahead of the rest of the state in terms of availability. The performance of most districts in the central tableland is better than those in the eastern ghats and the northern plains, but some of the districts like Balangir are found to be lacking in terms of agricultural development.

Kandhamal emerges as the worst-performing district in terms of the Availability Index. Almost as badly off are other districts of the eastern ghats (Rayagada, Nabarangpur) and adjoining Gajapati, along with Sundargarh and Anugul from the northern plateau. The surprises are Kalahandi and Ganjam which fare reasonably on the Availability Index (see Map 9 and Table 26).

Table 26: Status of Districts in Availability Index

Secure	Moderately Secure	Moderately Insecure	Severely Insecure	Extremely Insecure
Jagatsinghpur	Khordha	Nuapada	Nabarangpur	Kandhamal
Puri	Jajpur	Deogarh	Rayagada	
Bhadrak	Ganjam	Boudh	Angul	
Bargarh	Jharsuguda	Kendrapara	Sundargarh	
Cuttack	Balasore	Balangir	Gajapati	
Sonepur	Kalahandi	Nayagarh		
		Keonjhar		
		Dhenkanal		
		Koraput		
		Mayurbhanj		
		Sambalpur		
		Malkangiri		

In conclusion, the table below shows the classification of districts according to their status on availability of food (see Table 26 and Map 9).

The eastern states and the northern plateau are the worst-off regions. The central tableland falls in between, while the coastal plains are better-off.

5. Access to Food

The critical significance of access to food has been famously imprinted on the public mind by Sen's description of the Bengal famine, where people went hungry and starved, not because food was not available, but because they could not afford it (Sen, 1981). He linked the issue of access to a person's 'entitlements'. Broadly, entitlements refer to the bundle of goods and services a person can acquire, based on his or her endowments such as wealth and assets, skills, knowledge, status and so on. Thus, availability of food is important to food security but it is not enough; it should also be affordable and people should be able to access it. Access is tied up with people's capacity to buy, their earnings, livelihoods and other socio-economic factors.

Access of those who may individually lack the ability to secure enough food is often bolstered through unions, community groups and self-help groups (SHGs). Thus, the ability to form and take action in groups is also a part of one's entitlements.

Historic injustice and discrimination faced by the Scheduled Castes and Tribes and by women and other marginalized groups are well-documented. This discrimination permeates all aspects of life including their livelihoods, education, health, participation in political life and access to food and the benefits of government programmes. Access to food thus depends both on the availability of economic opportunities and the social inclusion of the population in availing those opportunities.

The indicators that have been taken to reveal food access in this report, monthly consumption expenditure per person, wages, nature of work, social groups, proportion of working age population and female literacy are discussed in this chapter. The overall status of Orissa in relation to other states is presented first and thereafter we discuss the disparities across districts. Finally, we present the overall index of food access across districts and map food access.

5.1 Rural wages

Casual workers tend to be the least protected and have the lowest level of earnings. The NSS defines the casual wage worker as one who was casually engaged in others' farm or non-farm enterprises (both household and non-household) and, in return, received wages according to the terms of the daily or periodic

Table 27: Wage Rate of Casual Workers by State

	Average Casual Rural Wage	
	Value (Rs.)	Rank
India	48.89	-
Andhra Pradesh	42.13	12
Assam	60.18	5
Bihar	43.95	11
Chhattisgarh	34.07	17
Gujarat	49.72	8
Haryana	72.2	3
Jharkhand	48.07	10
Karnataka	41.32	13
Kerala	119.51	1
Madhya Pradesh	35.76	16
Maharashtra	38.58	14
Orissa	38.45	15
Punjab	73.12	2
Rajasthan	62.12	4
Tamil Nadu	56.48	6
Uttar Pradesh	51.25	7
West Bengal	48.38	9

Source: NSS 59th Round – Situation Assessment Survey of Farmers, 2005.



work contract. It can be seen that Orissa has one of the lowest wage rates in the country (Rs. 38.5), with only MP (Rs. 35.8) and Chhattisgarh (Rs. 34) below it. The wage rate in the state is Rs.10 below the national average while the best performing state – Kerala (Rs. 120) has a wage rate more than thrice that of Orissa (Table 27).

Casual wage rates closely follow the level of agricultural development in the state. For instance, districts with better agricultural performance, like Bhadrak, Cuttack and Jagatsinghpur, have higher wage rates compared to the rest of the state. Only six of the thirty districts in the state have casual wages higher than the national average, while 15 districts lie below the state average. Comparing the wage rates with the National Minimum Wage, there is not even a single district in the state that comes close to the recommended wage rate of Rs. 66, which speaks of the extremely vulnerable condition of casual workers in the state. The situation is the worst in the northern parts of the central tableland. Almost all the districts in this region have wage rates lower than Rs. 30. This region is followed by the KBK region where all the districts, except Malkangiri, have wage rates lower than Rs. 35 (see Table 28 and Map 10).

Table 28: Rural Casual Wage Rate by District in Orissa (Rs)

District	Value	Rank	District	Value	Rank
Angul	38.4	15	Kandhamal	35.8	17
Balangir	29.4	25	Kendrapara	53.1	4
Balasore	45.8	8	Keonjhar	44.2	11
Bargarh	34.1	21	Khordha	50.1	6
Boudh	22.1	30	Koraput	35.9	16
Bhadrak	58.2	1	Malkangiri	41	14
Cuttack	56.1	3	Mayurbhanj	34.5	18
Deogarh	24.5	29	Nabarangpur	30.4	23
Dhenkanal	43.2	12	Nayagarh	46.5	7
Gajapati	45.2	9	Nuapada	32.4	22
Ganjam	45.2	9	Puri	42.2	13
Jagatsinghpur	52.9	5	Rayagada	34.4	19
Jajpur	56.2	2	Sambalpur	25.7	28
Jharsuguda	27.7	26	Sonepur	26.5	27
Kalahandi	34.4	19	Sundargarh	30.4	24

Source: As stated in Table 15, Variable b5.

5.2 Average Per Capita Monthly Expenditure

Low income levels directly affect consumption. The per capita consumption expenditure in absolute terms is a good indicator of food security in rural areas. Orissa again lies at the bottom in terms of



consumption expenditure. The value of per capita consumption expenditure (Rs. 245) is substantially lower than the national average (Rs. 307) and almost half that of Kerala (Rs. 455) (Table 29).

In terms of aggregate Monthly Per Capita Expenditure (MPCE), while the national MPCE increased by 15 percent over the two NSS rounds (1993-94 and 2004-05), the increase in Orissa was only seven percent, amounting to a small increase of Rs. 26. However, an analysis of MPCE by social groups shows some interesting results. There has been a marginal increase in MPCE for all social groups together, the MPCE for the Scheduled Tribes has in fact declined. Even among the Scheduled Castes, there has been a nominal increase in MPCE of only Rs.12, which is less than four percent, compared to the last NSS round. The relative increase in MPCE between the two rounds among OBCs (at more than 10 percent) is just higher than that for the 'Others' (at 9 percent).

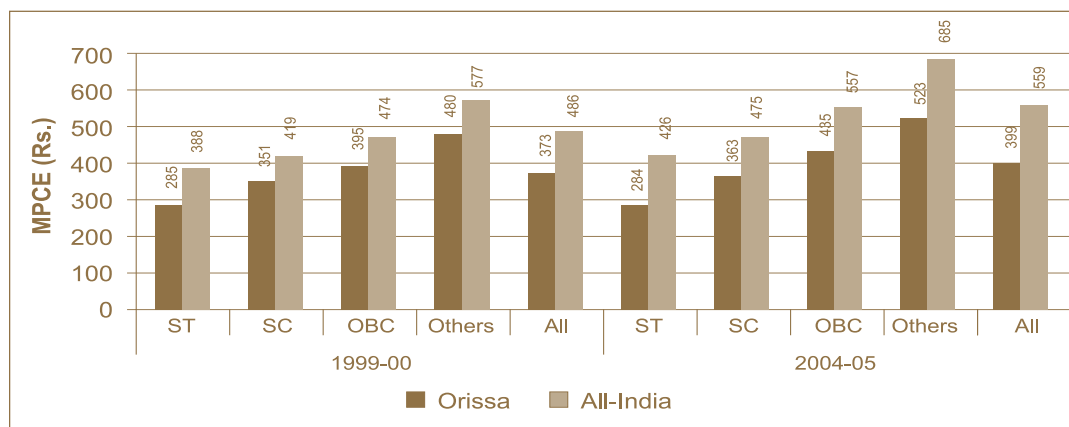
Though the state as a whole has very low consumption levels, there are stark disparities in consumption levels within the state. This can be judged from the fact that while the coastal plain districts have an average per capita consumption expenditure of almost Rs. 350 per

Table 29: Monthly Per Capita Expenditure in Rural Areas

	Monthly Per Capita Expenditure	
	Value (Rs.)	Rank
India	307.60	-
Andhra Pradesh	323.15	9
Assam	358.44	4
Bihar	270.26	13
Chhattisgarh	239.08	16
Gujarat	345.46	6
Haryana	419.34	2
Jharkhand	263.22	14
Karnataka	283.04	12
Kerala	455.64	1
Madhya Pradesh	232.17	17
Maharashtra	293.29	11
Orissa	245.58	15
Punjab	416.45	3
Rajasthan	323.97	8
Tamil Nadu	315.49	10
Uttar Pradesh	345.88	5
West Bengal	329.93	7

Source: NSS 61st Round.

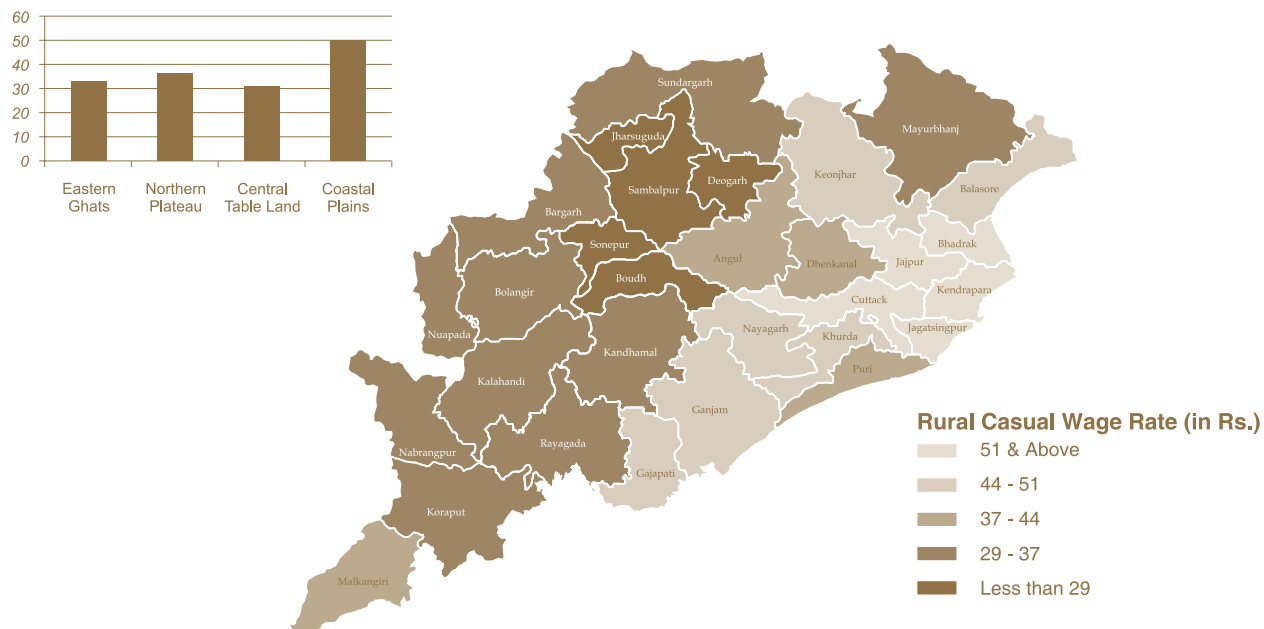
Figure 14: Monthly Per Capita Expenditure among Social Groups in Rural Areas, 1999-00 & 2004-05



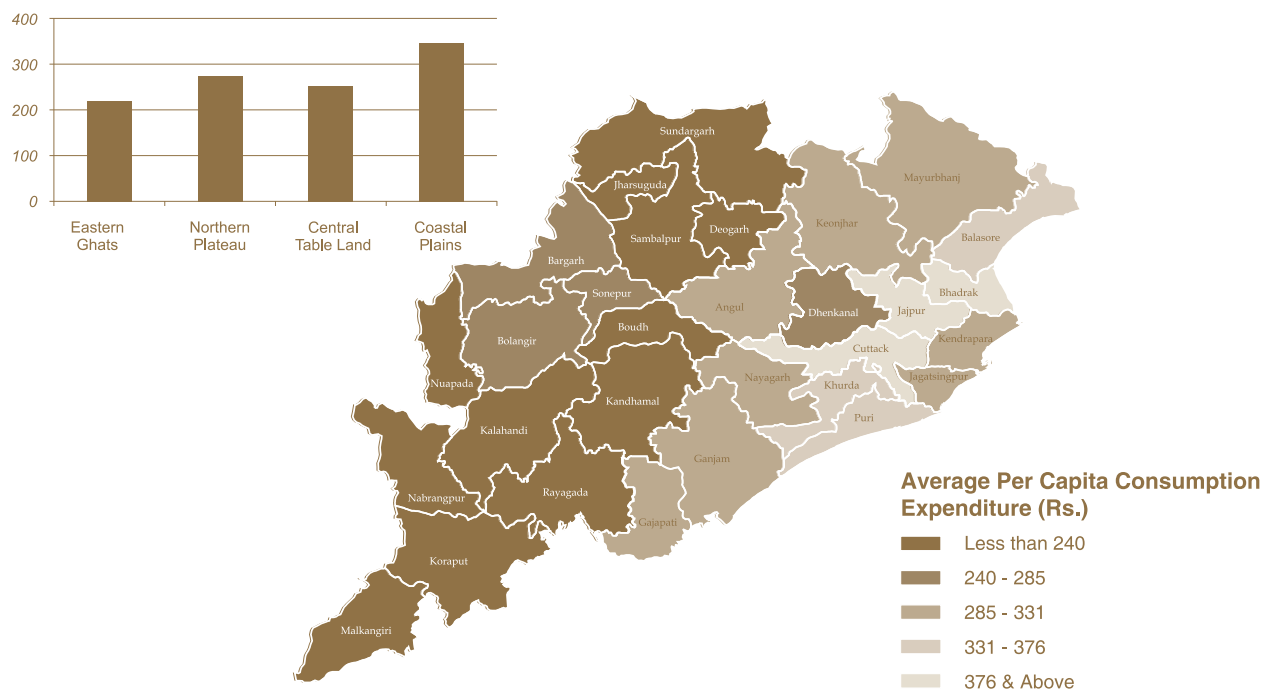
Source: NSS, 55th and 61st Round.



Map 10: Wage Rates of Rural Population



Map 11: Status of Consumption Expenditure





month, those of the eastern ghats have less than Rs. 220. Among these districts, Nabarangpur has per capita consumption expenditure of less than Rs. 200. At the other extreme, districts like Cuttack and Jajpur have figures exceeding Rs. 400 per capita. In all, 12 districts have values of per capita monthly expenditure that are below the state average, and 20 districts have values that are below the national average (see Table 30 and Map 11).

Table 30: Monthly Per Capita Consumption Expenditure by District (Rs)

District	Value	Rank	District	Value	Rank
Angul	286	14	Kandhamal	233	20
Balangir	259	17	Kendrapara	325	7
Balasore	351	5	Keonjhar	298	11
Bargarh	268	16	Khordha	358	4
Boudh	233	20	Koraput	206	28
Bhadrak	377	3	Malkangiri	206	28
Cuttack	408	2	Mayurbhanj	287	13
Deogarh	224	23	Nabarangpur	195	30
Dhenkanal	277	15	Nayagarh	288	12
Gajapati	316	9	Nuapada	233	20
Ganjam	316	9	Puri	335	6
Jagatsinghpur	318	8	Rayagada	221	26
Jajpur	421	1	Sambalpur	224	23
Jharsuguda	224	23	Sonepur	259	17
Kalahandi	221	26	Sundargarh	239	19

Source: As stated in Table 15, Variable b4.

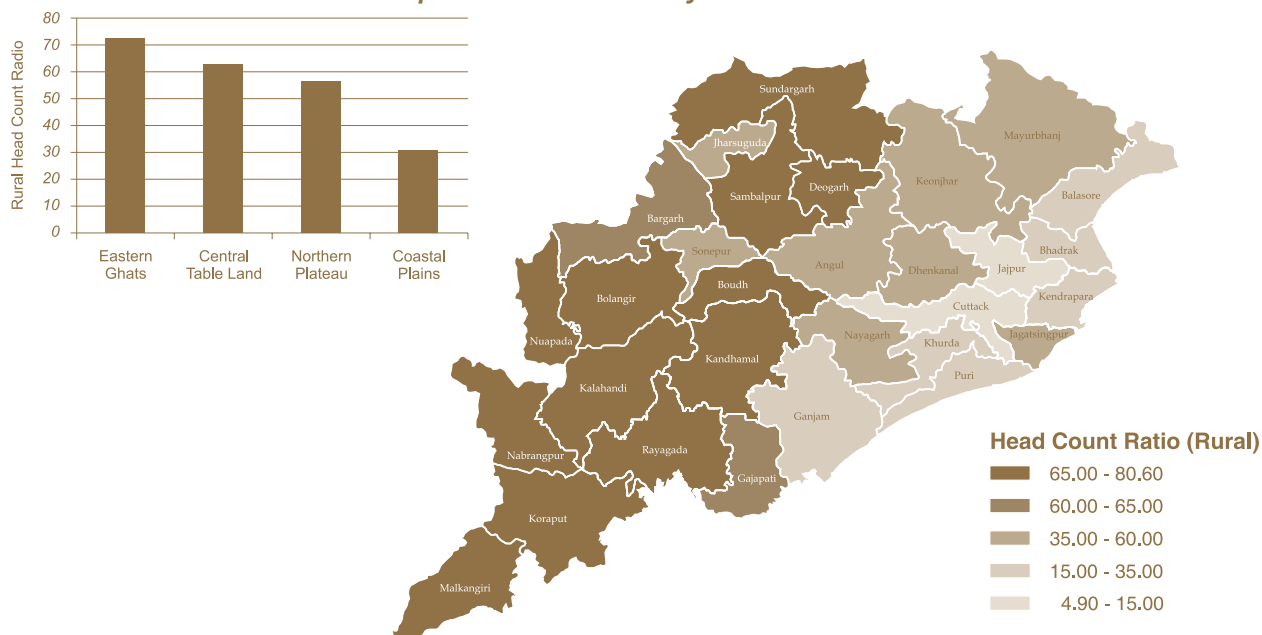
A very high negative correlation is found between the per capita expenditure and poverty levels, measured in terms of headcount ratio. More than two thirds of the people in rural areas are found to be below the poverty line in as many as 12 districts, while the figure is higher than 75 percent in Kandhamal, Sambalpur and Nabarangpur. Most of these districts are in the southern and western regions, bordering Chhattisgarh. At the other extreme, less than one third of the rural population is found to be poor in seven districts, the figure in Jajpur being less than five percent. The eastern coastal districts in general have lower poverty figures (see Map 12).

5.3 Agricultural Labourers

Orissa has a remarkably high proportion of agricultural labourers. There are very few states in the country where the percentage of agricultural labourers to all workers exceeds that of cultivators; Orissa is one of them. However, among the states with dominant (more than two thirds) workers engaged in agricultural activities, Orissa (39 percent) ranks after only Bihar (51 percent) and Andhra

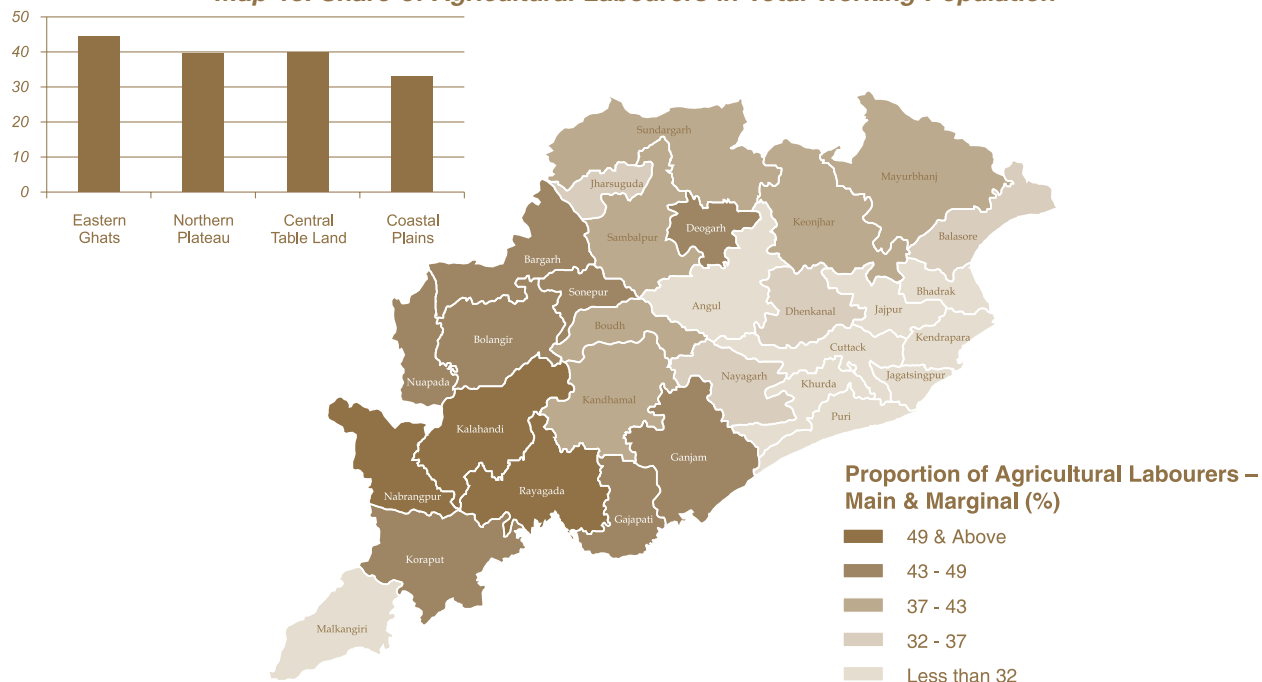


Map 12: Extent of Poverty in Rural Orissa



Source: Computed from 'Level and Pattern of Consumer Expenditure', NSS 61st Round by Chaudhuri & Gupta (2007).

Map 13: Share of Agricultural Labourers in Total Working Population





Pradesh (48 percent), where the agricultural labourers outnumber cultivators, pointing towards high levels of landlessness (Table 31).

Agriculture provides employment to more than 75 percent of the workers in as many as 15 districts in Orissa. However, in almost all these districts, the majority of the workers are employed as agricultural labourers. There are only seven districts in the state where the number of cultivators exceeds that of agricultural labourers and most of these districts lie in the agriculturally developed coastal belt, except Malkangiri. All the KBK districts have more than 80 percent of their workers in the agricultural sector, the bulk of these are labourers. This is a pointer towards the extreme vulnerability of these populations. Not only is the proportion of agricultural labourers higher, the wage rates in this region are also the lowest in the state, with an average daily wage of just Rs. 33, while that of the coastal plains is more than Rs. 50 (see Table 32 and Map 13).

Table 31: Proportion of Agricultural Labourers in Workforce by State

Area Name	Value (%)	Rank
India	33	-
Andhra Pradesh	47.5	16
Assam	14.9	2
Bihar	51	17
Chhattisgarh	36.1	12
Gujarat	33.2	9
Haryana	19	3
Jharkhand	32.8	7
Karnataka	34.5	11
Kerala	19.6	4
Madhya Pradesh	34.1	10
Maharashtra	37.8	13
Orissa	39.1	14
Punjab	21.9	5
Rajasthan	12.3	1
Tamil Nadu	42.9	15
Uttar Pradesh	28.9	6
West Bengal	33.1	8

Source: Census of India, 2001.

Table 32: Proportion of Agricultural Labourers in Workforce by District (in per cent)

District	Value	Rank	District	Value	Rank
Angul	31.2	8	Kandhamal	37.6	14
Balangir	43.3	21	Kendrapara	26.2	1
Balasore	35.4	12	Keonjhar	39.8	17
Bargarh	43.6	22	Khordha	28.2	4
Boudh	40.8	19	Koraput	44.9	23
Bhadrak	30.2	6	Malkangiri	26.8	2
Cuttack	30.4	7	Mayurbhanj	40.1	18
Deogarh	46	24	Nabarangpur	54.1	30
Dhenkanal	36.4	13	Nayagarh	33.8	11
Gajapati	47.6	26	Nuapada	47.8	27
Ganjam	43.2	20	Puri	28.4	5
Jagatsinghpur	27.9	3	Rayagada	49.9	28
Jajpur	31.4	9	Sambalpur	38.2	15
Jharsuguda	32.5	10	Sonepur	46.4	25
Kalahandi	52.5	29	Sundargarh	38.8	16

Source: As stated in Table 15, Variable b1.



5.4 Proportion of Scheduled Tribes and Scheduled Castes

Almost 22 percent of the total population in Orissa is tribal. In rural Orissa, the figure is higher at 25 percent. This is more than twice that of the national level, and only below the other tribal states of Jharkhand (31 percent), Chhattisgarh (38 percent) and Madhya Pradesh (26 percent). There are eight states in the country with a tribal population exceeding five million, of which Orissa ranks third, with a total tribal population of 8.15 million. Orissa has the maximum number of tribal communities (62 tribes including 13 primitive tribes¹) (Census of India 2001). These are mostly concentrated in the southern and western parts of the state.

Scheduled Castes form the other large marginalized community, particularly in the rural areas. While the Scheduled Tribes are marginalized mostly on account of their location, the Scheduled Castes have faced historical discrimination, which accounts for their marginalized and vulnerable status. The Scheduled Castes constitute more than 17 percent of the rural population in Orissa. Thus, the Scheduled Castes and Tribes together form more than 42 percent of the rural population in the state which in this respect is only below Chhattisgarh and Jharkhand among major states (Table 33).

Table 33: Proportion of Scheduled Tribes and Scheduled Castes in the Rural Population by State (in per cent)

	Proportion of Rural Scheduled Castes		Proportion of Rural Scheduled Tribes	
	Value	Rank	Value	Rank
India	17.9	-	10.4	-
Andhra Pradesh	18.4	11	8.4	8
Assam	6.7	1	13.6	11
Bihar	16.4	8	1.0	4
Chhattisgarh	11.4	5	37.6	17
Gujarat	6.9	2	21.6	13
Haryana	21.4	13	0	1
Jharkhand	12.4	6	31.0	16
Karnataka	18.4	11	8.4	8
Kerala	10.8	3	1.5	5
Madhya Pradesh	15.6	7	25.8	15
Maharashtra	10.9	4	13.4	10
Orissa	17.2	9	24.6	14
Punjab	33.0	17	0	1
Rajasthan	17.9	10	15.5	12
Tamil Nadu	23.8	15	1.6	6
Uttar Pradesh	23.4	14	0.1	3
West Bengal	26.9	16	7.2	7

Source: Census of India, 2001.

1. The primitive tribal communities have been identified by the Govt. of India in 15 states/UTs on the basis of (a) pre-agricultural level of technology, (b) extremely low economic and literacy levels, and (c) small, stagnant or diminishing population.



Within the state, there are wide differences across districts in the composition of the population by social group. The eastern region along with the northern plateau is marked by an extremely high proportion of tribal population. In fact, some of the districts like Malkangiri and Rayagada are the most tribal-dominated districts of the country, with the tribal population together with the Scheduled Caste population constituting more than 70 percent of the total rural population. In fact, the tribal population constitutes more than one-third of the rural population in as many as 15 districts in the state (see Table 34 and Map 14).

Table 34: Proportion of Scheduled Tribes and Scheduled Castes in the Population by District (in per cent)

District	Value	Rank	District	Value	Rank
Angul	29.9	9	Kandhamal	71.3	26
Balangir	39.8	15	Kendrapara	21.1	3
Balasore	31.4	11	Keonjhar	59.1	21
Bargarh	40	16	Khordha	22.8	5
Boudh	34.9	14	Koraput	69.4	25
Bhadrak	24.7	7	Malkangiri	81.5	30
Cuttack	25.7	8	Mayurbhanj	67	24
Deogarh	49.7	19	Nabarangpur	71.4	27
Dhenkanal	32.3	12	Nayagarh	19.9	1
Gajapati	62.7	23	Nuapada	49.6	18
Ganjam	23.2	6	Puri	20	2
Jagatsinghpur	22.8	4	Rayagada	76.7	29
Jajpur	31.1	10	Sambalpur	60.7	22
Jharsuguda	58.1	20	Sonepur	33.8	13
Kalahandi	48.1	17	Sundargarh	75	28

Source: As stated in Table 15, Variable b 2.

The tribal populations in these areas not only suffer from food insecurities on account of lack of food availability but also on account of high incidences of cholera and gastro-enteritis. It has been found that these diseases are not on account of inadequacies of water and sanitation but mostly due to unemployment, lack of healthcare services and basic amenities (Jena, 2008).

The adjoining box shows the areas marked as 'Scheduled' in Orissa. The undivided districts of Koraput, Mayurbhanj and Sundargarh as well as several blocks falling under the districts of Sambalpur, Keonjhar, Kalahandi, etc. have been classified as Scheduled Areas. These are the areas that have a dominant tribal population with an extremely low level of development. These areas are mainly in the KBK region as well as in the northern plateau adjoining Jharkhand, while parts of the northern regions of the central tablelands are also included (Box 3).



Box 3: Scheduled Areas in Orissa*

1. Mayurbhanj district
2. Sundargarh district
3. Koraput district
4. Kuchinda tahsil in Sambalpur district
5. Keonjhar and Telkoi tahsils of Keonjhar sub-division, and Champua and Barbil tahsils of Champua sub-division in Keonjhar district
6. Khondmals tahsil of Khondmals sub-division, and Balliguda and G. Udayagiri tahsils of Balliguda sub-division in Boudh-khondmals district
7. R. Udayagiri tahsil, and Guma and Rayagada Blocks of Parlakhemundi Tahsil of Parlakhemundi sub-division, and Surada tahsil, excluding Gazalbadi and Gocha Gram Panchayats of Ghumsur sub-division, in Ganjam district
8. Thuamul Rampur Block of Kalahandi Tahsil, and Lanjigarh Block, falling in Lanjigarh and Kalahandi tahsils, in Bhawanipatna sub-division in Kalahandi district.
9. Nilgiri Community Development Block of Nilgiri tahsil in Nilgiri Sub-division in Balasore district.

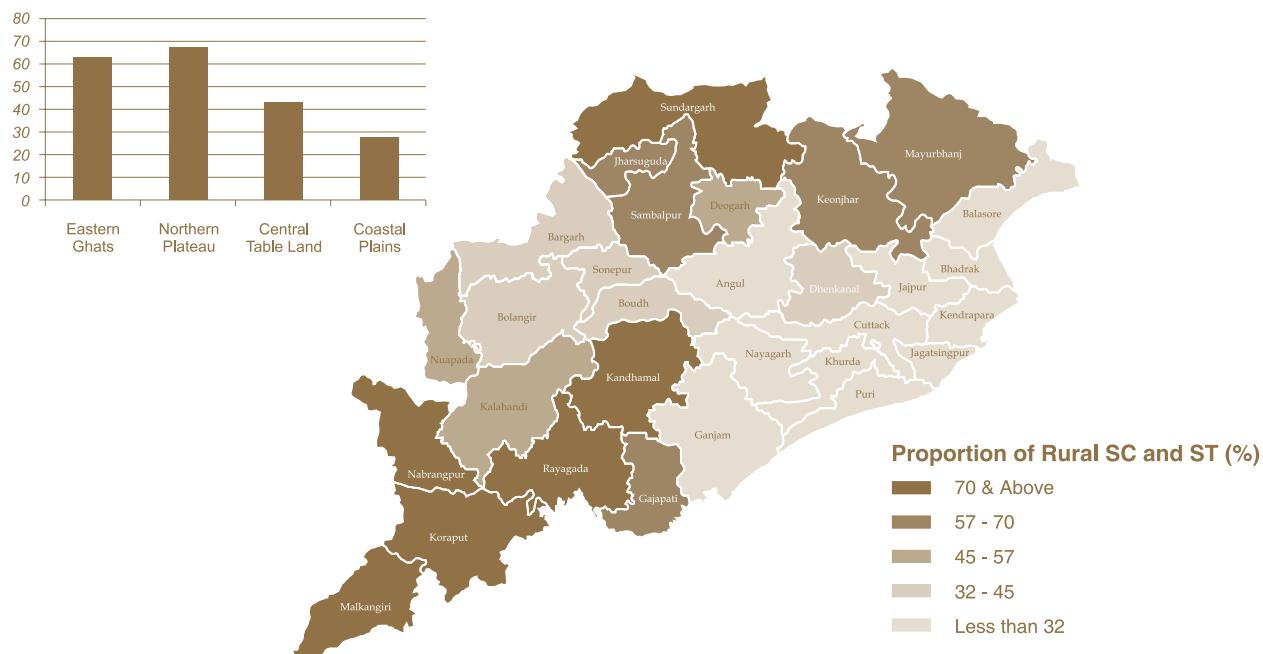
* The Scheduled areas in the State of Orissa were originally specified by the Scheduled Areas (Part A States) Order, 1950 (Constitution Order, 9) dated 23.1.1950 and the Scheduled Areas (Part B States) Order, 1950, (Constitution Order, 26) dated 7.12.1950 and have been specified as above by the Scheduled Areas (States of Bihar Gujarat, Madhya Pradesh and Orissa) Order, 1977, (Constitution Order, 109) dated 31.12.1977 after rescinding the Orders cited earlier in so far as they related to the State of Orissa

Source: Ministry of Tribal Affairs, GoI.

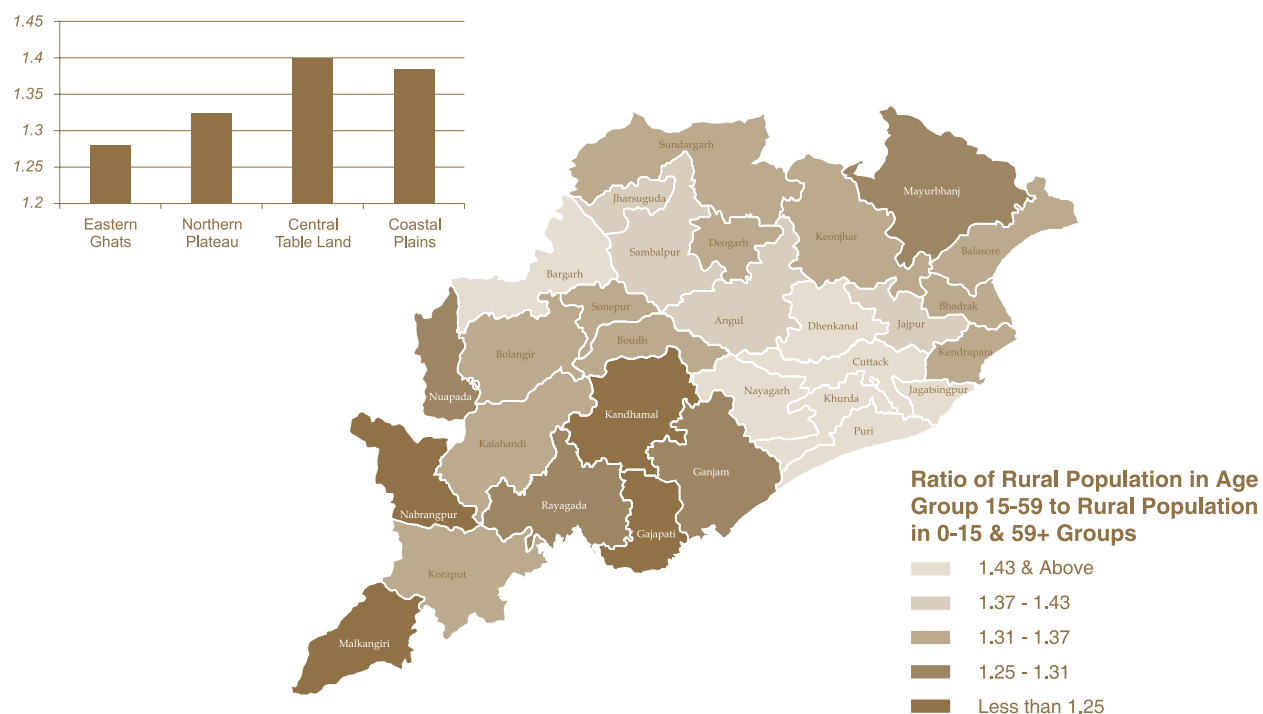
As discussed earlier, poverty levels are much higher among SCs/STs than the rest of the population and their share in the poor is larger than their share in the population: The STs constitute 28 percent of the rural population, but more than 43 percent of the rural poor. The incidence of poverty among the STs is 75.8 percent in rural Orissa. The share of the SCs in rural poverty, 19 percent, is a little more than their share in the rural population, 18.2 percent; while the incidence of poverty among the SCs is close to 50 percent. The STs and SCs together account for 62.3 percent of the rural poor, while accounting for 46.2 percent of the rural population (See Table 3 and Figure 5).

Thus, as seen earlier, poverty in rural Orissa has both a regional and a social dimension. With 73 percent of the population below the poverty line, poverty is highest in the southern region followed by the northern region (59 percent). It is lowest in the coastal region with 27 percent of the population falling below the poverty line, but even this is higher than the national average. In the southern region, the STs suffer disproportionately from poverty, with 83 percent living below the poverty line. In the southern region, even OBCs and 'Others' have a relatively high incidence of poverty of 64.7 percent and 44.1 percent respectively.

Map 14: Proportion of Scheduled Castes and Scheduled Tribes in Total Rural Population



Map 15: Share of Rural Working Age Population





5.5 Ratio of Working Age Population

The proportion of working age population has varied implications for the food security situation in a region. The working age ratio is the ratio between the working population (15–59 years) and the dependent population (less than 15 years and more than 59 years of age). The demographic transition from high fertility and mortality to low fertility and mortality has several phases. With development, fertility rates decline and the proportion of population in the working age group increases, resulting in a ‘bulge’ in the working age group. This leads to the hypothesis that the ‘demographic dividend’ derived from this gain would accelerate economic growth with a more productive population (Chandrasekhar, et al., 2006).²

The situation in Orissa in terms of the ratio of population in the productive age is found to be better compared to many states as well as to the national average. The southern states in general have a better working age ratio than the northern states. Orissa (1.35) lies midway between the best performing state (Kerala (1.70)) and the worst performing state (UP (1.02)). A low working age ratio implies a greater dependence on the existing productive population, and may also be related to high out-migration (Table 35).

A district-wise analysis of Orissa shows high disparity between the agriculturally developed and backward areas (see Table 36 and Map 15). For instance, agriculturally developed districts like Jagatsinghpur, Cuttack and Puri have a high working age group ratio, while the KBK region has very low values, followed by the northern tribal belt which has still lower values. The differences between the agriculturally developed and backward regions reflects out-migration from the latter to the former, as discussed later.

The change in working age population, at least at the sub-regional level, is highly influenced by the movement of population in this age group. In a developing region, young people move out in search of employment. It has already been seen in the analysis of per capita agricultural production that per capita production is lower in the agriculturally developed

Table 35: Ratio of Working Age Population by State

	Value	Rank
India	1.22	-
Andhra Pradesh	1.44	3
Assam	1.24	10
Bihar	1.03	16
Chhattisgarh	1.19	12
Gujarat	1.38	5
Haryana	1.21	11
Jharkhand	1.11	13
Karnataka	1.41	4
Kerala	1.70	1
Madhya Pradesh	1.10	14
Maharashtra	1.26	9
Orissa	1.35	7
Punjab	1.37	6
Rajasthan	1.06	15
Tamil Nadu	1.67	2
Uttar Pradesh	1.02	17
West Bengal	1.34	8

Source: Census of India, 2001.

2. Chandrasekhar and others have shown through employment figures that the absorption of the Indian youth into the labour force is not as high as one would expect. This is perhaps due to the poor employability of the workforce, which is severely affected by a deficit in educational attainment and health.



Table 36: Proportion of Working Age Population by District

District	Value	Rank	District	Value	Rank
Angul	1.4	11	Kandhamal	1.19	30
Balangir	1.35	15	Kendrapara	1.32	22
Balasore	1.35	15	Keonjhar	1.36	12
Bargarh	1.47	3	Khordha	1.46	4
Boudh	1.36	12	Koraput	1.35	15
Bhadrak	1.34	18	Malkangiri	1.23	27
Cuttack	1.44	6	Mayurbhanj	1.28	24
Deogarh	1.34	18	Nabarangpur	1.22	28
Dhenkanal	1.44	6	Nayagarh	1.46	4
Gajapati	1.2	29	Nuapada	1.26	25
Ganjam	1.26	25	Puri	1.49	1
Jagatsinghpur	1.48	2	Rayagada	1.29	23
Jajpur	1.42	8	Sambalpur	1.42	8
Jharsuguda	1.42	8	Sonepur	1.36	12
Kalahandi	1.34	18	Sundargarh	1.33	21

Source: As stated in Table 15, Variable b3.

regions of the state, mainly on account of their larger population size, which might be explained by an influx from the adjoining districts. Similarly, in the case of working age group population, the proportion is higher in the coastal plains and the central tableland, where again migratory movement has a definite role.

This can be validated by the fact that all the less developed districts of the state have a lower proportion of working age group population, for instance Kandhamal, Nabarangpur and Malkangiri, all have a working age ratio lower than 1.3. On the other hand, the average ratio for the coastal plain districts is 1.4 with districts like Puri, Cuttack and Jagatsinghpur having a ratio higher than 1.5.

Those who migrate due to lack of employment opportunities are stuck between the devil and the deep sea. They have little food security in their villages but are just as vulnerable in the destination areas. Several studies have shown the situation of migrant workers within and outside the state to be quite deplorable (Jha 2005). The in-migrants in the destination area suffer from exploitation of different kinds at the hands of their employers who rarely provide anything apart from wages, and the labourers have to fend for themselves to meet their basic requirements (Srivastava & Sasikumar, 2003).



5.6 Rural Female Literacy

Enhancing female literacy has been recognized as the single most important factor contributing to increase in food security and decline in malnutrition and mortality levels (Save the Children, 2008; Government of Orissa, 2004). Though in the case of rural female literacy, Orissa has marginally better figures than the national average (46.7 as compared to 46.1 percent), it is far below many other states (Table 37).

There are large disparities in literacy rates, as also in female literacy rates, across the state. The southern region is, as we would expect, much worse-off in literacy attainment, and is 20 percentage points below the all-India rural literacy for both the poor and all persons. There is evidently a strong negative correlation between female literacy in rural areas and proportion of tribal and Scheduled Caste population. In some of the tribal districts in the KBK region like Rayagada, Nabarangpura, Koraput, and Malkangiri,

Table 37: Rural Female Literacy by State (in per cent)

	Value	Rank
India	46.1	–
Andhra Pradesh	43.5	12
Assam	50.7	6
Bihar	29.6	17
Chhattisgarh	47.0	10
Gujarat	47.8	9
Haryana	49.3	7
Jharkhand	29.9	16
Karnataka	48.0	8
Kerala	86.7	1
Madhya Pradesh	42.8	13
Maharashtra	58.4	2
Orissa	46.7	11
Punjab	57.7	3
Rajasthan	37.3	14
Tamil Nadu	55.3	4
Uttar Pradesh	36.9	15
West Bengal	53.2	5

Source: Census of India, 2001.

Table 38: Rural Female Literacy by District (in per cent)

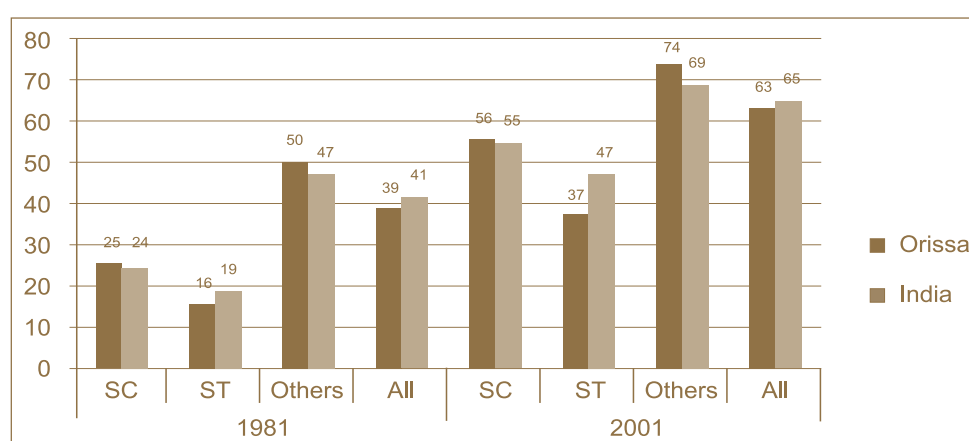
District	Value	Rank	District	Value	Rank
Angul	52	12	Kandhamal	32.8	23
Balangir	35.8	21	Kendrapara	66.3	3
Balasore	57.4	8	Keonjhar	43.6	17
Bargarh	48.6	14	Khordha	63	5
Boudh	37.4	20	Koraput	15.6	30
Bhadrak	63	4	Malkangiri	18.4	27
Cuttack	62.5	6	Mayurbhanj	35	22
Deogarh	45.6	15	Nabarangpur	18	29
Dhenkanal	56.1	10	Nayagarh	56.7	9
Gajapati	24.5	25	Nuapada	23.8	26
Ganjam	41.3	19	Puri	66.3	2
Jagatsinghpur	68.8	1	Rayagada	18.3	28
Jajpur	60.1	7	Sambalpur	49.5	13
Jharsuguda	53.6	11	Sonepur	44.7	16
Kalahandi	26.5	24	Sundargarh	43.1	18

Source: As stated in Table 15, Variable b6.

rural female literacy is lower than 20 percent, which is an alarming figure. This figure is less than one-third that of the coastal districts. In the three contiguous districts of Puri, Jagatsinghpur and Kendrapara, more than two-thirds of rural females are literate (see Table 38 and Map 16).

Literacy rates over the last three censuses have seen high increases. However, it would appear that

Figure 15: Literacy Rate by Social Groups, 1981 & 2001



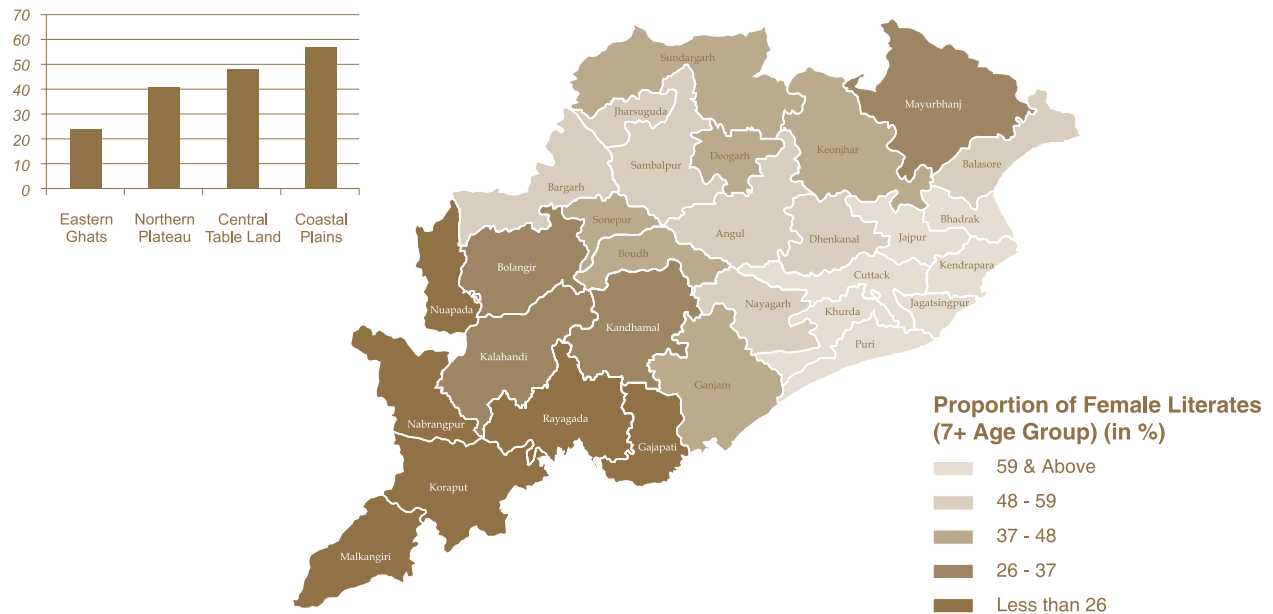
Source: Census of India, 1981 and 2001.

not everyone has benefited equally. For instance, the literacy rate for the tribal population in Orissa increased from a negligible 16 percent in 1981 to 37 percent in 2001; yet this figure is substantially lower than the total literacy level of 1981 (41 percent). The gap between the tribal population of Orissa and the country also increased between these two periods. Even in the case of Scheduled Castes, their literacy level more than doubled between 1981 and 2001 (from 25 percent to 56 percent) but was still below the figure for the total population (63 percent) (Figure 15).

While literacy for all persons in Orissa at 62.8 percent (NSS figure) is not much lower than the all-India rural rate of 65.1 percent, the difference increases for poor persons. Further, while the gap between the poor and all people in terms of literacy rates is less than 12 percentage points for the national average, it is 14 percentage points in the case of Orissa. In the case of females, the gap between the poor and all females is 11 percentage points for the national average, while in the case of Orissa, it is more than 15 percentage points (Table 39).



Map 16: Status of Rural Female Literacy



Map 17: Women's Workforce Participation Rate

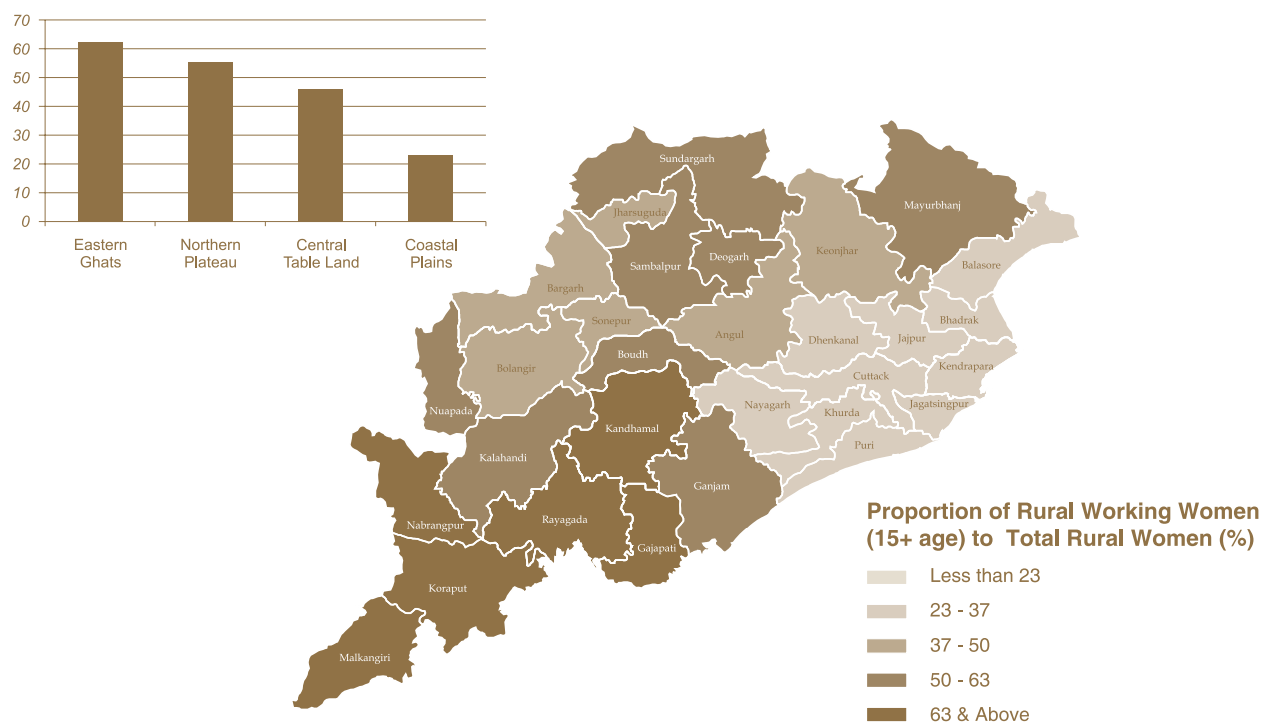




Table 39: Region-wise Literacy Rate for Individuals from the Poor and from All Categories by Gender for Orissa - 2004-05 (Rural) (per cent)

State	Region	Male		Female		Person	
		Poor	All	Poor	All	Poor	All
Orissa							
	Southern	43.1	50.9	22.7	29.5	33.0	40.4
	Northern	65.0	73.1	40.8	50.1	52.6	61.5
	Coastal	70.4	81.0	47.8	63.5	58.8	72.3
	Total	60.1	72.7	37.7	52.8	48.8	62.8
All-India	Rural	65.3	76.4	42.2	53.2	53.7	65.1

Source: NSSO, 2004-05.

5.7 Women's Workforce Participation

The women's workforce participation rate (WWPR) is another indicator of the status of women in the society. Women's workforce participation improves the household's access to food, and is also likely to improve the woman's own access to food, following Amartya Sen's argument that women's independent income would increase their bargaining power within the household. At the same time, women's participation in the *rural* workforce is likely to be negatively related to a household's food security situation. It would be highest among agricultural labourers and go down as one moved up the land cultivating categories. Women's workforce participation is also likely to be related to caste and ethnicity: it is higher among STs and lower as one goes up the caste ladder. Thus, one can expect a negative relation between women's workforce participation and the household's food security in a rural situation, particularly in the case of a state like Orissa. It is in urban households that the relationship between food security and women's workforce participation may go both ways. For rural food security, we can continue to use women's workforce participation as being negatively related to the food security situation, with high participation being associated with a poor food security situation.

Our analysis shows that the WWPR is higher in the southern region, dominated by tribes. In fact, all the districts where the WWPR is higher than 50 percent

Table 40: Level of Urbanization in Major States

	Value (%)	Rank
India	27.8	–
Andhra Pradesh	27.3	8
Assam	12.9	16
Bihar	10.5	17
Chhattisgarh	20.1	14
Gujarat	37.4	3
Haryana	28.9	6
Jharkhand	22.2	12
Karnataka	34.0	4
Kerala	26.0	10
Madhya Pradesh	26.5	9
Maharashtra	42.4	2
Orissa	15.0	15
Punjab	33.9	5
Rajasthan	23.4	11
Tamil Nadu	44.0	1
Uttar Pradesh	20.8	13
West Bengal	28.0	7

Source: Census of India, 2001.



are the most backward districts of the state, with high levels of poverty and low consumption levels. Such districts are found to be 15 in number. On the other hand, agriculturally developed districts in the coastal region have a very low WWPR. In fact, most districts in the coastal belt have a WWPR lower than 20 percent (see Map 17).

Women's workforce participation is also intrinsically related to migration. The nature of migration largely reflects household subsistence strategies in the face of social, cultural, demographic and other constraints. It is generally males who predominate in the streams of labour migration, but in the case of tribals and lower economic strata, both men and women migrate together for work. This is because, as already stated, in these populations the constraints on women's participation in non-household activities are fewer. In some sectors, like construction, brick kilns and sugarcane cutting, family migration is common as it is more economical for employers (Srivastava & Sasikumar, 2003).

5.8 Urbanization

The low economic development of a state is also reflected in the extent of stagnation. Among all major states, Orissa lies at the bottom in terms of urbanization levels, with only Bihar and Assam lying slightly below it. The figure for Orissa is almost half the national figure and one-third that of the most urbanized states Tamil Nadu and Maharashtra (Table 40).

Map 18: Level of Urbanization

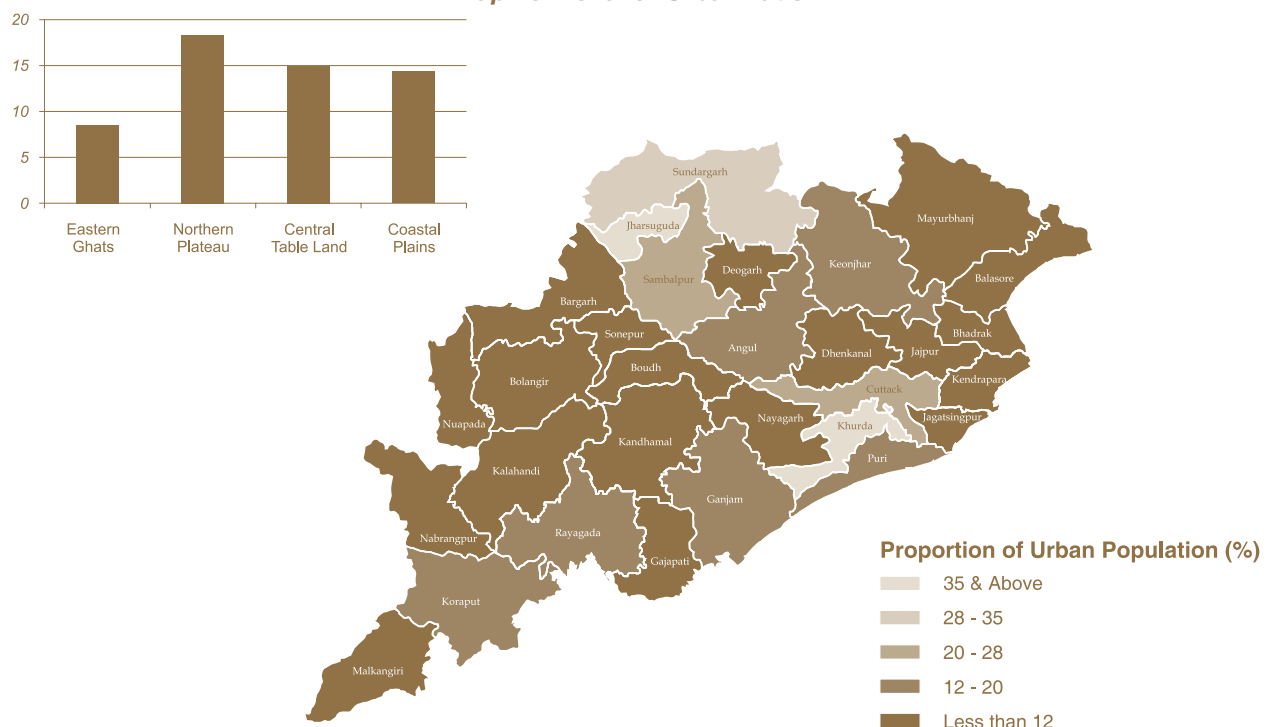


Table 41: Indicators used to Compute Index of Accessibility

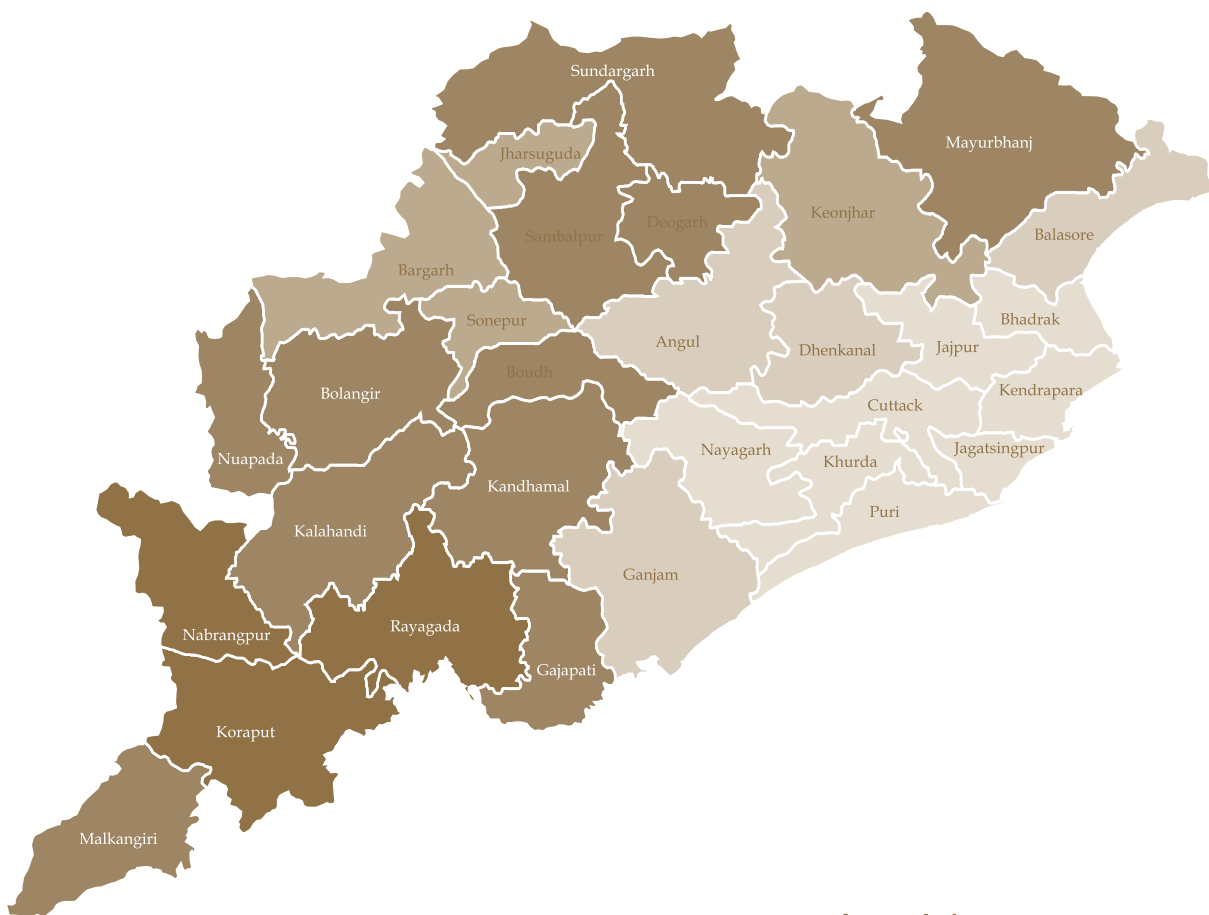
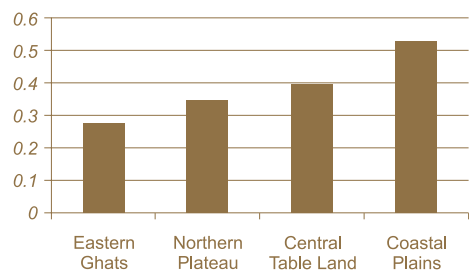
	Average Per capita Expenditure		Agricultural Labourers		Rural Wage Rate		Proportion of SC and ST		Ratio of Working Population		Rural Female Literacy		Access Index	
	Value (Rs)	Rank	Value (%)	Rank	Value (Rs)	Rank	Value (%)	Rank	Value	Rank	Value (%)	Rank	Value	Rank
Angul	286	14	31.2	8	38.4	15	29.9	9	1.4	11	52.0	12	0.473	11
Balangir	259	17	43.3	21	29.4	25	39.8	15	1.35	15	35.8	21	0.356	17
Balasore	351	5	35.4	12	45.8	8	31.4	11	1.35	15	57.4	8	0.505	9
Bargarh	268	16	43.6	22	34.1	21	40.0	16	1.47	3	48.6	14	0.410	13
Boudh	233	20	40.8	19	22.1	30	34.9	14	1.36	12	37.4	20	0.351	19
Bhadrak	377	3	30.2	6	58.2	1	24.7	7	1.34	18	63.0	4	0.576	3
Cuttack	408	2	30.4	7	56.1	3	25.7	8	1.44	6	62.5	6	0.587	1
Deogarh	224	23	46.0	24	24.5	29	49.7	19	1.34	18	45.6	15	0.334	20
Dhenkanal	277	15	36.4	13	43.2	12	32.3	12	1.44	6	56.1	10	0.478	10
Gajapati	316	9	47.6	26	45.2	9	62.7	23	1.2	29	24.5	25	0.320	22
Ganjam	316	9	43.2	20	45.2	9	23.2	6	1.26	25	41.3	19	0.442	12
Jagatsinghpur	318	8	27.9	3	52.9	5	22.8	4	1.48	2	68.8	1	0.581	2
Jajpur	421	1	31.4	9	56.2	2	31.1	10	1.42	8	60.1	7	0.572	4
Jharsuguda	224	23	32.5	10	27.7	26	58.1	20	1.42	8	53.6	11	0.385	15
Kalahandi	221	26	52.5	29	34.4	19	48.1	17	1.34	18	26.5	24	0.297	25
Kandhamal	233	20	37.6	14	35.8	17	71.3	26	1.19	30	32.8	23	0.302	24
Kendrapara	325	7	26.2	1	53.1	4	21.1	3	1.32	22	66.3	3	0.571	6
Keonjhar	298	11	39.8	17	44.2	11	59.1	21	1.36	12	43.6	17	0.396	14
Khordha	358	4	28.2	4	50.1	6	22.8	5	1.46	4	63.0	5	0.571	5
Koraput	206	28	44.9	23	35.9	16	69.4	25	1.35	15	15.6	30	0.253	28
Malkangiri	206	28	26.8	2	41.0	14	81.5	30	1.23	27	18.4	27	0.284	27
Mayurbhanj	287	13	40.1	18	34.5	18	67.0	24	1.28	24	35.0	22	0.330	21
Nabarangpur	195	30	54.1	30	30.4	23	71.4	27	1.22	28	18.0	29	0.207	30
Nayagarh	288	12	33.8	11	46.5	7	19.9	1	1.46	4	56.7	9	0.518	8
Nuapada	233	20	47.8	27	32.4	22	49.6	18	1.26	25	23.8	26	0.291	26
Puri	335	6	28.4	5	42.2	13	20.0	2	1.49	1	66.3	2	0.561	7
Rayagada	221	26	49.9	28	34.4	19	76.7	29	1.29	23	18.3	28	0.232	29
Sambalpur	224	23	38.2	15	25.7	28	60.7	22	1.42	8	49.5	13	0.354	18
Sonepur	259	17	46.4	25	26.5	27	33.8	13	1.36	12	44.7	16	0.374	16
Sundargarh	239	19	38.8	16	30.4	24	75.0	28	1.33	21	43.1	18	0.320	23

Source: As stated in Table 15.





Map 19: Food Access Map of Rural Orissa



Access Index

- Secure [0.5106 & Above]
- Moderately Secure [0.4346 - 0.5106]
- Moderately Insecure [0.3587 - 0.4346]
- Severely Insecure [0.2828 - 0.3587]
- Extremely Insecure [Less than 0.2828]



Table 42: Status of Districts in Access Index

Secure	Moderately Secure	Moderately Insecure	Severely Insecure	Extremely Insecure
Cuttack	Balasore	Bargarh	Balangir	Koraput
Jagatsinghpur	Dhenkanal	Keonjhar	Sambalpur	Rayagada
Bhadrak	Angul	Jharsuguda	Boudh	Nabarangpur
Jajpur	Ganjam	Sonepur	Deogarh	
Khordha			Mayurbhanj	
Kendrapara			Gajapati	
Puri			Sundargarh	
Nayagarh			Kandhamal	
			Kalahandi	
			Nuapada	
			Malkangiri	

Most districts of Orissa have a very low level of urbanization. However, a comparison across districts throws a startling revelation: only seven districts in the state have figures higher than the state average, which is a pointer towards the high level of disparity in terms of urbanization in the state. Compared to the national average (27.8 percent), only three districts – Khurda, Jharsuguda and Sundargarh – are found to be higher. While urbanization is higher in Khurda because it serves as the district of the state capital Bhubaneswar, the latter two are heavily influenced by industrial activities. Apart from these districts, the urbanization level in most districts is extremely low. For instance, in as many as 15 of 30 districts in the state, the proportion of people living in urban areas is less than 10 percent (see Table 40 and Map 18).

Summing Up

The divide between food secure and insecure regions is much sharper in terms of the indicators used to measure access to food. The coastal region, particularly its northern stretch, stands out in performance in these terms as compared to rest of the state. On the other hand, the eastern ghats districts are the most deprived on most of the indicators. The cumulative value of the index of accessibility in the coastal region is twice that of the eastern ghats region (see Table 41, 42 and Map 19).

6. Food Absorption

It has been estimated that in developing countries, one out of five people do not use safe water, and roughly half are without adequate sanitation (WHO, 2007). Primary health services in the country as a whole are utterly inadequate, particularly in rural areas. There are persistent gaps in human resources and infrastructure, disproportionately affecting the less developed rural areas. A significant proportion of hospitals do not have adequate personnel, diagnostic and therapeutic services and drugs. In a state like Orissa, with a high burden of communicable and non-communicable diseases because of persisting poverty, primary health infrastructure at the village level assumes huge significance. However, a good number of villages in the state are not adequately covered by a Primary Health Centre (PHC), the most critical health facility in rural areas. Only one PHC has been provided for as many as 40 villages, which hardly serves the purpose in the light of the high pressure on limited resources. This compares poorly to a state like Kerala that has excellent health infrastructure in the rural areas (one PHC for every one and half villages). Lack of primary public health facilities forces the vulnerable populations to depend on private health services, often leading to indebtedness in rural areas (Table 43).

Table 43: Factors Determining Status of Absorption

	Households Having Safe Drinking Water		No. of Villages per PHC		Households Having Toilet Facility	
	Value (%)	Rank	Value (no.)	Rank	Value (%)	Rank
India	78	–	27.6	–	21.9	–
Andhra Pradesh	80.1	9	18.9	6	18.1	9
Assam	58.8	15	43.1	15	59.6	2
Bihar	86.6	4	27.4	10	13.9	13
Chhattisgarh	70.5	11	39.4	13	5.2	17
Gujarat	84.1	8	17.3	4	21.7	6
Haryana	86	5	17.0	3	28.7	4
Jharkhand	42.7	16	58.1	17	6.6	16
Karnataka	84.6	7	17.5	5	17.4	10
Kerala	23.4	17	1.5	1	81.3	1
Madhya Pradesh	68.4	12	46.4	16	8.9	14
Maharashtra	79.8	10	24.6	7	18.2	8
Orissa	64.2	14	40.1	14	7.7	15
Punjab	97.6	1	26.2	9	40.9	3
Rajasthan	68.3	13	24.7	8	14.6	11
Tamilnadu	85.5	6	11.8	2	14.4	12
Uttar Pradesh	87.8	3	29.5	11	19.2	7
West Bengal	88.5	2	34.8	12	26.9	5

Source: Census of India, 2001 and Health Information of India, 2005.



Access to safe drinking water and sanitation is another indicator of the health status of a population. Provision of safe drinking water (calculated in terms of availability of a tubewell, handpump or tap) reduces the occurrence of a number of diseases and, at the same time, ensures effective absorption of food, ultimately leading to improved nutrition. In Orissa, only two-thirds of the households in the rural areas have access to safe drinking water. However, mere availability of physical infrastructure in the form of a tubewell, handpump or tap does not suffice. The quality and quantity of water being used is a matter for further examination (Table 43).

Sanitation status, analyzed here in terms of existence of a toilet facility in the house, is poor in Orissa. Less than 10 percent of the households in rural areas have a toilet in their house, which is far below the national average. Inadequate integration of public interventions in the area of drinking water and sanitation with public health programmes shows a failure to exploit potential synergies that reinforce health attainments of people (Table 43).

Diseases like cholera and gastroenteritis sometimes take an epidemic form in the tribal areas of Orissa, affecting thousands of people. Lack of healthcare services is evidently one of the major reasons behind this (Jena, 2008). The proportion of villages having access to primary health facilities is very low in the tribal areas. For instance, Rayagada in the eastern ghats, Keonjhar in the northern plateau and Deogarh in the central tableland have extremely low figures – less than 15 percent – in this respect, while Boudh in the eastern ghats region has as low as seven percent of villages having this basic facility. On an average, the eastern ghats region has a figure of 19 percent, while the coastal plains

Table 44: Access to PHCs (in per cent of villages)

District	Value	Rank	District	Value	Rank
Angul	16.31	23	Kandhamal	19.18	21
Balangir	24.3	12	Kendrapara	22.2	16
Balasore	33.87	5	Keonjhar	14.81	25
Bargarh	47.62	1	Khordha	39.19	3
Boudh	6.77	30	Koraput	22.35	15
Bhadrak	28.55	7	Malkangiri	16.14	24
Cuttack	22.8	14	Mayurbhanj	21.37	17
Deogarh	9.05	29	Nabrangpur	28.41	8
Dhenkanal	23.38	13	Nayagarh	19.99	19
Gajapati	19.68	20	Nuapada	25.55	11
Ganjam	18.67	22	Puri	39.57	2
Jagatsinghpur	36.16	4	Rayagada	13.24	28
Jajpur	27.11	10	Sambalpur	13.48	27
Jharsuguda	31.87	6	Sonepur	14.1	26
Kalahandi	20.99	18	Sundargarh	28.05	9

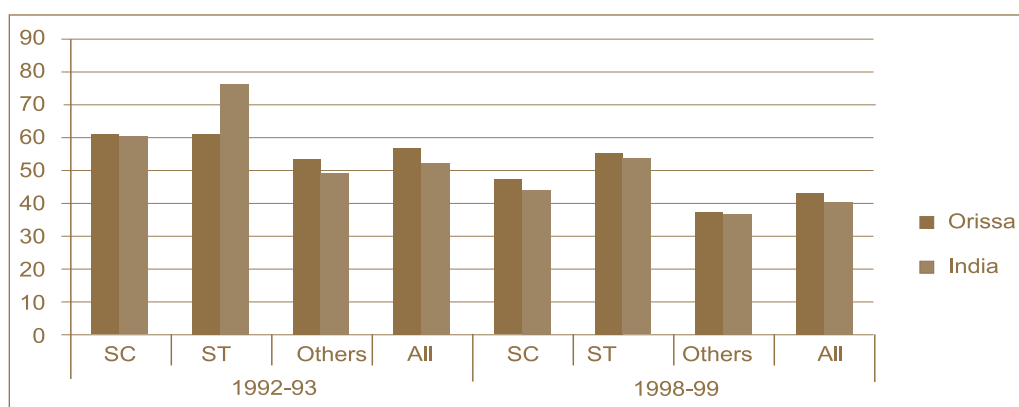
Source: Calculated from Census 2001.



have 28 percent with access to primary health facilities. The fact that the highest figure in the state is less than 50 percent (48 percent in Bargarh) speaks of the poor state of affairs as far as provision of health infrastructure is concerned (see Table 44 and Map 20).

The poor state of access to health infrastructure has already been discussed. Among the target population, it is observed that the tribal and SC population had the least access to health care in 1992–93. However, while the proportion of population not having access to health care declined for ‘others’ substantially and for SCs marginally, it did not make any significant change for the tribal population. Remarkably, the national average for tribal population saw a high decline between the two periods, but that of Orissa almost remained stagnant (Figure 16).

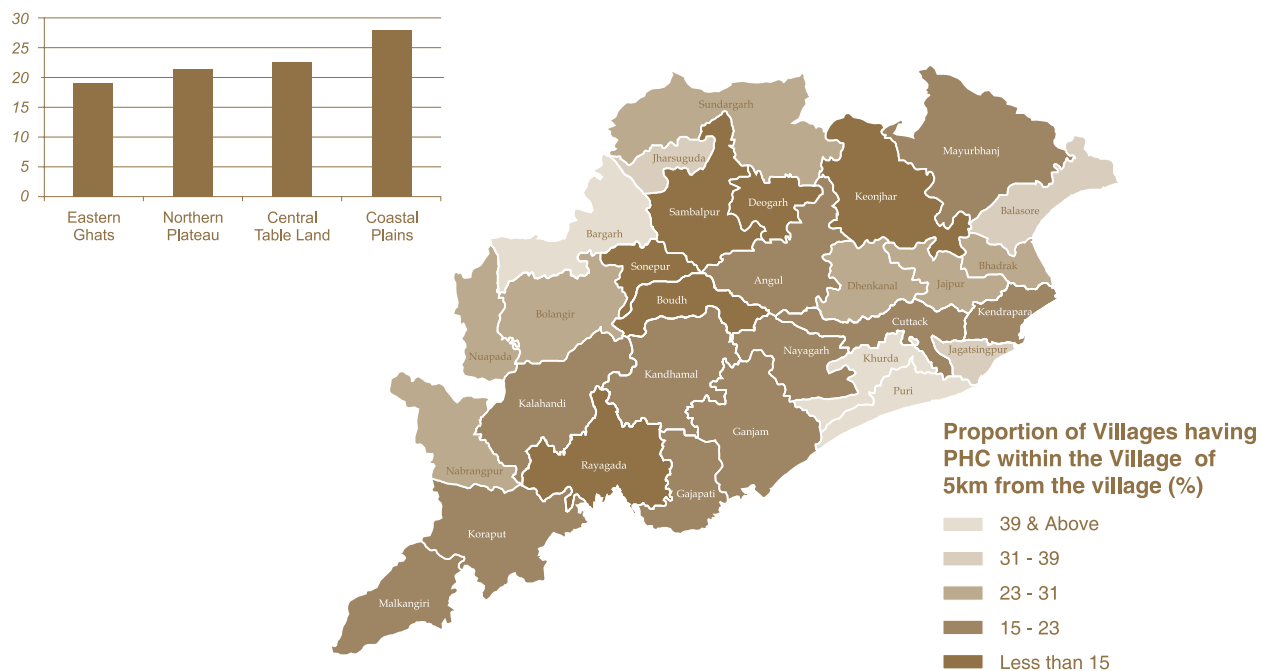
Figure 16: Proportion of Households without Access to Health Care by Social Groups



Source: NFHS, I and II and IIDS Data Bank, computed in Thorat (2007).

It has been observed that water and sanitation account for a substantial portion of the difference in infant and child mortality rates of the rich and the poor (Leipziger, et al., 2003). In terms of access to safe drinking water, the picture appears to be somewhat better in the eastern ghats region on an average, followed by the coastal plains. The districts adjoining Jharkhand have low access, while villages of some districts like Dhenkanal and Anugul in the central tableland have very low figures. However, the lowest status is seen again in an eastern ghats district - Kandhamal - that has less than one-third of its rural households having access to potable water (see Table 45 and Map 21). Analyses of safe drinking water in any such region, however, should be done very cautiously as the very existence of a well, tubewell or a tap does not imply that they are functioning. High levels of malnutrition and child deaths from these regions coupled with high incidences of vector diseases are a pointer towards poor drinking water amenities in these villages. That this does not get reflected in the secondary data points to the need for further in-depth examination.

Map 20: Access to Health Services in Rural Areas



Map 21: Access to Safe Drinking Water in Rural Areas

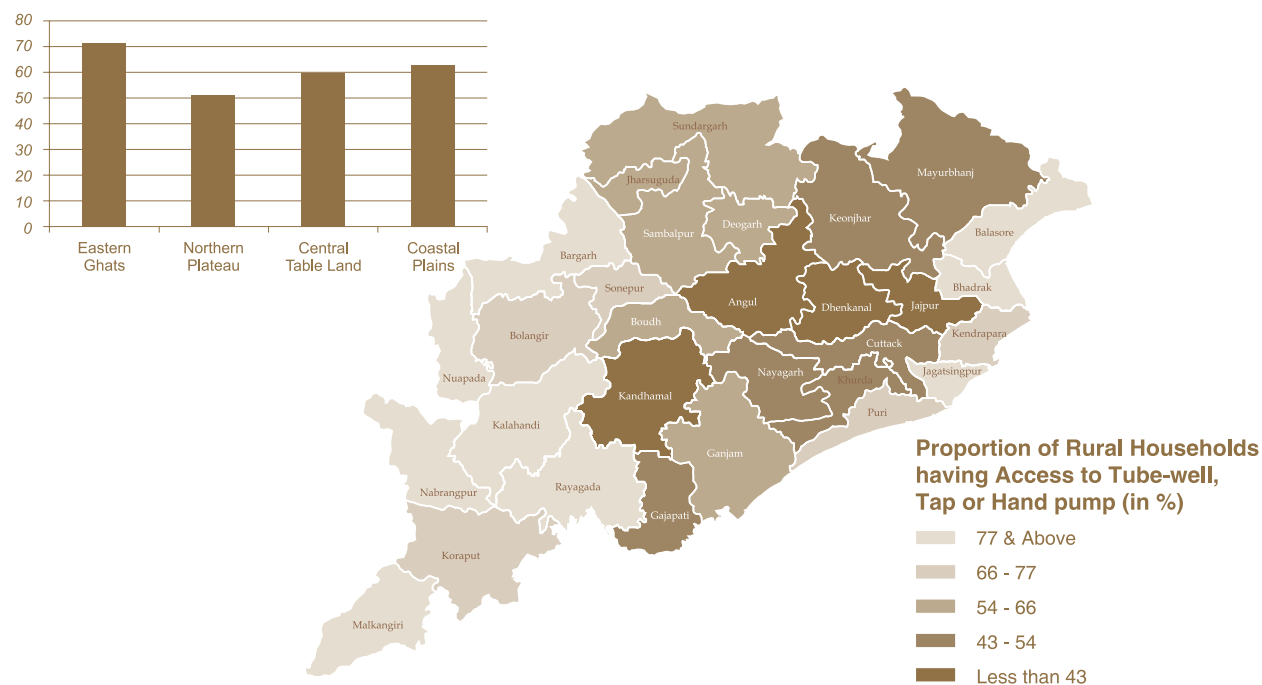




Table 45: Access to Safe Drinking Water (in per cent of households)

District	Value	Rank	District	Value	Rank
Angul	39.35	28	Kandhamal	32.03	29
Balangir	73.87	12	Kendrapara	73.74	13
Balasore	86.33	2	Keonjhar	52.39	21
Bargarh	83.26	4	Khordha	42.97	26
Boudh	64.31	15	Koraput	67.26	14
Bhadrak	88.63	1	Malkangiri	82.06	5
Cuttack	50.05	23	Mayurbhanj	43.9	24
Deogarh	56.16	20	Nabrangpur	80.37	7
Dhenkanal	31.34	30	Nayagarh	51.47	22
Gajapati	43.29	25	Nuapada	84.29	3
Ganjam	57.89	17	Puri	75.59	11
Jagatsinghpur	77.98	9	Rayagada	78.11	8
Jajpur	42.37	27	Sambalpur	56.48	19
Jharsuguda	62.81	16	Sonepur	76.28	10
Kalahandi	81.23	6	Sundargarh	56.98	18

Source: Calculated from Census 2001.

Table 46: Proportion of Households having Toilets in their houses (in per cent)

District	Value	Rank	District	Value	Rank
Angul	17.5	8	Kandhamal	10	18
Balangir	9.3	20	Kendrapara	9.3	20
Balasore	14.6	11	Keonjhar	10.3	16
Bargarh	8.9	22	Khordha	37.5	1
Boudh	5.5	30	Koraput	13.1	13
Bhadrak	11.3	15	Malkangiri	6.8	27
Cuttack	25.9	2	Mayurbhanj	8.8	23
Deogarh	8	25	Nabrangpur	6.9	26
Dhenkanal	12.1	14	Nayagarh	15.6	9
Gajapati	9.7	19	Nuapada	6.1	29
Ganjam	19.2	5	Puri	17.7	7
Jagatsinghpur	13.3	12	Rayagada	10.3	16
Jajpur	14.9	10	Sambalpur	18.6	6
Jharsuguda	20.8	4	Sonepur	6.7	28
Kalahandi	8.3	24	Sundargarh	23.5	3

Source: Census, 2001.



Though access to toilet facilities has not been taken as one of the indicators in our analysis, it is a potent proxy indicator to capture the level of sanitation in an area, which in turn determines the effectiveness of rural health services and overall food security in rural areas. Orissa is found to be at

Table 47: Indicators used to Compute Absorption Index

	Access to Safe Drinking Water		Access to PHCs		Absorption Index	
	Value (%)	Rank	Value (no.)	Rank	Value (%)	Rank
Angul	39.35	28	16.31	23	0.268	29
Balangir	73.87	12	24.3	12	0.519	9
Balasore	86.33	2	33.87	5	0.658	2
Bargarh	83.26	4	47.62	1	0.742	1
Boudh	64.31	15	6.77	30	0.337	23
Bhadrak	88.63	1	28.55	7	0.632	4
Cuttack	50.05	23	22.8	14	0.375	19
Deogarh	56.16	20	9.05	29	0.308	27
Dhenkanal	31.34	30	23.38	13	0.276	28
Gajapati	43.29	25	19.68	20	0.315	26
Ganjam	57.89	17	18.67	22	0.389	18
Jagatsinghpur	77.98	9	36.16	4	0.629	5
Jajpur	42.37	27	27.11	10	0.365	20
Jharsuguda	62.81	16	31.87	6	0.513	10
Kalahandi	81.23	6	20.99	18	0.535	8
Kandhamal	32.03	29	19.18	21	0.249	30
Kendrapara	73.74	13	22.2	16	0.503	12
Keonjhar	52.39	21	14.81	25	0.330	25
Khordha	42.97	26	39.19	3	0.457	16
Koraput	67.26	14	22.35	15	0.468	13
Malkangiri	82.06	5	16.14	24	0.504	11
Mayurbhanj	43.9	24	21.37	17	0.331	24
Nabrangpur	80.37	7	28.41	8	0.585	7
Nayagarh	51.47	22	19.99	19	0.363	21
Nuapada	84.29	3	25.55	11	0.586	6
Puri	75.59	11	39.57	2	0.641	3
Rayagada	78.11	8	13.24	28	0.461	14
Sambalpur	56.48	19	13.48	27	0.343	22
Sonepur	76.28	10	14.1	26	0.457	15
Sundargarh	56.98	18	28.05	9	0.453	17

Source: As stated in Table 15.



Map 22: Proportion of Households having Toilet Facility in Rural Orissa

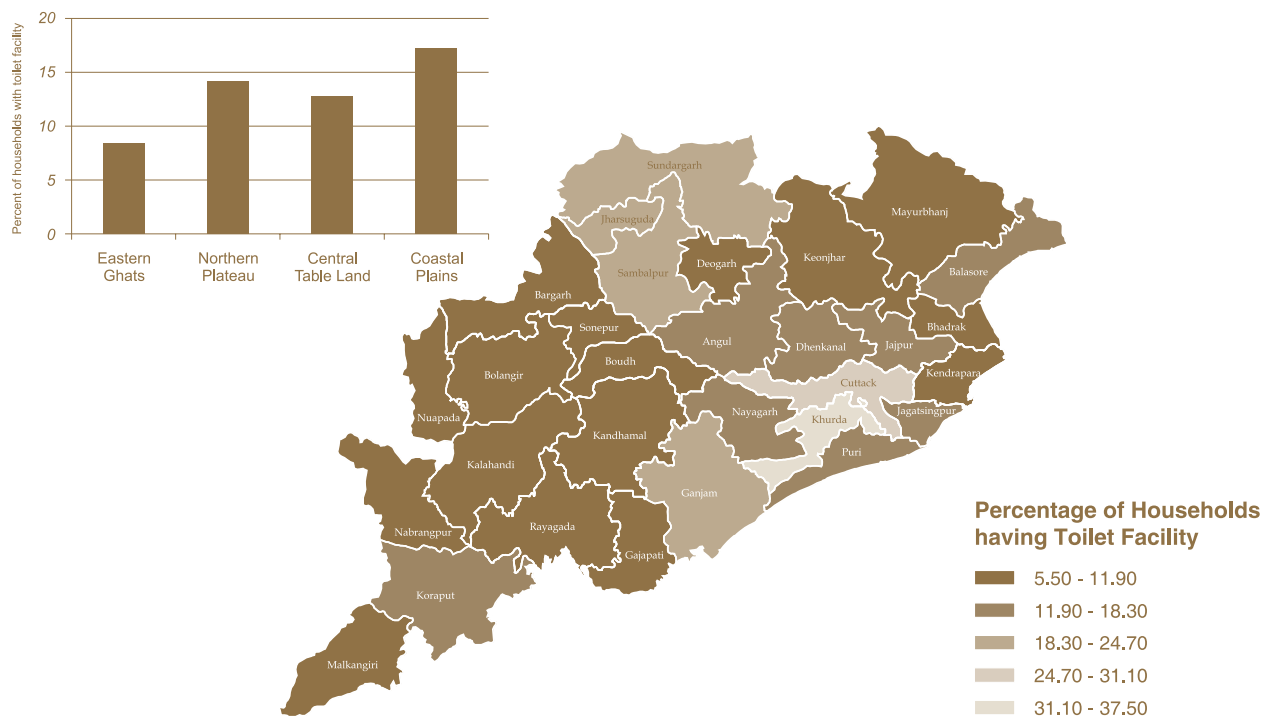
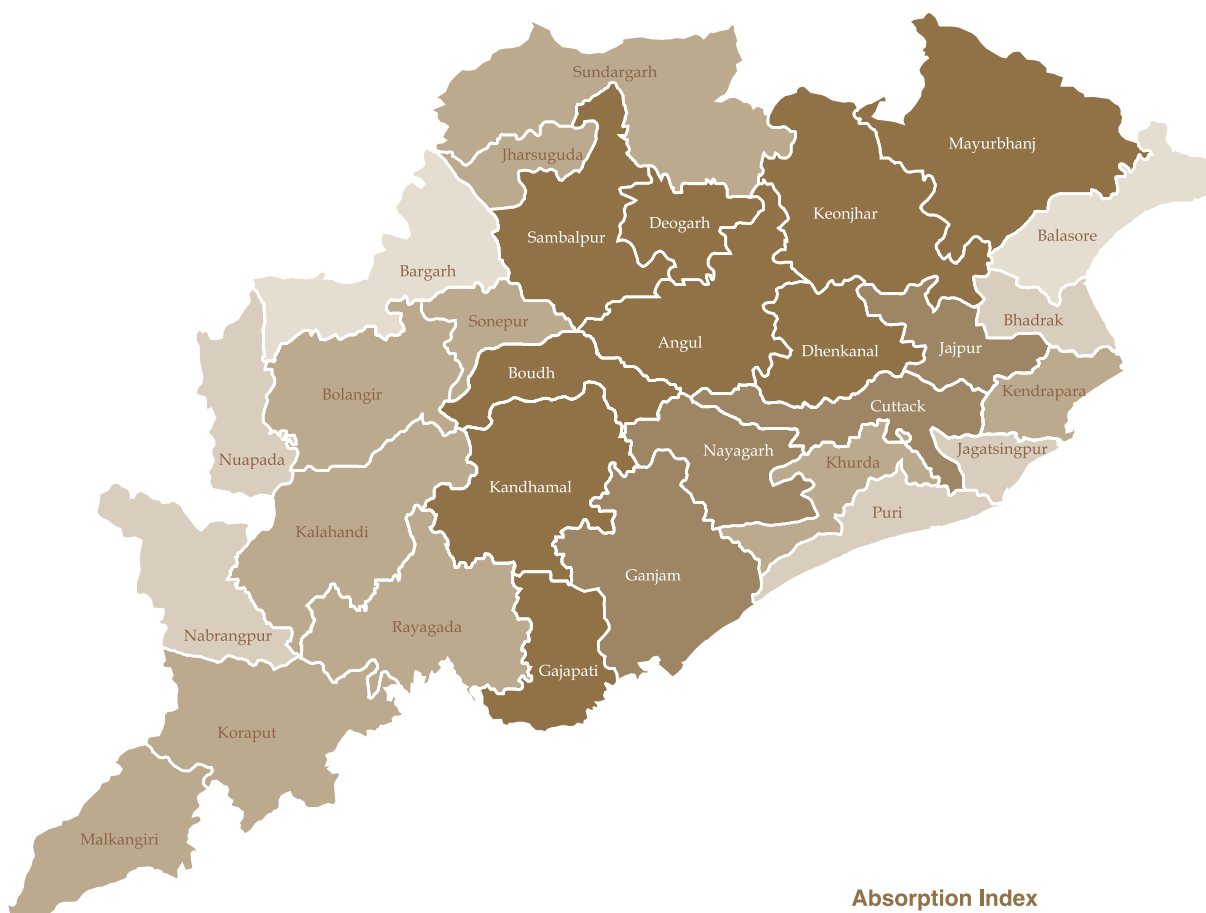
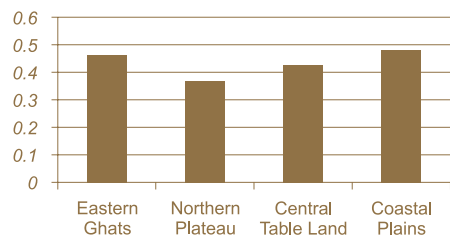


Table 48: Status of Districts in Absorption Index

Secure	Moderately Secure	Moderately Insecure	Severely Insecure	Extremely Insecure
Bargarh	Puri	Kalahandi	Ganjam	Sambalpur
Balasore	Bhadrak	Balangir	Cuttack	Boudh
	Jagatsinghpur	Jharsuguda	Jajpur	Mayurbhanj
	Nuapada	Malkangiri	Nayagarh	Keonjhar
	Nabrangpur	Kendrapara		Gajapati
		Koraput		Deogarh
		Rayagada		Dhenkanal
		Sonepur		Angul
		Khordha		Kandhamal
		Sundargarh		

Map 23: Food Absorption Map of Rural Orissa



Absorption Index

- Secure [0.6437 & Above]
- Moderately Secure [0.5449 - 0.6437]
- Moderately Insecure [0.4462 - 0.5449]
- Severely Insecure [0.3475 - 0.4462]
- Extremely Insecure [Less than 0.3475]



a very low status insofar as households' access to toilet facilities is concerned. The best figure in the state is shown by Khurda which itself has less than 40 percent of its households having toilet facilities. As many as 12 districts in the state have figures lower than 10 percent, most of these being located in the eastern ghats region (see Table 46 and Map 22).

Based on the twin indicators of access to safe drinking water and primary health facilities, the coastal plain districts are relatively better placed in terms of absorption compared to the northern plateau and central districts. Though the eastern ghats districts perform better in terms of drinking water infrastructure, they have very poor performance in terms of health facilities and sanitation. Primary health facilities in particular are found to be in a very poor shape in most parts of the state. Food absorption has been calculated and presented in table 47 and 48. Table shows that in regard to food absorption, eastern coastal districts like Balasore, Bhadrak, Jagatsinghur and Puri and also in the western districts like Bargarh, Nuapada and Nabrangpur are secure and moderately secure. Whereas districts in the central Orissa and northern Orissa regions like Mayurbhanj, Keonjhar, Sambalpur, Angul, Boudh, Kandhamal, Gajapati, Dhenkanal and Deogarh are extremely insecure as far as the food absorption index is concerned (see Map 23).

7. The KBK Districts

An analysis of the regional patterns of development in the state of Orissa reveals that development has not been evenly spread and there have been pockets of underdevelopment. The southern part of the state is one such area that has become infamous for its backwardness. This region is constituted by three districts: Koraput, Balangir and Kalahandi (and hence the name KBK), which since the early 1990s, have been divided into eight districts which together form the eastern ghats agro-climatic region, as illustrated below (also see Map 24).

The region accounts for around 31 percent of the total area of the state, but only 20 percent of the total population, indicating the low density of population in the region which is mostly consequent upon its rugged and hilly topography. A huge part of the region is unfit for cultivation and is mostly composed of degraded forests and scrublands (Table 49). Koraput has more than 1000 sq. kms of its area under wastelands, and the scrublands form almost two-thirds of the wastelands. In terms of area under degraded forests also, the scenario is quite dismal. The KBK region has a much higher proportion of degraded forests compared to the state as a whole. Except Koraput, all the districts have a very high proportion of degraded forests, particularly Nabarangapur and Nuapada.

K	Koraput	Koraput
		Rayagada
		Malkangiri
		Nabarangapur
B	Balangir	Balangir
		Sonepur
K	Kalahandi	Kalahandi
		Nuapada

Low levels of land development in the KBK region have resulted in poor performance on the agricultural front. Orissa as a whole, except for a few coastal districts, has very poor agricultural development.

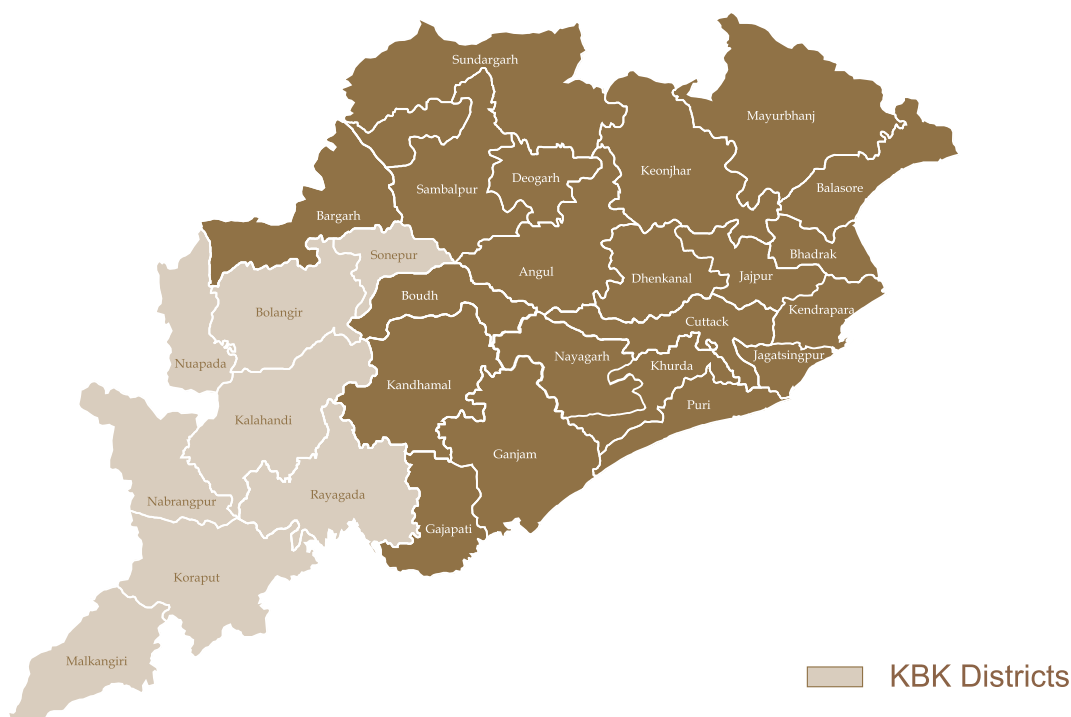
Table 49: Status of Land Degradation in KBK Districts

KBK Districts	Total Wastelands in sq. kms. (% of total area)	Proportion of Land with Scrubs (%)	Proportion of Degraded Forests (%)
Balangir	548.26 (8.34)	35.14	41.37
Kalahandi	864.86 (10.92)	20.55	43.99
Koraput	1118.88 (12.70)	63.90	25.53
Malkangiri	1878.33 (32.44)	52.40	41.69
Nabarangapur	650.23 (12.29)	26.07	72.64
Nuapada	656.98 (17.06)	32.05	61.78
Rayagada	912.73 (12.90)	33.27	44.97
Sonepur	399.42 (17.09)	48.04	41.07
KBK Region	7029.69 (15.47)	38.93	46.63
Orissa	18952.74 (12.17)	39.77	39.70

Source: Wasteland Atlas of India, 2003, Department of Land Resources, Ministry of Rural Development.



Map 24: Location of KBK Districts in Orissa



There is a very small area that can be cultivated twice in an agricultural year. This has resulted in very low cropping intensity.¹ As can be seen from the Table 50, even within the state, the KBK region shows extremely low figures for cropping intensity.

It should be noted here that though Sonepur district figures among the KBK districts, it is a consistently better-performing district for all indicators. With a high proportion of area under cultivation, the district also has a relatively high cropping intensity as well as high yield of foodgrains, as can be seen from the following table. Among all the KBK districts, Sonepur is the only district with a cereal yield higher than 1000 kgs per hectare. On the other hand, the south-western districts of Nuapada, Balangir and Kalahandi have extremely low productivity levels (Table 51).

Table 50: Status of Agricultural Land in KBK Districts (TE 2004-05)

	Area under Cultivation (% of total area)	Cropping Intensity (%)
Balangir	37.9	132.1
Koraput	35.6	133.1
Nabarangapur	36.4	138.6
Kalahandi	41.8	142.5
Nuapada	44.9	145.8
Malkangiri	20.9	146.1
Raygada	19.8	149.9
Sonepur	46.4	159.0
KBK Average	35.5	143.4
Rest of the State	41.3	152.5
Orissa	36.9	146.5

Source: Directorate of Economics and Statistics, Ministry of Agriculture.

1. Cropping Intensity = Gross Area Sown/Net Area Sown x 100.



The low level of land and agricultural development has in turn adversely affected the socio-economic status of the inhabitants of the region. For all the indicators, the status of KBK districts is found to be lower as compared to the rest of the state as well as the state as a whole.

The region is characterized by very low levels of urbanization coupled with a high proportion of Scheduled Tribes, and has almost twice the proportion of tribes as compared to other parts of the state. Five of the eight districts have urbanization of less than 10 percent. While rural literacy rates for the rest of the state are higher than the state as a whole as well as, noticeably, than the national average, the rate for the KBK districts is drastically lower. Districts like Koraput, Nabarangapur, Malkangiri and Rayagada have a rural female literacy rate lower than 20 percent, which is less than half the state average. As with the other indicators, Sonepur performs better in terms of these indicators as well with high literacy levels (higher than the state average) (Table 52).

It would be expected that the low level of agricultural and socio-economic development would finally result in food insecurity. The following table shows the food insecurity status of the KBK districts. In

Table 51: Foodgrain Yields in KBK Districts (kgs/ha)

	Total Cereals	Total Foodgrains
Nuapada	266	221
Balangir	313	302
Kalahandi	465	491
Malkangiri	614	597
Nabarangapur	690	657
Raygada	807	726
Koraput	862	792
Sonepur	1036	935
KBK Average	632	590
Rest of the State	797	696
Orissa	767	675

Source: Computed, Directorate of Economics and Statistics, Ministry of Agriculture.

Table 52: Socio-Economic Status of KBK Districts (Figures in percentages)

	Agricultural Labourers	Urbanization	Rural Literacy	Rural Female Literacy	Scheduled Tribes
Sonepur	46.4	7.4	61.7	44.7	10.2
Balangir	43.3	11.5	52.7	35.8	22.6
Nuapada	47.8	5.7	40.3	23.8	36.3
Kalahandi	52.5	7.5	43.5	26.5	30.4
Raygada	49.9	13.9	29.9	18.3	62.8
Nabarangapur	54.1	5.8	31.3	18	57.8
Koraput	44.9	16.8	27.3	15.6	56.5
Malkangiri	26.8	6.9	27.9	18.4	60.6
KBK Average	45.71	9.4	39.3	25.1	42.2
Rest of the State	32.14	14.8	64.2	51.2	22.9
Orissa	39.1	15	59.8	46.7	24.6

Source: Census of India, 2001.



terms of the proportion of tribal population that manages to access enough food throughout the year, only Sonepur is seen to be having a relatively higher figure of 7.2 percent. Other districts like Rayagada, Koraput and Kalahandi show extremely low figures, with less than five percent of the surveyed tribal population found to be in a food secure situation. On the other hand, the proportion of extremely food insecure tribal households that can hardly manage one square meal a day is found to be higher in the same districts, particularly Rayagada (Table 53).

Table 53: Food Insecurity Status of KBK Districts

	Enough Food Throughout the Year		Less than One Square Meal per Day for Major Part of Year	
	Scheduled Tribes	Total Population	Scheduled Tribes	Total Population
Koraput	3.9	7.1	5.5	5.1
Malkangiri	5.9	9.3	5.0	4.8
Nabarangpura	5.3	7.0	1.9	2.2
Raygada	2.4	6.0	11.9	10.2
Balangir	5.5	8.5	5.7	5.8
Sonepur	7.2	11.9	6.6	4.6
Kalahandi	4.4	7.7	2.7	2.5
Nuapada	5.5	7.7	2.9	2.9
Orissa	5.0	9.6	7.1	7.0

Source: Household Survey Reports, BPL Census 2002, Ministry of Rural Development, Government of India.

The high food insecurity status of the KBK districts is expected to be manifested in the form of mortality and under-nutrition conditions, particularly among children under five who form the most vulnerable section of the population. Our analysis shows that all the KBK districts have very high levels of child mortality. Rayagada, which has already been seen as a very food insecure district, has the highest child mortality rate, one of the highest among all districts of the country. Closely following Rayagada are districts like Malkangiri, Kalahandi, Koraput and Nabarangapur, all exceeding 150 child deaths per 1000 live births, which is a remarkably high figure for a specific region (Table 54).

Even in terms of malnutrition levels, almost all the districts except Nabarangapur have more than 40 percent children in the moderately underweight category. Further, Malkangiri, Raygada and Sonepur have more than 20 percent of total children in the severely underweight category. Similarly, a significantly higher proportion of children are found to be anaemic in the KBK region compared to other parts of the state (Table 54).

It would be expected that a specific region with identified backwardness would receive the maximum attention from the policymakers and executives. The Committee on the Constitution of Separate Development Board in Orissa had identified 96 percent of the blocks in the KBK districts as either



Table 54: Mortality and Nutritional Status of Children in KBK Districts

Districts	Infant Mortality	Child Mortality	Underweight Children (%)	Anaemia among Children (%)
Balangir	82	120	47.8	55.6
Kalahandi	103	157	40.6	39.8
Koraput	101	153	43.5	49.4
Malkangiri	103	158	56.1	48.4
Nabarangapur	102	156	33.4	47.2
Nuapada	91	136	57.0	24.9
Rayagada	106	163	50.6	47.8
Sonepur	76	110	58.2	44.9
KBK Average	96	142	48.4	44.8
Rest of the State	86	128	39.7	41.8

Source: IMR and CMR – Computed from Census of India, 2001 Underweight and Anemia – RCH-DLHS, 2002–04.

very backward or backward. In 1988, a special program – the Area Development Approach for Poverty Termination (ADAPT) – was implemented in 15 most backward blocks of Kalahandi and Koraput districts.

Recognizing that short term strategies would not suffice for the development of the region, a Long Term Action Plan (LTAP) was formulated in 1993, in consultation with the Central Government, specifically for the region. However, it never took off. Another plan, the Revised Long Term Action Plan (RLTAP) was submitted in 1998 to the Central Government. The action plans aimed at developing rural infrastructure and income-generating activities. The Special Area Development (KBK) Project

Box 4 : Emergency Feeding Programme for KBK Districts

The high level of poverty in the KBK region, caused by low agricultural productivity and depleting forest-based livelihoods, has over the years resulted in a poor, nutritional status of the population. Under such a scenario, the old and infirm become one of the most vulnerable sections of the population due to neglect in terms of intra-household food allocation.

The Emergency Feeding Programme being implemented in the KBK districts under the Revised Long Term Action Plan (RLTAP) provides food on each day throughout the year for the old, infirm and indigent persons belonging to BPL (Below Poverty Line) households. The funds are provided from the Special Central Assistance (SCA). Under the scheme, a cooked meal is provided to the beneficiaries under the Programme through the Anganwadi Centres. Locally available nutritious vegetables such as drumstick, papaya, brinjal, potato and pumpkin are used in the preparation of the meals so that the much-needed minerals and vitamins from these can be accessed by the beneficiaries. *Dal* (pulses) is cooked with seasonally available vegetables added to make a nutritious preparation of the local cuisine called '*dalma*'. The nutritional value of the food now being provided is 840.9 KCal of energy and 22.8 gms of protein.

Source: Department of Women & Child Development, Government of Orissa.



has been headquartered at Koraput and has been assigned the task of implementing the RLTA. Balangir, Kalahandi and Sonepur districts have also been included in the Drought Prone Area Programme (DPAP) (Box 4).

Table 55: Status of Public Intervention in KBK Districts (all figures in percentages)

Districts	Coverage of safe deliveries	Villages with access to PHCs	Children fully immunized	Households with toilet facilities	Villages connected with paved roads	Electrified households
Balangir	57.8	24.3	63.7	9.3	40.6	15.1
Kalahandi	41.8	20.9	53.8	8.3	41.5	13.2
Koraput	25.1	22.3	26.3	13.1	22.2	18.3
Malkangiri	18.1	16.1	39.3	6.8	21.2	10.1
Nabarangapur	36.6	28.4	45.2	6.9	45.1	7.9
Nuapada	37.0	25.5	46.1	6.1	61.2	13.2
Rayagada	41.4	13.2	54.3	10.3	33.5	18.3
Sonepur	45.1	14.1	64.6	6.7	36.3	18.5
KBK Average	37.9	20.6	49.2	8.4	37.7	14.3
Rest of the State	53.8	24.5	58.3	15.1	43.7	28.2

Source: Computed from Census of India, 2001 and RCH-DLHS, 2002-04.

Box 5: A District in Distress - Koraput

On the request of the WFP, the NSSO (National Sample Survey Organization) carried out a study of Food Security in 6 chosen food-insecure districts in 6 states: Koraput (Orissa), Jhabua (Madhya Pradesh), Surguja (Chhatisgarh), Banswara (Rajasthan), Chamoli (Uttaranchal) and Surendranagar (Gujarat). The results of this survey give a snap shot picture of Koraput district in comparison with other food insecure districts in the country.

Among these districts, Koraput had the lowest MPCE of Rs. 224, as against Rs. 356 for Jhabua, Rs. 424 for Suguja, Rs. 512 for Chamoli, Rs. 550 for Banswara and Rs. 837 for Surendranagar. Further, in Koraput, 63 percent of the rural population was below this MPCE and fully 91 percent was below Rs. 300.

% population with MPCE	Koraput	Jhabua	Surguja	Banswara	Chamoli	Surendranagar
Below Rs.225	63.1	2.0	11.8	1.7	1.8	0.0
Below Rs.300	90.9	25.7	32.6	15.5	4.1	0.0
Below Rs.380	96.7	66.6	50.4	39.8	21.8	1.1
Below Rs.470	98.1	92.2	79.8	56.8	49.8	6.4

What stands out is not only the low level of consumption in Koraput district, but the virtual absence of a middle class. Unlike other food-insecure districts, there is no middle, between, say, Rs. 380 and Rs. 225.

As would be expected, Koraput had the lowest per capita calorie intake of 1559 kcal per day, and the lowest per capita protein intake of 36 gms per day; as against more than 52 gms per day for all the other districts. 97 percent of the population of Koraput had a calorie consumption below the NSSO norm of 1980 kcal per day.



In Koraput, 35 percent of the households reported a shortage of food for some months of the year; while in all the other 5 districts only one per cent household reported such a shortage.

Fully 89 percent of Koraput's calories were from cereals, mainly rice, as against just 55 percent for Surendranagar. Along with Surguja, Koraput had the lowest value of livestock per household. The value of agricultural machinery was just Rs. 435 per household, as against Rs. 675 in Chamoli going up to Rs. 5,400 in Banswara and Rs. 12,000 in Surendranagar. This shows that the economy is at a very low level of intensity, with hardly any diversification.

In a situation of an economy with low agricultural productivity with little diversification, the one glimmer of hope comes from education. 86 percent of those in the age-group 15–18 who have ever been to school were not in school, meaning that they did not complete schooling. At the same time, current enrolment has increased: the percentage of those in the 10–14 age group in school was 60 percent, which was much higher than the 49 percent of those in the age group 15–18 who had been to school. Thus, there is a clear increase in the proportion of children going to school. Whether they will complete school is another matter.

The support that Koraput receives from the PDS (Public Distribution System) at 55 percent of the households is bettered only by Jhabua's 60 percent. ICDS coverage at 6 percent is again only bettered by Surendranagar's 9 percent, though the overall coverage for all of the districts is low. But in the case of the Mid-Day Meal Scheme, the coverage is only 10 percent of households in Koraput as against 27 percent in Surendranagar and 43 percent in Banswara.

However, the value of food received from all government-schemes is quite low at just Rs. 50 per household, which is less than 5 percent of average household consumption.

The picture of Koraput, then, is that of a low productivity rural economy, with little diversification. The benefit from government schemes is so little that it cannot make a dent on the overall low consumption and poor nutrition. The increase in educational enrolment, however, is a sign of hope. It could be that the Mid-day Meal Scheme, though it reaches only 10 percent of households, is having some effect in increasing school enrolment. A further extension of the Mid-Day Meal Scheme, meeting the Supreme Court's directive for full coverage, will surely have a positive effect on school enrolment.

However, it is surprising that the efforts put into the development of the region have not produced tangible results. The existence of widespread malnutrition and mortality levels, as already discussed, are valid cases in point. Besides these outcomes, even the direct development benefits are not visible. As the following table shows, the creation of health infrastructure, roads for rural connectivity, sanitation facilities and electrification are grossly lacking in these districts. This has also resulted in low levels of safe deliveries and immunization in these districts, which in turn has contributed to the high levels of IMR and CMR respectively (Table 55).

That the KBK districts are 'notorious' for their backwardness is not unknown. Urgent intervention by the government directed towards this most underdeveloped region of the country is required. The World Food Programme, as part of its core activities, has been working in all eight KBK districts. The WFP adopts a life-cycle approach for addressing the food insecurity situation in such regions. The ICDS program is directed towards pregnant and lactating women to take care of their feeding requirements, as well as at children between six months to six years of age. The Food-for-Education program takes care of the nutritional requirements of the school-going children from first to fifth grade. Finally, the Food-for-Work programme provides for the food requirements of the entire household by providing the adults with employment opportunities.

8. Addressing Food Insecurity in Orissa

Chapter 3 developed an index to show the ranks of districts by outcomes of food insecurity. The next logical step was to look at factors that contribute to making these districts so prone to food insecurity. These factors were analyzed in terms of the Availability, Access and Absorption framework in chapters 4 to 6. In this chapter, the strategies for promoting food security across districts are provided while highlighting the priority districts based on the Food Security Index (FSI). Map 25 gives districts by their rank on the FSI and Table 56 gives the corresponding table. The critical question is: Is there an overlap between the ranks of districts on the food security outcome index and the ranks on the food security index? That is, do the districts that have poor outcomes (in terms of under-five mortality and underweight children) also have low availability, access and absorption? If indeed there is an overlap, and we show that there is, it means that the factors or indicators that are included in the composite FSI do, indeed, contribute to food insecurity, and any strategy to improve the food security status must address them (Table 57).

Table 56: Status of Districts in Terms of FSI

Extremely Insecure	Severely Insecure	Moderately Insecure	Moderately Secure	Secure
Kandhamal	Koraput	Dhenkanal	Kendrapara	Bhadrak
Gajapati	Sundargarh	Jharsuguda	Jajpur	Puri
Rayagada	Mayurbhanj	Ganjam	Balasore	Jagatsinghpur
Nabarangpur	Malkangiri	Sonepur	Bargarh	
	Sambalpur	Nayagarh	Khordha	
	Deogarh		Cuttack	
	Boudh			
	Keonjhar			
	Angul			
	Nuapada			
	Kalahandi			
	Balangir			

The simple correlations between the food security outcome index and the food security index show a positive and significant correlation. In other words, while correlations do not tell us the causal factors, they do tell us the correlates to food insecurity. Districts that have the highest child mortality and underweight children are also the districts that have a high proportion of SC and ST population, high proportion of agricultural labourers (showing landlessness and poverty), low irrigation, low road connectivity and so on.

There exist a large number of programmes dealing with food security, along all three components of Availability, Access and Absorption. What the analysis in this atlas can do is to help prioritize the geographical targeting of these programmes and to refine interventions that could improve food security, and show ways to link short-term access measures with longer-term development measures.



Map 25: Food Security Map of Rural Orissa

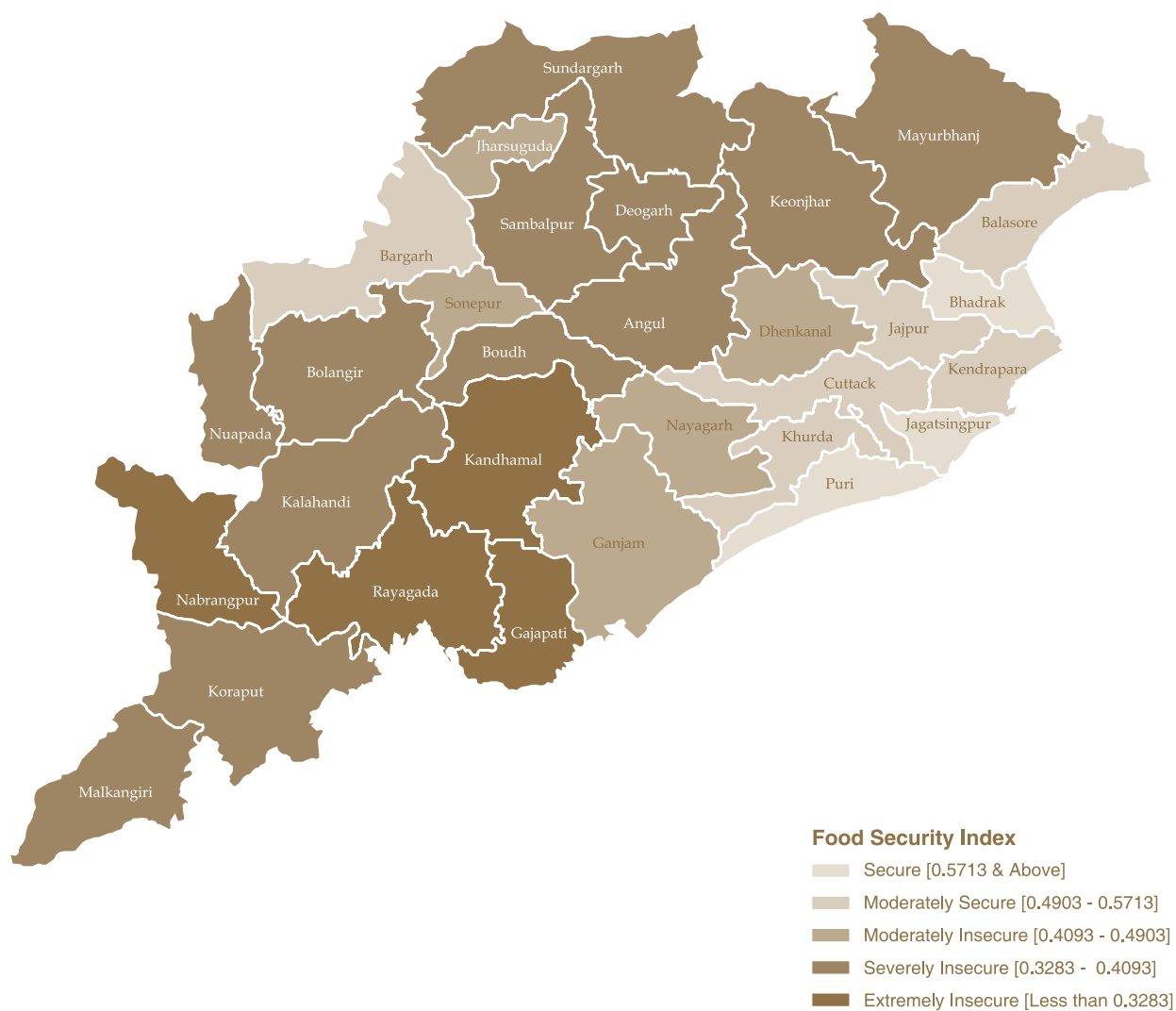




Table 57: Ranks of Districts on Composite Food Security Index and Components

DIST	Availability		Access		Absorption		FSI		FSOI	
	Index	Rank	Index	Rank	Index	Rank	Index	Rank	Index	Rank
Angul	0.326	27	0.473	11	0.268	29	0.390	18	0.485	12
Balangir	0.433	17	0.356	17	0.519	9	0.409	15	0.467	13
Balasore	0.498	11	0.505	9	0.658	2	0.528	7	0.600	5
Bargarh	0.601	4	0.410	13	0.742	1	0.529	6	0.410	21
Boudh	0.441	15	0.351	19	0.337	23	0.379	20	0.402	22
Bhadrak	0.601	3	0.576	3	0.632	4	0.594	3	0.414	20
Cuttack	0.593	5	0.587	1	0.375	19	0.553	4	0.692	3
Deogarh	0.443	14	0.334	20	0.308	27	0.366	21	0.504	11
Dhenkanal	0.406	20	0.478	10	0.276	28	0.420	14	0.565	6
Gajapati	0.274	29	0.320	22	0.315	26	0.304	29	0.294	28
Ganjam	0.511	9	0.442	12	0.389	18	0.456	12	0.389	24
Jagatsinghpur	0.684	1	0.581	2	0.629	5	0.624	1	0.624	4
Jajpur	0.515	8	0.572	4	0.365	20	0.518	8	0.452	15
Jharsuguda	0.503	10	0.385	15	0.513	10	0.446	13	0.830	1
Kalahandi	0.484	12	0.297	25	0.535	8	0.399	16	0.395	23
Kandhamal	0.164	30	0.302	24	0.249	30	0.247	30	0.237	30
Kendrapara	0.441	16	0.571	6	0.503	12	0.516	9	0.508	9
Keonjhar	0.408	19	0.396	14	0.330	25	0.389	19	0.415	19
Khordha	0.531	7	0.571	5	0.457	16	0.538	5	0.507	10
Koraput	0.395	21	0.253	28	0.468	13	0.336	26	0.386	25
Malkangiri	0.381	24	0.284	27	0.504	11	0.353	23	0.276	29
Myurbhanj	0.393	22	0.330	21	0.331	24	0.351	24	0.564	7
Nabarangpur	0.365	25	0.207	30	0.585	7	0.322	27	0.452	14
Nayagarh	0.424	18	0.518	8	0.363	21	0.461	10	0.708	2
Nuapada	0.447	13	0.291	26	0.586	6	0.392	17	0.344	26
Puri	0.625	2	0.561	7	0.641	3	0.596	2	0.563	8
Rayagada	0.362	26	0.232	29	0.461	14	0.313	28	0.302	27
Sambalpur	0.385	23	0.354	18	0.343	22	0.362	22	0.422	16
Sonepur	0.586	6	0.374	16	0.457	15	0.458	11	0.422	17
Sundargarh	0.322	28	0.320	23	0.453	17	0.343	25	0.418	18



8.1 Identifying Priority Districts

The food security outcome index described earlier provides the option of prioritizing the developmental efforts in the most food insecure districts. The districts in the two lowest categories, that is, the extremely and severely food insecure districts should be prioritized for developmental intervention for enhancing food security. These include all the districts in the eastern ghats region (largely constituted by the erstwhile KBK districts), but also include districts from the other regions. These are given as the priority districts for food security intervention in Table 58.

Table 58: Priority Districts for Food Security Intervention

Eastern Ghats	Northern Plateau	Coastal Plains	Central Table Land
1. Kandhamal	1. Keonjhar	1. Gajapati	1. Sonepur
2. Malkangiri	2. Sundargarh	2. Ganjam	2. Bargarh
3. Rayagada		3. Bhadrak	3. Sambalpur
4. Nuapada		4. Jajpur	4. Balangir
5. Koraput			
6. Kalahandi			
7. Boudh			
8. Nabarangpur			

Table 59 gives a subset of the priority districts that fall in the lowest two categories of the FSO index, but also rank very low on the FSI. These districts not only have a high child mortality and under-nutrition rate but also rank poorly in terms of availability, access and absorption indicators. They need the urgent attention of government and policy makers.

Table 59: Subset of Priority Districts

	Ranks of districts that fare poorly on the Food Security Outcome (FSOI) Index and the Food Security Index (FSI)	
District	FSOI Rank	FSI Rank
Kandhamal	30	30
Malkangiri	29	23
Gajapati	28	29
Rayagada	27	28
Koraput	25	26
Boudh	22	20
Keonjhar	19	19



8.2 Strategies for Promoting Food Security

The districts most beset by hunger and food insecurity have been identified in the earlier section. These are also the districts that call for priority intervention. The analysis of the earlier chapters suggests the measures and strategies that are needed for enhancing food security. Broadly, measures to improve availability must include improving irrigation and agricultural productivity. Farm incomes can be improved through better rural connectivity. Access should be improved by policies for enhancing rural wages and thereby spending on food, improving the lot of agricultural labour, land re-distribution, and enhancing the status of women. There can be no two opinions on the need to expand the reach of public interventions.

The central and state governments have launched a number of schemes and programmes that are aimed at enhancing food security in the state. Some of them are recent and it is too early to see their impact, while some have been under implementation for some time. This section discusses food security interventions.

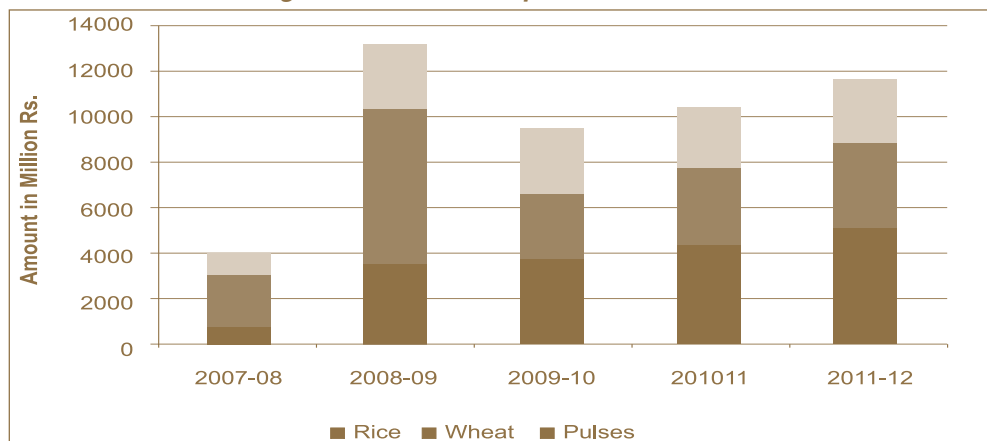
8.2.1 Enhancing Availability

More than a decade of low investment in agriculture, including agricultural research and infrastructure, has resulted in a relative stagnation in food output. With the present problems of spiraling food prices, there is a renewed emphasis on increasing food production.

8.2.1.1 Increasing Food Production: The National Food Security Mission

The dismal rate of growth in the agricultural sector has been a cause for concern – the sector grew at a meagre rate of 1.8 percent per annum during the nineties. This has been coupled with rising international prices as well wheat imports, bringing into question the food security of the country.

Fig 17. Allocation Proposed under NFSM



Source: Economic Survey, 2007-08.



With a view to increasing the rate of agricultural growth to 4 percent, the government has launched the National Food Security Mission (NFSM) as a centrally sponsored scheme, entirely funded by the central government, with a total estimated outlay of over Rs. 50,000 million (Fig. 17). The programme specifically aims at increasing the production and productivity of three crops: rice, wheat and pulses. Ongoing related schemes like the Integrated Cereal Development Programme (ICDP Rice/Wheat) and the Integrated Scheme on Pulses, Oilseeds and Maize (ISOPOM Pulse) would cease to operate in the identified districts once the relevant component of the NFSM comes into execution in the district.

The objective of the mission is to increase the production of rice by 10 million tons, wheat by 8 million tons and pulses by 2 million tons, by the end of the 11th Plan. The targets are to be achieved by restoring soil fertility and hence productivity, which would be complemented by increasing employment opportunities.

The mission would operate at multiple levels from the national level, to state and district levels. At the grass root level, the Panchayati Raj Institutions (PRIs) would have an active role and would be involved in the selection of beneficiaries and identification of priority areas and local initiatives.

The mission would be implemented in 133 districts for the rice component, 138 districts for wheat and 168 districts for the pulse component – all in identified districts of different states. In terms of target beneficiaries, 16 percent of the total allocation would be earmarked for Scheduled Castes under the Special Component Plan (SCP) and 8 percent would be earmarked for the Scheduled Tribes under the Tribal Sub-Plan (TSP). At least 33 percent of the fund would be utilized for small, marginal and women farmers. Further, the allocation to the SC/ST farmers would be made in proportion to their population in the district.

The modality of implementation of the mission would be in the form of demonstration of an improved package at farmers' fields, assistance for production of hybrid rice, nutrient management for all the three crops, mechanization for sowing and weeding, and assistance for purchase of pump sets and sprinkler sets. Several capacity-building initiatives would also be undertaken which would be in the form of farmers' training in Farmers' Field Schools (FFS) and exposure visits to international organizations. For efficient information dissemination, help from print and e-media and other methods would be taken as required. All these would be followed by rewarding the best performing districts on a set of indicators.

The NFSM concentrates on irrigated foodgrains, wheat and rice, and pulses. Other than for pulses, non-irrigated crops have been ignored. The NFSM is aimed at revitalizing fertility in lands which have deteriorated. But rainfed crops, such as the various millets that are grown on hills and other drylands, do not come under its purview. In the context of the plateauing (and even decline) of yields in irrigated crops, it becomes even more important to pay attention to these rainfed crops and to increase productivity in currently rainfed areas. These are also areas of higher food insecurity. An increase in agricultural productivity in rainfed areas will substantially reduce the incidence of hunger in these areas.



In Orissa, the following districts have been identified for development under the NFSM under the rice and pulses components:

Table 60: Districts under NFSM in Orissa

Rice (15)			
Balangir	Jajpur	Dhenkanal	Angul
Kalahandi	Nawapara	Keonjhar	Malkangiri
Nawarangpur	Phulbani	Boudh	Nayagarh
Deogarh	Jharsuguda	Sundargarh	
Pulses (10)			
Balangir	Baragarh	Cuttack	Ganjam
Kalahandi	Keonjhar	Khurda	Nayagarh
Puri	Rayagada		

Source: Government of India (2007b).

Orissa Agricultural Policy

The Orissa State Government's Draft Agricultural Policy 2007 provides a program for developing agriculture in the hilly areas. There is a combination of constructing water harvesting structures with diversification to crops such as oilseeds, pulses and horticultural plantation crops.

However, it is necessary to make one important distinction: The question is not one of diversification of lands in the case of land where rice is cultivated, since it is necessary to maintain existing levels of rice production for farmers in the uplands. The diversification into high-value or horticultural crops thus should be in addition to existing rice production. In the uplands, there are vast areas that yield very little. These areas can be turned into cash crop cultivation areas. The cash from such high-value and horticultural crops can be used to advance the process of accumulation (of both physical and human capital). It is important to reiterate that diversification need not be undertaken at the expense of existing rice or other foodgrain production, as a reduction of own rice production will leave the farmers vulnerable to paying high effective rates of interest in inter-linked market transactions. Reducing existing foodgrain production in the hills will worsen the food security of these farmers and expose them to forced sales of their commercial crops at minimal prices. A better food production situation will enable these farmers to get better prices for their commercial products.

8.2.1.2 Improving Connectivity

The rate of growth of rural incomes and reduction in rural poverty are strongly influenced by the provision of rural and district road connectivity. There is a close link between rural connectivity and growth, be it in the area of trade, employment, education or healthcare. States with poor connectivity are also states that report poor socio-economic indices. Improved connectivity between the growth production centres and the collection centres is vital for livelihood enhancements and that is possible only through the development of roads in remote areas.



Box 6: National Policy for Farmers, 2007

The National Policy for Farmers is intended to help in rejuvenating the farm sector and bringing about lasting improvement in the economic condition of farmers. The Government had constituted the National Commission on Farmers in 2004 under the chairmanship of Dr. M.S. Swaminathan. Based on the recommendations made by the Commission in its Revised Draft National Policy for Farmers and the comments/suggestions received from various Central Ministries and Departments and State Governments, the 'National Policy for Farmers, 2007' has been formulated and approved by the Government of India. The policy, among other things, aims to improve the economic viability of farming by substantially improving the net income of farmers in addition to improving productivity, profitability, land, water and support services and providing appropriate price policy risk management measures.

The recommendations include:

- a. Human Dimension: In addition to production and productivity, the economic well-being of the farmers to be given prime importance.
- b. Asset Reforms: To ensure that every man and woman, particularly the poor, in villages either possesses or has access to a productive asset.
- c. Water Use Efficiency: The concept of maximizing yield and income per unit of water to be adopted in all crop production programmes, with stress on awareness and efficiency of water use.
- d. Use of Technology: New technologies which can help enhance productivity per unit of land and water are needed. Biotechnology, information and communication technology (ICT), renewable energy technology, space applications and nano-technology to provide opportunities for launching an 'Evergreen Revolution' capable of improving productivity in perpetuity without harming the ecology to be developed.
- e. Inputs and Services - Soil Health: Good quality seeds, disease-free planting material, including in-vitro cultured propagules and soil health enhancement hold the key to raising small farm productivity. Every farm family to be issued with a Soil Health Passbook. Food security basket to be enlarged to include nutritious millets mostly grown in dryland farming areas.
- f. Credit & Insurance: The financial services to be galvanized for timely, adequate and easy reach to the farmers at reasonable interest rates.
- g. Single National Market: A Single National Market to be developed by relaxing internal restrictions and controls.

An Inter-Ministerial Committee has been set up to operationalize the implementation of the policy.

While over the last five decades the length of rural roads has been increasing, there are still more than 250,000 villages (40 percent) which remain unconnected. Other forms of rural infrastructure are also important as they help in widening the opportunities and choice of alternatives. Research into rural road investments suggests that the construction of a new road in a village raised the per capita income of households by 30 percent over a half-decade, after controlling for factors like household size and education (Deolalikar, 2001).

Pradhan Mantri Gram Sadak Yojana (PMGSY):

In an impact evaluation, the following effects of the PMGSY have been observed (Ministry of Rural Development, Government of India):

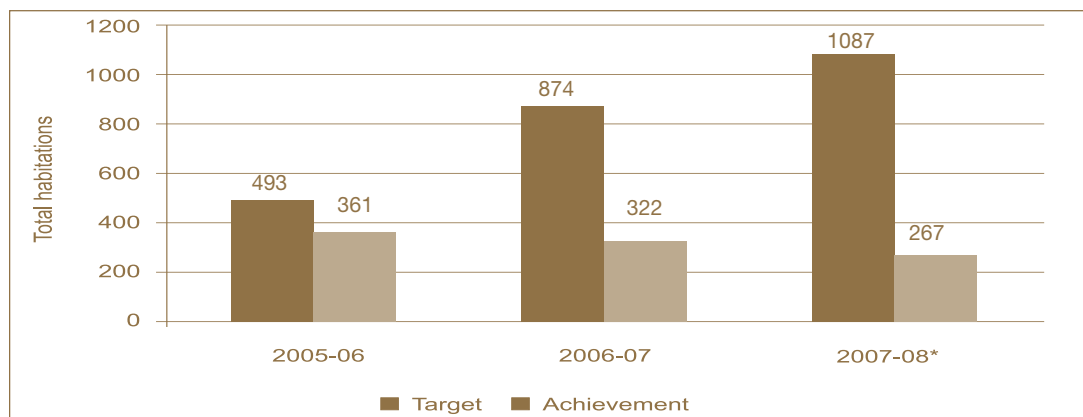


1. Use of chemical fertilizers and HYV seeds has increased considerably on account of their decreased transportation cost that formed a fair portion of their total cost.
2. An increase in the ownership and use of farm implements by the people has been observed.
3. The farmers get a higher price for their products due to better access to the wholesale market.
4. There has been substantial increase in dairy and poultry production in the villages which are located in close proximity to the newly constructed roads.
5. There has been substantial increase in employment opportunities both in agricultural and non-agricultural sectors in villages located close to the roads constructed under PMGSY.
6. Substantial achievements have also been made on the health front. The frequency of health workers visiting the village has increased, as have institutional deliveries, and villagers have better access to health facilities.
7. The enrolment rate has increased due to better accessibility to educational institutions.
8. An increase in land prices has been observed and many petty shops have come up on the road side.

Bharat Nirman: Rural Roads

Bharat Nirman is a plan for action in rural infrastructure that started in 2005 and will end in 2009. Under the scheme, action is proposed in the areas of irrigation, roads, rural housing, rural water

Figure 18: Total Habitations Covered under the Bharat Nirman Programme (Rural Roads) in Orissa: Targets and Achievements - 2005-2007



* Figures upto January 2008.

Source: Ministry of Rural Development, Government of India



supply, rural electrification and rural telecommunication connectivity, in partnership with the state governments and the PRIs.

The target for Orissa state is to connect 4,955 habitations with new connectivity of 14,968 kms of roads and upgradation of 7,659 kms of roads (Figure 18). The target to provide connectivity will be achieved through the *Pradhan Mantri Gram Sadak Yojana* (PMGSY) funding of Rs. 27,000 million during 2007–08 and 2008–09 over and above the funding out of State Plan resources.

8.2.2 Improving Access to Food

Improving access, the results of our analysis show, comes about through improvement on several fronts. These include:

- a) enhancing access to food provided in government schemes;
- b) improving wages, incomes and employment opportunities; and
- c) improving the position of the most marginal sections including women, and ST and SC communities.

The latest (2004–05) NSS Round provides information on the extent to which various government schemes reach the poor in Orissa, and thus contribute something to food security, though it does not show us how much they add to food entitlements.

Table 61: Region-wise Poor Households who have Ration Cards or Benefited from Various Schemes in Rural Orissa (2004–05) (in %)

Region	Ration card	Food for work	Annapoorna	ICDS	Midday meal
	Poor Households				
Coastal	76.7	0.5	1.0	19.4	33.2
Southern	68.0	26.9	1.9	22.6	19.5
Northern	70.7	12.8	1.0	14.6	39.4
Rural Orissa	71.3	14.5	1.3	18.4	31.4
Rural India	80.0	4.2	1.2	8.8	33.2

Source: Calculated from unit level data, NSS 61st round, 2004–05.

In the above table, we have also separately included ‘nearly poor’ households, i.e. those whose per capita consumption level is within 10 percent above the poverty line. In the crucial southern zone of Orissa, both the poor and nearly-poor have relatively more access to Food-for-Work schemes than the poor and nearly-poor in other zones. But even then, the schemes do not reach many of the poor in the southern zone, the reach to the poor of a little less than 27 percent is far from sufficient.



The reach of the ICDS to the poor is again relatively better in the southern region. But again, at just 22.6 percent, it is far from sufficient. What is important to note, from a development point of view is that the reach of the Mid-Day Meals Scheme is far less (at 19.5 percent) in the southern region than in the other two regions, in each of which the reach is more than 30 percent. With the reach to the nearly-poor households also being just 10.5 percent (as against more than double that in the other zones) the figures clearly show a poorly-functioning government school system.

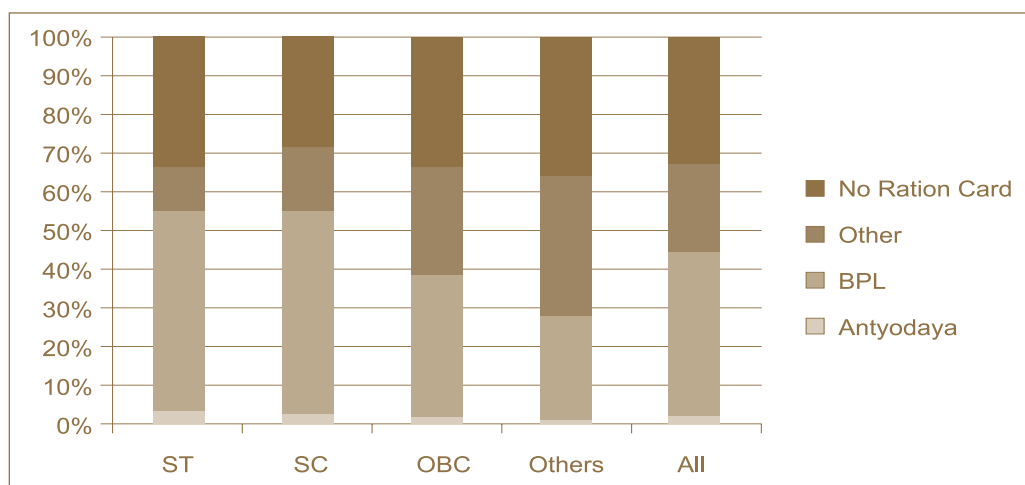
Box 7: Improved Targeting in the Public Distribution System

The Targeted Public Distribution System is perhaps the largest food safety net in the world. Yet, as surveys have revealed, its success is tarnished by several shortcomings. A pilot project launched by WFP in collaboration with the state government seeks to address these through the use of new technologies. The project aims to strengthen the identification and verification process and comprehensively plug the loopholes in TPDS. The project is being implemented in Rayagada district of Orissa.

The project involves the following: -

- **Biometric ration cards (Iris and finger print):** to ensure that all ghost and duplicate cards are removed from the system.
- **Distribution of new ration cards against biometric validation:** to remove the problem of shadow ownership at the ration card distribution stage.
- **Bar-coded coupons:** to prevent recording of off-take without the beneficiary's agreement and also check shadow ownership of coupons.
- **Smart cards installed with a point of sale device (PoS):** to prevent incorrect off-take recording and shadow ownership of ration cards.
- **Strong management information system:** to improve governance and enhance effectiveness of monitoring by providing more relevant and real-time information.
- **Web based interface:** to track and monitor progress.

Figure 19: Proportion of Households Possessing Ration Cards, 2004-05



Source: Calculated from Unit Level data NSS 61st Round, 2004-05.



Map 26: Status of Public Interventions

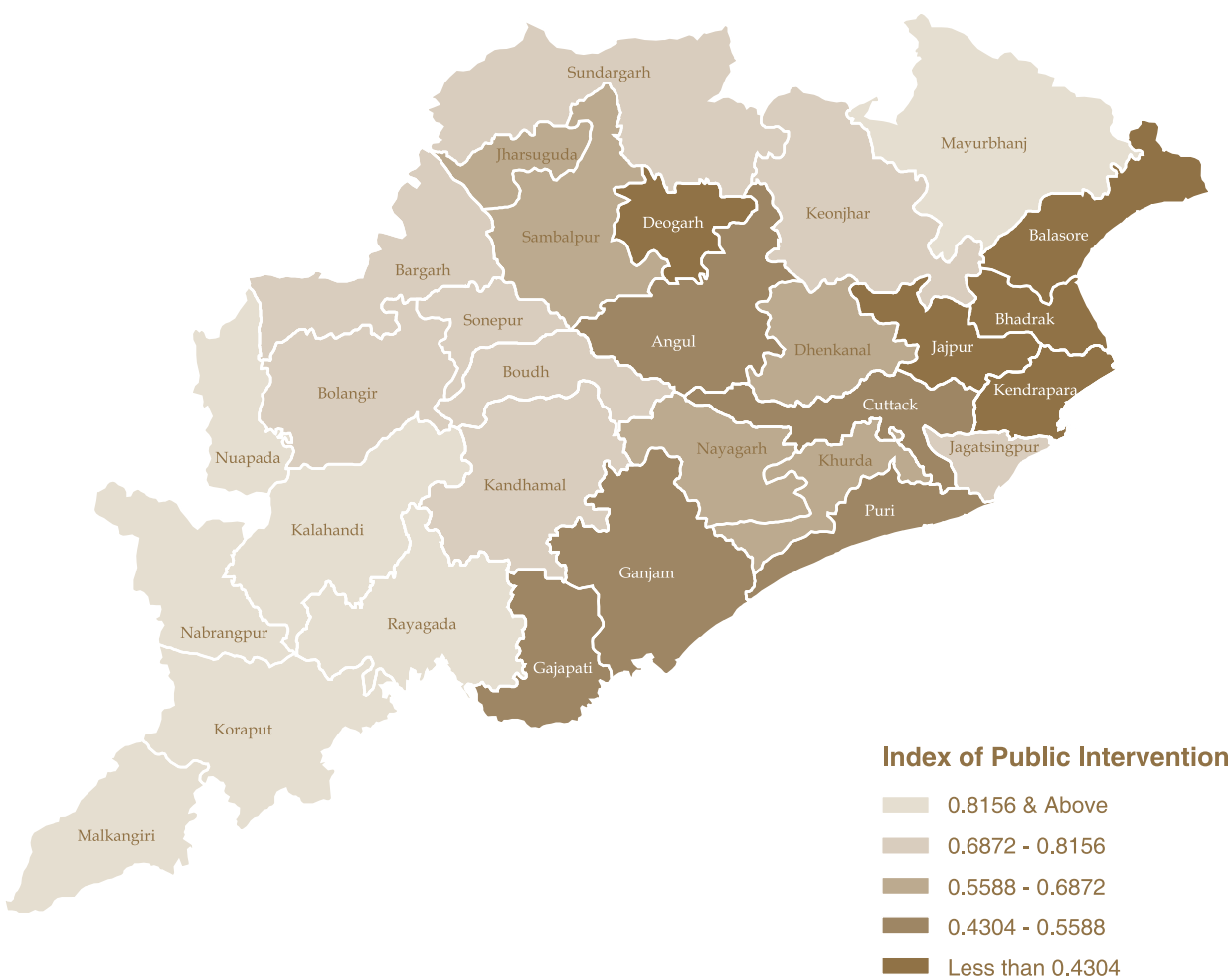
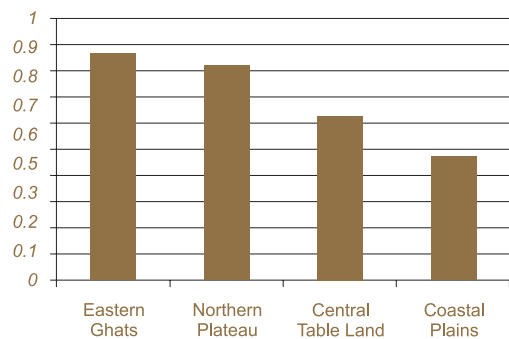




Table 62: Index of Public Intervention

District	Index	Rank	District	Index	Rank
Angul	0.538	21	Kandhamal	0.776	11
Balangir	0.730	13	Kendrapara	0.318	28
Balasore	0.390	27	Keonjhar	0.792	10
Bargarh	0.708	14	Khordha	0.591	19
Boudh	0.812	8	Koraput	0.944	1
Bhadrak	0.414	26	Malkangiri	0.922	3
Cuttack	0.451	25	Mayurbhanj	0.856	5
Deogarh	0.302	30	Nabarangpur	0.931	2
Dhenkanal	0.669	17	Nayagarh	0.572	20
Gajapati	0.466	23	Nuapada	0.826	6
Ganjam	0.457	24	Puri	0.535	22
Jagatsinghpur	0.706	15	Rayagada	0.872	4
Jajpur	0.309	29	Sambalpur	0.654	18
Jharsuguda	0.671	16	Sonepur	0.753	12
Kalahandi	0.819	7	Sundargarh	0.812	8

An analysis of the possession of ration cards by social groups reveals the poor state of affairs in the state. Almost one-third of the tribal population does not possess any ration card. The figure among the Scheduled Caste population is more than a quarter. Though the proportion of BPL (Below Poverty Line) and *Antyodaya* card holders is found to be higher for the tribal and Scheduled Caste population, in absolute terms and compared to their relative position, it is far from adequate (Figure 19).

Both in the Food-for-Work and the ICDS, the reach to the poor is better in southern Orissa and the whole of rural Orissa than for rural India as a whole. However, in the case of the schools' Mid-day Meal Scheme, it is only southern Orissa where the performance in reaching the poor and nearly-poor is worse than in the rural all-India situation. Given the extent of attention paid to the problems of

Table 63: Poor and Nearly Poor Households who have Ration Cards or Benefited from Various Schemes in Rural India and Orissa (2004-05)(in %)

Region	Poor Households				
	Ration card	Food for work	Annapoorna	ICDS	Midday meal
Orissa	71.3	14.5	1.3	18.4	31.4
All-India	80.0	4.2	1.2	8.8	33.2
	Nearly Poor Households				
	Ration card	Food for work	Annapoorna	ICDS	Midday meal
Orissa	68.3	5.7	1.7	12.4	24.7
All-India	82.9	2.8	1.1	6.7	29.5

Source: Calculated from NSS 61st Round, 2004-05 Unit Level Data.



poverty and hunger in southern Orissa, this is not a surprising result. But the poor result for the schools' scheme shows that there is not much connection between coping with food insecurity and development. The continuing reports of crises and hunger in the old KBK districts could mean that the food-based interventions work more as hand-outs, without transforming the economic base of the area (See Table 62 and Map 26).

The relatively low reach of food-based programs to the poor, as revealed by NSSO figures, should be contrasted with the generally high reach shown by official government figures. The reach of the ICDS and Mid-Day Meals in schools are routinely reported by government agencies to be close to 100 percent.

8.2.2.1 Improving Performance

One of the main avenues of enabling the poor to access food is through the Public Distribution System (PDS). The role of the PDS becomes particularly important in a situation of rising food prices, as at present. There are numerous inadequacies in the PDS – inadequate coverage of the poor with BPL ration cards (as illustrated in table 63), insufficient grain acquired through the PDS, and so on.

In the lowest consumption (MPCE) class (<Rs. 235), only 49 percent of households are in either Antyodaya or BPL categories. There is obviously a large error of exclusion here. At the same time, there is also an error of inclusion, as 12 percent of the households in the highest consumption class are included in either Antyodaya or BPL (Suryanarayana, 2008).

Along with the above, where we are more concerned with the high exclusion, the extent to which those who use the PDS depend on it for their food purchase is also quite low: just 30 percent of rice and 35 percent of wheat purchased by households in the lowest consumption class is from the PDS (*ibid*).

How to improve the performance of these government schemes? Chhattisgarh state pioneered a system for village women (called *Mithanin* or friend) to monitor development schemes at the local level. Starting from education on health matters, the functions of the *Mithanin* broadened to include monitoring of every government development activity. They took up questions of absentee teachers, pilferage of food meant for Mid-Day Meals and so on. The success of the *Mithanin* program has encouraged the Health Ministry to consider extending it to other states in the country.

In Rajasthan, the Right-to-Food movement has used the Right to Information Act (RTI) for bringing into the open information about government programs. In what are called *Jan Sunvais* (public hearings) with the slogan '*Hamara Paisa, Hamara Hisaab*' (Our Money, Our Account), details of the schemes have been brought into the open. This can be useful in building public opinion and mobilizing the community against corruption in government schemes.

There is an important role for political mobilization of the poor in improving implementation of the ICDS, MMS, NREGS and other such schemes. Implementation of these schemes has generally



been decentralized down to the panchayat level. But panchayats can be corrupt and dominated by the local power-brokers. A pilot social audit held in Balangir in November 2001 showed substantial and relatively open corruption at the panchayat level (de Haan and Dubey, 2005, fn. 39, p. 2329). Studies in other states have shown that when women are in panchayats, or lead panchayats, the panchayats perform better in administering food-related interventions. In IFAD projects in Andhra Pradesh too, it was observed that women's SHGs performed better in undertaking small infrastructure projects than those managed by men and saved more money for the community than the latter.

The contribution of the PDS in promoting food security is well covered in the extensive literature on the subject. But a study by Jos Mooij points out that the supply of cheap grain for BPL households has made running a PDS highly profitable, as cheap grain can easily be diverted into the open market or sold to APL (above poverty-line) households. More recently, the Central government is reported to have pointed out to the West Bengal government that there has been diversion of cheap PDS grain to the Bangladesh market. Many newspaper reports point out that even in the midst of starvation, the Food Corporation of India's godowns remain full of grains. If there is insufficient purchasing power with the poor in a district, even the supply of grain at subsidized prices is unlikely to be accessed by the poor, and there will inevitably be a tendency for this grain to flow to markets, whether within the locality or outside, where prices are higher (Jos Mooij, 2001).

The problem of diversion of foodgrains increases when there is a partial subsidy, such as with the PDS. Grain is supplied at a lower than market price, but the buyer has to have the money to buy the lower-priced grain. If the person just does not have the required money, or does not have it at the time the grain is made available, the person cannot benefit from the subsidy.

The above points to two critical points in the functioning of the PDS: First, the dual price system that it brings about, encouraging diversion of foodgrain from the lower BPL price to the higher open market price. Second, the inability of many poor households to utilize their quotas because of inadequate purchasing power.

The abolition of dual pricing would reduce the usual diversion problems, but there would still be the problem that now exists of the poor not being able to utilize the subsidy. A direct transfer would make sure that the person/household actually benefited, since it is not conditional on the beneficiary having to provide some collateral amount.

Another way of enabling the poor to acquire their public entitlement of grain would be to provide work, such as through the NREGS, which allows the poor to acquire the money needed for purchase of food. A combination of a coupon system with the NREGS could improve the functioning of the PDS system. Such a system would have the added benefit of increasing the monetization of the rural economy and improving the functioning of the bank and/or post office systems.



The above-mentioned food-based schemes are meant to meet the needs of shorter-term or even transient (seasonal) food insecurity. By increasing the quantities of public entitlements to food they can deal, to an extent, with immediate problems of hunger. If these foods are fortified, or supplements given as in the ICDS schemes, protein and fat deficiencies could also be temporarily tackled. But any solution to food insecurity requires an increase in the regular access to food in sufficient quantity and quality. This requires an increase in the production and earning capacity of the households and individuals too, given that there are gender-based discriminations in the distribution of food and allied health-care services within households. It is important, therefore, that food schemes be linked with development activities.

8.2.2.2 Increasing Wages and Employment

The critical importance of wage incomes in ensuring access to food is demonstrated dramatically through the experience of Kalahandi. The district of Kalahandi in Orissa, notorious for persistent and acute hunger, was a net exporter of paddy all through the 1980s and 1990s (Bob Currie, 2000), as people were too poor to afford to purchase it. Another study shows that Uttar Pradesh is a food surplus state, but malnutrition rates are high. The abundance of food does not translate into access to food for all, because widespread poverty constrains the purchasing power of the poor and other vulnerable sections (Nisha Srivastava, 2003:257). Taking another example, Kerala, is highly deficient in food

Box 8: Food insecurity persists, despite district production greater than requirement

The FAO FIVIMS study of Orissa conducted by D.J. Research and Consultancy (n.d.) comes to the following conclusion about the connection (or, non-connection) between local production and food security.

'At district levels it is interesting to observe that food availability from internal production in the so-called distressed districts was much higher than food ... requirements. Availability of food in Nawarangpur, Nuapada, Sonepur, Balangir, Boudh, Kalahandi, Koraput, Malkangiri, mostly comprising the KBK districts, is much above their respective requirement level [calculated as amount of food required to meet per capita calorie consumption as per NSSO 55th Round]. This is mainly due to low consumption demand of poor people whose income is low. On the contrary, the perceived well off districts of Balasore, Bhadrak, Cuttack, Dhenkanal, Jagatsinghpur, Jajpur, Khurda and Sundargarh are food deficit in most years due to level of food demand being higher than the within district food production,' (D. J. Research and Consultancy, n.d., p. 21)

production relative to consumption of food. But that says nothing at all about food security in Kerala. The *Food Insecurity Atlas of Rural India* (MSSRF/WFP 2001, Map No. 2.1) lists Kerala as the only 'extreme deficit' state of India in terms of the 'Deficit of cereal production over consumption.' But in the overall food insecurity map (Map no. 5.1) Kerala is listed as 'Moderately secure'. It is a moot point whether the 'extreme deficit' in cereal production status of Kerala is responsible for it being only 'moderately secure' and not 'secure.'



Box 9: Indebtedness among Farmers in Orissa

The decennial *All-India Debt and Investment Survey* (AIDIS) and the *Situation Assessment Survey of Farmers*, both conducted by NSSO, bring out the situation of farmers' indebtedness in India. Incidence of indebtedness was found to be higher in states with input-intensive or diversified agriculture. Thus, agriculturally developed states had much higher incidences of indebtedness as well as average debt per farmer, as compared to the eastern and central states. Further, the incidence of indebtedness and the share of institutional finance increased with the increase in size of land holding.

However, indebtedness for productive purposes was found to be higher in states with higher incidences of indebtedness and lower in states with low incidence of indebtedness. For instance, in Orissa incidences of loans for unproductive purposes for self-consumption, marriages and ceremonies was found to be higher than the national average. Nevertheless, with an average loan amount per household for Orissa being one of the lowest in the country (Rs. 5871 as compared to national average of Rs. 12,585, the highest being Rs. 41,576 in Punjab,) the state stands at a static position in agricultural scenario with low absorptive capacity. This also shows a very low level of investment in agriculture on the part of the workers and that the level of agricultural development is at a very nascent stage. This has amply got reflected in the level of agricultural yield and per capita and gross production as discussed earlier.

Source: Report of the Expert Group on Agricultural Indebtedness.

Provided areas are not cut off from the markets, the supply of foodgrains, even in deficit areas, can be taken care of by market forces, supplemented by the PDS. What are needed are interventions to reduce transport and other transactions costs, and thus improve the functioning of markets and the PDS and, most of all, measures to increase incomes. In particular, the food insecure often have to operate in inter-linked markets (e.g., selling in advance in order to secure grain on credit), and intervention is needed to help the poor break the inter-linking of the credit and product markets.

The critical role of access is brought out by the Box 8, which shows that districts in Orissa that are food insecure produce more food than is required for all inhabitants to receive the requisite number of calories per day. But, of course, production in a district does not mean that it is equally distributed among all classes of cultivators or that the agricultural and other labourers in the district receive enough in wages to secure the required amount of food. This box only reiterates the point that production in a district (or state or even the country as a whole) does not mean adequate access by the poor.

Wage rates for casual labour employment are extremely low in the state. All food insecure districts, except Malkangiri, have low levels of wages. The highest wage rate is found in Bhadrak, which itself is less than Rs. 60 per day, far below the National Minimum Wage of Rs. 66. In fact, Orissa, along with Madhya Pradesh, has the highest percentage of casual non-agricultural workers receiving wages below the minimum wages in both rural and urban areas. The state of agricultural labourers, who form almost the entire proportion of rural casual labourers, is much worse. Almost all the rural agricultural labourers in Orissa get wages far below the norm (97 percent); if we take the NCRL¹ as the norm (Rs. 49), 74 percent of the agricultural labourers come below this norm as well (NCEUS 2007). Low wage rates and thus low incomes, lead to lower levels of consumption. This coupled with

1. National Commission on Rural Labour. All wages at 2004-05 level.



a higher dependency ratio means lower consumption for the entire family resulting in food insecurity.

At the same time, possession of even a small patch of land can improve the food security position of those who are now landless. The Planning Commission points out in the Approach to the 11th Plan, ‘... there is clear evidence that even a tiny plot that provides livelihood fallback for families to stay behind and children to go to school as men migrate, can be a powerful enabler for the poor to diversify occupations without jeopardizing the capability of future generations. There are also a number of examples where women have been able to cultivate their tiny plots co-operatively and thereby secure required economies of scale. Such efforts must be supported as also attempts to provide a homestead plus a little more to all the poor’ (Planning Commission 2007: 5.3.20).

Box 10: NREGA and Food Security

A recent study done by the Institute for Human Development to evaluate NREGA's performance in Bihar and Jharkhand indicates that beneficiaries of the scheme are spending a major part of their earnings from NREGA on food-related consumption items. In Bihar, 67 per cent of the earnings from NREGA is being spent on food while in Jharkhand, the percentage is 71. However in case of Scheduled Tribes and Scheduled Castes, who are generally more vulnerable to food insecurity because of low and irregular income, the spending on food from earnings received for NREGS work is more than the state average. Given the findings of the study, one can suggest that NREGA can be a safety net for the food insecure population.

Percentage of Income from NREGA Spent on Food and Related Items

	Bihar	Jharkhand	Total
Upper Caste	51.29	89.16	73.31
OBC I	62.62	68.13	63.64
OBC II	72.62	68.69	71.28
SC	68.7	75.68	69.65
ST	84.94	66.24	66.85
Total	67.3	71.31	68.6

Source: Understanding the Process, Institutions and Mechanism of Implementation and Impact Assessment of NREGA in Bihar and Jharkhand, *Institute for Human Development, Delhi, March 2008.*

Districts with higher proportions of agricultural labour are also the ones with higher food insecurity, such as the districts of Gajapati, Ganjam, Bhadrak and Jajpur. This will suggest that both employment schemes and distribution of land to the landless are relevant to improved food security in these districts. Employment schemes will provide immediate income and thus improve food security. The point, however, is to link those employment schemes with measures that will increase the productive capacity of the local economy. With most of the areas of the food insecure districts being single-cropped, there is clearly room to use employment schemes for building irrigation, water-retention structures and infrastructure in general.



National Rural Employment Guarantee Scheme (NREGS)

The National Rural Employment Guarantee Scheme (NREGS) has been devised as a public work program and has a key role to play in providing assured employment to one person in each household for 100 days per year. The major objectives of this scheme are to provide income security through employment guarantee; reduce/check distress migration from rural to urban areas; and, in this process, also to create durable assets in villages, leading to overall development of the rural economy; and empowerment of rural women through the opportunity to earn income independently and to participate in social groups.

NREGS is based on the National Rural Employment Guarantee Act (NREGA). The Act came into effect in 200 selected (backward) districts of the country on February 2, 2006 and was extended to 130 more districts from April 1, 2007. Now (April 1, 2008) the Government of India has decided to extend NREGA to all rural areas of all districts of the country. The Act provides a legal guarantee of 100 days of wage employment in a financial year to one person of every rural household whose adult members volunteer to do unskilled manual work at the minimum wage rate notified for agricultural labour prescribed in the state or, in the event that employment is not provided, to give the person an unemployment allowance.

The overall performance of NREGA is quite impressive. Of the 31.1 million job card holders who demanded work under the scheme, 30.8 million have been provided employment. As per the information reported on the government website, the scheme has therefore been able to provide employment to almost all the people, among the job card holders, who demanded work. Under this scheme, people are mainly provided with work related to creating or improving rural connectivity, water conservation, land development, drought-proofing, micro-irrigation, renovation of traditional water bodies, land development etc.

Table 64: NREGS Performance, April 2008

National Bulletin – All-India	
Households Demanding Employment	31.1 Million
Households Provided Employment	30.8 Million
Persondays [in Million]:	
Total	126.85
SCs	334 [26.33%]
STs	367.4 [28.96%]
Others	567.1 [44.71%]
Women	879.7 [69.35%]

Source: <http://nrega.nic.in>.



A large number of the beneficiaries under the scheme are women, close to 69 percent of them as on 3 April, 2008. As pointed out earlier in this report, women spend more of their income than men on essential consumption needs of the family, education of children and healthcare requirements, all of which are supportive of improving the nutritional status of their households.

Table 65: NREGS Performance in Orissa, April 2008

Households Demanding Employment	0.97 Million
Household Provided Employment	0.94 Million
Persondays [in million]:	
Total	31.1
SCs	7.4 [23.8%]
STs	13.1 [42.26%]
Women	11.9. [38.31%]
Others (non-ST/ST)	10.5 [33.94%]
Total Expenditure (Rs.million)	4357.8

Source:<http://nrega.nic.in>.

NREGS: ORISSA

In Orissa, even more than at the all-India level, there is an over-representation of STs and SCs among those seeking employment under the NREGS. But the proportion of women in this employment is much less than at the all-India level. Relaxing this condition and considering each individual and not just each household as requiring work and income, is likely to increase the proportion of women seeking employment. But the large proportion of men seeking NREGS employment in Orissa certainly shows that the scheme must have had a substantial impact on distress migration (since it is unlikely that women will migrate, leaving men and children behind).

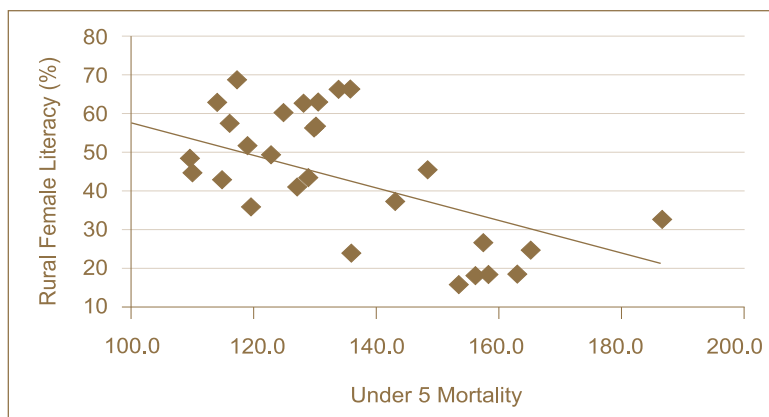
Reports show, as will be expected, that there is corruption in the running of NREGS (all, for example, CSE, 2008) this could be reduced through organization of the workers in these schemes, use of the Right to Information (RTI), etc. Such measures will increase the impact of the scheme on incomes and food security. Nevertheless, there can be no doubt that NREGS, by increasing the incomes of the poorest, is already having a major impact on food security.

8.2.2.3 Improving Gender Relations

The results of our analysis show that female literacy in rural areas is the most significant factor determining food security of the rural population. This can be corroborated by the fact that all the districts in the most food insecure category rank very poorly in terms of rural female literacy (Figure 20 shows a clear correlation between an increase in rural female literacy and a reduction in under-five mortality in Orissa district). Thus, it is imperative that girls' literacy be prioritized and all barriers to their access to



Figure 20: Association between Rural Female Literacy and Under-five Mortality in Orissa



Source: Census of India (2001) and Census (2001) computed by IIPS.

Box 11: Female Literacy: The Pivot for Reducing Food Insecurity and Child Mortality

Recent research findings from 35 demographic and health surveys have brought out that children of mothers with no education are more than twice as likely to die or to be malnourished compared with children of mothers who have secondary or higher education. Further, mothers with limited literacy and educational skills are much less likely to receive trained support during pregnancy and childbirth. In Nigeria, for instance, only 15 percent of births amongst uneducated women are assisted by trained medical personnel, compared to 56 percent of births among women with primary education and 88 percent among women with higher education.

Source: Save the Children, 2006.

education be effectively tackled, taking care to see that girls from the poorest and most marginalized communities get priority treatment (also see Box 11). This should be coupled with the provision of quality education.

The food insecure are usually thought to be non-bankable or not credit-worthy. But they do access credit from moneylenders, at very high effective rates of interest of above 10 percent per month. They frequently end up in inter-linked market transactions, selling their advance labour or non-timber forest products (NTFP) for much less than market prices, with implicit interest rates for credit far above those in the credit market alone. Such inter-linked market transactions often occur at times of acute distress, such as when medical emergencies require immediate credit, or when drastic falls in the ability to acquire food lead to a need for credit. In such situations, if credit were available, these inter-linked market transactions could be avoided.

It hardly needs to be repeated that financial services for the poor, both savings and credit, are required, both to enable consumption smoothening and to utilize market opportunities. Whether through the Indian Self Help Group (SHG) model or the Bangladesh Grameen Bank model, micro-financial services need to be provided. Through an increased use of educational facilities and credit to utilize growing



market opportunities, micro-finance programs can link increased food security with development. The food security impact of micro-finance is also increased by its contributing to enhancing women's agency in the household.

In a more general sense, what can be said is that women's empowerment is directly related to improved food security. One key factor in empowerment can be the acquiring of land rights. The Orissa State Government's Draft Agricultural Policy of 2007 also points to the importance of securing women's right to land and to provide women with access to training for new technologies, crops and finance.

8.2.2.4 Scheduled Tribes

Another policy implication from the indicators used for enhancing food security is the betterment of the plight of the vulnerable populations, the Scheduled Tribes and Scheduled Castes. All the food

Box 12: The Forest Rights Act

The Scheduled Tribes and Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 was promulgated towards the end of 2006 with a view to correcting the injustices done to the forest dwelling Scheduled Tribes. The Act recognizes and vests forest rights and occupation in forest land in forest-dwellers who have been residing in such forests for generations but whose rights could not be recorded. It also provides for recognition of forest rights of other traditional forest-dwellers provided they have primarily resided in and have depended on the forest or forest land for *bona fide* livelihood needs for at least three generations (25 years each) prior to 13 December 2005.

The Act has a number of significant provisions in the interest of the tribals and forest-dwellers. For the purpose of recognition of forest rights, the Act provides for a ceiling on occupation of forest land to the area under actual occupation not exceeding an area of four hectares. Importantly, no member of a forest-dwelling tribe or traditional forest-dwellers shall be evicted or removed from forest land under one's occupation until the recognition and verification process is completed. Besides, right of ownership-access to minor forest produce which has been traditionally collected within or outside village boundaries has been recognized. With implications on Rehabilitation and Resettlement (R&R) issues, the Act recognizes the right to *in-situ* rehabilitation, including alternative land in cases where the dwellers have been illegally evicted or displaced from forest land of any description without granting their legal entitlement to rehabilitation, prior to 13 December 2005. The Gram Sabhas have been designated as the competent authority for initiating the process of determining the nature and extent of individual or community forest rights (Government of India, 2007a).

The Act should go a long way in protecting the rights of the forest dwellers, particularly the tribal population and help in building up their livelihood, at the same time contributing in terms of conservation of forest resources. However, it has been criticized on a number of grounds. One, the Act requires the target population to live 'in' the forests, which could be interpreted in terms of areas 'recorded' as forests. This deems to exclude a vast majority of those forest-dwellers who live in areas recorded as revenue lands but cultivate forest lands and use forest resources. Secondly, investing Gram Sabhas with the power to decide the rights and grant permits may open the doors for corruption and abuse of power, as landownership rights are seldom documented in such areas. Importantly, the Act does not adequately answer how the vital balance between tribes and forest systems will be maintained. There are also concerns of the Act's impact on the Wildlife Protection Act, passed in the same year.

Despite these criticisms, the very fact that the intent is to provide landownership to the original inhabitants means that the equity issue gets addressed to a great extent. It is expected that the ownership will lead to better forest conservation and hence more environmental sustainability.

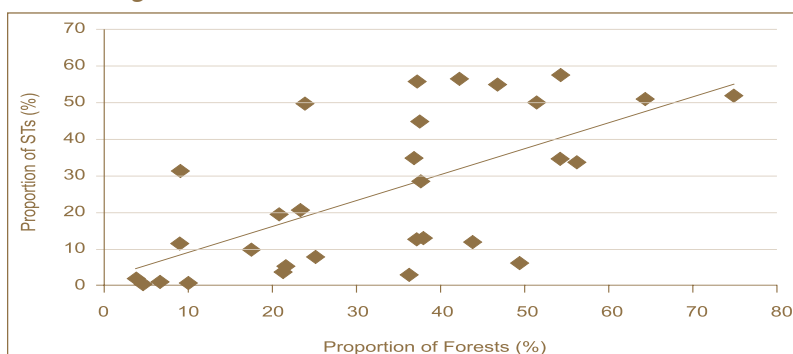


insecure districts in Orissa are dominated by a higher proportion of Scheduled Tribes who form the most vulnerable section due to their location specificity and remoteness from facilities and amenities. Among the food insecure districts, Kalahandi (52 percent) and Nuapada (50 percent) have about half their population as SCs/STs. In all other insecure districts, the SC/ST population is more than 60 percent, and even goes up in some cases to more than 80 percent of the population; while all the food secure districts have a low proportion of ST population. Thus, it can be said that the districts dominated by ST population are the ones that are food insecure. This points to the political marginalization of the ST population and the necessity of dealing with it.

It will be observed that like most states, the tribal population in Orissa also has a close spatial correlation with the forests (Figure 21). These Scheduled Tribes, particularly the primitive tribal groups, have faced a history of discrimination, and due to their locational disadvantage, they have remained deprived of facilities. The Forest Rights Act seeks to address such groups (see Box 12).

The high level of forest areas in most food insecure districts shows the importance of a proper development policy for forest-dwellers. The Forest-Dwellers' Rights Act, granting tenurial security, in conjunction with the Panchayats (Extension To The Scheduled Areas) Act (PESA), and accepting the role of Gram Sabhas and Gram Panchayats in managing forest resources, should help in framing and implementing appropriate development policies in the food insecure forest areas of the state.

Figure 21: Association between Forests and STs



8.2.3 Enhancing Absorption

Increasing the nutrient intake of the poor is not the end of the story of food security. It is also necessary that the body be able to utilize the increased intake of nutrients. This depends closely on complementary measures, such as access to safe drinking water and hygienic sanitation. These two inputs would substantially reduce exposure to water-borne and gastro-intestinal diseases, such as diarrhoea and cholera, which often destroy the benefits of the food consumed. We discuss below measures to improve access to clean drinking water and promote hygiene and sanitation.



Box 13: Innovative Food Security Initiatives: The Food for Work Programme in Tribal Development Projects

Blessed with bountiful natural wealth and rich in human resources, the forested and tribal- dominated areas in the country are, nonetheless, among the poorest and severely food insecure areas. They are characterized by degraded natural resources, stark poverty, chronic hunger, high indebtedness and heavy out-migration. For the sustainable development of some of these regions, Tribal Development Programmes are being implemented in the states of Chhattisgarh, Jharkhand and Orissa. These were launched by the state government with the objective of ensuring household food security and improving livelihood opportunities based on the sustainable and equitable development of natural resources. The programmes are supported by the International Fund for Agricultural Development (IFAD) and the World Food Programme. The latter provides food assistance for a food for work component.

Given the abysmal poverty in the area, it is no surprise that the Food For Work (FFW) activity has become enormously popular. Payment for FFW includes a cash component and 3 kgs of grains (earlier pulses were also included). The programme, based on the performance of manual labour, is self-targeting towards the poor. It provides 70 days of work in the lean season when food insecurity is high.

Participatory Processes And Community Ownership

The point of departure in this programme, compared to other government programmes is the philosophy that the poor should be enabled to overcome their own poverty. This principle is woven intrinsically into all processes. To this end the project stresses the participation of the poor, community ownership and capacity building. Food is given to the community and they take the decisions. Inclusion of the most marginalized begins with the planning. All activities are discussed in the Gram Sabha. What activity should be taken up? What are the likely benefits? Who will benefit from the creation of the asset? How many people will get work? All these questions are debated and decided by the community. The project facilitates them in prioritizing, planning and implementing the plans.

The project shows how a simple activity like providing food as wages for work can become a kaleidoscope reflecting all the pulls, pressures, and dynamics of village life. This would not have been the case had it been a top-down programme where people had little or no role in decision-making. That not being the case, and all decisions now being taken in the Gram Sabhas, they have become sites of deep contestation. Valuable lessons in collective decision-making, negotiating, handling conflicts and targeting are being learnt.

The most marginalized are for the first time in their lives finding a platform for articulating their views. It is for this reason, that most community assets created under the programme are located so as to benefit poor hamlets and households and there is a significant impact on the food security of a desperately poor population living in remote and inaccessible areas.

Food for Work Activities

Tribal communities share a symbiotic relationship with forests that are a major source of food, nutrition and livelihoods. Empowering the community to engage in forestry-related activities has led to increase in yields of NTFPs and enhanced food availability.

The list of activities taken up under FFW is very long and, *inter alia*, includes land development, earth-bunding, stone-bunding, gully-plugging, pond construction and restoration, backyard plantations, plant nurseries, digging wells and building canals, trenches and check dams. These activities have helped to irrigate large areas. For the first time people have been able to get a second crop of wheat apart from the single rain-fed crop of rice that they used to harvest earlier. Many farmers have cultivated vegetables for the first time in generations. '*Neither our fathers nor our grandfathers ever cultivated these crops*' they say with obvious pride.

In some villages, as for instance in Semra in Chhattisgarh, under the food for work programme, villagers have almost literally moved mountains: They dug a well that has been lined with massive boulders they hauled from nearby hills. Apart from providing work and food for a large number of the poorest, it has helped ease the problem of drinking water for them and their livestock.



Enhanced Production and Productivity

There has been a big boost in production in many villages. In village Sagasai in Jharkhand for instance, paddy production takes place by the traditional 'broadcast' method. However, as a result of new sources of irrigation and water-harvesting, paddy production through transplantation has become possible. This has doubled yields, enhanced incomes and ensured food security.

Demand-driven approaches that give play to people's initiatives throw up as many diverse ways of doing an activity as the activities themselves. They draw on people's intuitive knowledge of local conditions, their creative urges and their innate skills in a way no top-down programme can. In village Ghangari, in Chhattisgarh, bunding was taken up around fields of the poor. In addition, they had the innovative idea of planting *arhar* (a pulse rich in protein) on the bunding. This not only utilized the land which would otherwise have gone waste, but the roots of the plant also strengthened the bunding which often gets washed off in the rains, because the fields are situated on a slope.

Impact on Migration and Indebtedness

Ask anyone what has been the impact of the Food For Work programme, and if the first answer is 'people do not go hungry anymore', the second will certainly be, 'people have stopped migrating for work'. Migration has stopped almost totally, particularly distress migration to far-off areas. In Ranchi, the capital city of Jharkhand, it is tragic, if common, to see hordes of adolescent tribal girls standing by the main square, waiting for labour contractors who entice them with promises of employment. In project areas, migration of adolescent girls from the Ho tribe used to be a common phenomenon. This has almost stopped now. The impact has not been even across the project areas, but there is little doubt that it is one of the most important positive outcomes of the programme.

The other significant impact has been on indebtedness. In fact, the main 'casualty' of the project has been the moneylender. Self-help groups (SHGs) have mushroomed in the project areas and as their lending operations expand, the business of the moneylender has been shrinking.

Strengthening of Local Institutions

The most intangible, but the most critical impact of the Food For Work programme, and one that holds the promise of sustainability, has been the strengthening of people's grass root level institutions; particularly the Gram Sabha and SHGs. As one young man in a village in Ranchi said: *'Earlier our village assembly used to meet only for settling disputes between families, or for religious purposes, but never to discuss development issues. Now we regularly meet to discuss what we should do for the progress of the village. Very often women outnumber men in the meetings.'*

A woman in Kalahandi district of Orissa said, *"Initially, few people would come to the project meetings; in fact meetings frequently had to be adjourned for lack of a quorum. Now that people are seeing the benefits of the programme, the attendance has swelled."*

The lessons learnt by the village community in decision-making, handling, distributing and monitoring the food for work activity has had visible positive spin-offs on other programmes. The impact on improved functioning of the ICDS and schools, for example is in evidence in several villages. In a village in Koraput district in Orissa, the women say, *'the anganwadi worker used to come to the centre only once a week. Now since the OTELP (Orissa Tribal Empowerment and Livelihood Project) started, she has been coming regularly because she knows she is accountable to the Gram Sabha'.*

Women's SHGs have become vibrant vehicles of change. They are empowering women in many remarkable ways. For one, they are helping women to become financially sound through income generating activities. The enhanced availability of water as a result of FFW activities has enabled them to take up diverse income-generating projects. Some women have taken up vegetable cultivation; others are engaged in aquaculture. At the same time, SHGs have helped women develop confidence to challenge regressive social norms and attitudes.

Source: Srivastava, N. (2006).



8.2.3.1 Clean Drinking Water: Rural Water Supply

Accelerated Rural Water Supply Programme (ARWSP)

The main objective of the ARWSP is to provide potable drinking water by way of installing tube wells, sanitary wells and piped water supply projects in rural areas. For implementation of Rural Water Supply Schemes, the Government of India provides funds under the ARWSP.

Swajaladhara

The Rural Drinking Water Supply Programme was launched in the state on 25 December, 2002. The purpose of this scheme is to ensure community participation and to shift from a supply-driven to a demand-driven approach. The scheme envisages 10 percent of the capital cost of the project to be borne by the community along with the responsibility for the operation and maintenance of the water supply projects, and the remaining 90 percent of the capital cost to be borne by Central Government through the District Water Supply and Sanitation Mission.

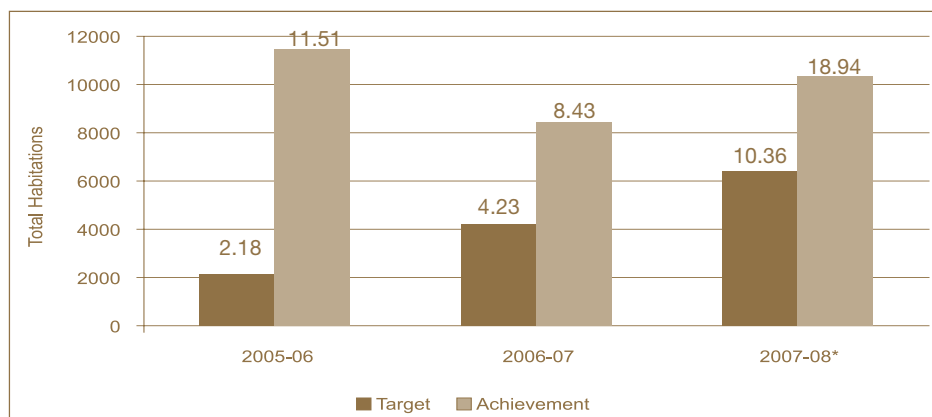
Bharat Nirman: Rural Water Supply

Rural water supply is one of the six components of Bharat Nirman.

The norms for coverage under Rural Drinking Water supply are:

1. 40 litres per capita per day of safe drinking water for human beings.
2. One hand pump or stand post for every 250 persons.

Figure 22: Total habitations covered under Bharat Nirman Programme (Rural water) in Orissa: Target and Achievements – 2005-2007



* Figures up to March 2008

Source: Ministry of Rural Development, Government of India.



Box 14: Meeting the Nutritional Needs of Vulnerable Groups

Infants and Young Children

According to the National Family Health Survey 3 (NFHS-3, 2005-06), in India 40.4% and 44.9% of children under 3 years of age are underweight and stunted, respectively. The prevalence of underweight and stunting continually increases up to the age group of 18-23 months. This indicates that there is need for improvement in complementary feeding practices, and in the quality of complementary foods fed to infants and young children. Besides the high rates of malnutrition, the infant mortality rate is also quite high at 57 per 1,000 live births.

During the first two years of life, significant cognitive development and physical growth occurs that requires adequate nutrition as well as good care practices. Damage that may occur at this early age is often irreversible and has lifetime consequences. Therefore, it is of critical importance that children receive proper nutrition in the first few years of life.

In order to address the prevalence of widespread malnutrition and the high infant mortality rate that impede human development, the United Nations World Food Programme (WFP) is developing a low-cost 'ready-to-use supplementary food' (RUSF). The main ingredients in the ready-to-eat food will be cereal, oil, sugar, pulse, peanut paste and milk powder. In addition, the ready-to-eat food will be fortified with an array of micronutrients and will be packaged in individual hygienic serving sachets.

The food will be rigorously tested in a laboratory to ensure that it is compliant with internationally accepted standards. Next, acceptability trials will be carried out to determine how suitable the product is for the targeted beneficiaries. Finally, pilot distribution of the RUSF will be through the Integrated Child Development Services (ICDS) to infants and young children aged 6-24 months living in Nabarangapur District, Orissa. During the pilot distribution, an efficacy study will be conducted to assess the impact on the growth and micronutrient status of children receiving the RUSF compared to children receiving other foods.

3. The water source should exist within 1.6 km in the plains and within 100 meters elevation in the hilly areas.

Orissa has made remarkable strides in access to safe drinking water under the Bharat Nirman scheme (Figure 22). In the last three years, it has covered almost 40,000 habitations, which is more than twice the target figure of around 17,000 habitations. Thus, Orissa contributes more than 15 percent of the total habitations covered under the scheme all over the country. While the achievement for the country as a whole has been around 92 percent, for Orissa, as already noted, the achievement is more than twice the target. One reason for this remarkable achievement can be attributed to the fact that the Bharat Nirman scheme in Orissa has not covered the 'uncovered habitations'. The success rate in terms of uncovered habitations is less than 75 percent in the rest of the country. However, in the case of Orissa, such habitations have not been included in the target. This is surprising, given that a considerable number of villages do not have access to safe drinking water, as we have already seen from census data.

One factor in food absorption, besides the above-mentioned factors of improved water and health facilities, is that of nutritional practices. Nutritional practices here refer to those inputs (e.g. proteins or micro-nutrients) that are both available and accessible, but not consumed in desirable quantities; it also refers to behavioural practices (e.g. breastfeeding) that are not practiced as required. But as the widespread problem of under-nourishment in India shows, nutritional problems affect not just the



Box 15: Innovative Schemes for Ensuring Nutritional Security

The Department of Women and Child Development is the nodal agency for the formulation and execution of programmes directed towards the holistic development of women and children. The department also aims at implementing different social welfare schemes meant for persons with disabilities, the old, infirm and indigent persons. Within the purview of the Department, a number of innovative schemes are being executed under the larger aegis of the Integrated Child Development Services programme:

1. *Kishori Shakti Yojana*: The scheme aims at improving the nutritional, health and development status of adolescent girls (11-18 years), promote awareness of health, hygiene, nutrition and family care, link them to opportunities for learning life skills, going back to school, help them gain a better understanding of their social environment and take initiatives to become productive members of the society. The scheme is currently being executed in all the states of the country covering a total of 6118 blocks of which 326 blocks are in Orissa.
2. *Udisha*: In technical collaboration with UNICEF, the scheme envisages a spectrum of locally relevant training interventions for achieving development goals for women and children - rather than training only ICDS functionaries. It lays new emphasis on decentralized quality improvement processes, through state and district training plans of action, guided by inter-sectoral national/state training task forces.
3. *Swayamsiddha*: This is an integrated project for the empowerment and development of women based on the formation of women into Self Help Groups (SHGs) with emphasis on converging services, developing access to micro-credit and promoting micro-enterprises.

category of those with severe problems of food security, but also those with reasonable levels of food security, in terms of their consumption of adequate food and sufficient nutrition. The Indian experience of the last 15 years shows that despite the reduction in the incidence of poverty, there may not be a corresponding improvement in the nutritional indicators of a large section of the population (see Box 14).

It is interesting to note that Vietnam in the period 1992–93 to 1997–98 had a similar experience: a sharp fall in poverty without a corresponding reduction in under-nourishment. This, however, changed in the period 1997–98 to 2003–04, when there were sharp declines in both poverty and under-nourishment. This, as argued in Vinod Mishra and Ranjan Ray (2007), was brought about by a combination of policy intervention through information campaigns to promote desired changes in dietary patterns, and direct nutrient enhancing programs. All this took place in a situation of increasing literacy and educational attainment, which would be expected to generally increase nutritional awareness.

India has programmes of providing nutrition supplements, eg. through ICDS programs of nutritional supplements. Adequate diversification of food to include superior calories such as proteins can be promoted through information campaigns along with providing supplements in processed foods, such as *atta* (see Box 15). There is clearly need for an improvement in nutritional practices even among those who can afford to acquire the right types of food.

9. Conclusion: Towards a Food Secure Orissa

There are two ways in which one could go about addressing food insecurity, particularly in the context of meeting the MDG goals of reducing by half the incidence of child malnutrition, defined as children under five who are underweight. One could target those who are just below the international weight norm, and undertake special interventions to bring them up to the norm. In this manner the state could meet its MDG target of reducing by half the incidence of child malnutrition.

Another approach would be to target the most severely under-nourished populations, both by region and by social class, including gender characteristics. This would be amply justified on moral grounds - that those who are the most deprived should receive the most attention in any use of public money. It would also be justified on economic grounds - that at the lowest levels of nourishment, the very ability of adults to work and of children to learn, are most adversely affected. An improvement in nutritional status would increase the productivity of working adults (or working persons, given that children also work), thus yielding an immediate economic benefit. An improvement in the nutritional status of school-going children would increase their learning capacity and thus be an investment in the future. Finally, an improvement in the nutritional status of the most under-nourished mothers is a gain not only for them but would also have inter-generational benefits in reducing the incidence of low-weight births.

The analysis in this report shows that ensuring food security and improving nutritional status is a challenge for the state as a whole. The identification of certain districts for priority action does not mean that either resources or efforts to bring up all districts can slacken; but only draws attention to the need for more inclusive growth efforts and the special efforts needed to bridge the divides between different regions and districts of the state.

The analysis of the report has yielded the districts shown in Table 66 as requiring special attention for food security interventions.

Table 66: Priority Districts for Food Security Intervention

Eastern Ghats	Northern Plateau
1. Kandhamal	1. Keonjhar
2. Malkangiri	2. Sundargarh
3. Rayagada	
4. Nuapada	
5. Koraput	
6. Kalahandi	
7. Boudh	
8. Nabarangpur	
Coastal Plains	Central Table Land
1. Gajapati	1. Sonepur
2. Ganjam	2. Bargarh
3. Bhadrak	3. Sambalpur
4. Jajpur	4. Balangir



The districts with extremely and severely food insecure FSO status should be prioritized for developmental intervention towards enhancing food security. All the districts in the eastern ghats region fall in the category of most food insecure districts. The region is largely constituted by the erstwhile KBK districts. Some districts from the relatively better-off coastal region that lie adjacent to this region also show poor food security and have been included in the list of priority districts.

Thus, food security measures need to be focused towards the region that forms a contiguous zone of food insecurity.

Within this zone of food insecurity, there is a further group of four districts which require even more focused attention. These are the four districts that rank as Extremely Insecure: the districts of Kandhamal, Malkangiri, Gajapati and Rayagada.

Along with the above, our analysis reveals that areas with a high proportion of Scheduled Tribes are more prone to be food insecure. They are forest areas and point to the importance of a development policy for forest-related populations.

With a high proportion of agricultural labourers and Scheduled Castes in Orissa, it is necessary to pay attention to increasing employment and wages, including through non-agricultural development. At the same time, provision of even a small plot of land can substantially increase the food access of the landless.

The analysis of the FSI and the related Principal Component Analysis (PCA) points to the following areas/sectors that require priority intervention:

- Women's literacy, which can be taken as a proxy for women's empowerment;
- Irrigation; and
- Infrastructure

Interventions in the above areas are issues for development policy and it is necessary to explore how food-based schemes can be linked with development.

9.1. *Linking Food Programmes and Development*

How can food-based schemes be linked with development? In the case of the Mid-Day Meals Scheme in schools, there is already a link with development. Improved school attendance is of benefit to the individual and her household in terms of an increase in potential future earnings. A reduction in illiteracy also provides a social benefit to the village or relevant area, as the quality of the workforce goes up and the health and hygiene behaviour of the villagers improves, causing improvement in absorption of food. Improved school attendance is also beneficial in enabling migration to better urban livelihoods than would be available to illiterates.



At very low levels of nutrition, any improvement in nutrition would increase the productivity of the individual. With regard to mothers there is the substantial future benefit of reducing the incidence of low birth-weight babies. For those with severe malnutrition, supplementary feeding programmes have a considerable role in improving production capabilities.

But, as mentioned above, the implementation of such programmes, including issues of reaching those with severe malnutrition, depends very much on the demand from the affected persons for these services. In the absence of such demand from the most malnourished, the benefits of such programmes are very likely to be captured by the better-off in the village. Decentralization of the implementation of programmes has to be combined with enhancing the voice of the malnourished in order that the benefits reach the desired persons.

Securing the 'Right to Food' is very much a matter of mobilizing of the concerned persons to secure their rights. The Right to Information (RTI) provides a means that can be used to reveal corruption at different levels. But what is important is the mobilization and organization of the poor or food insecure themselves. Their voice is necessary to make the ending of hunger a part of the political platform of various political parties and civil society organizations, NGOs and Community-Based Organizations (CBOs), including traditional tribal organizations.

NREGA and other food-for-work schemes can be channelized to improve both these key areas of village road connectivity and small-scale irrigation. Village approach roads to main roads, and small irrigation schemes (eg. check dams in valleys, or moisture retention works on sloping lands) can both increase economic opportunities and productivity. Improved roads would also provide better access to both health and educational facilities. Improved roads, including the building of culverts, have a clear impact in improving girls' attendance at schools. Post-primary schooling often involves some travel outside the village, and boys seem to be able to overcome communication problems in attending school; but good roads increase girls' attendance at schools.

The linking of food schemes with infrastructure works for development, however, can be a two-fold process. The manner of implementation of standard infrastructure schemes by line departments can be changed so that the benefiting communities are involved in the implementation of these works. Involving SHGs as contractors of small schemes (minor irrigation, school buildings, approach roads) has been found to result in substantial income benefits for the concerned village. There can also be an improvement in the quality of the work, as the beneficiaries are themselves the implementers of the construction works. Construction with local labour through SHGs will provide substantial income from the implementation of small infrastructure works, besides increasing the knowledge and management capabilities of the communities.

The implementation of infrastructure and related schemes (school feeding) through the community could be expected to provide additional income, particularly in lean periods. Some of it could be used to carry out investments on private lands. Investments in higher-value tree crops (eg. coffee and



pepper, or cashew, pineapples, turmeric, etc.) have been seen to provide substantially higher incomes, in combination with traditional swidden cultivation. But such investment, unlike seasonal swidden crops, is a medium-term investment. Households require security of tenure in order to undertake such investments. The recently-passed Forest Dwellers' Rights Act could provide some security of tenure for these lands.

While security of tenure would allow an increase in investments on land and thus higher incomes, complementary steps need to be taken to enhance women's agency in the household and community. Besides literacy and education, there is also the matter of women's land rights. Among the food insecure, women have high labour force participation, but they do not have ownership rights over the lands on which they work. Women's ownership of land could have a double effect. It could lead to greater productivity and investment by women in land improvement by enhancing their standing in the household; it could also pave the way for women to have more of a say in the disposition of household income - away from wasteful areas (e.g. alcohol and cigarette consumption) and towards more expenditure on food.

Improvements in rural connectivity can improve the terms of access to markets. Security of tenure creates conditions favourable for investment to enhance production or to take up new forms of cultivation. But bringing about changes in production systems also requires an enhancement of capabilities of both women and men. Enhancing capabilities, through rights, access to resources and training, will open the road for building capacity to aspire - the aspirations for a better life exist, but the means or capacity to realize those aspirations is lacking.

Improved communication will also enable rural producers to produce for the wider market, whether regional, national or global. In a relatively open economy, there need not be sole reliance on agriculture as the engine of rural growth. Non-agricultural production for wider markets is also an option. But along with better communications, this also requires a more-educated workforce. A higher level of education would both enable producers to take up opportunities available through connections with the wider economy and also improve the types of jobs they can try to get on migrating. As we have seen earlier, consumption in the better-off districts is probably related to income from non-farm development and to migrants' remittances. This is not to deny the importance of increasing farm productivity in the food insecure districts, but to point out that options are not limited to agricultural development.

Given women's general responsibility for food security in rural areas of developing countries, and given the pervasive gender bias in these societies, the enhancement of agency of the poor, translates particularly into the enhancement of the agency of poor women. Consequently, food security approaches increasingly pay attention to the elimination of gender inequality and to women's empowerment as important preconditions.



Agency of poor women, or of the poor as a whole, is not only a matter of individual agency (which itself might be dependent on collective mobilization) but also of the poor putting their stamp on economic policies. This is necessary in order to bring about the much-needed political will that is often referred to as the missing element for bringing about adequate attention to food security policies. Without adequate political pressure for reform, proper food security policies are unlikely to be adopted. At a country-level, when there are adequate supplies of food to ensure food security for all, why are such policies not implemented? There can be no question that the political mobilization of the poor, through a combination of community-based and civil society organizations, is required for such a food security policy to be adopted and implemented.

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Appendix I: The Right to Food

Along with the change in understanding of the meaning of food security, there has been much discussion on whether there is a right to food. The kind of economic growth that the world has been undergoing has been seen to not automatically 'trickle down' in benefits to all. Even a reasonably high rate of growth, like India's 6 percent or so over the period 1995-2004, has been seen to not bring about a commensurate reduction in the proportion of those who are undernourished. The existence or acceptance of a right to food would make the exertion of pressure to adopt and implement a policy that secures this right more likely. But is there a right to food?

The right to food or 'freedom from hunger' figures in the Universal Declaration of Human Rights (1948). Subsequently the UN General Assembly adopted two covenants in 1966, one on Civil and Political Rights and the other on Economic, Social and Cultural Rights. Besides these covenants, the Convention on the Rights of the Child and the Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW) both considerably strengthened the place of the right to food and adequate nutrition in international law on human rights.

A two-fold distinction is often made between the civil and political rights, on the one hand, and economic, social and cultural rights, on the other (Eide 1999). The first set is said to be 'absolute', and 'immediate', while the second set is considered something relative and to be realized gradually, over time. In a sense this distinction coincides with the Indian constitution's distinction between its 'core' provisions, which are to be realized immediately, and its 'Directive Principles of State Policy', which are programmatic and to be realized over time.

It can well be argued that the civil and political rights are also something that can only be realized over time. Merely putting them into the statute books does not result in their being realized. On the other side, if civil and political rights are held to be the foundation of democracy, one can as well argue that economic and social rights are equally important to democracy. Without economic rights, and not just the right to property, political democracy itself would be a mere shell. The realization of political and economic rights is inter-twined and one set does not have any a priori precedence over the other.

A related distinction is between rights that are respected through non-interference and those that require resources to be realized. The first is like the freedom of religion, or of association, while the right to food would require resources to be realized. Jean Zigler, the UN Special Rapporteur on the Right to Food, questioned the whole distinction between those freedoms that require resources to be realized and those freedoms that do not. The whole machinery of the state, of administration, police, courts, etc. all need to set up, and involve costs, to enable citizens to realize the freedom to religion, or freedom of association, and associated rights. 'Even implementing civil and political rights does in fact imply resources. The cost of setting up and training the police force, military and judiciary to implement international human rights law is not insignificant.' (Jean Zigler, 2002, quoted in FAO, WFS-fyl, Focus on Issues, What is the right to food? www.fao.org)



Thus, rights require state action with regard to the obligations to respect, protect and fulfil them.(Shue, 1980 in Gaiha 2003), which require setting up of administrative, police, and judicial structures to enable rights to be realized. Consequently all rights have a cost in their being realized. And the costs of the right to food may not be as much as they seem, since it is only in certain circumstances that it involves state provision of food (Gaiha, 2003, 4270).

What the acceptance of the right to food does is to focus attention on the necessity of economic and social policy paying attention to the poorest and most marginal. It also takes the debate on rights inside the 'private sphere' to raise the question of women's rights in assuring food to themselves and their children and families. 'The "right to adequate food" may be as much a question of the full realization of the rights of women as of ensuring a bundle of nutrients handed over through food supplement schemes.' (Asbjorn Eide, 1999, 'The right to adequate food and to be free from hunger,' Study on the Right to Food submitted to the ECOSOC, Commission on Human Rights, 28 June, United Nations, New York, (www.unhchr.ch).

Right to Food in India

Earlier, we looked at the status of the right to food and its embodiment in various international covenants. Food policies, however, are critically formulated and implemented at the level of the national state. It is, perhaps, only in the case of 'failed states' that the international covenants can themselves be the basis for action by international agencies. For the most part, and certainly in India, it is through the national state that actions on the right to food are carried out. Of course, this does not mean that some actions cannot be carried out at the international level, as, for instance, by groups representing women or indigenous peoples taking their case for redressal of grievances to their respective international forums in the manner that trade unions also take their case to the ILO.

The establishment of a 'right to food' in India was substantially carried forward by the April 2001 petition of the People's Union for Civil Liberties (PUCL), Rajasthan, (PUCL vs Union of India and Others, Writ Petition (Civil) 196 of 2001) and the orders of the Supreme Court of India in response to this and subsequent petitions. In the context of the then-prevailing drought in Rajasthan, the argument of the PUCL was simple - that Article 21 of the Constitution of India guarantees the 'right to life' and imposes on the state the duty to protect this right to life. In elaborating the right to life, the Supreme Court in past decisions had held that this right also includes the right to live with dignity and all that goes to make this up, including the right to food.

The petition argued that in the context of the drought in Rajasthan, the actions or inactions of the Governments of India and of the State of Rajasthan, constituted a violation of this right to food and, thus, of the right to life. Specifically, the violation of the right to food was seen in two aspects. First, was the failure of the Public Distribution System (PDS), in terms of the exclusion of various Below Poverty Line (BPL) households from its scope. Second, was the inadequacy of the quantities delivered through the PDS as the monthly quota could not meet the household's nutritional standards set by the Indian Council of Medical Research (ICMR).



The PUCL petition also pointed to the inadequacy of government relief works in the Rajasthan drought condition. Thus, it linked the right to access relief works in a drought condition as part of the meaning of the right to food. As the Supreme Court pointed out in a later order, while agreeing with the High-Level Committee on Long-Term Grain Policy (Abhijit Sen Committee), employment generation should be distinct from food delivery: 'This should not, however, undermine the importance of employment and income generation in eliminating hunger and malnutrition' (Supreme Court Order of 2 May 2003).

The different orders of the Supreme Court:

- Established a Constitutional basis for the right to food in terms of the right to life;
- Drew attention to the serious plight of the aged, destitute, etc;
- Stated that where the hungry are not able to buy grain, even at the subsidized price, the relevant governments should consider giving them the grain free;
- Pointed out that 'Plenty of food is available, but distribution of the same amongst the very poor and destitute is scarce and non-existent leading to mal-nourishment, starvation and other related problems';
- Identified the various schemes to operationalize the right to food;
- Changed the status of those who received food or income through these schemes from 'beneficiaries' to 'rights-holders';
- Made the Government of India and the State Governments responsible for securing the right to food through these schemes;
- Placed responsibility on specified government officials (Chief Secretary of the State Governments, District Magistrates) as being answerable for the implementation of the schemes that concretize the right to food, and thus being accountable for failures, like starvation deaths; and
- Established Food Commissioners who would report on and monitor implementation of schemes constituting the right to food.

At the level of rights this is a reasonably comprehensive scheme with rights, ways of achieving them, responsibilities for achieving them, all fairly well specified. Given the fact that there is a clear perpetuation of both endemic starvation and frequent bouts of acute starvation, it is necessary to see how to link food security measures with development. Rights are critical in establishing the obligation of the state to provide a means of realizing those rights. But the measures that realize the right to food also need to be connected and contribute to development objectives, such as to improve productive capacities of small and marginal farmers, increase employment opportunities for agricultural labour, and empower women so as to increase the access to food through their normal economic activities. Measures relating to the above have all been discussed in various sections of this report. They need to be drawn together into a comprehensive package.

Appendix II: Food Security Index (FSI) - A Methodological Note

At the outset we must state that the Food Security Index is calculated for rural areas only. All variables constructed in this section are for rural areas, unless otherwise specified.

Here we have attempted to construct a Food Security Index (FSI) at the sub-state level, that is, the district level. The district having a higher index value is considered as relatively more food secure as compared to a district with a lower index value.

Broadly, we have adopted Max-Min (range equalization method, REM) approach, adopted by UNDP (HDR 2005) and Principal Component Analysis (PCA). One of the objectives of the district FSI is to show the district's position in various dimensions of food security.

The FSI is a composite index covering three dimensions, i.e., Availability factors, Access factors, and Absorption factors. Besides these three groups of factors, an additional component i.e. public entitlement has been used to explain how this influences food security. But the public entitlement factor is not included in the indices of food security. The public entitlement policy is based on various parameters which are supposed to be directly linked with food insecurity; the lower the level of food security, the greater should be public intervention. In such a scenario, the direction of public interventions should run counter to the FSI, though it need not be so.

For each of the dimensions, as discussed earlier, some relevant variables have been chosen.

Table A 2.1 Choice of Indicators, Sources, Reference Year and Calculating Procedure in Orissa

Name of Variable and Description	Sources	Ref. Year
(a) Availability		
1. Proportion of net irrigated area to net sown area	Orissa Agricultural Statistics, 2005-06, p 27-28 Directorate of Agriculture & Food Production, GOO	2005-06
2. Per capita value of agricultural output In order to take account of the cyclical nature of agricultural production, the variable uses an average for three to five years, depending on the availability of data. The value of each food and non-food item is derived by multiplying the amount of production with its price obtained from all-India prices of these items at constant 1993-94 prices. Adding the value of each and	Orissa Agricultural Statistics, 2005-06, A Profile on Agriculture in Orissa, 2006 Directorate of Agriculture & Food Production, GOO	2003-04 to 2005-06



Name of Variable and Description	Sources	Ref. Year
every food and non-food item, gives the overall value of agricultural output for a year. The per capita value of agricultural output is calculated by dividing the average value of agricultural output by total population in the midpoint year.		
3. Percentage of inhabited villages having access to paved roads. This is calculated as a share of total number of villages in the district	Census of India, 2001	2001
4. Percentage of forest area to total geographical area	Statistical Abstract of Orissa, 2005, Directorate of Economics and Statistics, Orissa Page 40	2005
(b) Access		
1. Percentage of agricultural labour to total workers. Agricultural labour comprises both main and marginal workers*	Census of India, 2001	2001
2. Proportion of ST and SC population to total population*	Census of India, 2001	2001
3. Dependency ratio This is calculated as rural population in the age group (15-59) divided by the sum of (0-14) the child population and 59+ population. We have then inversed the value to get the share of working age population to relate positively to food security.	Census of India, 2001	2001
4. Per capita monthly consumption expenditure (inequality adjusted) The formula for inequality adjusted monthly per capita consumption expenditure (MPCE) is: $MPCE \cdot (1 - Gini)$.	61 st NSS round	2004-05
5. Rural casual wage rate This is calculated as average daily wage rate for the age group 15-59	61 st NSS round	2004-05
6. Female literacy rate (7+) Total female literates as a proportion of total female population for the age group 7 years and above.	Census of India, 2001	2001



Name of Variable and Description	Sources	Ref. Year
(c) Absorption		
1. Percentage of households having access to safe drinking water. Here rural households with access to three sources of drinking water, such as a tube well, tap and hand pump have been considered.	Census of India, 2001	2001
2. Percentage of inhabited villages having access to PHCs (PHC facility within the village or within 5 kms from the village)	Census of India, 2001	2001
(d) Public Entitlement		
1. Percentage of midday meal beneficiaries out of total children The data for MDM is for rural and urban areas combined. To find out the value of this variable we have divided the total MDM beneficiaries by the projected child population (Rural +Urban) in the age group (6-11) and multiplied the ratio by 100	Downloaded from http://orissagov.nic.in/wcd/activity/Annexure-VII.pdf	Sept 2005-06
2. Percentage of ICDS beneficiaries to total project population Here we have taken only the SNP (supplementary nutrition programme) beneficiaries. To find out the value of this variable we have divided the SNP beneficiaries (pregnant and lactating women and children (0-6) age group) by the total population covered by the project.	Women and Child Development Department, Government of Orissa	2006-07

Max-Min Approach

Using the Max-Min approach an index has been constructed for each variable. This is calculated by applying the following general Range Equalization Method (REM) formula adopted by the UNDP:

$$\text{Variable Index} = \frac{(X_i - \min X)}{(\max X - \min X)}$$

where X_i - Value of the variable

min X- Minimum value of X in the scaling

max X- Maximum value of X in the scaling

In undertaking the scaling procedure, desirable norms have been adopted for each indicator. In some cases, the scaling of indicators is self-selecting, and for some others there is an element of value judgment.



Construction of Food Security Index

Different indicators included in the three components of the FSI have been scaled and normalized (to make them unidirectional) to take a value on a scale ranging from 0 to 1. The scaled least achievement corresponds to zero, whereas the best achievement corresponds to 1. For three selected variables, viz., percentage of agricultural labour to all labour and proportion of ST and SC population and percentage of forest area to total geographical area, we have used the reverse figure (percent of non-agricultural labour to total workers; percent of non-ST & SC to total population; and percent of non-forest area to total area). Likewise, the variable dependency ratio has also been reversed.

After calculating the index of each variable, we have averaged them to give each of the three dimensions of food security. The composite Food Security Index is again derived by averaging all the selected dimensions.

Principal Component Analysis (PCA)

The PCA is a data reduction technique. Sometimes there is a high correlation between variables. In such cases, it is useful to transform the original data set into a new set of uncorrelated variables called principal components. It is quite likely that the first few components account for most of the variability in the original data set. The PCA can be applied either to the original values of variables or to the normalized values of the variables. In general, normalization can be done by three methods, i.e., by deviation of the variables from their respective means (i.e., $\frac{X - \bar{X}}{s}$); by dividing the actual values by their respective means (i.e., $\frac{X}{\bar{X}}$) and the deviation of the value of a variable from the mean which is then divided by standard deviation {i.e., $(\frac{X - \bar{X}}{s})/s$ }. We have applied the second method. The basic objective of using PCA is to find the factor loading of each and every variable. Factor loading gives us the amount of total variation explained by a particular variable.

We have used the PCA in the Food Security Index for those States where the indices derived through the RE method and PCA method are highly correlated.

Food Security Outcome (FSO)

To crosscheck the validity of the Food Security Index for the three AAA (Availability, Access and Absorption) components, we have used the Food Security Outcome (FSO) index. The nutritional status of an individual can be considered as the outcome of food security. Though intake of food is not the only factor that affects nutritional status, it is definitely the prime one. The outcome index calculated here is based on two child-related variables: under-five mortality rate (U5MR) and child malnutrition (weight for age -2SD). Child malnutrition - 2SD includes children who are below -3SD from the International Reference Population median. The district-wise figure relating to the above two variables are taken from the Reproductive and Child Health (RCH) 2002 Survey.



The food security outcome (FSO) against which the input variables are considered here as explanatory indicators should ideally be a composition of morbidity, mortality and under-nutrition among the entire rural population, which includes adults. However, due to inadequacy of data on adults, especially at the district-level, we have resorted to using the child-related variables to construct the FSO. In order to validate the use of this, we have undertaken a simple correlation exercise at the state level between the Body Mass Index (BMI) for adults and the FSO.

The State-level Body Mass Index for men and women has been used from NFHS III. The NFHS calculates BMI as weight in kilograms divided by the square of height in meters and the resulting value is again divided by the number of men/women in the 15-49 age group. Here we have taken the number of men and women with BMI below 17.0 which tells us the number of men /women moderately and severely thin. The composite adult BMI has been calculated by aggregation of BMI for men and women using the population share of men and women in the sample as weights.

We have calculated the state-level Food Security Outcome index (for 29 states) from DLHS and NFHS child-related variables (the same two variables taken for the district-level FSO). We have adopted the RE method for finding out the state-level FSO. The correlation among the DLHS and NFHS child-related indicators as well as NFHS-based BMI adult indicators shows a very high correlation across 29 states, thereby justifying the use of the child FSO as the outcome measure. However, it can be argued that inter-district variations within different states can be quite dissimilar.

Grouping of Districts

For each variable, component and index, districts have been divided into five classes: Secure to Moderately Secure, Moderately Insecure, Severely Insecure and Extremely Insecure. The method used for making class intervals is the 'equal intervals' method, i.e. the difference between all upper and lower class intervals for an indicator is the same. This method takes into account the range of the indicator's values and divides the range into five equal classes. The number of districts in different classes can be different.