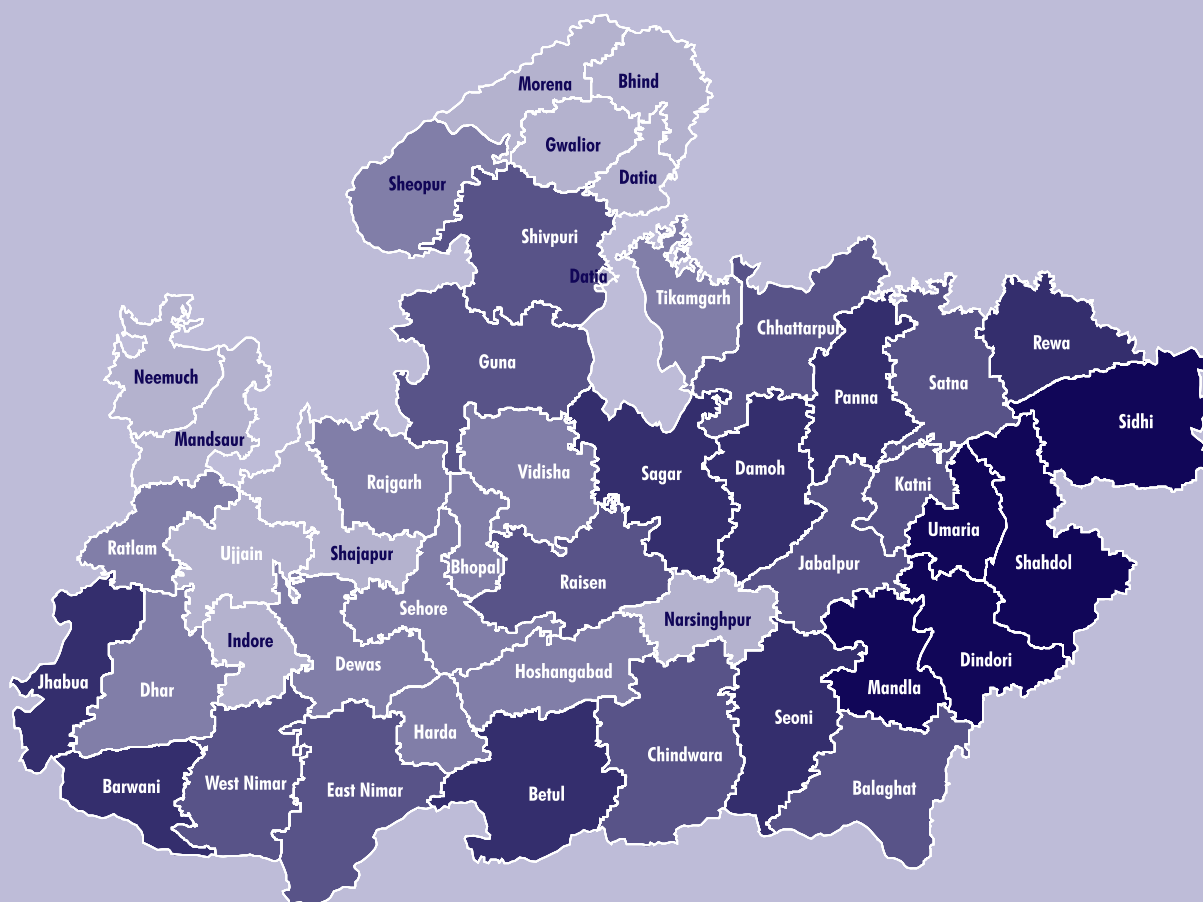


# Food Security Atlas Of RURAL MADHYA PRADESH



The UN World Food Programme



Institute for Human Development

# **Food Security Atlas** **Of RURAL MADHYA PRADESH**



The UN World Food Programme  
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## FOREWORD

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

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

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

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

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

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## Preface

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

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

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

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

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

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

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

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

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

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

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The Madhya Pradesh state report was prepared with the inputs of numerous resource persons and regional institutions, including WFP sub-office at Bhopal which also helped in organising state consultations. We acknowledge Prof. S. N. Chaudhury from Barkatullah University who helped us in the collection and collation of state-specific resource material and data.

A preparatory workshop was organised on 4th October 2007 in Bhopal at the RCVN Noronha Academy of Administration. This was chaired by Mr. Malay K. Roy, Principal Secretary, Food, Civil Supplies and Consumer Protection, Government of Madhya Pradesh, and was attended by experts from the state government, academia and civil society organisations. The insights and active participation of a few experts deserves special mention – Mr. Amitabh Singh, Debate; Mr. B L Sharma, Advisor, State Planning Board; Mr. Sachin Jain, Vikas Samvad, Right to Food Campaign; Prof. S. N. Chaudhary, Head of Department Sociology and Social Work, Barkatullah University; Dr. Kulshrestha, Senior Scientist, Central Institute of Agriculture Engineering; Mr. Prem, Action Aid India; among many others.

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## List of Abbreviations

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

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

# Executive Summary

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

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

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

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

The values of districts on each of these 12 indicators were combined to develop a Food Security Index (FSI), on the basis of which each district was ranked. Districts were also ranked by their performance in food security outcome (FSO) measures, child mortality and undernutrition. The FSO can allow us to rank districts on the basis of nutrition performance, with the caveat that, on the whole, nutritional status in India is poor, and, therefore, the variation between districts may not be very much. The FSI, on the other hand, also allows us to judge the relative importance of variables in the differences between districts.

The analysis of this report has yielded the following districts as requiring special attention for food security interventions in Madhya Pradesh:



### *Priority Districts for Intervention*

<i>District</i>	<i>FSOI Rank</i>	<i>FSI Rank</i>	<i>District</i>	<i>FSOI Rank</i>	<i>FSI Rank</i>
Katni	43	32	Mandla	32	44
Panna	44	40	Shivpuri	42	24
Sidhi	45	41	Guna	40	26
Chhatarpur	34	27	Vidisha	41	20
Dindori	37	43	Sagar	38	33
Umaria	29	45	Barwani	35	34
			Jhabua	38	37

Three clear clusters for underdevelopment in terms of food security can be identified in the state:

- (a) The western tribal districts of Jhabua and Barwani;
- (b) The eastern parts of the state comprising the region adjoining Northern Chhattisgarh (districts of Sidhi, Shahdol, Dindori and Mandla) and large parts of Keymore Plateau (districts of Panna, Katni and Umaria);
- (c) The third distinct region is Bundelkhand (particularly Chhatarpur) and the peripheral districts of the Bundelkhand Region – Damoh, Sagar, Vidisha, Guna and Shivpuri that form the margin of Vindhya Plateau and southern parts of the Grid Region (Gwalior and surrounding districts).

Among the eight states of this study, Madhya Pradesh has the lowest per capita calorie intake and the worst performance in terms of child mortality and undernutrition indicators. Thus, in terms of food security outcomes, the state is one of the worst performers in the country, with 60 per cent of the children underweight and almost 30 per cent of them are severely underweight. In terms of wasting as well, the state has the highest figure (35 per cent). Half of the children are stunted, an indicator of chronic undernutrition. In general, the districts of Madhya Pradesh fare poorly on nutritional outcomes, with Northern Chhattisgarh Region, Buldelkhand and Jhabua Hills forming the most insecure regions. Ensuring food security and improving the nutritional status is also a challenge for the rest of the state as a whole. The identification of certain districts for priority action does not mean that either resources or efforts to bring up all districts can slacken; but only draws attention to the need for more inclusive growth efforts and the special efforts needed to bridge the divides among various regions and districts of the state.

Improving irrigation facilities and access to roads are two areas in which the low productivity, poor and subsistence-based forest districts of the state considerably lag behind in the country. Rural connectivity and small-scale irrigation in a manner appropriate to regions affected by drought and



large-scale soil erosion, along with improving female literacy, should form the core of efforts to reduce extreme poverty, and thus hunger, in the food insecure districts of Madhya Pradesh.

Also special efforts are needed for improving livelihoods of forest-based populations. This itself comprises a number of measures, including:

- (a) Implementation of the Forest Rights Protection Act so as to provide security of tenure
- (b) Investment to enable a shift to production of high value crops
- (c) Shorten the chain of intermediaries and promote value-added processing in NTFP.

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

Measures to increase household and individual incomes need to be supplemented by Community Forest Management (CFM), which can enable communities to balance production and local environmental concerns.

Complementary steps need to be taken for women's empowerment in the household and community, and their access to food through:

- Literacy and education
- Women's land rights.

Micro-finance, through SHGs supported by NGOs, could help:

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

In Madhya Pradesh there are four issues of land reform that need to be tackled in order to improve food security:

- (a) Restoration of illegally-acquired tribal lands
- (b) Distribution of land to landless, largely SCs
- (c) Security of tenure of STs in forest areas
- (d) Women's land rights



Madhya Pradesh is predominantly agriculture dependent and has a large proportion of agricultural labourers in the rural workforce. Schemes of distribution of agricultural land to the landless, including women, would help in improving access of the rural poor to food and thus reduce food insecurity. Increasing productivity in common lands, often unmanaged pastoral or otherwise degraded lands, would also increase food security.

The agricultural production in the state is largely rainfed. Revitalising this agriculture is a necessary step to reduce food insecurity, as that would increase both employment and wage rates. Efforts to diversify agriculture and provide incentives for growth of secondary sector activities are other useful measures in this direction. Employment programmes (e.g. NREGA schemes) can themselves be planned to improve infrastructure to provide needed public goods (roads), or quasi-public goods (irrigation) for the area.

Improvement in the implementation of these government schemes depends, at one level, on improvement in administration and governance systems. But more important is the role of the people who are to benefit from the schemes, whether organised through CBOs, NGOs or traditional tribal bodies – in both **demanding and monitoring implementation** of the numerous schemes.

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

# 1. Introduction

Latest hunger estimates show that there are almost 850 million undernourished people across the globe. Almost all of these - 98 per cent - reside in the developing world. Over 300 million undernourished people live in South Asia, of which India alone accounts for 230 million. Despite the immensity of the problem and although reducing hunger has been recognized as the first Millennium Development Goal (MDG), hunger and food security receive less attention than poverty reduction from both a policy and research perspective.

As a signatory to the UN's Millennium Development Goals (MDGs), the Government of India and all state governments have an obligation to reduce by half the proportion of people suffering from hunger by 2015.

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

The persistence of undernutrition and the reported occurrence of starvation deaths together define the nature of the current problem of food insecurity within a situation of overall adequate availability of foodgrains. The fact that they occur within a situation of adequate foodgrain availability (domestic foodgrain production plus amounts released from government stocks plus imports made possible by India's burgeoning foreign exchange reserves), serves to underline the importance of framing adequate policies and interventions to secure food security, or access to food, for not just households, but also individuals. It also provides the rationale for this report, prepared by the Institute for Human Development (IHD), on behalf of the United Nations' World Food Programme (WFP).

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



decided to extend the analysis to the district level, the level at which food security interventions are implemented.

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

The main objectives of this report are to analyse the nature and dynamics of the food security situation at the sub-state level and suggest disaggregated strategies. It is hoped that this Atlas will stimulate action and further analysis.

To contribute to reaching the above goals, the Institute for Human Development (IHD) has undertaken an analysis of the dimensions of food security at the sub-state or district level on behalf of WFP. This has been done for 8 states of India including Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Maharashtra, Orissa, Rajasthan and Uttar Pradesh. This report documents the food security situation in Madhya Pradesh, with following underlying objectives:

- To identify the regions and social groups in Madhya Pradesh most affected by food insecurity;
- To analyze the nature and dynamics of the food security situation at the sub-state level; and
- To suggest policy interventions appropriate to improving food security for those regions and social groups.

It is hoped that this Atlas will stimulate action and further analyses. With this effort, the issue of food security must be brought to the forefront of the development and political agenda not only at the Centre, but also at the state/sub-state level.

## 1.1 What is Food Security?

What constitutes food security has gone through two phases of understanding or definition. In the 1970s, food security was understood as the 'availability at all times of adequate world food supply of basic foodstuffs...'<sup>1</sup> (UN, 1975). But the seminal work of Amartya Sen in 1981 on '*Poverty and Famines: An Essay on Entitlement and Deprivation*' brought forward a new understanding to the problem of hunger or food security. Rather than just the 'availability' of food, Sen emphasised 'access' to food through what he called 'entitlements' – a combination of what one can produce, exchange in the market plus state or other socially provided supplies.

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1. The World Food Summit (1974) defined food security as 'availability at all times of adequate world food supplies of basic foodstuffs to sustain a steady expansion of food consumption and to offset fluctuations in production and prices'.





What Sen posited is that availability or supply of food does not itself create entitlements for food.<sup>2</sup> Sen's theory was followed by an expansion of the definition of food security by FAO in 1983 to include access by vulnerable populations to available supplies. Food security was thus defined as 'ensuring that all people at all times have both physical and economic access to the basic food that they need' (FAO, 1983). The World Bank further enhanced the scope of the term to ensure 'access of all people at all times to enough food for an active, healthy life' (World Bank, 1986).

The definition of food security adopted at the World Food Summit of 1996 is comprehensive and widely accepted - 'Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life' (FAO, 1996).

What an individual or household can consume or access depends on the individual's or household's entitlements. Entitlements draw attention to the conditions under which people access food, whether from direct production (or exchange with nature), market exchange (income from either goods produced or wage labour) and social security measures. They also draw attention to the rules that govern intra-household allocation, as a result of which women and girls may face hunger or deprivation even though they are part of households whose general entitlements are sufficient. Importantly, entitlements point to the fact that hunger is situated within poverty, rather associated with extreme poverty, as a result of which households and individuals do not have adequate entitlements to food. Thus, the elimination of hunger is the first landmark in reducing poverty.

Food, of course, is not an end in itself. Food is consumed for nutrition. Instead of focusing attention on the commodity, one can look at the objective for which food is consumed, that is providing nutrition to body. The purpose of nutrition, in turn, is not just to survive, but to lead a healthy and meaningful life.

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

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



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

Capabilities are a combination of two factors – states of well-being (like being well nourished and being healthy) and activities (achieving self-respect, or being socially integrated). Self-respect and social integration are in themselves goals of a meaningful life. But they are also instrumentally important, in that those without self-respect or the socially marginalised may not be able to achieve food security. Consequently, achieving self-respect or playing a meaningful part in social life may both be necessary to achieve food security. This leads to the proposition that food security is not just a matter of some external organisation, whether the state or society, providing food, but of the enhancement of the capability of the hungry or poor. Thus, some level of complex capabilities becomes necessary to reach adequate levels of primary well-being.

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

Empowerment of the poor in general and the women in particular is necessary in order to bring about the much-needed political will that is often referred to as missing, in order to bring about adequate attention to food security policies. Without adequate political pressure for reform, proper food security policies are unlikely to be adopted. There can be no question that the political mobilisation of the poor is required for such a food security policy to be implemented.

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

In India, following the case filed by the People's Union for Civil Liberties (PUCL), the Supreme Court has passed a number of judgments and orders on realising the right to food (Appendix I). These include orders to implement the Mid-Day Meals Scheme (MDMS) in primary schools in all states, the provision



of work, etc. Consequently, it is in the context of the international and national obligations, following the acceptance of the right to food, that this Report looks at the ways to realise food security.

The concept and implications of food security has, thus, undergone a sea change since it was initially coined. Food security as it stands today takes off from the availability of food, access of it by all and finally its consumption for a nutritious and healthy being. The present exercise attempts to follow this line of analysis through a set of indicators - resulting in an innovative approach to frame a food security information system at the state level.

## 1.2 Overview of the Report

This report is an effort to provide a district-level profile of food security in Madhya Pradesh. As the country moves towards greater devolution and decentralisation, data at disaggregated levels remain a stumbling block. District-level data are highly inadequate and this report urges for greater attention to be paid to data collection and dissemination at sub-state levels. The next chapter provides an overview of the state and places it in the context of other states in the country. Chapter 3 derives a composite index of food security outcomes and provides a brief methodological note. It draws a distinction between the Food Security Outcome Index (FSOI) that is based on outcome measures on the one hand, and the Food Security Index (FSI) that is a composite index of the factors that are critical to food security on the other. Chapters 4 to 6 analyse the food security situation along the dimensions of availability, access and absorption. The most food insecure districts both in terms of outcomes and in terms of the factors that contribute to it are given in chapter 7. The strategies for action that emerge from our analysis are placed in the context of the broader state and national strategic interventions already in place. This is most significant from the perspective of policy. Chapter 8 wraps up with the final conclusions.

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## 2. A Profile of the State of Madhya Pradesh

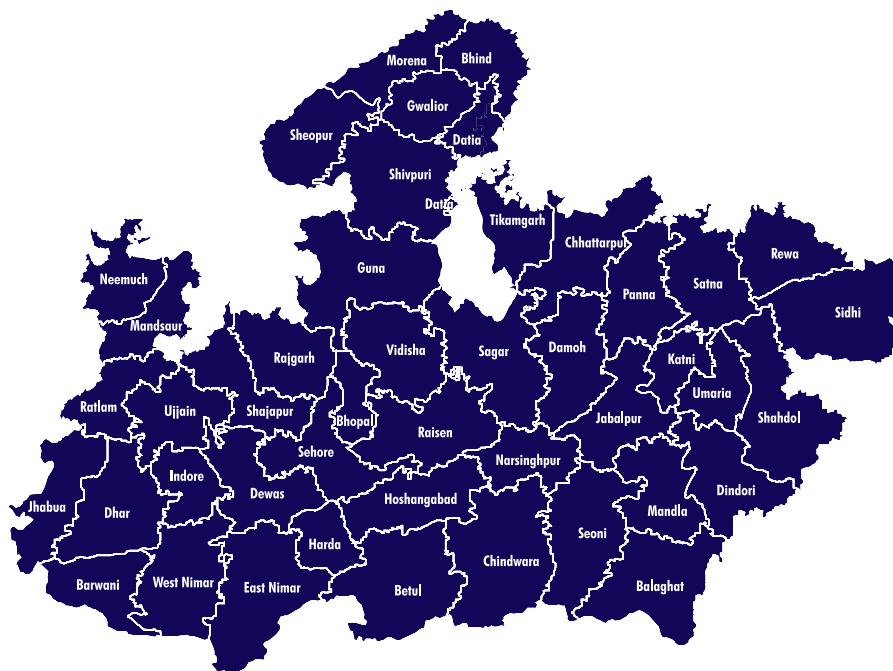
Food security has multiple dimensions and is linked to almost all sectors of the economy. In order to understand and map the food security situation in Madhya Pradesh, we first provide an overview of the socio-economic profile of the state and the important changes that are taking shape in the macro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

### 2.1 Agro-Climatic Regions

Madhya Pradesh forms the vast heartland of the country. Till bifurcation of the state into the two states of Madhya Pradesh and Chhattisgarh in 2000, it was the largest state in the country in terms of area. However, Madhya Pradesh is still the second largest state in the country, accounting for almost 10 per cent of the total area of the country (Map 2.1). However, in terms of total population it ranks seventh – a pointer towards sparsely populated terrains of the region.

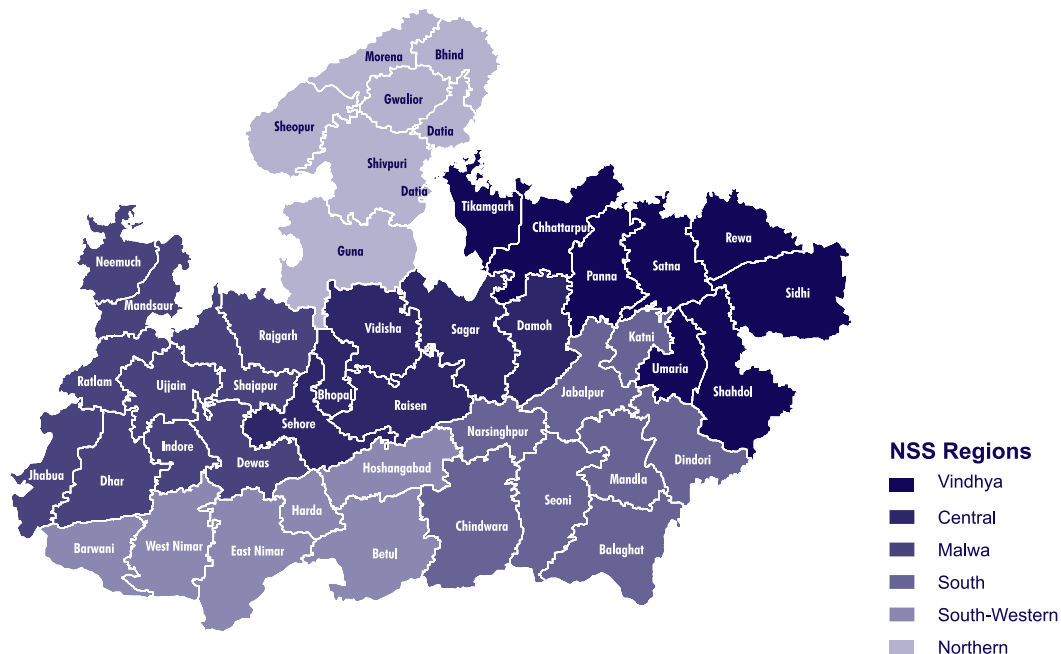
Because of a vast geographical area, the state is characterised by huge regional variations. The state receives an annual rainfall of 1150 mm, but this varies from almost 1600 mm in Mandla in the east to less than 700 mm in Datia in the west-central region (Sen *et al.*, 2007). Consequent upon these regional variations, the state has as many as eleven agro-climatic regions.<sup>1</sup> The eastern half has generally sub-humid climate while the western half has arid or semi-arid climate (Department of

Map 2.1: Madhya Pradesh: Administrative Divisions

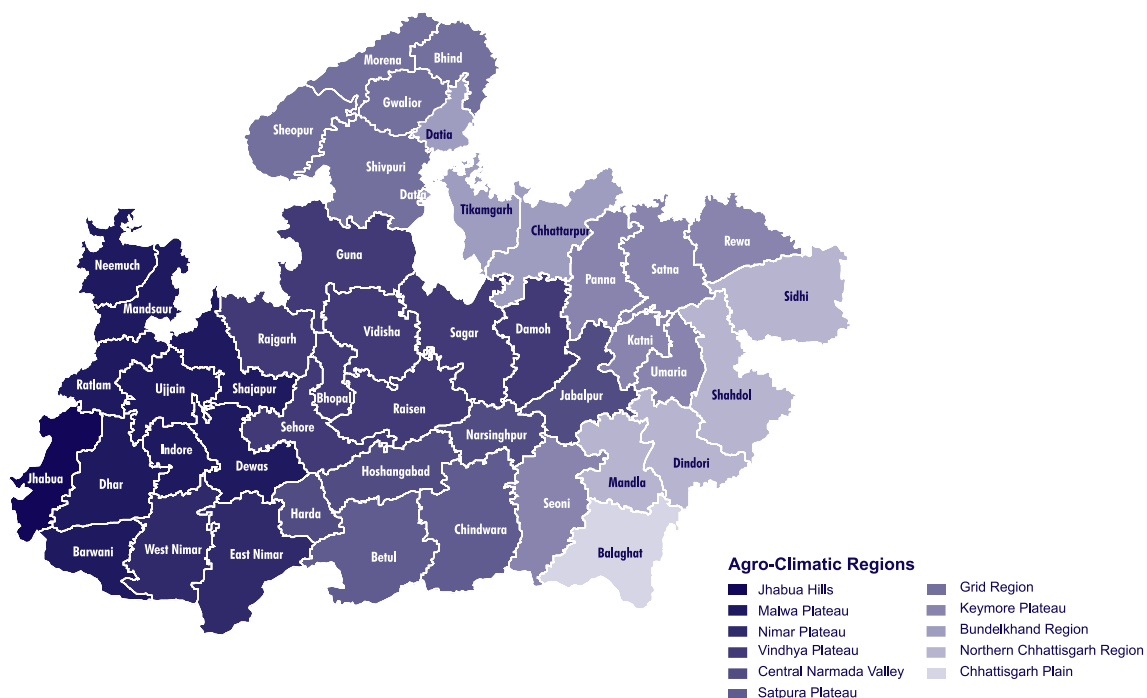


1. Keymore plateau in the eastern part of the state is also popular as Baghelkhand.

**Map 2.2: Districts by NSS Regions in Madhya Pradesh**



**Map 2.3: Districts by Agro-Climatic Regions in Madhya Pradesh**





Agriculture, GoMP). The National Sample Survey Organisation (NSSO) follows a similar pattern of regionalisation of the state, but it combines some of the agro-climatic regions to form six NSS regions, which still is the highest among all states, besides Maharashtra (Maps 2.2 and 2.3).

## 2.2 Economic Status and Poverty

Despite its huge size and rich natural resources, the state lies seventh in terms of NSDP among the major states of the country.<sup>2</sup> The per capita income at Rs. 7600 is very low and reflects the high poverty levels – the state lies at the 13th position in both per capita income as well as poverty ratio.

**Table 2.1: Net State Domestic Product (NSDP) and Rural Poverty Status**

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

Note: TE = Triennium ending

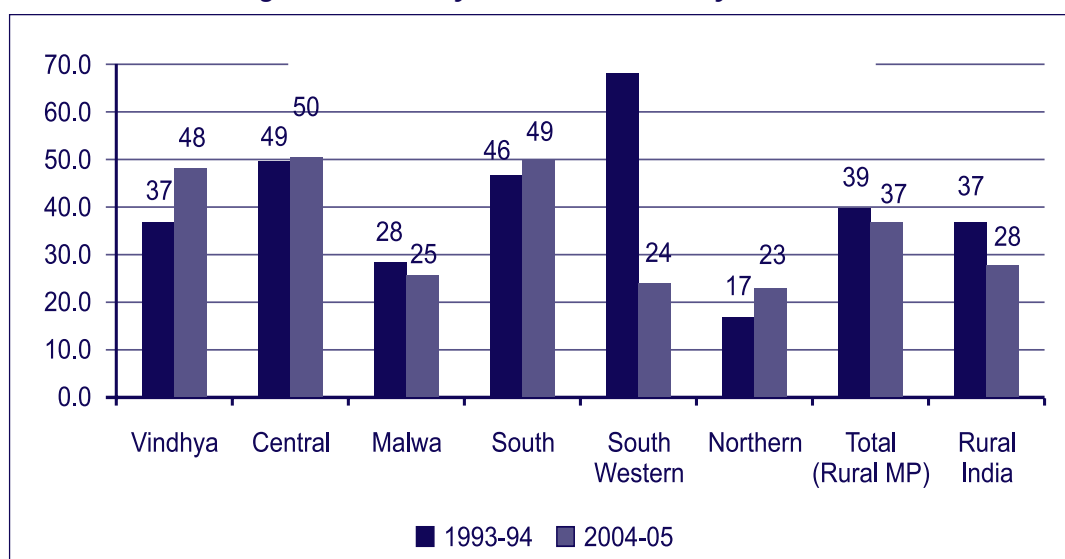
Source: NSDP and Per capita Income – Computed from CSO, Various years; Poverty Ratio (based on URP consumption)– Planning Commission Poverty Estimates, Computed from NSS 61st Round, 2004-05.

The proportion of poor people in rural Madhya Pradesh is quite high (36.9 per cent) as per the latest figures released by the National Planning Commission. In fact the incidence of poverty is higher in rural Madhya Pradesh than that of rural India (28.1 per cent). Rural Madhya Pradesh has the fifth

2. Major states have been defined as those states with a total population of 20 million or above. In all analyses only the major states with this criterion have been discussed, unless otherwise specified.

highest poverty rate after Orissa (46.8 per cent), Jharkhand (46.3 per cent), Bihar (42.1 per cent) and Chhattisgarh (40.8 per cent). Within Madhya Pradesh also, there exists considerable amount of regional disparities in terms of incidence of poverty.

**Figure 2.1: Poverty Rate in Rural Madhya Pradesh**



Source: NSS, Various Rounds, based on Uniform Recall Period (URP).

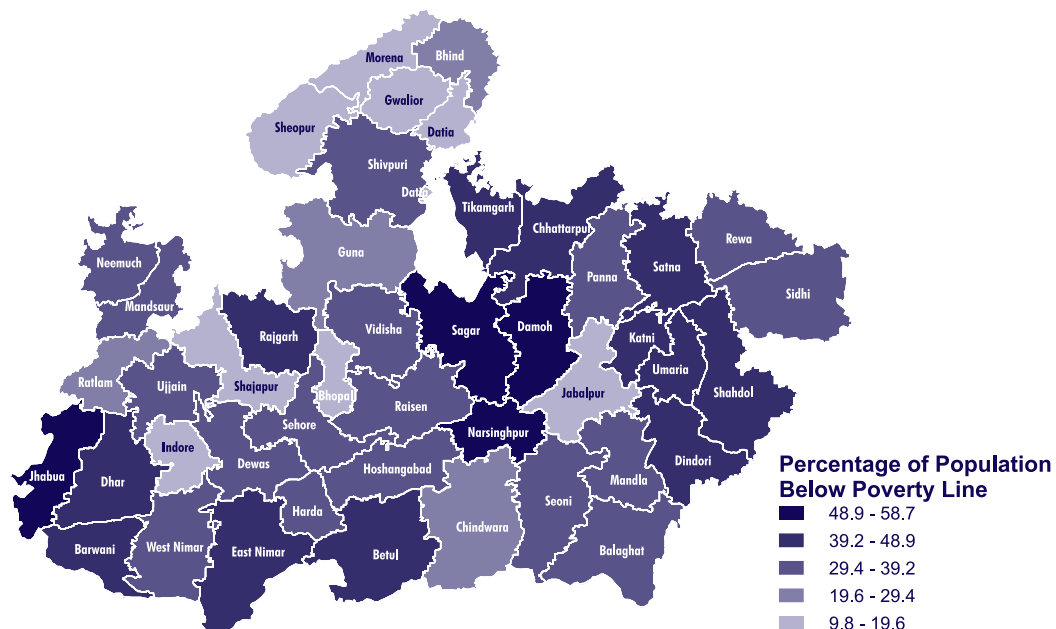
At the NSS regional level, poverty rate is lowest in northern Madhya Pradesh (22.87 per cent) while it is highest in central Madhya Pradesh (50.40 per cent). Poverty is also high in regions like Vindhya (48.02 per cent) and South (49.45 per cent). In regions like Malwa Plateau (25.09 per cent) and the South West (23.77 per cent), the poverty rate is lower than overall rural India average.

Although the incidence of poverty has fallen in the state over the period 1993-94 to 2004-05 it is still higher than rural India figure by more than 8 percentage points. The fall in poverty is very significant in the south-western region. The poverty rate was the highest in south-western region in 1993-94 but it has dropped to 23.77 per cent from 67.83 per cent. The scenario is opposite in the Vindhya Region where poverty rate has moved up by 11 per cent points. The trend of rising poverty rate over the period is also noted for the southern and northern regions of the state. Central region has seen a very insignificant rise in poverty rate. What is noteworthy however is that it (Central) is the region where the poverty levels are the highest in 2004-05. Apart from Malwa and the south-western region which are among the relatively lower poverty regions as per NSS figures, the remaining four regions have seen a rise in poverty rates (Map 2.4).

Apart from regional disparities in poverty there are also sharp differences in the prevalence of poverty by social groups. Poverty among Scheduled Tribes in state is uniformly high in all the regions. Not only that, the rate is higher than the all India average for STs by more than 13 per cent points. The



**Map 2.4: Proportion of Population Below Poverty Line in Madhya Pradesh**



share of ST in the poor household is much greater than their share in the population - they constitute 26 per cent of total rural households but 41.5 per cent of all poor households.

The poor status of the tribal population in Madhya Pradesh can be gauged from the fact that the STs have the highest poverty levels in all regions of the state. For instance, in the Vindhya Region where poverty levels are higher relative to other parts of the state, the STs record a higher poverty rate. However, even in the northern region, where poverty rate is quite low (lowest in Madhya Pradesh), poverty among STs are still as high as 73.4 per cent.

Similarly, the SC population form 19 per cent of the rural population but contribute 22.22 per cent of the rural poor population. Within the SCs, the incidence of poverty is 43 per cent. The STs and SCs together account for 63.72 per cent of the rural poor, while accounting for only 45.15 per cent of rural households.

in rural MP, the share of OBC in the poor households is also significant at around 31 per cent while their share in total population is 40 per cent.

The trend in decline of poverty rates among social groups reveals that the decline in the non-SC/ST population, which already had a lower proportion of poor people, has been higher as compared to that among the SCs and STs. Remarkably, while the prevalence of poverty among tribal population declined by 18 percentage points at the national level between 1983 and 1999, the decline was just 10 per cent in Madhya Pradesh.





**Table 2.2: Region-wise Percentage Share of Poor and All Households by Social Group for Rural Madhya Pradesh (2004-05)**

Regions	ST	SC	OBC	Others	All*
<i>All poor households</i>					
Vindhya	41.86	14.64	34.77	8.73	100.00
Central	18.18	40.86	38.16	2.80	100.00
Malwa	48.40	28.98	17.64	4.97	100.00
South	50.27	13.85	34.53	1.35	100.00
South-western	56.14	15.54	16.49	11.83	100.00
Northern	34.33	32.72	27.76	5.19	100.00
Total	41.50	22.22	30.97	5.31	100.00
Rural India	18.1	28.4	38.0	15.4	100.00
<i>All households</i>					
Vindhya	25.54	14.76	38.34	21.36	100.00
Central	14.03	27.35	46.10	12.53	100.00
Malwa	27.17	18.59	36.72	17.52	100.00
South	38.36	12.71	43.68	5.25	100.00
South-western	34.44	20.27	33.04	12.25	100.00
Northern	10.66	27.33	41.86	20.15	100.00
Total	26.08	19.07	39.80	15.05	100.00
Rural India	10.9	21.4	42.0	25.6	100.00

Note: \* includes not reported cases.

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

As estimated from the NSS records (2004 -05), at the district-level, the proportion of people below poverty line is highest in Jhabua (58.7 per cent) which is a tribal dominated district, followed by Burhanpur (54.23 per cent), Narsimhapur (52.17 per cent), Sagar (50.49 per cent), Damoh (50.21 per cent), while the figure is lowest in districts like Shajapur (9.85 per cent), Gwalior (10.99 per cent), Indore (15.13 per cent), Morena (16.22 per cent), Sheopur (16.99 per cent). By and large, the districts of northern region have lower proportion of people below poverty line. But for districts having higher incidence of BPL people, there exists no such regional pattern.

The sectoral composition of the economy is a valid indicator of the level of economic development of a state. The status of the state in terms of sectoral composition is not quite remarkable, as compared to the size of its economy. Though the tertiary sector accounts for the largest share of its economy (43 per cent), it lies much behind most states as well as the national average in terms of share of tertiary sector in NSDP. An underdeveloped tertiary sector compares poorly with developed states like Kerala and Maharashtra, where this sector accounts for more than 60 per cent of the NSDP. The share of secondary sector is almost the same as the national average at 23 per cent indicating average



**Table 2.3: Sectoral Composition of NSDP\* (TE 2004-05)**

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

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

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

level of industrial development in the state. However, the primary sector is still a dominant sector in the state providing employment to over 70 per cent of total workers in the state and also contributing over one-third of the NSDP.

## 2.3 Health and Nutritional Status

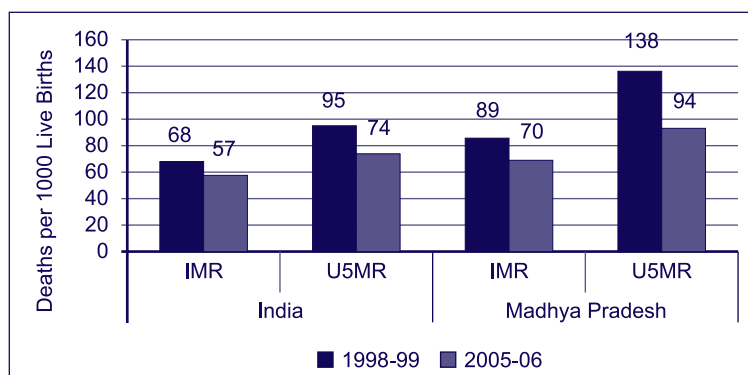
The significance of health and nutritional status of an individual as well as a community can hardly be overestimated. The health and nutritional status can be measured through a variety of indicators.

While mortality under age one [infant mortality] is an indicator of poor reproductive health facilities and antenatal care, mortality under age five is closely linked with immunisation and overall poverty levels, in addition to these factors. The under-five mortality thus reflects both social practices and public policy and can be taken as a comprehensive indicator for the overall quality of life.

Figure 2.2 shows the relative position of India and Madhya Pradesh in terms of both under-five mortality and infant mortality. It is seen that though the state has higher mortality levels compared to the national average in both these indicators (in fact, mortality level in Madhya Pradesh in 2005-06 is the same as



**Figure 2.2: Trend in Infant Mortality and Under-Five Mortality in India and Madhya Pradesh, 1998-99 and 2005-06**



Source: NFHS II and III (1998-99 and 2004-05).

that of the national average in 1998-99), the reduction in absolute terms in the state is higher than that of the country as a whole. For instance, while in IMR the figure for national average declined from 68 to 57, i.e., 11 deaths per 1000 live births, the same for Madhya Pradesh was 16 deaths per 1000 live births. Similarly, for under-five mortality the decline in the state was twice that of the national

**Table 2.4: Mortality and Nutritional Status of Children and Women\* (2005-06)**

	Under-five mortality	Infant Mortality	Under-weight Children	Wasted Children	Stunted Children	Anemic Children	Thin Women
India	74.3	57	42.5	19.8	48.0	69.5	35.6
Uttar Pradesh	96.4	72.7	42.4	14.8	56.8	73.9	36.0
<b>Madhya Pradesh</b>	<b>94.2</b>	<b>69.5</b>	<b>60.0</b>	<b>35.0</b>	<b>50.0</b>	<b>74.1</b>	<b>41.7</b>
Jharkhand	93.0	68.7	56.5	32.3	49.8	70.3	43.0
Orissa	90.6	64.7	40.7	19.5	45.0	65.0	41.4
Chhattisgarh	90.3	70.8	47.1	19.5	52.9	71.2	43.4
Rajasthan	85.4	65.3	39.9	20.4	43.7	69.7	36.7
Assam	85.0	66.1	36.4	13.7	46.5	69.6	36.5
Bihar	84.8	61.7	55.9	27.1	55.6	78.0	45.1
Maharashtra	46.7	37.5	37.0	16.5	46.3	63.4	36.2
<b>Best State</b>	<b>16.3</b> (Kerala)	<b>15.3</b> (Kerala)	<b>22.9</b> (Kerala)	<b>9.2</b> (Punjab)	<b>24.5</b> (Kerala)	<b>44.5</b> (Kerala)	<b>18.0</b> (Kerala)
<b>Worst State</b>	<b>96.4</b> (UP)	<b>72.7</b> (UP)	<b>60</b> (MP)	<b>35.0</b> (MP)	<b>56.8</b> (UP)	<b>78.0</b> (Bihar)	<b>45.1</b> (Bihar)

Source: National Family Health Survey, 2005-06.

Note: \* Only those states have been selected that have under-five mortality higher than 80 per thousand live births.



average (44 compared to 21 respectively). Despite the significant decline, the state still has unacceptably high levels of mortality among both infants and children.

Table 2.4 shows comparative mortality rates as well as nutritional status of children for all states that have an under-five mortality figure higher than 80 per 1000 live births. Madhya Pradesh records the highest number of child deaths, with only UP marginally above it in terms of under-five mortality. In terms of infant mortality, an indirect indicator of access to health facilities, the state has a similar ranking.

In terms of nutritional indicators, Madhya Pradesh has the highest proportion of underweight children (60 per cent), which is much higher than the national average. What is more worrying, is the fact that the state also has the highest proportion of severely underweight children (27.3 per cent) as well as wasted children (35 per cent) – a pointer towards the high nutritional insecurity levels in the state among the vulnerable populations. These figures coupled with high anaemia levels (74 per cent among children under five) classify the state as one of the most food insecure states of the country.

Food insecurity emanating from grave economic conditions, as already seen initially, is the prime reason for high undernutrition levels coupled with high mortality among children. A brief look at the same states in terms of consumption levels however gives fairly optimistic results. Madhya Pradesh

**Table 2.5: Status of Consumption**

	Per Capita per Day Intake of Calorie (kcal)	Per Capita per Day Intake Protein (gm)	% given Vitamin A supplements in last 6 month (Children < 5yrs)	% given iron supplements in last 7 days (Children < 5yrs)	% Received food supplements under ICDS Programme
<b>India</b>	2047	57.0	18.2	4.7	26.3
Uttar Pradesh	2200	65.9	6.1	1.5	14.7
<b>Madhya Pradesh</b>	<b>1929</b>	<b>58.8</b>	<b>14.1</b>	<b>3.5</b>	<b>36.4</b>
Jharkhand	1961	51.2	20.1	3.5	36.5
Orissa	2023	48.3	21.9	5.2	52.5
Chhattisgarh	1942	47.4	9.1	3.1	58.4
Rajasthan	2180	69.6	10.0	1.0	17.3
Assam	2067	52.7	12.9	0.8	28.0
Bihar	2049	57.8	26.4	2.9	4.2
Maharashtra	1933	55.7	25.2	7.1	42.4
<b>Best State</b>	<b>2240 (Punjab)</b>	<b>69.6 (Haryana)</b>	<b>38.5 (TN)</b>	<b>12.5 (Karnataka)</b>	<b>58.4 (Chhattisgarh)</b>
<b>Worst State</b>	<b>1842 (TN)</b>	<b>44.9 (TN)</b>	<b>6.1 (UP)</b>	<b>0.8 (Assam)</b>	<b>4.2 (Bihar)</b>

Source: Calorie and Protein intake from NSSO, 61<sup>st</sup> Round (2004-05); Rest – National Family Health Survey, 2005-06.



has marginally higher per capita intake of protein (largely consequent upon high pulses production in the state), but, it lacks in terms of calorie consumption (Table 2.5).

In terms of supplementary feeding practices, the scenario in the state is only marginally below the national average, but much below the better performing states. For example, though vitamin A intake in the state (14 per cent of children under five years) is only four percentage points below the national average (18 per cent), it is almost one-third of the best performing state – Tamil Nadu (39 per cent). Similarly, for iron supplements, the figure for Madhya Pradesh (3.5 per cent) is only marginally below the national average (4.7 per cent) but the iron intake of Karnataka (12.5 per cent) is more than thrice that of the state. Nevertheless, the proportion of target population having benefited from the Integrated Child Development Services (ICDS) programme (36 per cent) is quite good as compared to the national average (26 per cent).

Although the state has relatively fair figures in terms of public intervention in the field of nutritional requirements for children, in absolute terms much needs to be done. This is amply revealed in terms of ICDS coverage in the state. While the neighbouring state Chhattisgarh has the highest figures in the country, Madhya Pradesh lies way behind.

### 2.3.1 Nutrition trends

As already discussed, the nutritional status of Madhya Pradesh is not impressive. The proportion of underweight (60 per cent) and wasted children (35 per cent) below five years for Madhya Pradesh are much higher than that for national average (Table 2.6).

For adult men and women too, the picture is quite similar. The figures of Madhya Pradesh compare very unfavourably with the national average. While one-third of adults are thin at the national level, the figure for the state is above 40 per cent. It would be observed that there is no significant difference

**Table 2.6: Nutritional Status of Children and Adults in India and Madhya Pradesh, 2005-06**

	India	Madhya Pradesh
<b>Children (Under 5 Years)</b>		
Stunted	48	50.0
Wasted	19.8	35.0
Underweight	42.5	60.0
<b>Adult (15-49 years)</b>		
Thin Men	34.2	41.6
Thin Women	35.6	41.7
Mean BMI Men	20.2	19.5
Mean BMI Women	20.5	8.4

Source: National Family Health Survey, 2005-06 (NFHS-3)

[Body Mass Index (BMI) is the proportion of weight (in kg) per square meter of height; a BMI below 18.5 is considered below normal, i.e. thin]



between men and women in terms of proportion below normal BMI (18.5). However, while the difference in average BMI is negligible at the national levels, in Madhya Pradesh the mean BMI for men is more than twice that of women.

To elaborate the issue, let us take a look at Table 2.7 representing proportion of men and women aged 15-49 consuming specific foods at least once a week (NFHS-III, 2005-06). It is seen that proportion of men consuming dairy products, egg and chicken is higher than that of women and the difference is quite large.

**Table 2.7: Consumption of Specific Food Items (Madhya Pradesh and India)**

Variables	Milk or curd	Pulses or beans	Green, leafy vegetables	Fruits	Eggs	Chicken
<b>Madhya Pradesh</b>						
Women	48	93.2	88.1	35	12.1	6.5
Men	71.2	94.3	85.1	38.2	19.2	10.2
<b>India</b>						
Women	55.4	89.5	92.9	39.8	32.3	22.7
Men	67.2	90.7	93.6	47.4	41.3	28.3

Source: NFHS III (2005-06).

Data show that women's consumption of nutritious food like milk, egg and chicken is quite low in Madhya Pradesh as compared to the national average. This in turn gets reflected in the low average BMI of women in the state (19.7). Even in terms of consumption pattern of men, the figure for eggs, chicken, fruits and green leafy vegetables in the state is very low as compared to the national average for men in these items.

Madhya Pradesh has a dominant tribal population. Usually tribal children are prone to be undernourished for a variety of reasons. If a child's intake is less than 70 per cent of the recommended daily allowance (RDA), then it will lead to severe undernutrition. But almost 25 per cent of tribal children could not even get their minimum cereal requirements; not to talk about the requirement of dairy products, fat and oil (Table 2.8).

With such poor levels of consumption and gender discriminatory practices in intra-household food consumption, anaemia among children and women is quite widespread across the country. Early age at marriage puts undue burden on young women which results in severe health consequences, especially during childbearing. The proportion of women having three or more antenatal visits is only 41 per cent<sup>3</sup> in Madhya Pradesh. The poor status of access to adequate healthcare can be inferred from the fact that among the total number of women receiving any antenatal care, only one-third

3. Among women with a live birth in the last five years, preceding the NFHS-III (2005-06) survey, percentage who received three or more ANC during the pregnancy for their most recent live birth.



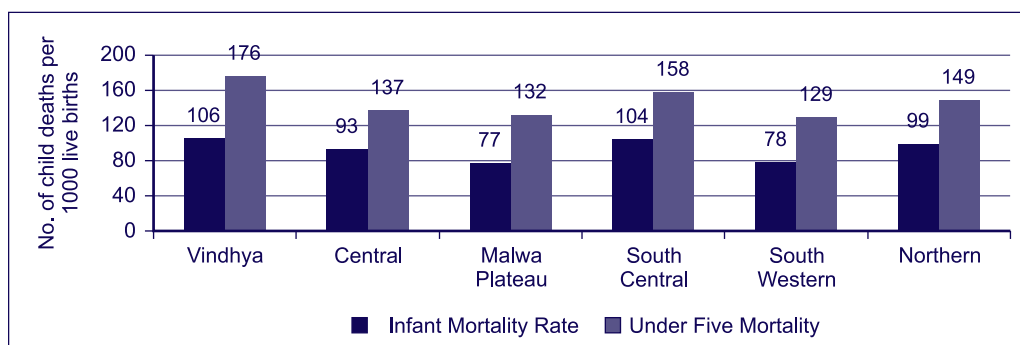
**Table 2.8: Percentage of Tribal Children Receiving 70% of RDA**

	Age 1-3 years $\geq 70\%$ RDA	Age 4-6 years $\geq 70\%$ RDA
Cereals and millets	77.4	77.2
Pulses	35	45.8
Leafy vegetables	11.1	11.4
Other vegetables	32.4	31.4
Roots and tubers	39.7	36.8
Milk and milk prod.	0.3	0.9
Fats and oils	3.9	0.9
Sugar and jaggary	0.5	0.2

Source: National Nutrition Monitoring Bureau, NIN: Diet and Nutritional Status of Tribal Population, Report on First Repeat Survey, 2000.

received ANC from a doctor while more than 41 per cent received ANC from a nurse/midwife or lady health workers (LHV).

**Figure 2.3: Infant and under-Five Mortality across NSS Regions in Madhya Pradesh, 1998-99**



Source: NFHS II, 1998-99.

The high percentage of tribal population in Madhya Pradesh (26 per cent in rural areas), widespread undernutrition among the children (60 per cent underweight) and limited access to antenatal care lead to high child and infant mortality. The interstate comparison shows that both the rates are highest in Vindhya Region. According to the FSI (the details will be provided in section), Vindhya Region has maximum number of food insecure districts.

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



This chapter has given a brief overview of the economic, health and nutritional status of Madhya Pradesh as compared to other states and to the national average. The ensuing chapters relate these to the food security issues in terms of inputs and outcomes to food security and measures taken and to be taken to address food insecurity.

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# 3. Analysis of Food Security

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

- a) Food availability of the household, which results from own production of food retained for household consumption, plus food purchased from the market through sale of other commodities, whether labour time or products, and any non-production based entitlements to food.
- b) Household's access to food, depending upon socio-economic status and factors governing intra-household food distribution.
- c) Capacity of an individual to absorb the consumed food - a factor affected by access to safe drinking water and health facilities.

## 3.1 Measuring Food Security Status

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

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

The weight-for-height index examines body mass in relation to body length. Children who are more than two standard deviations below the median of the reference population for the same index are considered too thin or 'wasted' and this indicates prevalence of 'acute undernutrition'. Wasting is associated with the failure to receive adequate nutrition in the period immediately before the survey and may be the result of seasonal variations in food supply or recent episodes of illness (NFHS, 2007).



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

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

Therefore, under-five mortality has been taken as the second indicator for measuring food insecurity. The under-five mortality rate indicates the probability of dying between birth and five years of age, expressed per thousand live births. There are a number of advantages of using the under-five mortality ratio as an indicator of food insecurity. Child mortality is known to be the outcome of a wide variety of factors, for instance, nutritional status of the child and its mother, food availability in the family, level of immunisation, availability of maternal and child health services, economic status, availability of safe drinking water, basic sanitation, and so on (UNICEF, 2005). Thus, under-five mortality encompasses a number of facets, most of which have been used as explanatory indicators, as already enumerated and will be discussed later.

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

The UN explicitly mentions reduction of under-five mortality by two-thirds by 2015 as one of its primary MDGs (MDG-4). The interrelation between nutritional status and child mortality can be gauged from the fact that undernutrition contributes up to 50 per cent of all child deaths (WHO and UNICEF, 2006). Improving nutrition and achieving MDG-1 (eradicate extreme poverty and hunger) would substantially help avert child deaths from diarrhoea, pneumonia, malaria, HIV, or measles. Thus, improving nutritional status is a prerequisite for achieving MDG-4 (UNICEF, 2006).



As many as 60 countries across the globe have been prioritised for urgent action, based on two criteria: countries with more than 50,000 deaths of children under five and countries with an annual child mortality of at least 90 per 1000 live births. In 2005, these 60 countries accounted for 93 per cent of all deaths of children under five. India figures prominently among these countries and shares place along with four other South Asian countries. Regrettably, India does not appear to be on track to achieve the MDG-4 (UNICEF, 2006) (Box 3.1).

#### Box 3.1: Towards MDG - 4

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

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

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

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

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

A statistical analysis of the NFHS-III data across states reveals a significant negative correlation between micro-nutrient intake (like Vitamin A and iron) and proportion of underweight children and under-five mortality, implying thereby that an increased intake of essential micronutrients significantly reduces the risk of undernutrition, which in turn, as discussed, contributes to reduction in child mortality (Table 3.1).

## 3.2 Food Security Outcome Index

It follows from the preceding discussions that child undernutrition status and mortality appear to be an overall outcome of nutritional and food insecurity. It, therefore, makes sense to form a combined



**Table 3.1: Correlation between Micronutrient Intake and Under-nutrition and Mortality Status**

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

\*\* Correlation significant at 0.01 level

\* Correlation is significant at 0.05 level

index of these two indicators to compute an overall index of food security outcome in Madhya Pradesh<sup>1</sup>. Districts<sup>2</sup> have been divided into five groups on the basis of this index – extremely insecure, severely insecure, moderately insecure, moderately secure and secure – each category representing the relative severity of outcome of food insecurity (Map 3.1).

As already discussed, the situation on malnutrition in the state is one of the worst in the country, with 60 per cent of the children categorised as underweight while almost 30 per cent of the total children are severely underweight. Even in terms of wasting, the state has the highest figure (35 per cent),

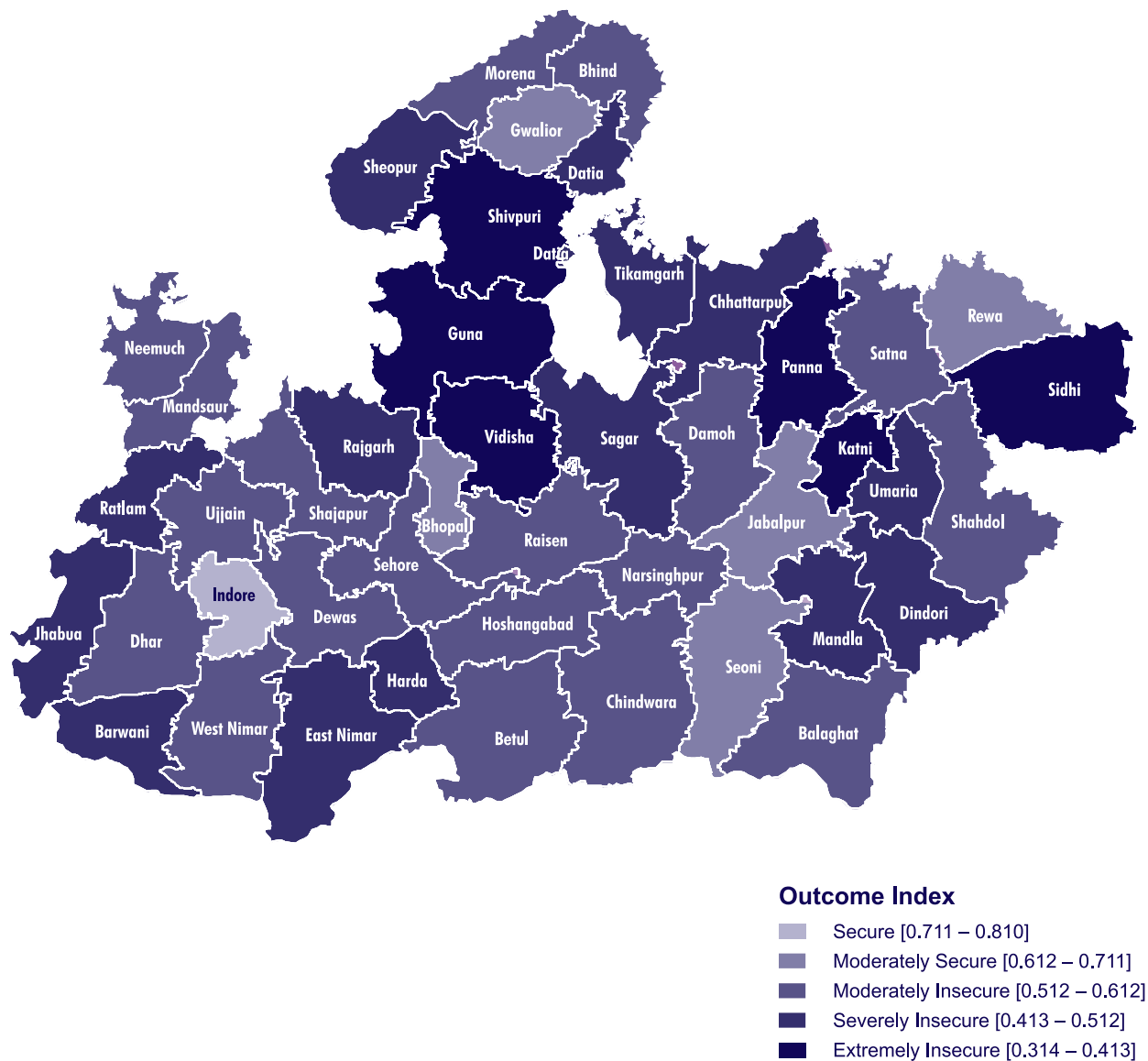
**Table 3.2: Food Security Outcome Index**

Extremely insecure	Severely insecure	Moderately insecure	Moderately secure	Secure
Guna	Harda	Morena	Bhopal	Indore
Vidisha	Tikamgarh	Bhind	Rewa	
Shivpuri	Datia	Satna	Seoni	
Katni	Umariya	Raisen	Jabalpur	
Panna	East Nimar	Shahdol	Gwalior	
Sidhi	Sheopur	Ujjain		
	Mandla	Betul		
	Ratlam	Neemuch		
	Chhatarpur	West Nimar		
	Barwani	Chhindwara		
	Rajgarh	Dhar		
	Dindori	Mandsaur		
	Jhabua	Shajapur		

1. The study is limited by absence of a nutritional/morbidity indicator for adult population at district level. Hence the FSOI analysis has been restricted to indicators on children. Nevertheless, correlation results have shown significant positive relation between proportion of underweight children and adults with low BMI at state level. Please refer to the technical notes in Appendix II for details.

2. Three new districts –Anuppur, Ashoknagar, and Burhanpur - came into existence in 2003 by reorganising Shahdol, Guna and East Nimar district, respectively. Similarly, two new districts - Alirajpur carved from Jhabua and Singrauli from Sidhi - were formed in 2008. The construction of food security indices has been done excluding these five districts since data are not available for all the indicators for these districts. Wherever possible, information on them has been included for analysis.

Map 3.1: Food Security Outcome Map of Madhya Pradesh





Also, half of the children are stunted - an indicator of chronic undernutrition. The state also has the highest under-five mortality, only marginally below Uttar Pradesh, with almost 95 children per 1000 live births dying before attaining the age of five.

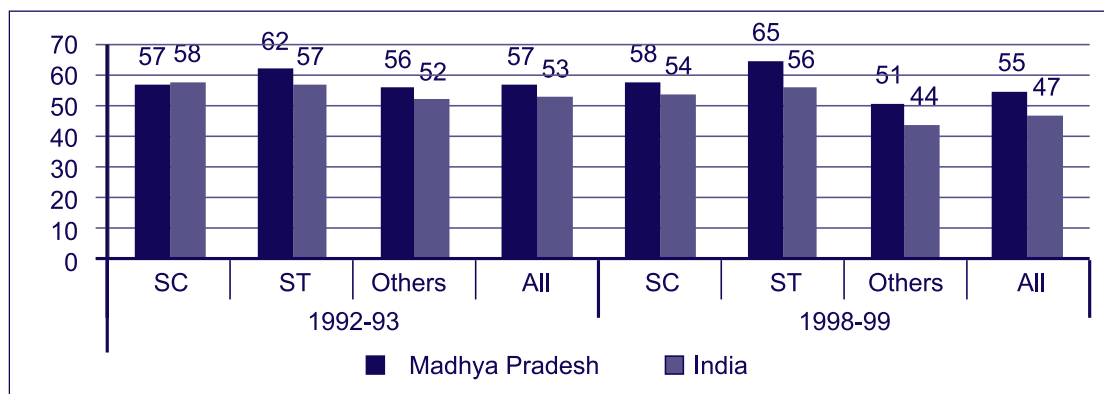
The picture at the aggregate level thus appears to be grim. It, therefore, becomes imperative to identify the problem areas so that developmental efforts are focused on such areas.<sup>3</sup> All the districts in the state have under-five mortality figure of above 100 per 1000 live births, except Indore. As many as 21 of these districts have mortality figures above 150, which is quite alarming. The eastern districts in Keymore Plateau and the Grid Region have the highest under-five mortality figures in the state.

An analysis of proportion of underweight children reveals a somewhat different picture. While Sidhi in the eastern Satpuras retains a high figure, the higher figures are found in the western parts of the state in the Malwa Region, besides Jhabua and Nimar Plains. As many as 18 districts are found to be having figures higher than 60 per cent.

Among the social groups, it is found that during 1998-99 almost two-third of the total tribal children in the state were underweight. Remarkably, while the proportion of underweight children declined in the non-SC/ST populations from 56 to 51 per cent, it actually increased among the tribal (62 to 65 per cent) and SC population (57 to 58 per cent). Even among non-SC/ST population, the decline in the state is seen to be less as compared to that in the national population (52 to 44 per cent).

A composite effect of these two indicators brings out the overall food insecurity scenario in the state. Sidhi that fairs poorly in both the indicators emerges as the most vulnerable district in the state. This is followed by other districts in Keymore and Grid Region. Understandably, the tribal districts on the western margin like Jhabua and Barwani have very low status in terms of FSO index.

**Figure 3.1: Proportion of Underweight Children by Social Groups, 1992-93 and 1998-99**



Source: NFHS I and NFHS II.

3. Although the NFHS figures are not strictly comparable with those of RCH-DLHS due to differences in method and sample, the latter is the only source available to analyse at district level. Further, the direction of scale of the indicators is presumed to remain the same, hence capturing variations over space.



### 3.3 Explaining Food Security

Taking the under-five mortality and child undernutrition rates as the outcomes of food security, one could rank districts on the basis of this index as presented in Table 3.3. If the objective of the exercise

*Table 3.3: Food Security Outcome Index and Constituent Indicators*

District	FSO Index		Under-Five Child Mortality		Proportion of Underweight Children	
	Value	Rank	Value	Rank	Value	Rank
Balaghat	0.523	22	143	18	57.1	22
Barwani	0.449	35	152	25	64.7	38
Betul	0.570	13	143	18	48.9	1
Bhind	0.605	8	112	4	60.7	28
Bhopal	0.697	2	107	3	47.8	12
Chhatarpur	0.451	34	158	29	60.8	30
Chhindwara	0.558	16	137	15	54.4	16
Damoh	0.521	23	166	34	44.3	6
Datia	0.481	28	159	31	55.1	19
Dewas	0.521	23	144	21	56.9	21
Dhar	0.558	16	121	5	63.7	37
Dindori	0.436	37	166	34	58.8	27
East Nimar	0.479	29	143	18	64.7	38
Guna	0.410	40	170	39	61	32
Gwalior	0.640	6	106	2	58.1	24
Harda	0.506	26	168	37	45.6	9
Hoshangabad	0.534	21	164	33	43.1	5
Indore	0.810	1	78	1	45	8
Jabalpur	0.646	5	134	12	41	4
Jhabua	0.431	38	156	27	65.5	41
Katni	0.335	43	199	45	57.3	23
Mandla	0.460	32	168	37	53.6	15
Mandsaur	0.555	18	127	10	60.7	28
Morena	0.607	7	136	14	46.6	11
Narsimhapur	0.545	20	134	12	58.5	26
Neemuch	0.570	13	121	5	61.6	33
Panna	0.334	44	190	44	62.7	36
Raisen	0.592	10	138	16	48.1	13
Rajgarh	0.444	36	147	23	68.3	44

(Contd...)



District	FSO Index		Under-Five Child Mortality		Proportion of Underweight Children	
	Value	Rank	Value	Rank	Value	Rank
Ratlam	0.459	33	145	22	67	43
Rewa	0.661	3	148	24	30.5	2
Sagar	0.431	38	156	27	65.5	41
Satna	0.597	9	174	42	26.5	1
Sehore	0.520	25	142	17	58.2	25
Seoni	0.647	4	128	11	44.3	6
Shahdol	0.590	11	158	29	36.9	3
Shajapur	0.555	18	124	8	62.5	35
Sheopur	0.469	31	163	32	54.9	18
Shivpuri	0.399	42	166	34	65.2	40
Sidhi	0.314	45	170	39	77.6	45
Tikamgarh	0.500	27	154	26	54.7	17
Ujjain	0.585	12	125	9	56.7	20
Umaria	0.479	29	175	43	46.3	10
Vidisha	0.401	41	173	41	60.9	31
West Nimar	0.565	15	122	7	61.9	34

Source: *Underweight Children - RCH-DLHS (2002-04); Under-five mortality - Computed from Census (1991 and 2001), Ram et al. (2004)*

were merely to decide on the districts in which to concentrate food security interventions, then such a ranking would be sufficient. But this would say nothing about the types of interventions that should be undertaken in order to improve food security, which is one of the key objectives of the study.

However, food security indicators can draw attention to the factors that distinguish the food secure from the food insecure districts. These indicators can point out the specific areas in which the food insecure districts differ the most from food secure districts. Of course, such association between indicators in an index cannot tell us what the causal relation between them and food security is. For instance, if we find that female literacy is consistently higher in food secure districts and consistently lower in food insecure districts that only show a correlation between female literacy and food security. Why such a relation holds is something that is a matter for analysis. Whether it is due to enhanced capability of women to contribute to a better utilisation of household income, or through literate women having a better knowledge of improved nutritional practices, or some other relation, it is for analysis to bring out these relations. But the indicators can draw attention to the issues for which significant differences exist. It would even be possible to rank these variables, a rank that would point to the extent to which these variables are different between districts. Such an analysis could also point to





variations between food insecure districts - the same variables may not contribute the most to the low index in all districts, or some of them may even move in opposite directions.

Food security is the ability of a household to command food (its food entitlements), generally acquired through the net result of its livelihood activities (plus any other non-livelihood-based entitlements), that is crucial in determining food security of the household. These livelihood activities, from the point of view of food security, are valued not only for the food they might directly produce but also from the point of the command over food that

they give to the household. It is at this level of effective demand for food (both consumed out of self-production and purchased) that market failures take place, requiring public intervention of different kinds.

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

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

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

- (a) Production factors (at the district level) influencing *availability*;
- (b) Household and individual *access* to food; and
- (c) Ability to *absorb* food.



### 3.3.1 Food Availability

The concern for food availability stems from production and related aspects that sustain a desired level of food production (Box 3.2). Foodgrains are considered to be of paramount significance for household food and nutritional security, the reason being that cereals and pulses are staple foods and there are no perfect substitutes for them (Chand, 2007). Foodgrains are also the cheapest source of energy compared to other foods and are indispensable for the food security of low income classes (Chand and Kumar, 2006).

#### Box 3.2: Agricultural Production and Food Security

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

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

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

*World Development Report, 2008.*

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

- a) **Per Capita Value of Agricultural Production:** Agricultural output is an indicator reflecting availability of food. Since agriculture is dependent on climate, it is advisable to take an average of three to five years' data of agricultural production to take into account the variability of production. Food and non-food production both would be included since non-food production would contribute to the income of households and therefore have an impact on food security. To account for variations in population across districts, the per capita value of agricultural production has been used.



- b) Proportion of Forests:** Forests are a form of common property resource. Availability of forest area can affect food security as access to forest products provides income and supports nutrition, depending on the type and magnitude of the produce. But there are both legal and geographical restrictions on developing production in forest areas. Thus, it can be assumed that forest area is negatively associated with food security, since it limits the extension of agricultural production.
- c) Irrigation Extent:** Irrigation has a key role in both stabilising agricultural production and, through an increase in cropping intensity and an associated increase in productivity, improving a district's food security position. It would also provide a better prospect in terms of rural employment.
- d) Rural Connectivity:** Access to paved roads has a big role in development. It reduces transport costs and can reduce transaction costs, with possible positive results on the prices realised by farmers. By improving communication, roads can increase the options available to rural producers, connecting them with larger national, regional and even international markets. Studies of rural roads have shown that they raise the productivity and value of land for poor farmers (Jacoby, 2000). It has been found that government spending on rural infrastructure, besides agricultural research and development, irrigation and rural development programmes targeted to the rural poor, have all contributed to reductions in rural poverty and increases in agricultural productivity. Marginal government expenditure on roads, in particular, has been found to have the largest positive impact on productivity growth (Fan *et al.*, 1999).

### 3.3.2 Food Access

Access to food or food distribution has been regarded to be the most important factor determining food security. A household's access to food depends on its own production of food and the food it can acquire through sale of labour power or commodities produced by it. These are linked to what Amartya Sen calls endowment and exchange entitlements.

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

- a) Proportion of Agricultural Labourers:** The total number of agricultural workers in the country has been estimated at 259 million as of 2004–05. Of these, more than one-third are wage workers and almost all of these are casual labourers. Agricultural labourers are characterised by extremely poor physical and human capital and also the highest poverty levels (NCEUS, 2007). Thus, it is expected that the proportion of agricultural labourers will be negatively related to food security, i.e., the more the agricultural labourers in a district, the worse will be the food security situation.



- b) Wage Rate of Rural Persons:** Casual wage workers constitute about one-fifth of the workers in the unorganised non-agricultural sector while almost all agricultural labourers are casual workers (NCEUS, 2007). Casual workers tend to be the least protected and have the lowest level of earnings. The understanding is that agricultural labour, without the backing of self-produced food, is particularly vulnerable to food insecurity. There is, therefore, a particular concern with the earnings of agricultural labour.
- c) Proportion of STs and SCs:** The ST and SC households are known to be generally more food insecure, largely on account of their economic and social deprivation - the former on account of geographical marginalisation and the latter due to historical deprivation and exclusion from mainstream - all resulting in political marginalisation. The proportion of ST and SC population in a district has been taken as an indicator of this marginalisation. The assumption is that the greater the ST and SC population in a district, the less will be the level of food security.
- d) Proportion of Working Age Population:** The ratio between the productive sections of the population to the economically dependent part is a valid demographic indicator at the household level. A ratio higher than unity represents a positive scenario, with more productive population compared to the dependent population.<sup>4</sup> This 'demographic dividend', if effectively harnessed, leads to increased production and hence food security (Chandrasekhar, Ghosh and Roychowdhury, 2006).
- e) Per Capita Consumption Expenditure:** The NSS estimates of per capita consumption expenditure, adjusted for inequality, is a proxy for per capita income reflecting a significant dimension of access to food. This variable accounts for all sources of income, including those which are depicted through availability of food as measured in terms of value of agricultural output. For instance, a district with low value of agricultural output along with a high value of consumption would mean that non-agricultural income, including remittances from migrants, plays a role in enabling consumption to be higher than agricultural production. This is the only way in which we can indirectly bring migration, which is such a crucial component of households' food security strategies, into the picture.
- f) Rural Female Literacy:** It is well-known that there are gender-based inequalities in food consumption within a household. Consequently, mere household consumption data or per capita household consumption data would not tell us the story of intra-household distribution of food and related facilities, such as access to medical services, which would affect the nutritional status of females, women and girls. That such gender-based inequalities in household consumption exist is attested to by numerous case studies (see those reviewed in

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



Bina Agarwal, 1994). We have used the rural female literacy rate as the variable to represent gender-based inequality in household consumption. The argument is that a higher literacy rate for women is more likely to enable women to enhance their roles in family decision-making and increase their share of household consumption. At the same time, higher women's literacy is also likely to lead to better knowledge of nutritional systems and improved health practices in the household.

### 3.3.3 Food Absorption

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

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

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

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

- b) **Access to primary health services:** Public health services, which reduce a population's exposure to disease through such measures as sanitation and vector control, are an essential part of a country's development infrastructure. The health infrastructure prevents the local inhabitants from exposure to diseases, for instance, through assuring food safety, vector control and health education to improve personal health behaviour (Gupta, 2005). In rural areas, all the health services are pivoted around the PHCs, and hence we have taken access to them as an indicator determining food absorption.



**Table 3.4: Indicators used to Analyse Food Security**

Name of variable	Sources	Ref. year
<b>(a) Availability</b>		
1. Proportion of net irrigated area to net sown area	Directorate of Economics and Statistics, GoMP	2004-05
2. Per capita value of agricultural output	Commissioner of Land Records, GoMP, Gwalior	2003-04 to 2005-06
3. Percentage of villages having access to paved road	Census of India	2001
4. Percentage of forest area to total geographical Area	Directorate of Economics and Statistics, GoMP	2003-04
<b>(b) Access</b>		
1. Percentage of agricultural labourers to total labourers	Census of India	2001
2. Proportion of ST and SC population to rural population	Census of India	2001
3. Ratio of working age group	Census of India	2001
4. Monthly per capita expenditure	NSS 61st round (Computed)	2004-05
5. Rural casual wage rate	NSS 61st round (Computed)	2004-05
6. Rural female literacy rate	Census of India	2001
<b>(c) Absorption</b>		
1. Percentage of households having access to safe drinking water	Census of India	2001
2. Percentage of villages having access to PHC (within <5 km distance)	Census of India	2001
<b>(d) Public entitlement*</b>		
1. Percentage of midday meal beneficiaries out of total children	Department of Rural Development, GoMP	Sept 2006
2. Percentage of ICDS beneficiaries to total project population	Ministry of Women and Child Development, GoMP	March 2007

Note: \*These variables are not used for calculation of indices. They are used for analysis of the indices. Set (d) pertaining to public entitlement variables have been analysed but not included in the construction of the Index.

### 3.4 Food Security Index (FSI)

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



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

For each of the dimensions, as discussed earlier, some relevant variables have been chosen. All indicators used to calculate the composite index should be positively related to the index. In order to do that, some of the variables have been reversed. Table 3.4 gives the indicators, source of information and the reference year (Appendix II, Table A2.1 for description of the variables).

\*\*\*\*\*

# 4. Food Availability

The concern for food availability stems from production and related aspects that sustain a desired level of food production. Where production is largely for subsistence and is the main source of a household's food entitlement, foodgrain production is of paramount significance for household food and nutritional security. Foodgrains are also the cheapest source of energy and proteins compared to other foods, and are indispensable for the food security of the lower income groups (Chand and Kumar, 2006).

In the context of stagnant yields of foodgrain production, use of food crops for biofuel production, diversion of crop land to biofuel cultivation, falling carrying capacity of land, environmental and sustainability issues and global warming directly affecting agricultural production, all of this manifested in rising international prices of food, increasing availability of food is a matter of urgent global concern. Global climate change, in particular, could have a critical impact on agricultural production. Empirical evidence shows that an increase in temperature affects crop production both directly and indirectly.<sup>1</sup> It has been estimated that cereal yields in tropical regions, such as India, are going to decline for even a marginal increase (1-2 degree C) in temperatures (IPCC, 2007). A great deal of research is needed to understand this impact in different states of the country.

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

## 4.1 Agricultural Development

Madhya Pradesh forms the vast tract of dry lands in central India. Although the average rainfall is 1150 mm it mostly remains concentrated in the brief monsoon season while most watercourses remain dry between January and June. The irrigation extent is quite low. The horizontal coverage (gross area irrigated to gross area cropped) of irrigation is extremely low at 27 per cent as compared to the national average of 41 per cent (Sen et al., 2007). Consequently, almost 90 per cent of the districts in the state covering around 80 per cent of its total area are categorised as dry lands. These districts constitute 23 per cent of India's 177 dry land districts and occupy 19 per cent of the country's arid areas (Shah *et al.*, 1998).

### 4.1.1 Role of Agriculture in the Economy

The majority of workforce in Madhya Pradesh are agricultural workers – either as cultivators or as agricultural labourers. As per Census 2001, 43 per cent of the total workforce is involved in the agricultural sector as cultivators while another 29 per cent work as agricultural labourers. Interestingly,

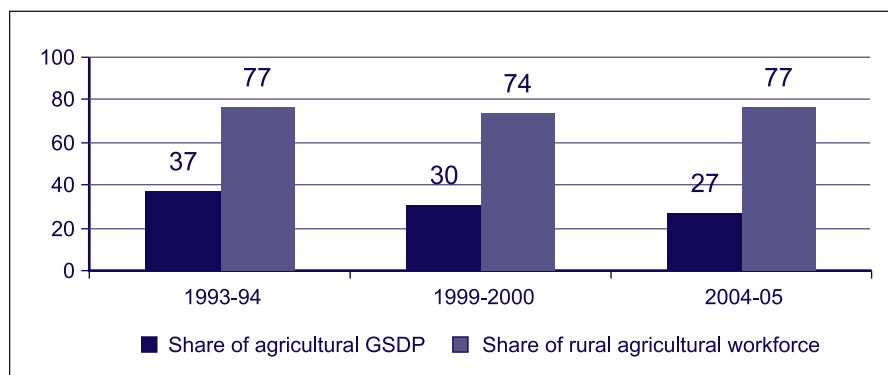
1. Temperature increases have found to be reducing crop duration, increasing crop respiration rates, developing new equilibrium between crops and pests, increase evapo-transpiration and so on. Indirectly, the land usage would be substantially affected due to snowmelt, availability of irrigation, frequency and intensity of droughts and flood, etc (Agarwal, 2007).





while the proportion of cultivators in the state declined from 1991 (50 per cent) to 2001 (43 per cent), that of agricultural labourers increased from 24 to 29 per cent – a pointer towards increasing casualisation of farmers.

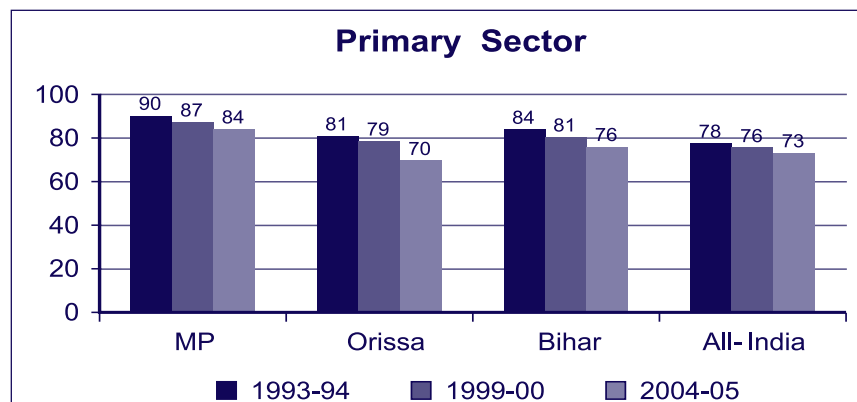
**Figure 4.1: Contribution of Agriculture in GSDP and Employment**



Source: Computed from NSSO, Various Rounds and CSO, Various Years.

These figures are validated by the trends shown by NSS (Figure 4.1). However, a comparison of contribution of agricultural sector to employment and to the GSDP shows that while the former has remained virtually stagnant over the years, the latter has declined by 10 percentage points between 1993-94 (37 per cent) and 2004-05 (27 per cent). A stagnant employment level with declining growth in production indicates declining productivity which holds true even at the national level. Needless to say, agricultural productivity can be affected by a host of other factors, such as reduction in gross sown area, poor rainfall, crop-failure, drought or even fall in agriculture prices.

**Figure 4.2: Sectoral Composition of GSDP (%) (1993-94 Prices)**



Source: CSO, Various Years.



An analysis of trend in sectoral composition of GSDP in Madhya Pradesh reveals a declining proportion of primary sector and an increasing significance of the tertiary sector. Remarkably, while the secondary sector saw high increase from 1993-94 (21 per cent) to 2000-01 (29 per cent) it actually declined in significance by 2005-06 (28 per cent).

#### 4.1.2 Growth in Agriculture

Growth in agricultural GDP in India has declined during the decade 1993-94 to 2003-04 as compared to the preceding decade. Almost all the states have witnessed a decline in their agricultural growth rates between the two periods, except the developing states like Bihar, Orissa and Gujarat. The highest decline in agricultural growth is seen in agriculturally developed states like Punjab, Haryana, Tamil Nadu and Maharashtra (probably because of high base). Agricultural GSDP in Madhya Pradesh too

**Table 4.1: Growth of Agricultural GDP and GSDP across States**

State	1983-84 to 1993-94 (at 1980-81 Prices)		1993-94 to 2003-04 (at 1993-94 Prices)	
	Agricultural GSDP	GSDP	Agricultural GSDP	GSDP
Andhra Pradesh	3.05	4.58	2.80	5.63
Assam	2.12	3.51	0.51	2.93
Bihar	-0.45 ***	2.69	2.50	5.34
Gujarat	0.84 ***	5.00	1.13 ***	6.19
Haryana	4.86	6.18	1.77	5.96
Himachal Pradesh	3.08	5.89	1.30	6.53
Jharkhand			4.25	4.28
Karnataka	3.54	5.86	3.12	7.10
Kerala	4.40	5.33	-2.00 *	4.85
<b>Madhya Pradesh</b>	<b>2.82 *</b>	<b>5.21</b>	<b>0.23 ***</b>	<b>4.14</b>
Maharashtra	5.39 *	7.42	1.27	4.92
Orissa	-0.57 ***	3.39	0.17 ***	3.96
Punjab	4.62	5.13	2.15	4.13
Rajasthan	3.93	6.19	1.21 ***	5.32
Tamil Nadu	4.43	7.45	-0.60 ***	5.08
Uttar Pradesh	2.8	4.66	2.18	3.76
West Bengal	4.45	4.73	3.45	7.03
India	3.05	5.32	2.19	6.01
CV for States	58.72	25.43	102.88	22.75

Note: Growth is Compound Annual Growth Rate. GSDP denotes Gross State Domestic Product. All growth rates are significant at 5 per cent, but for \* which is significant at 10 per cent and \*\*\* which is insignificant even at 20 per cent. CV denotes coefficient of variation.

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



has declined from almost 3 per cent to less than 1 per cent. Although GSDP has also seen a marginal decline in growth through the states, the decline is not that prominent as in the case of agriculture. Thus while there has been a net increase in GSDP growth, there has been a net decline in agricultural GSDP growth at the national level.

Remarkably, the inter-state disparities have increased between the two periods. This is evident from the fact that though the coefficient of variation for the GSDP across states has declined (from 25 to 23 per cent), it has almost doubled from 59 per cent to 103 per cent for the agricultural GSDP.

While most states, particularly those in the wheat belt, gained immensely during 1960-80, Madhya Pradesh was one of the poor performers in terms of agricultural growth in that period. The agricultural sector in the state grew at an annual rate of around 1 per cent in this period, which was almost half of the national average. The growth rate of the average land productivity (Rs/ha) in the state during the same period was about 0.9 per cent, which was again half of the national average. Slow growth in agriculture, the mainstay of the state, gradually translated into the state's poor performance with respect to all indicators of economic and human development (Shankar, 2005).

**Table 4.2: CAGR\* of Triennium Averages of GSDP of Madhya Pradesh (1994-05)**

Sectors	CAGR of Triennium Average
Agriculture	1.30
Forestry & logging	1.74
Fishing	8.62
Mining & quarrying	5.45
Primary	1.74
Secondary	5.65
Tertiary	5.85
State domestic product (Rs. lakhs)	4.27

Note: \*CAGR – Compound Annual Growth Rate.

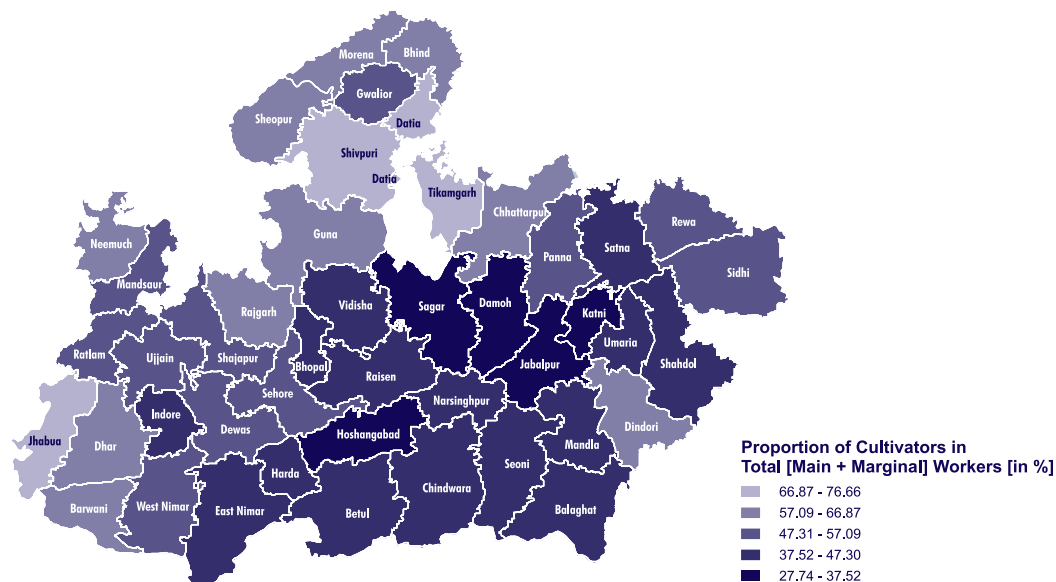
Source: Calculated from CSO (Various Years).

The growth rates of agriculture in the state only reiterate the story of stagnation in production. In the period 1994-05, agriculture grew at just 1.3 per cent and forestry at 1.74 per cent per annum. The sector which grew highest over this period was fishing sector – almost 9 per cent though its share in GSDP is very insignificant (0.21 per cent) in 2004-05. The sectors which grew substantially apart from fishing are mining (5.45 per cent) in the primary sector. The growth rate of secondary sector (5.65 per cent) and tertiary sector (5.85 per cent) are also significant.

In rural areas of Madhya Pradesh, vast sections of the working masses still depend on primary sector activities in spite of the declining trend noted. The proportion of rural workforce depending on the



**Map 4.1: Proportion of Cultivators in Rural Madhya Pradesh, 2001**



primary sector was more than 84 per cent in 2004-05, just 6 percentage points lower than that in 1993-94. As against this, the decline in other developing states like Orissa and Bihar was 11 and 8 percentage points, respectively. The proportion of workforce in primary sector in Madhya Pradesh (84 per cent) was much higher than these states and the national average (73 per cent) in 2004-05.

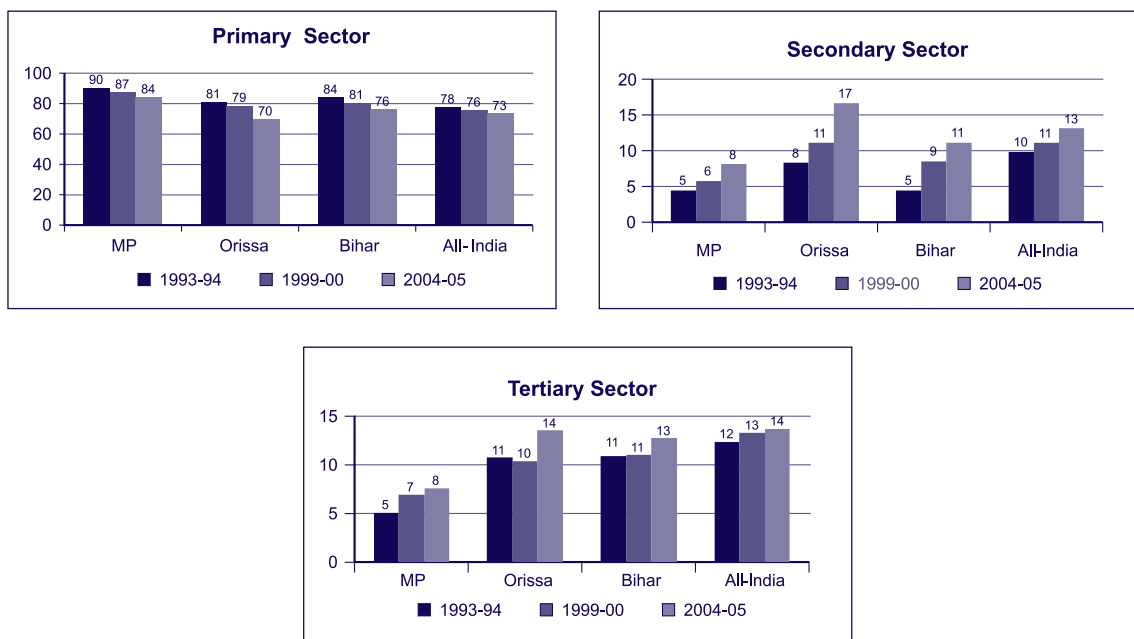
With a clear downward trend in employment in primary sector, there is a growth in proportion of employment in secondary and tertiary sectors. However, compared to other states and the all-India average the state lags behind. For instance, the proportion of employment in secondary (8.1 per cent) and tertiary sector (7.6 per cent) in Madhya Pradesh for 2004-05 is lower than the figure for the national average in 1993-94 (9.9 and 12.4 per cent, respectively). It is also noteworthy that districts such as Jhabua, Shivpuri, Datia and Tikamgarh have more than 70 per cent of the rural workforce involved in

**Table 4.3: Yield of Crops and their CAGR in Madhya Pradesh (kg/ha)**

	Cereals	Pulses	Foodgrains	Oilseeds
1988-89	1030.1	663.2	932.8	755.7
1998-99	1397.8	799.3	1199.8	943.7
2004-05	1357	749	1140	823
CAGR from 1988-89 to 1998-99	3.09	1.88	2.54	2.24
CAGR from 1998-99 to 2004-05	-0.50	-1.07	-0.84	-2.25
Overall CAGR	1.73	0.76	1.26	0.53

Source: Directorate of Agriculture, GoMP.

**Figure 4.3 Percentage Distribution of Usually Working Persons by Industry (Rural)**



Source: NSSO, Various Rounds

cultivation activities (Map 4.1). Aggregating cultivators and the agricultural labourers, all the districts in the state have more than two-third of their rural workforce engaged in agricultural activities. The significance of agriculture for the economy can hardly be underrated in the context of such large-scale involvement in the sector.

Increasing productivity of crops is the core determinant for attaining food security. However, in Madhya Pradesh it is seen that after major gains in yield levels in the decade intervening 1988-1998 (2.54 per cent) has declined thereafter (-0.84 per cent). Even for pulses of which the state is the leading producer the growth rate in yield has declined (from 1.9 to -1.1 per cent).

Despite negative growth in yield in recent years, the state is a major producer of oilseeds, with soyabean being a principal oilseed crop. Along with oilseeds, it is also an important producer of wheat and pulses. It also leads in production of spices such as garlic and coriander. Malwa potato is also popular for production of chips. Therefore, there is much scope for agro-based industries in the state and that will improve the financial status of the farmers.

Given the fact that agriculture is still the mainstay of the state, and it is operational at such a low level of investment and productivity, under extremely trying conditions for a large proportion of cultivators, poverty levels are indeed high and measures to improve food security cannot overlook the poor conditions within agriculture.



The ordinary performance of Madhya Pradesh stands starkly against the fact that the state is one of the most natural resource-rich states in the country. Of the 14 major Indian river systems, Madhya Pradesh encompasses the upper catchments of seven and the state is the source of all major river systems of Central India. Even after a relatively better rainfall profile (compared to several other arid and semi-arid regions in the country) large forest areas and undulating topography in large parts of the state impedes the steady growth of agriculture (Sen *et al.*, 2007).

Nevertheless, the state with its sheer size has a considerable share of national agricultural production. Madhya Pradesh leads the country in terms of production of pulses and soyabean and ranks fifth in overall foodgrain production contributing to more than 7 per cent of the national foodgrain production. However, compared to the absolute agricultural production, yield levels are extremely low (1184 kg/ha) which compares poorly with the national average (1714 kg/ha). In fact, the yield level of agriculturally developed states like Punjab (4000 kg/ha) and Haryana (3100 kg/ha) are thrice that of Madhya Pradesh.

**Table 4.4: Level of Agricultural Development**

State	% of National Foodgrain Production		Foodgrain Yield (TE 2005-06)		Instability in Foodgrain Production <sup>1</sup>		Cropping Intensity <sup>2</sup>		Irrigation Extent <sup>3</sup>	
	(TE 2005-06)	Rank	kg / ha	Rank	(1991-2005)	Rank	(%)	Rank	(%)	Rank
India	100		1714		9.4		134.4		39.6	
Andhra Pradesh	7.1	4	2155	4	18.9	7	121.7	11	38.1	7
Assam	1.8	15	1437	9	6.2	2	143.1	6	6.2	16
Bihar	4.5	9	1498	8	17.1	6	138.8	7	60.6	4
Chhattisgarh	2.8	14	1107	14	66.6	14	116.9	13	23.1	12
Gujarat	2.9	12	1554	7	43.6	13	113.8	16	31.6	10
Haryana	6.3	7	3087	2	6.5	3	177.5	2	84.0	2
Jharkhand	1.8	16	1265	12	122.4	15	120.3	12	9.3	15
Karnataka	3.6	10	1275	11	28.7	11	116.6	14	24.9	11
<b>Madhya Pradesh</b>	<b>7.1</b>	<b>5</b>	<b>1184</b>	<b>13</b>	<b>23.9</b>	<b>9</b>	<b>128.4</b>	<b>8</b>	<b>33.5</b>	<b>8</b>
Maharashtra	5.4	8	909	16	25	10	127.2	9	16.9	14
Orissa	3.4	11	1334	10	38.5	12	146	5	22.9	13
Punjab	12.2	2	3996	1	5.8	1	185.9	1	95.4	1
Rajasthan	6.6	6	1053	15	229.6	16	123.8	10	33.4	9
Tamil Nadu	2.9	13	1806	6	20.8	8	115.8	15	50.2	6
Uttar Pradesh	19.7	1	2119	5	9	5	153.4	4	73.7	3
West Bengal	7.8	3	2464	3	6.6	4	176.5	3	54.5	5

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

<sup>1</sup> Instability in production = standard deviation of growth rates of total food grain production (1991-2005)

<sup>2</sup> Cropping Intensity = Gross Area Sown / Net Area Sown (expressed as percentage)

<sup>3</sup> Irrigation Extent = Net Area Irrigated / Net Area Sown (expressed as percentage)



The coverage of irrigation in the state is quite low with only one-third of the net area sown under irrigation. This is much lower than many other states, given its abundant river systems and a fair rainfall profile. A poor irrigation coverage impedes the prospect of net area sown getting cultivated more than once and many areas in the state have a single crop in the year. Resultantly the intensity of cropping is very low (128 per cent), lower than the national average (134 per cent) and very low as compared to most other states.

Low irrigation coverage implies high dependence on rainfed agriculture. The irony of the state is that the areas experiencing higher rainfall are also the ones that have high forest coverage. Consequently, the scope for intensive agriculture is quite limited. This also results in high instability in foodgrain production (24 per cent), indicating high temporal fluctuations in foodgrain production, which is very high as compared to the national average (9 per cent).

### 4.1.3 Limitations to Agricultural Development

As a consequence of poor irrigation coverage, large parts of the state are affected by droughts almost every year. It may also be noted that during the last three decades in the districts of eastern Madhya

Pradesh, the average rainfall was 10 per cent lower than the average rainfall prior to 1970 (GoMP, 2000).

Besides lower irrigation extent, the following factors affect agricultural development in the state (as specified by Dept. of Agriculture, GoMP):

- (a) Large-scale soil erosion in most parts of the state resulting in:
  - i) water congestion due to impeded drainage in early parts of the monsoon season; and
  - ii) inadequate moisture in latter part when needed the most.
- (b) Nearly 72 per cent of cultivated area is rainfed agriculture.

**Table 4.5: Number of Districts Affected by Drought**

Year	Number of districts ( out of total 48 districts in the state)
1991-92	23
1992-93	4
1994-95	4
1995-96	8
1996-97	5
1997-98	35 (affected by excess and heavy rains)
1998-99	23
1999-2000	10
2000-01	32
2001-02	6
2002-03	33
2004-05	21
2005-06	17
2006-07	9

Source: Department of Agriculture, GoMP.

- (c) Low cropping intensity (135 per cent) due to practice of keeping land fallow in kharif and taking only one crop on residual/conserved moisture in rabi in some parts of the state.



- (d) Large proportion of cultivable waste and fallow land that is dependent on rainfall.
- (e) High proportion of low-value crops in cropping patterns (coarse cereals 20.6 per cent in kharif particularly).
- (f) Inadequate technology development suitable to specific regions of the state, particularly varieties suitable to match rainfall patterns.
- (g) Large tribal population, marginal and small farmers having low investment capacity for adoption of high yielding technology.
- (h) High proportion of non-descript animals and fodder shortage in spite of large proportion of fallows and wastelands.
- (i) Vagaries of monsoon and frequent natural calamities.

**Table 4.6: Environmental Limitations to Agricultural Development**

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

Source: Wasteland – Wasteland Atlas, 2003; Forest – State of Forest Report, 2003; Rainfall and NAS – Ministry of Agriculture

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





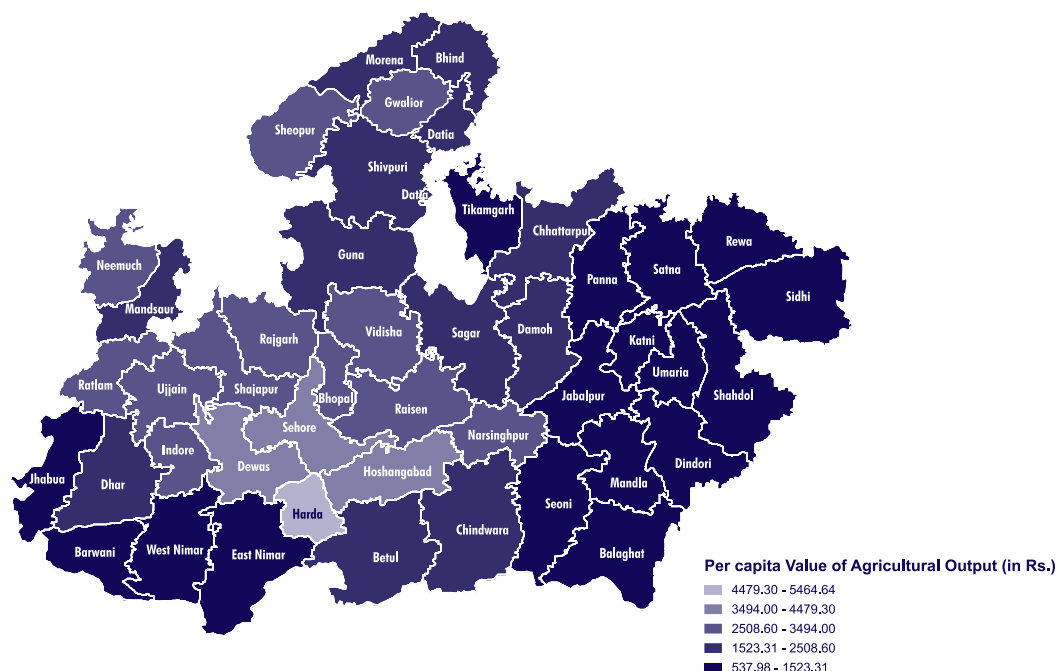
Among the major states in the country, Madhya Pradesh has one of the highest coverage of wastelands – more than 55,000 sq km covering almost 20 per cent of its vast geographical spread. Among the various categories of wastelands in the state, the scrublands constitute almost 14 per cent while the degraded forests cover more than 10 per cent of area. The gullied and ravinous lands are quite dominant in the northern region, particularly in districts in Grid Region – Bhind (25 per cent of total geographical area), Sheopur-Kalan (11 per cent) and Guna - Ashoknagar (5 per cent). Of these, Bhind and Sheopur-Kalan are infested with deep ravines and gullies.

Although Madhya Pradesh has a better rainfall profile as compared to many other states, the rainfall is quite erratic and experiences a high deviation (-8.3 per cent) from the normal. A high coverage of forests (25 per cent), a good proportion of which is degraded, further impedes the increase in cultivated area, which consequently forms just one-third of the total geographical area of the state. This compares poorly against the national average of more than 45 per cent.

## 4.2 Per Capita Value of Agricultural Output

The per capita value of agricultural output closely responds to the level of agricultural development in the state. The eastern parts of the state, particularly those bordering Chhattisgarh, have extremely low per capita production levels. Similarly the tribal districts in the western parts like Jhabua, Barwani and Nimar plains (East and West Nimar) have lower per capita production levels, whereas the districts in

*Map 4.2: Status of Agricultural Production*





**Table 4.7: Per Capita Value of Agricultural Output [TE 2005-06] (in Rs.)**

District	Value	Rank	District	Value	Rank	District	Value	Rank
Balaghat	918	36	Harda	5465	1	Rewa	885	37
Barwani	538	45	Hoshangabad	3956	2	Sagar	1784	27
Betul	1958	25	Indore	3246	6	Satna	942	34
Bhind	2147	22	Jabalpur	1430	30	Sehore	3760	3
Bhopal	3183	8	Jhabua	823	39	Seoni	1487	29
Chhatarpur	1589	28	Katni	775	40	Shahdol	675	43
Chhindwara	2056	24	Mandla	710	41	Shajapur	2944	11
Damoh	1807	26	Mandsaur	2128	23	Sheopur	3131	9
Datia	2236	21	Morena	2317	19	Shivpuri	2385	17
Dewas	3667	4	Narsimhapur	3047	10	Sidhi	692	42
Dhar	2253	20	Neemuch	2681	14	Tikamgarh	1310	31
Dindori	935	35	Panna	1022	33	Ujjain	3488	5
East Nimar	1217	32	Raisen	2585	16	Umaria	582	44
Guna	2363	18	Rajgarh	2770	12	Vidisha	3235	7
Gwalior	2678	15	Ratlam	2743	13	West Nimar	868	38

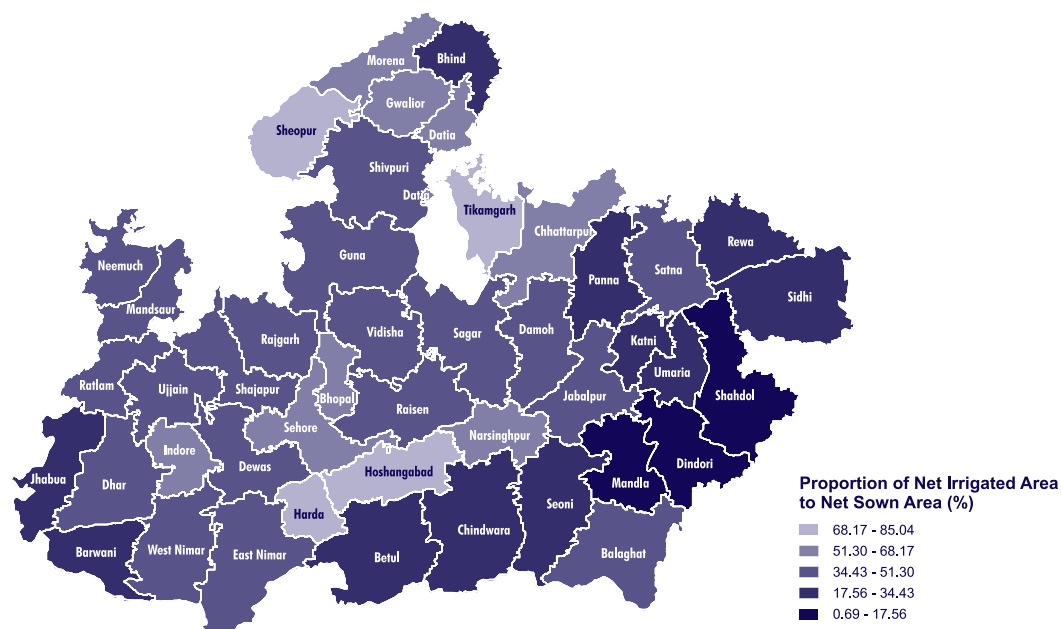
Source: Commissioner of Land Records, GoMP.

the catchment of Narmada River have higher level of per capita agricultural output. Among these districts, the production level is particularly found to be high in the lower reaches of the river where Harda and Hoshangabad districts have the highest agricultural output in the state. The surrounding Vindhya and Malwa Regions have medium levels of production. The production levels are also found to be towards the lower side in the northern Grid Region (Gwalior and surrounding districts) (Map 4.2).

### 4.3 Proportion of Net Irrigated Area

A regional analysis of the irrigation coverage in the state reveals higher irrigation coverage in the central Narmada Valley for obvious reasons. The northern Grid Region has a fair irrigation extent. On the other hand, the eastern districts bordering Chhattisgarh have very low irrigation coverage. The disparity in irrigation extent can be gauged from the fact that Hoshangabad and Harda in the Narmada Valley have irrigation extent higher than 75 per cent, whereas Shahdol and Mandla in the east have irrigation coverage of less than 10 per cent and Dindori in the same agro-climatic zone has negligible irrigation facility (less than 1 per cent of net area sown is irrigated) (Map 4.3).

**Map 4.3: Share of Irrigated Area**



**Table 4.8: Proportion of Net Area Irrigated to Net Area Sown, 2004-05**

District	Value	Rank	District	Value	Rank	District	Value	Rank
Balaghat	42.98	19	Harda	77.53	2	Rewa	23.66	38
Barwani	32.94	32	Hoshangabad	85.04	1	Sagar	40.65	25
Betul	25.36	37	Indore	58.1	8	Satna	37.01	28
Bhind	32.07	34	Jabalpur	37.25	26	Sehore	58.9	7
Bhopal	51.96	12	Jhabua	17.69	42	Seoni	26.6	36
Chhatarpur	54.7	10	Katni	28.71	35	Shahdol	5.88	44
Chhindwara	23.34	39	Mandla	8.72	43	Shajapur	45.43	16
Damoh	34.44	31	Mandsaur	42.92	20	Sheopur	70.17	4
Datia	59.63	6	Morena	61.99	5	Shivpuri	47.64	13
Dewas	42.37	23	Narsimhapur	56.52	9	Sidhi	17.74	41
Dhar	46.91	14	Neemuch	43.31	18	Tikamgarh	73.09	3
Dindori	0.69	45	Panna	32.65	33	Ujjain	46.22	15
East Nimar	35.7	30	Raisen	42.73	22	Umaria	17.89	40
Guna	37.11	27	Rajgarh	41.5	24	Vidisha	43.68	17
Gwalior	54.57	11	Ratlam	36.86	29	West Nimar	42.87	21

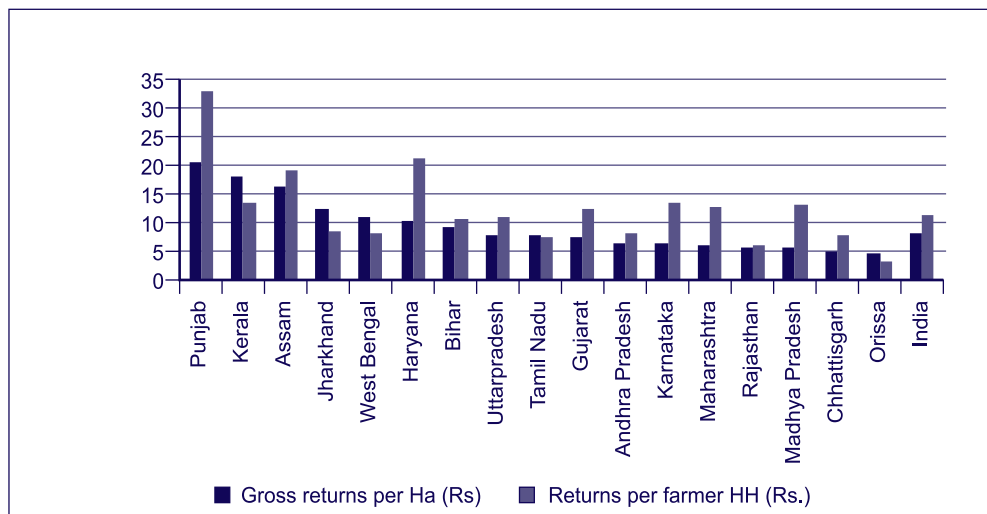
Source: Directorate of Economics and Statistics, GoMP.



## 4.4 Returns to Cultivation

Concerned by the plight of farmers and the alarming rise in suicides, the government wanted an in-depth study of the condition of farmers in the country. In 2003, the Situation Assessment of Farmers was released by the NSSO. One of the aspects covered by the survey was the profitability of farming as an occupation. The return to cultivation is a comprehensive indicator of the level of development of agriculture. An examination of returns to cultivation across states reveals the extremely poor status of Madhya Pradesh. Profitability, measured in terms of gross returns per hectare cultivated as well as returns to a farmer household, is found to be at a very low level as compared to any other state. For instance, the figure in Punjab (Rs. 20,500) is almost four times that of Madhya Pradesh (Rs. 5500) for returns to cultivated area while it is three times (Rs. 32,800) for farming households as compared to that in Madhya Pradesh (Rs. 13,146).

*Figure 4.4: Returns to Cultivation, 2002-03*

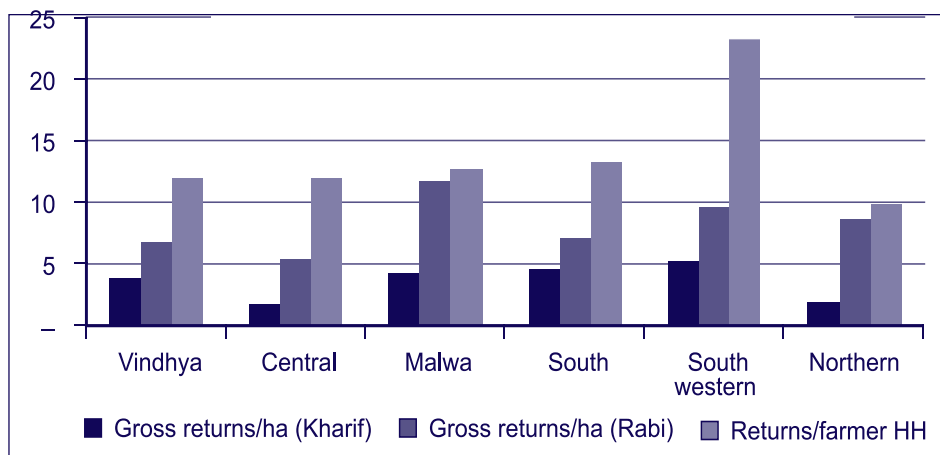


Source: Situation Assessment Survey of Farmers, National Sample Survey, 59th Round, Computed in Mishra (2007).

The grim situation in Madhya Pradesh masks an even more serious situation when we compare regions across the state. At the regional level within the state as well, a huge difference is observed in per hectare returns between kharif and rabi crops. This is primarily because of the semi-arid nature of these regions. Only the south-western region that receives high rainfall (Hoshangabad has the highest average rainfall in the state) shows a higher return per unit area cultivated in kharif season (Rs. 5237). Even this, however, is lower than the all-India average of Rs. 6756 per hectare. This region also has a higher irrigation extent, as already discussed.

Central Vindhya and Grid Region have very low returns. Further, in terms of returns per cultivating household, the south-western region comprising the Narmada Valley and Nimar Plains has very high returns, much above the state and national average. On the other hand, the Grid Region in the north has the lowest returns.

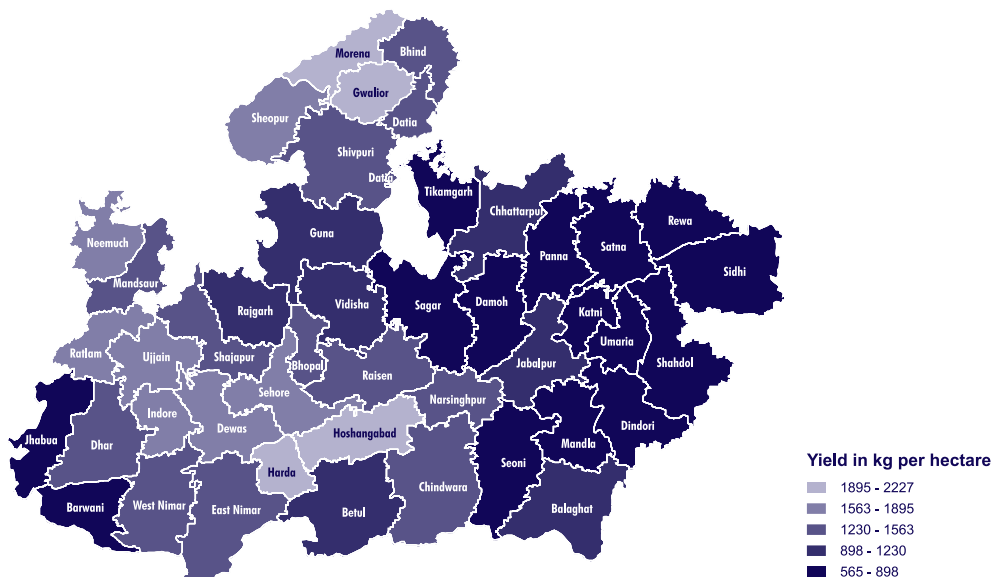
**Figure 4.5: Returns to Cultivation by NSS Regions, 2002-03**



Source: Computed from NSS, 59th Round (Mishra, 2007).

The disparity in irrigation facilities gets adequately reflected in the agricultural productivity of the state. The Narmada Valley in the centre and Grid Region in the north have higher yield levels than rest of the state. Dindori, which has almost no irrigation facility, has the least yield level in the state; almost one-fourth of Morena and Hoshangabad. Even in terms of absolute production levels, the Narmada Valley and adjoining districts like Raisen and Vidisha are found to be contributing almost 40 per cent of the total foodgrain production of the state (Map 4.4).

**Map 4.4: Yield of Total Foodgrains in Madhya Pradesh (TE 2006-07)**



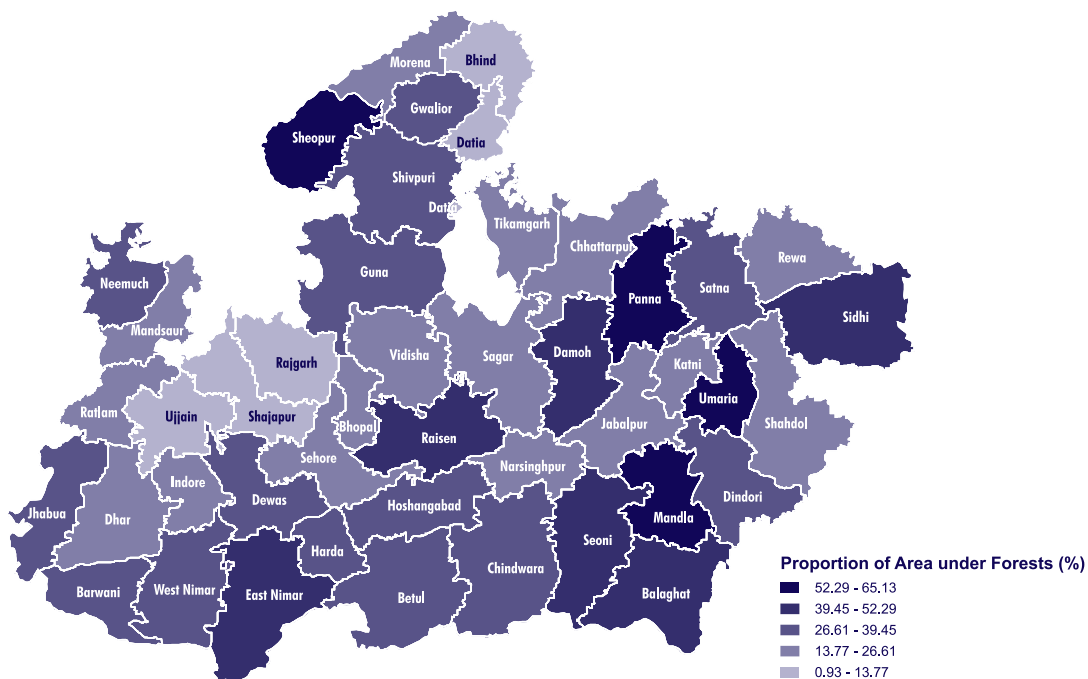


**Table 4.9: Yield of Total Foodgrains [TE 2006-07] (kg/ha)**

District	Value	Rank	District	Value	Rank	District	Value	Rank
Balaghat	1126	26	Harda	2018	4	Rewa	789	37
Barwani	865	31	Hoshangabad	2035	2	Sagar	823	35
Betul	1078	28	Indore	1811	6	Satna	802	36
Bhind	1364	14	Jabalpur	1131	25	Sehore	1637	8
Bhopal	1503	12	Jhabua	789	37	Seoni	827	34
Chhatarpur	938	30	Katni	710	40	Shahdol	721	39
Chhindwara	1334	19	Mandla	608	43	Shajapur	1357	17
Damoh	864	32	Mandsaur	1348	18	Sheopur	1807	7
Datia	1279	20	Morena	2227	1	Shivpuri	1357	16
Dewas	1633	9	Narsimhapur	1363	15	Sidhi	668	42
Dhar	1437	13	Neemuch	1596	11	Tikamgarh	860	33
Dindori	565	45	Panna	689	41	Ujjain	1633	10
East Nimar	1249	23	Raisen	1256	22	Umaria	570	44
Guna	1051	29	Rajgarh	1091	27	Vidisha	1178	24
Gwalior	2018	3	Ratlam	1838	5	West Nimar	1265	21

Source: Directorate of Economics and Statistics, GoMP.

**Map 4.5: Share of Area under Forests**





## 4.5 Proportion of Forests

An analysis of the districts with low agricultural production and yield reveals a higher proportion of area covered by forests in these districts. Districts in the Chhattisgarh region like Mandla, Umaria and in the Keymore Plateau like Panna and Umaria have very high proportion of forest areas and very low productivity levels (Map 4.5).

*Table 4.10: Proportion of Area under Forests, 2003-04*

District	Value	Rank	District	Value	Rank	District	Value	Rank
Balaghat	43.9	41	Harda	33.7	26	Rewa	16.7	10
Barwani	34.6	29	Hoshangabad	34.0	27	Sagar	26.4	21
Betul	39.2	35	Indore	21.9	14	Satna	29.7	24
Bhind	2.1	3	Jabalpur	18.2	12	Sehore	26.3	20
Bhopal	15.5	8	Jhabua	27.8	22	Seoni	42.0	39
Chhatarpur	22.9	16	Katni	25.1	18	Shahdol	22.3	15
Chhindwara	36.7	31	Mandla	65.1	45	Shajapur	0.9	1
Damoh	41.7	38	Mandsaur	14.1	6	Sheopur	58.6	44
Datia	13.1	5	Morena	20.6	13	Shivpuri	31.6	25
Dewas	35.6	30	Narsimhapur	24.2	17	Sidhi	41.6	37
Dhar	16.8	11	Neemuch	34.4	28	Tikamgarh	15.3	7
Dindori	38.7	34	Panna	56.2	42	Ujjain	1.7	2
East Nimar	43.4	40	Raisen	39.6	36	Umaria	57.9	43
Guna	38.4	33	Rajgarh	4.6	4	Vidisha	15.8	9
Gwalior	28.8	23	Ratlam	25.2	19	West Nimar	36.8	32

Source: Directorate of Economics and Statistics, GoMP.

It may be argued that the high forest cover also provides alternative livelihood options to people while filling critical gaps in traditional diets of these communities. However, as earlier stated there are legal and community restrictions on access to forests.

## 4.6 Connectivity

Access to paved road is another important component of the availability index. It indicates access to various facilities. It also reduces transportation cost, and hence transaction cost. Improvement of communication system also opens up various markets to the rural producers. Increase in business also helps them to improve their financial situation and hence their food security status. Empirical evidences have also shown that rural roads have a significant positive impact on agricultural productivity (GoMP, 2007).

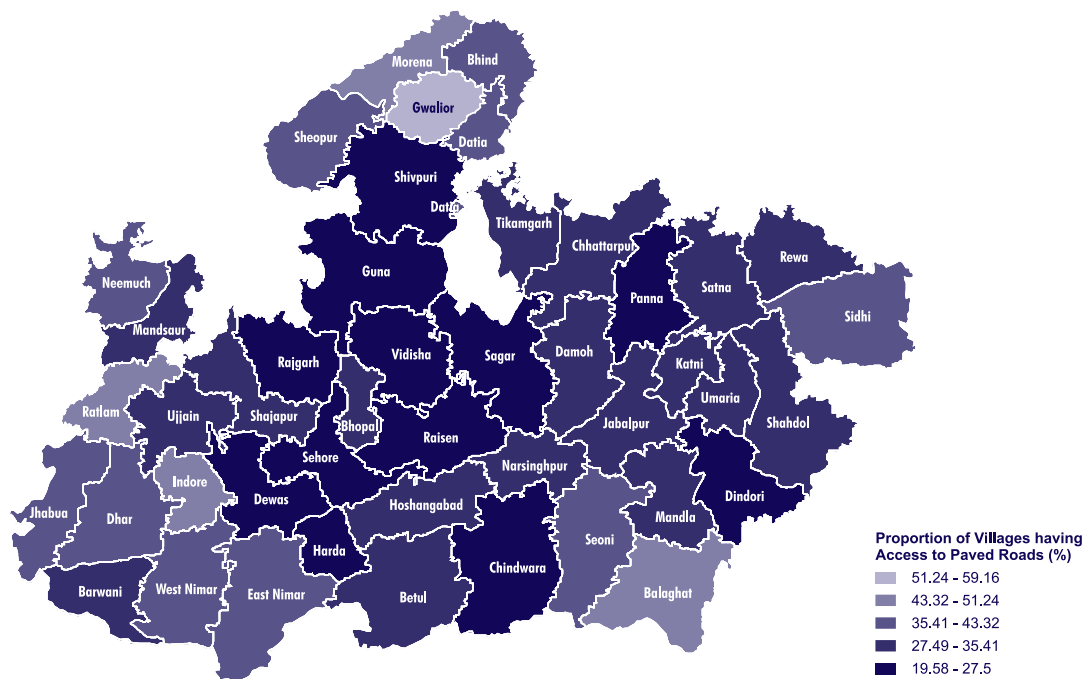


**Table 4.11: Proportion of Villages with Access to Paved Roads, 2001**

District	Value	Rank	District	Value	Rank	District	Value	Rank
Balaghat	44.4	5	Harda	24.6	39	Rewa	30.7	29
Barwani	27.5	33	Hoshangabad	31.7	27	Sagar	23.2	41
Betul	29.8	30	Indore	51.0	2	Satna	31.8	26
Bhind	42.7	6	Jabalpur	35.0	16	Sehore	26.3	36
Bhopal	29.5	31	Jhabua	40.2	12	Seoni	37.5	14
Chhatarpur	32.3	21	Katni	32.7	18	Shahdol	33.7	17
Chhindwara	27.0	35	Mandla	32.7	19	Shajapur	32.1	23
Damoh	32.3	20	Mandsaur	32.0	25	Sheopur	42.3	7
Datia	36.1	15	Morena	48.8	4	Shivpuri	22.4	43
Dewas	22.9	42	Narsimhapur	30.9	28	Sidhi	41.4	10
Dhar	42.3	7	Neemuch	40.3	11	Tikamgarh	32.2	22
Dindori	21.9	44	Panna	25.6	37	Ujjain	27.6	32
East Nimar	37.6	13	Raisen	24.8	38	Umariya	32.1	24
Guna	27.3	34	Rajgarh	19.6	45	Vidisha	24.0	40
Gwalior	59.2	1	Ratlam	49.4	3	West Nimar	42.3	9

Source: Census of India, 2001.

**Map 4.6: Status of Rural Connectivity**







The vast size and difficult terrain of Madhya Pradesh have meant that road connectivity is hard to achieve. This has been compounded by the continued legacy of neglect of large tracts of the interiors of the state, especially tribal areas. Resultantly, road connectivity in the state has been among the lowest in the country. Road length per 100 sq km in Madhya Pradesh was 52 km as compared to the national average of 75 km (GoMP, 2007).

The percentage of villages having access to paved road varies from 20 per cent (in Rajgarh) to 59 per cent (in Gwalior) within Madhya Pradesh. One interesting observation in this context is Jhabua, a very backward district in the state, which has higher percentage of villages having access to paved road, whereas the rural parts of Bhopal district have lower percentage of villages having access to paved road. Bhopal, which is the state capital, is one of the most developed districts of the state. But its rural parts are lagging behind in terms of access to paved road. The northern region of Madhya Pradesh has higher access to paved roads, while the central region has comparatively lower access to paved roads (Map 4.6).

#### 4.7 Availability Index

Consequent upon high agricultural production and even terrain (and hence easy connectivity), the districts of Central Narmada Valley (particularly Harda and Hoshangabad) are placed at a comfortable position in terms of availability. The adjoining districts in Malwa (particularly Indore) and Vindhya Region (particularly Sehore and Bhopal) follow closely. Sheopur in the Grid Region though has high proportion of forests, scores high in terms of irrigation coverage. Similarly, Gwalior and Morena (in Grid Region) and Indore rank high in availability factors on account of better rural connectivity.

*Table 4.12: Availability Index*

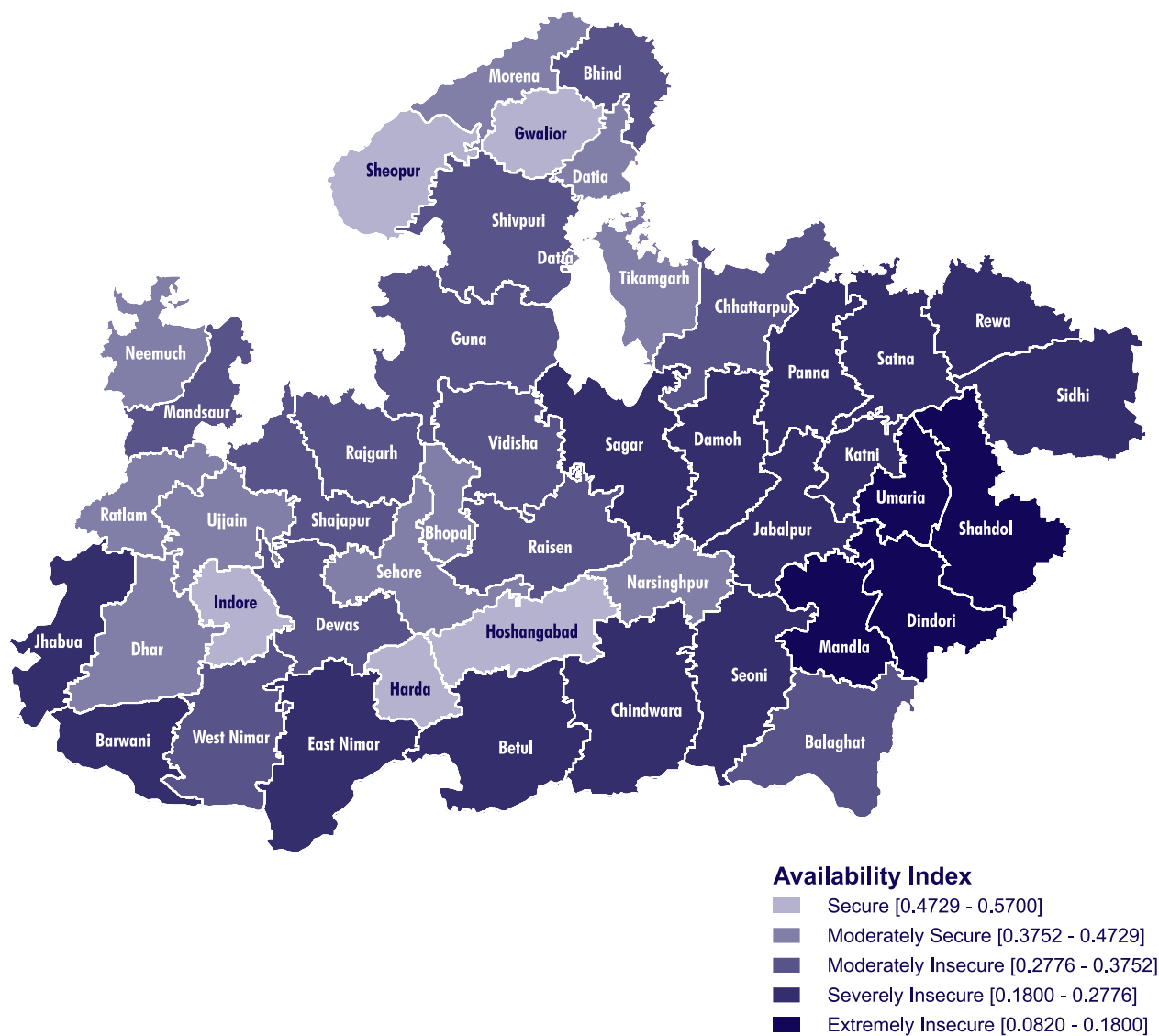
District	Irrigation Extent		Per Capita Agricultural Output		Share of Forest Area		Rural Connectivity	
	Value	Rank	Value	Rank	Value	Rank	Value	Rank
Balaghat	43.0	19	918	36	43.9	41	44.4	5
Barwani	32.9	32	538	45	34.6	29	27.5	33
Betul	25.4	37	1958	25	39.2	35	29.8	30
Bhind	32.1	34	2147	22	2.1	3	42.7	6
Bhopal	52.0	12	3183	8	15.5	8	29.5	31
Chhatarpur	54.7	10	1589	28	22.9	16	32.3	21
Chhindwara	23.3	39	2056	24	36.7	31	27.0	35
Damoh	34.4	31	1807	26	41.7	38	32.3	20
Datia	59.6	6	2236	21	13.1	5	36.1	15
Dewas	42.4	23	3667	4	35.6	30	22.9	42
Dhar	46.9	14	2253	20	16.8	11	42.3	7
Dindori	0.7	45	935	35	38.7	34	21.9	44

(Contd...)



District	Irrigation Extent		Per Capita Agricultural Output		Share of Forest Area		Rural Connectivity	
	Value	Rank	Value	Rank	Value	Rank	Value	Rank
East Nimar	35.7	30	1217	32	43.4	40	37.6	13
Guna	37.1	27	2363	18	38.4	33	27.3	34
Gwalior	54.6	11	2678	15	28.8	23	59.2	1
Harda	77.5	2	5465	1	33.7	26	24.6	39
Hoshangabad	85.0	1	3956	2	34.0	27	31.7	27
Indore	58.1	8	3246	6	21.9	14	51.0	2
Jabalpur	37.3	26	1430	30	18.2	12	35.0	16
Jhabua	17.7	42	823	39	27.8	22	40.2	12
Katni	28.7	35	775	40	25.1	18	32.7	18
Mandla	8.7	43	710	41	65.1	45	32.7	19
Mandsaur	42.9	20	2128	23	14.1	6	32.0	25
Morena	62.0	5	2317	19	20.6	13	48.8	4
Narsimhapur	56.5	9	3047	10	24.2	17	30.9	28
Neemuch	43.3	18	2681	14	34.4	28	40.3	11
Panna	32.7	33	1022	33	56.2	42	25.6	37
Raisen	42.7	22	2585	16	39.6	36	24.8	38
Rajgarh	41.5	24	2770	12	4.6	4	19.6	45
Ratlam	36.9	29	2743	13	25.2	19	49.4	3
Rewa	23.7	38	885	37	16.7	10	30.7	29
Sagar	40.7	25	1784	27	26.4	21	23.2	41
Satna	37.0	28	942	34	29.7	24	31.8	26
Sehore	58.9	7	3760	3	26.3	20	26.3	36
Seoni	26.6	36	1487	29	42.0	39	37.5	14
Shahdol	5.9	44	675	43	22.3	15	33.7	17
Shajapur	45.4	16	2944	11	0.9	1	32.1	23
Sheopur	70.2	4	3131	9	58.6	44	42.3	7
Shivpuri	47.6	13	2385	17	31.6	25	22.4	43
Sidhi	17.7	41	692	42	41.6	37	41.4	10
Tikamgarh	73.1	3	1310	31	15.3	7	32.2	22
Ujjain	46.2	15	3488	5	1.7	2	27.6	32
Umaria	17.9	40	582	44	57.9	43	32.1	24
Vidisha	43.7	17	3235	7	15.8	9	24.0	40
West Nimar	42.9	21	868	38	36.8	32	42.3	9

*Map 4.7: Food Availability Map of Rural Madhya Pradesh*





**Table 4.13: Status of Districts in Availability Index**

Extremely Insecure	Severely Insecure	Moderately Insecure	Moderately Secure	Secure
Umariya	Jabalpur	Shajapur	Morena	Harda
Mandla	Damoh	Dewas	Sehore	Hoshangabad
Shahdol	East Nimar	Vidisha	Narsimhapur	Sheopur
Dindori	Sagar	Chhatarpur	Datia	Indore
	Seoni	Bhind	Ratlam	Gwalior
	Betul	Mandsaur	Bhopal	
	Satna	Raisen	Ujjain	
	Chhindwara	Shivpuri	Tikamgarh	
	Katni	Balaghat	Neemuch	
	Panna	Rajgarh	Dhar	
	Jhabua	West Nimar		
	Sidhi	Guna		
	Barwani			
	Rewa			

On the other hand, the districts in the eastern parts of the state fair poorly in terms of availability indicators. The districts adjoining northern Chhattisgarh Region (Dindori, Mandla and Shahdol) are particularly in a poor state and lie at the bottom. This region along with the adjoining Keymore Plateau (particularly Umariya) forms a contiguous zone of backwardness in availability factors. For instance, Dindori has negligible irrigation coverage while Mandla and Shahdol have irrigation coverage lower than 10 per cent.

Similarly, in terms of rural connectivity, Dindori again has only 22 per cent of its villages connected. Mandla and Umariya have the highest coverage of forests in the state, wherein the forests constitute two-third of the total geographical area of Mandla. As a consequence of lower irrigation and higher forest area, all these districts have very low agricultural output – all the four districts have PCVAO less than Rs. 1000 per capita per annum, which is a pointer towards the lower level of agricultural development in these districts (Map 4.7).

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## 5. Access to Food

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

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

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

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

### 5.1 Rural Wages

Wage rates affect the food security situation of the rural population engaged as casual workers tend to be the least protected and have the lowest level of earnings. The NSS defines a casual wage worker as one who was casually engaged in others' farm or non-farm enterprises (both household and non-household) and, in return, received wages according to the terms of the daily or periodic work contract. It can be seen from Table 5.1 that Madhya Pradesh has one of the lowest wage rates in the country (Rs. 35.7), with only Chhattisgarh (Rs. 34) below it. The wage rate in the state is more than Rs. 10 below the national average while the best performing state Kerala (Rs. 120) has wage rates more than three times that of Madhya Pradesh.

The poor wage levels in the state can be gauged from the fact that the district with the highest wage rate in the state – Morena – has wage rate lower than Rs. 60, which itself is lower than the national minimum wage of Rs. 66. As many as seven districts in the state have wage rates lower than Rs. 30. Most of these districts are found in the agriculturally backward region of Dindori, Shahdol, Umaria and Betul (Map 5.1).

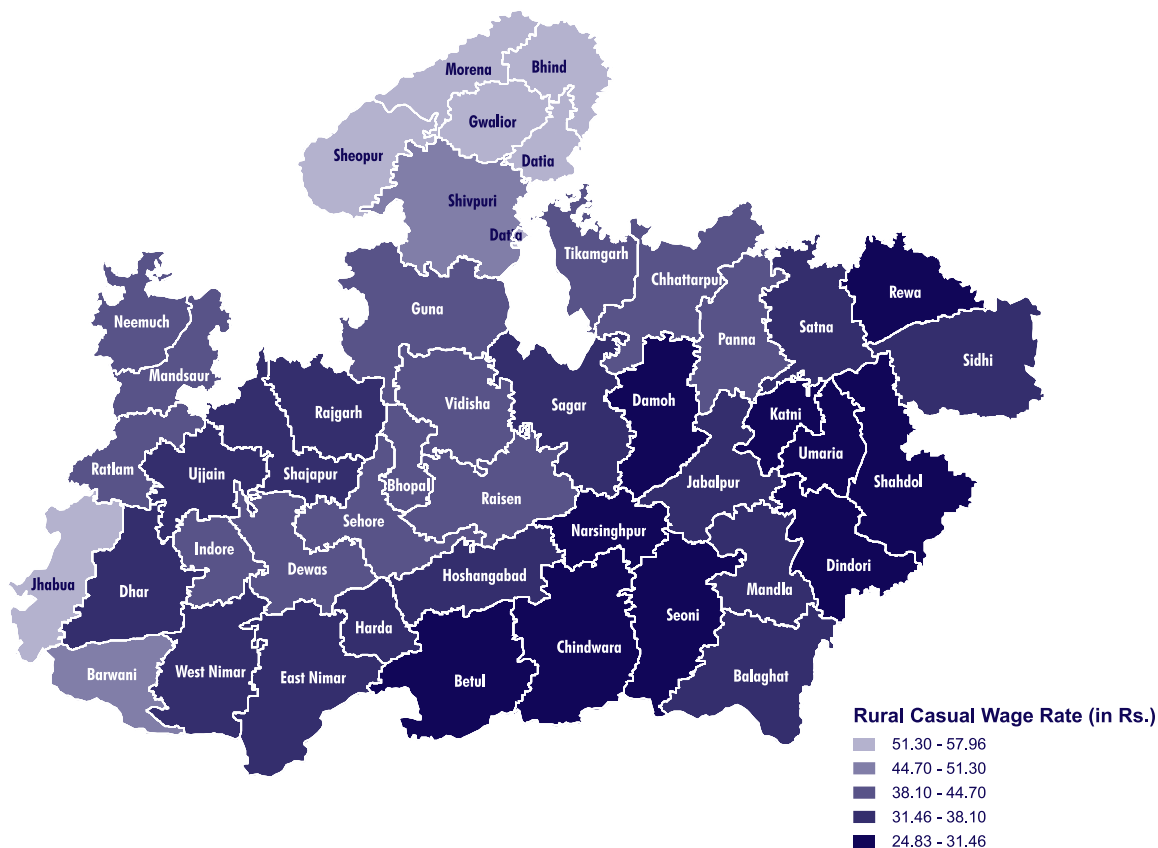


**Table 5.1: Wage Rate of Casual Workers by State, 2004-05**

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

Source: As stated in Table 3.4, Variable b5.

**Map 5.1: Wage Rates of Rural Population**





**Table 5.2: Wage Rate of Casual Workers, 2004-05**

District	Value	Rank	District	Value	Rank	District	Value	Rank
Balaghat	31.94	32	Harda	31.95	31	Rewa	28.77	41
Barwani	48.98	8	Hoshangabad	31.59	35	Sagar	31.77	34
Betul	27.43	44	Indore	38.17	21	Satna	34.77	25
Bhind	52.99	3	Jabalpur	31.94	32	Sehore	39.03	19
Bhopal	40.36	17	Jhabua	52.17	6	Seoni	24.83	45
Chhatarpur	41.85	13	Katni	30.88	37	Shahdol	28.61	42
Chhindwara	31.46	36	Mandla	34.8	24	Shajapur	32.62	28
Damoh	29.94	39	Mandsaur	42.86	10	Sheopur	55.65	2
Datia	52.99	3	Morena	57.96	1	Shivpuri	49.16	7
Dewas	41.68	14	Narsimhapur	30.8	38	Sidhi	32.31	30
Dhar	34.32	26	Neemuch	42.86	10	Tikamgarh	42.21	12
Dindori	29.07	40	Panna	41.51	15	Ujjain	33.77	27
East Nimar	36.56	22	Raisen	38.71	20	Umaria	28.61	42
Guna	43.47	9	Rajgarh	36.43	23	Vidisha	40.85	16
Gwalior	52.78	5	Ratlam	39.48	18	West Nimar	32.37	29

Source: NSS, 61st Round (Computed from unit records).

## 5.2 Per Capita Consumption Expenditure

The low income levels directly affect the consumption patterns. Monthly per capita consumption expenditure (MPCE) is a good indicator of food security in rural areas. Madhya Pradesh again lies among the low ranking states in terms of consumption expenditure. The value (Rs. 440) is substantially lower than the national average (Rs. 560) and less than half of the best ranking state, Kerala (Rs. 1013).

**Table 5.3: Monthly Per Capita Consumption Expenditure (Rural), 2004-05**

State/India	Value	Rank	State	Value	Rank
India	558.78	–	Kerala	1013.15	1
Andhra Pradesh	585.55	7	Madhya Pradesh	439.06	13
Assam	543.18	10	Maharashtra	567.76	8
Bihar	417.11	16	Orissa	398.89	17
Chhattisgarh	425.1	15	Punjab	846.75	3
Gujarat	596.09	5	Rajasthan	590.83	6
Haryana	862.89	2	Tamil Nadu	602.17	4
Jharkhand	425.3	14	Uttar Pradesh	532.63	11
Karnataka	508.46	12	West Bengal	562.11	9

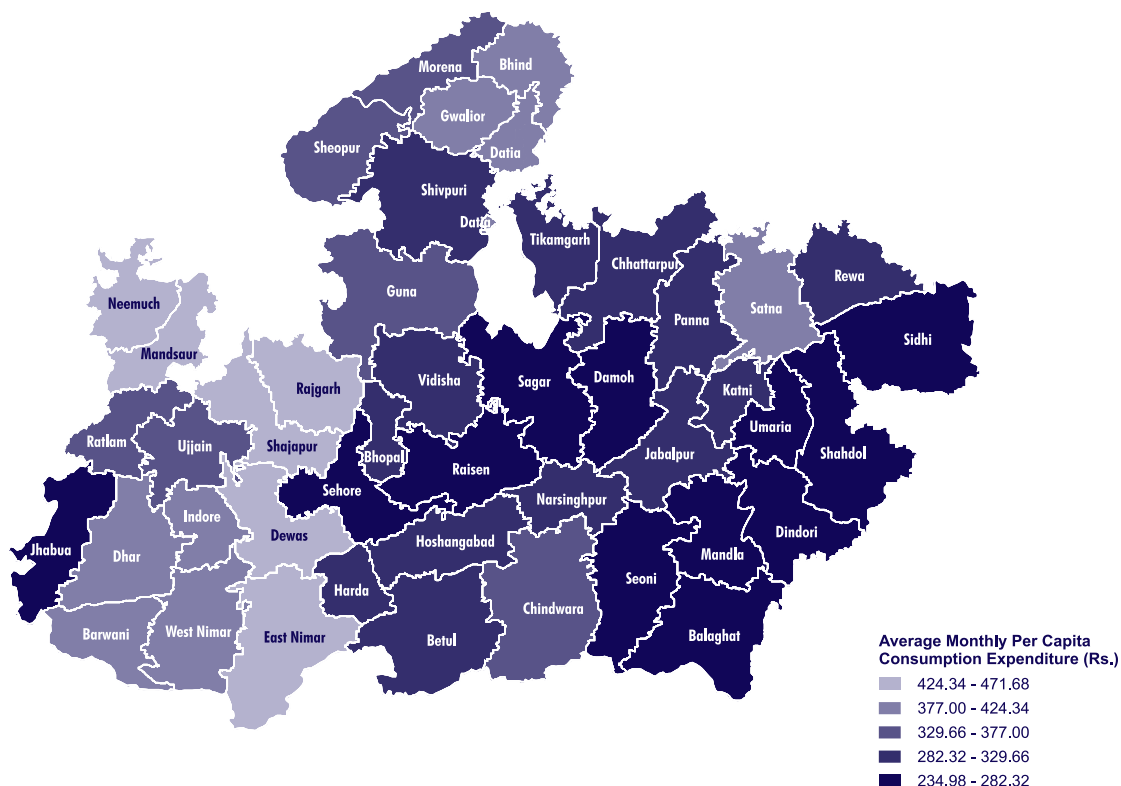
Source: Calculated from NSS, 61st Round.



A very close association is found between wage rates and MPCE levels – pointing towards the significance of enhancing income levels to ensure a qualitatively improved standard of living. For instance, within the state, districts in the Grid Region (particularly Bhind and Gwalior) and Datia in Bundelkhand have relatively high wage rate as well as higher MPCE levels (which though is quite low in absolute terms). Similarly, districts on the eastern margin – Shahdol, Umaria, Dindori and Seoni— have extremely low wage rates as well as MPCE.

A regional analysis of these indicators shows that all the districts in northern Chhattisgarh Region (Mandla, Dindori, Shahdol and Sidhi) have MPCE level equal to or less than Rs. 250. In fact, as many as 16 districts have MPCE figures lower than Rs. 300. Among other districts having extremely low MPCE are Umaria (Rs. 252) and Seoni (Rs. 269) in Keymore Plateau and Damoh, Sagar, Raisen and Sehore forming a stretch in Vindhya Plateau – all having MPCE at Rs. 276-277. Tikamgarh, Chhattarpur (in Bundelkhand Region) and Panna (in Keymore Plateau) form another such continuum. Most of these districts are dominated by tribal population, while Tikamgarh and Chhattarpur have higher concentration of SC population (Map 5.2).

**Map 5.2: Status of Consumption Expenditure**







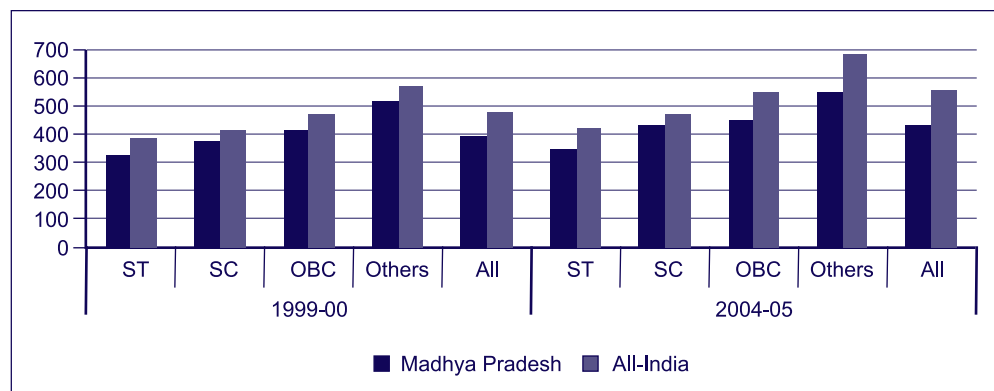
**Table 5.4: Monthly Per Capita Consumption Expenditure, 2004-05**

District	Value	Rank	District	Value	Rank	District	Value	Rank
Balaghat	269	39	Harda	309	26	Rewa	296	30
Barwani	392	12	Hoshangabad	309	26	Sagar	276	37
Betul	309	26	Indore	393	10	Satna	387	14
Bhind	422	7	Jabalpur	319	21	Sehore	277	35
Bhopal	315	24	Jhabua	281	34	Seoni	269	39
Chhatarpur	293	31	Katni	319	21	Shahdol	252	42
Chhindwara	353	20	Mandla	235	44	Shajapur	424	4
Damoh	276	37	Mandsaur	472	1	Sheopur	373	17
Datia	422	7	Morena	373	17	Shivpuri	305	29
Dewas	424	4	Narsimhapur	319	21	Sidhi	266	41
Dhar	393	10	Neemuch	472	1	Tikamgarh	293	31
Dindori	235	44	Panna	293	31	Ujjain	374	15
East Nimar	434	3	Raisen	277	35	Umaria	252	42
Guna	368	19	Rajgarh	424	4	Vidisha	315	24
Gwalior	422	7	Ratlam	374	15	West Nimar	392	12

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

Among the social groups, MPCE has increased only marginally from a very low level of Rs. 325 in 1999-2000 to Rs. 352 in 2004-05, i.e., an increase of just 8 per cent in five years. The all-India increase for tribal population is 10 per cent over the same period. The MPCE for SCs has seen a higher increase from Rs. 375 to Rs. 437, i.e., an increase of 17 per cent. However, it can be inferred from the Figure 5.1 that the MPCE for STs (Rs. 352) and SCs (Rs. 437) in 2004-05 is even lower than the MPCE for

**Figure 5.1: Monthly Per Capita Expenditure among Social Groups in Rural Areas, 1999-2000 and 2004-05**



Source: Calculated from NSS (various rounds).



'others' in 1999-2000 (Rs. 516) – a pointer towards the high disparity in existence among the social groups. The gap between tribal and 'others' has further increased in 2004-05 as compared to the previous period, though the gap between SCs and 'others' has marginally declined.

### 5.3 Agricultural Labourers

A high proportion of agricultural labourers in workforce points towards high landlessness which in turn is a pointer towards high poverty levels. Madhya Pradesh has a remarkably high proportion of agricultural labourers and ranks 10<sup>th</sup> among all major states. The agricultural labourers together with the cultivators form more than 85 per cent of the rural workforce in the state.

**Table 5.5: Proportion of Agricultural Labourers in Workforce by State, 2001**

Area Name	Value (%)	Rank	Area Name	Value (%)	Rank
India	33	–	Kerala	19.6	4
Andhra Pradesh	47.5	16	<b>Madhya Pradesh</b>	<b>34.1</b>	<b>10</b>
Assam	14.9	2	Maharashtra	37.8	13
Bihar	51.0	17	Orissa	39.1	14
Chhattisgarh	36.1	12	Punjab	21.9	5
Gujarat	33.2	9	Rajasthan	12.3	1
Haryana	19.0	3	Tamil Nadu	42.9	15
Jharkhand	32.8	7	Uttar Pradesh	28.9	6
Karnataka	34.5	11	West Bengal	33.1	8

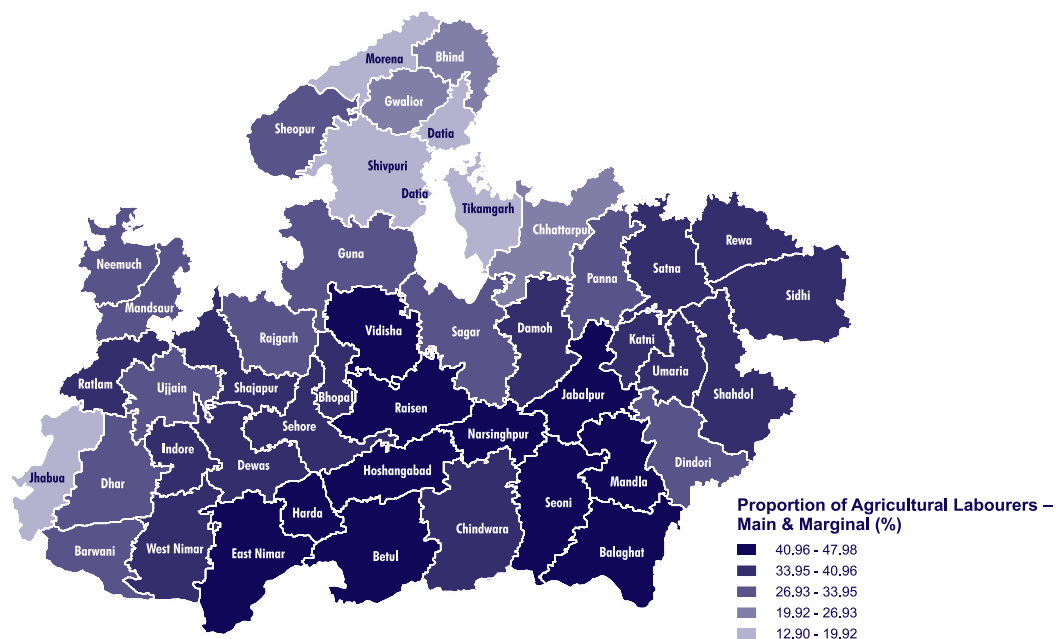
Source: As stated in Table 3.4, Variable b1.

A district-wise status of agricultural labourers shows a close coherence with the level of agricultural development, wherein districts with high level of agricultural development also have a higher proportion of agricultural labourers. For instance, the Central Narmada Valley (particularly Harda and Hoshangabad districts) along with the nearby Vindhyas, that have a high per capita agricultural output, also have the highest proportion of agricultural labourers. This is quite understandable as with the low level of mechanised agriculture, the significance of manual labour in these areas increases. On the other hand, agriculturally backward districts like Morena, Jhabua, Shivpuri, Tikamgarh and Datia have proportion of agricultural labourers lower than 20 per cent of total workers (Map 5.3).

### 5.4 Proportion of STs and SCs

Madhya Pradesh has the highest tribal population among all states in the country. Almost 26 per cent of the rural population in the state is tribal. The figure is more than twice that at the national level, and

**Map 5.3: Share of Agricultural Labourers in Total Working Population**



**Table 5.6: Proportion of Agricultural Labourers in Total Workers, 2001**

District	Value	Rank	District	Value	Rank	District	Value	Rank
Balaghat	41.53	35	Harda	45.61	42	Rewa	37.9	28
Barwani	29.02	10	Hoshangabad	45.15	41	Sagar	33.29	18
Betul	41.77	36	Indore	36.76	24	Satna	37	25
Bhind	20.32	6	Jabalpur	46.9	44	Sehore	40.05	31
Bhopal	39.95	30	Jhabua	14.57	2	Seoni	44.34	40
Chhatarpur	22.58	7	Katni	37.28	26	Shahdol	40.62	34
Chhindwara	40.13	32	Mandla	43.47	38	Shajapur	34.9	23
Damoh	34.16	21	Mandsaur	31.62	14	Sheopur	30.08	13
Datia	17.95	4	Morena	12.9	1	Shivpuri	19.26	5
Dewas	40.31	33	Narsimhapur	47.98	45	Sidhi	33.96	20
Dhar	32.09	15	Neemuch	28.07	9	Tikamgarh	17.92	3
Dindori	29.88	11	Panna	33.07	17	Ujjain	33.41	19
East Nimar	46.12	43	Raisen	43.09	37	Umaria	39.62	29
Guna	32.49	16	Rajgarh	29.88	11	Vidisha	43.51	39
Gwalior	26.78	8	Ratlam	34.4	22	West Nimar	37.64	27

Source: Census of India, 2001.



only below other tribal states of Jharkhand (31 per cent) and Chhattisgarh (38 per cent). There are eight states in the country with a tribal population exceeding five million, wherein Madhya Pradesh tops the list with a total tribal population exceeding 12 million.

SCs form the other marginalised community, particularly in the rural areas. While the STs get marginalised mostly on account of their location the SCs have faced historical discrimination which accounts for their marginalisation and vulnerability. The SCs constitute more than 15 per cent of the rural population in the state. Thus, the SCs and STs together form more than 40 per cent of the rural population in the state, which is only below Chhattisgarh, Jharkhand and Orissa among major states.

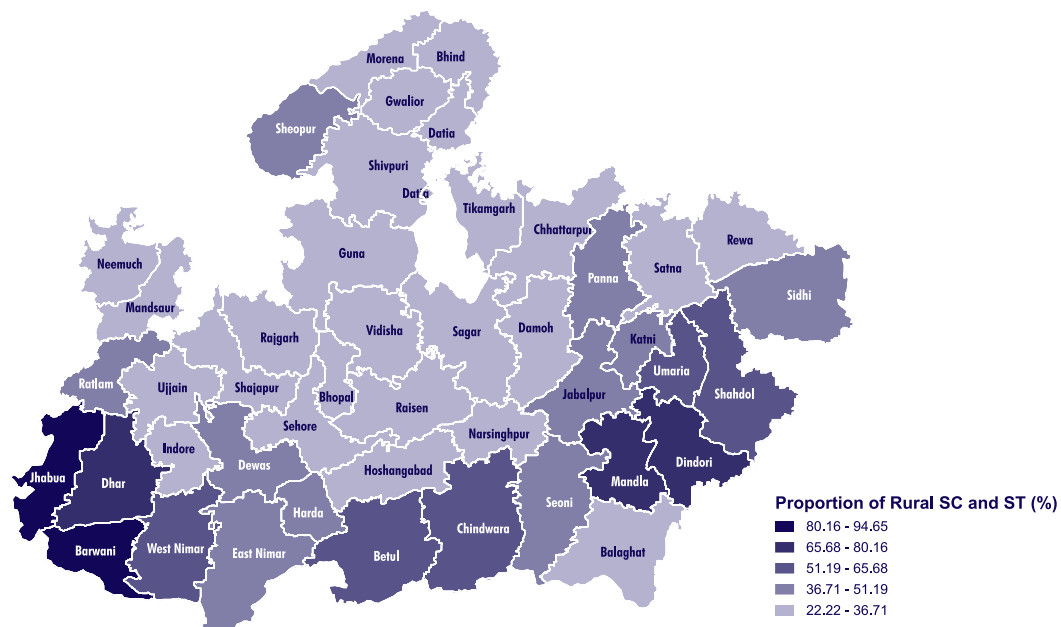
Like any other state in the country, while the hills and forests are inhabited by the tribal population the SCs reside in the plains. The latter constitute more than 20 per cent of the rural population in as many as 13 districts in the state. Thus, taking together the proportion of SCs and STs, we see that Madhya Pradesh has a very high proportion of these vulnerable groups. These vulnerable populations constitute more than 20 per cent of the rural population in all the districts in the state (Map 5.4).

**Table 5.7: Proportion of Scheduled Tribes and Scheduled Castes in the Rural Population by State**

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

Source: Census of India, 2001.

**Map 5.4: Proportion of Scheduled Castes and Scheduled Tribes in Total Rural Population**



**Table 5.8: Proportion of Rural STs and SCs, 2001**

District	Value	Rank	District	Value	Rank	District	Value	Rank
Balaghat	30.26	13	Harda	49.1	32	Rewa	30.5	14
Barwani	81.53	44	Hoshangabad	35.52	25	Sagar	33.64	18
Betul	55.84	39	Indore	34.29	22	Satna	33.76	19
Bhind	22.43	3	Jabalpur	40.4	29	Sehore	34.11	21
Bhopal	25.06	6	Jhabua	94.65	45	Seoni	50.37	34
Chhatarpur	29.07	11	Katni	38.62	27	Shahdol	61.27	40
Chhindwara	53.08	37	Mandla	66.59	41	Shajapur	27.39	8
Damoh	34.47	23	Mandsaur	23.34	5	Sheopur	40.93	30
Datia	28.54	10	Morena	22.22	1	Shivpuri	32.34	16
Dewas	39.85	28	Narsimhapur	31.18	15	Sidhi	44.96	31
Dhar	68.03	42	Neemuch	23.13	4	Tikamgarh	29.77	12
Dindori	72.39	43	Panna	37.48	26	Ujjain	33.78	20
East Nimar	50.53	35	Raisen	35.48	24	Umariya	54.52	38
Guna	33.01	17	Rajgarh	22.33	2	Vidisha	27.09	7
Gwalior	28.43	9	Ratlam	50.31	33	West Nimar	52.11	36

Source: Census of India, 2001.



Madhya Pradesh also comprises some of the most tribal-dominated districts in the country. For instance, the tribal population comprises more than 92 per cent of the rural population in Jhabua and more than 75 per cent in Barwani. Barwani, in particular, has remained infamous for high levels of undernutrition and starvation deaths. Surveys have shown that almost 85 per cent of the children in rural areas are malnourished and almost 22 per cent of the children were found to be severely malnourished<sup>1</sup> (CEHAT, 2003).

The plight of the tribal population in the state is deplorable and in most cases the only coping mechanism they resort to is out-migration. A study on migratory behaviour of tribal population in the state suggests that if a household's food requirement during normal situation is met from the available food, migration is only a voluntary activity, pointing to the fact that the tribal people migrate only when they face food insecurity. Thus in most tribal areas of the state, migration is seasonal in nature, occurring in the lean agricultural season. Seasonal migration, on its part, is a group phenomenon, generally resorted to by the household as a whole, normally by several households together. The duration of such migration is determined by the household's requirement and shortfall in consumption. As soon as this shortfall is met, the migrating households and persons return to their native villages (Sah, 2007).

The in-migrants in the destination area suffer from exploitation of different kinds in the hands of their employers who rarely provide anything apart from wages, and the labourers have to fend for themselves to meet their basic requirements (Srivastava and Sasikumar, 2003). Thus, the people who migrate due to lack of employment opportunities become further vulnerable in the destination areas.

#### Box 5.1: 'Chait' Migration and Food Security

Chait in the Indian system of months refers to march-April. However, in the tribal areas of Madhya Pradesh it is more synonymous with the large scale seasonal migration that takes place in this season. In the rainfed areas, the tribal after harvesting the kharif crops regularly migrate to the irrigated areas like Hoshangabad, Harda, etc. as casual wage labourers for the rabi harvesting ([www.righttofoodindia.org/data/migration\\_ega\\_khandwa.doc](http://www.righttofoodindia.org/data/migration_ega_khandwa.doc)).

A well-established system of crop sharing exists between the chait cultivator/landowner and the tribal labourers. Contracts are taken for harvesting a fixed area of land, irrespective of the number of person days of labour involved. In return, the landowner gives the labourer a fixed amount of wheat (the main rabi crop) as wage (the current rate is around 40 kg of wheat per bigha of land harvested), irrespective of the total amount harvested (Kabra, 2003). It has been postulated that among the households in the village, those with some seasonal migration are the ones with relatively higher food intake. In a scarcity situation, it is quite probable that the food intake of remaining members of migrating households would be higher than that of the members of non-migrating households in a village (Sah, 2007). Thus, migration appears to be the most common coping mechanism to avert food insecurity in tribal areas in Madhya Pradesh, as in all other tribal areas.

1. The study notes that if Gomez classification, that has a higher cutoff for normalcy (>90% expected weight for age) is used, about 98% in the sample population in Barwani would be classified as malnourished.



The patterns of migration are different in different regions of the state and can be divided broadly into three main regions/patterns - South West ST districts, South East ST districts and the Bundelkhand SC districts. In the South West, the proportion of population and period of migration are both higher as compared to rest of the state. They usually migrate to Maharashtra, Gujarat, Rajasthan and Indore to work in industries there for about 4-6 months. South-eastern regions witness shorter periods of migration up to 15-30 days, limited to going to adjoining villages/districts to work as agriculture labourers. Here the women folk do not accompany men while in west, especially Jhabua, Dhar and Ratlam, women and children also travel along. In the Bundelkhand district, largely men migrate to NCR, Jhansi, Punjab, Haryana and Western Uttar Pradesh for 2-3 months in a year.

#### Box 5.2: Scheduled Areas in Madhya Pradesh

1. Jhabua district
2. Mandla district
3. Sardarpur, Dhar, Kukshi and Manawar tahsils in Dhar district
4. Barwani, Rajpur, Sendawa, Bhikangaon and Maheshwar tahsils in Khargone (West Nimar) district
5. Khalwa Tribal Development Block of Harsud tahsil, and Khaknar Tribal Development Block of Burhanpur tahsil in Khandwa (East Nimar) district
6. Sailana tahsil in Ratlam district
7. Betul tahsil (excluding Betual Community Development Block) and Bhainsdehi tehsil in Betul district
8. Lakhnadon tahsil and Kurai Tribal Development Block of Seoni tahsil in Seoni district
9. Baihar tahsil in Balaghat district
10. Kesla Tribal Development Block of Hoshangabad tahsil in Hoshangabad district
11. Kusumi Tribal Development Block of Gopadbanas tahsil in Sidhi district
12. Karahal Tribal Development Block of Shcopur tahsil in Morena district
13. Tamia and Jamai Tribal Development Blocks, specified patwari circles in Harral and Bichua Tribal Development Blocks

The term 'Scheduled Areas' has been defined in the Indian Constitution as "such areas as the President may by order declare to be Scheduled Area" based on the following criteria – preponderance of tribal population, compactness and reasonable size of the area, under-developed nature of the area and marked disparity in economic standard of the people. It was thought that these areas are inhabited by people who have resided on the basis of their own customary practices, traditional beliefs and culture and thus general laws of the land would be inappropriate for them. The Constitution thus envisaged a special scheme of administration in the form of scheduled areas.

*Source: Ministry of Tribal Affairs, Government of India*



## 5.5 Ratio of Working Age Group

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

**Table 5.9: Ratio of Working Age Population by State**

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

Source: Census of India, 2001

The situation in Madhya Pradesh in terms of ratio of population in the productive age is found to be quite deplorable as compared to many states as well as the national average. The southern states in general have a better working age group ratio than the northern states. The fact that the dependent population is only marginally lower than the productive age population speaks of a high dependence on the existing productive population, and also implies high out-migration.

High out-migration has its implications on the age structure of the rural population. The districts with lower level of agricultural development, in general, have a higher dependents' population, as compared to the productive age population. In fact, four of the districts – Jhabua, Sidhi, Barwani and Bhopal – have a ratio lower than one, i.e., population in the non-productive age group (less than 15 and 59+) is higher than population in the productive age group (15-59). Incidentally, these are also the districts that have high undernutrition and child mortality figures and rank very low in terms of agricultural development (Map 5.5).

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



Map 5.5: Share of Rural Working Age Population

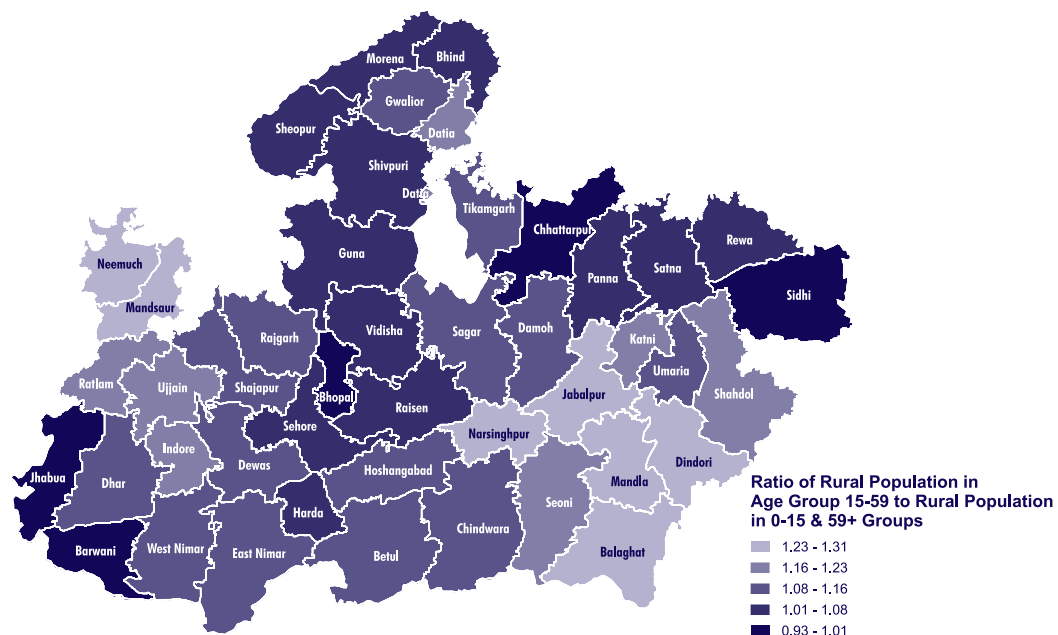


Table 5.10: Ratio of Working Age Group Population, 2001

District	Value	Rank	District	Value	Rank	District	Value	Rank
Balaghat	1.31	1	Harda	1.07	32	Rewa	1.01	40
Barwani	0.97	43	Hoshangabad	1.15	15	Sagar	1.09	24
Betul	1.11	20	Indore	1.21	9	Satna	1.08	29
Bhind	1.08	29	Jabalpur	1.26	5	Sehore	1.02	39
Bhopal	0.99	42	Jhabua	0.93	45	Seoni	1.2	10
Chhatarpur	1	41	Katni	1.18	11	Shahdol	1.23	8
Chhindwara	1.13	18	Mandla	1.28	3	Shajapur	1.12	19
Damoh	1.15	15	Mandsaur	1.25	7	Sheopur	1.03	37
Datia	1.18	11	Morena	1.05	35	Shivpuri	1.06	34
Dewas	1.11	20	Narsimhapur	1.26	5	Sidhi	0.97	43
Dhar	1.09	24	Neemuch	1.3	2	Tikamgarh	1.1	22
Dindori	1.27	4	Panna	1.08	29	Ujjain	1.18	11
East Nimar	1.1	22	Raisen	1.07	32	Umaria	1.14	17
Guna	1.05	35	Rajgarh	1.09	24	Vidisha	1.03	37
Gwalior	1.09	24	Ratlam	1.16	14	West Nimar	1.09	24

Source: Census of India, 2001.



The impact of migration on changing age structure of the population in backward districts can be gauged from the fact that an increase in sex ratio is found between 0-6 age and 7+ age in most of these districts. For instance, sex ratio in Balaghat in the 0-6 age group is a decent 971, but this increases to 1042 in the 7+ population. Similarly, sex ratio of Jhabua increases from 977 to 997. Given the fact that migration is an important demographic factor that affects sex ratio in the 7+ age group, it points towards the high level of out-migration from these districts.

## 5.6 Rural Female Literacy

Madhya Pradesh was often mentioned as a prospering state which would hopefully leave the group of low income states and the socio-political category of BIMARU states. Although this vision was not realised, the state has seen good progress in education. The state's average literacy rate is almost equal to the national average; however, the state performs poorly in terms of rural literacy, particularly rural female literacy and ranks low among major states.

Poor rural literacy levels are coupled by the fact that even after the bifurcation of the state, Madhya Pradesh has the highest population of STs in the country - more than 12 million – accounting for more than 15 per cent of the total tribal population of the country. With as many as 14 districts having one-third of their total population as tribal, the state has some of the most densely populated tribal districts of the country. Out of these, Jhabua and Barwani (bordering Gujarat) and Dindori (bordering Chhattisgarh) have more than two-third tribal population.

Enhancing female literacy has been recognised as the single most important factor contributing to increase in food security (FAO, 2005). Female literacy of Madhya Pradesh at 50 per cent is only marginally behind the national average (53.7 per cent). However, in terms of female literacy in rural areas the proportion is very low. With only 42.8 per cent of rural females literate, the state ranks only above Bihar, Jharkhand and Rajasthan.

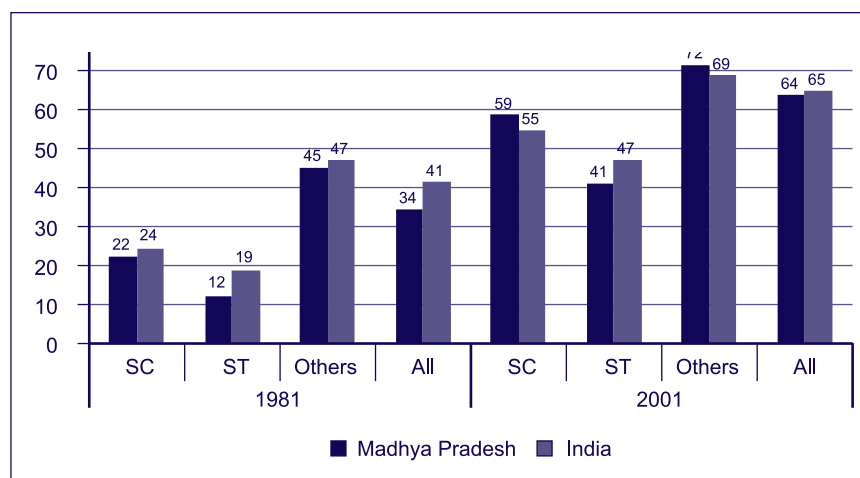
**Table 5.11: Rural Female Literacy by State**

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

Source: Census of India, 2001



**Figure 5.2: Literacy Rate by Social Groups, 1981 and 2001**



Source: Census of India, 1981 and 2001.

Literacy among other vulnerable populations is found to be low as compared to the non-SC/ST population. Among the social groups, the SCs have seen the maximum increase in literacy between 1981 and 2001 censuses – from 22 to 59 per cent, which is higher than the national average. On the other hand, the tribal population increased from an extremely low rate of 12 to 41 per cent, which not only was lower than the national average for tribal population but also lower than the literacy level of non-SC/ST population in 1981. That even after two decades of development the tribal population have yet to come at par with the non-tribal population, speaks of the very high vulnerability status of these populations.

Data from NSS 61st Round (2004-05) provide more recent information of literacy levels. They also allow us to see difference by poverty status across regions. The rural literacy rate of Madhya Pradesh (59 per cent) is only six percentage points lower than the national average (65 per cent). This gap further decreases for the poor people. Similarly the gap in male literacy rates between India and Madhya Pradesh is also quite low. However, the literacy rate of rural female is nine percentage points lower than that of the national average. This gap again decreases for the poor females.

At the regional level the south-western region has the highest rural literacy (68.5 per cent) largely on account of higher literacy in Harda and Hoshangabad. On the other hand, Malwa Region has the lowest literacy rate (47 per cent). Incidentally, it also has the highest gap between poor and all people (20 percentage points) which is more than twice the gap at the state and national levels. The gap between all and poor population is higher among males (23 per cent) as compared to females (16 per cent) in Malwa. In the state as a whole the gap between male and female populations is higher for total population (29 per cent) as compared to poor population (25 per cent).



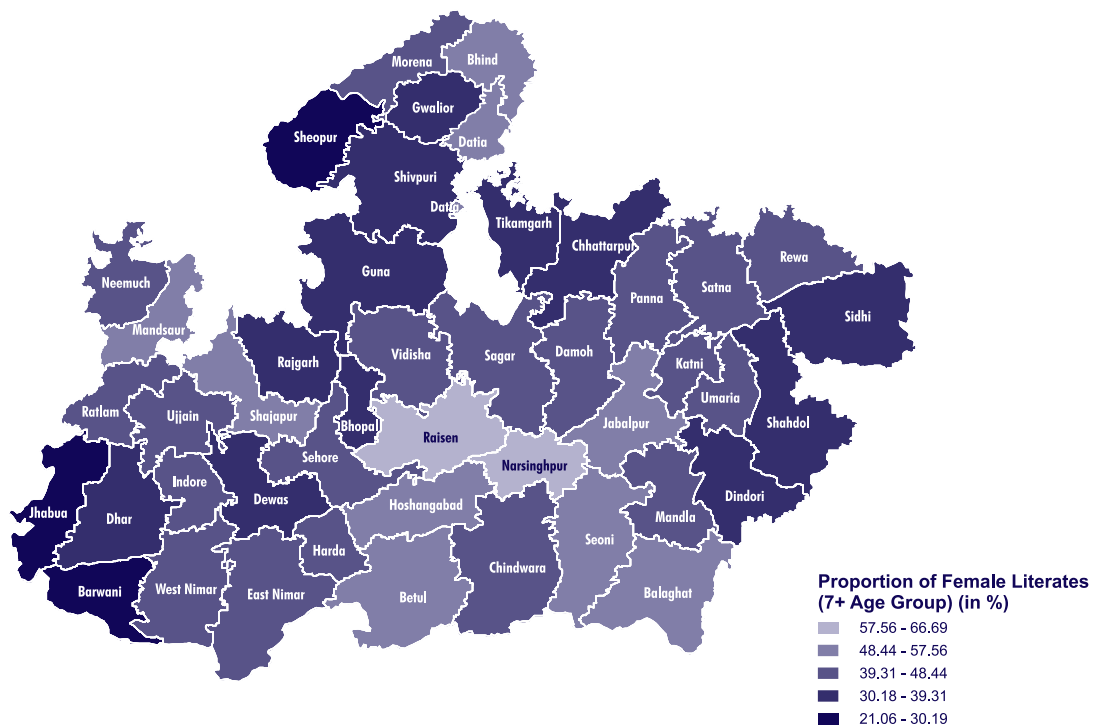
**Table 5.12: Region-wise and Gender-wise Literacy Rate from Poor and All Categories of Rural Madhya Pradesh (2004-05)**

	Male		Female		Person	
	Poor	All	Poor	All	Poor	All
Vindhya	59.5	72.6	35.8	44.3	47.9	59.0
Central	63.5	72.7	40.3	47.4	52.6	61.2
Malwa	40.4	63.2	14.7	30.6	27.4	47.2
South	73.3	77.4	47.2	53.3	59.9	65.4
South-western	67.2	81.0	42.8	53.1	55.5	68.5
Northern	63.4	72.3	34.5	42.5	50.5	58.9
Rural Madhya Pradesh	61.6	72.5	36.6	43.9	49.3	58.9
Rural India	65.3	76.4	42.2	53.2	53.7	65.1

Source: Calculated from NSS, 61st Round, 2004—05.

At the district-level, rural female literacy in some of the districts is alarmingly low. For instance, it is less than 30 per cent in Jhabua, Barwani and Sheopur. The low literacy levels in the state can be gauged from the fact that only two-third of the rural females are found to be literate in Narsimhapur, which is the highest figure in the state (Map 5.6).

**Map 5.6: Status of Rural Female Literacy**





**Table 5.13: Rural Female Literacy, 2001**

District	Value	Rank	District	Value	Rank	District	Value	Rank
Balaghat	54.7	4	Harda	48.1	14	Rewa	44.2	20
Barwani	25.8	43	Hoshangabad	48.8	11	Sagar	45.9	18
Betul	50.5	9	Indore	39.8	30	Satna	46.7	16
Bhind	53.0	6	Jabalpur	49.7	10	Sehore	42.6	21
Bhopal	36.5	36	Jhabua	21.1	45	Seoni	50.9	8
Chhatarpur	32.3	41	Katni	41.3	27	Shahdol	37.7	31
Chhindwara	48.3	13	Mandla	41.7	23	Shajapur	55.1	3
Damoh	41.4	26	Mandsaur	50.9	7	Sheopur	24.6	44
Datia	54.1	5	Morena	41.6	24	Shivpuri	36.0	37
Dewas	36.8	34	Narsimhapur	66.7	1	Sidhi	32.3	41
Dhar	33.6	39	Neemuch	41.8	22	Tikamgarh	37.3	32
Dindori	36.7	35	Panna	45.1	19	Ujjain	48.4	12
East Nimar	41.0	29	Raisen	59.6	2	Umaria	41.5	25
Guna	37.2	33	Rajgarh	32.3	40	Vidisha	41.3	27
Gwalior	34.4	38	Ratlam	45.9	17	West Nimar	47.2	15

Source: Census of India, 2001.

## 5.7 Food Access Index

The composite impact of these selected indicators depicting access shows a grim scenario for the southern districts of the state. Incidentally all these districts have a very strong positive correlation with the proportion of tribal population. On the western part of the state, the districts of Jhabua, Barwani and Dhar and towards the eastern part the northern Chhattisgarh districts of Sidhi, Shahdol, Dindori and Mandla exhibit poor access figures. As observed earlier, these are also the districts that have poor outcomes in terms of under-five mortality and proportion of underweight children.

Bhopal in this case presents an interesting picture. The state capital is the most urbanised district of the state (more than 80 per cent of the total population is urban) but the rural areas of the district have fared poorly in most of the indicators in terms of accessibility. The district ranks very low in terms of consumption expenditure. A little over one-third of the females in rural areas are found to be literate, which is again surprising as the total literacy rate of the district is 75 per cent. The ratio of working age population is also less than one, as in the case of Jhabua, Barwani and Sidhi. The reason for this anomaly may possibly be migration of working age population to the urban areas for employment. However, the second most urbanised district of the state – Indore – has a fairly high working age ratio in the rural areas (Map 5.7).



*Table 5.14: Indicators Used to Compute Index of Accessibility*

District	Agricultural Labourers		Proportion of SCs and STs		Average per Capita Expenditure		Rural Wage Rate		Ratio of Working Age Group Population		Rural Female Literacy	
	Value	Rank	Value	Rank	Value	Rank	Value	Rank	Value	Rank	Value	Rank
Balaghat	41.5	35	30.3	13	269	39	31.9	32	1.31	1	54.7	4
Barwani	29.0	10	81.5	44	392	12	49.0	8	0.97	43	25.8	43
Betul	41.8	36	55.8	39	309	26	27.4	44	1.11	20	50.5	9
Bhind	20.3	6	22.4	3	422	7	53.0	3	1.08	29	53.0	6
Bhopal	40.0	30	25.1	6	315	24	40.4	17	0.99	42	36.5	36
Chhatarpur	22.6	7	29.1	11	293	31	41.9	13	1	41	32.3	41
Chhindwara	40.1	32	53.1	37	353	20	31.5	36	1.13	18	48.3	13
Damoh	34.2	21	34.5	23	276	37	29.9	39	1.15	15	41.4	26
Datia	18.0	4	28.5	10	422	7	53.0	3	1.18	11	54.1	5
Dewas	40.3	33	39.9	28	424	4	41.7	14	1.11	20	36.8	34
Dhar	32.1	15	68.0	42	393	10	34.3	26	1.09	24	33.6	39
Dindori	29.9	11	72.4	43	235	44	29.1	40	1.27	4	36.7	35
East Nimar	46.1	43	50.5	35	434	3	36.6	22	1.1	22	41.0	29
Guna	32.5	16	33.0	17	368	19	43.5	9	1.05	35	37.2	33
Gwalior	26.8	8	28.4	9	422	7	52.8	5	1.09	24	34.4	38
Harda	45.6	42	49.1	32	309	26	32.0	31	1.07	32	48.1	14
Hoshangabad	45.2	41	35.5	25	309	26	31.6	35	1.15	15	48.8	11
Indore	36.8	24	34.3	22	393	10	38.2	21	1.21	9	39.8	30
Jabalpur	46.9	44	40.4	29	319	21	31.9	32	1.26	5	49.7	10
Jhabua	14.6	2	94.7	45	281	34	52.2	6	0.93	45	21.1	45
Katni	37.3	26	38.6	27	319	21	30.9	37	1.18	11	41.3	27
Mandla	43.5	38	66.6	41	235	44	34.8	24	1.28	3	41.7	23
Mandsaur	31.6	14	23.3	5	472	1	42.9	10	1.25	7	50.9	7
Morena	12.9	1	22.2	1	373	17	58.0	1	1.05	35	41.6	24
Narsimhapur	48.0	45	31.2	15	319	21	30.8	38	1.26	5	66.7	1
Neemuch	28.1	9	23.1	4	472	1	42.9	10	1.3	2	41.8	22
Panna	33.1	17	37.5	26	293	31	41.5	15	1.08	29	45.1	19
Raisen	43.1	37	35.5	24	277	35	38.7	20	1.07	32	59.6	2
Rajgarh	29.9	11	22.3	2	424	4	36.4	23	1.09	24	32.3	40
Ratlam	34.4	22	50.3	33	374	15	39.5	18	1.16	14	45.9	17
Rewa	37.9	28	30.5	14	296	30	28.8	41	1.01	40	44.2	20
Sagar	33.3	18	33.6	18	276	37	31.8	34	1.09	24	45.9	18

(Contd...)



District	Agricultural Labourers		Proportion of SCs and STs		Average per Capita Expenditure		Rural Wage Rate		Ratio of Working Age Group Population		Rural Female Literacy	
	Value	Rank	Value	Rank	Value	Rank	Value	Rank	Value	Rank	Value	Rank
Satna	37.0	25	33.8	19	387	14	34.8	25	1.08	29	46.7	16
Sehore	40.1	31	34.1	21	277	35	39.0	19	1.02	39	42.6	2
Seoni	44.3	40	50.4	34	269	39	24.8	45	1.2	10	50.9	8
Shahdol	40.6	34	61.3	40	252	42	28.6	42	1.23	8	37.7	31
Shajapur	34.9	23	27.4	8	424	4	32.6	28	1.12	19	55.1	3
Sheopur	30.1	13	40.9	30	373	17	55.7	2	1.03	37	24.6	44
Shivpuri	19.3	5	32.3	16	305	29	49.2	7	1.06	34	36.0	37
Sidhi	34.0	20	45.0	31	266	41	32.3	30	0.97	43	32.3	41
Tikamgarh	17.9	3	29.8	12	293	31	42.2	12	1.1	22	37.3	32
Ujjain	33.4	19	33.8	20	374	15	33.8	27	1.18	11	48.4	12
Umaria	39.6	29	54.5	38	252	42	28.6	42	1.14	17	41.5	25
Vidisha	43.5	39	27.1	7	315	24	40.9	16	1.03	37	41.3	27
West Nimar	37.6	27	52.1	36	392	12	32.4	29	1.09	24	47.2	15

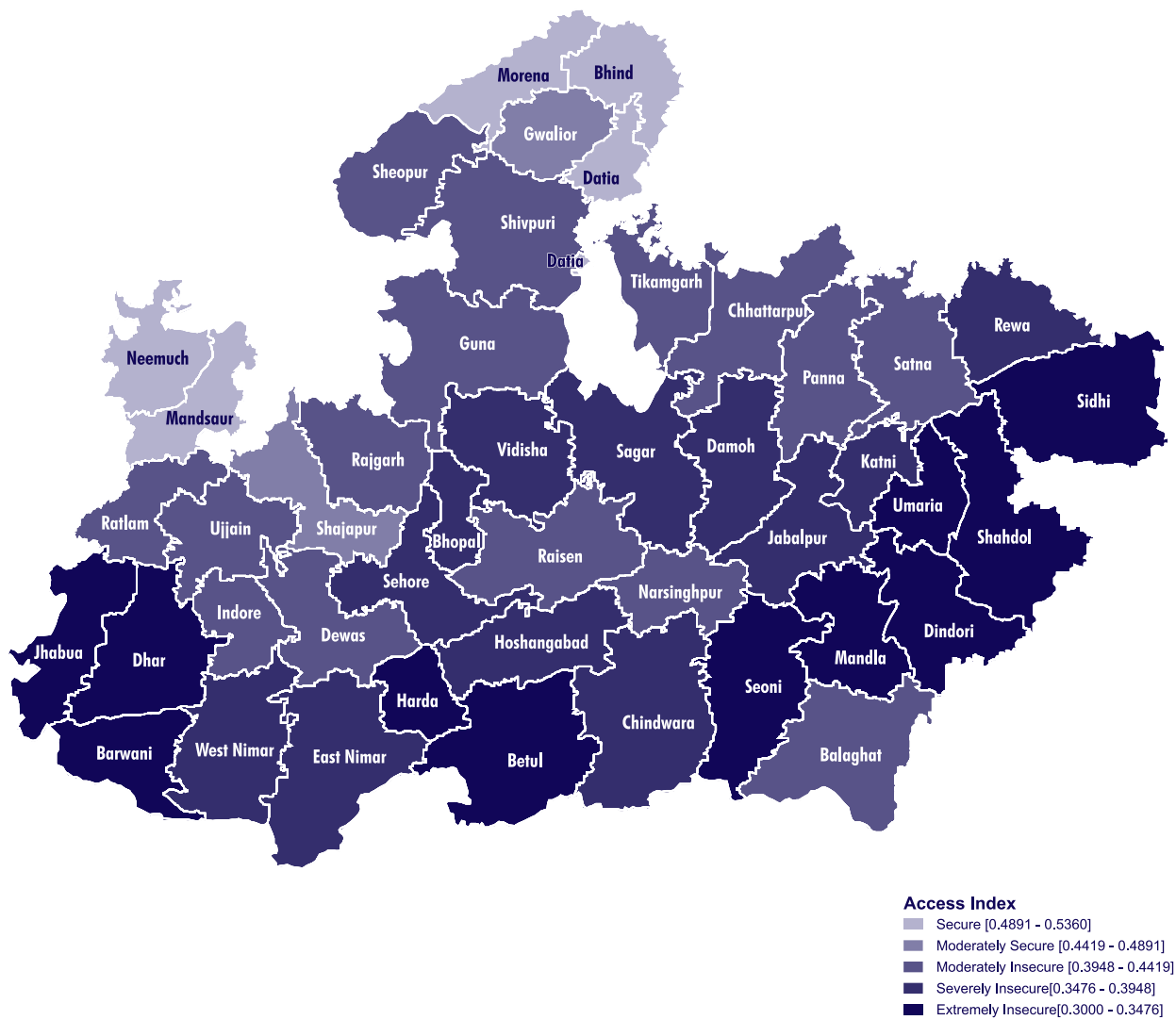
Source: As stated in Table 3.4.

**Table 5.15: Status of Districts in Access Index**

Extremely Insecure	Severely Insecure	Moderately Insecure	Moderately Secure	Secure
Harda	Sagar	Shivpuri	Gwalior	Datia
Betul	Vidisha	Tikamgarh	Shajapur	Bhind
Dhar	Bhopal	Rajgarh		Morena
Seoni	West Nimar	Ujjain		Mandsaur
Barwani	Jabalpur	Narsimhapur		Neemuch
Sidhi	Katni	Indore		
Umaria	Hoshangabad	Guna		
Mandla	Damoh	Satna		
Dindori	Sehore	Balaghat		
Shahdol	Rewa	Chhatarpur		
Jhabua	East Nimar	Raisen		
	Chhindwara	Ratlam		
		Sheopur		
		Panna		
		Dewas		



Map 5.7: Food Access Map of Rural Madhya Pradesh



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## 6. Food Absorption

Lack of health infrastructure and low access to safe water has been cited as primary reasons for high child mortality and undernutrition. It has been estimated that in developing countries, one out of five people do not use safe water, and roughly half are without adequate sanitation (WHO, 2007). Primary health services in the country as a whole are lacking, particularly in rural areas. There are persistent gaps in human resource and infrastructure, disproportionately affecting the less developed rural areas. A significant proportion of hospitals do not have adequate personnel, diagnostic and therapeutic services and drugs.

Only two-third of rural households in Madhya Pradesh have access to safe drinking water, which accords a poor 12th rank to the state among the 17 major states. However, it should be noted that safe drinking water here has been measured in terms of access to tap, tubewell or handpump, which in no way is a pointer to the quality of drinking water available in these sources or even the very functioning of these sources. Not only the state has a poor status in terms of drinking water, but also has a deplorable status in terms of access to toilets – a proxy indicator of sanitation. The proportion of households having toilet facilities is very low in the country – less than 25 per cent as in 2001. However, the state compares

*Table 6.1: Factors Determining Status of Absorption*

India/States	Households Having Safe Drinking Water		Number of Villages per PHC		Households Having Toilet Facility	
	Value (%)	Rank	Value	Rank	Value (%)	Rank
India	78	–	27.6	–	21.9	–
Andhra Pradesh	80.1	9	18.9	6	18.1	9
Assam	58.8	15	43.1	15	59.6	2
Bihar	86.6	4	27.4	10	13.9	13
Chhattisgarh	70.5	11	39.4	13	5.2	17
Gujarat	84.1	8	17.3	4	21.7	6
Haryana	86	5	17.0	3	28.7	4
Jharkhand	42.7	16	58.1	17	6.6	16
Karnataka	84.6	7	17.5	5	17.4	10
Kerala	23.4	17	1.5	1	81.3	1
Madhya Pradesh	68.4	12	46.4	16	8.9	14
Maharashtra	79.8	10	24.6	7	18.2	8
Orissa	64.2	14	40.1	14	7.7	15
Punjab	97.6	1	26.2	9	40.9	3
Rajasthan	68.3	13	24.7	8	14.6	11
Tamilnadu	85.5	6	11.8	2	14.4	12
Uttar Pradesh	87.8	3	29.5	11	19.2	7
West Bengal	88.5	2	34.8	12	26.9	5

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



poorly even to the national average, wherein less than 10 per cent of households in the state have toilets in their houses, and ranks 14th among major states.

The state has a poor status in terms of health infrastructure. Whereas on an average, one primary health centre (PHC) serves 25 villages at the national level, in Madhya Pradesh the number of villages served by a PHC is almost 50, making the state one of the least developed states in terms of health infrastructure.

## 6.1 Access to Safe Drinking Water

Although availability of safe drinking water (calculated in terms of access to tap, tubewell, or handpump) is not a very accurate indicator for capturing access to safe drinking water, it does throw some light on the physical availability of the infrastructure for the same. It is seen that the districts in central Narmada Valley (particularly Narsimhapur and Jabalpur) and the Malwa Plateau (particularly Indore, Ujjain and Ratlam) have higher availability of this facility. On the other hand, districts in the northern Chhattisgarh Region (particularly Shahdol and Sidhi) and Bundelkhand Region (Tikamgarh and Chhattarpur) lie in a very critical state in terms of access to safe drinking water. Less than 30 per cent of the rural households in Shahdol and Sidhi have access to safe drinking water (Map 6.1).

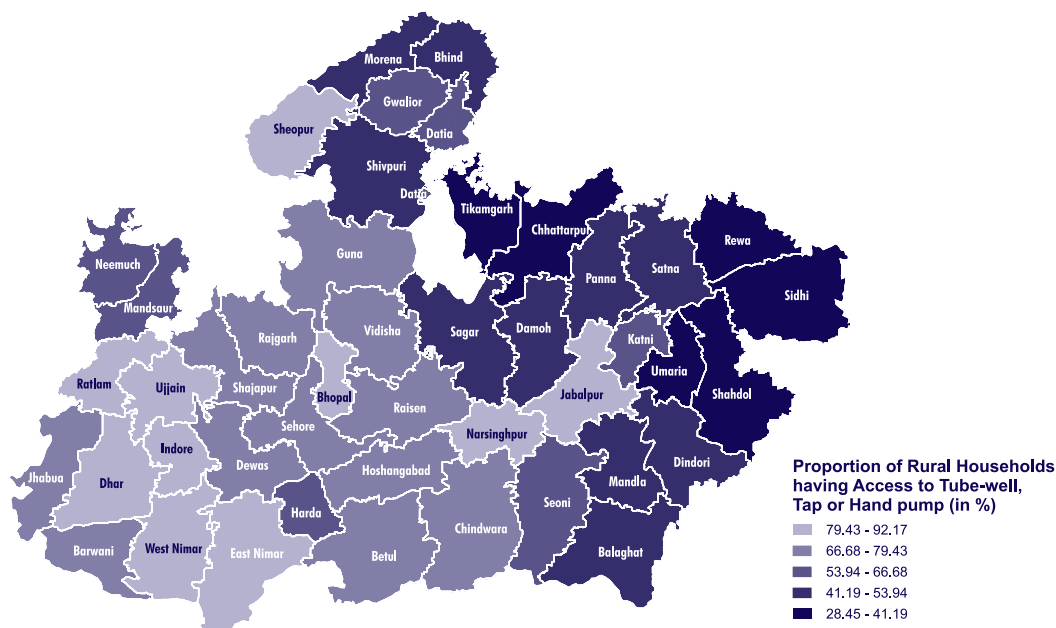
**Table 6.2: Proportion of Households with Access to Safe Drinking Water, 2001**

<i>District</i>	<i>Value</i>	<i>Rank</i>	<i>District</i>	<i>Value</i>	<i>Rank</i>	<i>District</i>	<i>Value</i>	<i>Rank</i>
Balaghat	52.74	31	Harda	65	24	Rewa	40.96	40
Barwani	74.98	14	Hoshangabad	71.51	16	Sagar	50.23	34
Betul	67.88	22	Indore	92.13	2	Satna	48.34	35
Bhind	45.86	39	Jabalpur	83.78	5	Sehore	70.07	18
Bhopal	84.92	3	Jhabua	77.36	12	Seoni	63.73	26
Chhatarpur	34	42	Katni	62.07	27	Shahdol	28.45	45
Chhindwara	69.56	19	Mandla	51.7	33	Shajapur	75.75	13
Damoh	52.47	32	Mandsaur	58.53	29	Sheopur	80.79	9
Datia	64.12	25	Morena	46.95	36	Shivpuri	53.26	30
Dewas	74.87	15	Narsimhapur	92.17	1	Sidhi	29.63	44
Dhar	80.2	10	Neemuch	66.5	23	Tikamgarh	30.74	43
Dindori	45.95	38	Panna	46.95	36	Ujjain	84.61	4
East Nimar	81.81	7	Raisen	77.79	11	Umariya	36.27	41
Guna	69.44	20	Rajgarh	70.54	17	Vidisha	68.58	21
Gwalior	61.44	28	Ratlam	81.6	8	West Nimar	82.08	6

Note: Safe drinking water defined as water from tap, tubewell or handpump.

Source: Census of India, 2001

**Map 6.1: Access to Safe Drinking Water in Rural Areas**



It is also highlighted that the level of fluoride content in the quality of water is quite high in most habitations as noted by the Rajiv Gandhi National Drinking Water Mission. The measurement of safe drinking water though is anomalous, as the existence of such infrastructure, like a tap, tube-well or hand-pump, does not necessarily imply that they are actually functioning.

## 6.2 Access to Toilet Facility

The paucity of safe drinking water is aggravated by poor sanitation. Although the access to toilet facilities has not been taken as one of the indicators, it is a potent proxy indicator to capture the level of sanitation in an area, which in turn determines the overall food security outcomes in rural areas. It is seen that as many as 15 districts have less than 15 per cent of households having toilet facility in their houses. The figure in the most food insecure district – Sidhi – is less than 10 per cent while Dindori, another tribe dominated district, has a figure less than 6 per cent. Only three districts—Indore, Bhopal and Gwalior – have more than 50 per cent households having access to toilets while all other districts except Jabalpur, Hoshangabad and Ujjain lie below the 30 per cent mark (Map 6.2).

## 6.3 Access to Health Infrastructure

The lack of access to safe drinking water and sanitation leads to a number of diseases, and in such a situation it is imperative that a strong health infrastructure exists in the villages. However, the scenario in terms of access to primary health centres, the pivot of rural infrastructure, is seen to be grim. The proportion



Map 6.2: Proportion of Rural Households having Toilet Facility in the House

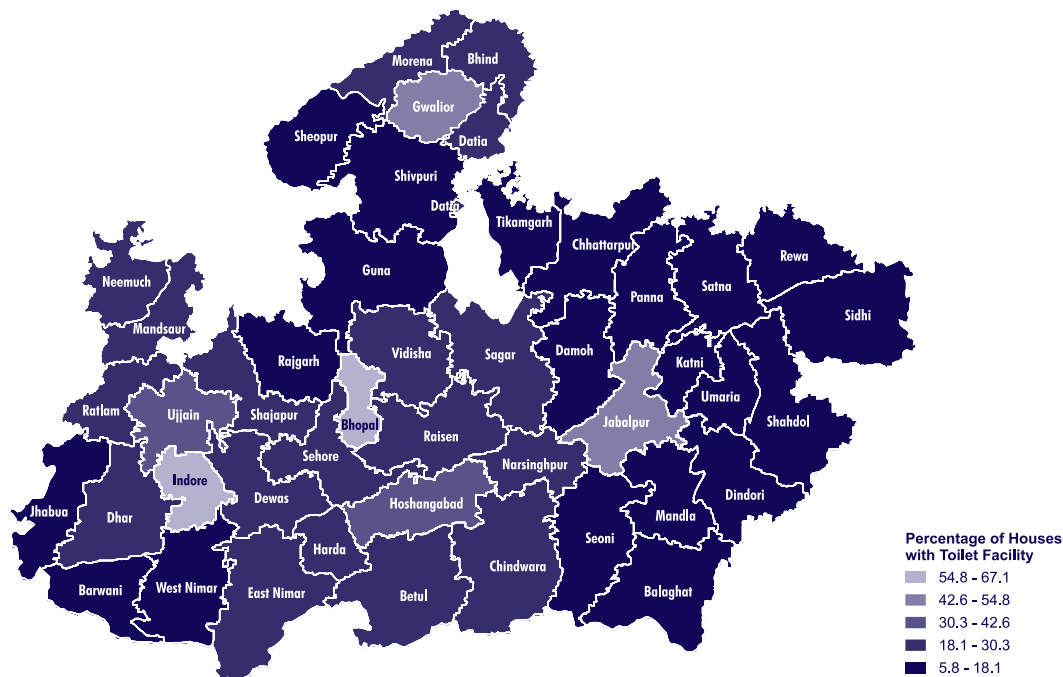


Table 6.3: Proportion of Households having Toilet Facility, 2001

District	Value	Rank	District	Value	Rank	District	Value	Rank
Balaghat	13.2	37	Harda	30	7	Rewa	11	42
Barwani	14.1	34	Hoshangabad	37.1	6	Sagar	21.3	17
Betul	20.2	21	Indore	67.1	1	Satna	14.2	33
Bhind	21.9	15	Jabalpur	45.1	4	Sehore	26.9	11
Bhopal	65.8	2	Jhabua	12.7	38	Seoni	14.6	32
Chhatarpur	15.3	31	Katni	17.1	27	Shahdol	16.3	28
Chhindwara	20.8	20	Mandla	11.5	40	Shajapur	18.4	24
Damoh	13.9	35	Mandsaur	18.8	23	Sheopur	11.9	39
Datia	21.4	16	Morena	19.7	22	Shivpuri	15.8	30
Dewas	28.3	10	Narsimhapur	28.4	9	Sidhi	9.5	44
Dhar	23	13	Neemuch	21.1	18	Tikamgarh	11	42
Dindori	5.8	45	Panna	11.1	41	Ujjain	37.2	5
East Nimar	23	13	Raisen	25.9	12	Umaria	13.6	36
Guna	17.7	25	Rajgarh	16.3	28	Vidisha	21	19
Gwalior	54.4	3	Ratlam	29.4	8	West Nimar	17.3	26

Source: Census of India, 2001.



of villages that have access to a PHC is less than 15 per cent in as many as 33 out of 45 districts. Of these, 11 districts have a figure of less than 10 per cent, wherein Sagar has a negligible figure.

Of the 20 districts that lie in the extremely or severely low categories of FSOI, 14 districts have very low level of health infrastructure. There is not even a single district that has adequate health facilities among all these districts. Given the fact that there is not even a single district in the state that has at least one-third of its villages served by a PHC, provisioning of adequate health infrastructure should be given the top-most priority for attaining some level of nutritional security (Map 6.3).

**Table 6.4: Proportion of Households with Access to a PHC, 2001**

District	Value	Rank	District	Value	Rank	District	Value	Rank
Balaghat	11.96	24	Harda	8.9	41	Rewa	11.35	28
Barwani	20.06	6	Hoshangabad	12.56	20	Sagar	1.33	45
Betul	12.65	19	Indore	30.46	2	Satna	12.26	22
Bhind	15.8	10	Jabalpur	11.8	25	Sehore	12.99	16
Bhopal	11.11	29	Jhabua	19	7	Seoni	10.01	34
Chhatarpur	9.34	40	Katni	12.51	21	Shahdol	12.67	18
Chhindwara	15.83	9	Mandla	14.6	13	Shajapur	9.56	38
Damoh	6.99	44	Mandsaur	21.12	4	Sheopur	12.01	23
Datia	10.78	30	Morena	15.16	12	Shivpuri	10.47	31
Dewas	11.61	27	Narsimhapur	12.95	17	Sidhi	9.9	35
Dhar	20.15	5	Neemuch	31.94	1	Tikamgarh	10.4	33
Dindori	13.49	14	Panna	8.34	43	Ujjain	10.45	32
East Nimar	15.49	11	Raisen	9.74	37	Umaria	8.67	42
Guna	9.45	39	Rajgarh	13.27	15	Vidisha	9.76	36
Gwalior	11.76	26	Ratlam	15.95	8	West Nimar	21.8	3

Note: Access to PHC defined as existence of a PHC within 5 km from the village.

Source: Census of India, 2001

The existing health infrastructure cannot be called adequate by any norm as the rural population served per PHC and SHC is much higher as compared to the designated population. For instance, rural population served per PHC is significantly higher than the prescribed norm of 30,000 (Fig. 6.1). Similarly, the number of SHCs is also less compared to the norm of 5000 population in general and 3000 in tribal areas. The existing health infrastructure is facing an acute shortage of quality human resource (GoMP, 2007).

It can thus be inferred that the existing health infrastructure has not been able to meet the demands of the growing population. One possible explanation of such a poor state of affairs may be found in the fact that many PHCs have been converted into Community Health Centres<sup>1</sup> (CHCs). Thus, in absolute figures, the number of PHCs in the state has gone down over the last decade (Directorate of Health, GoMP).



Map 6.3: Access to Health Services in Rural Areas

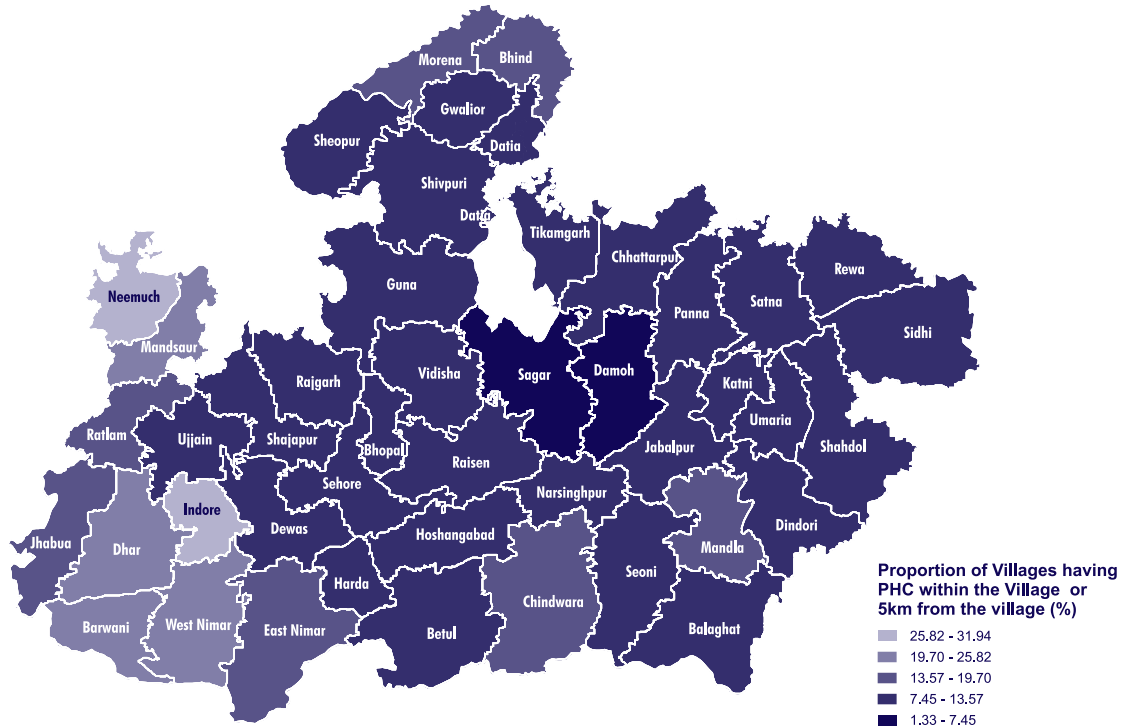
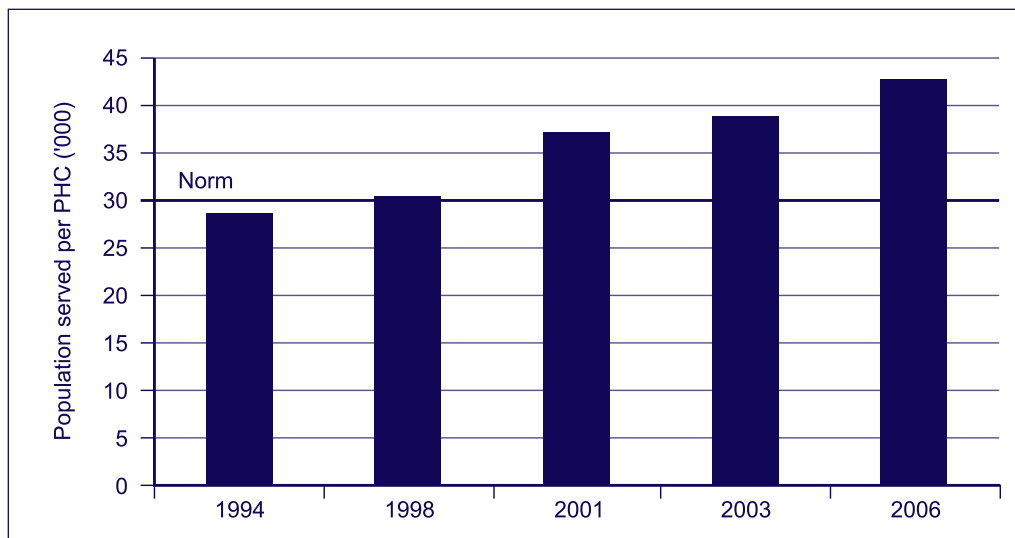


Figure 6.1: Trend in Population Served by PHCs

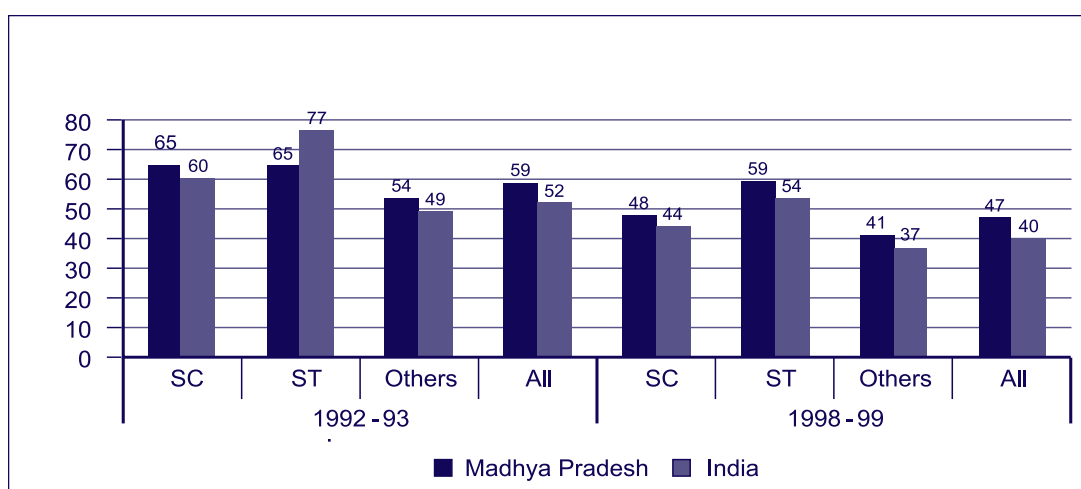


Source: Directorate of Health, GoMP.



In terms of access to health infrastructure, two-third of tribal and SC population had no access to healthcare in 1992-93 in Madhya Pradesh. Although the proportion of SC households without access to health facilities declined from such a level to 48 per cent in 1998-99, the decline in tribal population was only marginal (Fig.6.2). This fares poorly as compared to the national average, where the decline was much higher.

**Figure 6.2: Proportion of Households without Access to Healthcare by Social Groups**



Source: National Family and Health Survey, I and II (1992-93 and 1998-99) and IIDS Data Bank, computed in Thorat (2007).

## 6.4 Absorption Index

A composite index of access to safe drinking water and health infrastructure presents the overall scenario of absorption in the state. Two distinct regions appear to be in a critical state:

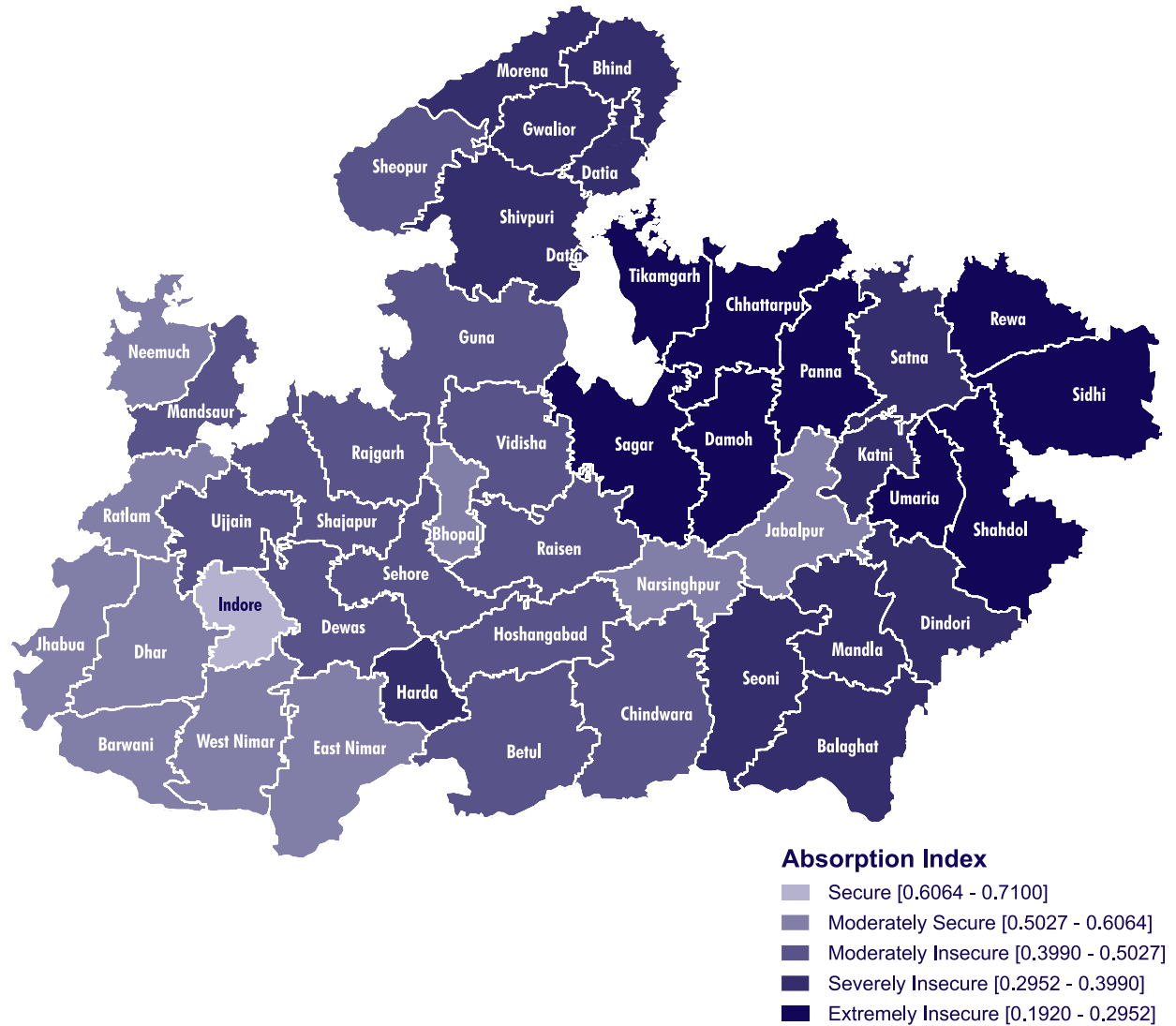
- Tikamgarh and Chhattarpur districts in Bundelkhand Region and Damoh and Sagar districts in eastern Vindhya Plateau
- Sidhi and Shahdol districts in northern Chhattisgarh Region and Rewa and Umaria in eastern Keymore Plateau (Map 6.4).

These regions have the lowest access to drinking water where less than one-third of the rural households have access to safe drinking water. Similarly, even in terms of access to primary health facilities these districts, particularly eastern Vindhyas have a deplorable status – Sagar has less than 2 per cent of villages with access to a PHC. It would thus be seen that the absorption index has a very close correlation with the FSOI, particularly in terms of access to health infrastructure.

10. The public health system is built on a three-tier system: Sub-Health Center (SHC), Primary Health Center (PHC) and specific service focused Community Health Center (CHC) in the first tier, district/civil hospitals in the second grade followed by the referral hospitals. However, in rural areas, the PHC is the most critical health facility.



Map 6.4: Food Absorption Map of Rural Madhya Pradesh







**Table 6.5: Indicators Used to Compute Absorption Index**

District	Access to Safe Drinking Water		Access to PHC	
	Value	Rank	Value	Rank
Balaghat	52.7	31	12.0	24
Barwani	75.0	14	20.1	6
Betul	67.9	22	12.7	19
Bhind	45.9	39	15.8	10
Bhopal	84.9	3	11.1	29
Chhatarpur	34.0	42	9.3	40
Chhindwara	69.6	19	15.8	9
Damoh	52.5	32	7.0	44
Datia	64.1	25	10.8	30
Dewas	74.9	15	11.6	27
Dhar	80.2	10	20.2	5
Dindori	46.0	38	13.5	14
East Nimar	81.8	7	15.5	11
Guna	69.4	20	9.5	39
Gwalior	61.4	28	11.8	26
Harda	65.0	24	8.9	41
Hoshangabad	71.5	16	12.6	20
Indore	92.1	2	30.5	2
Jabalpur	83.8	5	11.8	25
Jhabua	77.4	12	19.0	7
Katni	62.1	27	12.5	21
Mandla	51.7	33	14.6	13
Mandsaur	58.5	29	21.1	4
Morena	47.0	36	15.2	12
Narsimhapur	92.2	1	13.0	17
Neemuch	66.5	23	31.9	1
Panna	47.0	36	8.3	43
Raisen	77.8	11	9.7	37
Rajgarh	70.5	17	13.3	15
Ratlam	81.6	8	16.0	8
Rewa	41.0	40	11.4	28
Sagar	50.2	34	1.3	45
Satna	48.3	35	12.3	22

(Contd...)



District	Access to Safe Drinking Water		Access to PHC	
	Value	Rank	Value	Rank
Sehore	70.1	18	13.0	16
Seoni	63.7	26	10.0	34
Shahdol	28.5	45	12.7	18
Shajapur	75.8	13	9.6	38
Sheopur	80.8	9	12.0	23
Shivpuri	53.3	30	10.5	31
Sidhi	29.6	44	9.9	35
Tikamgarh	30.7	43	10.4	33
Ujjain	84.6	4	10.5	32
Umaria	36.3	41	8.7	42
Vidisha	68.6	21	9.8	36
West Nimar	82.1	6	21.8	3

Source: As stated in Table 3.4

**Table 6.6: Status of Districts in Absorption Index**

Extremely Insecure	Severely Insecure	Moderately Insecure	Moderately Secure	Secure
Damoh	Katni	Ujjain	West Nimar	Indore
Panna	Datia	Sheopur	Neemuch	
Rewa	Gwalior	Chhindwara	Narsimhapur	
Sagar	Seoni	Raisen	Dhar	
Umaria	Harda	Dewas	Jhabua	
Chhatarpur	Mandla	Rajgarh	Ratlam	
Shahdol	Balaghat	Hoshangabad	Barwani	
Tikamgarh	Morena	Mandsaur	East Nimar	
Sidhi	Bhind	Shajapur	Bhopal	
	Shivpuri	Sehore	Jabalpur	
	Satna	Betul		
	Dindori	Guna		
		Vidisha		

\*\*\*\*\*

## 7. Addressing Food Insecurity in Madhya Pradesh

Chapter 3 developed an index to show the ranks of districts by outcomes of food insecurity. The next logical step was to look at factors that contribute to making these districts so prone to food insecurity. These factors were analysed in terms of the Availability, Access and Absorption framework in chapters 4 to 6. In this chapter, all these factors that are taken to explain food security across districts are combined to form a single index, called the Food Security Index (FSI). Map 7.1 shows districts by their rank on the FSI and Table 7.1 gives the corresponding table. The critical question is: Is there an overlap between the ranks of districts on the FSOI and the ranks on the FSI? That is, do the districts that have poor outcomes (in terms of under-five mortality and underweight children) also have low availability, access and absorption? If indeed there is an overlap, and we show that there is, it means that the factors or indicators that are included in the composite FSI do, indeed, contribute to food insecurity, and any strategy to improve the food security status must address them.

**Table 7.1: Food Security Index**

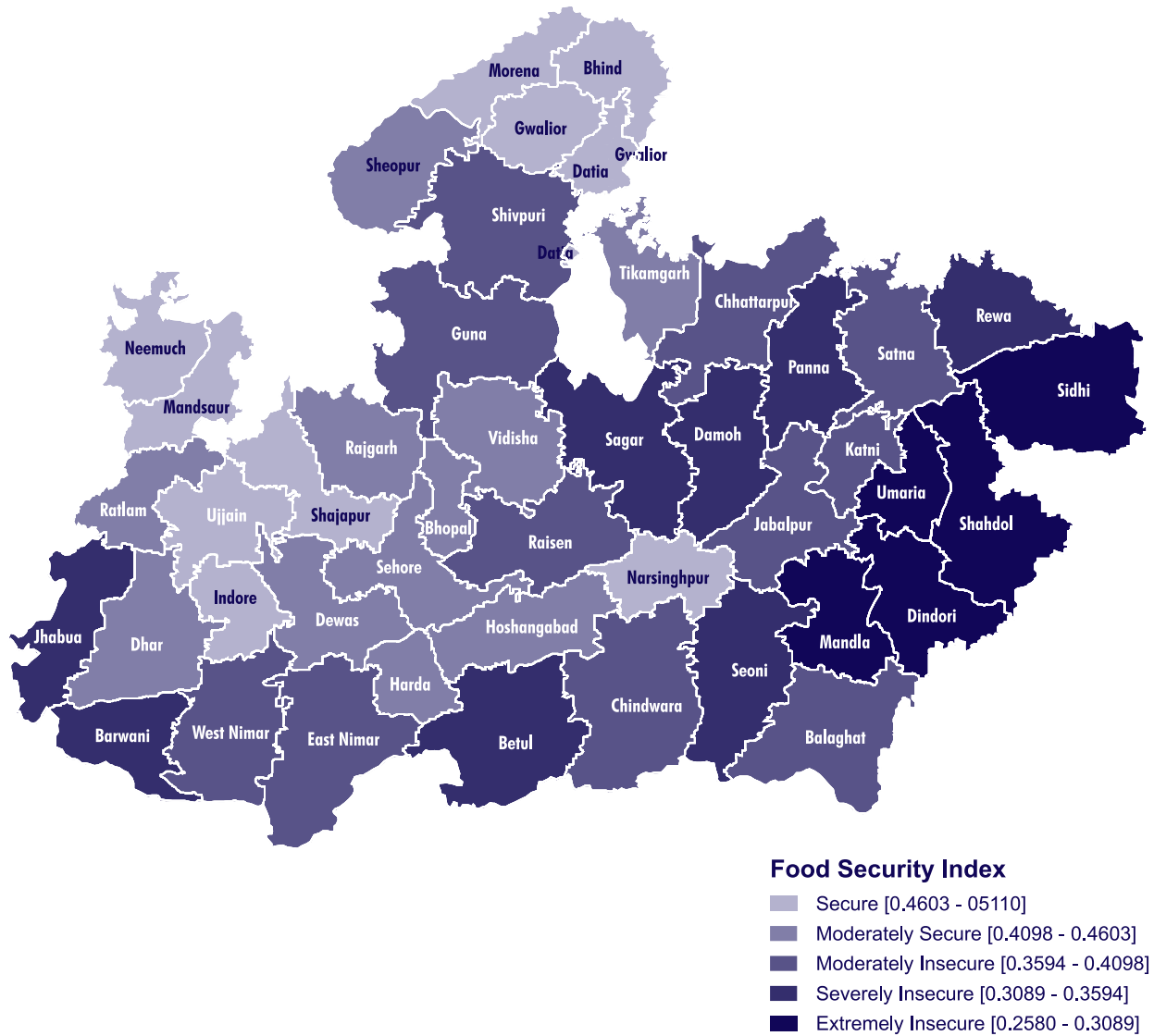
District	Value	Rank	District	Value	Rank	District	Value	Rank
Balaghat	0.375	29	Harda	0.426	16	Rewa	0.342	38
Barwani	0.345	34	Hoshangabad	0.447	11	Sagar	0.353	33
Betul	0.345	35	Indore	0.511	1	Satna	0.371	30
Bhind	0.482	5	Jabalpur	0.407	22	Sehore	0.422	18
Bhopal	0.441	14	Jhabua	0.344	37	Seoni	0.335	39
Chhatarpur	0.380	27	Katni	0.363	32	Shahdol	0.280	42
Chhindwara	0.363	31	Mandla	0.264	44	Shajapur	0.476	6
Damoh	0.345	36	Mandsaur	0.475	7	Sheopur	0.429	15
Datia	0.502	2	Morena	0.489	3	Shivpuri	0.402	24
Dewas	0.411	21	Narsimhapur	0.466	10	Sidhi	0.283	41
Dhar	0.423	17	Neemuch	0.488	4	Tikamgarh	0.414	19
Dindori	0.270	43	Panna	0.323	40	Ujjain	0.474	8
East Nimar	0.377	28	Raisen	0.398	25	Umaria	0.258	45
Guna	0.391	26	Rajgarh	0.443	13	Vidisha	0.414	20
Gwalior	0.470	9	Ratlam	0.445	12	West Nimar	0.405	23

To see the degree of conformity between FSOI and FSI, a correlation exercise has been done the results of which show a good positive correlation among the indices.<sup>1</sup> The FSOI not only has a significant positive correlation with the overall FSI, but also with the availability and absorption indices. It doesn't have a significant correlation with access, which might be explained by uniformly high proportion of some of the indicators throughout the state, and poor performance of some agriculturally developed districts in terms of proportion of agricultural labourers.

1. It is to be reiterated that the FSOI is a direct measure of food insecurity status at the district level whereas the food security indices (FSIs) are only explanatory indices, which are expected to influence food insecurity in one way or the other. Hence, the correlation between the two indices may not be very strong, but the FSI does throw some light on the causative factors for food insecurity.



Map 7.1: Food Security Map of Rural Madhya Pradesh





**Table 7.2: Status of Districts in Terms of FSI**

Extremely Insecure	Severely Insecure	Moderately Insecure	Moderately Secure	Secure
Sidhi	Sagar	Jabalpur	Hoshangabad	Indore
Shahdol	Barwani	West Nimar	Ratlam	Datia
Dindori	Betul	Shivpuri	Rajgarh	Morena
Mandla	Damoh	Raisen	Bhopal	Neemuch
Umaria	Jhabua	Guna	Sheopur	Bhind
	Rewa	Chhatarpur	Harda	Shajapur
	Seoni	East Nimar	Dhar	Mandsaur
	Panna	Balaghat	Sehore	Ujjain
		Satna	Tikamgarh	Gwalior
		Chhindwara	Vidisha	Narsimhapur
		Katni	Dewas	

**Table 7.3: Correlations between FSO, FSI and Explanatory Indices**

	Availability	Access	Absorption	FSI	FSOI
Availability	1	0.497 **	0.397 **	0.823 **	0.331 *
Access		1	0.095	0.794 **	0.213
Absorption			1	0.541 **	0.369 *
FSI				1	0.416 **
FSOI					1

Note: \*\* Correlation is significant at the 0.01 level  
\* Correlation is significant at the 0.05 level

## 7.1 Identifying Priority Districts

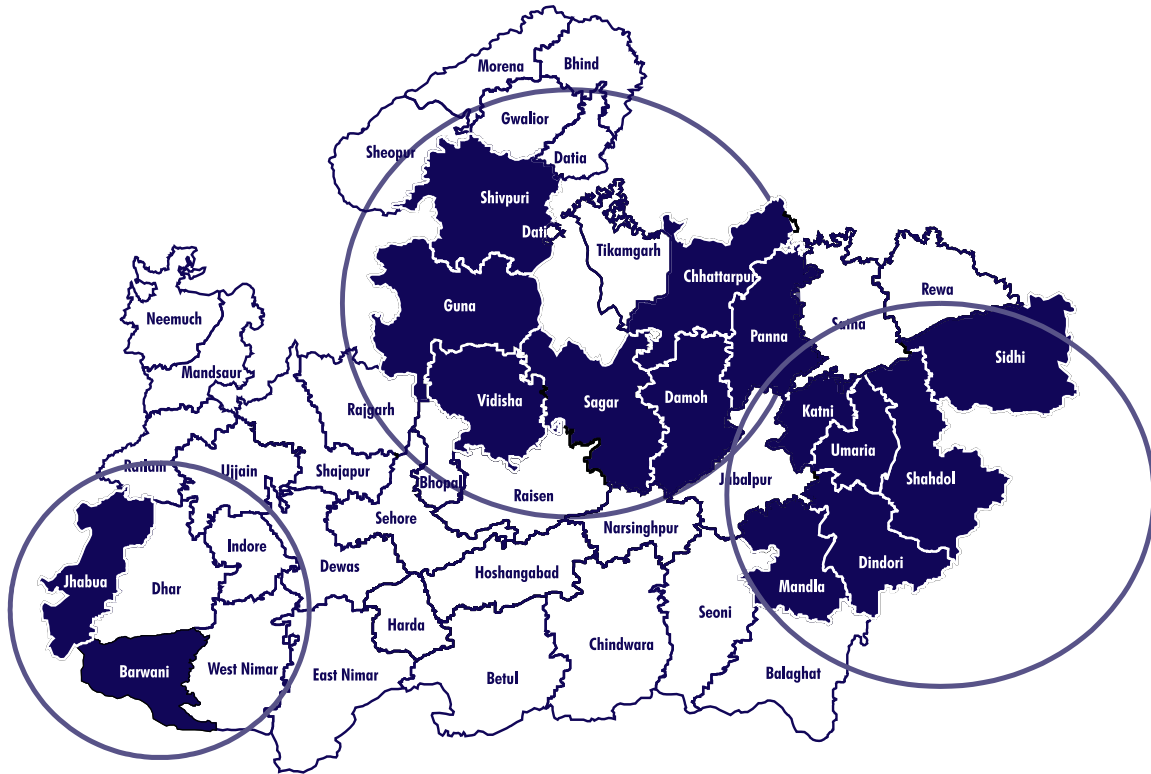
Based on these analyses of FSOI and FSI, the study proposes the districts in Table 7.4 as the priority districts for interventions. These are the districts that rank poorly in terms of both these indices, i.e., the effect of poor performance in FSI is starkly exhibited in the outcome - the FSOI, and hence they require urgent attention and interventions to pull them up from their critical state. The priority areas of intervention in these districts have already been spelt out in the previous three chapters.

Three clear clusters for underdevelopment in terms of food security can be identified in the state:

- The western tribal districts of Jhabua and Barwani;
- The eastern parts of the state comprising the whole region adjoining northern Chhattisgarh Region (districts of Sidhi, Shahdol, Dindori and Mandla) and large parts of Keymore Plateau (districts of Panna, Katni and Umaria);



Map 7.2: Districts Identified for Priority Intervention in Madhya Pradesh



- (c) The third distinct region is Bundelkhand (particularly Chhattarpur) and the peripheral districts of the Bundelkhand Region - Damoh, Sagar, Vidisha, Guna and Shivpuri that form the margin of Vindhya Plateau and southern parts of the Grid Region (Gwalior and surrounding districts) (Map 7.2).

## 7.2 Jhabua: The Tribal Heartland - A Case Study

Jhabua forms the core tribal area of central India. All the districts surrounding Jhabua - Banswara (Rajasthan), Ratlam, Dhar (Madhya Pradesh), Panchmahal, Vadodara (Gujarat) and Nandurbar (Maharashtra) - have tribal population exceeding one-third of their total population. Of these, Banswara and Nandurbar have more than two-third tribal population, with Jhabua leading with 87 per cent total tribal population and 92 per cent rural tribal population. This makes Jhabua a unique district with the highest concentration of tribal population in the country, marginally following The Dangs (Gujarat), also close by, which has 94 per cent.

Located in the western-most semi-arid agro-climatic zone, these are also the few most backward districts of the country, with Jhabua at the bottom. Jhabua's relative position in the state is somewhat



like Madhya Pradesh's relative position in the country. The district has a high share of area under barren and unculturable wasteland; on the other hand, urbanisation and literacy rates are very low. Due to the high pressure on agricultural land, the forest resources of the district have been rapidly declining. Still, only some coarse crops and maize can be grown here (Sen et al., 2007).

As can be inferred from Table 7.5, the status of Jhabua in terms of some socio-economic indicators as compared to Madhya Pradesh and to the national average is quite low. In terms of urbanisation and literacy rates Madhya Pradesh has almost similar status as that of India, but Jhabua lies way behind. Some blocks of the district like Jobat (6.4 per cent), Alirajpur<sup>1</sup> (7 per cent) and Petlawad (7.3 per cent) have negligible level of urbanisation, while more than a quarter of the state and national population lives in urban areas.

Similarly, rural female literacy in the state is 43 per cent which is only marginally less than the national average of 46 per cent. However, the figure for Jhabua is as low as 21 per cent wherein Alirajpur block has a figure of 16 per cent and Jhabua block has 17 per cent. As already stated, Jhabua has the maximum concentration of tribal population in central India. The proportion of tribal population in tribal areas is as high as 97 per cent in Bhavra block and 95.4 per cent in Jobat block (Map7.3). Agriculture is the dominant occupation of these populations, which can be deciphered from the fact that almost 90 per cent of the workers in the district are engaged in agricultural activities either as cultivators or as agricultural labourers whereas this proportion is 72 per cent at the state level and 60 per cent at the national level.

Due to its unique characteristics, Jhabua has been an experimental ground for a number of developmental projects. The watershed development programmes (WDPs) have been executed in a big way in the district particularly in the last decade. Rural development programmes like EAS, DPAP and IWDP have been channeled towards watershed development under the aegis of Rajiv Gandhi Mission for Watershed Management (RGMWM), and is complemented by the National Watershed Development Project for Rainfed Areas (NWDPR) of the Department of Agriculture. Apart from these, dedicated projects have been floated to develop tribal handicrafts.

**Table 7.4: Priority Districts for Intervention**

District	FSO rank	FSI rank
Katni	43	32
Panna	44	40
Sidhi	45	41
Chhatarpur	34	27
Dindori	37	43
Umariya	29	45
Mandla	32	44
Shivpuri	42	24
Guna	40	26
Vidisha	41	20
Sagar	38	33
Barwani	35	34
Jhabua	38	37

1. Alirajpur has been carved out of Jhabua to form a new district in 2008.



Map 7.3: Proportion of Scheduled Tribes in Blocks of Jhabua

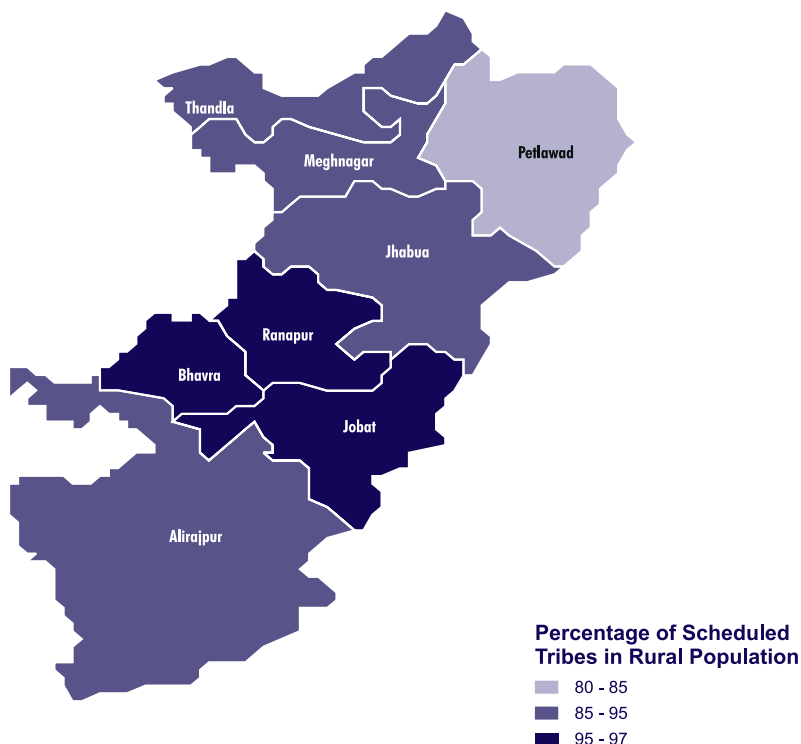


Table 7.5: Block-wise Socio-Economic Status of Jhabua

	Urbanisation	Rural Literacy Rate	Rural Female Literacy Rate	Proportion of Rural ST	Proportion of Agricultural Workers
Alirajpur	6.8	24.4	16.2	91.4	90
Bhavra	10.6	36.4	25.5	97.1	88.7
Jhabua	11.8	28.4	17.4	94.7	86.1
Jobat	6.4	28.6	19.3	95.4	85.6
Meghnagar	8.3	40.4	26.7	92.5	87.1
Petlawad	7.3	46.6	30.7	80.3	87.7
Ranapur	11.7	38.6	25.2	96	81.5
Thandla	9	32.7	20.2	94.7	85.9
<b>Jhabua district</b>	<b>8.7</b>	<b>32.3</b>	<b>21.1</b>	<b>92.2</b>	<b>87.2</b>
<b>Madhya Pradesh</b>	<b>26.5</b>	<b>57.8</b>	<b>42.8</b>	<b>25.8</b>	<b>71.5</b>
<b>India</b>	<b>27.8</b>	<b>58.7</b>	<b>46.1</b>	<b>10.4</b>	<b>58.2</b>

Note: \* Includes cultivators and agricultural labourers.

Source: Census of India, 2001.





These programmes have yet to achieve the desired results in ensuring food security. WFP has been working in Jhabua consistently to address the food insecurity issue. Both the Food for Education programme for primary school-going children and Food for Work programme for adults were implemented to take care of the nutritional and livelihood requirements of the target population.

### **7.3 Strategies for Promoting Food Security**

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

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

#### ***7.3.1 Enhancing Availability***

Low investment in agriculture and neglect of agricultural research and infrastructure has resulted in a relative stagnation in food output growth. With present problems of increase in food prices, there is now a renewed emphasis on increasing food production.

#### ***Increasing Food Production: National Food Security Mission***

The dismal rate of growth in the agricultural sector has been a cause for concern - the sector grew at a meagre rate of 1.8 per cent per annum during the nineties. This has been coupled with rising international prices as well wheat imports, bringing into question the food security of the country. With a view to increasing the rate of agricultural growth to 4 per cent, the government has launched the National Food Security Mission (NFSM) as a centrally sponsored scheme, entirely funded by the central government, with a total estimated outlay of over Rs. 50,000 million. The programme specifically aims at increasing the production and productivity of three crops: rice, wheat and pulses. Ongoing related schemes like the Integrated Cereal Development Programme (ICDP Rice/Wheat) and the Integrated Scheme on Pulses, Oilseeds and Maize (ISOPOM Pulse) would cease to operate in the identified districts once the relevant component of the NFSM comes into execution in the district.



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

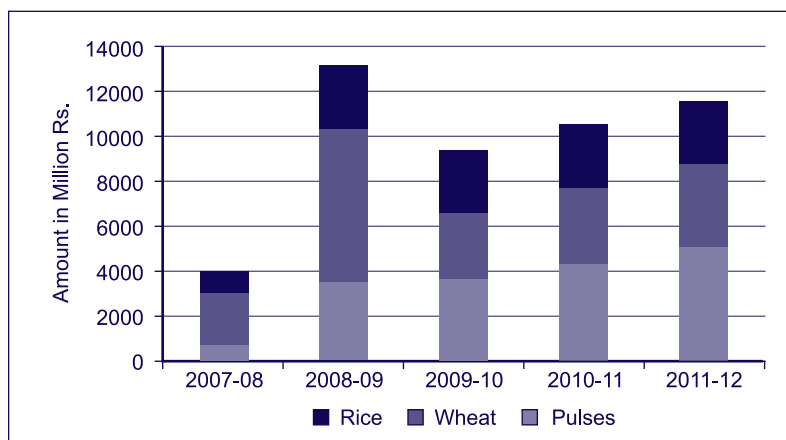
The mission operates at multiple levels from the national level, to state and district levels. At the grassroot level, the Panchayati Raj Institutions (PRIs) have an active role and are involved in the selection of beneficiaries and identification of priority areas and local initiatives.

The mission is being implemented in 133 districts for the rice component, 138 districts for wheat and 168 districts for the pulse component - all in identified districts of different states. In terms of target beneficiaries, 16 per cent of the total allocation has been earmarked for SCs under the Special Component Plan (SCP) and 8 per cent for the STs under the Tribal Sub-Plan (TSP). At least 33 per cent of the fund is stipulated to be utilised for small, marginal and women farmers. Further, the allocation to the SC/ST farmers is to be made in proportion to their population in the district.

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

The NFSM concentrates on irrigated foodgrains - wheat, rice and pulses. Other than for pulses, non-irrigated crops have been ignored. The NFSM is aimed at revitalising fertility in lands which have

**Figure 7.1: Allocation Proposed under NFSM**



Source: Economic Survey, 2007-08.



**Table 7.6: Districts under NFSM**

<b>Rice (9)</b>				
Anuppur	Damoh	Dindori	Katni	Mandla
Panna	Rewa	Satna	Shahdol	
<b>Wheat (30)</b>				
Betul	Bhind	Chattarpur	Damoh	Dewas
East Nimar	Guna	Harda	Indore	Jabalpur
Katni	Raisen	Rajgarh	Rewa	Sagar
Satna	Sehore	Seoni	Shivpuri	Sidhi
Tikamgarh	Ujjain	Vidisha	Balaghat	Dhaar
Dindori	Jhabua	Mandala	Panna	Shahdol
<b>Pulses (20)</b>				
Chhatarpur	Chindwara	Damoh	Dewas	Guna
Rewa	Raisen	Satna	Tikamgarh	Sagar
Vidisha	Ujjain	Jabalpur	Narasinghpur	Shivpuri
Panna	Rajgarh	Seoni	Shajapur	Jhabua

Source: Government of India (2007b).

deteriorated. But rainfed crops, such as millets that are grown on hills and other drylands, do not come under its purview. In the context of the plateauing (and even declining) yields in irrigated crops, it becomes even more important to pay attention to these rainfed crops and to increase productivity in currently rainfed areas. These are also areas of higher food insecurity. An increase in agricultural productivity in rainfed areas will substantially reduce the incidence of hunger in these areas.

In the State of Madhya Pradesh, the following districts have been identified to be developed under the NFSM under the rice and pulses components given in Table 7.6.

**Box 7.1: National Policy for Farmers, 2007**

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



The recommendations include:

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

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

*Source: Department of Agriculture and Cooperation, Ministry of Agriculture, Government of India*

## ***Watershed Development Programmes***

One of the most major responses to address the prevailing issues in the rainfed and arid areas came in the early nineties in the form of watershed development programmes (WDPs). WDPs seek to integrate various constituents of agro-ecological systems - cultivation, pastures and forests - in a holistic manner, at the same time, supporting the livelihoods and effect institutional development in the process. Madhya Pradesh is perhaps the only state to have set up a special mission - Rajiv Gandhi Mission for Watershed Management (RGMWM) - for implementing watershed development projects in the state. The RGMWM has been funded through the Ministry of Rural Development by integrating schemes like Employment Assurance Scheme (EAS), Drought Prone Areas Programme (DPAP) and Integrated Wasteland Development Programme (IWDP).

Besides these, the Ministry of Agriculture has also been implementing the National Watershed Development Project for Rain-fed Areas (NWDPR), besides River Valley Projects (RVP) and other projects funded by donor agencies and Department of Forests. These projects have been implemented



in a manner as to avoid duplication of efforts and have together covered more than 15 per cent of the total geographical area of the state, one-third of which has been implemented by RGMWM alone (Sen *et al.*, 2007).

Evaluation of these programmes, particularly RGMWM, has revealed an increased cropped area, yield and short-term employment opportunities (TARU, 2001). Significantly, water availability, particularly for drinking and irrigation has experienced both a horizontal increase, i.e., in numbers and catchments of water sources, as well as vertical increase, i.e., the rise of water table in existing ground water sources (CARD, 2002; CSWCRTI, 2004).

The government has accorded high significance to the WDPs. As per the new guidelines issued by the Ministry of Rural Development, Desert Development Programme (DDP), DPAP and IWDP have been replaced by the Integrated Watershed Management Programme (IWMP) as a Centrally Sponsored Scheme under Department of Land Resources (DoLR website). The Planning Commission has also developed a 25-years perspective plan to develop 88.5 million hectares of land under WDPs in the country up to XIII Plan (11th Plan Approach Paper, Planning Commission).

Madhya Pradesh has a vast tract of rainfed and arid areas. Therefore, the key to enhancing production levels lies in developing these areas in a watershed framework for both increasing the area under cultivation as well as productivity levels.

### ***Wastelands as Common Property Regimes (CPRs)***

A large part of land in the state is classified as "wasteland". These are actually various forms of common and government lands that have turned into "open access" lands. There is little or no community or government regulation of use and no investment in regeneration of the production potential of these lands. As per the pioneering work of N. S. Jodha, the poor rely substantially on these degraded common lands for a large part of their fodder and fuel, and even some food (vegetable) needs.

These degraded commons could be brought under forms of Common Property Regimes (CPRs). CPRs, however, can be of the whole village or of a defined section of it. In the highly unequal and caste-structured Indian village, village CPRs are likely to be dominated by the upper caste and class persons. On the other hand, there could be a clear policy of allotting the CPRs to the poor, in a form of user rights, since it is the poor who disproportionately use these commons. Such CPRs of the poor would serve both goals of regenerating these resources and improving the food security of the poor. There has been frequent discussion of the possibility of giving out these wastelands for corporations to develop. A better policy, one that would not only increase productivity of these resources but also improve the food security position of the poor, would be to lease these lands to the landless and other food-insecure to be developed as their common properties.



The productivity of these wastelands as they now stand is quite low. They are, for instance, suitable as grass and fodder lands for raising livestock. These dry lands likely have a comparative advantage in livestock and horticulture (C.H. Hanumantha Rao, 1994 and 1999). Livestock itself is a sector that can both provide higher employment per unit of income, and with milk and meat being superior goods, their markets are not likely to face the constraints that grain markets faces. R. K. Sharma and Babu Jacob estimate that the employment elasticities of output for crops and livestock were 0.41 and 0.91, respectively, during the period 1972-73 to 1987-88 (Sharma and Jacob, 1997). But by themselves these degraded open access lands cannot provide much income or support many animals. "... the observations from micro-level studies suggest that CPL (Common Pasture Land) can provide about 75 per cent of the fodder requirements during the four months in monsoon season and about 50 per cent during the subsequent two months and that too if the rainfall is reasonably good. For the remaining period, fodder requirements have to be met through crop-residue or market-purchase" (Amita Shah, 1997). It is no wonder that animals distributed to the poor through the IRDP did not survive in their hands.

What is needed is to transform what are effectively "open access" lands into CPRs of the poor users. Investment support can be provided through food-based schemes to support employment of the poor in improving infrastructure and productivity. In defining access of the poor to CPRs, once again consideration needs to be paid to the separate rights of women from poor families.

Part of the wastelands has also been taken over by individuals or families of the poor. But in this case too there is a question of the low productivity of these lands. In the rainfed conditions of the semi-arid drought prone districts of the state, they need substantial investment even for one reasonable crop. Water harvesting structures, bunding and other land improvements are needed. This is another area for investment support, which can be tied up with NREGA. The difference from conventional rural works programmes is that the asset creation would not be public and would be concentrated on those lands and assets that have been transferred to or otherwise belong to the poor.

### ***Improving Connectivity: Rural Roads***

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

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



### *Pradhan Mantri Gram Sadak Yojana (PMGSY)*

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

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

According to statistics, Madhya Pradesh is ranked second in the construction of rural roads in the country. Under PMGSY, 12,321 kms of rural roads were constructed from 2003-07 with an average of 9 km per day; 5686 villages are directly connected with main roads (TOI, 2007).

### *Bharat Nirman*

Bharat Nirman is a plan for action in rural infrastructure that started in 2005 and will end in 2009. Under the scheme, action is proposed in the areas of irrigation, roads, rural housing, rural water supply, rural electrification and rural telecommunication connectivity, in partnership with the state governments and the PRIs.

As part of the programme, the government intends that by end of financial year 2008-09, every village of over 1000 population, or over 500 in hilly and tribal areas should have an all-weather road. To achieve the targets of Bharat Nirman, 146,185 km of road length is proposed to be constructed by 2009. This will benefit 66,802 unconnected eligible habitations in the country. To ensure full farm to market connectivity, it is also proposed to upgrade 194,132 km of the existing Associated Through Routes.



### Box 7.2: Golden Quadrilateral 'misses' Madhya Pradesh!

Madhya Pradesh has only 52 km of road per 100 sq km of area and lags much behind the national average of 75 km. Further, only 6 per cent of the total road length in the state (72,416 km) are national highways, while almost 17 per cent is classified as *kuchcha* (non-concrete). Despite these figures, the ambitious Golden Quadrilateral project misses the state comprehensively. The two corridors (east-west and north-south), have a combined length of just 621 km in the state, which forms less than 5 per cent of the total length of these roads. It may also be remarked that the East-West corridor has only a brief presence in the northern margin of the state. Thus, in spite of the fact that Madhya Pradesh is the second largest state, constituting 10 per cent of the country's area, and that it is centrally located, the state has only 8 per cent of the national highways passing through it.

Source: Madhya Pradesh Human Development Report, 2007

The target for Madhya Pradesh for 2007-08 is to connect 2399 habitations with new connectivity of 8326.85 km and upgradation of 614.38 km of roads.

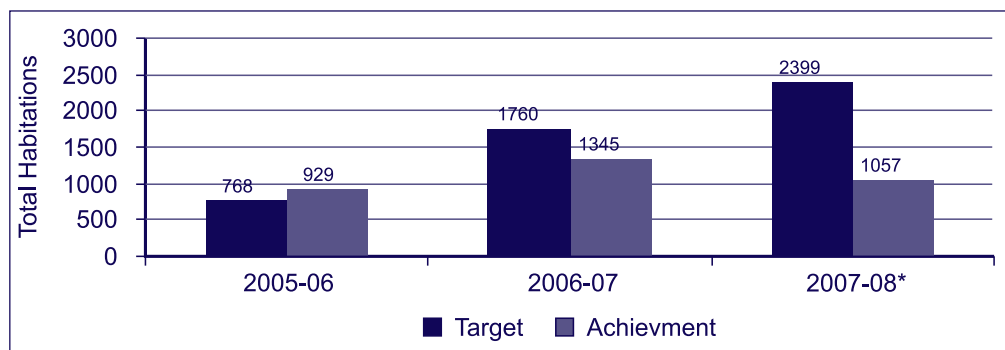
### Revitalising the Rural Economy

Low agricultural productivity, poor climatic conditions and large-scale soil erosion affect the large proportions of agriculture dependent populations in the state of Madhya Pradesh. The state reportedly has a poor irrigation spread, with the eastern districts, Shahdol, Mandla and Dindori, having the lowest irrigation coverage. In addition to this, the state is also affected by drought conditions.

Among the reasons for low agricultural productivity is the large-scale soil erosion, with water congestion during monsoons and inadequate moisture when most required for crop production. Districts with low agricultural production are also those which have a higher forest cover, such as Mandla, Panna and Umaria of the Keymore Plateau.

In a depressed agrarian economy both the extent of employment and wage rates will be low, thus affecting the access of agricultural labourers (and others, such as supplying craft production or other

Figure 7.2: Total Habitations Connected under Bharat Nirman (Rural Roads) in Madhya Pradesh: Targets and Achievements, 2005-07



Note:\* 2007-08 figure is up to January 2008

Source: Ministry of Rural Development, Government of India





services to farmers) to food. Revitalising the agrarian, and thus the rural economy of the districts with low productivity, is necessary for improving their food security situation. This could take the form of diversification of crops, or even activities in the rural economy. Such revitalisation is likely to increase employment and wages of labourers and increase the demand for locally produced products and services.

Agricultural diversification is essential to improve the returns from the sector and thereby the food security of the large mass of agricultural labourers and cultivators dependent on the sector for their livelihood. The soyabean promotion supported by the GoMP is an apt example of the improvements in returns and benefits to the rural economy as a whole. Focus on the R&D for evolving appropriate alternatives towards agricultural diversification and efforts for developing the agro-processing sector are recommended.

### ***7.3.2 Improving Access***

Access measures in Madhya Pradesh, as in other states of India, have been along the following lines:

- (a) The provision of low-priced food grains through the Targeted Public Distribution System (TPDS).
- (b) Food for Work schemes, now carried out under the National Rural Employment Guarantee Act (NREGA).
- (c) The mother and infant supplementary feeding programme through the Integrated Child Development Services (ICDS).
- (d) The Mid-Day Meal Scheme (MDMS) for children in government-run schools.

The 61st NSS Round (2004-05) gives information on the extent to which these schemes reach the poor in the state, and thus contribute to food security, though it does not show us how much they add to food entitlements.

In Table 7.7, we have also separately included 'nearly poor' households, i.e., those whose per capita consumption level is within 10 per cent above the poverty line. Both among the rural poor and nearly poor households 72 per cent hold ration cards which is nearly 10 per cent lower than the national average. Remarkably, the Vindhya Region that has the maximum number of food-insecure districts has one of the least proportion of poor and nearly poor households holding a ration card. This speaks poorly of the reach of food security programmes to the poor in the most food insecure region. Similarly, in terms of reach of programmes like Food for Work (FFW) and Annapoorna a very small proportion of poor households get the benefit. However, here again the proportion of beneficiaries from the Vindhya Region is nil. The southern region (7 per cent) is the only region that has figures remarkably above the state average (3 per cent) in terms of FFW programme. The Annapoorna programme is virtually non-existent in the state.



An analysis of the possession of ration cards by social groups reveals the poor state of affairs in the state. Almost one-third of the tribal population doesn't possess any form of ration card. The figure among the SC population is one-quarter. Although the proportion of BPL and Antyodaya card holders is found to be higher for the tribal and SC population, in absolute terms and compared to their relative position, it is far from adequate.

**Table 7.7: Percentage Share of Poor and Nearly Poor\* Households who have Ration Card or Benefited from Various Schemes in Rural Madhya Pradesh (2004-05)**

Region	Ration Card	Food for Work	Annapoorna	ICDS	Mid-Day Meal
<b>Poor Households</b>					
Vindhya	68.6	0.0	0.0	2.1	42.7
Central	76.9	1.6	0.1	1.7	46.5
Malwa	72.2	3.2	0.1	3.9	49.0
South	70.2	7.2	2.5	6.3	42.0
South-western	67.7	2.0	0.3	11.2	57.3
Northern	78.3	4.1	0.0	0.0	47.9
Total (rural MP)	71.6	3.0	0.7	3.9	45.6
Rural India	80.0	4.2	1.2	8.8	33.2
<b>Nearly Poor Households</b>					
Vindhya	61.3	0.0	0.0	1.2	34.4
Central	71.0	0.0	0.0	1.3	42.4
Malwa	87.3	0.0	0.0	0.0	35.7
South	75.3	0.0	3.2	8.0	19.8
South-western	62.0	0.0	0.0	0.0	15.4
Northern	83.7	0.0	0.0	0.0	26.2
Total (rural MP)	73.1	0.0	0.6	1.9	29.1
Rural India	82.9	2.8	1.1	6.7	29.5

Note:\* Those households whose per capita consumption is within 10 per cent above the poverty line.

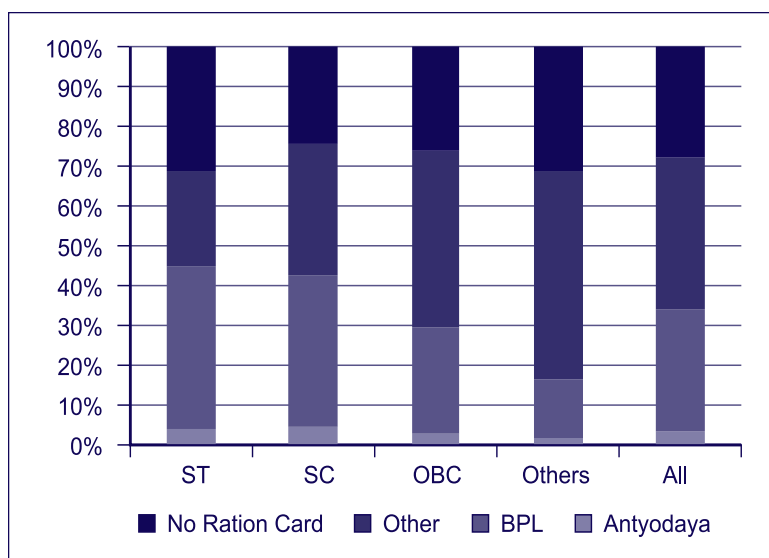
Source: Calculated from NSS, 61st Round, 2004-05.

The ICDS programme that aims at the integrated nutritional development of children below six years of age and pregnant and nursing mothers through supplementary feeding has seen very little success in Madhya Pradesh as compared to the national average. The NSS figures indicate that the proportion of beneficiaries among the poor households in the state (4 per cent) is less than half of that of the national average (9 per cent). The programme has met only a fair section in the south-western and southern regions.

However, the performance of the MDMS in Madhya Pradesh is encouraging. The proportion of poor households benefiting from the scheme is more than 45 per cent while it is less than 35 per cent at



**Figure 7.3 Proportion of Households Possessing Ration Cards, 2004-05**



Source: NSS, 61st Round, 2004-05.

the all-India level. The south-west region again has the maximum proportion of beneficiaries among the poor households (57 per cent).

A comparison of Madhya Pradesh with states at similar level of economic development in terms of performance of these programmes indicates that other states in general have performed better. For instance, the proportion of poor households holding a ration card is almost universal in Rajasthan. Participation in FFW programme is much higher in Rajasthan and Orissa, while the ICDS programme has worked quite well in Orissa and Maharashtra. Nevertheless, it is again in terms of MDMS that the Madhya Pradesh has excelled as compared to all these states. In fact, in terms of coverage of MDMS among poor households its rank is fifth among all the states of India after Chhattisgarh (55.5 per cent), Karnataka (53.7 per cent), Tamil Nadu (49.8 per cent) and Gujarat (49.1 per cent).

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

There is an important role for mobilisation of the poor in improving implementation of the ICDS, MDMS, NREGS and other such schemes. Implementation of these schemes has generally been decentralised down to the panchayat level. But panchayats can be corrupt and dominated by the local power-brokers. A pilot social audit held in Bolangir in November 2001 showed substantial and relatively open



### Box 7.3: Improved Targeting in the Public Distribution System

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

The project involves the following:

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

**Table 7.8: Percentage Share of Poor and Nearly Poor Households who have Ration Card or Benefited from Various Schemes across Various States (Rural) 2004-05**

	Ration Card	Food for Work	Annapoorna	ICDS	Mid-Day Meal
<b>Poor Households</b>					
Madhya Pradesh	71.6	3.0	0.7	3.9	45.6
Rajasthan	96.4	18.2	1.7	2.4	35.5
Orissa	71.3	14.5	1.3	18.4	31.4
Bihar	74.6	0.4	1.4	0.8	13.1
Maharashtra	79.5	2.5	0.4	22.5	42.6
<b>Nearly Poor Households</b>					
Madhya Pradesh	73.1	0.0	0.6	1.9	29.1
Rajasthan	99	15.8	1.9	3.0	29.8
Orissa	68.3	5.7	1.7	12.4	24.7
Bihar	76.7	0.0	3.7	0.8	10.6
Maharashtra	81.1	4.0	0.2	16.1	34.8

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



corruption at the panchayat level (de Haan and Dubey, 2005). Studies in other states have shown that when women are in panchayats, or lead panchayats, the panchayats perform better in administering food-related interventions. In IFAD projects in Andhra Pradesh too, it was observed that women's SHGs performed better in undertaking small infrastructure projects than those managed by men and saved more money for the community than the latter.

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

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

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

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

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

The 'Mukhyamantri Annapurna Yojana', launched in April, 2008, seeks to tackle the food insecurity problems of the poorest. Under the programme, BPL card holder families are provided 20 kg food grains per family per month including wheat at the rate of Rs. 3 per kg and rice at Rs 4.50 per kg. The



food grains under the scheme are distributed in the presence of local Panchayat representatives and members of monitoring committees and Deendayal Antodaya Samitis.

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

#### **Box 7.4: Meeting the Nutritional Needs of Vulnerable Groups**

##### **Infants and Young Children**

According to the National Family Health Survey 3 (NFHS-III, 2005-06), in India 42.5 per cent of children under five are underweight while 48 per cent are stunted. The prevalence of underweight and stunting continually increases up to the age group of 18-23 months. This indicates that there is need for improvement in complementary feeding practices and in the quality of complementary foods fed to infants and young children. Besides the high rates of undernutrition, the infant mortality rate is also quite high at 57 per 1000 live births.

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

In order to address the prevalence of widespread undernutrition and the high infant mortality rate that impede human development, WFP has developed a low-cost 'Ready to Use Food for Children (RUFC). The main ingredients in the ready-to-eat food are cereal, oil, sugar, pulse, peanut paste and milk powder. In addition, the ready-to-eat food is fortified with an array of micronutrients and is packaged in individual hygienic serving sachets.

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

#### ***National Rural Employment Guarantee Scheme (NREGS)***

The NREGS has been devised as a public work programme and has a key role to play in providing assured employment to one person in each household for 100 days per year. The major objectives of this scheme are to provide income security through employment guarantee; reduce/check distress



migration from rural to urban areas; and, in this process, also to create durable assets in villages, leading to overall development of the rural economy; and empowerment of rural women through the opportunity to earn income independently and to participate in social groups.

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

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

A large number of the beneficiaries under the scheme are women, close to 69 per cent of them as on 3 April 2008. It is well known that women spend more of their earnings than men on essential consumption needs of the family, education of children and healthcare requirements, all of which are supportive of improving the nutritional status of their households.

**Table 7.9: Outputs and Achievements of NREGS (Figures in Millions)**

	India	Madhya Pradesh
Households demanding employment	31.1	4.35
Households provided employment	30.8	4.35
Persondays		
Total	1268.5	275.3
SCs	334 (26.33 %)	49.2 (17.87 %)
STs	367.4 (28.96 %)	134.2 (48.76 %)
Women	879.7 (69.35 %)	114.7 (41.67 %)
Others	567.1 (44.71 %)	91.9 (33.37 %)
Expenditure (billion Rs.)		28.93

Source: NREGA website, 3 April 2008.



It is worthwhile noting that a large share of the earning received from the NREGS works have been utilised for food-related expenses. A study undertaken by the IHD has documented this finding regarding the contributions from the NREGS being expended by the villagers on food related consumption needs (Box 7.5).

In Madhya Pradesh, almost all persons who demanded work, got work. The proportion of STs is higher than overall India. But, the proportion of women in employment is lower than overall India. Relaxing the present rule, or changing it to acknowledge each individual, and not just household, as requiring work and income, is likely to increase the proportion of women seeking employment. But the large proportion of men seeking NREGS employment here certainly shows that the scheme must have had a substantial impact on distress migration (since it is unlikely that women would migrate, leaving men and children behind).

#### Box 7.5: NREGA and Food Security

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

##### Percentage of Income from NREGA Spent on Food and Related Items

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

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

Reports show, as would be expected, that there is corruption in the running of NREGS. This could be reduced through organisation of the workers in these schemes, use of RTI, etc. Such measures would increase the impact of the scheme on incomes and food security. Nevertheless, there can be no doubt that NREGS, by increasing the incomes of the poorest, is already having a major impact on food security.





## Agricultural Labourers

One important category of the food insecure in Madhya Pradesh is agricultural labourers. A large proportion of them are also likely to be from the dalits or STs. Agricultural wages and the number of days of employment can be influenced by a number of factors - including transfer of land and resources to the landless and creation of other avenues of employment. The object of distributing land to the landless is not one of creating "viable" farms, but of enabling a reduction of food insecurity among the currently landless. In the current scenario where there is a lot of migration from the countryside, there could be scope for a market-mediated land reform programme.

The National Commission on Farmers points out that land reform is the first task for agrarian renewal. The issues in the currently needed round of land reform are not the same as in the earlier rounds of the 50s and 60s. The abolition of intermediary tenures is not any more an issue. What is important is: a) security of tenancy; b) redistribution of ceiling surplus land to the landless; and c) land rights of women. The last two are directly important for food security. One can also include the reduction of land ceilings in order to restrict ownership to the size of a family farm.

At the production level, the case for these kinds of land reform rests on three main propositions: that owner-operated family farms are in general more efficient in use of land and other inputs, than large farms operated with supervised wage labour; that secure tenancy rights promote longer-term investment in enhancing productivity and conservation, compared to insecure rights; and that securing women's land rights too increases agricultural productivity. Land reform then qualifies as productivity-enhancing asset redistribution, something that is an important consideration in a globalised situation (Bowles and Gintis, 1998).

Historically, other than in China, land reform has excluded women. But in some second-generation land reform movements in India (e.g., the Bodh Gaya movement of the 1980s) women raised the demand for land to be allotted in their names. "We had tongues but could not speak; we had feet but could not walk. Now that we have land, we have the strength to speak and walk" (Poor peasant women of Bodh Gaya, 1987); and, "We were there in harvesting the fields. We were there in carrying ploughs and snatching arms from the zamindar's goondas. Why, when the land is distributed, do we not get our independent rights to land?" (Dalit women's meeting, village Basuhari, Bihar, 3 September 1990, both in Kelkar, 1992). It is now recognised that women's ownership of land is necessary to stimulate their labour and investment, and use their managerial talents (Agarwal, 1994). More particularly, in a situation of high male out-migration, as is characteristic of Nepal, Uttarakhand and the dry regions of India and China, women's ownership of land becomes a necessary condition for adequate use of credit and necessary flexibility in management of farm resources.

Redistribution to the landless is both difficult to implement, and important in India, where the former untouchable castes (dalits) are largely landless. It is well known that the dalits are concentrated among the agricultural labourers in most of the Indian states. Traditionally in the caste system, the dalits have



been excluded from ownership of land. It is thus a major step in ending this age-old social exclusion for the dalits to gain ownership of land. This issue remains relevant for the dalits all over India.

The aim of redistribution of ceiling surplus land is not to create 'viable' farms, but one of enabling a more equitable participation in the growth process, one, which would reduce incidence of poverty of the landless. Studies point out that ownership of even a tiny plot of land increases the bargaining power of the agricultural labourers. In Andhra Pradesh, "...the policy of allowing landless to encroach government waste land and housing sites [along with cheap credit, asset subsidies and food subsidies]...together with state funded employment creation ... significantly tightened the labour market..." (da Corta and Venkateshwarlu, 1997). For Uttar Pradesh, "The growth of non-agricultural opportunities, the more limited public works employment, as well as other factors - such as some increase in land and asset ownership among the rural poor have increased reservation wages in agriculture" (Srivastava, 1997, p. 47).

The transfer of property rights to the landless and land poor increased their bargaining power in the wage market. But the study from Andhra Pradesh (da Corta and Venkateshwarlu, 1997) points out that women agricultural labourers, whose families got some waste land did not share in the improved bargaining position. The responsibility of women for household maintenance, and the diversion of men's incomes into liquor and other channels of personal consumption, left women with lower reservation wages than men and forced women to accept various onerous conditions of work, conditions that men refused to accept. This shows that it is not enough to increase the bargaining power of men in the name of the household. Specific attention has to be paid to increasing the bargaining power of women as agricultural labourers by allotting them too individual land rights.

The political coalition now existing does not favour an implementation of a forcible land distribution from large owners to landless and marginal owners, as was done in China, South Korea and Taiwan. Market assisted land reform, which attempts to accomplish land reallocation by "voluntary" land market transactions, has been touted as an alternative to redistributive land reform. However, "voluntary" land market cannot function without deliberate policy interventions in support for the purchase of land by the poor households. Such intervention can be justified not only on the equity ground but also by the generalisable proposition that small farms are more efficient than large farms.

Thus, a way of redistributing good quality land is through government purchase of designated lands and their subsequent transfer to the poor. Large landowners, anxious to migrate to urban locations with better education and more economic opportunities, may be keen to sell their lands. Without adequate political mobilisation, the landless could be by-passed in yet another round of land reform. For the success of such market-mediated land reforms what is needed is to link up with movements of the landless in the various stages of identification, take-over and redistribution.

Is it likely that there would be enough land available on a 'willing seller, willing buyer' basis for the majority of the land-aspiring poor to gain access to it? As pointed out above, with larger landowners,



and particularly their children, keen to migrate to urban areas with their superior educational facilities and their new economic opportunities, there could be land available for such market-mediated transfers. There is a growth of fallow lands, not all of which may be for the above reason.

The role of employment and food-based programmes comes in for supporting those newly-acquiring land to invest labour in improving their lands. Employment schemes could be directed towards this end.

### ***Forest and Adivasis***

The report has pointed to the tribal inhabited forest districts of Jhabua and Barwani as the most food insecure districts in Madhya Pradesh. In these districts there are problems of security of land holdings, an issue that could be addressed by the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act 2006, popular as Forest Rights Act.

A large section of the population in the surrounding districts and other parts of the state, where almost one-third or more of the inhabitants are adivasis, depend on non-timber forest products (NTFPs) for seasonal livelihood sustenance. These forest-based livelihoods of the tribals result in low incomes and often face other constraints in their access to forest areas. They require government support for conduct of these activities of NTFP collection and marketing.

There problems of acquiring land are similar to those of other landless. But there is also scope for increasing productivity in the poor soils of the uplands - through developing irrigated patches in the valleys, improving moisture retention on the slopes and increasing the value of the mix of crops grown on slopes. A study in Koraput showed that even a small plot of irrigated rice land (in the valley) could make a substantial difference to food security (Rath, 2003).

Similar study of the IFAD Tribal development projects in Andhra Pradesh showed that building small check dams to create valley pockets of irrigated paddy land could make a substantial difference to households and shift them from mere subsistence cultivation to accumulation. Further, the transformation of upland cultivation, with a switch to a mix of commercial crops could also begin the process of accumulation.

Consequently, increasing agricultural productivity through irrigation, water-retention schemes, etc. and the cultivation of higher-value commercial crops in uplands, has a role to play in improving food security in the insecure districts. Since the food insecure districts have a higher proportion of cultivators, increases in agricultural productivity will have a direct effect in improving food security. The question is not one of diversification of lands where rice is cultivated. It is necessary to maintain existing levels of rice production for farmers in the uplands, as a reduction of own rice production would leave the farmers vulnerable to paying high effective rates of interest in interlinked market transactions.



The diversification into high-value or horticultural crops thus should be in addition to existing rice production. In the uplands there are vast areas that yield very little. These areas can be turned into cash crop cultivation areas. The cash from such high-value and horticultural crops can be used to advance the process of accumulation (of both physical and human capital).

The adoption of horticultural and other cash crops, however, needs to be undertaken with one qualification. Given the volatility of prices of various horticultural products (e.g., coffee, cashew) it is better for farmers to undertake a mixture of different horticultural crops, e.g., coffee mixed with pepper, or cashew with pineapple and turmeric, tea with arhar, and so on. Such combinations have a double purpose. They utilise the synergies between different parts of the eco-system, as in combining the nitrogen-fixing and shade-giving arhar with tea. On top of that, a combination of crops provides some insurance against the volatility of prices. If coffee prices fall, it is likely that pepper could provide some stability in incomes, etc. Cultivation of, say, coffee without cutting natural forests, what is called "shade-grown coffee" could provide an additional premium on price, along with the promotion of organic coffee, etc.

It is important to emphasise that diversification should not be undertaken at the expense of existing food grain production. Reducing existing food grain production would worsen the food security of these farmers and expose them to forced sales of their commercial crops at minimal prices. A better food production situation would enable these farmers to get better prices for their commercial crops.

Undertaking investment in horticultural crops, however, requires security of tenure in the land. At present, most hill land is untitled. This inhibits any possible investment in the improvement of upland cultivation. The recently-passed Forest Dwellers' (Scheduled Tribes) Rights Act (2007) needs to be implemented in order to provide the farmers with the security of tenure needed to foster investments in the land.

### **Capacity Enhancement of Women**

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



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

### ***7.3.3 Enhancing Absorption***

#### ***Clean Drinking Water: Rural Water Supply***

##### ***Bharat Nirman***

Rural water supply is one of the six components of Bharat Nirman. During the Bharat Nirman period, 55,067 uncovered habitations and about 3.31 lakh slipped-back habitations are to be covered and 2.17 lakh quality-affected habitations are to be addressed. Under Bharat Nirman, for water quality problems, tackling Arsenic and Fluoride contamination has been given priority.

The norms for coverage under rural drinking water supply are:

- (a) 40 litres per capita per day of safe drinking water for human beings.
- (b) One hand pump or stand post for every 250 persons.
- (c) The water source should exist within 1.6 km in the plains and within 100 metres elevation in the hilly areas.

##### ***Accelerated Rural Water Supply Programme (ARWSP)***

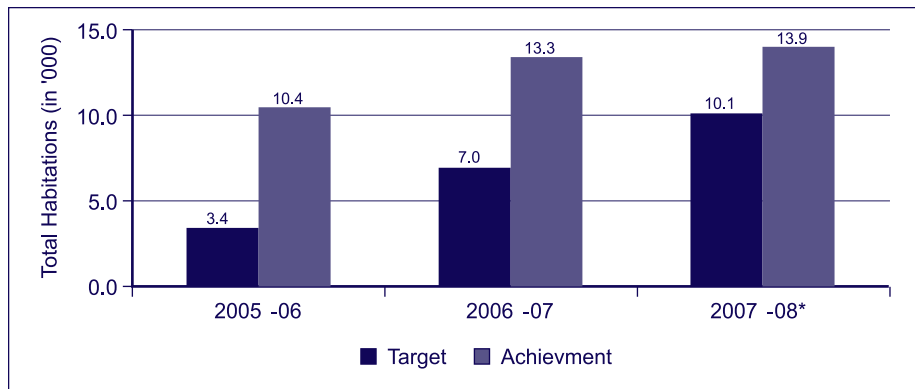
The main objective of ARWSP is to provide potable drinking water by way of installing tube wells, sanitary wells and piped water supply projects in rural areas. For implementation of Rural Water Supply Schemes, Government of India provides funds under ARWSP. Rs.3322 million was allocated to the state under this scheme in 2007-08. It has been decided to cover all Not Covered (NC) and Partially Covered (PC) habitations (and), rural schools and quality affected habitations from 2005-06 to 2008-09 in phased manner to achieve the goal of Bharat Nirman.

##### ***Swajaladhara***

Rural Drinking Water Supply Programme has been operational in the state. The purpose of this scheme is to ensure community participation and to shift from supply driven to demand-driven approach. The scheme envisages 10 per cent of the capital cost of the project to be borne by the community along with the responsibility for operation and maintenance of water supply projects and 90 per cent capital cost to be borne by Central Government through the District Water Supply and Sanitation Mission. In 2006-07, Rs. 2463 lakhs has been allocated to the state.



**Figure 7.4: Total Habitations Covered under Bharat Nirman Programme (Rural Water) in Madhya Pradesh: Target and Achievements, 2005-07**



Note: \* 2007-08 figure is up to March 2008.

Source: Ministry of Rural Development, Govt. of India.

The Women and Child Development Department of the GoMP implements the following schemes towards reduction of vulnerability among these populations:

- (a) *Swayamsidhdha Yojana*: The Govt. of India's Indira Mahila Yojana was started in 1995 in Dhar and Gwalior districts of Madhya Pradesh. In 2000-01 the scheme was reincarnated in the form of Swayamsidhdha Yojana in 13 districts and 36 blocks of the state. The scheme aims at economic empowerment of women through SHGs. Under the scheme, a total of 3667 SHGs have been framed in the target areas, as against a stipulated target of 3600, having a total membership of 41,000 women. A number of community infrastructures have also been built under the scheme.
- (b) *Mangal Diwas Yojana*: The scheme aims at complementing the ICDS programme by way of enhancing community participation in the ICDS services through Anganwadi centres. The

#### **Box 7.6: Government Exceeds Target on Safe Drinking Water**

Madhya Pradesh has taken major strides towards safe drinking water in the rural areas. Against a target of supplying safe drinking water in 2,961 villages, 8,451 villages in the state were provided access to it during the three-month period between February and March in 2006. The Centre for Monitoring Indian Economy conducted a survey and ranked Madhya Pradesh second in the country when it came to implementing the safe drinking water projects. Under the accelerated rural water supply programme, 20,500 rural habitations were provided access to safe drinking water in the state within a two-year period.

While access to safe drinking water was ensured in 10,700 habitats in 2004--05, the number of habitats covered under it was 9924 in 2005--06. A State Public Health Engineering department spokesman said that they were taking special steps to institutionalise community-based water supply programme.

*The Hindu, July 24, 2006*



scheme targets the pregnant and lactating women, children and adolescent girls wherein various programmes are run for health and nutrition on Tuesdays. The pregnant women are required to get registered at the Anganwadi Centre and the scheme ensures their nutritional requirements, antenatal checks and vaccinations. Besides this, on specific Tuesdays, respective target populations like the infants (more than six months of age) and adolescent girls, are monitored for their nutritional requirements and gaps filled up through supplementary nutrition.

- (c) *Bal Sanjeevani Abhiyan*: The Bal Sanjeevani Abhiyan scheme was launched by the government to address and control the problem of the severe undernutrition in the state. It has completed its 12 phases since June 2001. The campaign is running twice a year.

### ***Improving Nutritional Practices***

This report has dealt with what can be called severe problems of food insecurity, or undernourishment, meaning by that an inadequate access to food as such. But as the widespread problem of undernourishment in India shows, nutritional problems affect not just the above category of those with severe problems of food security, but also those with reasonable levels of food security, in terms of their ability to access adequate food of sufficient nutrition. It is interesting to note that Vietnam in the period 1992-93 to 1997-98 had a similar experience - a sharp fall in poverty without a corresponding reduction in undernourishment. This, however, changed in the period 1997-98 to 2003-04, when there were sharp declines in both poverty and undernourishment. This, as argued in Vinod Mishra and Ranjan Ray (2007), was brought about by a combination of policy intervention through information campaigns to promote desired changes in dietary patterns, combined with nutrient enhancing programmes. All this took place in a situation of increasing literacy and educational attainment.

India has programmes of providing nutrition supplements - through ICDS programmes of nutritional supplements. But there is clearly need for an improvement in nutritional practices even among those who can afford to acquire the right types of food. Adequate diversification of food to include more of superior calories, such as proteins can be promoted through information campaigns along with providing supplements in processed foods, such as atta. Along with this, simple measures such as exclusive breast-feeding of children till the age of six months are known to have substantial benefits on the nutritional status of children. Improvements in nutritional practices are necessary to ensure that improved access to nutrition is translated into improved nutritional outcomes.

## **7.4 Towards Developing an Index of Public Intervention**

This chapter has dealt with an indicative set of programmes and schemes directed towards mitigating the impact of food insecurity, directly or indirectly. We now make an attempt to build up a district-wise index of public intervention that would capture the effort of the government in this direction. In the absence of information on all programme outputs at the district-level, we have made use of the



#### Box 7.7: Innovative Schemes for Ensuring Nutritional Security

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

1. Kishori Shakti Yojna: The scheme aims at improving the nutritional, health and development status of adolescent girls (11-18 years), promote awareness of health, hygiene, nutritional and family care, link them to opportunities for learning life skills, going back to school, help them gain a better understanding of their social environment and take initiatives to become productive members of the society. The scheme is currently being executed in all the states of the country covering a total of 6118 blocks of which 367 blocks are in Madhya Pradesh.
2. Udisha: with technical collaboration with UNICEF, the scheme envisages a spectrum of locally relevant training interventions for achieving women and child development goals-rather than training of only ICDS functionaries. It has a new emphasis on decentralized quality improvement processes, through state and district training plans of action, guided by inter-sectoral national/state training task forces.
3. Swayamsiddha: This is an integrated project for the empowerment and development of women based on the formation of women into Self Helping Groups (SGHs) with emphasis on converging services, developing access to micro-credit and promoting micro-enterprises

reach of two programmes only - ICDS and MDM. For ICDS, percentage of ICDS beneficiaries to total project population has been calculated while percentage of MDM beneficiaries out of total children has been used as an indicator signifying the reach of MDM, We also compare this index with the FSOI and FSI to assess whether the public intervention in mitigating the effect of food insecurity has been prioritised and given its due significance.

#### Box 7.8: Female Literacy: The Pivot for Reducing Food Insecurity and Child Mortality

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

*Source: Save the Children, 2006*

Table 7.11, based on government figures, shows a high ICDS and MDM coverage for the Food Insecure districts - except for Rewa and Shahdol. On the other hand, the Food Secure districts show a low coverage, with only three districts (Datia, Morena and Sheopur) receiving high ranking in public intervention index. Indore, that has the best ranking both in terms of FSI and FSOI, has the last rank in terms of public intervention index (Map 7.4). This reflects that public intervention is more in the areas where it is more needed, i.e., in the more food insecure districts. But as already observed, the





**Table 7.10: Public Intervention Index**

District	Value	Rank	District	Value	Rank	District	Value	Rank
Balaghat	0.710	10	Harda	0.646	16	Rewa	0.476	41
Barwani	0.614	22	Hoshangabad	0.549	34	Sagar	0.574	30
Betul	0.684	12	Indore	0.376	45	Satna	0.587	29
Bhind	0.587	28	Jabalpur	0.496	38	Sehore	0.624	20
Bhopal	0.444	44	Jhabua	0.771	4	Seoni	0.737	7
Chhatarpur	0.590	27	Katni	0.754	6	Shahdol	0.460	42
Chhindwara	0.711	9	Mandla	0.833	2	Shajapur	0.559	32
Damoh	0.623	21	Mandsaur	0.503	37	Sheopur	0.848	1
Datia	0.656	14	Morena	0.686	11	Shivpuri	0.763	5
Dewas	0.457	43	Narsimhapur	0.518	36	Sidhi	0.478	40
Dhar	0.629	19	Neemuch	0.540	35	Tikamgarh	0.639	18
Dindori	0.795	3	Panna	0.607	23	Ujjain	0.480	39
East Nimar	0.670	13	Raisen	0.555	33	Umaria	0.650	15
Guna	0.597	24	Rajgarh	0.592	25	Vidisha	0.719	8
Gwalior	0.639	17	Ratlam	0.591	26	West Nimar	0.566	31

Note: Indicators used: Proportion of ICDS and MDMS beneficiaries.  
Source: MDMS beneficiaries - Dept of Rural Development, GoMP.  
ICDS beneficiaries - Department of Women & Child Development, GoMP.

**Table 7.11: Comparison of Public Intervention Index (PII), FSOI and FSI**

District	PII	FSOI	FSI	District	PII	FSOI	FSI	District	PII	FSOI	FSI
Balaghat	10	22	29	Harda	16	26	16	Rewa	41	3	38
Barwani	22	35	34	Hoshangabad	34	21	11	Sagar	30	38	33
Betul	12	13	35	Indore	45	1	1	Satna	28	9	30
Bhind	28	8	5	Jabalpur	38	5	22	Sehore	20	25	18
Bhopal	44	2	14	Jhabua	4	38	37	Seoni	7	4	39
Chhatarpur	27	34	27	Katni	6	43	32	Shahdol	42	11	42
Chhindwara	9	16	31	Mandla	2	32	44	Shajapur	32	18	6
Damoh	21	23	36	Mandsaur	37	18	7	Sheopur	1	31	15
Datia	14	28	2	Morena	11	7	3	Shivpuri	5	42	24
Dewas	43	23	21	Narsimhapur	36	20	10	Sidhi	40	45	41
Dhar	19	16	17	Neemuch	35	13	4	Tikamgarh	17	27	19
Dindori	3	37	43	Panna	23	44	40	Ujjain	39	12	8
East Nimar	13	29	28	Raisen	33	10	25	Umaria	15	29	45
Guna	24	40	26	Rajgarh	25	36	13	Vidisha	8	41	20
Gwalior	17	6	9	Ratlam	26	33	12	West Nimar	31	15	23



Map 7.4: Status of Public Interventions

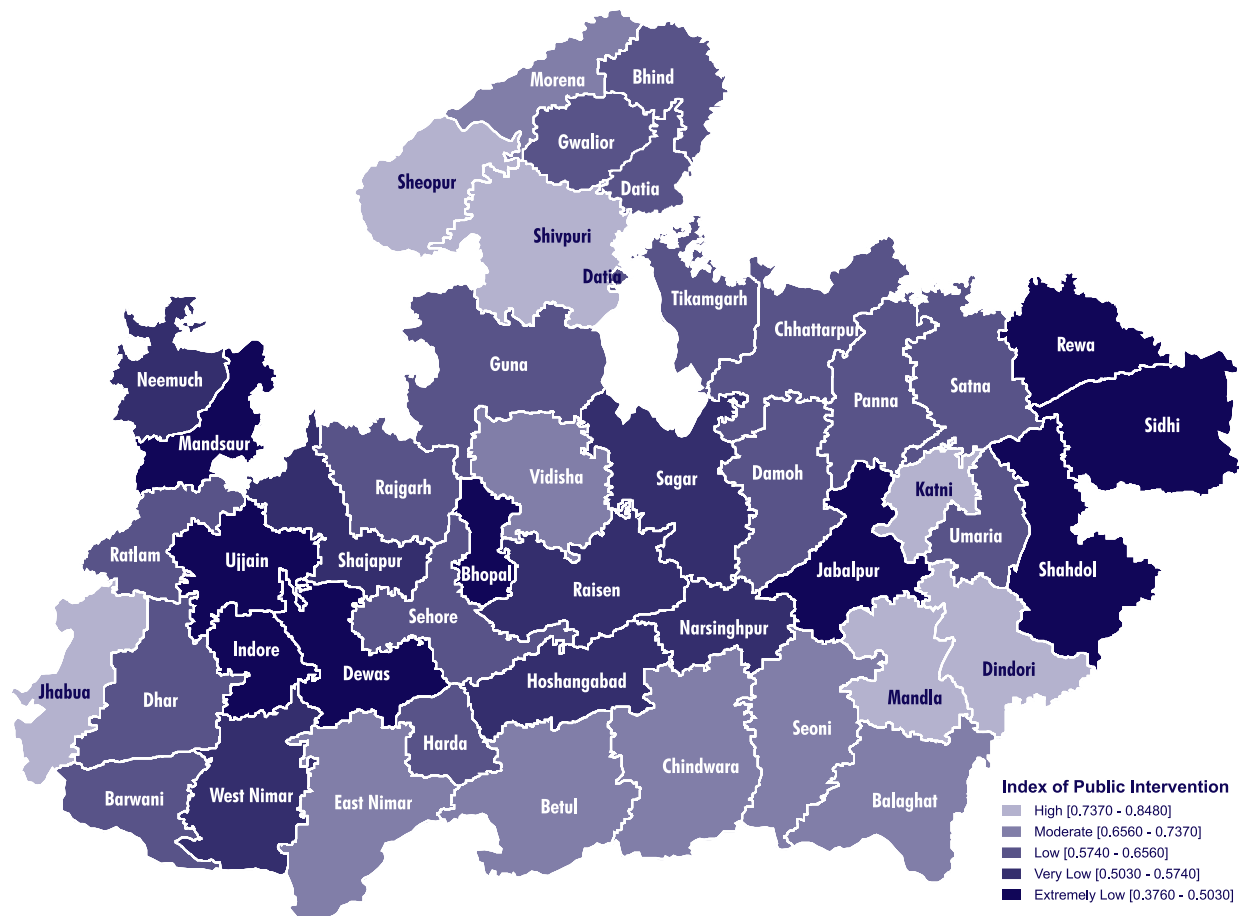


Table 7.12: Correlations between Food Insecurity Outcome, Overall FSI and Public Intervention Index

	Public interventions	FSOI	FSI
PII	1	-0.467**	-0.319*
FSOI		1	0.416**
FSI			1

Note: \*\* Correlation is significant at the 0.01 level (2-tailed).  
\* Correlation is significant at the 0.05 level (2-tailed).



#### Box 7.9: Failure of Social Security Schemes in Madhya Pradesh

Despite a budget of Rs. 251,23,000 for supplementary nutrition, the department spent only Rs. 90,19,557 in the year 2003-04. The result is long and frequent disruptions in the supply of nutrition to highly vulnerable children and mothers living in the Sahariya-dominated area of the state. It is reported that not a single anganwadi in the blocks of Pichore, Kolaras and Badarwas is distributing supplementary nutrition.

Complaints were received from district Barwani for reporting the massive use of machinery in works that were shown to have actually been done by men. A joint enquiry has proved these charges of corruption. The district has also not paid wages to hundreds of workers on the ground that an NGO is supporting their cause!

An enquiry in the rural works in Dhar district showed that the payment made to workers was only between Rs.30 and Rs. 40, as against the stipulated minimum wage of Rs. 52.87. There was large-scale corruption and at two sited funds amounting to Rs. 1.55 lakhs and Rs. 0.77 lakh, respectively remained unaccounted for.

*Source: 'Protecting the Vulnerable Poor in India -The Role of Social Nets', Nisha Srivastava and Pravesh Sharma (eds.), 2006.*

low coverage shown in NSSO figures for rural Madhya Pradesh especially for ICDS contradicts this optimism. It is possible that the extent of leakages due to corruption reduces the reach of the programme.

## 7.5 Improving Performance

How to improve the performance of these government schemes? There is an important role for mobilisation of the poor in improving implementation of ICDS, MDMS, NREGS and other such schemes. Implementation of these schemes has generally been decentralised down to the panchayat level. But panchayats too can be corrupt and dominated by the local power brokers. Studies in other states have shown that when women are in panchayats, or lead panchayats, the panchayats perform better in administering food-related interventions. In IFAD projects in Andhra Pradesh too it was observed that women's SHGs performed better in undertaking small infrastructure projects than those managed by men and saved more money for the community than the latter.

Further, as Jos Mooij points out in an analysis of the functioning of PDS in Bihar and Jharkhand, giving food to the poor is not a political issue, as it is in South India (2001). But the functioning of the PDS is not a matter of making the right to food a political issue. It is also "a problem of economic access, in the sense that the poorest people do not have cash ready at the moment the stocks arrive" (Jos Mooij, 2001, p. 3291).

The study points out that the supply of cheap grain for below BPL households has made running a PDS highly profitable, as cheap grain can easily be diverted into the open market or sold to APL households.

More recently, newspaper reports pointed out that there has been diversion of cheap PDS grain to the Bangladesh market. There were reports that even in the midst of starvation, the FCI godowns



have grain. If there is insufficient purchasing power with the poor in a district, even the supply of grain at subsidised prices is unlikely to be accessed by the poor, and there will inevitably be a tendency for this grain to flow to markets, whether within the locality or outside, where prices are higher.

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

If grain is to be supplied at below market prices to the poor, a better scheme would be to give the equivalent of the subsidy as a grant, either in cash or as grain. If, say, the subsidy equals the price of 5 kg grain, the person could be given that amount of grain, without requiring the person to produce any supplementary money, as PDS now requires. In this fashion, the subsidy is more likely to reach the intended beneficiary. There would be the usual diversion problems, but there would not be the problem that now exists of the poor not being able to utilise the subsidy. A direct transfer would make sure that the person/household actually benefited, since it is not conditional on the beneficiary having to provide some collateral amount.

The above-mentioned food-based schemes are meant to meet the needs of shorter-term or even transient (seasonal) food insecurity. By increasing the quantities of public entitlements to food they can deal, to an extent, with immediate problems of hunger. If these foods are fortified, or supplements given as in the ICDS schemes, protein and fat deficiencies could also be temporarily tackled. But

#### **Box 7.10: Innovative Food Security Initiatives: The Food for Work Programme in Tribal Development Projects**

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

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

#### **Participatory Processes and Community Ownership**

The point of departure in this programme, compared to other government programmes is the philosophy that the poor should be enabled to overcome their own poverty. This principle is woven intrinsically into all processes. To this end the project stresses



the participation of the poor, community ownership and capacity building. Food is given to the community and they take the decisions. Inclusion of the most marginalised begins with the planning. All activities are discussed in the Gram Sabha. What activity should be taken up? What are the likely benefits? Who will benefit from the creation of the asset? How many people will get work? All these questions are debated and decided by the community. The project facilitates them in prioritising, planning and implementing the plans.

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

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

#### **Food for Work Activities**

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

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

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

#### **Enhanced Production and Productivity**

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

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

#### **Impact on Migration and Indebtedness**

Ask anyone what has been the impact of the FFW programme, and if the first answer is 'people do not go hungry anymore', the second will certainly be, 'people have stopped migrating for work'. Migration has stopped almost totally, particularly distress migration to far-off areas. In Ranchi, the capital city of Jharkhand, it is tragic, if common, to see hordes of adolescent tribal girls



standing by the main square, waiting for labour contractors who entice them with promises of employment. In project areas, migration of adolescent girls from the Ho tribe used to be a common phenomenon. This has almost stopped now. The impact has not been even across the project areas, but there is little doubt that it is one of the most important positive outcomes of the programme.

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

### **Strengthening of Local Institutions**

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

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

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

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

The projects are being implemented in the most poverty stricken belt of India. Wherever there is poverty, there is alienation, strife and revolt. In all this the FFW programme has proved invaluable in building trust and confidence and has taken care of the primary need of people of food with dignity. In the words of a young labourer, it is a vardan or a 'gift of God'.

*Srivastava, N. (2006).*

any solution to food insecurity requires an increase in the regular access to food in sufficient quantity and quality. This requires an increase in the production and earning capacity of the households and individuals, given that there are gender-based discriminations in the distribution of food and allied healthcare services within households. What this means is that food-schemes need to be linked with development activities.



## 7.6 Priority Areas for Intervention

The indicative indicators that put forward the priority areas of intervention in prioritised food insecure districts can be further corroborated by judging the individual importance of each of the indicators in affecting food security status as a whole in the state.<sup>2</sup>

The indicators influencing availability factors emerge as the most significant areas of intervention to ensure food security. Madhya Pradesh has a very high proportion of forests and hence forests become a limiting factor for determining agricultural development. Most of the agricultural lands in the state are rainfed with very low irrigation. As a result, the per capita agricultural production is found to be very low in all such districts. Consumption expenditure partly consequent upon low wages (which in turn points to the low employment opportunities available) form another set of reasons for high level of food insecurity. Surprisingly, factors like female literacy, access to PHC and roads and working age ratio that otherwise emerge as significant factors determining food security, rank low in terms of their importance in the PCA analysis. The reason for this anomaly can be found in their uniform low level throughout the districts in terms of these indicators. That the extent of variation in these variables in rural Madhya Pradesh is not very high, the PCA analysis does not identify it as a variable affecting the overall FSI.

In the case of SC/ST population, among the food insecure districts, apart from 4-5 districts, they are more than 60 per cent and even go up to almost 95 per cent of the population, while all the food secure districts got low ranks for proportion of SC/ST population. Thus, it can be said that the districts dominated by ST population are the ones that are food insecure. This points out to the political marginalisation of the ST population and the necessity of dealing with it.

Infrastructure, represented by access to paved roads, is, as one would expect, positively related to food security. The Infrastructure Development Index, keeping the all-India average at 100, is 72 for Madhya Pradesh, as against 85 for Rajasthan, 86 for Orissa, 97 for Bihar and 111 for Uttar Pradesh (Annual Plan 2002-03, GoMP). Even compared with other BIMARU states, infrastructural facilities available in Madhya Pradesh are quite backward. Poor infrastructure has the effect of increasing transport and transaction costs. But there are more important dynamic effects in restricting the range of options that populations in these areas have.

An analysis of the food insecure districts in terms of agricultural output reveals a very grim state of affairs with most such districts having an extremely low per capita production of output. This brings out the low agricultural productivity of these regions. Low level of agricultural productivity, in turn, is as a consequence of low irrigation extent and low intensity as cultivation mostly remains rainfed. High proportion of forested area offers little scope for cultivation. All these factors are compounded by low rural connectivity with majority of the villages in these districts not accessible by paved roads.

2. This has been done through a Principal Component Analysis (PCA). The Eigen values from the PCA show the contribution of various variables to the food security status (higher the Eigen value, higher is the significance of that indicator in determining food security status). Please refer to Appendix II for details.



#### Box 7.11: The Forest Rights Act

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

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

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

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

Out of the 20 food insecure districts, seven are high in the proportion of SC/ST population. They are also mainly high in forest area (or, low in non-forest area), with only Ratlam in the medium category for this variable. The high level of forest areas in most food insecure districts shows the importance of a proper development policy for forest-dwellers. The Rights to Forest Act, 2006, granting tenurial security, in conjunction with PESA, accepting the role of Gram Sabhas and Gram Panchayats in managing forest resources, should help in framing and implementing appropriate development policies in the food insecure forest areas of the state (See Box 7.11).

In fact, Madhya Pradesh, along with Orissa, has the highest percentage of casual non-agricultural workers receiving wages below the minimum wages in both rural and urban areas. The state of agricultural labourers, who form almost the entire proportion of rural casual labourers, is found to be further worse (See Box 7.12). Almost all the rural agricultural labourers in the state get wages much





#### Box 7.12: Indebtedness among Farmers in Madhya Pradesh

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

However, indebtedness for productive purposes was found to be higher in states with higher incidences of indebtedness and lower in low incidence of indebtedness. For instance, in Madhya Pradesh incidences of loans for unproductive purposes for self-consumption, marriages and ceremonies was found to be higher than the national average. It is quite probable most of these loans are sourced from moneylenders who constitute almost one-quarter of the loans in terms of sources, consequently pulling the rural populace into the vicious cycle of poverty. In total the non-institutional sources of loans form 43 per cent of the total loans granted, which is much higher than its erstwhile part – Chhattisgarh, where the figure is less than 28 per cent.

*Source: Report of the Expert Group on Agricultural Indebtedness*

below the norm (99 per cent), while if we take the NCRL<sup>3</sup> as the norm (Rs. 49) 90 per cent of the agricultural labourers lie below this norm as well (NCEUS, 2007). Low wage rates, i.e., low incomes leads to lower levels of consumption.

This coupled with a higher dependency ratio means lower consumption for the entire family - finally resulting in food insecurity situations. The status of above mentioned districts in terms of these variables are not impressive. Therefore a food secure district could only be achieved through over all development of the district.

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

## 8. Conclusion: Towards a Food Secure Madhya Pradesh

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

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

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

### 8.1 Linking Food Programmes and Development

How can food-based schemes be linked with development? In the case of the MDM scheme in schools there is already a link with development. Improved school attendance is of benefit to the individual and her household in terms of an increase in potential future earnings. A reduction in illiteracy also provides a social benefit to the village or relevant area, as the quality of the workforce goes up. Improved school attendance is also beneficial in enabling migration to better urban livelihoods than would be open to illiterates.

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

But, as mentioned above, the implementation of such programmes, including issues of reaching those with severe undernutrition depends very much on the demand from the affected persons for these services. In the absence of such demand from the most malnourished, the benefits of such programmes are very likely to be captured by the better-off in the village. Decentralisation of the



implementation of programmes has to be combined with enhancing the voice of the malnourished in order for the benefits to reach the desired persons.

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

Looking at average rainfall (which is medium to high in most parts of the state) and the variability over time and space, it becomes clear that the main issue here is not the adequacy of rainfall *per se*. Rather the issue is more of effective conservation and utilisation of water resources in these regions. The watershed programmes have a significant role to play in this regard (Sen *et al.*, 2007).

Special care should be taken for tribal population in Madhya Pradesh. The government needs to pay special attention to ensure proper functioning of the schemes. Since a large number of evidences tell that acute level of undernutrition is present among tribes whereas others have a much better life. For instance, in Sheopur district the tribal population is almost 40 per cent. Within this 40 per cent population, the undernutrition level is skyscraping; especially 'Saharia' tribals are living a miserable life.

Another issue that needs urgent attention in terms of mitigating persisting high levels of malnutrition is the departmental mode of implementation of programmes. All issues related to child and women malnutrition are solely vested with the Department of Women and Child Development. However, the Health Department as well as the Panchayat and Rural Development Department do not find themselves responsible and accountable towards previous starvation deaths, even though in reality, they should have a responsibility. This calls for a synergy in action and convergence in planning for handling such issues.

Another core area of concern is rural roads. Rural connectivity is very poor in most of the districts of Madhya Pradesh, reflected in the fact that the state has only 52 kms of road per 100 kms while the national average is 75 kms. The vast size of the state with neglected interiors and difficult, hilly terrain, pose tremendous challenge for maintenance and upkeep of roads. The tribal populated districts are among the most neglected. NREGA and other food-for-work schemes can be channelised to improve both these key areas of village road connectivity and small-scale irrigation. Village approach roads to main roads, and small irrigation schemes (e.g., check dams in valleys, or moisture retention works on sloping lands) can both increase economic opportunities and productivity. Improved roads would also provide better access to both health and educational facilities. Improved roads, including the building of culverts, have a clear impact in improving girls' attendance at schools. Post-primary schooling often involves some travel outside the village, and boys seem to be able to overcome communication problems in attending school; but good roads increase girls' attendance at schools.



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

The implementation of infrastructure and related schemes (school feeding) through the community could be expected to provide additional income, particularly in lean periods. Some of it could be used to carry out investments on private lands. Investments in higher-value tree crops (e.g., coffee and pepper, or cashew, pineapples, turmeric, etc.) have been seen to provide substantially higher incomes, in combination with traditional swidden cultivation. But such investment, unlike seasonal swidden crops, is a medium-term investment. Households require security of tenure in order to undertake such investments. The recently-passed Forest Dwellers' Rights Act could provide some security of tenure for these lands.

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

Revitalizing the agrarian economy in the districts with rainfed agriculture is crucial to improving the income and thus food security of the poor in these areas. This requires both an increase in irrigation and in watershed development programmes. Appropriate diversification to high-value crops could be undertaken. At the same time, productivity needs to be increased in the vast CPRs classified as watersheds. Distribution of land to the landless, including women, would improve the food security and could also be an incentive to increase productivity.

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



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

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

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

Access to safe drinking water in the food insecure districts is poor with high levels of fluoride content and poor quality of water. Treatment of drinking water and information about it can go a long way in improving the water quality and thereby food absorption. Given the high incidence of water-borne morbidity and mortality, improving the quality of water is likely to have a strong bearing on the food security outcomes. Besides, provision of basic health infrastructure is critical for addressing the requirements of the rural population.

Improvement in the implementation of these schemes depends, at one level, on improvement in administration and governance systems. But more important is the role of the people who are to benefit from the schemes, whether organised through CBOs, NGOs or traditional tribal bodies. Only they can insist on the adequate implementation of these schemes and ensure that this is done. Framing adequate policies is only the first step. What is crucial is that people, women and men, assert their democratic political rights in order to secure implementation of the schemes and policies.

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# Appendix I: The Right to Food

Along with the change in understanding of the meaning of food security, there has been much discussion on whether there is a right to food. The kind of economic growth that the world has been undergoing has been seen to not automatically 'trickle down' in benefits to all. Even a reasonably high rate of growth, like India's 6 per cent or so over the period 1995—04, has been seen to not bring about a commensurate reduction in the proportion of those who are undernourished. The existence or acceptance of a right to food would make the exertion of pressure to adopt and implement a policy that secures this right more likely. But is there a right to food?

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

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

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

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

Thus, rights require state action with regard to the obligations to respect, protect and fulfil them, which require setting up of administrative, police, and judicial structures to enable rights to be realised (Shue,



1980 in Gaiha, 2003). Consequently all rights have a cost in their being realised. And the costs of the right to food may not be as much as they seem, since it is only in certain circumstances that it involves state provision of food (Gaiha, 2003).

What the acceptance of the right to food does is to focus attention on the necessity of economic and social policy paying attention to the poorest and most marginal. It also takes the debate on rights inside the 'private sphere' to raise the question of women's rights in assuring food to themselves and their children and families. 'The "right to adequate food" may be as much a question of the full realization of the rights of women as of ensuring a bundle of nutrients handed over through food supplement schemes' (Eide, 1999).

### ***Right to Food in India***

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

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

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

The PUCL petition also pointed to the inadequacy of government relief works in the Rajasthan drought. Thus, it linked the right to access relief works in drought as part of the meaning of the right to food. As the Supreme Court pointed out in a later order, while agreeing with the High-Level Committee on



Long-Term Grain Policy (Abhijit Sen Committee), employment generation should be distinct from food delivery: 'This should not, however, undermine the importance of employment and income generation in eliminating hunger and malnutrition' (Supreme Court Order of 2 May 2003).

The various orders of the Supreme Court that are related to the right to food:

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

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

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

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

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

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

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

**Table A 2.1 Choice of Indicators, Sources, Reference Year and Calculating Procedure in Madhya Pradesh**

<i>Name of variable and description</i>	<i>Sources</i>	<i>Ref. year</i>
<b>(a) Availability</b>		
1. Proportion of net irrigated area to net sown area	Statistical Abstract of Madhya Pradesh 2006, page 100-103 Directorate of Economics and Statistics, GoMP	2004-05
2. Per capita value of agricultural output In order to take account of the cyclical nature of agricultural production the variable uses an average of three to five years depending on the availability of data. The value of each food and non-food items is derived by multiplying the amount of production with its price obtained from all-India prices of these items at constant 1993-94 prices. Adding the value of each and every food and non-food items, gives the overall value of agricultural output for a year. The per capita value of agricultural output is calculated by dividing the average value of agricultural output by total population in the midpoint year.	Commissioner of Land Records, GoMP, Gwalior	2003-04 to 2005-06
3. Percentage of inhabited villages having access to paved road. This is calculated as a share of total number of villages in the district	Census of India	2001



Name of Variable and Description	Sources	Ref. Year
4. Percentage of forest area to total geographical Area	Statistical Abstract of Madhya Pradesh, 2006 page 138-141 Directorate of Economics and Statistics, GoMP	2003-04
<b>(b) Access</b>		
1. Percentage of agricultural labour to total workers. Agricultural labour comprises both main and marginal workers*	Census of India	2001
2. Proportion of ST and SC population to total population*	Census of India	2001
3. Dependency ratio This is calculated as rural population in the age group (15-59) divided by the sum of (0-14) child population and 59+ population.	Census of India	2001
4. Per capita monthly consumption expenditure (inequality adjusted) The formula for inequality adjusted monthly per capita consumption expenditure (MPCE) is: $MPCE \times (1 - Gini)$ .	61st NSS round (Computed)	2004-05
5. Rural casual wage rate This is calculated as average daily wage rate for the age group 15-59	61st NSS round (Computed)	2004-05
6. Women's literacy rate (7+) Total female literate as a proportion of total female population for the 7 years and above.	Census of India	2001
<b>(c) Utilisation</b>		
1. Percentage of households having access to safe drinking water. Here rural households with access to three sources of drinking water, such as tube well, tap and hand pump have been considered.	Census of India	2001
2. Percentage of inhabited villages having access to PHC (PHC facility within the village or within 5 km from the villages)	Census of India	2001
<b>(d) Public entitlement</b>		
1. Percentage of mid-day meal beneficiaries out of total children The data for MDM are for rural and urban areas combined. To find out the value of this variable we have divided the total MDM beneficiaries by the projected child population (Rural + Urban) in the age group (6-11) and multiplied the ratio by 100	Department of Rural Development, GoMP	Sept 2006
2. Percentage of ICDS beneficiaries to total project population Here we have taken only the SNP (supplementary nutrition programme) beneficiaries. To find out the value of this variable we have divided the SNP beneficiaries (pregnant and lactating women and child (0-6) age group) by total population covered by the project.	Ministry of Women and Child Development, GoMP	March 2007

Note: \*The direction of these variables has been reversed to have a positive association with food security.



For each of the dimensions, as discussed earlier, some relevant variables have been chosen (Table A 2.1).

### Max-Min Approach

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

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

where,  $X_i$  is the value of the variable

$\min X$  is the minimum value of  $X$  in the scaling

$\max X$  is the maximum value of  $X$  in the scaling.

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

### Construction of FSI

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

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

### Principal Component Analysis (PCA)

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



We have used the PCA in the FSI for those states where the indices derived through the RE method and PCA method are highly correlated.

### **Food Security Outcome (FSO)**

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

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

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

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

### **Grouping of Districts**

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

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The **Food Security Atlas of Rural Madhya Pradesh** is one of a series of eight Atlases produced by the Institute for Human Development (IHD) on behalf of the UN World Food Programme (WFP). The other states covered in this series are: Chhattisgarh, Jharkhand, Maharashtra, Orissa, Rajasthan, Bihar and Uttar Pradesh. The Atlases carry out a district-level analysis of food security for each of these states.

The purpose of the Atlas is to identify regions and districts within the state that require priority attention in order to improve their food security status. This is followed by an identification of the characteristics that differentiate the better-off from the worse-off districts. These characteristics of food insecure regions and districts are used to put forward a set of recommended interventions that could be expected to improve food security.

It is hoped that the Atlas will stimulate further analysis, action and advocacy for reducing the incidence of hunger.



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