

Understanding the Dynamics of Food Insecurity and Vulnerability in Orissa, India

Food Security and Agricultural Projects Analysis Service (ESAF)

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Contact: Christian Romer Lovendal
email: christianromer.lovendal@fao.org

Abstract

This paper documents the main findings of a study on food insecurity and vulnerability in the Indian state of Orissa in support of promoting interventions for food security and livelihoods at state level. A similar study was undertaken in Himachal Pradesh, India.

The paper analyses the main characteristics and causes of food insecurity and vulnerability. It seeks to identify who are vulnerable and food insecure and where they are, why they risk food insecurity and what options exist to reduce their vulnerability. Using the sustainable livelihoods framework and collecting qualitative and quantitative data from four selected districts, the paper looks at six livelihood groups, notably marginal and small scale farming households, labouring rural households, mining worker households, rural artisan households, fishing households and scheduled tribal households.

Even though Orissa is virtually self-sufficient in food grains, there is a significant prevalence of food insecurity in the state and around 9 percent of the population are classified as extremely food insecure (consuming less than 1,800 kcal per day). The situation varies significantly within the state: 15 percent of the population in the southern region are extremely food insecure compared to 3 percent of the population living in the coastal areas. The study finds that food insecurity and vulnerability are mainly caused by a limited physical as well human asset base, slow economic growth, limited or no access to welfare provisions and public services, lack of land reform and difficulties in accessing credit institutions.

Based on the findings of the analysis, the paper identifies key interventions to address the causes of food insecurity and vulnerability in Orissa. These need to address the immediate food needs of the most vulnerable and to stimulate rural development, in

particular promoting agriculturally linked livelihoods. Proposed interventions include increased investment in agricultural research, improved watershed development, developing financial services and promoting small scale industries as well as micro enterprises and strengthening anti-poverty programmes within the state.

Finally, the paper includes recommendations on indicators to be monitored as part of a potential Food Insecurity and Vulnerability Information and Mapping System (FIVIMS) in Orissa, focusing on a core set of indicators to be monitored at the state and district levels.

Key Words: vulnerability, food security, vulnerable groups, livelihoods, Orissa, India.

JEL: Q18, Q19, O20.

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CONTENTS

Executive Summary	7
1. Introduction and Rationale for the Study	10
1.2 Poverty, Food Insecurity and Vulnerability in India	11
1.3 The National FIVIMS Project	13
1.4 Study Objectives and Methodology	14
2. Data on Poverty, Food Insecurity and Vulnerability in Orissa	18
2.1 Orissa: Socio-economic Background	18
2.2 Agricultural Trends, Food Availability, Markets and Access	24
2.3 Food Consumption, Utilization and Nutritional Status	28
3. Vulnerable Livelihoods in Orissa	30
3.1 Marginal and Small Scale Farming Households	30
3.2 Labouring Rural Households (LRHs)	35
3.3 Mining Worker Households (MWHs)	38
3.4 Rural Artisan Households (RAHs)	40
3.5 Fishing Households	41
3.6 Scheduled Tribes Households (Non-timber Forest Products-based Livelihoods)	45
4. Options for Reducing Food Insecurity and Vulnerability	48
4.1 Present Key State Wide Policies and Programmes	48
4.2 Reducing Food Insecurity and Vulnerability: Strategic Implications ...	50
4.3 Priority Areas for Public Intervention	51
5. Continued Support to Strengthen Food Insecurity and Vulnerability Analysis	56
References	60

Abbreviations

APP	Anti Poverty Programme
BMI	Body Mass Index
BPL	Below Poverty Line
FAO	Food and Agricultural Organization of the United Nations
FHs	Fishing Households
FIVIMS	Food Insecurity and Vulnerability Information Mapping Systems
GoI	Government of India
GoO	Government of Orissa
GSDP	Gross State Domestic Product
HDI	Human Development Indicator
HHW	Households Headed by Women
ICDS	Integrated Child Development Scheme
ICT	Information and Communication Technology
IMR	Infant Mortality Rate
JFM	Joint Forest Management
Kcal	Kilo - calorie
LBW	Low Birth Weight
LRH	Labouring Rural Household
MDG	Millennium Development Goal
MDMS	Mid Day Meal Scheme
MISTVSM	Management Info System Tracking Vulnerability to Starvation and Malnutrition
MT	Metric Tons
MWH	Mining Worker Household
NCMP	National Common Minimum Programme
NFP	New Forest Policy
NGO	Non Governmental Organization
NNMB	National Nutrition Monitoring Bureau
NREGS	National Rural Employment Guarantee Scheme
NSS	National Sample Survey
NTFP	Non Timber Forest Products
OPSRP	Orissa Public Sector Reforms Programme
OSFC	Orissa State Finance Corporation
PFCS	Primary Fisherman Cooperative Societies
PHDMS	Poverty and Human Development Monitoring System
PRI	Panchayati Raj Institution
PTF	Poverty Task Force
RAH	Rural Artisan Household
RGI	Registrar General of India
RLTAP	Revised Long Term Action Plan UK
SC	Scheduled Caste
SGSY	Swarna Jayanthi Gram Swarozgar Yojana (SGSY)
SHDR	State Human Development Report
SHG	Self Help Group

SLA	Sustainable Livelihoods Approach
SSFH	Small Scale Farming Household
ST	Scheduled Tribe
TPDS	Targeted Public Distribution Scheme
UFMR	Under Five Mortality Rate
UNDP	United Nations Development Programme
UNICEF	United Nations Childrens Fund
VGP	Vulnerable Group Profile
WCD	Women and Child Development (Department of)
WFS	World Food Summit
WFP	World Food Programme of the United Nations

THE DYNAMICS OF FOOD INSECURITY AND VULNERABILITY IN ORISSA

Executive Summary

More than one-third of the world's under weight children live in India. Moreover, the prevalence continues to be alarmingly high with close to every second child being underweight (UNICEF, 2006). A significant policy lesson in recent decades has been that while macro level food self-sufficiency in India has been achieved, this has not translated into micro-level food security for the poor. Although overall poverty levels may have declined during the 1990s, regional disparities and socio-economic inequalities within and between states may have worsened.

Studies of food security and vulnerability were undertaken in the states of Orissa and Himachal Pradesh as part of the FAO-supported FIVIMS India pilot project launched in 2003 by the National Ministry of Food and Consumer Affairs together with state level departments of food and public distribution.

This study follows a livelihoods-based approach to better understand the vulnerability of people to food insecurity. Four districts in Orissa were identified for the purposes of the study (Kendrapara, Keonjhar, Gajapati and Nuapada), on the basis of their representation of four regional areas (Coastal Plains, Northern Plains, Eastern Ghats and Mixed Region). Six of the main food insecure or vulnerable livelihood groups were identified: (i) marginal and small scale farming households (HHs); (ii) labouring rural HHs; (iii) mining worker HHs; (iv) rural artisan HHs; (v) fishing HHs; and (vi) scheduled tribal HHs. Data was collected through a combination of community level semi-structured focused discussions (65) and household level data collected from 550 households.

Orissa is among the poorest of India's poor states. It depends largely on an undiversified agricultural economy. The poverty headcount rate is 47 percent.¹ Poverty is an overwhelmingly rural phenomenon and is clearly linked to low land productivity, limited diversification of the agricultural economy (primarily paddy) and the lowest agricultural wages in the country. While the state, including some of the poorest districts, is virtually self sufficient in food grains, there is a significant portion of chronic food insecurity associated with particular areas and population groups. Inequalities are greater between the relatively better off coastal areas and the more remote and inaccessible southern region. Regional differences are closely linked to differences among social groups, with poverty among castes and especially indigenous tribal people being strikingly higher than for other groups.

The pervasive and chronic food insecurity of poor communities in Orissa is captured by anthropometric measures as over half of the children between 1 and 5 are stunted. Almost half of all adult women and three quarters of all children under three in Orissa are undernourished. The infant mortality rate for Orissa is higher than any other state in India. And while child malnutrition in Orissa is significantly higher than the national

¹ Government of India, Planning Commission, 1999/2000.

average, average per capita kcal intake (and even that of the lowest income decile) is among the highest in India.

The proportion of labouring rural households with an average daily energy intake of less than 1800 kcal (less than 75 percent of the recommended minimum intake) was found to be 43 percent for the Coastal Plains, 57 percent for the Northern Plains and 69 percent for the Eastern Ghats. The vulnerable group category with the greatest prevalence of extreme food insecurity (defined as calorie intake per capita per day below 1800 kcal for people who are 40 percent below a poverty line income) was rural artisan households (73 percent), while more than half of all marginal farming households and labouring rural households (52 to 58 percent) were also considered extremely food insecure. Children of labouring rural households and marginal farming households emerged as the most affected by extreme undernourishment (hunger), particularly in the districts of Gajapati and Nuapada where between 56 and 80 percent were found to be consuming less than 1800 kcal per day.

Other findings arising from the study include, *Human capital*: Alarmingly poor education levels and awareness of basic health and sanitation issues among poor communities. *Social capital*: Traditional extended family and community and civil society support systems have been significantly undermined as a result of entrenched poverty and shocks such as natural disasters. *Natural capital*: Unsustainable farming practices and declining soil fertility are key factors causing slow growth in the agricultural sector and worsening rural livelihood conditions. *Physical capital*: Poor rural connectivity is a major factor underlying limited market development. In addition, the low capital value of the dwellings of vulnerable households has negative implications for access to formal credit services. *Financial capital*: More than 75 percent of all poor rural households were found by the study to be indebted (mostly through informal and often exploitative arrangements). The majority of loans were taken to meet basic consumption requirements. It was not uncommon for households to report that more than 50 percent of income regularly went to meet repayments.

The central challenge facing policy makers in Orissa involves managing a transition away from an underdeveloped agricultural economy, while ensuring basic levels of human welfare and equitable access to resources. Central to this achievement is an increase of labour productivity within agriculture and, simultaneously, expansion of non-agricultural employment opportunities in both rural and urban areas. The study proposes 11 specific priority areas of intervention for reduced vulnerability and enhanced food security following a twin-track approach addressing both rural/agricultural development while addressing also immediate food needs of the most vulnerable:

<p style="text-align: center;">TRACK 1 Rural development</p>	<p style="text-align: center;">TRACK 2 Addressing immediate food needs</p>
<ul style="list-style-type: none"> • greater investment in dryland/ agricultural technology • adaptive agricultural research • watershed development • irrigation and water management • pro-poor land policy reform • joint forest management and Non Timber Forest Products (NTFP) promotion • developing financial services • diversification e.g. through horticulture, animal husbandry and fish production • improved agro-processing • promotion of small scale industries and micro-enterprises • developing tourism and mining sectors 	<ul style="list-style-type: none"> • strengthening of disaster management capacities • strengthening anti-poverty programmes for enhanced social protection • food storage

1. Introduction and Rationale for the Study

Despite steady economic growth and development in many parts of the world, a significant proportion of the global population continues to suffer from food insecurity and malnutrition. MDG 1 recognizes that hunger and food insecurity are the core afflictions of poor people, and specifically sets out to halve the proportion of extremely poor and hungry people in the world. Although the situation has improved since the 1990s, the rate of improvement remains far short of that required to attain these targets. The latest FAO figures suggest that 823 million people in developing countries are undernourished, which is an increase of 23 million since 1996. Nonetheless, over the past 10 years, the proportion of undernourished people in the developing countries fell to 17 percent, because the total population grew faster than the undernourished portion. There is increasing evidence that the number of people who remain vulnerable to food insecurity is considerably higher (FAO, 2006).

A widely accepted definition of food security was agreed upon at the World Food Summit (WFS) in 1996: “*Food security 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.*”

Box 1.1 Key Concepts: Hunger, Food Security and Vulnerability

Hunger: A general concept to describe the sensation of not having enough to eat. FAO’s indicator of hunger is ‘undernourishment,’ a measure of energy deficiency or food deprivation.

Food Security: As defined above, the broad definition of food security has four dimensions: availability, access, utilization and stability. Stability refers to risks associated with fluctuations in food availability and access over time.

Vulnerability: Generally defined as a function of ‘exposure to risk and ability to cope.’ In the FIVIMS context, vulnerable people are those who face a high likelihood of experiencing food insecurity in the future.

Poor nutrition is a key outcome of food insecurity. The impact of undernutrition can be transferred from women to their children because malnourished mothers have a higher risk of giving birth to low-birth weight children, as do women whose own growth was stunted by malnutrition. Hence, maternal health and food insecurity are linked, and the harmful effects of hunger are passed from one generation to the next with malnourished mothers having low-weight babies who face a high risk of stunting during childhood. This can lead to a reduced work and earning capacity as an adult and puts them at a higher risk of giving birth to low-weight children themselves. Even children who are only moderately underweight have been found to be twice as likely to die of common infectious diseases as children who are better nourished. The United Nations Children’s Fund (UNICEF) estimates that of the 146 million children under five who are

underweight in the developing world, 106 million (73 percent) live in just 10 countries (UNICEF, 2006).

Food insecurity causes poverty, vulnerability and livelihood insecurity, but is at the same time also a result of these conditions. Eradicating extreme hunger speeds up progress towards the development goals in other sectors. Hunger and undernutrition make it extremely difficult for poor people to improve their own livelihoods and make it impossible for them to contribute toward sustainable and broad-based growth. The persistence of hunger is a direct challenge to efforts to reduce child mortality, to improve educational attainment and to enable people to invest in their own futures.

1.2 Poverty, Food Insecurity and Vulnerability in India

In 2000, 28.6 percent of the population of India fell below the national poverty line (on the basis of monthly per capita expenditure), and approximately half of all children and one fifth of the total population were either moderately or severely malnourished (FAOSTAT)². Despite sustained economic growth, poverty reduction and centrally-backed targeted policy efforts, India has made less progress in reducing malnutrition over the last decade than have other countries with comparable socio-economic indicators. In addition, regional disparities and economic inequalities within and between states have worsened, despite an overall decline in poverty during the 1990s.

In 2006, more than one third (57 million) of underweight children under five in the developing world lived in India. UNICEF attributes 50 percent of all childhood deaths in India to malnutrition.³ Hunger tends to be chronic rather than acute, affecting in particular women, adolescent girls, children under five, scheduled tribe and caste communities and people living in remote rural areas.

² The proportion of underweight children below five years of age fell from 53 percent in 1992-93 to 49 percent for 1998-99 (Millennium Development Indicators).

³ This marks only a very slight improvement from the early 1990s. Between 1992 and 1998 the annual decline of malnutrition is estimated to be only 0.8 percent for India in general (UNICEF, 2006).

Box 1.2 MDG1 Update: Progress on the Eradication of Extreme Poverty and Hunger in India

- To achieve the goal set globally of halving extreme poverty and hunger by 2015, India should reduce the proportion of people below the poverty line from nearly 37.5 percent in 1990, to 18.75 percent.
- Data from 1999-2000 show that the poverty headcount ratio is 28.6 percent.
- The prevalence of under nourishment during 2001-2003 is estimated at 20 percent down from 25 percent in 1990-1992.
- The total number of undernourished people during the period from 2001-2003 is estimated to be 212 million.

Source: FAOSTAT and Human Development Report 2006

In 2001-2003 in average, 20 percent of the total population of India was undernourished. The average calorie consumption marginally increased from 2370 kcal during 1990-1992 to 2470 kcal in 2002-2004.⁴ In addition to energy deficiency, a low diversity in the diet is a key issue. Thus, cereals contribute as much as 80 percent for the lowest income decile, compared to approximately 50 percent for the highest.

According to a World Bank report on malnutrition across India, undernutrition related to micronutrient deficiencies alone may cost the country \$2.5 billion annually owing to lowered productivity (Gragnotati et al, 2005). A large share of India's population suffers some degree of iron deficiency (anaemia affects 74 percent of children under the age of three, more than 90 percent of adolescent girls and 50 percent of all women) and a significant proportion suffer Vitamin A and iodine deficiencies (fewer than half of all households use iodized salt). Diseases involving diarrhoea are the second highest cause of death in India, after respiratory diseases. An estimated 700,000 children die annually and the total national infant mortality rate is 62 per 1000 live births. Half of the underweight children of India live in only six states (Maharashtra, Orissa, Bihar, Madhya Pradesh, Uttar Pradesh and Rajasthan) where child malnutrition levels exceed those of countries in Sub Saharan Africa.

To address widespread poverty, food insecurity and vulnerability, the Government of India (GoI) has since independence implemented multiple initiatives such as the Integrated Child Development Services (ICDS) Programme, the National Health Programme, the National Rural Employment Guarantee Scheme and, in recent years, the National Plan of Action on Nutrition. A significant policy lesson has been that while macro-level food self sufficiency has been achieved, partly by establishing national systems for public grain procurement and distribution, as well as an increasing food production⁵. However, this has proved insufficient to ensure micro-level food security for the poor.

⁴ FAOSTAT: available at www.fao.org/es/ess/faostat/foodsecurity/index_en.htm.

⁵ The food production per capita has increased by 8.4 percent from 1990 to 2006 (FAOSTAT).

The national food policy has been debated particularly as it relates to the question of whether India's general development is better served by ensuring national, state and farming household level 'self sufficiency' in food or whether the persistence of food insecurity despite adequate food availability, points to policy options geared more broadly towards the acceleration of 'pro-poor' growth. Proposals to dramatically reorient India's rural economy towards potentially more lucrative (but also higher risk) export markets and thereby meet food requirements through market driven commercial imports in response to supply deficits remain controversial. The restricted landholding size (or none at all) is a major constraint facing the rural poor, and land poverty remains a key proxy for chronic poverty, vulnerability and hunger in rural India.⁶

The slow progress on food security and nutrition related targets calls for the creation of more effective policies and programmes across multiple sectors.

1.3 The National FIVIMS Project

Box 1.3 Objective of the Global Food Insecurity and Vulnerability Information and Mapping Systems Initiative (FIVIMS):

The global FIVIMS initiative aims to integrate and improve existing data systems and analysis (at global, national and sub-national levels) to ensure the availability, quality, relevance and utilization of reliable, timely and accessible information on food security and vulnerability. This is expected to enhance greatly the effectiveness of policies and programmes across sectors and thereby accelerate efforts to eradicate extreme poverty and hunger.

The central and state governments recognize the importance of continuously developing and refining national and state level poverty and human development monitoring systems as a priority to ensure evidence-based policy initiatives and investments. Various information is e.g. collected for the food distribution systems, but no single organization within the government or in the non-government sector collects or brings together all the information necessary to identify who are the food insecure and vulnerable groups, their locations and the underlying causes of persistent hunger.

In 2003, the Ministry of Food, Consumer Affairs and state departments of Food and Public Distribution, along with the support of FAO, launched a pilot project to support Food Insecurity and Vulnerability Information and Mapping Systems (FIVIMS) in the two states of Orissa and Himachal Pradesh.⁷ The project had two major components: a food security information system component seeking to define how FIVIMS could

⁶ In India, it is estimated that 60 million rural households are landless while a further 250 million own less than 0.2 ha. Only 3.9 percent of households own land greater than 4 ha. Women comprise a disproportionate share of the landless and rarely hold legal rights to land.

⁷ The project was launched in September 2003 and completed in August 2007.

function at state level, and a study component, aimed at improving baseline understanding of why people are food insecure or vulnerable in the two states.

1.4 Study Objectives and Methodology

This working paper is based on the study, *Understanding the Dynamics of Food Insecurity and Vulnerability in Orissa* that was undertaken on in support of the Government of Orissa, with the support of FAO, by D.J. Research and Consultancy Pvt. Ltd (DJRC) from 2004 to 2005. The study was intended to assist the development of a framework for establishing an information system to monitor food insecurity and vulnerability in Orissa. To this end, it had two principle objectives: (i) to generate initial findings relating to core FIVIMS questions including who are the food insecure and vulnerable? Where are they located? Why are they food insecure or at risk of becoming so? And, which potential policy options could improve present and future food security through reduced vulnerability?; and (ii) to make recommendations toward identifying key indicators that could be monitored to better inform policy processes aimed at improving food security for vulnerable groups.

In recent years the concepts of ‘livelihoods’ and ‘vulnerability’ have become increasingly central to the development agenda. While the livelihoods approach offers a people-centred, multi-sectoral and holistic conceptual framework for understanding the complexities of real lives, the concept of vulnerability covers the results of unexpected blows and people’s efforts to manage the risks they face. The Sustainable Livelihood Approach (SLA) looks at how people combine their tangible and intangible assets to reach their livelihood objectives and how policies and the institutional environment within which they live mediate their success. It also examines the influence of the shocks and trends to which they are exposed (DFID, 1999). The SLA furthermore connects micro, meso and macro level agendas and focuses on promoting a participatory and multi-stakeholder approach to data collection and analysis.

Vulnerable groups are made up of people with common characteristics who are likely to become or remain food insecure in the near future. To enhance the value of data for policymakers and planners, people are strategically clustered into groups on the basis of certain shared characteristics.⁸ Vulnerable group profiles can therefore indicate who and how many people are vulnerable, where they can be found and why they are vulnerable. A summary of the VGP approach is provided in Box 1.4 below.

⁸ While the ‘clustering’ method has proved extremely valuable in providing a broad-brush picture of vulnerability of great strategic value to enhancing policies and programmes, it does not substitute disaggregated microanalysis required for participatory development activities at the local level.

Box 1.4 What is Vulnerability Group Profiling?

Vulnerable Group Profiling (VGP) is used to analyse the multiple factors influencing the food insecurity of relatively homogenous groups: their assets, external factors that affect their lives, their own actions, the resulting intermediate outcomes and their ultimate food security status. The most important criterion to identify common livelihood groups is income sources (often closely associated with location on the basis of relatively homogenous livelihood/agro-ecological zones).

The main purpose of VGP is to answer the following questions:

1. Who are the vulnerable people?
2. Where are the vulnerable people?
3. How many people are vulnerable?
4. Why are people vulnerable?
5. What can be done to reduce their vulnerability?

The VGP is a simple and relatively low-cost tool for building an overview of vulnerability and food insecurity grounded in local knowledge.

The basic methodological framework consists of five steps:

- *Review of existing data.* Qualitative and quantitative with attention to significant information gaps;
- *Identifying main vulnerable livelihoods.* National/sub-national multi-stakeholder workshops to facilitate identification and consensus building regarding livelihood sub groups and selection of communities;
- *Community level qualitative research.* Key informant interviews, focus group discussions and in-depth semi-structured interviews with ‘typical’ households within each livelihood sub group. Focus group discussions are held with different groups of women and men to ensure optimum sensitivity to social difference;
- *Household level quantitative research.* Interviews with selected households from different livelihood groups;
- *Validation.* National/sub-national multi-stakeholder workshops to validate findings and explore potential policy implications. Dialogue includes district, state and national level workshops.

To refine the analysis of people sharing common livelihood systems, sub groups are identified within each livelihood group and organized along a ”vulnerability

continuum”.⁹ This tool helps conveying the relative degree of vulnerability of different sub groups and the key characteristics of each. These can include asset base e.g. land access, geophysical characteristics of physical assets, possible alternative livelihood strategies, diet and nutritional status.

The VGP methodology provides a multi-tiered and multi-stakeholder approach to data collection. Each level can potentially provide information that is unavailable at other levels, and the iterative process of information exchange and sharing in turn contributes to greater consensus of understanding and analysis among stakeholders.

Integrating livelihood based, qualitative VGP data with quantitative data already collected by the public administration is a key challenge. A minimum food security information set was used for guiding the initial organization of complex qualitative data and facilitating its supplementation by existing quantitative data sets.

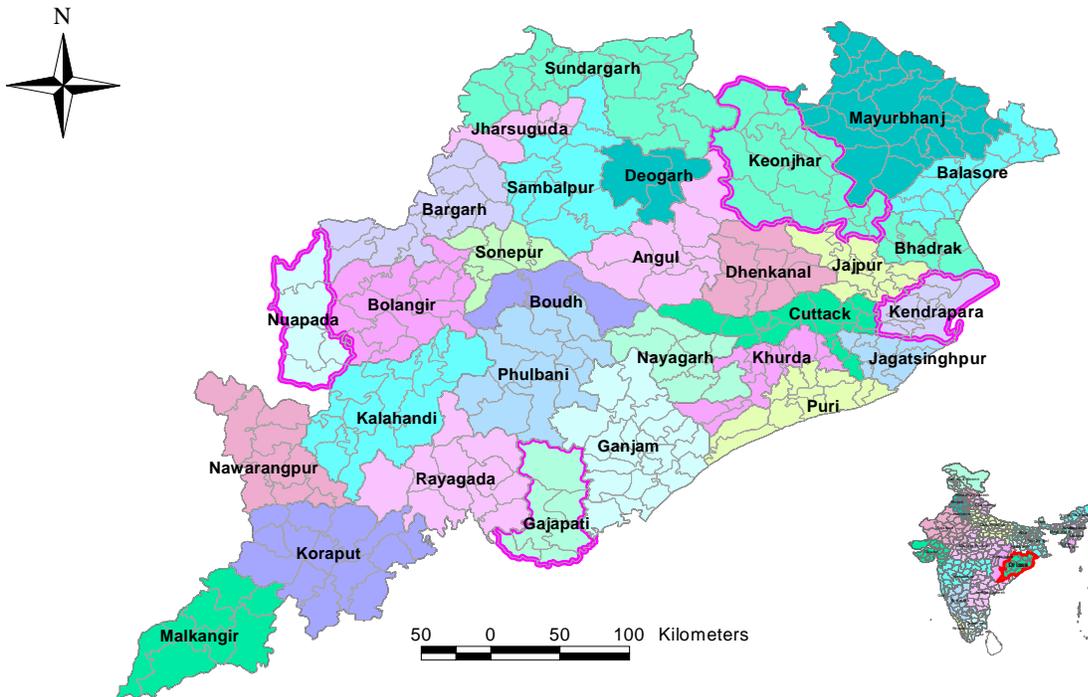
Following meetings with key stakeholders at both national and state levels, four districts (Kendrapara, Keonjhar, Gajapati and Nuapada) were identified for the purposes of the study. These districts, which respectively represent the four regional areas (Coastal Plains, Northern Plateau, Eastern Ghats and Coastal Plains, and Eastern Ghats), were also selected by the Government of Orissa Poverty Task Force on the basis of vulnerability criteria for an earlier data collection exercise (primarily quantitative) involving 400 households. The VGP exercise drew on this existing data.

Table 1.4.1: Key Characteristics and Proportion of Scheduled Tribes and Scheduled Castes Population by Study District

	Key Regional Characteristics	Scheduled Tribes	Scheduled Castes
<i>Kendrapara (Coastal Plains)</i>	Alluvial lowland plains. Most at risk from cyclonic storms and flooding.	0-10%	20-25%
<i>Nuapada (Eastern Ghats)</i>	Cultivation mainly on eroded highland, largely rainfall dependent.	30-40%	10-15%
<i>Keonjhar (Northern Plateau)</i>	Hill ranges rising to elevations between 2000 and 3000 feet above sea level.	40-60%	10-15%
<i>Gajapati (Mixed Region of Coastal Plains and Eastern Ghats)</i>	Combination of lowland and highland in almost equal proportions. Fertility is low in highland areas and better in lowland areas.	40-60%	0-10%

⁹ See Lovendal, Knowles and Horii (2004) for further detail.

Map 1.4.1: Orissa FIVIMS Study Districts



In order to identify and differentiate vulnerable and food insecure groups, a state level workshop was held in January 2005 with participants including representatives of the major government departments, district collectors of the four districts and experts from NGOs and UN agencies. The participants identified six groups as the main vulnerable livelihoods to be studied on the basis of their distinctive livelihood strategies:

1. Marginal and small scale farming households (MFHs and SSFHs)
2. Landless (labouring) rural households (LRHs)
3. Mining worker households (MWHs)
4. Rural artisan households (RAHs)
5. Fishing households (FHs)
6. Scheduled Tribes (ST)¹⁰ households (gatherers of Non Timber Forest Products (NTFP))¹¹

¹⁰ Article 242 of the Indian Constitution lists 62 tribes in Orissa as ST of which 13 have been recognized as 'primitive tribes'. As per the 2001 Census, ST population (8.14 million) constituted 22.1 percent of the total population and 24.6 percent of the rural population of the state. Members of the population belonging to the ST community have certain characteristics that distinguish them from people in caste groups.

¹¹ The ST category, along with the category of SC, is not necessarily as strongly associated with a specific set of livelihood activities as might be commonly assumed.

It should be noted that on the basis of official data, more than three quarters of all households living below the poverty line come from the first two groups on the list.

Within these districts, data was collected from a total number of 550 households representing 16 villages from eight development blocks (25 households from each village representing a cross section of different vulnerable groups).¹² District level workshops were held to identify the development blocks and groups for the study, while village selection took place after detailed discussion with functionaries, available NGOs and key informants at each block level. The two most food insecure and vulnerable blocks were selected from each district and two villages were selected from each block for focus group discussions and household surveys.

Data collection instruments were designed to collect both quantitative and qualitative data. Research took place initially at the village level and then at the household level. Sixty-five focus group discussions were held at the village level to develop an understanding of the key characteristics of selected vulnerable groups and the most significant vulnerability and food security issues they face, including health and sanitation, risks and shocks (co-variate and idiosyncratic), social capital and impact of public policies and programmes. Structured questionnaires were then administered at the household level in order to obtain detailed information on income, expenditure, consumption, calorie intake, health, sanitation and feeding practices, etc.

2. Data on Poverty, Food Insecurity and Vulnerability in Orissa

2.1 Orissa: Socio-economic Background

Orissa, with a population of 36.7 million (2001) and the third lowest population density among the major states of India,¹³ is among the poorest of India's poor states. About 87 percent of the population live in rural areas and the annual per capita income is estimated to be approximately US\$250. Agricultural wages are the lowest in India¹⁴ and per capita income for Orissa has increasingly fallen behind the rest of the country.¹⁵ The Human Development Index for the major states of India has ranked Orissa among the bottom five since 1981.¹⁶ Agriculture employs about 80 percent of the population, but its contribution to the Gross State Domestic Product (GSDP) is only about one third. Small and marginal holdings predominate. The share of those employed as cultivators fell dramatically from 45 percent in 1993-1994 to 30 percent in 1999-2000.

¹² In two villages, additional households were selected to study fishing and tribal households in more detail.

¹³ Population density is 236 persons per sq. km in 2001, which is only ahead of the other two relatively poor states of Rajasthan and Madhya Pradesh.

¹⁴ Deaton and Dreze, 2002.

¹⁵ Mackinnon, 2002 *Assessing the Impact of Fiscal and Structural Reforms on Poverty in Orissa* (Oxford Policy Management).

¹⁶ Government of India, 2001.

The most recently available data on the poverty headcount ratio is 47.2 percent (1999-2000), as compared to 26 percent in India as a whole.¹⁷ Ninety percent of the poor people live in the rural areas of Orissa making poverty an overwhelmingly rural phenomenon. Inequalities are sharpest between the relatively better off coastal areas and the more remote and inaccessible inland areas. Coastal areas have a poverty rate of 32 percent showing a decline during the 1990s while in the inland southern region (where almost 75 percent of the state's poor live) the poverty rate is 87 percent, an increase from 69 percent in 1992-1994.¹⁸ Overall, the rural poverty rate is 48 percent compared to the urban poverty rate of 43 percent.

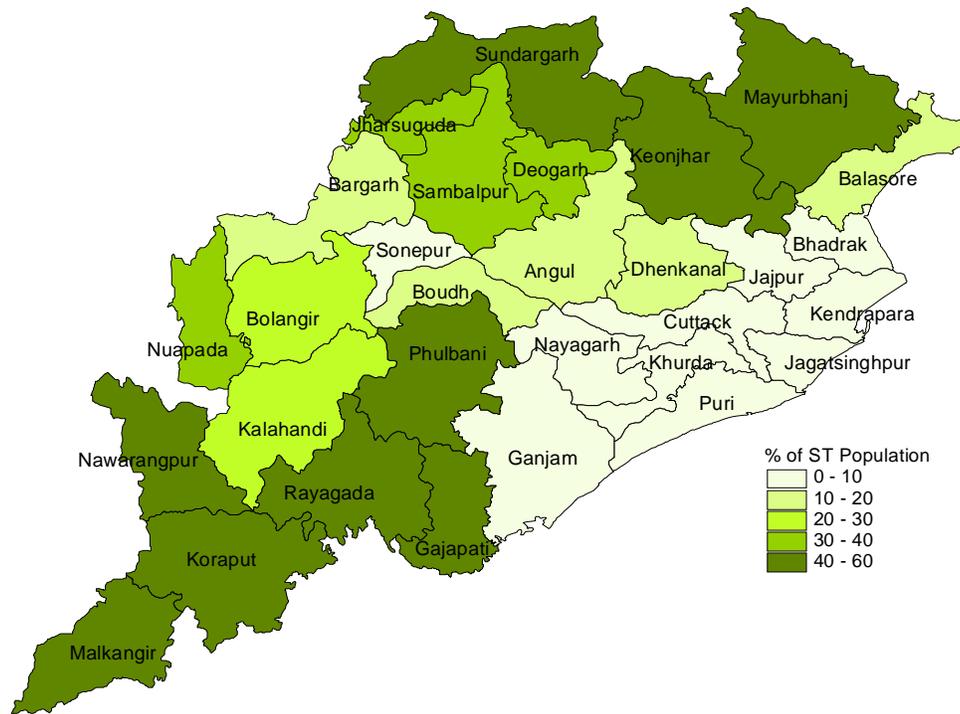
Orissa's proportion of scheduled tribes (ST) (22 percent) and scheduled castes (SC)¹⁹ (16 percent) is significantly higher than that of India as a whole and poverty among these two groups is strikingly higher than among other population groups. More than 75 percent of STs are concentrated in northwestern and southwestern districts whereas more than 50 percent of SCs are concentrated in the coastal region districts. ST communities are distinguished by their traditional dependence on forests for their livelihood.

¹⁷ Government of India, Planning Commission, 1999-2000. Alternative poverty rates calculated in Deaton (2003) suggest a poverty rate of 43.3 percent in Orissa compared to 29 percent in India as a whole.

¹⁸ NSS Data.

¹⁹ Sub-castes like Kaibartas, Dhibars, Baghuti, Gokha and Machhua Keuta are all included in the SC group.

Map 2.1.1: Concentration of Scheduled Tribes Population Across the Districts

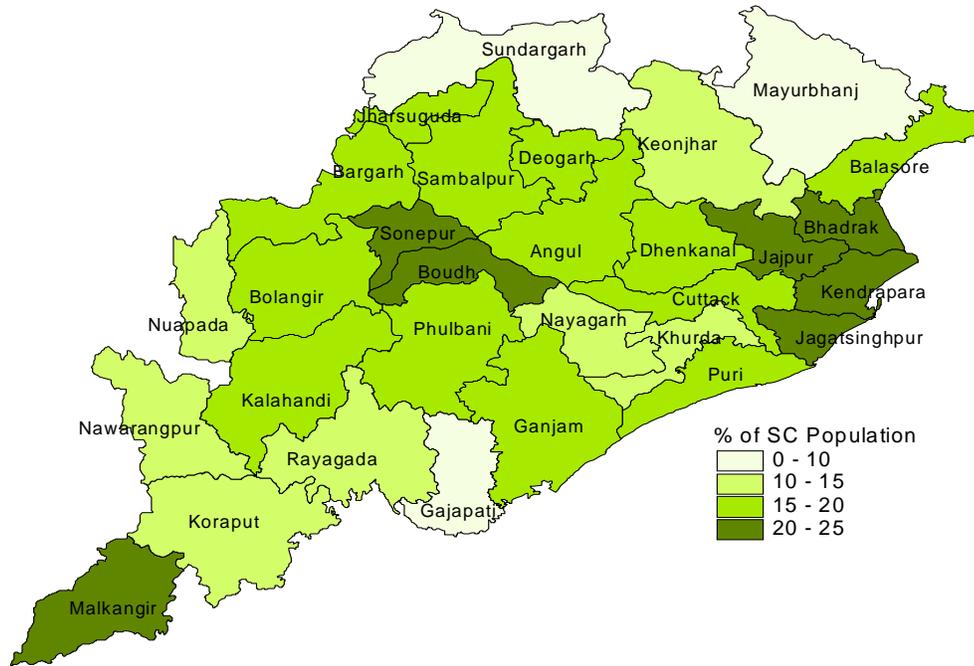


Box 2.1 Scheduled Tribes: Livelihood and Vulnerability Issues

For centuries, forest resources have played a critical role in sustaining the livelihoods of tribal communities in Orissa throughout the year, with both timber and non-timber forest produce (NTFP) providing a source of food, construction material, fuel, medicines, animal feed and fertilizers for cultivation. In addition, small-scale manufacturing of forest-based products has traditionally provided an important source of rural employment. Tribal women play a particularly significant role in forest-based livelihood strategies and contribute substantially to the household economy and food security.

However, formal government ownership over forests and forest products coupled with growing commercialization and degradation of forest resources, has led to the undermining of customary rights and declining economic and physical access to forest resources. Historically, both colonial and post colonial policies appear to have done little to protect the livelihoods of groups that have traditionally occupied forests, focusing instead on revenue generation, state control, outside trade and the requirement to displace indigenous communities (PRAXIS, 2002).

Map 2.1.2: Concentration of Scheduled Caste Populations across the District



The overall incidence of poverty for the rural ST population in Orissa is 71.5 percent (1993-1994), compared to the national ST average of 52 percent. While the ST represent 23 percent of the population, they constitute more than 40 percent of the total number of poor in Orissa. As shown in Table 2.1.1, the incidence of poverty among the ST is a staggering 92 percent within the southern region of the state.

Table 2.1.1: Region and Social Group Incidence of Poverty, Rural Orissa, 1999 to 2000

Region	Poverty Headcounts			
	<i>Scheduled Tribes</i>	<i>Scheduled Castes</i>	<i>Others</i>	<i>All</i>
<i>Coastal</i>	66.6	42.2	24.3	31.7
<i>Southern</i>	92.4	88.9	77.7	87.1
<i>Northern</i>	61.7	57.2	34.7	49.8
Orissa	73.1	52.3	33.3	48.0

Source: De Haan and Dubey, 2003

Between 1993-1994 and 1999-2000, the poverty ratio significantly increased in the southern and northern regions of the state. The inter-district disparity in the poverty ratio

has steadily increased from 1983-1984 to 1999-2000.²⁰ The rural poverty gap²¹ data also indicates that the intensity and severity of poverty in the southern region is almost twice as high as in the coastal and northern regions.²²

Besides general soil fertility, other regional characteristics related to agricultural development help to explain the sharp differential among poverty ratios. Firstly, the irrigation base of the northern and southern regions is restricted as compared to the coastal region with Orissa having the lowest irrigation coverage in the country. Secondly, the intensity of input use in the northern and southern regions is significantly less than that in the coastal region (47 percent and 25 percent respectively).²³ Thirdly, the extent of rural non-farm employment opportunities differs substantially.

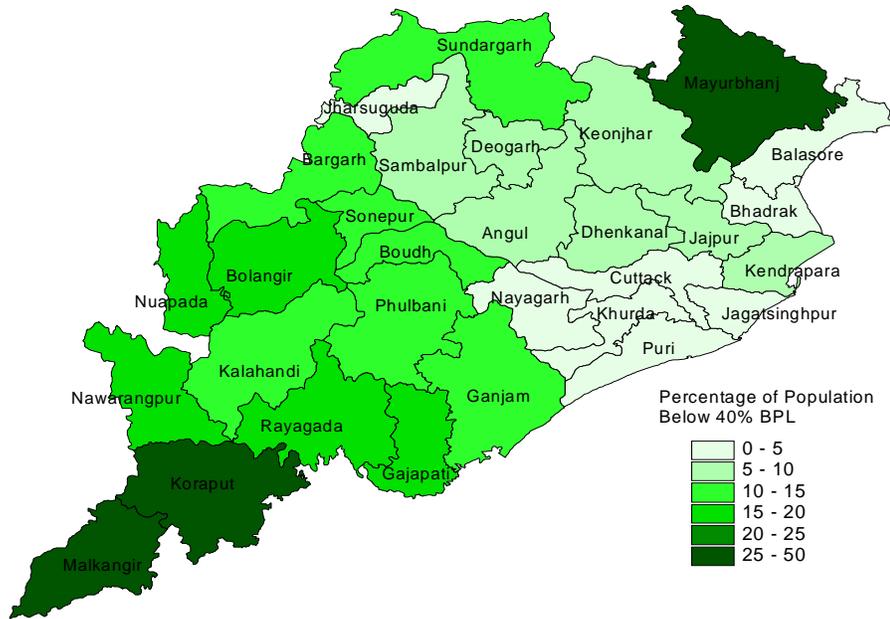
²⁰ De Haan and Dubey, 2003.

²¹ 'Poverty gap' refers to the percentage difference between the poverty line income/consumption expenditure and the average income/consumption expenditure of the poor, thereby measuring the depth and severity of poverty.

²² Government of Orissa and UNDP, 2004.

²³ Government of Orissa, 1997.

Map 2.1.3: Percentage of the Population Below 40 percent of Poverty Line Income in Orissa



Households headed by women (HHW) are generally worse off. When a male head of a household moves away or dies, the earning capacity of the household usually makes a sudden decline. Another significant factor underscoring the high probability of HHW living in chronic poverty and food insecurity involves the patrilineal inheritance system, which effectively governs the property rights.

Table 2.1.2 below provides a summary of National Sample Survey Organization (NSSO) data (50th and 55th Round) for real agricultural wages (on the basis of the price of rice per kg) disaggregated by region and sex. The data highlights how spatial and gender related differences mutually reinforce each other to exacerbate socio-economic disparities.

Table 2.1.2. Real Agricultural Wages (kg. of rice) Disaggregated by Region and Sex

Region	1993			1999		
	<i>All</i>	<i>Male</i>	<i>Female</i>	<i>All</i>	<i>Male</i>	<i>Female</i>
<i>Coastal</i>	3.02	3.20	2.47	3.79	3.93	3.03
<i>Southern</i>	1.95	2.14	1.63	2.25	2.34	2.09
<i>Northern</i>	2.37	2.62	1.91	2.65	2.78	2.35

Source: 50th and 55th Round of National Sample Survey (NSS).

2.2 Agricultural Trends, Food Availability, Markets and Access

Orissa has a highly varied agro-ecological profile which can usefully be divided into four zones consisting of: (i) *Northern Plateau* (hill ranges rising to elevations of 2000 to 3000 feet above sea level (asl)); (ii) *Central Table*²⁴ (generally flat and undulating); (iii) *Eastern Ghats* (hill ranges rising to 2000 feet asl); and *Coastal Plains* (river deltas).

While highland areas constitute almost 50 percent of the state's cultivated area, the relative fertility of soil in these areas is very low, with other features including poor moisture retention and susceptibility to erosion. The result is that cultivation in the highlands is mainly restricted to low water intensive crops, whereas the alluvial soil of the lowlands is more suitable for paddy cultivation. The coastal region presents an essentially mono-cultural cropping landscape. By contrast, hilly forested areas (mainly bamboo and forests) yield a wide range of 'minor' products and hold the state's major mineral deposits. In recent years, degraded forested areas have resulted in more droughts and floods state wide due to more rapid run off of rainwater in the hills and increased sediment load at the delta channels. The coastal areas of Orissa are also highly susceptible to cyclones originating in the Bay of Bengal.

Table 2.2.1: Livelihood Groups in Orissa

Region / Livelihood Group	Northern Plateau	Central Table Land	Coastal Plain	Eastern Ghats
Agriculture Labourer	17.87	24.39	24.86	29.10
Marginal Farmer	25.59	20.66	18.55	26.48
Small Farmer	14.56	10.62	6.73	10.72
Rural Artisan	9.68	1.45	2.22	2.14
Other Groups	32.30	42.88	47.64	31.56

The long-term rate of agricultural growth has been significantly lower than those of the secondary and tertiary sectors and growth in agriculture and animal husbandry has actually slowed down in the course of the 1990s to about two percent p.a.²⁵

²⁴ Also called Mixed Region due to both lowland and highland.

²⁵ Calculated by DJ Research Consultancy from CSO National Accounts Statistics (NAS) data.

Box 2.2 Overview of Causes of the Agricultural Crisis in Orissa

Rainfall dependency: Declining rainfall levels and increasing fluctuations have had an adverse effect on Small Scale Farming Households and Marginal Farming Households who strongly depend on rainfall. Orissa's 10th Plan target was to exceed treatment of 0.5 million ha of watershed area but the implementation has not been effective.²⁶

Irrigation potential not realized: Currently the full irrigation potential in Orissa has not been realized because of inadequate investment, poor infrastructure and ineffective management. Roughly 28 percent of Orissa's gross area planted with crops actually benefits from irrigation at present, compared to the existing potential for irrigation of about 40 percent.

Lack of food security focused research: To date, investment in adaptive research targeting the most food insecure farmers (e.g. crop varieties and planting materials such as *ragi*, *suan*, *kandula*, *horsegram* and drought proof upland rice varieties, etc.) in low potential areas is negligible due to perceived low commercial returns.

Absence of comprehensive vision: Ongoing institutional reforms and high management turn over in the Department of Agriculture have hampered the emergence of a lasting vision for the sector and its effective implementation.

Lack of rights to common resources and land: Lack of access to common resources such as grazing areas as well as titles to own land.

Little progress in horticultural development: GoO estimates that, from a production perspective, the coverage potential of horticultural crops may be around 2 million ha from the present level of 320,000 ha.

Lack of attention to animal husbandry: While milk production increased in the late 1990s, the livestock population as a whole actually declined. Orissa imports significant levels of poultry and eggs from Andhra Pradesh.

Declining fish production: Available data suggests that Orissa's fish production has actually declined in recent years due to the limited use of improved technologies, under-investment in research and a lack of infrastructure, etc. Currently, more than 40,000 tons p.a. of fresh water fish is imported from Andhra Pradesh to Orissa as per official estimates.

As earlier noted, high poverty levels in Orissa are tied to low land productivity and low agricultural wages. Constraints to agricultural growth and restricted access to credit in turn restrict the ability of farmers to invest in technologies for crop diversification resulting in an unusually high share of paddy in total output (90 percent of crop area and 80 percent irrigated area). Strikingly, rice yields fall short of the national level reflecting low agricultural productivity (see Table 2.2.2 below).

²⁶ Government of India, Planning Commission, Mid-Term Review and data from monitoring reports received from implementing agencies in the Planning and Coordination Department, Orissa-various reports (on watershed development).

Table 2.2.2: Selected Agricultural Productivity Indicators for India and Orissa

	Orissa	India
<i>Per capita food production (kg)</i>	164	209
<i>Rice yield (kg/ha)</i>	1210	1930
<i>Food grain yield (qt/ha)</i>	10.8	16.2

Source: Directorate of Food Production and Directorate of Statistics, Orissa and Directorate of Economics and Statistics, Ministry of Agriculture, Government of India

Despite low levels of agricultural productivity, the principal source of food supplies in Orissa is food grain production with intra-state imports of food grains (commercial and public distribution) constituting a marginal proportion of total consumption. Currently, based on the levels of household demand for food (using NSSO consumption data), Orissa is virtually self-sufficient based on the level of household demand in food grains.²⁷ In many of the districts most commonly associated with food insecurity and vulnerability (e.g. KBK districts), the gap between food grain production and effective consumption tends to be positive, whereas many better off coastal districts are technically food 'deficit' on the basis of local production in relation to actual market demand (Tripathy and Misra, 2004).

The Government of Orissa Poverty Task Force defines extreme food insecurity in terms of calorie intake as per capita per day being below 1800 kcal. Using this definition, the proportion of the population considered extremely food insecure has been measured on the basis of various geographical and socio-economic categories as shown in Table 2.2.3 below:

Table 2.2.3: Proportion of Various Socio-economic Categories Classified as Extremely Food Insecure

Specified Population and Group	Proportion of Extremely Food Insecure
Coastal	3.4
Northern	9
Southern	14.8
Agricultural Labourer	11.8
Non Agricultural Labourer	10.9
Cultivator	8.7
Other Labourer	5.8
Self Employed	3.4
Regular Salary Earner	1.6
Male Head of Household	8.6
Female Headed Household	9.7
Scheduled Caste	7.8
Scheduled Tribes	16.5
Orissa as a whole	8.6

Source: Tripathy and Misra (2004)

²⁷ Regional Office of the Food Corporation of India, Bhubaneswar.

There is significant variance in food grain production from year to year (ranging from 5 to 7.3 million MT between 1993-1994 to 2001-2002 for instance) because of droughts and other natural disasters. The effect of seasonal variations and its related consequences for higher prices and lower employment and wages hits poorer and more food insecure households the hardest. Aside from unpredictable shocks, the lean season for Orissa tends to be from July to September, during which time almost four fifths of the population may face some food shortages.

One important factor leading to food insecurity and vulnerability in Orissa is the limited asset base. Landless labourers typically have significantly lower asset levels relative to all other groups while small-scale farmers generally have the highest asset level. The problems concerning the limited asset base can be divided into the following categories:

Human Capital: The human development index for Orissa is significantly lower than the national average with key indicators including high infant mortality rates and maternal mortality rates, high incidence of severe malnutrition, low rates of literacy (especially for women), high school drop out rates and poor standards in health and education. In education, there is some indication of that Orissa may be catching up with the rest of India, both in terms of enrolment and literacy rates for both sexes. However, evidence suggests that health and education are considerably worse among the poor, and this perpetuates a cycle of debilitating ill health, illiteracy and poverty. The adult literacy rate for Orissa was 63.6 percent for both sexes and 51 percent for females in 1999/2000. The field study highlighted poor awareness of basic health and sanitation issues among vulnerable communities. The neglect of human capital development has important implications for the employment prospects of specific groups. For example, the acceleration of mining activities in recent years has reduced the levels of employment generated by agriculture and encouraged people to migrate and take on casual labour, both of which are associated with wage and employment instability.

Social Capital: Rural people tend to live in extended families, communally sharing resources for basic subsistence requirements. As strong intra-caste and community bonds exist, support for neighbours is strong in principle although greatly restrained by resource availability. NGOs have yet to develop the necessary coverage and capital to have a significant impact. As a result, the state plays a major role in the provision of emergency relief. A poor asset base severely restricts the capacity of vulnerable groups to withstand the impact of covariate and idiosyncratic shocks through the adjustment of livelihood and risk management strategies.

Natural Capital: Declining soil fertility is a widespread problem. In the Coastal Plain areas, water logging has increased soil salinity, uncontrolled mining activities have eroded soil, the impact of cyclones have destroyed forest resources, and common grazing land has been reduced. Unsustainable management practices have extensively thinned the forest cover in the Northern Plateau, reducing bio-diversity, including the forest products on which the local and tribal people depend for many of their subsistence needs. In the Eastern Ghats, declining and fluctuating rainfall and frequent droughts over the last two

decades have led to soil erosion, and a reduced ground water and excessive reliance on forest resource resulting in severe degradation. Under such conditions, traditional methods of cultivating crops exacerbate declining productivity levels and result in livelihood and food insecurity for the majority of small scale and marginal farming households.

Physical Capital: Poor rural connectivity and a sluggish market development are major factors underlying the lack of incentives for investment. In terms of physical capital, members of poor and vulnerable households generally live in mud wall structures with thatched roofs, which are relatively small in relation to the number of residents (with five or six people sharing small rooms together with livestock). Such dwellings have little capital value and cannot, therefore, be used as collateral against loans.

Financial Capital: More than 75 percent of the poor rural households interviewed were indebted. Rising debts occur as a result of high interest levels on unsecured loans taken mainly to meet basic consumption needs or to cover the costs of ceremonies. Chronic indebtedness often leads to household income going to repayments, resulting in further crises and the inability to accumulate productive assets over time.

2.3 Food Consumption, Utilization and Nutritional Status

Malnutrition both perpetuates poverty and undermines economic growth, as a result of direct productivity losses from poor physical status, indirect losses from poor cognitive function and increased health care costs. Inadequate food intake in energy terms is only one possible cause of malnutrition. Malnutrition is also caused by bad sanitation and disease, leading to diarrhoea, especially among young children, and by insufficient intake of micro-nutrients. An overview of key indicators for undernutrition and health in Orissa is provided below in Table 2.3.1.

Table 2.3.1 Health and Nutrition Indicators for Women and Children in Orissa

Indicator	Orissa	India
Infant mortality (per 1000 live births)	65	57
% Children 0 to 3 underweight	44	46
% Infants 12 to 23 months who are fully vaccinated	52	44
% households using piped drinking water	10.2	42.0
% households with toilet facilities	19.3	44.5

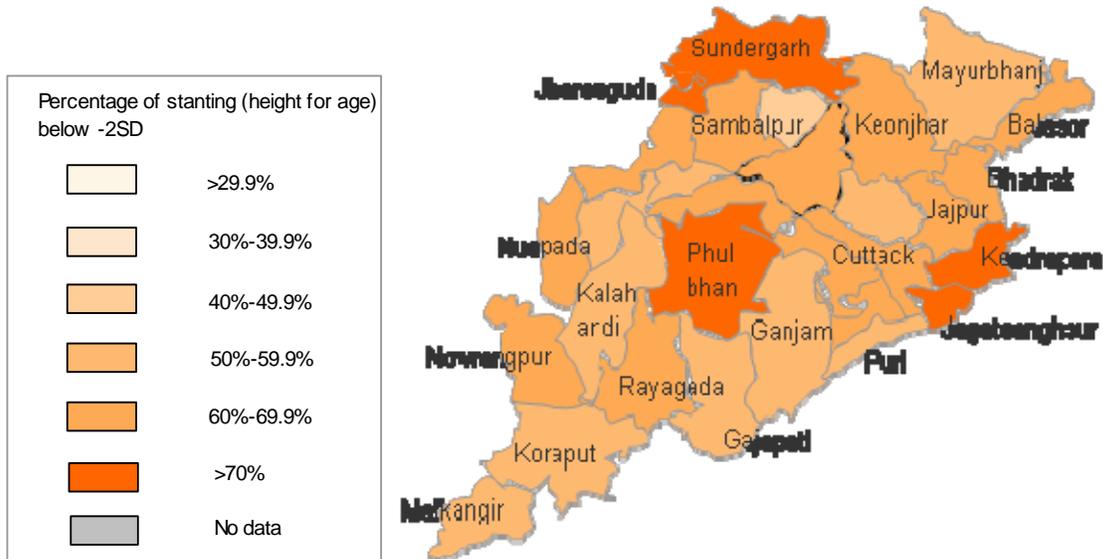
Source: Ministry of Health and Welfare (2006)

There is a significant rural and urban divide in access to proper sanitation. Only 2 percent of rural households have access to piped drinking water compared to 52 percent of urban households.

Height for age, proving the stunting status of children across the districts (pooled gender), is equally spread out and the prevalence of moderately stunted children is nearly 50 to 60

percent. This means that 6 out of 10 children (age one to five years) suffer from chronic malnutrition in every district.

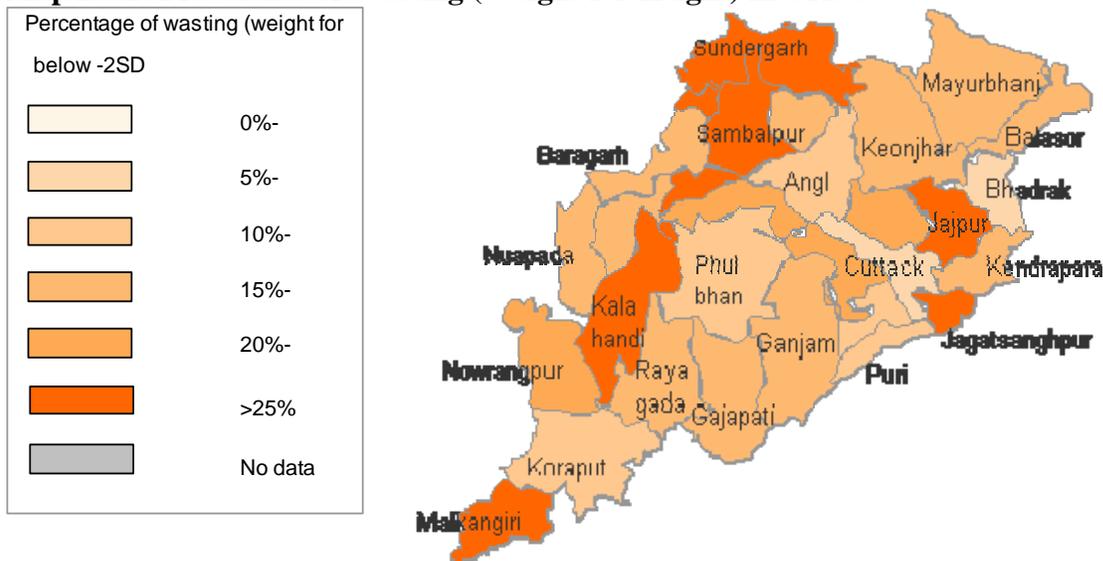
Map 2.3.1: Prevalence of Stunting (Height for Age) in Orissa



Source: National Institute of Nutrition-Indian Council of Medical Research (2002)

The prevalence of wasting does not seem to be distributed consistently across the districts. This means that acute malnutrition occurs in a more visible and concentrated manner in specific geographic zones, and it implies that looking into the homogeneity among these districts marked with a high prevalence of this type of malnutrition could also provide important information on the causes of malnutrition.

Map 2.3.2: Prevalence of Wasting (Weight for Height) in Orissa



Source: National Institute of Nutrition-Indian Council of Medical Research (2002)

Male children are slightly more affected than female children for any kind of moderate malnutrition. In addition, the gap seems to be larger when the malnutrition is severe.

Table 2.3.2. Prevalence of Malnutrition in Children From Age One to Five Years According to Anthropometric Approaches (%) in FIVIMS Selected Districts

FIVIMS selected districts	Height for Age (stunting)				Weight for Age (underweight)				Height for Weight (wasting)			
	< -2SD		< -3SD		< -2SD		< -3SD		< -2SD		< -3SD	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Gajapati	60.3	59.2	23.1	27.2	65.3	61.6	27.3	19.2	18.2	12.8	6.6	2.4
Kendrapadra	76.1	68.8	51.1	41.6	67.7	61.1	26	19.4	15.7	10.7	9.4	5.8
Keonjhar	58.9	58	22.2	27	65.5	56	22.2	19	18.9	12	6.7	0
Nuapada	67.2	58.1	30.6	26.5	64.2	61.1	21.6	24.3	17.2	16	6	4.1

Source: National Institute of Nutrition-Indian Council of Medical Research (2002)

The link to maternal malnutrition is strong with premature births, which result in low birth weight babies, identified as the main cause of infant deaths (accounting for 38.5 percent of all infant deaths).

3. Vulnerable Livelihoods in Orissa

The following section explores the main findings and conclusions from the field study for each of the six selected vulnerable groups outlined above.

3.1 Marginal and Small Scale Farming Households

A household with an operational land holding of up to one hectare (ha) is categorized as a *marginal farming household (MFH)* and with an operational holding of between one and two hectares as a *small scale farming household (SSFH)*. Within the categories of MFH and SSFH, there is considerable variation in agricultural productivity, income, household welfare and more broadly agricultural practices.

For farming households, two key variables relating to food insecurity and vulnerability are of particular importance: (i) size (and security) of land holding, and (ii) potential productivity of land holding (e.g. as a result of soil fertility and access to irrigation facilities). Dependence on rain fed agriculture leads to significant food insecurity. Exposure to covariate weather-related shocks (affecting many households at the same time) locks households into chronic poverty as they cope by drawing on their assets accumulated during better years.

A comparative analysis of reported monthly per capita income for MFHs by different regions is provided below in Table 3.1.1. The greatest proportion of households with a monthly per capita income of below Rs. 100 can be found where the proportion of ST population is highest (Gajapati 58 percent and Keonjhar 58 percent). For all selected districts studied, at least two thirds of all households report a monthly per capita income of under Rs. 150 confirming that severe poverty is widespread.

Table 3.1.1 District-wise Percentage of Marginal Farmer Households in Different Ranges of Monthly Per Capita Income

Monthly Per Capita Income	Kendrapara (Costal Plains)	Gajapati (Mixed Region)	Nuapada (Eastern Ghats)	Keonjhar (Northern Plateau)
Below Rs. 100	38	58	26	42
Rs. 100-150	32	24	41	23
Rs. 150-200	14	14	18	11
Rs.200-250	10	2	6	6
Rs. 250-300	2	2	9	8
Above Rs. 300	4	2	0	9

Virtually all small or marginal households are found to be indebted and facing high rates of interest from local moneylenders. During years of low production, it was difficult to find alternative employment opportunities including public work programmes.

Despite having a low and uncertain income, MFHs reported surprisingly limited access to Targeted Public Distribution Scheme (TPDS) benefits as a result of both problematic local availability and the fact that households did not have enough resources to make purchases required by TPDS. The more secure asset base of SSFHs, compared to MFHs, were able to: (i) build up basic livestock assets (to a limited extent); (ii) gain access to various sources of credit as an occasional risk management strategy; and (iii) purchase TPDS items to reduce overhead costs.

crustaceans. More than two-thirds of the total household income was used to purchase food from local markets. The majority of MFHs were found to be food insecure, while SSFHs with non-irrigated land also struggled to meet basic food requirements. By contrast, farmers with more than two hectares were generally food secure despite low productivity. Gender disparity in food intake was found to be more significant for coastal MFHs and SSFHs, with women eating only after the men and children.

Food insecurity for MFHs in this region is affected by low land productivity, low wage income and high risk of cyclones, flood and erratic rainfall during crucial stages of the crop development. MFHs have a weak productive asset base and make little use of modern farming inputs. Within this category the better off households tend to produce two or more crops (such as paddy, pulses and vegetables) and provide the food security except in years of natural covariate disaster, particularly if they have reasonable access to markets and two or more months of employment a year.

Eastern Ghats

MFHs and SSFHs were found to operate mainly in eroded, rain-fed highland areas and to be food insecure in the majority of cases. MFHs reported struggling to produce enough food (mainly rice and millet) to last four or five months even in a good year. Drought and erratic rainfall are considered the greatest threats by MFHs and SSFHs alike and during droughts (around one in every three years) food production is reduced further. The percentage of irrigated land to total cropland is low. It is common for farmers to report a crop loss of more than 50 percent, particularly in drought years. MFHs' food consumption (mainly rice and millet) is about two-thirds of their required energy intake with nutritional deficiencies even further pronounced. On the other hand, SSFHs with reasonably fertile land and harvesting two crops a year, were found to be significantly more food secure in the Eastern Ghats with a nutritionally improved diet resulting from regular consumption of pulses, vegetables and seasonal fruits in addition to grains. In cases where MFHs or SSFHs were found to have free access to common property resources such as forests, a greater degree of food security was reported, with adequate food produced for around eight months of the year.

Seasonally available forest-based fruits were found to play a critical role in contributing to food security during the lean summer and monsoon months. Migratory labour also provides a key livelihood strategy during this period. While the relative food security of SFHHs is constantly threatened by regular covariate shocks such as drought, these households tend to be in a better position than MFHs to access credit from various sources. However, reducing food intake and selling assets (including pawning BPL cards with local dealers and money lenders) were reported as regular coping strategies.

Northern Plateau

About one-fifth of the population in the region falls into the category of extreme poverty (living on less than 75 percent of the poverty line income), with data from certain districts (e.g. Mayurbhanja) actually showing an increase in the poverty head count rate (from 48 percent to 68 percent between 1993-1994 and 1999-2000) (De Haan and Dubey, 2003). The majority of those living in extreme poverty are MFHs. SSFHs, particularly those

with some irrigation, are more likely to be food secure, because they can grow two to three crops a year and often market their surplus to generate cash for non-food household requirements.

SSFHs tend to have smaller families than MFHs and their dietary balance, as a result, is significantly improved (cereals regularly supplemented with pulses and vegetables as well as meat and fish occasionally).

A crucial factor underscoring chronic (and in some cases, worsening) impoverishment is that the land area per farming household (generally rain fed) has been shrinking. This has turned a number of SSFHs into MFHs.

MFHs are unable to secure the modest investments required to exploit mountain streams for irrigation, so the effect of the shocks associated with erratic rainfall and drought contributes to further impoverishment. There are a number of related factors that contribute to the food insecurity of MFHs, including extremely low land productivity, high levels of unemployment and underemployment and severe indebtedness. SSFHs with larger land plots and, perhaps, irrigation tend to be more likely to invest in farm equipment, fertilizer and manure application, and to adopt modern agricultural practices. As a result of better collateral and repayment records, SSFHs have more ready access to both formal and informal sources of credit. However, SSFHs still live with the constant threat of food insecurity, particularly with respect to the effect of successive droughts (or more idiosyncratic shocks such as crops destroyed by wild animals).

Poor MFHs try to supplement their food requirements through additional employment in the informal sector or by participating in public employment programmes (which tend to provide low wages and reportedly less than 15 days employment a year for some). However, both of these strategies tend to be insufficient to secure minimum consumption needs at the household level.

Mixed Region (Lowland and Highland)

MFHs and SSFHs constitute the most significant component of the food insecure population in the central plateau region. These households tend to practice shifting cultivation as well as seeking additional agricultural employment when available and gathering non-timber forest products to supplement consumption and income. MFHs often consume only one meal a day, while SSFHs were found to consume two main meals a day with significantly greater levels of sustained nutritional diversity throughout the year. Nevertheless, even SSFHs with between two and three hectares of rain fed land depend heavily on the consumption of forest food to ensure food security.

Many households are officially classified as belonging to primitive tribes and face the additional challenge of living in isolated pockets with poor connectivity as well as operating with inadequate or insecure land rights. MFHs in these tribes tend not to use modern inputs or technology, and grow only one crop (using after slash and burn practices) with low productivity levels. Household members generally consume only one main meal per day, which is supplemented by fruits, roots and tubers gathered from the

forest. Seasonal food insecurity and specific nutrient deficiencies are connected to the seasonal availability of forest food. SSFHs with landholdings of between one and two hectares are often better off and were more likely to grow more than one crop and apply manure and fertilizer. The key potential income shocks identified by these groups included drought and the death of a primary earner within a household.

3.2 Labouring Rural Households (LRHs)

LRHs, for whom casual employment is the dominant livelihood strategy, constitute the largest component of poor and vulnerable people in India. In the context of Orissa, with relatively low levels of urbanization and weak economic diversification in rural areas, such households are primarily dependent on the demand of labour from agriculture.

Despite various progressive reforms and legislation regarding the minimum wage for unorganized labour,²⁸ including agricultural workers, implementing these reforms remains a challenge across the country. Even in publicly funded works, de facto violation of minimum wages and gender-based discrimination are common. Moreover, child labour is known to be widespread, although extremely difficult for officials to quantify with any precision. The insecurity experienced by LRHs is underscored by recent research undertaken in Orissa²⁹ suggesting that rural households have access on average to 80 to 120 days of employment per year. For a family of five or six with only one main earner, and at wage rates around the minimum wage, net annual earnings would barely cover the minimum food requirements for four to five months. Both the demand for labour and associated wage rates tend to be substantially lower, especially in areas where less productive dry land agriculture predominates, resulting in chronic food insecurity for many LRHs. LRHs are also highly vulnerable to food insecurity because of covariate shocks such as cyclones, flooding and droughts and their impact on agricultural performance.

For LRHs, the crucial variables underpinning food insecurity and vulnerability include: (i) number of earning household members (and their ability to travel away from home); (ii) number of days of employment available throughout the year in a given area, (iii) wage levels at various times of the year,³⁰ and (iv) extent to which LRHs can supplement their earnings with some small scale (often subsistence) farming.

Table 3.2.1 reports monthly per capita income for LRHs by region. As with MFHs and SSFHs, a larger proportion of households have a monthly per capita income of below Rs. 100 where the proportion of ST population is highest (Gajapati and Keonjhar). The

²⁸ The unorganized or informal sector has been identified by the National Labour Commission as the group of workers (including casual, agricultural, construction, market, domestic workers, etc.) generally unable to organize themselves effectively in pursuit of a common objective as a result of the highly casual nature of employment, a high prevalence of illiteracy, the small scale of enterprises involved, disempowerment and the scattered nature of employment, etc.

²⁹ Tripathy and Misra, 2004b.

³⁰ Given the relative lack of economic diversification and non-farm employment opportunities, this relates closely to land productivity and the ratio of farming to labouring households in a given area.

widespread severity of poverty is confirmed by the fact that for three selected districts, more than 70 percent of all households report a monthly per capita income of less than Rs. 150. However, the data suggests that in Nuapada (Eastern Ghats) the majority of LRHs receive a significantly higher monthly per capita income of between Rs. 150 and 300.

Table 3.2.1 District-wise Percentage of Labouring Rural Households in Different Ranges of Monthly Per Capita Income

Monthly Per Capita Income	Kendrapara (Coastal Plains)	Gajapati (Mixed Region)	Nuapada (Eastern Ghats)	Keonjhar (Northern Plateau)
Below Rs. 100	37	69	22	47
Rs. 100-150	43	8	11	21
Rs. 150-200	9	8	33	21
Rs.200-250	6	8	22	5
Rs. 250-300	3	8	11	0
Above Rs. 300	3	0	0	6

The National Rural Employment Guarantee Act passed in 2005 is expected to have a significant effect on the livelihood security of LRHs by guaranteeing wage employment at a minimum wage rate of Rs. 52.5 per day for at least 100 days per year. Such income support is expected to reduce the likelihood of LRHs having to resort to damaging coping strategies such as depleting existing productive assets, withdrawing children from school to work and cutting back on the quality and quantity of their dietary intake.

In the face of either co-variate or household level shocks, when credit is required, sources tend to be informal or traditional as a result of low collateral and the high risks perceived by more formal credit lenders. LRHs reported errors of exclusion with regard to BPL entitlements, with the result that they could not routinely have access to benefits such as TPDS subsidies. Reduced consumption (both quality and quantity of diet) therefore tends to be a common coping mechanism.

Table 3.2.2: Vulnerability of Labouring Rural Households

	Severity of Vulnerability	
	← Less	More →
	Labouring Rural Households - With Small Plot of Land	Labouring Rural Households - Landless
<i>Number of earners</i>	More than one.	One.
<i>Family size</i>	Four or more members.	Six or more members.
<i>Livestock</i>	More likely to have some.	Tend to have none.
<i>Credit, repayment and saving</i>	Loans more likely to be taken for productive investment as well as unmet consumption needs.	Where an informal loan is taken for investment, it is more likely to be spent on meeting basic household consumption needs.
<i>Migration</i>	Inter and intra-district migration more probable.	Less able to migrate – e.g. for female headed households with responsibility for reproductive tasks.
<i>Health and hygiene</i>	-	Low hygiene and frequent suffering from disease, especially malaria.
<i>Dietary patterns</i>	Some own production of cereal crops, which tends to cover about two months of household requirements - rice, pulses, vegetables and forest produce.	Mostly rice and local vegetables, local forest produce.
<i>Access to government programmes</i>	More likely to own BPL card and access associated subsidies and benefits.	Often de facto excluded from TPDS despite policy entitlement to BPL card.
<i>Risks and shocks</i>	Cyclone, seasonal, drought, flood, disease and death of income earner.	Cyclone, seasonal, drought, flood, disease and death of income earner.
<i>Coping mechanisms</i>	Taking loans and migrating to find additional income. Seasonal food collected from forest and stored to enhance diet during lean period.	Taking loans from neighbours and informal moneylenders. Reduced dietary consumption. Seasonal fruits collected from forest and sold to enhance income.

LRHs in the Eastern Ghat

In the Eastern Ghat most agricultural workers are engaged in dry-land mono crop areas, and agricultural employment in rain fed areas tends to be between 80 and 100 days. A significant proportion of households were found to have only a single earner, which made household insecurity a characteristic for about eight or nine months of the year. Much of the year (outside the peak agricultural season) is spent searching for jobs at both block and district levels, in addition to collecting forest products to consume and sell. A significant number of those seeking employment migrate to the neighbouring state of

Andhra Pradesh where they often have to accept harsh and exploitative working conditions (low wages, long hours, poor health and safety conditions, being bonded for an extended duration without any written contract on the basis of an initial loan provision secured prior to departure, etc.). Many such workers reported that while they are able to manage at subsistence levels during their time at the work place, it is often a struggle to save anything and remit money home to family members in their villages.

LRHs in the Mixed Region (Central Plate)

A significant proportion of LRHs live below the poverty line. Many respondents report that they find only enough employment to meet basic food needs (with poor dietary diversity) for only three months of the year. Impoverished and highly food insecure households engage in a range of activities to supplement agricultural labour (including shifting cultivation on public lands and unauthorised hunting of wild animals for food). Forest collection for consumption (seasonal fruits, roots and tubers, etc.) and mango kernel is a significant activity. The most food insecure households typically also suffer from insufficient storage facilities making it difficult to store food for the lean season.

LRHs in the Coastal Plains

Agricultural labourers from this region tend to secure employment for more days per year (on average 140 days, and about 160 days in irrigated areas) than their counterparts in other areas of Orissa. During the agricultural season, the market wage rate also tends to be close to the minimum wage and even higher in the peak season. Household members report intra-district migrating for periods of about one month to irrigated areas during the summer paddy season. Those living close to the sea or to rivers can supplement their diet with fish and crustaceans.

LRHs in the Northern Plateau

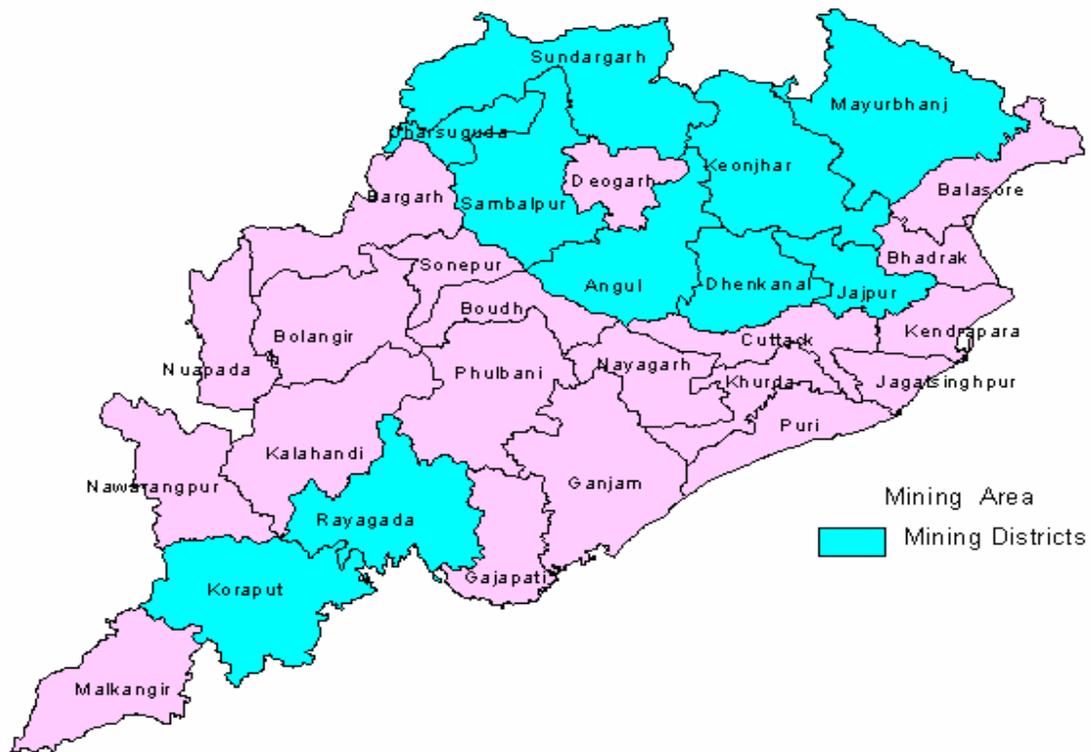
About 75 percent of cultivation is rainfall dependent. In these areas, agricultural workers tend to receive between 90 and 120 days of employment a year. By contrast, in irrigated areas, labourers reported receiving up to 140 days of employment per year. Those without any land report continuous food insecurity.

3.3 Mining Worker Households (MWHs)

Districts with mining-based employment opportunities are mainly in the north of Orissa. Mine-based work tends to be associated with significantly higher daily wage rates than those paid to agricultural labourers (often at least double). However, the work is extremely harsh and workers must relocate away from family, and live, often, in slum areas adjacent to mining sites. MWHs explained that while daily wage rates appear high, average monthly employment is only 15 to 18 days for most workers (due to a combination of employment availability and health and fatigue factors), suggesting that ultimately, income levels are only marginally higher than those of agricultural workers. Additional health expenditures are common because of the mine work and poor diet (exacerbated by the lack of access to forest-based foods in mining areas). Where children accompany workers to the mining slums, they are often left without adult care and without access to education. Alcoholism is another reported problem, in particular among

ST households, which undermines the overall household welfare.

Map 3.3.1 Mining Districts in Orissa



As a result of poverty and despite hard physical work, average daily per capita calorie intake is extremely low with around two-thirds of the population having a daily per capita consumption below 1800 kcal and around three-quarters of total household income spent on food. Key determinants of food security for MWHs include the availability of more than one earner in the family and having free access to forest resources to supplement income and consumption. However, factors such as the sudden closure of a mine and work stoppages lead to considerable livelihood insecurity for MWHs.³¹

³¹ The Government of Orissa is currently developing a comprehensive mining policy to address the livelihood security of both MWHs and those displaced as a result of mining activities.

Table 3.3.1 Vulnerability of Mining Worker Households in the Northern Plateau

Severity of Vulnerability



	Working Inter State	Working Inter District	Working Intra District
Family size	Small family size (under six).	Small family size (under six).	Large (above six).
Occupations	Long term and relatively more secure employment.	Casual occupation including mining and agricultural work.	Casual occupation (only mining).
Income and Expenditure	Low but more regular income with expenditure shared between food, health and education.	Low and irregular income with expenditure mostly on food and health related needs.	Low and irregular income with expenditure mostly on food.
Food Storage	Store fruits and other foodstuff for the lean period.	Store fruits and other foodstuff for the lean period.	Tend not to store foods.
Health and Hygiene	Improved hygienic practices with less suffering from disease.	Poor hygienic practices but slightly less suffering from disease.	Poor hygienic practices with high levels of disease prevalence.
Residential Status	Resident.	Non-resident.	Non-resident.
Access to Basic Services	Less restricted.	Restricted.	Restricted.
Coping Mechanisms	Taking loans and migration for additional income.	Taking loans and migration for additional income.	Taking loans from neighbours and local informal moneylenders. Reducing consumption.

3.4 Rural Artisan Households (RAHs)

Rural artisans throughout Orissa (including traditional potters, blacksmiths, gold and silversmiths, weavers, carpenters, etc.) have generally experienced worsening livelihoods, because locally produced items are being substituted with industrially manufactured goods. For example, modern aluminium utensils have replaced bell metal and brass as well as earthen pots and pans; traditional weavers have not been able to compete with the production of modern mills, etc. A significant proportion of RAHs therefore tend to experience chronic poverty, food insecurity and vulnerability.

In many cases, as a result of market dynamics and falling local demand, RAHs are increasingly indistinguishable from MFHs or LRHs, and may only produce traditional crafts on a small scale. As shown in Table 3.4.1 below, the monthly per capita income of RAHs shows a similar pattern to that identified for RLHs (the majority of the population earning less than Rs. 150 per capita per month), although RAHs still remain slightly better off (with only 13 percent of RAHs having less than Rs. 100 per month, compared to 47 percent of LRHs). However, slightly more RAHs were found to be living with extreme food insecurity (74 percent live on less than 1800 kcal per capita) as opposed to LRHs (58 percent) (see table 3.4.2).

Table 3.4.1 Monthly Per Capita Income of Rural Artisan Households

Monthly Per Capita Income in Rs.	Percentage of LRHs in Northern Plateau	Percentage of RAHs in Northern Plateau
Under 100	47	13
100 – 150	21	47
150 – 200	21	27
200 – 250	5	7
250 – 300	0	0
Over 300	6	6

Table 3.4.2 Rural Labour and Artisan Households' Per Capita Consumption

Calorie Consumption Class (Kcal)	Average Daily Consumption in Kcal Rural Labour (and % share)	Average Daily Consumption Kcal Artisan (and % share)
Under 1200	1081 (26)	1133 (20)
1200-1600	1414(16)	1385 (47)
1600-1800	1710(16)	1782 (7)
1800-2400	2083(31)	1963(26)
Over 2400	2960(11)	0

The challenge of shifting livelihood strategies from artisanal production to alternative sources of secure income has proved difficult. The training such as marketing guidance, financial services, etc. that would support professional diversification and thereby ensure livelihood security has not been provided to any greater extent.

3.5 Fishing Households

The population belonging directly to fishing households is estimated to be more than one million by the GoO,³² but many more are engaged in transporting, processing and marketing fish products. Around 3 percent of the Gross State Domestic Product is provided by fisheries. Approximately 40 percent of the fish production is marine based and 60 percent is from inland fisheries. The sector as a whole has grown by 4 percent per annum and one billion Rs. worth of fish are exported by the state each year. Orissa, like other Indian coastal states, has high fish consumption per capita. About 95 percent of the

³² Government of Orissa, 2002.

fish caught are consumed within the state. Marine fishing households are mainly concentrated in the six coastal districts of Balasore, Bhadrak, Jagatsinghpur, Kendrapara, Ganjam and Puri. Both men and women are engaged in various fishing activities. More than 80 percent of all marine households are below the poverty line.³³

Map 3.5.1: Fisher Folk and Fish Production Centres in Orissa



For the purpose of the study, marine fishing households were selected in two blocks of Kendrapara district.³⁴ Households were found to belong to several scheduled castes and sub-castes with a substantial proportion of the population adopting multiple livelihood strategies (e.g. ferry boatmen, agricultural workers and net making) and many also engaged in illegal fishing (e.g. fishing in mangrove forests and fishing during banned seasons).

Large-scale mechanization has had an adverse effect on traditional fishing households. Production practices by large-scale enterprises have resulted in lower stocks, leading to reduced catch and lower incomes for traditional producers. Those unable to maintain viable small-scale enterprises have often lost their capital and either taken up employment as boat crewmembers for larger businesses, or shifted to more insecure casual employment in the local informal sector. Government backed efforts to support the formation and institutionalization of fishermen cooperative societies have been largely unsuccessful.

³³ Government of Orissa, 2003.

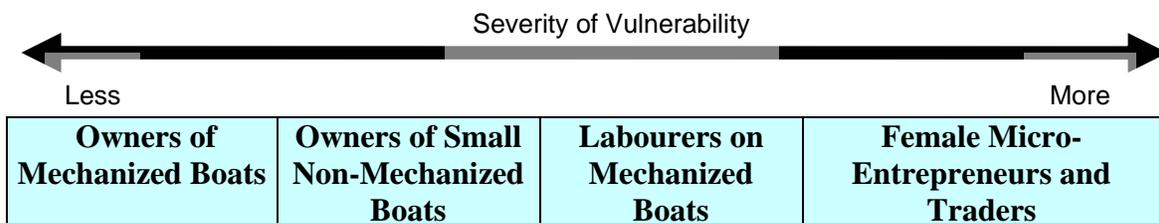
³⁴ For a detailed study of fishing livelihoods in Orissa, see Salagrama 2006.

Discussions with fishing households confirmed the experience of food insecurity as a function of poverty with households having insufficient resources to ensure at least two meals a day for family members, after meeting essential non-food requirements (health, shelter, social obligations, etc.) Households above the poverty line stressed their sense of vulnerability and potential food insecurity with regard to such unforeseen shocks as cyclones, accidents or the death of earning household members, changing government policies, etc.

The average per capita daily energy intake of 40 percent of the fishing household population was found to be just above 1800 kcal. The study found that the children of fishing households tend to have poor health and nutrition status. Many children were held back from school to help generate income. Household incomes were found to vary significantly across time (as a result of both seasonal variation and occasional natural disasters). As with other vulnerable groups, a lack of ownership of productive assets was a key variable underlying the causes of food insecurity for fishing households

For the purposes of more detailed vulnerability profiling, after discussions with the fishing community, the study identified the following distinct sub-groups within the broader category of fishing households according to their degree of vulnerability: (i) owners of mechanized boats; (ii) owners of small non-mechanized boats; (iii) labourers on mechanized boats; and (iv) female micro-entrepreneurs and traders.

Table 3.5.1 Vulnerability of Fishing Households



Owners of Mechanized Boats

People in fishing operations who own mechanized boats, fishing nets and other equipment and engage other fisher folk as crew members earn a reasonably good income of between Rs. 5000 to Rs. 15000 a month, from fishing activities carried out for about seven months in a year. With good network and links to traders they can market their prime products at reasonable prices. They are generally food secure throughout the year. Their family members consume adequate quantities of nutritious food (a combination of rice, fish, crustacean and vegetables). Their average per capita calorie intake is higher than or equal to the recommended 2400 kcal per capita per day. While the big boat owners are relatively rich and often have insurance against weather-related risks, a large number of small mechanized boat owners are vulnerable to food insecurity during recurring cyclones, high and turbulent sea and bad weather. Thus, during the last major cyclone in 1999, almost all of them lost their boats and equipment and were heavily indebted to financial institutions and local moneylenders.

Owners of Small Non-mechanized Boats

People within this sub-group tend to make a reasonable income from fishing. Besides owning their own boats, they usually have their own equipment (such as fishing nets), but do not normally engage other fisher folk as crew members. The members of these households consume a diet of primarily rice, fish, crustaceans and locally available vegetables. Their livelihood is vulnerable to natural disasters such as cyclones as well as to the illness and/or death of an earning family member. They tend to have access to formal credit and can save during good times. They are often BPL card holders and have access to other relevant schemes. As coping strategies they generally tend to use credit, reduce expenditures on food or, in the worst case, sell their boats and other fishing equipment.

Labourers on Mechanized Boats

For six to seven months of the year members of this livelihood group are engaged in fishing activities and earn an average monthly income below the poverty line. They are often paid in kind with half of the fish caught distributed equally among the labourers (with the valuable fish being sold on the market and small fish consumed by family members). They do not own or operate land to supplement their income. Without any other skill and without training, they have difficulty finding other off-season jobs. Although a few work as casual labourers, income from this source is low because of the small number of days engaged (about 20 to 30 days a year) and the low rural wage (reported to be less than 30 Rs. although the minimum wage is Rs. 52.50). They often resort to taking loans from neighbours, boat owners or moneylenders. They are severely affected by the risks of cyclones (reducing the number of days of operation), seasonal changes in diseases (fever, diarrhoea, malaria) that affect their working capacity and a declining trend in the availability of and access to natural resources (including fish population). They eat rice and the small fish and small crabs that cannot be sold.

Female Micro- entrepreneurs and Traders

This group comprises several subgroups, i.e. those who grade fish, those who prepare dried fish (sukhua) for local sale as well as for sale outside the state, and also those who sell small quantities of fish on headloads in villages or in urban local markets. The fish graders help the boat owners in grading the fish as soon as the entire catch is landed on shore. This is usually done for a small charge mostly paid in fish.

The dried fish market both within the state and outside has great potential. But most women lack financial resources so they dry the fish on a micro-scale and mostly earn a below poverty level income. The women pay little attention to sanitation and health considerations while drying fish, which limits their marketing to low-income customers. However, they usually earn more than female labourers.

3.6 Scheduled Tribes Households (Non-timber Forest Products-based Livelihoods)

Almost one quarter (24.61 percent) of Orissa's rural population are ST. The livelihood strategies of ST households in the Eastern Ghats are in many ways similar to those of LRHs as a result of landlessness and primary dependence on agricultural employment. Chronic food insecurity is the norm for those who depend on limited and poorly paid agricultural labour, supplemented by forest collection, as a principal source of livelihood. When households have access to even a small amount of land to complement income and consumption, the well being of household members increases significantly.

The tribal livelihood economy is relatively broad based, covering a range of activities including forestry, horticulture, animal husbandry and crop cultivation. Consequently, the traditional skill base of tribal households (acquired over centuries) is broad involving hunting, gathering, weaving, handicrafts, agriculture, etc. Traditional values are also of great significance within the tribal culture. Local institutions and networks (such as those to support the poorest and most vulnerable members of society) tend to play a central role in reinforcing the consensus around moral norms and conduct, particularly related to concerns for the greater good of the community over and above the welfare of individuals and of individual households. For this reason, development initiatives that focus on enhancing the well being of individuals and households in isolation from broader collective visions have tended not to be effective or accepted by tribal communities. Moreover, the relatively low population density of tribal areas is often perceived by policy makers and planners as problematic for service delivery, market development and employment generation, and so models designed to work elsewhere are not necessarily effective in this setting.

In Orissa, shifting cultivation (based on slash and burn) is practiced by between 20 and 40 percent of the tribal population. As a result of land encroachment by the non-tribal population into traditionally exclusive tribal areas, the continued reliance on this practice has seriously reduced soil fertility and reduced the income available for tribal communities. The study found that more than 75 percent of tribal households belonged to small or marginal farming categories, with small-scale subsistence cultivation generally practiced. A lack of irrigation facilities, a low resource base, poor access to formal credit and relatively undeveloped market linkages, result in a correspondingly low probability of community development. As annual household cultivation is generally short of food requirements for the whole year, wild fruits, roots, tubers, leaves and nuts collected from the forest (together with non-food NTFP sold to generate additional income) are highly significant from a food security perspective. The field study also highlighted the finding that grain and food preservation practices differ widely among tribal communities. In many cases, significant food losses (for grain, forest food stuffs, etc.) were observed and/or reported and possibly reinforced seasonal insecurity.

3.7 Summing Up

Overall, the study confirms the significant prevalence of vulnerability to food insecurity in the areas studied in Orissa. In the Coastal Region 43 percent of LRHs had an average daily energy intake of less than 1800 kcal, and there were 57 percent in the Northern Region and 69 percent in the Eastern Ghats. RAHs are the vulnerable group category with the most extreme food insecurity (see Table 3.7.1) followed by MFHs and LRHs (52 and 58 percent). While none of the MWHs were found to consume more than 2400 kcal per capita per day, around two thirds of all families consumed more than 1800 kcal per capita per day.

Table 3.7.1 State Wide Average Proportion of Households Living with Extreme Food Insecurity

Vulnerable Group	% of Households < 1800 Kcal Per Capita Per Day
Marginal Farming Household	57.5
Labouring Rural Household (Agricultural)	52.6
Labouring Rural Household (Non-Agricultural)	58.0
Mine Working Household	33.3
Rural Artisan Household	73.3
Fishing Household	35.1

Table 3.7.2 below highlights the variation in daily per capita energy intake for children belonging to different livelihood groups and living in different regional areas.³⁵ In addition to confirming the prevalence of extreme food insecurity for the majority of children, the data points to significant differences in the severity of food insecurity (measured by consumption). Children of LRHs (both agricultural and other sectors) and MFHs appear to be the most vulnerable to extremes of food insecurity, particularly in the districts of Gajapati (Mixed Region) and Nuapada (Eastern Ghats), where between 56 and 80 percent of all children were found to consume less than 800 kcal per day.

³⁵ As dietary requirements for children vary according to age (950 kcal for a child of 6 to 12 months, 1600 kcal for a child of 3 to 5 years), the team applied an average requirement for children of all ages.

Table 3.7.2 Variation in Daily Per Capita Energy Intake for Children Belonging to Different Livelihood Groups and Districts

	Estimated Kcal Intake Per Day	Kendrapara (Coastal)	Keonjhar (Northern Plain)	Gajapati (Mixed Region)	Nuapada (Eastern Ghats)
<i>Rural Labouring Households (Agricultural)</i>	< 800	14	18	80	40
	800-1200	67	64	10	40
	1200-1600	14	18	10	20
	Above 1600	5	-	-	-
<i>Rural Labouring Households (Non-Agricultural)</i>	< 800	38	37	60	56
	800-1200	44	50	40	33
	1200-1600	15	13	-	6
	Above 1600	3	-	-	5
<i>Marginal Farming Households</i>	< 800	29	23	73	65
	800-1200	41	60	20	26
	1200-1600	21	15	7	9
	Above 1600	9	2	-	-
<i>Rural Artisan Households</i>	< 800	37	-	-	-
	800-1200	63	-	-	-
	1200-1600	-	-	-	-
	Above 1600	-	-	-	-
<i>Fishing Households</i>	< 800	15	-	-	-
	800-1200	54	-	-	-
	1200-1600	19	-	-	-
	Above 1600	12	-	-	-

4. Options for Reducing Food Insecurity and Vulnerability

4.1 Present Key State Wide Policies and Programmes

There are centrally funded public programmes that directly address poverty, food insecurity and malnutrition. Orissa, as one of India's poorest states with some of the most significant pockets of malnutrition, receives considerable support from the central GoI through such schemes. There is a broad range of programmes, but the most significant are the National Rural Employment Guarantee Scheme (NREGS) and the Integrated Child Development Scheme (ICDS).

The NREGS constitutes a legal commitment to provide an annual guarantee of 100 days employment for every rural household in which adults are willing to do manual labour at the minimum wage. Critics of the NREGS have pointed out that similar schemes have failed to address the root causes of rural poverty in the past because wages paid are too low to lift households from poverty, and do not address the difficulties in generating a productive and sustainable infrastructure that responds to the priorities of the rural poor. Nevertheless, NREGS can also be viewed as a safety net programme protecting food security and potentially empowering and organizing rural labourers.

ICDS, the largest programme of its kind in the world, targets the most vulnerable groups within the population including children up to six years of age, pregnant women and nursing mothers belonging to the poorest of the poor families and living in disadvantaged areas including rural areas, tribal areas and urban slums. The objectives of the scheme are:

- to improve the nutritional and health status of pre-school children in the age-group of 0 to 6 years;
- to lay the foundation for the proper psychological development of the child;
- to reduce the incidence of mortality, morbidity, malnutrition and school drop-outs;
- to achieve effective coordination of policy and implementation among the various departments to promote child development; and
- to enhance the capability of the mother to look after the normal health and nutritional needs of the child through proper nutrition and health education.

ICDS provides a package of services, consisting of supplementary nutrition, immunization health check-up, referral services, non-formal pre-school education, and nutrition and health education. The programme provides an integrated approach for providing basic services through community-based Anganwadi workers and helpers, supportive community structures and women's groups through the Anganwadi Centre, the health system and in the community. These centres are meeting places where women's and mothers' groups can come together to promote awareness and joint action for child development and women's empowerment.

Both the government and academics (Nutrition Foundation India 2006) have expressed concern in recent years that the scheme pays insufficient attention to child feeding practices, education and counselling for mothers, and that the service delivery is not sufficiently focused on children under three.³⁶

Other important centrally sponsored social protection initiatives include the Targeted Public Distribution System (TPDS),³⁷ Swarnjayanti Gram Swarozgar Yojana³⁸ (SGSY) and the Mid Day Meal Scheme (MDM). As an obviously food-commodity-based intervention, TPDS is often considered a key initiative to promote food security. However, reviews have highlighted numerous implementation challenges including leakage, targeting, non-availability of rationed foodstuffs and problems faced by the poor in accessing Below Poverty Line (BPL) entitlement cards. Issues of cost efficiency and long-term market distortion have also been raised in regards to India's long standing grain procurement and distribution systems.

The predominantly tribal districts of Koraput, Bolangir and Kalahandi (known as the KBK districts) are also the recipients of a number of parallel special schemes covering multiple aspects of the rural economy. The Revised Long Term Action Plan (RLTAPT) provides a significant level of resources to the districts and covers natural resource management, construction of infrastructure, livelihood support and investment in safety nets.

Issues relating to the recognition, protection and promotion of sustainable tribal livelihoods and food security are significant to the development discourse in Orissa. In the face of increasing threats to the livelihood security of forest dependent tribal communities, Joint Forest Management (JFM) Guidelines (issued in 1993) have been officially adopted as the core of the New Forest Policy (NFP, 1998) and involve, through the *Vana Surakhya Samiti* (VSS), programmes such as the assertion of tribal rights to collect NTFPs and enhanced responsibilities of local elected village councils (Panchayati Raj Institutions).

Research suggests that the effectiveness of implementation of the large programmes varies enormously across states and within states, on the basis of geographical and socio-economic differences. Problems include beneficiary selection (inclusion and exclusion errors), neglecting human development outcomes and logistical problems (access and timing of resource distribution). Moreover, many different agencies are involved in the delivery of anti-poverty programmes with blurred responsibilities complicating coordination, accountability and transparency. This undermines the ability to review critically the overall cumulative contribution of the schemes.³⁹

³⁶ M.S. Swaminathan Research Foundation (2001).

³⁷ Public hearings organized in 2002 by the Right to Food Campaign in the KBK districts highlighted the multiple challenges faced by poor and food insecure households in accessing TPDS commodities.

³⁸ Micro enterprise promotion for the poor, designed to lift families above the poverty line after three years. The programme provides training and a credit matching subsidy via private banks.

³⁹ See e.g. Ranson et al, 2006; Deshingkar et al, 2005; Kulabkar, 2002; and Sahu et al, 2004 for examples of case studies.

4.2 Reducing Food Insecurity and Vulnerability: Strategic Implications

There are many causes of food insecurity and vulnerability in Orissa. These include fragmentation of land, low wages, reduced access to common property resources and increasing landlessness. The situation has been worsened by the stagnation of the agricultural sector and absence to date of a viable and comprehensive strategy for reform and through the rising numbers of casual labourers. The lack of land entitlements and the resulting environmental degradation seem to have increased the probability of covariate shocks (droughts, flooding, cyclones, etc). Finally, traditional and informal community based support networks are being undermined as a result of widespread and chronic impoverishment, and the public social protection instruments have so far been unable to ensure that everybody are able to meet and sustain minimum levels of welfare.

While immediate food insecurity and guarantee minimum levels of welfare must be addressed with appropriate short term measures, there is no fast track that will guarantee lasting food security for all. It is important that effectively targeted social protection policies and programmes be used as a crucial component of a broader strategy for human development, rather than as an end to poverty, food insecurity and vulnerability in their own right.

To ensure livelihood security, and thereby the eradication of extreme poverty, vulnerability and food insecurity on a sustainable basis, requires a complementary twin track approach (Stamoulis and Zezza, 2003). One track involves growth led *rural development* through the generation of livelihood opportunities that can be accessed by the poor, thereby strengthening their incomes and productivity. The other track focuses on *addressing immediate food needs* of the poorest and most vulnerable and tackle the pervasive uncertainty associated with the experience of food insecurity (e.g. through enhanced access to social protection and ensuring immediate access to food for all). The following section follows this approach and looks at options for increasing food security.

Track 1 – Rural Development: Concrete measures to raise productivity and accelerate diversification are central to livelihood promotion strategies when agricultural activities are so central to rural livelihoods. Interventions include rural infrastructure development (roads, water and irrigation, power, etc.), skills training, private enterprise and market support services (farm-based, agro-processing and non-farm), natural resource management and environmental conservation, regulatory framework for food safety and quality, improved access to enhanced social services (education, health, etc.).

Track 2 – Addressing immediate food needs: Interventions aimed at ensuring immediate access to food by the most vulnerable groups include ensuring adequate provision of social security and social protection; targeted nutrition programmes for the extremely poor, labour intensive public works policies, school meals and gardens, targeted conditional cash transfers and subsidies, etc. Programmes cannot be expected by themselves to reduce poverty, food insecurity and vulnerability on a sustainable basis, but rather ensure that people's welfare does not further deteriorate.

Operationalizing such a twin track strategy to eradicate successfully food security and hunger will necessitate the following cross cutting livelihood components:

People centred focus: The GoO is committed to improving the efficiency and effectiveness of service provision, thereby reducing the food insecurity and vulnerability of the poor. It is also committed to prioritizing the principles of decentralization and community participation to build local institutions and capabilities, strengthen legal rights, enhance inclusive access to resources, and empower women and other specific marginalized and vulnerable groups.

Ensuring optimum impact of scarce resources: This requires targeting areas and communities with a particularly high incidence of food insecurity and hunger with focused policies and investments to support dynamic and pro-poor market development.

Strengthening markets to favour the poor: Accelerating access towards open and fair trading systems, including labour markets, at all levels with special attention to improving market access and information and minimizing trade distorting interventions. However, this should only be done where there is sufficient evidence to suggest that this will enhance poverty reduction. A key requirement will be the strengthening of civil society to ensure effective engagement in the formulation, implementation and monitoring of pro-poor policies.

Commitment to time-bound outcomes: Setting time bound, state level targets that can be monitored for poverty reduction, agreeing on coordinated action, and mobilizing resources (public, private and community based) accordingly.

Effective policies are required to address the range of factors and trends that negatively influence food security such as landlessness, market instability, environmental degradation, and increasingly restricted access to common property rights, lack of workers protection in the informal sector, and inefficient public welfare provision (TPDS and ICDS, etc.). Such factors and trends will benefit from further specialized studies to ensure that they are explored in more depth and in partnership with vulnerable households themselves, in order to enhance the effectiveness of progressive policies and programmes designed to reverse negativities. However, on the basis of the findings generated by the study and stakeholder consultations arising from initial dissemination of the findings of this study, a number of recommendations are made in the following sections.

4.3 Priority Areas for Public Intervention

This study suggests that five cross cutting areas in particular should be prioritized to improve food security and reduce vulnerability, accelerate inclusive agricultural growth and reduce rural poverty: (i) development and take up of appropriate technologies; (ii) enhanced investment in e.g. dry land technology; (iii) capacity building of institutions (public and private) at various levels; (iv) improved opportunities for more inclusive

participation, particularly by vulnerable groups; and, (v) more effective policy management.

The specific recommendations regarding policy priorities emerge from the process of stakeholder dialogue and exchange associated with this study. They have been grouped into the categories of “Track 1 – Rural Development” and “Track 2 – Addressing immediate food needs” following the twin-track approach (see section 4.2). Some of the recommendations are important initiatives under both “tracks,” but they have been put under the track where they are most relevant. However, one cross-sectional group of recommendations regarding the institutional setup has been put under the category “General recommendations” as it covers both “tracks” equally.

General recommendations:

Strengthening the institutional setup

- Track market access and risk management to identify actual and potential risks faced by different livelihood groups in this respect and explore risk management strategies available, and how these might be supported or enlarged.
- Develop potential for greater community synergy, in particular regarding (i) the possible role that self-help groups (SHGs) might play as community and gender empowerment catalysts; and, (ii) ensuring greater responsibility, accountability, and thereby strengthening the role of local government institutions in the coordination of both Anti Poverty Programmes (APP) and broader development initiatives.
- Support the engagement of citizens and civil society organizations such as SHGs in processes of public expenditure tracking and assessments of service delivery to enhance the effectiveness of existing policies and programmes.
- Intensify the commitment and capacity at the state level for poverty monitoring and programme evaluation.

Track 1 – Rural Development:

Greater investment in dry land technology

- Around 70 percent of the gross area for crops in Orissa is rain fed dependent. This will require both technologies to better exploit existing rainfall (watershed development, water conservation, etc.) and enhanced application of regenerative technologies to ensure agricultural growth.
- Regenerative technologies hold enormous promise for improved productivity, efficiency and sustainability for resource poor farmers in low potential areas through conserving existing nutrients and moisture, etc. as well as introducing new elements such as nitrogen fixing crops, agro-forestry, water harvesting, etc.
- Promote private sector expertise (e.g. in technical research and delivery of services) in order to support government extension delivery.

Adaptive agricultural research

- Make greater investments in adaptive agricultural research in collaboration with SSFHs and MFHs (coordinated within comprehensive watershed development strategies).
- Prioritize policies designed to ensure access to quality seed by small farming households.
- Research on indigenous fish food as this constitutes an increasingly high component of overall costs.
- Participatory farm-led agricultural research focusing on priorities such as preservation of bio-diversity to maintain traditional skills in coping with moisture stress.

Watershed development

- Evaluations of water conservation technologies indicate the potential for a 30 to 50+ percent productivity increase where effectively combined with improved technologies for crops. Combined with land reform policies, this can amplify poverty reduction.
- Promote a multi-sectoral approach including markets, extension support, financial services, etc.
- Consider an area targeted approach to accelerate the food security impact (focusing on highlands and KBK areas for instance).

Irrigation

- Where viable, introduce or enhance irrigation systems to boost the income of SSFHs and MFHs where planning, operation and management structures are effective and other relevant constraints (access to inputs, financial services, markets, etc.) are simultaneously addressed.
- Explore public support to SSFHs and MFHs to adopt higher cost drip and sprinkler irrigation technologies to facilitate a shift towards higher value crop production.

Land policy reform

- Replicate/adapt the land policy reform initiatives adopted in West Bengal.
- Ensure land use rights, as an initial priority of such reform, for tillers (shareholders) in plains, hilly and forested areas.
- Develop land reform initiatives in the context of broader participatory agricultural and rural development initiatives (research, credit, marketing, etc.) with an adaptive area and community specific focus.
- Extend rights to tribal communities to cultivate lands up to 30 degrees slope where appropriate.

Joint Forest Management and Promotion of NTFPs

- Strengthen commitment to ensure that recent legislation aiming to devolve forest management and benefit sharing to tribal communities and their elected local representatives is implemented. Accelerate investments in reforestation, social forestry, etc.

- Develop and operationalize state policy on NTFPs focusing on promoting the livelihoods of forest dwelling communities by empowering them to procure, process and market NTFPs, recognizing the value of indigenous knowledge.
- Establish a market network information system for marketing and processing NTFPs, and promote community based enterprise structures.
- Ensure that priority services for NTFP processing and marketing including water, energy, chemical and other inputs, storage facilities, training, technical assistance and marketing outlets are available.

Developing financial services

- Ensuring effective micro-finance requires building adequate capacity (private and public), an appropriate regulatory environment, the inclusion of insurance provision, etc.
- State level, multi-sectoral strategy and coordination of key institutional mandates are needed to promote financial service provision for the poor.
- Review statewide experience regarding self-help groups-commercial bank linkage programmes operating over the past decade, and scale up effective initiatives where appropriate.
- Explore possibilities for introducing micro-insurance, including cost effective commercial insurance to protect farmers from risks.

Diversification through horticultural development, animal husbandry and fish production

- Strengthen policies and programmes to promote horticultural and livestock production (including floriculture and bee-keeping where appropriate), with necessary levels of investment including effective policy and technology support, business development and financial services provision, market development (including large scale investment in infrastructure), active promotion of agro-processing, etc.
- Develop information and communication technologies to support rural enterprises and to help small producers gain access to information on prices, innovative production methods and market trends.
- Review progressive innovations in various states of India and evaluate their relevance for different livelihood groups in the context of Orissa.
- Lease public water bodies to fish production cooperatives with public support to promote the upgrading of technologies, catch preservation, infrastructure, marketing support, etc.
- Tackle underemployment for LRHs and RAHs by promoting subsidiary activities such as animal husbandry, bee-keeping, etc.

Promoting small and medium-sized industries and micro enterprises

- Articulate a joint inter-sectoral strategic approach to promote Small and Medium-sized Enterprises (SMEs) and build an appropriately qualified team of SME expertise within the public sector (to partner with the private sector).
- Opportunities of providing technical and marketing assistance to small-scale units should be supported by creating entrepreneur networks with easy access to

- information and extension services.
- Provide the necessary primary and secondary schooling complemented with vocational training.
 - Establish a special task force on small industries to ensure improved coordination of stakeholders around a common strategic framework for enterprise development.
 - Implement emerging national policy frameworks for enhancing conditions of employment in the non-farm unorganised sector.
 - Ensure that small-scale producers become increasingly involved in marketing and transport.

Developing the tourist sector

- Investment in eco-tourism, particularly in highland areas, complemented with improved transportation and greater professionalism.

Developing the mining sector

- Address the root causes of unrest related to mining sector displacement and investment. These include environmental degradation, livelihood destruction, etc.
- Introduce inclusive planning processes and appropriate levels of investment in relocation and re-training displaced communities.

Developing an urban infrastructure

- Accelerate initiatives to provide urban standard amenities in rural areas with particular emphasis on four connectivities (physical, electronic, knowledge and economic).

Track 2 – Addressing immediate food needs:

Disaster Management

- Develop and implement sub-district, decentralized and participatory disaster management and strategies (such as community based insurance initiatives) to ensure effective and needs oriented response initiatives in specific contexts.

Strengthen anti-poverty programmes for enhanced social protection

- Explore the overlay of livelihood related dynamics with social and inter-generational inequities such as relate to gender, childhood, older people and disabled people.
- Review accessibility, effectiveness and impact of major programmes such as TPDS, ICDS and MDM and ensure proper targeting.
- Focus on enrolment and retention of children at school (e.g. through initiatives such as MDM), which is particularly crucial for LRHs where bonded labour is a key constraint for children.
- Provide subsidized health benefits to mitigate the impact of shocks on impoverished families.
- Improve awareness of nutrition, hygiene, health and sanitation issues to benefit intra-household nutrition.

Food storage

- Disseminate the experiences with community grain banks and scale up the coverage to enhance seasonal availability as technologies for improved storage of foodstuffs can have a significant impact on food security at both the community and household level.

5. Continued Support to Strengthen Food Insecurity and Vulnerability Analysis

A range of central level ministries and corresponding departments at state level collect data and publish reports relevant to food security.⁴⁰ NGOs, UN agencies, bilateral agencies and the members of academia also carry out data collection, analysis and reporting activities for various purposes of relevance to FIVIMS, although the difficulties in accessing relevant information as well as a lack of data comparability makes a systematic review problematic.

Analysis of the food security and vulnerability situation on the basis of socio-economic and livelihood based disaggregation can play a crucial role in highlighting the link between food security's different dimensions of poverty and human development. To be effective, transparent information systems for monitoring and tracking outcomes should be built on the basis of a holistic understanding of how various data sets relate, so they are complementary and ensure optimum synergy between initiatives. They must also be demand driven and responsive to the requirements of both government and civil society representatives for key indicators. During the study, government representatives at the state level emphasized the need to ensure improved transparency and access to information across various levels. Under the Right to Information Act (2005) institutions of public authority (including Panchayati Raj) are required to provide available information to the public through various means. At present, the Management Info System Tracking Vulnerability to Starvation and Malnutrition (MISTVSM) systems are primarily oriented towards ensuring public responsibility for the immediate prevention of starvation under extreme circumstances. While this is a laudable intention as a last resort, integrating specific vulnerability and food security indicators into efforts monitoring broader development initiatives will ensure that policies and programmes are more effectively able to prevent starvation and extreme situations from arising.

The GoI, when discussing making FIVIMS objectives complement existing data collection efforts, initially selected a set of indicators as strategically significant for FIVIMS activities in India. An additional set of five indicators have also been provisionally added by the GoO bringing the total number of currently agreed indicators to nineteen as presented in Table 5.1 below. So far, 11 FIVIMS indicators have been

⁴⁰ In addition to the Planning Commission, these also include the Ministry of Food, Consumer Affairs and Public Distribution (Department of Public Distribution), Ministry of Human Resources Development (Department of Woman and Child Development), Ministry of Agriculture, Fisheries, Forestry and Livestock, Ministry of Rural Development (Department of Panchayati Raj), Ministry of Urban Areas and Employment, Ministry of Health and Family Welfare, and Ministry of Social Justice and Empowerment.

mapped as a result of this pilot initiative for the four selected districts. In addition, for each of the vulnerable groups identified during the study and on the basis of the specific findings, a set of strategically relevant indicators have been proposed for routine monitoring and analysis. This will require special attention for: (i) promoting better understanding of users' needs, relevance of data and enhanced utilization of information; (ii) facilitating the integration of information within broader systems for poverty monitoring; and (iii) improving dissemination and access to information through enhanced communication strategies, networking and sharing.

A key challenge facing the GoO regards the integration of vulnerability and food security analysis into the ongoing Poverty and Human Development Monitoring System (PHDMS) initiative. Currently, the data collected within the MISTVSM initiative for continued food insecurity monitoring is not easily accessible, and the information flow is unidirectional going directly from districts to the Office of the Chief Secretary. Departmental monitoring tends to be restricted to data regarding specific development programmes and related physical achievements and expenditures. Opportunities to strengthen the connection between outputs and programme outcomes (in terms of food security and welfare indicators) are therefore being missed. In order to strengthen existing systems, issues of transparency and accountability will need to be addressed at all levels such that demand from civil society organizations at all levels for evidence of results is more effective.

Table 5.1 List of 14 Indicators Selected for Initiating FIVIMS Activities in India with an Additional Five Indicators Selected by the Government of Orissa⁴¹

No.	INDICATOR	SOURCE/DATA AVAILABILITY
1.	Population below poverty line (rural)	Planning Commission/State Governments/No. of BPL Families
2.	(a) Population below poverty line (urban) and (b) Number of slums and population living in them	Planning Commission/Ministry of Urban Affairs and Employment/No. of BPL Families
3.	Number of landless agricultural labourers	Ministry of Agriculture/State Government/No. of BPL Agricultural Labourers
4.	Number of households with less than one ha of rain fed farm land	Ministry of Agriculture/State Government/No. of BPL Marginal Farmers
5.	Children born with birth weight less than 2.5 kg	Department of Women & Child Development (only for ICDS Blocks)/measured by AWCs

⁴¹ **NNMB** – National Nutrition Monitoring Bureau, Hyderabad (currently covers only ten states namely Kerala, Tamil Nadu, Karnataka, Andhra Pradesh, Maharashtra, Madhya Pradesh, Orissa, West Bengal and Uttar Pradesh). **WCD** – Department of Women and Child Development (Ministry of Human Resource Development). **RGI** – Registrar General of India & Census Commission.

No.	INDICATOR	SOURCE/DATA AVAILABILITY
6.	Under weight (percentage of children age 1 to 5 years according to weight for age)	Department of WCD/NNMB/measured by AWCs
7.	Wasting (percentage of children age 1 to 5 years according to height for age)	NNMB/measured by AWCs
8.	Stunting (percentage of children age 1 to 5 years according to weight for height)	NNMB/measured by AWCs
9.	Chronic energy deficiency (percentage of children age 6 to 60 months according to Indian Academy of Pediatrics Classifications)	NNMB/measured by AWCs (percentage of Grade III and IV Children)
10.	Infant Mortality Rate (number of infant deaths per thousand births)	RGI/Some information available from WCD Dept. GP should also be entrusted with registration of birth and death.
11.	Under 5 Mortality Rate	RGI (S.R.S.)/National Family Health Survey/should be measured by W&CD Dept.
12.	Access to fair price shop within five km	Department of Food Supplies and Consumer Welfare/No. of fair price shops (existing and functioning) Also PDS/AY and AAY allotments and no. of beneficiaries plus number of families who have not accessed entitlements
13.	Annual variation in open market prices of Wheat Rice Coarse cereals Key vegetables	Department of Consumer Affairs/Present Market Price per kg
14.	Number of old, infirm and indigent	Ministry of Social Justice and Empowerment/OAP, ODP, WP, EFP, SSN (No. of Pension Holders), No. of destitute in need of pension
15.	Number of poor female headed households	Female headed BPL household information

No.	INDICATOR	SOURCE/DATA AVAILABILITY
16.	Number of people from Primitive Tribes/various ethnic groups	ST/SC Development Dept/ST + SC Population with disaggregated details for BPL, access to health facilities, access to food supplies/PDS/AY/AAY, etc., population affected by natural calamities and epidemics
17.	Vulnerability to natural calamities	Information collected by Revenue Department on natural calamities
18.	Body Mass Index	W&CD through Anganwadi Centres
19.	Rainfall	Information collected by Revenue Department

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Agricultural Development Economics Division (ESA)

The Food and Agriculture Organization
Viale delle Terme di Caracalla
00153 Rome
Italy

Contact:

Office of the Director
Telephone: +39 06 57054358
Facsimile: + 39 06 57055522
Website: www.fao.org/es/esa
e-mail: ESA@fao.org