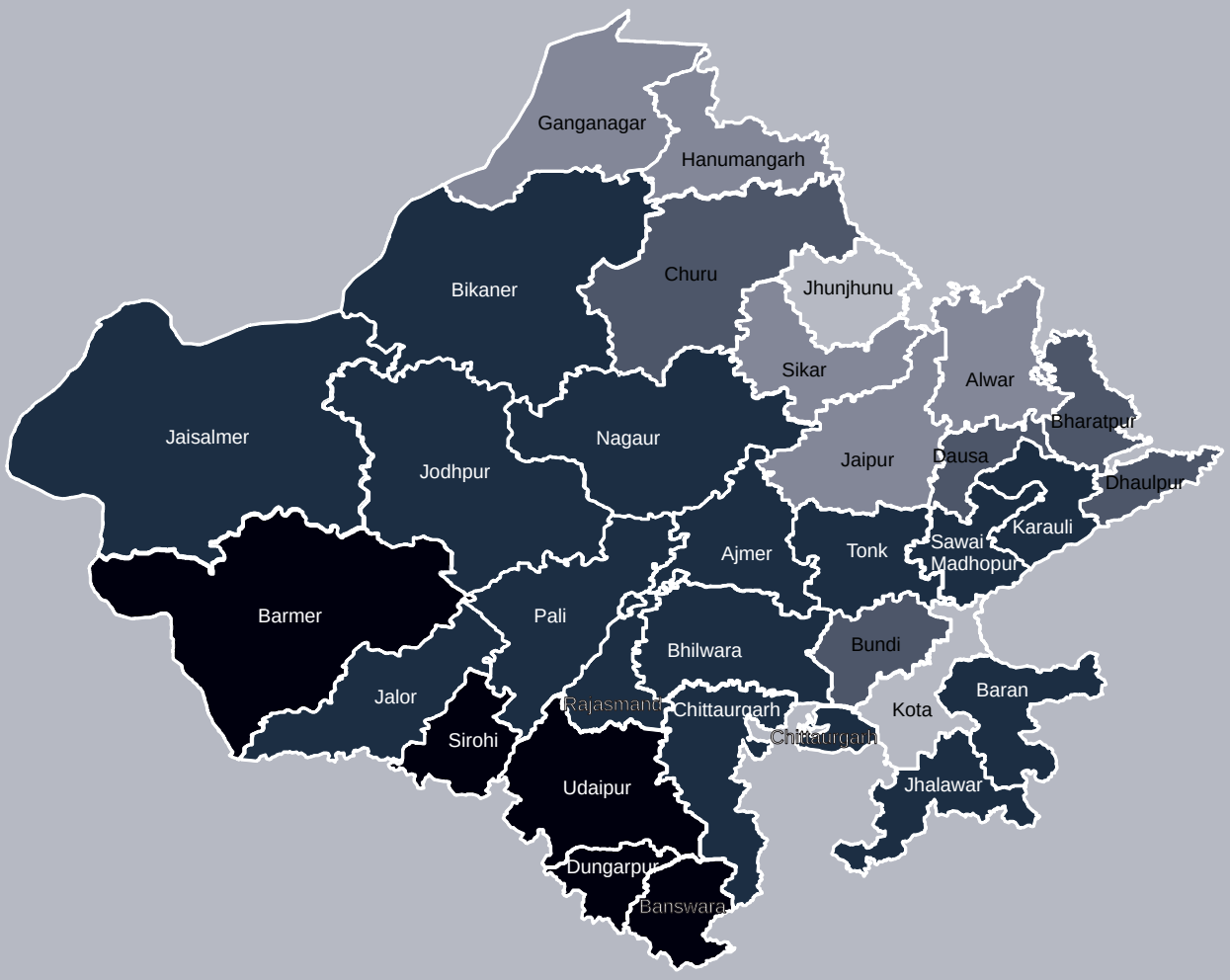
Food Security Atlas
Of RURAL RAJASTHAN



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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 and Dr. Abhay Kumar who helped in finalising the report. 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; Mr. Bal Paritosh Dash, Ms. Pradnya Paithankar 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 organizations, individuals and government officials. The primary input for construction of the indices as well as formulation of appropriate indicators came from reliable disaggregated sub-state level data, which was collected, collated and mined from secondary sources as well as the information made available by various state departments and ministries. We wish to thank all of them for their support and assistance. We are grateful to the Department for International Development (DFID) for funding the project through the Global Institutional Support Grant to WFP.

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

The Rajasthan state report was prepared with inputs from numerous resource persons and regional institutions, which also helped in the organization of state consultations. We acknowledge Dr. Surjit Singh, Director, Institute for Development Studies, Jaipur and other staff who helped us in the collection and collation of state specific resource material and data, and also in the organization of the state consultation. We would like to thank the resource persons for their facilitation and active participation during the state level consultation and also for providing constructive comments to enrich the quality of the reports.

A preparatory workshop was organized on 2 May, 2007 in Jaipur. This was chaired by Dr. V.S. Vyas, Professor Emeritus and Chairman, Governing Board, IDS and was attended by experts from the state government, academia, and civil society organizations. The insights and active participation of some of the experts deserve special mention – Mr. S.M. Meena, Labour Commissioner, Government of Rajasthan; Mr. I.C. Srivastava, Retired IAS; Mr. Mukesh Chand Gupta, Deputy Secretary, Food and Civil Supply, Government of Rajasthan; Prof. Anju Kohli and Dr. Arun Prabha Chaudhury from the Department of Economics, MLS University, Udaipur; Mr. Alok, Centre for Community Economics and Development Consultant Society (CECODECON); Ms. Nisha Sidhu, NFIW; Mr. Niranjan Sharma, Director, SOHARD, Alwar; Mr. Manohar Singh Rathore, Social Worker, Udaipur; Dr. Sunita and Mr. Sharique Mashhadi from Seva Mandir, Udaipur; Ms. Arti Joshi, Anubhuti Sansthan, Chittorgarh; Dr. M.M. Sheikh, ISDESR, Churu; and faculty from IDS - Prof. M. S. Rathore, Prof. Vidya Sagar, Prof. Sunil Ray, Prof. Pradeep Bhargava, Prof. Kanchan Mathur, Dr. P. R. Sharma, Prof. K.N. Joshi, Dr. Shobita Rajagopal and Dr. Varsha Joshi; among many others. The enthusiasm for the project that was evident at the state consultation has been a great source of inspiration for us.

We would like to thank Mr. Michael Sheinkman, WFP Senior Regional Programme Adviser for Vulnerability Analysis and Mapping in WFP's Regional Bureau at Bangkok, for his presentation and participation in the state consultation.

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The smooth execution of this project would not have been feasible without constant support and inspiration from Prof. Alakh N. Sharma, Director, IHD. He steered the course of ideas and discussions during the entire period of the project.

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- IHD and WFP Research Team

Contents

List of Tables, Figures, Maps and Boxes

List of Abbreviations

ADAPT	Area Development Approach for Poverty Termination
AIDIS	All-India Debt and Investment Survey
APL	Above Poverty Line
ARWSP	Accelerated Rural Water Supply Programme
BMI	Body Mass Index
BPL	Below Poverty Line
CMR	Child Mortality Rate
CSO	Central Statistical Organization
DLHS	District-level Household Survey
DPAP	Drought Prone Area Programme
FAO	Food and Agriculture Organization
FCI	Food Corporation of India
FFS	Farmers' Field School
FSI	Food Security Index
FSO	Food Security Outcome
FSOI	Food Security Outcome Index
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
IIPS	International Institute for Population Sciences
IMR	Infant Mortality Rate
LTAP	Long Term Action Plan
MDGs	Millennium Development Goals
MDM	Mid-Day Meal
MPCE	Monthly Per Capita Expenditure
MSSRF	M S Swaminathan Research Foundation
NCEUS	National Commission for Enterprises in the Unorganized Sector
NCRL	National Commission on Rural Labour
NFHS	National Family Health Survey
NFSM	National Food Security Mission
NREGA	National Rural Employment Guarantee Act
NREGS	National Rural Employment Guarantee Scheme
NSDP	Net State Domestic Product
NSS	National Sample Survey
NTFP	Non-Timber Forest Product
NWDPRA	National Watershed Development Project for Rainfed Areas
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
RGMWM	Rajiv Gandhi Mission for Watershed Management
SC	Scheduled Caste
SCA	Special Central Assistance
SCP	Special Component Plan
SHG	Self-Help Group
ST	Scheduled Tribe
TE	Triennium Ending
TSP	Tribal Sub Plan
UNICEF	United Nations' Children Fund
WFP	World Food Programme
WFS	World Food Summit
WHO	World Health Organization

Executive Summary

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

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

- Identify the districts/regions and social groups most affected by food insecurity; and
- Suggest policy interventions for improving food security among food insecure regions and social groups.

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

The values of districts on each of these twelve variables 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, which include under-five mortality and proportion of underweight children.

The most food insecure districts in Rajasthan are located in the sub-humid southern plains and western arid plain.

The areas requiring priority attention are:

- whole southern region, including Banswara, Dungarpur, Rajsamand and Udaipur;
- 8 out of 11 districts in the western arid region, including Barmer, Jaisalmer, Pali, Sirohi, Bikaner, Jalor, Nagaur and Jodhpur;

- 6 districts namely Ajmer, Bhilwara, Karauli, Sawai Madhopur, Tonk and Dholpur, out of the total 12 districts in the notheastern region; and
- 4 of the 5 districts of southeastern region, including Baran, Chittaurgarh, Jhalawar and Bundi.

The irrigated north-western districts, parts of the humid southeastern plain and certain districts in the inland drainage region and the semi-arid eastern plain are relatively secure regions.

Priority Districts for Food Security Intervention

North Eastern	South Eastern	Southern	Western
Ajmer	Baran	Banswara	Barmer
Bhilwara	Chittaurgarh	Dungarpur	Jaisalmer
Karauli	Jhalawar	Rajsamand	Pali
Sawai Madhopur	Bundi	Udaipur	Sirohi
Tonk			Bikaner
Dhaulpur			Jalor
			Nagaur
			Jodhpur

Many of these districts are inharited by a high proportion of Scheduled Tribe (ST) population, while in some of these districts, there is also a high proportion of Scheduled Castes (SC). These areas also have a high proportion of agricultural labourers and low wage rates. Women's literacy rate is also dismal in these districts, which is taken as a proxy for women's status. Rural connectivity too is poor in most of these food insecure districts.

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

- Policy and enabling measures for development of livelihoods of hill-forest-based populations. This itself comprises a number of measures, including:
  - Implementation of the Forest Rights Protection Act so as to provide security of tenure
  - Investments to enable a shift to production of high value crops

- Expansion of irrigation in a manner appropriate to hill and plateau regions
- Improvement of rural connectivity, to reduce transaction and transport costs and increase economic opportunities.

■ For Scheduled Castes, other agricultural labourers and small farmers in the plains:

- Distribution of land to the landless (including women), large numbers of whom would be from the Scheduled Castes
- Development of non-farm enterprises and agricultural diversification, so as to increase absorption of labour

Rajasthan being a water-deficit state, in order to increase the income of small and marginal farmers and thus their access to food and also for the agricultural development of the state as a whole, it is necessary to pay attention to development of high-value crops, that use less water.

Further, livestock plays an important role in the state's economy. Increasing income from livestock, through a number of measures (improvement in breeds, developing production chains as for milk, improving marketing systems, improving management and productivity of grazing lands, etc.) are necessary for improving food security in its vast desert regions.

Avenues to agricultural development in an environmentally difficult state such as Rajasthan are restricted. This calls for development of the secondary and tertiary sectors and the transfer of workers from the primary to these sectors, as part of the strategy to improve food security.

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

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

All these are medium-term development measures that would have a positive impact on access to food by the poorest. There is an urgent need to widen the reach and improve the functioning of short-term food access measures, such as under the National Rural Employment Guarantee Act (NREGA),

or the Mid-Day Meals Scheme, and link them with the medium term development interventions. It is through such schemes of employment and schooling; the PDS and ICDS, that the Right to Food is currently realizable. The challenge is to link schemes of short-term food access with medium-term development interventions, which alone can provide a stable basis for food security. Realizing the Right to Food is not just about improving the functioning of government schemes or the administration but about mobilizing more and more people, women and men, to assert their democratic will over the political and administrative processes. Rajasthan, through its pioneering initiatives on the Right to Information and Social Audits (*Jan Sunvais*) has made a good beginning in this area; steps that can be consolidated in realizing food security and the Right to Food.

1. Introduction

India has seen in impressive growth rate in the last decade with the GDP averaging more than 7 per cent per annum. Despite this rapid growth, India is still home to more than a quarter of the hungry people in the world. Rapid growth has not translated into a commensurate reduction in poverty and hunger. The current turmoil in world food markets, with sharp rises in food prices, and the recent global economic downturn together threaten to make the food security situation in India even worse. Despite significant achievements in food grain production, high incidence of hunger and undernutrition continue to plague the country.

These vicissitudes bring home the stark truth that food security is a critical and continuing challenge and there is no place for complacency on this front. In 1996, the World Food Summit (WFS) and subsequently the Millennium Development Goals (MDGs) recognized the importance of achieving food security and reducing hunger by half by the year 2015.

As a following to the WFS, a 2002 assessment called '*World Food Summit — Five Years Later,*' pointed out that there has been a decrease in hunger at the rate of 8 million people per year across the world. But in order to achieve the goal of reducing world hunger by half by 2015, it is necessary to reduce the incidence of malnutrition by 15 million per year. Continuing to implement the current economic, political and social policies will not enable the world to reach this goal by 2015. A mid-course correction in these policies is needed in order to achieve the above stated goals.

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

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

The UN World Food Programme and the M S Swaminathan Research Foundation (MSSRF) earlier collaborated in analyzing the food insecurity situation in various states in the country. Using chosen indicators to map the relative standing of states with regard to food security, MSSRF and WFP prepared

the *Food Insecurity Atlas of Rural India* in 2001. This was followed by the *Food Insecurity Atlas of Urban India* in 2002. The third in the series, the *Atlas of Sustainability of Food Security* was launched in 2004. In 2009, UN WFP & MSSRF brought out an update of food insecurity atlas of rural India. The Atlases raised the bar in the analysis and understanding of food security across states, while also posing fresh challenges at the same time. 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 the socio-economic development impact 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 should be planned and implemented.

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

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

1.1 What is Food Security?

What constitutes food security has gone through two phases of understanding or definition. In the 1970s, food security was understood as the 'availability at all times of adequate world food supply of basic foodstuffs..'. (UN, 1975). But the 1981 publication of Amartya Sen's *Poverty and Famines: An Essay on Entitlement and Deprivation* brought forward a new understanding of the problem of hunger or food security. Rather than just the 'availability' of food, Sen emphasized 'access' to food through what he called 'entitlements' – a combination of what one can produce, exchange in the market plus state or other socially provided supplies. What Sen posited is that availability or supply of food does not itself create entitlements for food. In a sense, Sen's emphasis on entitlements is similar to Keynes' notion of 'effective demand'. Both entitlement and effective demand are quite different from need. Since Keynes was dealing with a fully capitalist market economy, with only two classes, employers and workers, all effective demand was related to monetary income. But Sen is dealing with a 'mixed economy' with at least three classes, employers, workers and peasants or other own-account producers. For those who produce food, part, if not all, of their entitlement is due to their own production. This portion of the consumption of food is not mediated by the market. Consequently, this is not captured by the market-based notion of effective demand.

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

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

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

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

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

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

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 mobilization) but also of the poor putting their stamp on

economic policies. This is necessary in order to bring about the much-needed political will that is often lacking, to focus adequate attention on food security policies. Without adequate political pressure for reform, proper food security policies are unlikely to be adopted. There can be no question that the political mobilization of the poor is required for such a food security policy to be implemented.

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

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

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

1.2 Structure of the Report

This report is an effort to provide a district level profile of food security in Rajasthan. As the country moves towards greater devolution and decentralization, data at disaggregated levels remains a stumbling block. District-level data is notoriously inadequate and this report urges that greater attention be paid to data collection and dissemination at the sub-state levels. While Chapter 1 introduces the concept of food security, Chapter 2 provides an overview of the state and places it in the context of other states in the country. In line with the current and correct approach that emphasizes

outcomes rather than inputs, Chapter 3 derives a composite index of food security outcomes and provides a brief methodological note. It draws a distinction between the Food Security Outcome Index (FSOI) that is based on outcome measures on the one hand, and the Food Security Index (FSI) that is a composite index of the factors that are critical to food security on the other hand. Chapters 4 to 6 analyze the food security situation along the dimensions of availability, access and absorption. 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. This chapter also discusses strategies for action that emerge from our analysis, in the context of the broader state and national strategic interventions already in place. This is most significant from the perspective of policy. Chapter 8 wraps up with the final conclusions.

2. A Profile of the State of Rajasthan

An overview of the socio-economic profile of the state and the important changes that have taken place in its economy are important to understand and map the multiple dimensions of food security in Rajasthan. This chapter highlights the geographical features of the state, and discusses its relative position in key areas of the economy.

2.1 Agro-Climatic Regions

On the basis of climatic conditions and agricultural produce, Rajasthan has been divided into nine agro-climatic zones, each one having special characteristics of its own.

(i) Arid Western Plain

This region comprises Bikaner, Jaisalmer and Barmer districts, and some tehsils of Jodhpur and Churu districts. This is the most arid part of the state where the annual rainfall varies from 10 to 40 cms, and is quite erratic, so much so, that the entire rainfall of the year may fall on a single day and the rest of the year may be dry.

(ii) Irrigated North-Western Plains

Hanumangarh and Ganganagar districts which consist of an alluvial and aeolian plain form this agro-climatic zone. A part of this region which is arid, is the northern extension of the Indian Thar Desert covered with wind-blown sand. Extreme aridity marked with high summer and low winter temperatures is its usual climatic characteristic. Due to abundance of canal water irrigation, this region has today become the granary of Rajasthan.

(iii) Transitional Plain of Inland Drainage

This zone comprises Nagaur, Sikar and Jhunjhunu districts and some tehsils of Churu district. The area is covered with sand dunes and inter-dunal sandy plains. Climatically, this zone is slightly more wet as compared to the adjoining Arid Western Plain.

(iv) Transitional Plain of Luni Basin

This area lies between the Aravalli ranges and western arid region. The region encompasses the entire districts of Jalore and Pali and some tehsils of Sirohi and Jodhpur districts. The region has semi-arid climate with an annual rainfall of 30 to 50 cms. It is drained by the river Luni which flows only during the rainy season.

(v) Semi-Arid Eastern Plain

This region comprises of four districts namely, Jaipur, Dausa, Tonk and Ajmer, which form a rich fertile plain. On the western side, the region is flanked by the low Aravalli hills which extend from the south-west to the north-east.

(vi) Flood Prone Eastern Plains

This region comprises the districts of Alwar, Karauli Bharatpur and Dhaulpur and the northern part of Sawai Madhopur. The region has rich alluvial soil, the fertility of which is replenished every year by the flood water of the rivers.

(vii) Sub-Humid Southern Plains and the Aravalli Hills

Bhilwara district, most of the tehsils of Udaipur and Chittorgarh districts and some tehsils of Sirohi districts form this agro-climatic zone. The region has a moderately warm climate in summer and mild winters.

(viii) Humid Southern Plains

The districts of Dungarpur and Banswara, parts of Udaipur and Chittorgarh are included in this region. The area comprises of low Aravalli hills with intrusions of black lava rocks. The area has a humid climate with an average rainfall of more than 70 cms per year. Besides, there are a number of surface water streams which have made this area very fertile. Cotton and sugarcane are the chief cash crops grown in the black soil region.

(ix) Humid South-Eastern Plains

This region includes the districts of Kota, Baran, Bundi and Jhalawar and two tehsils of Sawai Madhopur. The black soil region of this plateau is fertile and is used for cultivation of sugarcane, cotton and opium.

2.2 National Sample Survey Regions

According to the National Sample Survey (NSS), the state has been classified in to four geographical regions (see Map 2.1). In general, each region has its peculiarities in terms of geo-physical characteristics that determine the economic and living conditions of the people. These regions are as follows:

(i) Western Region: Comprises of the districts of Barmer, Bikaner, Churu, Ganganagar, Hanumangarh, Jaisalmer, Jalore, Jodhpur, Nagaur, Pali and Sirohi.

(ii) Southern Region: This region comprises of the districts of Banswara, Dungarpur, Rajsamand and Udaipur.

(iii) North-East Region: Ajmer, Alwar, Bharatpur, Bhilwara, Jaipur, Dausa, Jhunjhunu, Karauli, Sawai Madhopur, Sikar and Tonk fall in this region.

(iv) South Eastern Region: This region covers the districts of Bundi, Chittaurgarh, Jhalawar, Kota, Baran and Sawai Madhopur.

Map 2.1: Rajasthan: National Sample Survey Regions

2.3 Economy

Rajasthan is the largest state of the country with a geographical area of 34 million hectares and a population of 56 million. The state is noted as one of the developing states in the country. In terms of rural poverty ratio the state occupies the fifth rank among the major states[1] while in terms of per capita income it lies above Assam, Chhattisgarh, Jharkhand, Madhya Pradesh, Orissa and Bihar (Table 2.1). In terms of Net State Domestic Product, Rajasthan ranks 6th after Maharashtra, Uttar Pradesh, West Bengal, Tamil Nadu and Andhra Pradesh.

2.3.1 Sectoral Composition of State Economy

The sectoral composition of the economy is a valid indicator of the level of economic development of the state. The performance of tertiary sector of Rajasthan is quite good and it draws about 45 per cent of its income from this sector, lying only eight percentage points below the national average. The secondary sector accounts for one-fourth of the state economy and the state occupies the fifth position in this respect among all states. The contribution of this sector was above the national average

1. 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.

Table 2.1: Net State Domestic Product (NSDP) and Rural Poverty Status, 2004-05

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
Madhya Pradesh	835	7	7666	13	36.9	13
Maharashtra	2,951	1	15567	2	29.6	11
Orissa	461	12	5985	16	46.8	17
Punjab	723	10	15611	1	9.1	1
Rajasthan	888	6	8788	11	18.7	5
Tamil Nadu	1,511	4	12719	5	22.8	9
Uttar Pradesh	1,876	2	8809	10	33.4	12
W. Bengal	1,705	3	10992	9	28.6	10

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

and is far ahead of other states like Assam, Bihar, Chhattisgarh, Kerala, Orissa, Uttar Pradesh and West Bengal. The share of the primary sector was about 29 per cent, which is similar to the national level.

In an aggregated form, the secondary and tertiary sector together form only 70 per cent of the total NSDP of the state, while this figure is more than 85 per cent for states like Maharashtra and Tamil Nadu, with the national average exceeding 75 per cent (Table 2.2).

The share of the primary sector in Gross State Domestic Product (GSDP) is declining at a faster rate (Table 2.4), as is the experience in other states too. During the recent years, from 1993-94 to 2004-05, the decrease has been recorded as 7 percentage points, from 36 to 29 per cent. Among the different constituents of the primary sector a faster decrease has been recorded in agriculture. At the same time, there is still a high dependence of the population (61 per cent) on agriculture (Table 2.5) reflecting its vulnerability. A slight increase has been noticed in mining and quarrying. The share of the secondary and tertiary sectors, however, has increased by about 2 to 5 percentage points. Interestingly, the contribution of the tertiary sector is considerable. In this, the contribution of trade, hotels and restaurants

Table 2.2: Sectoral Composition of NSDP (TE 2004-05)

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

** Net State Domestic Product (NSDP) at Factor Cost at 1993-94 prices.*
Source: Computed from Central Statistical Organization (Various Years).

was substantial (about 13 per cent) followed by transport, storage & communication (about 8 per cent) (Table 2.3).

Besides, the share of different sectors, it is important to note the growth estimates of different sectors in GSDP, as that has a strong implication for the food security scenario in the state. During the decade 1993-94 to 2004-05, the annual average growth was between 7 to 8 per cent. In the primary sector, growth of 8 per cent and more has been recorded in agriculture and mining & quarrying and it is around 3 to 4 per cent among forestry and fishing. The growth rate in agriculture is very good, with only manufacturing and services growing faster. But it is a moot point whether this growth rate in agriculture can be maintained over a longer period of time.

2.3.2 Participation of Workers and Gross State Domestic Product

In the present section, an attempt has been made to understand the workers' participation status, their principal status (PS) as well as their usual principal and subsidiary status (UPSS) in different sectors of the economy. The participation of principal status workers in the primary sector is about 59 per cent (Table 2.5) while their participation in secondary and tertiary sector is in equal proportion,

Table 2.3: Share (per cent) of Different Sectors to Total GSDP at 1993-94 Prices

Sector	1993-94	1999-00	2004-05
Agriculture	32.07	26.52	24.77
Forestry & logging	1.79	1.32	1.26
Fishing	0.11	0.07	0.08
Mining & quarrying	2.30	2.43	2.71
Sub total of primary	**36.27**	**30.32**	**28.82**
Manufacturing	12.27	16.61	13.24
Manu-registered	6.39	11.17	7.53
Manu-unregistered	5.89	5.44	5.70
Construction	9.02	9.67	10.20
Electricity, gas and water supply	3.67	3.90	4.13
Sub total of secondary	**24.96**	**30.19**	**27.57**
Transport, storage & communication	5.12	5.83	7.51
Railways	1.64	1.43	1.66
Transport by other means	2.56	2.47	2.68
Storage	0.09	0.10	0.10
Communication	0.83	1.83	3.07
Trade, hotels and restaurants	12.96	12.75	13.30
Banking & insurance	2.92	3.39	4.27
Real estate, ownership of dwellings and business services	6.98	5.93	6.10
Public administration	4.03	4.09	3.76
Other services	6.77	7.47	8.66
Sub total of tertiary	**38.77**	**39.47**	**43.61**

Source: *CSO, relevant years*

i.e. about 20 per cent each. The participation of main and marginal workers in the primary sector is also considerably higher as compared to others i.e. 63 per cent. But their participation in the secondary and tertiary sectors is about 19 and 18 per cent respectively, which was also slightly lower than that of the PS workers. Productivity and correspondingly access to food are much lower for workers engaged in agriculture than in manufacturing or services.

The tertiary sector is the major contributor to GDP with about 44 per cent share followed by agriculture and secondary sectors with shares of about 29 and 28 per cent respectively. It emerges from the analysis that agriculture is the major absorber of the labour force while its contribution to GSDP is comparatively lower. The contribution of the tertiary sector in GSDP is larger while the participation of the labour force is less than one-fifth. It can be concluded that a shift of the agricultural labour force to other sectors would improve the productivity of labour.

Table 2.4: Average Annual Growth Rate of GSDP in Rajasthan, 1994-05

Sector	Average Annual Growth Rate	Sector	Average Annual Growth Rate
Agriculture	8.05	Railways	6.76
Forestry & logging	3.30	Transport by other means	8.24
Fishing	3.75	Storage	9.13
Mining & quarrying	8.55	Communication	20.33
Sub total of primary	**7.11**	Trade, hotels and restaurants	7.39
Manufacturing	8.27	Banking & insurance	10.63
Manufacturing-registered	10.25	Real estate, ownership of	
Manufacturing-unregistered	6.69	dwellings & business services	5.50
Construction	8.15	Public administration	6.14
Electricity, gas and water supply	8.94	Other services	9.08
Sub total of secondary	**7.96**	**Sub total of tertiary**	**7.84**
Transport, storage & communication	10.59	**Calculated State Domestic Product**	**7.00**

Source: CSO, relevant years.

Table 2.5: Percentage of GSDP and Workers in Rajasthan, 2004-05

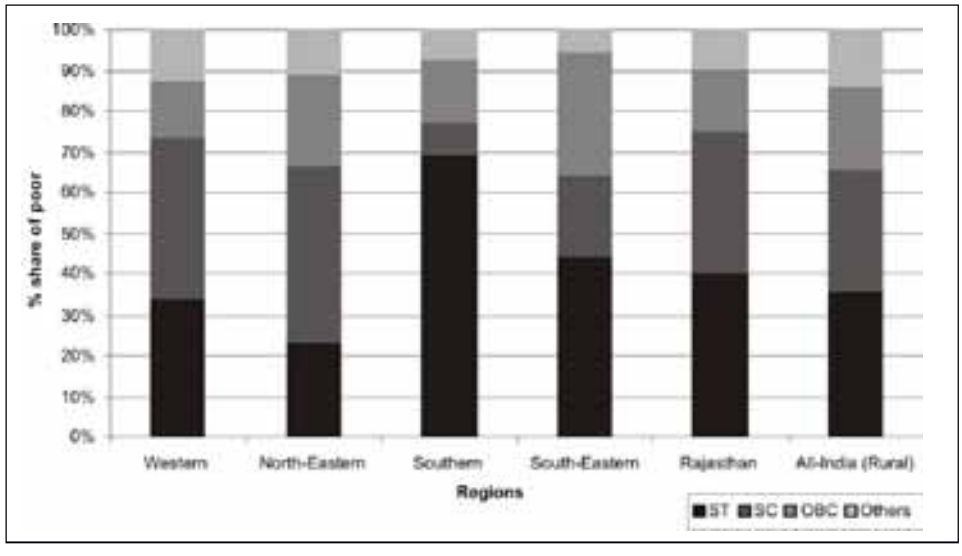
Sector	PS	UPSS	GSDP
Agriculture, etc.	57.61	61.70	26.11
Mining & Quarrying	1.25	1.08	2.71
Primary	**58.87**	**62.78**	**28.82**
Manufacturing	9.26	9.05	13.24
Elecetricity, Gas & Water supply	0.56	0.48	4.13
Construction	10.83	9.66	10.20
Secondary	**20.65**	**19.19**	**27.57**
Trade, Hotel & Restaurants	8.61	7.56	13.30
Transport, Storage & Communication	3.33	2.89	7.51
Finance, Business, Real Estate, etc	1.32	1.18	10.37
Public Admn., Health, education, etc.	7.21	6.40	12.43
Tertiary	**20.48**	**18.03**	**43.61**
Total (number)	**20,597,868**	**24,012,282**	**6685282**

Source: *CSO, relevant years.*

2.3.3 Poverty Status

In Rajasthan, there is reduction in the incidence of poverty, compared to the country as a whole. However, there are wide variations in the poverty status across different regions of the state. In the southern region,

Figure 2.1: Region-wise Percentage Share of Poor Households by Social Group for Rural Rajasthan (2004-05)



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

conditions of the households are worse due to high poverty ratio compared to rest of the regions. This ratio is more than one-third higher than that at the state level, because of factors such as a concentration of tribal population which has a limited access to the productive resources, limited size of land holdings, etc. (Sagar and Ahuja 1987). The south-eastern and north-eastern regions have a lower poverty ratio because these regions are endowed with land and water resources and favourable agro-climatic conditions, which have all aided in enhancing agricultural production.

Figure 2.1 shows the region-wise percentage share of poor households by Social Groups for Rural Rajasthan (2004-05). The poverty rate of the Scheduled Tribe population is highest in southern Rajasthan whereas in the western region of Rajasthan, both Scheduled Castes and Scheduled Tribes show a high incidence of poverty.

2.4 Environmental Conditions

The state has a very limited coverage of forests i.e. less than 5 per cent. As per the available estimates of the state Forest Department, 1.85 and 2.85 per cent are categorized as dense and degraded forests respectively. At the same time, wastelands cover almost 30 per cent of the total geographical area. As a result, the extent of net area cultivated is about 44 per cent of the total area of the state, which is slightly lower than the national average of 45 per cent (Table 2.6). The water scarcity and fluctuations in rainfall across agro-climatic regions are the major constraints for further expansion of area under cultivation. It also points to the necessity of switching from a water- intensive to a less water-consuming cropping pattern (Vyas, 2005). This is important in determining household income and thus access to food. Rajasthan is below the all-India average in agricultural productivity.

Table 2.6: Environmental Limitations to Agricultural Development

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

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

In Rajasthan, while livestock has increased, the area available for grazing has remained stagnant. This has reduced the productivity of the Common Property Resources (CPRs) in a process referred to as desertification: '*Desertification is the process of land degradation that affects dryland areas and is caused by poverty, unsustainable land management and climate change*.' (see IFAD, Desertification, ifad.org)

Rajasthan accounts for approximately10 per cent of India's land area, but only 1 per cent of its water resources. Of its land area, 60 per cent approximately is desert (Table 2.6). These two factors together severely limit the extent of agricultural development; they also influence the nature of possible agricultural development – towards less water-using but high value crops and livestock development (see also World Bank, 2006).

2.5 Socio-Economic Status

The agricultural and consequently economic development of the state is also reflected in the socio-economic status of the rural population. Rajasthan was formed out of 16 princely states and 3 chiefdoms.

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

Table 2.7: Socio-Economic Status of Major States (All Figures in Percentages)

	Level of Urbanization		Rural Female Literacy		Proportion of Rural Scheduled Castes		Proportion of Rural Scheduled Tribes		Proportion of Agricultural Labourers	
	Value	Rank	Value	Rank	Value	Rank	Value	Rank	Value	Rank
India	27.8	–	46.1	–	17.9	–	10.4	–	33.0	–
Andhra Pradesh	27.3	8	43.5	12	18.4	11	8.4	8	47.5	16
Assam	12.9	16	50.7	6	6.7	1	13.6	11	14.9	2
Bihar	10.5	17	29.6	17	16.4	8	1.0	4	51.0	17
Chhattisgarh	20.1	14	47.0	10	11.4	5	37.6	17	36.1	12
Gujarat	37.4	3	47.8	9	6.9	2	21.6	13	33.2	9
Haryana	28.9	6	49.3	7	21.4	13	0	1	19.0	3
Jharkhand	22.2	12	29.9	16	12.4	6	31.0	16	32.8	7
Karnataka	34.0	4	48.0	8	18.4	11	8.4	8	34.5	11
Kerala	26.0	10	86.7	1	10.8	3	1.5	5	19.6	4
Madhya Pradesh	26.5	9	42.8	13	15.6	7	25.8	15	34.1	10
Maharashtra	42.4	2	58.4	2	10.9	4	13.4	10	37.8	13
Orissa	15.0	15	46.7	11	17.2	9	24.6	14	39.1	14
Punjab	33.9	5	57.7	3	33.0	17	0	1	21.9	5
Rajasthan	23.4	11	37.3	14	17.9	10	15.5	12	12.3	1
Tamil Nadu	44.0	1	55.3	4	23.8	15	1.6	6	42.9	15
Uttar Pradesh	20.8	13	36.9	15	23.4	14	0.1	3	28.9	6
West Bengal	28.0	7	53.2	5	26.9	16	7.2	7	33.1	8

Source: Census of India, 2001.

This feudal background meant that Rajasthan, compared to other states in India, was a latecomer to the development process (World Bank, 2006) and this feudal background has yet to be fully overcome in many economic and social aspects.

Among all major states, Rajasthan occupies the mid position in terms of urbanization levels. The rate of urbanization in the state is lower than the national level by about 4 per cent (Table 2.7). During recent years, there has been a faster increase in urbanization. This can be attributed to various factors such as continuous drought conditions that led to crop failure, and limited employment opportunities in the rural areas that pushed the rural households to migrate to urban areas for livelihood. Besides, sharp improvements in infrastructure in urban areas encouraged the rural households in general and the poor in particular to migrate from rural to urban areas.

It is generally accepted that there is a need to pay due attention to gender relations in order to strengthen women's agency in dealing with food security. Taking women's literacy rate as an indicator of gender, rural Rajasthan has lower rural women's literacy rate in comparison to the national average. Other than the three states of Uttar Pradesh, Jharkhand and Bihar, Rajasthan is lagging behind in education of females (Table 2.7). The low education level among females can be attributed to various socio-economic factors such as the pastoral economy of the state that requires grazing labour, the tradition of child marriage etc. (Singh, 1999).

2.5.1 Social Group-wise Composition of Households

Tribals constitute about 16 per cent of the total population in the state. The figure is higher than the national proportion, and only below other tribal-dominated states such as Madhya Pradesh, Orissa, Jharkhand and Chhattisgarh. Thus Rajasthan emerges as one of the tribal populated states of the country among the major states (Table 2.7). The proportion of Scheduled Castes in Rajasthan is at the national level of 17.9 per cent.

Poverty is high among the SC and ST categories as compared to national estimates. In Rajasthan, more than one-fourth, i.e. about 26 per cent of the poor households belong to the ST category, whereas the national level estimates for the same category were 18 per cent (Table 2.8). One-third and slightly less than that of the poor households belong to the SC and 'Other Backward Class' (OBC) categories. Only 8 per cent of poor households belonged to the 'other' category.

Table 2.8: Region-wise Percentage Share of Poor and All Households by Social Group for Rural Rajasthan (2004-05)

Region	ST	SC	OBC	Others	All*
Poor Households					
Western	9.2	47.4	32.1	11.2	100.0
North-Eastern	8.1	38.0	45.6	8.3	100.0
Southern	87.6	1.9	7.2	3.3	100.0
South-Eastern	24.7	17.4	54.7	3.2	100.0
Rajasthan	26.6	33.0	32.3	8.1	100.0
Rural India	18.1	28.4	38.0	15.4	100.0
All Households					
Western	6.4	26.3	50.5	16.8	100.0
North-Eastern	9.3	22.8	49.9	18.0	100.0
Southern	56.8	5.6	20.1	17.4	100.0
South-Eastern	16.7	21.0	48.7	13.7	100.0
Rajasthan	15.9	21.3	45.7	17.0	100.0
Rural India	10.9	21.4	42.0	25.6	100.0

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

Across the regions, there exists a vast variation in the distribution of poor households among the different social groups. In the western region, a major proportion of households, i.e. 47 per cent belonged to the SC category. Nearly, one-third of the total households are in the OBC category. North-eastern Rajasthan is dominated by OBC poor followed by SC poor households. The southern region is dominated by ST poor households – about 88 per cent – while more than half of the poor households belong to OBC category in south-eastern region (Table 2.8).

2.5.2 Occupation-wise distribution of Households

The occupational pattern among households in general, and the poor in particular, shows their dependence on varied sources of livelihood. Overall, about half of the households are self-employed in the agriculture sector, followed by other labour which is substantially higher than national level estimates (Table 2.9). The dependence of poor households on wage employment as agricultural labourers is three times lower than at the national level. Inter-regional comparison shows that except in the southern region, the agriculture sector is the major source of livelihood. In the southern region, the non-farm sector absorbs about one-third of the total labour force deployed.

Among the poor households, agriculture is the major source of employment followed by other activities, whereas about one-third of them are dependent on wage employment in other sectors. In the south-eastern and north-eastern regions, which are well endowed with a good natural resource base,

Table 2.9: Region-wise Distribution of Poor and All Households by Household Type for Rural Rajasthan (2004-05) (%)

Region	Self-employed in non-agriculture	Agricultural labour	Other labour	Self-employed in agriculture	Others	Total
Poor Households						
Western	11.2	19.3	27.2	32.5	9.7	100.0
North-Eastern	14.4	13.2	23.6	46.9	1.8	100.0
Southern	0.3	4.3	67.9	25.7	1.8	100.0
South-Eastern	3.8	17.4	4.1	73.5	1.2	100.0
Rajasthan	9.3	14.3	33.2	38.1	5.2	100.0
Rural India	12.8	41.5	12.1	26.5	7.1	100.0
All Households						
Western	16.9	8.5	15.3	48.8	10.4	100.0
North-Eastern	16.3	6.0	14.5	51.5	11.7	100.0
Southern	12.0	3.9	46.2	31.5	6.3	100.0
South-Eastern	10.9	9.4	3.9	69.9	5.8	100.0
Rajasthan	15.3	7.0	18.0	49.9	9.8	100.0
Rural India	15.6	26.7	10.7	35.5	11.4	100.0

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

agriculture is the major source of employment; while in other regions wage employment is the major source of livelihood. The availability of wage employment in the agriculture sector is considerably lower than at the national level. This may be due to limited availability of irrigation facilities and lower size of land holdings.

2.5.3 Urbanization

The level of urbanization has strong implications for migration from the rural areas. Urbanization increases opportunities for a variety of livelihood options. But the livelihoods in which one can enter depend very much on the person's education and skills. Unskilled, illiterate persons can only take up low income options which may not do much more than reduce the burden on feeding in the village household. But, in vulnerable conditions like drought and flood, such options play a considerable role in terms of livelihood.

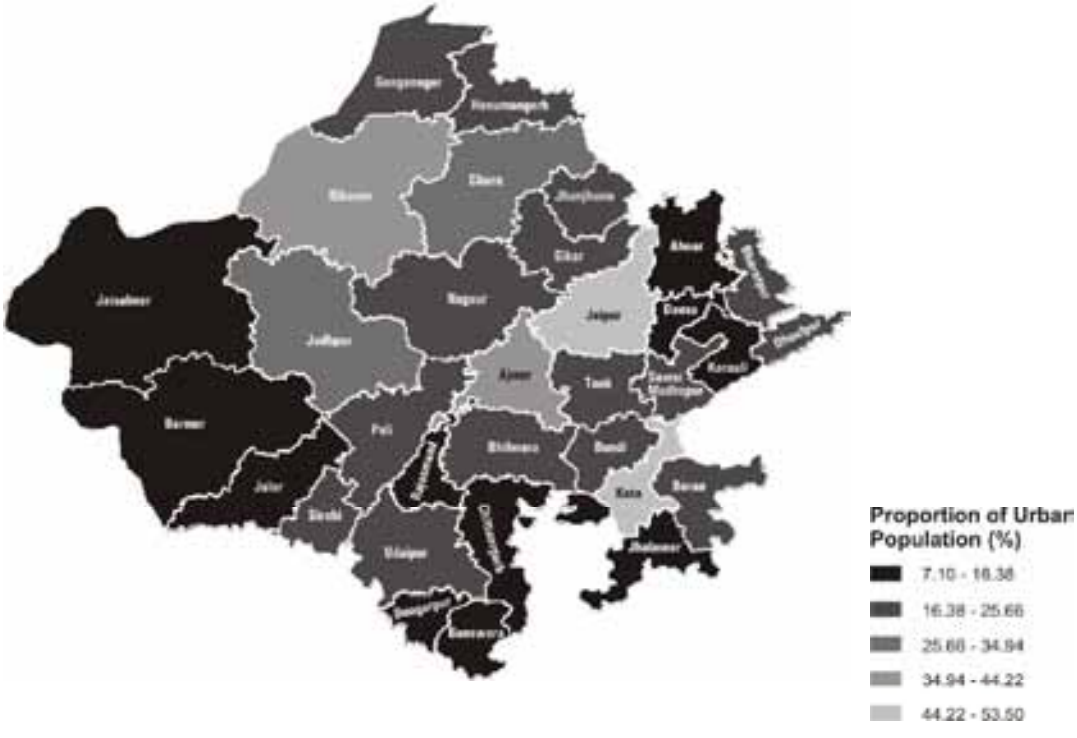
Some districts, like Kota and Jaipur, were leading in urbanization. In recent years, Kota city is growing towards a metro city and there has been huge infrastructure investment, including on education, which has resulted in a variety of livelihood opportunities. This city is also known as the education hub of the country. This has attracted a particular class not only from within the state but also from other

Table 2.10: Status of Urbanization

High		Moderate		Low		Very Low		Extremely Low	
District	**Value**	**District**	**Value**	**District**	**Value**	**District**	**Value**	**District**	**Value**
Kota	53.5	Ajmer	40.1	Jodhpur	33.9	Ganganagar	25.3	Chittaurgarh	16
Jaipur	49.4	Bikaner	35.5	Churu	27.9	Pali	21.5	Jaisalmer	15
						Tonk	20.9	Alwar	14.5
						Sikar	20.7	Jhalawar	14.3
						Bhilwara	20.6	Karauli	14.2
						Jhunjhunun	20.6	Rajsamand	13
						Hanuman-garh	20	Dausa	10.3
						Bharatpur	19.5	Jalor	7.6
						Sawai Madhopur	19	Barmer	7.4
						Bundi	18.7	Dungarpur	7.3
						Udaipur	18.6	Banswara	7.1
						Dhaulpur	18		
						Sirohi	17.7		
						Nagaur	17.2		
						Baran	16.8		

Source: *Census of India, 2001.*

Map 2.2: Level of Urbanization



states of the country. Similarly, a substantial infrastructure investment has attracted MNCs. A moderate level of urbanization is found in Ajmer and Bikaner districts. In districts located in the southern and western parts of the states, the level of urbanization is less than 10 per cent. These are districts with poor environmental conditions and inhabited by tribal populations, leading to low purchasing power, and limited scope for urbanization. The status of urbanization has been presented in Table 2.10 and Map 2.2.

2.6 Health and Nutritional Status

It is well known fact that a healthy person has a higher capacity to work. The goal of any economic activity is human well-being, an important component of which is health. Health and nutritional status can be measured through a number of indicators. While mortality under age one [infant mortality] is an indicator of poor reproductive health facilities, ante-natal care and post-natal care; mortality under age five is closely linked with immunization and overall poverty levels. The latter is also useful for assessing both social practices and public policy and can be taken as a comprehensive indicator for the overall quality of life.

Table 2.11 shows the comparative mortality as well as nutritional status of children for the states with an under-five mortality figure higher than 80 per 1000 live births. While Uttar Pradesh shows the highest

Table 2.11: Mortality and Nutritional Status of Children and Women*

	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
Madhya Pradesh	94.2	69.5	60.0	35.0	50.0	74.1	41.7
Jharkhand	93.0	68.7	56.5	32.3	49.8	70.3	43.0
Orissa	90.6	64.7	40.7	19.5	45.0	65.0	41.4
Chhattisgarh	90.3	70.8	47.1	19.5	52.9	71.2	43.4
Rajasthan	85.4	65.3	39.9	20.4	43.7	69.7	36.7
Assam	85.0	66.1	36.4	13.7	46.5	69.6	36.5
Bihar	84.8	61.7	55.9	27.1	55.6	78.0	45.1
Maharashtra	46.7	37.5	37.0	16.5	46.3	63.4	36.2
Best State	*16.3 (Kerala)*	*15.3 (Kerala)*	*22.9 (Kerala)*	*9.2 (Punjab)*	*24.5 (Kerala)*	*44.5 (Kerala)*	*18.0 (Kerala)*
Worst State	*96.4 (UP)*	*72.7 (UP)*	*60 (MP)*	*35.0 (MP)*	*56.8 (UP)*	*78.0 (Bihar)*	*45.1 (Bihar)*

Source: National Family Health Survey, 2005-06.

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

figure (96) in terms of under-five mortality, Rajasthan under-five mortality is 85.4 per thousand live births. For all malnutrition indicators, the figures for Rajasthan remain poor and near the national average. High malnutrition levels, coupled with high mortality among children also possibly point towards poor feeding practices. Poor access to food emanating from grave economic conditions, as already seen earlier, is the prime reason for such a situation.

2.6.1 Nutritional status

An encouraging picture has emerged in food consumption levels in the case of Rajasthan. It lies far ahead of the national average in terms of per capita per day intake of calories and proteins. But, service delivery for mitigating under nutrition and micro-nutrient deficiencies among children under the Integrated Child Development Services (ICDS) programme, is considerably lower than that of national level estimates. In Rajasthan, percentage of children below five years who have received Vitamin A and Iron supplements is only 10 per cent and 1 per cent respectively against the national average of 18.2 per cent and 4.7 per cent respectively. Similarly, percentage of children who received food supplement under ICDS programme in Rajasthan is only 17.3 per cent against the national average of 26.3 per cent (Table 2.12).

The status of nutrition among the children below the age of three years in terms of stunted and wasted children was slightly lower or at par with the national level (Table 2.13).

Table 2.12: 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
India	2047	57.0	18.2	4.7	26.3
Uttar Pradesh	2200	65.9	6.1	1.5	14.7
Madhya Pradesh	1929	58.8	14.1	3.5	36.4
Jharkhand	1961	51.2	20.1	3.5	36.5
Orissa	2023	48.3	21.9	5.2	52.5
Chhattisgarh	1942	47.4	9.1	3.1	58.4
Rajasthan	2180	69.6	10.0	1.0	17.3
Assam	2067	52.7	12.9	0.8	28.0
Bihar	2049	57.8	26.4	2.9	4.2
Maharashtra	1933	55.7	25.2	7.1	42.4
Best State	*2240 (Punjab)*	*69.6 (Haryana)*	*38.5 (TN)*	*12.5 (Karnataka)*	*58.4 (Chhattisgarh)*
Worst State	*1842 (TN)*	*44.9 (TN)*	*6.1 (UP)*	*0.8 (Assam)*	*4.2 (Bihar)*

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

Table 2.13: Nutritional Status of Children (NFHS II, III)

Variable	NFHS III			NFHS II
	Total	Urban	Rural	Total
Rajasthan				
Children under 3 year who are stunted (%)	40.1	29.4	42.8	59.0
Children under 3 year who are wasted (%)	22.5	19.6	23.3	16.2
Children under 3 year who are underweight (%)	36.8	26.1	39.5	46.7
India				
Children under 3 year who are stunted (%)	44.9	37.4	47.2	51.0
Children under 3 year who are wasted (%)	22.9	19.0	24.1	19.7
Children under 3 year who are underweight (%)	40.4	30.1	43.7	42.7

Source: NFHS II (1998-99) and NFHS III (2005-06)

2.6.2 Immunization of Children

Immunization of children is an important contributor to child survival. The focus is on six serious but preventable diseases viz: tuberculosis, diphtheria, pertussis, tetanus, polio and measles. As per the available information, about 17 per cent of the children in the state in the age group of 1 to 2 years

Table 2.14 Immunization of Children

Variables	NFHS III			NFHS II
	Total	Urban	Rural	Total
Rajasthan				
Children 12-23 months fully immunized (BCG, Measles, and 3 doses each of polio/DPT) (%)	26.5	44.3	22.1	17.3
Children 12-23 months who have received BCG (%)	68.5	76.1	66.7	53.9
Children 12-23 months who have received 3 doses of polio vaccine (%)	65.2	73.9	63.0	44.6
India				
Children 12-23 months fully immunized (BCG, Measles, and 3 doses each of polio/DPT) (%)	43.5	57.6	38.6	42.0
Children 12-23 months who have received BCG (%)	78.1	86.9	75.1	71.6
Children 12-23 months who have received 3 doses of polio vaccine (%)	78.2	83.1	76.5	62.8

Source: NFHS II, III

were fully vaccinated in 1993-94. This proportion increased to more than one-fourth in 2005-06. In rural areas there was an improvement in full vaccination from 11 per cent to 22 per cent during this period. Earlier, there was a limited reach of the measles vaccination and the third dose of DPT. The effect of the pulse polio immunization campaign is visible over time (Table 2.14).

This chapter has given a brief overview of the economic, health and nutritional status of Rajasthan as compared to other states and the national average. The ensuing chapter 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 the condition of sufficient nutrition, which is due to a combination of food access of the household and the individual, and of the ability of the body to absorb nutrients. In more detail, food security of an individual is the result of:

1. Food availability, which refers to the quantity of food available, whether through own production or from the market and government programmes. In India food availability is usually measured with respect to foodgrains, which are the chief source of energy, particularly of the poor.

2. The food accessed by the household through own production, market purchase and government entitlements and distributed among household members on the basis of various social norms and bargaining positions, including gender relations among the household members.

3. The food consumed by an individual translated into nutrition on the basis of access to safe water, the absence of parasitic diseases, and the overall health status, all of which would affect the body's capacity to absorb consumed food.

3.1 Measuring Food Security Status

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

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

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

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

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

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

The significance of under-five mortality as an indicator lies in the fact that it is less susceptible to the fallacy of averages than, for instance, per capita income. This is because the natural scale does not allow children of the rich to be 1000 times as likely to survive, even if the human-made scale does permit them to have 1000 times as much income. To put it simply, it is much more difficult for a wealthy minority to affect a region's under-five 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 child mortality (children under five) by two-thirds by 2015 as one of its primary MDGs (MDG–4). The interrelation between nutritional status and under-five mortality can be gauged from the fact that under-nutrition 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).

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 16th 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).

As many as 60 countries across the globe have been prioritized for urgent action, based on two criteria: countries with more than 50 per thousand deaths of children under five and countries with an annual under-five 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) (See Box 3.1).

A statistical analysis of the NFHS–3 data across states reveals that micro-nutrient intake bears a significant negative correlation with proportion of underweight children as well as under-five mortality.This implies that an increased intake of micronutrient are associated with reduced risks of under-nutrition, which in turn, contributes to reduction in under-five mortality (Table 3.1).

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.*

Table 3.2: Indicators used to compute Food Security Outcome Index (FSOI)

	Under-Five Mortality		Under-weight Children		FSOI	
Districts	**Value**	**Rank**	**Value**	**Rank**	**Value**	**Rank**
Ajmer	121.2	17	69.1	29	0.469	23
Alwar	103.3	10	57.6	15	0.605	9
Banswara	168.7	31	41.7	1	0.493	19
Baran	130.3	20	66.9	25	0.453	25
Barmer	120.9	16	72.6	32	0.446	26
Bharatpur	112.4	13	45.4	3	0.656	6
Bhilwara	152.8	28	50.2	5	0.489	20
Bikaner	73.6	1	70.2	31	0.620	7
Bundi	123.1	19	63.9	21	0.497	18
Chittaurgarh	154.7	29	65.2	22	0.383	31
Churu	89.9	6	66.9	25	0.588	11
Dausa	117.8	14	54.2	11	0.579	12
Dhaulpur	133.1	21	61.6	18	0.479	22
Dungarpur	173.9	32	57.0	14	0.374	32
Ganganagar	81.0	5	50.6	7	0.726	3
Hanumangarh	75.5	3	50.5	6	0.745	2
Jaipur	101.7	9	56.9	13	0.615	8
Jaisalmer	108.6	12	69.6	30	0.507	17
Jalor	134.9	23	51.8	8	0.538	15
Jhalawar	118.4	15	52.6	10	0.588	10
Jhunjhunu	74.9	2	58.7	16	0.692	4
Jodhpur	95.6	7	52.1	9	0.667	5
Karauli	122.1	18	58.7	16	0.535	16
Kota	103.6	11	63.1	20	0.567	13
Nagaur	100.4	8	68.6	28	0.541	14
Pali	159.9	30	48.1	4	0.480	21
Rajsamand	144.2	26	66.2	23	0.411	30
Sawai Madhopur	137.4	24	66.5	24	0.432	28
Sikar	79.0	4	44.3	2	0.775	1
Sirohi	134.0	22	68.5	27	0.430	29
Tonk	143.6	25	62.1	19	0.441	27
Udaipur	150.4	27	54.5	12	0.469	23

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

It follows from the preceding discussions, that child under-nutrition status and mortality appear to be an overall outcome of food insecurity. It thus necessitates to combine these two indicators to compute an overall index of food security outcome in Rajasthan (see Table 3.2).

The under-five mortality has been found to be lowest (73.6) in Bikaner district, whereas Dungarpur district has the highest (173.9) under-five mortality. As far as the underweight children in different districts are concerned, the lowest proportion (41.7) has been found in Banswara and the highest proportion (72.6) of such children is in Barmer. The Food Security Outcome Index has been calculated based on these two indicators. However, since both the indicators are negative indicators, meaning that their high values are associated with a more insecure outcome, the FSO index has been reversed so as to get high value for secure region.

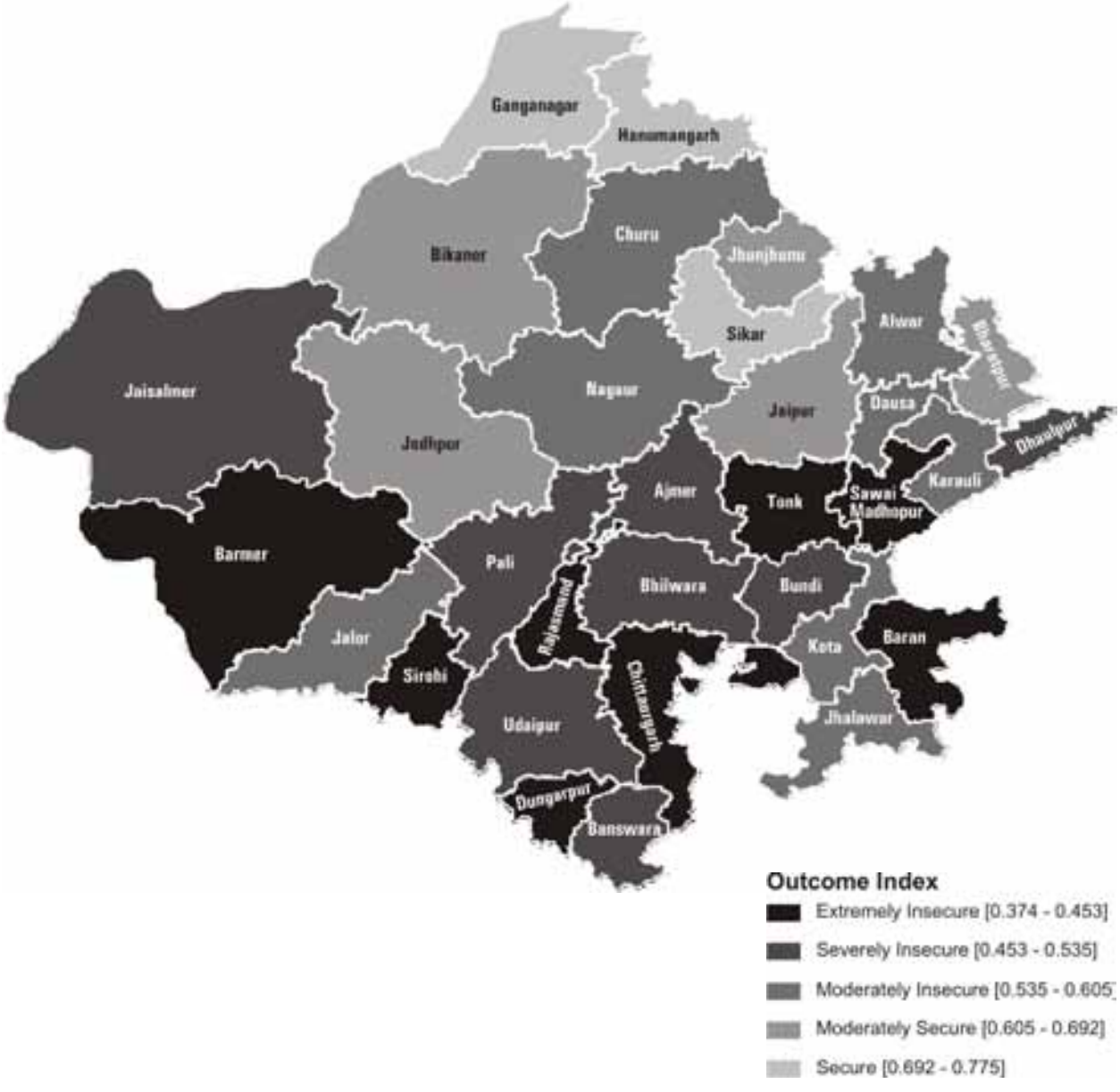
Districts have been divided into five groups on the basis of this index – secure, moderately secure, moderately insecure, severely insecure, and extremely insecure – each category representing the relative severity of the outcome of food insecurity (Table 3.3 and Map 3.1).

The FSO index shows that eight districts are secure and moderately secure. Sikar, Hanumangarh, Ganganagar are among the secure districts in terms of food security outcome. Broadly, these districts are agriculturally developed and equipped with infrastructure like good road connectivity, etc. Most districts, however, are in the category of food insecurity. Eight districts are extremely food insecure, nine districts are severely insecure and only seven districts are in the moderate food insecure position. The districts in the southern parts of the states are extremely food insecure. Baran, Barmer, Tonk, Sawai Madhopur, Sirohi, Rajsamand, Chittaurgarh and Dungarpur are some of the extremely insecure districts. What this shows is that most of the state of Rajasthan requires attention to improve the food security outcomes.

Table 3.3: Status of Districts in Terms of FSOI

Secure	Moderately Secure	Moderately Insecure	Severely Insecure	Extremely Insecure
Sikar	Jhunjhunu	Alwar	Karauli	Baran
Hanumangarh	Jodhpur	Jhalawar	Jaisalmer	Barmer
Ganganagar	Bharatpur	Churu	Bundi	Tonk
	Bikaner	Dausa	Banswara	Sawai Madhopur
	Jaipur	Kota	Bhilwara	Sirohi
		Nagaur	Pali	Rajsamand
		Jalor	Dhaulpur	Chittaurgarh
			Ajmer	Dungarpur
			Udaipur	

Map 3.1: Food Security Outcome Map of Rajasthan



3.2 Explaining Food Security

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

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

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

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

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

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

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

3.2.1 Food Availability

The concern for food availability stems from production and related aspects that sustain a desired level of food production. 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).

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

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

2. ***Proportion of Forests:*** Forests are a form of common property resource. Availability of forest area can affect food security as access to forest products provides income and supports nutrition, depending on the type and magnitude of the produce. But there are both legal and

geographical restrictions on developing production in forest areas. Thus, it can be assumed that forest area is negatively associated with food security, since it limits the extension of agricultural production.

3. ***Irrigation Extent:*** Irrigation has a key role in both stabilizing agricultural production and, through an increase in cropping intensity and an associated increase in productivity, improving a district's food security position. It would also provide a better prospect in terms of rural employment.

4. ***Rural Connectivity:*** Access to paved roads has a big role in development. It reduces transport costs and can reduce transaction costs, with possible positive results on the prices realized by farmers. By improving communication, roads can increase the options available to rural producers, connecting them with larger national, regional and even international markets. Studies of rural roads have shown that they raise the productivity and value of land for poor farmers (Jacoby 2000). It has been found that government spending on rural infrastructure, besides agricultural research and development, irrigation and rural development programmes targeted to the rural poor, have all contributed to reductions in rural poverty and increases in agricultural productivity. Marginal government expenditure on roads, in particular, has been found to have the largest positive impact on productivity growth (Fan et al., 1999).

3.2.2 Food Access

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

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

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

2. ***Proportion of Scheduled Tribes and Scheduled Castes:*** The ST and SC households are known to be generally more food insecure, largely on account of their economic and social deprivation

– the former on account of geographical marginalization and the latter due to historical deprivation and exclusion from mainstream – all resulting in political marginalization. The proportion of ST and SC population in a district has been taken as an indicator of this marginalization. The assumption is that the greater the ST and SC population in a district the less it will be associated with food security.

3. ***Proportion of Working Age Population:*** The ratio between the productive section of the population to the economically dependent part is a valid demographic indicator at the household level. A ratio higher than unity represents a positive scenario, with more productive population compared to the dependent population.[1] This 'demographic dividend', if effectively harnessed, leads to prosperity and hence food security (Chandrasekhar et al. 2006).

4. ***Per Capita Consumption Expenditure:*** The NSS estimates of per capita consumption expenditure, adjusted for inequality, is a proxy for per capita income reflecting a significant dimension of access to food. This variable accounts for all sources of income, including those which are depicted through availability of food as measured in terms of value of agricultural output. For instance, a district with low value of agricultural output along with a high value of consumption would mean that non-agricultural income, including remittances from migrants, plays a role in enabling consumption to be higher than agricultural production. This is the only way in which we can indirectly bring migration, which is such a crucial component of households' food security strategies, into the picture.

5. ***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 food consumption exist is attested by numerous case studies (see those reviewed in Bina Agarwal, 1994). Further, very high incidence of anaemia among women and girls shows that females are nutritionally deficient even in households that are not otherwise poor or nutritionally deficient. We have used the rural female literacy rate as the variable to represent gender-based inequality in household consumption. The argument is that a higher literacy rate for women is more likely to enable women to enhance their roles in family decision-making and increase their share of household consumption. At the same time, higher women's literacy is also likely to lead to better knowledge of nutritional systems and improved health practices in the household.

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

6. ***Wage Rate of Rural Persons:*** Casual wage workers constitute about one-fifth of the workers in the unorganized non-agricultural sector while almost all agricultural labourers are casual workers (NCEUS 2007). Casual workers tend to be the least protected and have the lowest level of earnings. The understanding is that agricultural labour, without the backing of self-produced food, is particularly vulnerable to food insecurity. There is, therefore, a particular concern with the earnings of agricultural labour.

3.2.3 Food Absorption

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

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

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

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

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

Table 3.4: Rajasthan - Indicators Used to Analyze Food Security

Name of Variable and Description	Sources	Ref. Year
(a) Availability		
1. Proportion of net irrigated area to net sown area	Agricultural Statistics of Rajasthan, 2003-04	2003-04
2. Per capita value of agricultural output	Department of Agriculture, Government of Rajasthan http://rajasthankrishi.gov.in/Departments/Agriculture/main.asp?t=statics_top.htm&p=statics_index_new.htm	2002-03 to 2004-05
3. Percentage of inhabited villages having access to paved roads	Census of India, 2001	2001
4. Percentage of forest area to total geographical area	Department of Forest, Government of Rajasthan	2003
(b) Access		
1. Percentage of agricultural labour to total workers*.	Census of India, 2001	2001
2. Proportion of ST and SC population to total population*	Census of India, 2001	2001
3. Working Age Population	Census of India, 2001	2001
4. Per capita monthly consumption expenditure (inequality adjusted)	61st NSS round	2004-05
5. Rural casual wage rate	61st NSS round	2004-05
6. Female literacy rate (7+)	Census of India, 2001	2001
(c) Utilization		
1. Percentage of households having access to safe drinking water	Census of India, 2001	2001
2. Percentage of inhabited villages having access to PHCs	Census of India, 2001	2001
(d) Public Entitlement		
1. Percentage of ICDS beneficiaries to total project population	Department of Women and Child Development, Government of Rajasthan	2006

** These indicators are inversely related to food security. The direction of their indices has been reversed to have a positive association with food security.*

*** These variables are not used for calculation of indices. They are used for analysis of the indices.*

3.3 Food Security Index (FSI)

The FSI is a composite index covering three dimensions, i.e., Availability, Access, and Absorption discussed above. 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 dimensions, 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. (See Appendix 2 Table A2.1 for a description of the variables).

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4. Food Availability

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

4.1 Agricultural Growth

Reflecting the deepening agrarian crisis in the country, growth in agricultural GSDP in India has declined during the decade 1993-94 to 2003-04 as compared to the preceding decade. More importantly, inter-state disparities among states have also increased. The coefficient of variation in the growth of agriculture GSDP, that is a measure of the disparities among states, increased significantly from 59 to 103 over the

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
Madhya Pradesh	2.82 *	5.21	0.23 ***	4.14
Maharashtra	5.39 *	7.42	1.27	4.92
Orissa	-0.57 ***	3.39	0.17 ***	3.96
Punjab	4.62	5.13	2.15	4.13
Rajasthan	3.93	6.19	1.21 ***	5.32
Tamil Nadu	4.43	7.45	-0.60 ***	5.08
Uttar Pradesh	2.8	4.66	2.18	3.76
West Bengal	4.45	4.73	3.45	7.03
India	3.05	5.32	2.19	6.01
CV for States	58.72	25.43	102.88	22.75

Note:Growth is Compound Annual Growth Rate. 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.

Box 4.1: 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 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 nutrient content of the crop.

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

The increase or even sustenance of the present level of production is limited by a number of factors – land constraints, water scarcity, high energy prices – all over encompassed by 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.

Source: World Development Report, 2008

two periods. Some agriculturally developed states like Punjab, Haryana, Maharashtra, Tamil Nadu, etc. witnessed a decline in their agricultural growth rates (largely on account of a high base). Rajasthan also experienced a similar pattern of declining rate of agriculture growth (Table 4.1).

A brief comparison with the major agricultural states of the country[1] sheds light on the poor state of agricultural development in Rajasthan. As a large state, it contributes proportionately much less, just about seven per cent, to the aggregate national agricultural production due to low productivity levels in the state (Table 4.2). The yield levels of food grains are quite low, lying far below the national average.

The state has both the lowest and the most uncertain rainfall. Rainfall is erratic and unevenly distributed, leading to crop failures and frequent drought situations. Added to this is the low extent of irrigation i.e. just about one-third of the agricultural land. Groundwater is the major source of irrigation, accounting for about 68 per cent share in total area irrigated. In recent years, there has been a faster depletion of aquifers, attributed to low rainfall conditions and over-exploitation by well owners (Singh, 2007). All this shows that the scope for agricultural development in Rajasthan may be quite narrow, or may require high investments (as in Israel) to overcome these limits. It would also be necessary to further utilize surface water, rather than the fast-depleting groundwater.

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).

Table 4.2: Level of Agricultural Development

State	% of National Foodgrain Production		Foodgrain Yield (TE 2005-06)		Instability in Foodgrain Production[1]		Cropping Intensity[2]		Irrigation Extent[3]	
	(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
Madhya Pradesh	7.1	5	1184	13	23.9	9	128.4	8	33.5	8
Maharashtra	5.4	8	909	16	25	10	127.2	9	16.9	14
Orissa	3.4	11	1334	10	38.5	12	146	5	22.9	13
Punjab	12.2	2	3996	1	5.8	1	185.9	1	95.4	1
Rajasthan	6.6	6	1053	15	229.6	16	123.8	10	33.4	9
Tamil Nadu	2.9	13	1806	6	20.8	8	115.8	15	50.2	6
Uttar Pradesh	19.7	1	2119	5	9	5	153.4	4	73.7	3
West Bengal	7.8	3	2464	3	6.6	4	176.5	3	54.5	5

Source: Ministry of Agriculture, Govt. of India (Various Years).
1 Instability in production = standard deviation of growth rates of total food grain production (1991-2005)
2 Cropping Intensity = Gross Area Sown / Net Area Sown (expressed as percentage)
3 Irrigation Extent = Net Area Irrigated / Net Area Sown (expressed as percentage)

Agricultural productivity per hectare in Rajasthan is the second lowest in the country (Table 4.3). This low productivity is aggravated by very high instability in production. The standard deviation of growth in foodgrain production is as high as 230, more than double that of Jharkhand, the second worst state in this respect.

4.2 Per Capita Value of Agricultural Output

Agricultural output is an initial indicator of a district's rural production. To the extent that availability of food depends on the level of a district's production, per capita production can be taken as representing availability.

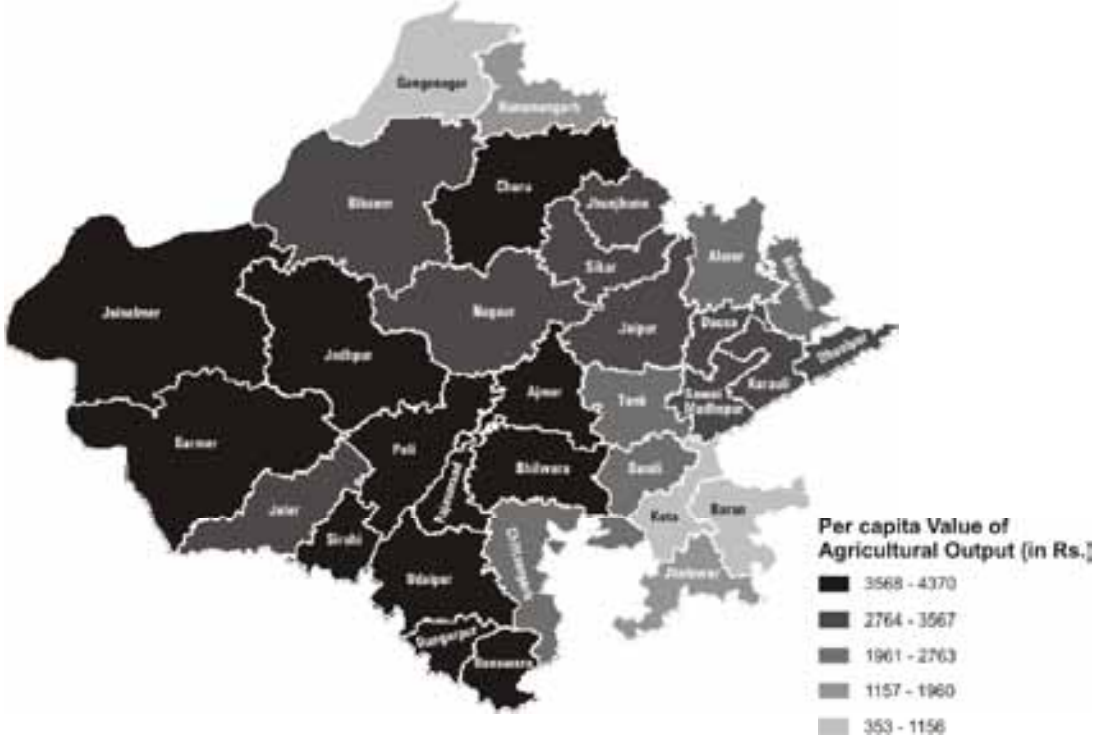
Agricultural output is one of the initial indicators of food security that reflect the per capita food production in rural areas. Per capita agricultural production is determined by the climatic conditions, infrastructure development and farming practices. The analysis shows that there exists wide variation in the per capita

Table 4.3: Per Capita Value of Agricultural Output in Rajasthan (in Rupees) per annum, 2002-03 to 2004-05

High		Moderate		Low		Very Low		Extremely Low	
District	**Value**	**District**	**Value**	**District**	**Value**	**District**	**Value**	**District**	**Value**
Kota	4370	Ganganagar	3857	Bundi	2732	Sawai Madhopur	1904	Jodhpur	1120
Baran	3962	Hanuman-garh	2874	Bharatpur	2373	Dhaulpur	1901	Jaisalmer	1088
		Jhalawar	2847	Chittaurgarh	2168	Karauli	1753	Bhilwara	1025
				Tonk	2125	Jaipur	1656	Churu	977
				Alwar	2017	Jhunjhunu	1631	Banswara	880
						Dausa	1606	Pali	753
						Bikaner	1476	Ajmer	743
						Nagaur	1412	Udaipur	595
						Sikar	1278	Sirohi	582
						Jalor	1246	Barmer	522
								Dungarpur	503
								Rajsamand	353

Source: *As stated in Table 3.4, Variable a2.*

Map 4.1: Status of Agricultural Production



agricultural output across districts and regions. In certain districts like Kota and Baran, the value of per-capita agricultural output is substantial, which can be attributed to the favourable agro-climatic conditions and availability of sound irrigation facilities which help in enhancing agricultural production. The moderate agricultural output was recorded in three districts of Ganganagar, Hanumangarh, and Jhalawar. Largely, these districts fall in the command area of the Indira Gandhi Nahar Project, Chambal command areas and other minor irrigation programmes. Low output was noticed in five districts of Bundi, Bharatpur, Chittaaurgarh, Tonk and Alwar (Table 4.3). In these districts, there was low availability of irrigation facilities compared to the high and moderate ranked districts. Except Bundi district, major sources of irrigation were minor irrigation projects and groundwater.

Broadly, it can be inferred that in one-third of the districts, per capita agricultural production was very low. Largely, these districts fall in the arid region. Irrigation facilities are poor in these districts. In twelve districts of the state, the per capita agricultural production was extremely low. The districts with low agricultural production fall in the western arid and southern plains (Map 4.1 and Table 4.3). In these regions, factors like unfavourable agro-climatic conditions, absence of adequate irrigation facilities and small size of holdings restrict production.

4.3 Per-Capita Value of Livestock Product

Livestock rearing is generally considered as a supplementary source of livelihood. In arid regions like Rajasthan, the livestock economy contributes more than agriculture, and it is the major source of livelihood that has strong implications on food security.

Kota district leads in livestock production in the state. It has been noted that in irrigated regions, the income level derived from the livestock economy is substantial and this is attributed to the abundant supply of quality feed that helps in improving the productivity of animals. In the western desert region districts like Jaisalmer and Bikaner, there is dominance of small ruminants which are considered cash by the herd owners. They sell them at times of financial requirement (Ahuja and Rathore 1987). This category of animals has contributed considerably to food security, e.g. in Bhilwara district and its surrounding areas. In other words, animal husbandry is a potential area where public interventions will help in improving the livelihood conditions of the rural households.

4.4 Coverage of Irrigation Facilities

Irrigation plays a key role in both stabilizing agricultural production as well as increasing the cropping intensity, productivity and employment, improving a district's food security position.

Coverage of irrigation facilities is an important indicator that ensures food security in the region. The extent of irrigation is represented by the ratio of the net area irrigated to the net area sown. In Rajasthan, less than one-third of the net sown area is irrigated. In other words, there is rain-fed agriculture in 70 per cent of the cultivated area. The districts with high irrigation, good rainfall and good condition of

Map 4.2: Share of Irrigated Area

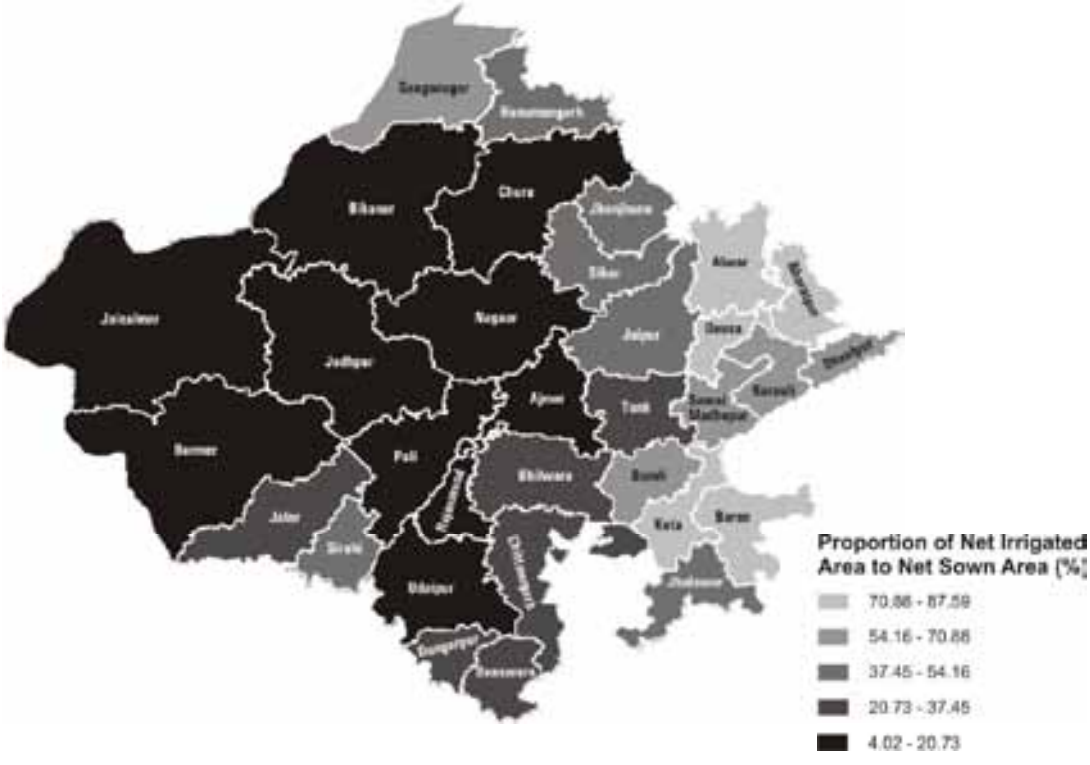


Table 4.4 Extent of Irrigation in Rajasthan (Net Irrigated Area to Net Sown Area)

High		Moderate		Low		Very Low		Extremely Low	
District	**Value**	**District**	**Value**	**District**	**Value**	**District**	**Value**	**District**	**Value**
Alwar	87.59	Bundi	68.59	Karauli	54.47	Banswara	32.85	Nagaur	19.81
Baran	81.00	Dhaulpur	66.22	Jhalawar	52.10	Jalor	30.96	Udaipur	18.19
Kota	78.85	S. Madhopur	57.87	Jhunjhunu	50.52	Chittaurgarh	28.71	Pali	15.83
Bharatpur	75.26			Jaipur	47.01	Tonk	27.87	Ajmer	12.56
Dausa	71.73			Sikar	41.52	Dungarpur	26.59	Jodhpur	10.10
Ganganagar	70.61			Sirohi	38.80	Bhilwara	22.43	Bikaner	9.89
				Hanuman-garh	38.19			Rajsamand	9.65
								Jaisalmer	7.96
								Barmer	5.84
								Churu	4.02

Source: *As stated in Table 3.4, Variable a1.*

aquifers, are all in canal command areas. In these districts, more than 50 to 80 per cent of the net area sown is irrigated.

Districts where more than one-fourth to half of the net area sown is irrigated are ranked as medium. (Table 4.4 and Map 4.2) In parts of these districts, the condition of groundwater is good compared to other regions. The minor irrigation programme has played an important role in the expansion of irrigated area.

Certain districts in the arid western plain and transitional plain of the inland drainage regions have the lowest proportion of irrigated land. This is because of low and uncertain rainfall and poor groundwater conditions. According to available estimates, the arid zone in western Rajasthan has brackish groundwater, with chloride levels above 1000 mg/l. The estimates show that 73 per cent of India's saline water area is in the arid region of Rajasthan.

4.5 Status of Road Connectivity

Access to paved roads has a big role in development. It reduces transport costs and can reduce transaction costs, with possible positive results on the prices realized by farmers. By improving communication, roads can increase the options for 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 targeted at the rural poor, have all contributed to reductions in rural poverty and agricultural productivity. The marginal government expenditure on roads, in particular, has been found to be having the largest positive impact on productivity growth (Fan, et al 1999).

In overall terms, more than half of the villages i.e. 53 per cent, had the facility of road connectivity. There exists a wide variation in the status of road connectivity across the districts/ regions ranging from a little more than one-fourth (27 per cent) to more than two-third (68 per cent). In 13 districts of the state, more than 60 per cent of villages were connected with roads constructed by both the state and central government. In certain districts, the density of roads and level of agricultural development are positively related which shows that agencies involved in the process of agricultural development like the State Agricultural Marketing Board and NABARD were enabled to play an important role in this regard. The role of other programmes, such as *Pradhan Mantri Gram Sadak Yojana* is also important.

Districts like Jhunjhunu, Ganganagar, and Pali occupy the leading position in road connectivity where more than two-thirds of the villages have access. Interestingly, Churu district which ranked among those districts having a low value of per-capita agricultural output and extremely limited area under irrigation has the highest position in road connectivity. A moderate position in road connectivity was found in six districts located in different regions of the states. Broadly, districts located around the Aravali hills have a low proportion of road connectivity (Table 4.5 and Map 4.3). This may also be due to the high cost of construction of roads in these areas.

Map 4.3: Status of Rural Connectivity

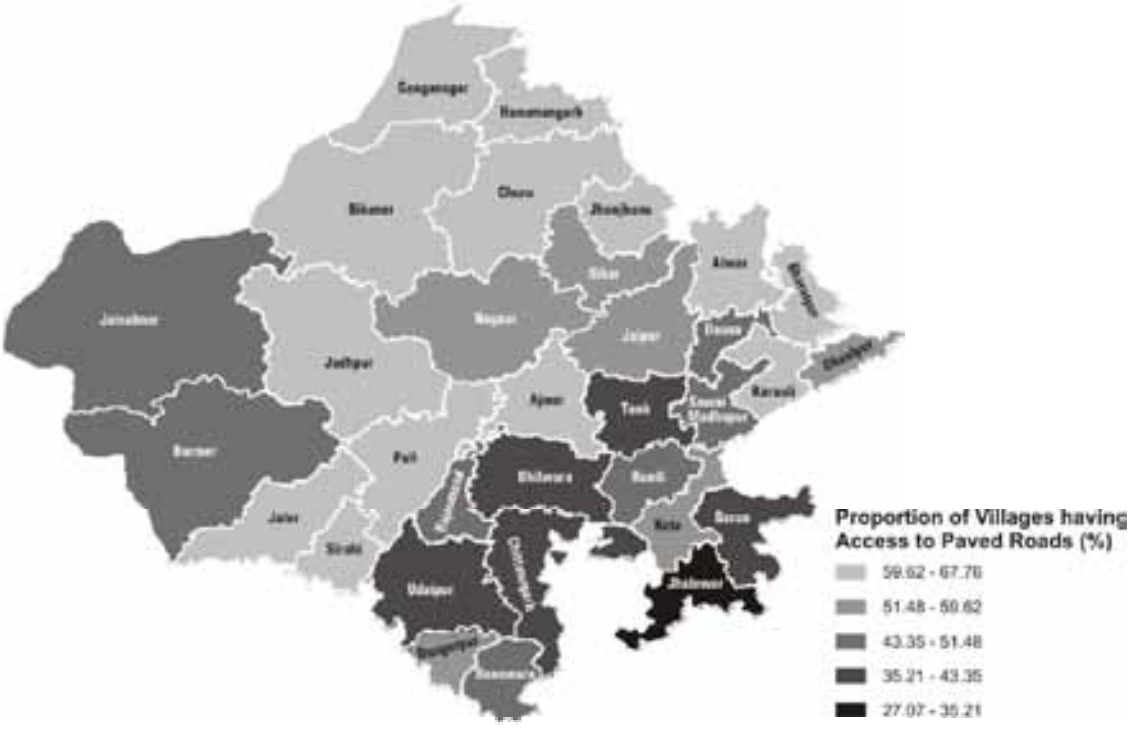


Table 4.5: Percentage of Villages having Access to Paved Roads

High		Moderate		Low		Very Low		Extremely Low	
District	**Value**	**District**	**Road**	**District**	**Value**	**District**	**Value**	**District**	**Value**
Jhunjhunu	67.76	Sikar	59.52	Dausa	51.33	Udaipur	42.84	Jhalawar	27.07
Ganganagar	67.07	Jaipur	57.50	Rajsamand	50.68	Bhilwara	41.56		
Pali	65.87	Dhaulpur	56.79	Jaisalmer	49.71	Tonk	41.48		
Bikaner	65.06	Nagaur	56.20	Banswara	46.68	Chittaurgarh	40.14		
Hanuman-garh	65.02	Dungarpur	55.36	Bundi	44.52	Baran	37.76		
Alwar	64.29	Kota	52.39	Barmer	44.26				
Jalor	63.64			S.Madhopur	43.65				
Sirohi	63.06								
Ajmer	62.12								
Jodhpur	61.92								
Churu	61.60								
Bharatpur	60.78								
Karauli	59.95								

Source: *As stated in Table 3.4, Variable a4.*

4.6 Coverage of Forest Areas

Forests are one of the major components of common property resource, which can be considered as a support of rural livelihood for rural households in general and poor in particular. The extent of forest lands in a region has strong linkages with food security in rural areas. The livestock economy depends largely on these lands. The importance of these resources is considerable in the case of a pastoral economy which is one of the major characteristics of the Rajasthan economy. This is noted from the fact that there was less than one-tenth of the geographical area under forest cover. In other words, more than 90 per cent area has been put to other uses including agriculture. As per the forest policy of India, environmental imbalances exist in the state. As per the norms, one-third of the geographical area should be under forest cover (GoI, 1988). This proportion may help to maintain the ecological balance in the region.

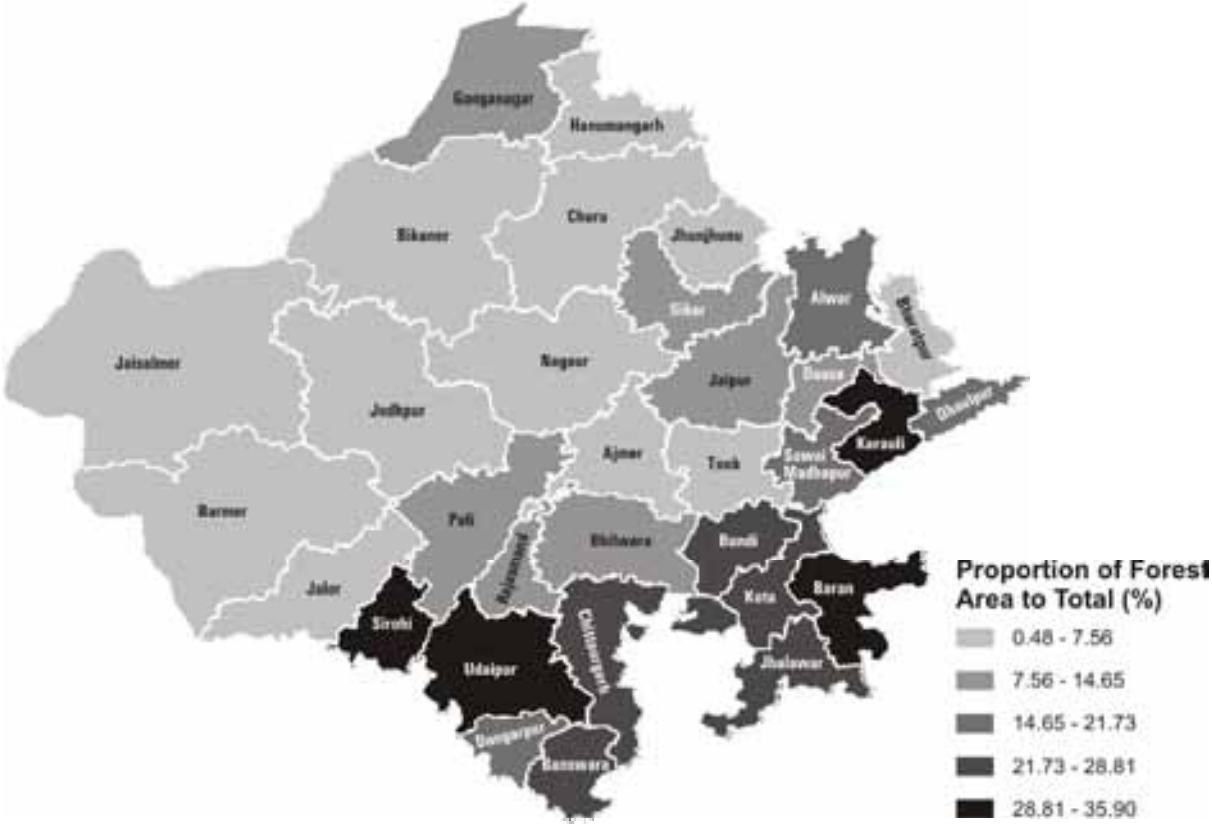
In Rajasthan, a large numbers of districts have limited area under forest cover. Except for three districts of Ajmer, Bharatpur and Tonk, other districts with low forest cover fall in the western part of the state. This is, of course, the desert region of the state. In districts with low forest coverage, pastoral activities are one of the major sources of livelihood. Seven districts located in the semi-arid eastern plains have 7 to 11 per cent forest cover, which is considered very low in the context of food security. In Alwar, Sawai Madhopur, Dhaulpur and Dungarpur districts, the proportion of forest coverage was varying from about 17 to 21 per cent of the total geographical area of the districts. The districts that have a proportion of forest cover from one-fifth to one-fourth were Kota, Chittaurgarh, Banswara and Jhalawar. A high

Table 4.6: Proportion of Forest Area in Rural Rajasthan

High		Moderate		Low		Very Low		Extremely Low	
District	**Value**	**District**	**Value**	**District**	**Value**	**District**	**Value**	**District**	**Value**
Udaipur	35.90	Bundi	28.42	Alwar	21.58	Rajsamand	10.84	Ajmer	7.23
Karauli	33.45	Kota	24.80	S.Madhopur	21.15	Dausa	9.57	Bharatpur	7.06
Sirohi	31.17	Chittaurgarh	24.76	Dhaulpur	21.06	Sikar	8.25	Jhunjhunu	6.84
Baran	30.46	Banswara	24.55	Dungarpur	17.16	Jaipur	8.17	Jalor	5.27
		Jhalawar	21.81			Ganganagar	7.90	Tonk	4.61
						Bhilwara	7.60	Bikaner	4.08
						Pali	7.60	Barmer	2.09
								Hanuman-garh	1.89
								Nagaur	1.33
								Jaisalmer	0.82
								Jodhpur	0.82
								Churu	0.48

Source: *As stated in Table 3.4, Variable a5.*

Map 4.4: Share of Area under Forests



proportion of the forest cover was found in five districts of Udaipur, Karauli, Sirohi, Baran and Bundi, which fall in the south-eastern region of the state (Table 4.6 and Map 4.4). Districts where forest coverage was high and moderate also have a concentration of tribal population that is dependent to a large extent on forest resources for their livelihood.

4.7 Food Availability Index

Table 4.7 presents district wise value and ranks of indicactors that have been used to compute Food Availability Index.

Table 4.8 and Map 4.5 shows the status of districts in terms of the Food Availability index. Ganganagar, Kota, Alwar and Bharatpur have been identified as secure in terms of the availability index. On the other hand Bhilwara, Jaisalmer, Udaipur, Rajsamand and Barmer are extremely insecure. In all, 11 districts fall in secure and moderately secure categories in the availability index and the remaining 21 districts have been identified as insecure in the food availability index.

Map 4.5: Food Availability Map of Rural Rajasthan

Table 4.7: Indicators used to Compute Availability Index

District	Irrigation extent		Per capita value of agricultural output		Rural connectivity	
	Value	Rank	Value	Rank	Value	Rank
Ajmer	12.56	26	743	27	62.12	9
Alwar	87.59	1	2017	10	64.29	6
Banswara	32.85	17	880	25	46.68	23
Baran	81.00	2	3962	2	37.76	31
Barmer	5.84	31	522	30	44.26	25
Bharatpur	75.26	4	2373	7	60.78	12
Bhilwara	22.43	22	1025	23	41.56	28
Bikaner	9.89	28	1476	17	65.06	4
Bundi	68.59	7	2732	6	44.52	24
Chittaurgarh	28.71	19	2168	8	40.14	30
Churu	4.02	32	977	24	61.60	11
Dausa	71.73	5	1606	16	51.33	20
Dhaulpur	66.22	8	1901	12	56.79	16
Dungarpur	26.59	21	503	31	55.36	18
Ganganagar	70.61	6	3857	3	67.07	2
Hanumangarh	38.19	16	2874	4	65.02	5
Jaipur	47.01	13	1656	14	57.50	15
Jaisalmer	7.96	30	1088	22	49.71	22
Jalor	30.96	18	1246	20	63.64	7
Jhalawar	52.10	11	2847	5	27.07	32
Jhunjhunu	50.52	12	1631	15	67.76	1
Jodhpur	10.10	27	1120	21	61.92	10
Karauli	54.47	10	1753	13	59.95	13
Kota	78.85	3	4370	1	52.39	19
Nagaur	19.81	23	1412	18	56.20	17
Pali	15.83	25	753	26	65.87	3
Rajsamand	9.65	29	353	32	50.68	21
Sawai Madhopur	57.87	9	1904	11	43.65	26
Sikar	41.52	14	1278	19	59.52	14
Sirohi	38.80	15	582	29	63.06	8
Tonk	27.87	20	2125	9	41.48	29
Udaipur	18.19	24	595	28	42.84	27

Source: As stated in Table 3.4.

Table 4.8: Status of Districts in Food Availability Index

Secure		Moderately Secure		Moderately Insecure		Severely Insecure		Extremely Insecure	
District	**Value**	**District**	**Value**	**District**	**Value**	**District**	**Value**	**District**	**Value**
Ganganagar	0.6864	Baran	0.5866	Jaipur	0.4543	Jhalawar	0.3847	Bhilwara	0.2655
Kota	0.6691	Dhaulpur	0.5270	S.Madhopur	0.4367	Bikaner	0.3577	Jaisalmer	0.2592
Alwar	0.6396	Hanuman-garh	0.5204	Sikar	0.4271	Pali	0.3459	Udaipur	0.2364
Bharatpur	0.5992	Bundi	0.5171	Jalor	0.4099	Nagaur	0.3455	Rajsamand	0.2333
		Jhunjhunu	0.5136	Sirohi	0.4008	Tonk	0.3372	Barmer	0.1984
		Dausa	0.5048			Chittaurgarh	0.3357		
		Karauli	0.4955			Jodhpur	0.3260		
						Dungarpur	0.3195		
						Banswara	0.3175		
						Ajmer	0.3167		
						Churu	0.2972		

*****

5. Access to Food

The critical significance of access to food emerges from 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 enough to ensure 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 community groups and self-help groups (SHGs). Thus, the ability to form and take action in groups is an important factor for ensuring entitlements.

Historic injustice and discrimination faced by the Scheduled Castes and Tribes, other marginalized groups and women 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 discuss food access are rural wages, monthly per capita expenditure, agricultural labourers, proportion of Scheduled Castes and Scheduled Tribes, ratio of working age population, rural female literacy, women's workforce participation and urbanization. The overall status of Rajasthan in relation to other states is presented first and thereafter we discuss the disparities across districts. Finally, we present the overall index of food access across districts and map food access.

5.1 Rural Wages

Casual workers tend to be the least protected and have the lowest level of earnings. The NSS defines the casual wage worker as one who was casually engaged in others' farm or non-farm enterprises (both household and non-household) and, in turn, received wages according to the terms of the daily or periodic work contract. It can be seen that Rajasthan provides lower wage rates (Rs. 62) in comparison to many other major states like Kerala (Rs. 120), Punjab (Rs. 73.12) and Haryana (Rs. 72.20) (Table 5.1).

Rural wage rates are determined by various factors such as status of agricultural development, including area and productivity of crops, size of holdings, and irrigation facilities (Acharya, 2005). Broadly, the districts that have low wage rates have high proportion of tribal population and are characterized by limited sources of livelihood. In these areas, the labour force is available at a cheaper rate as compared to other districts. The more urbanized central belt of Rajasthan, which also lies along the Delhi-Mumbai highway, also has generally higher agricultural wages. Maximum

Table 5.1: Wage Rate of Casual Workers by State (in Rupees)

India/States	Value	Rank	States	Value	Rank
India	48.89	-	Kerala	119.51	1
Andhra Pradesh	42.13	12	Madhya Pradesh	35.76	16
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: NSS 59th Round – Situation Assessment Survey of Farmers, 2005.

Map 5.1: Wage Rates of Rural Population

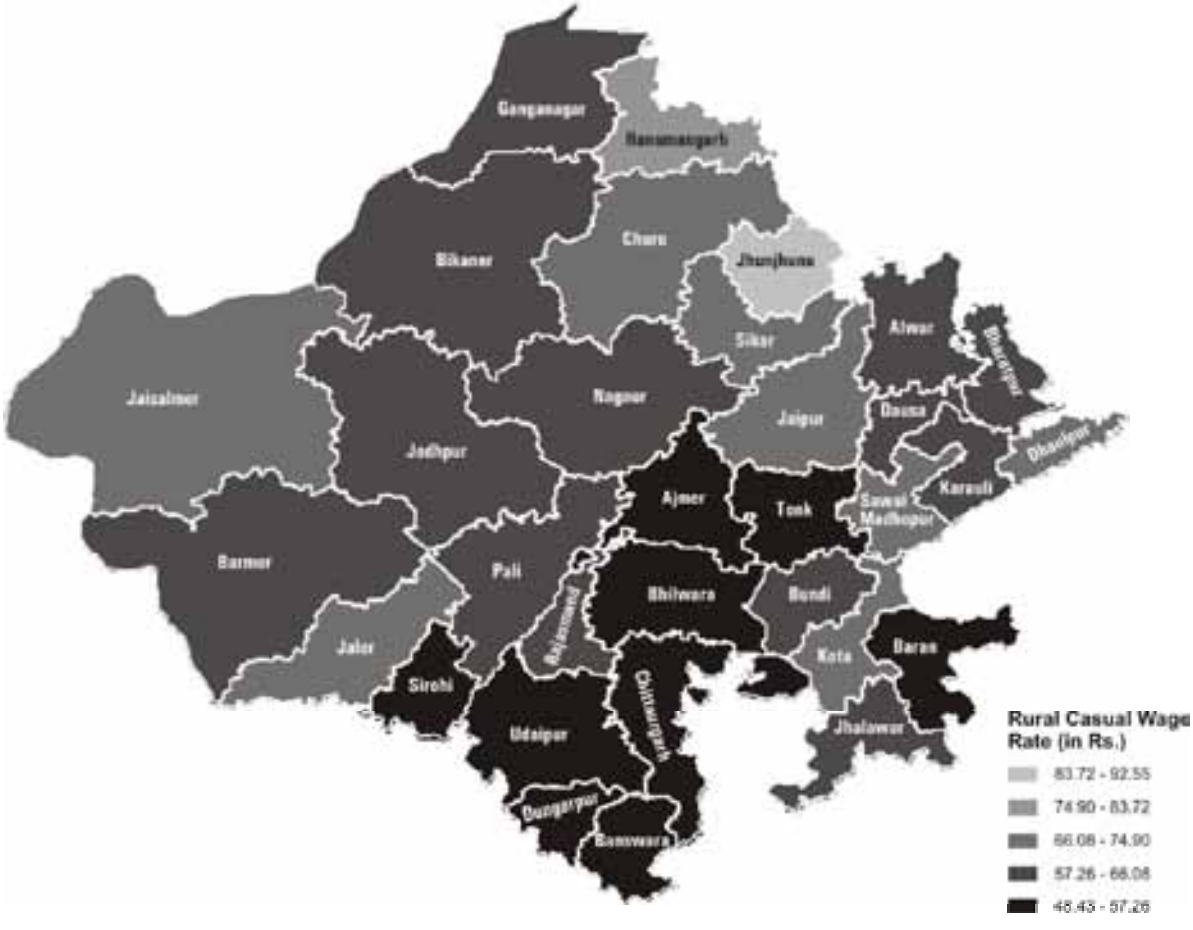


Table 5.2: Status of Rural Wages in the Districts of Rajasthan (in Rupees), 2004-05

High		Moderate		Low		Very Low		Extremely Low	
District	**Value**	**District**	**Value**	**District**	**Value**	**District**	**Value**	**District**	**Value**
Jhunjhunu	92.55	Hanumangarh	81.95	Kota	71.58	Barmer	64.60	Tonk	56.85
				Jaisalmer	70.55	Bharatpur	64.29	Udaipur	54.49
				Jalor	70.38	Ganganagar	64.17	Ajmer	54.13
				Dhaulpur	68.87	Bundi	64.08	Bhilwara	54.00
				Sawai Madhopur	68.08	Bikaner	62.83	Sirohi	52.23
				Sikar	67.99	Dausa	62.10	Dungarpur	52.06
				Jaipur	67.82	Jodhpur	61.58	Baran	51.22
				Churu	66.23	Jhalawar	60.34	Chittaurgarh	51.08
						Karauli	60.26	Banswara	48.43
						Nagaur	59.30		
						Rajsamand	59.17		
						Alwar	59.12		
						Pali	59.03		

Source: As stated in Table 3.4, Variable b5.

wage rates were seen in Jhunjhunu and Hanumangarh districts at Rs. 92.55 and Rs. 81.95 respectively. On the lower side, Banswara district provided the lowest wage rate of Rs. 48.43. Chittaurgarh, Baran, Dungarpur, Sirohi, Bhilwara, Ajmer, Udaipur and Tonk are all in the category of extremely low rural wages (Table 5.2 and Map 5.1).

5.2 Average Per Capita Monthly Expenditure

Low income levels directly affect consumption. The NSS estimates of per capita consumption, adjusted for inequality, are taken as the primary measure of household access to food. In the earlier discussion, value of agricultural output per capita has been considered as a variable that relates to availability of food. Taking both consumption and the value of agricultural output allows us to check whether the two variables move in the same direction. A low value of agricultural output for a district along with a high value of consumption would mean that non-agricultural income, including remittances from migrants, plays a role in enabling consumption higher than agricultural production. In case the per capita consumption is lower than per capita value of agricultural production, it can be considered as household savings.

The per capita consumption expenditure in absolute terms is a good indicator of food security in rural areas. Rajasthan ranks 8th among the major states of India in terms of per capita consumption expenditure. The value of per capita consumption expenditure (Rs. 324) is higher than the national average of Rs. 307 by 17 rupees. (Table 5.3).

Table 5.3: Monthly Per Capita Expenditure on Food, 2004-05

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

Source: *: As stated in Table 3.4, Variable b4.*

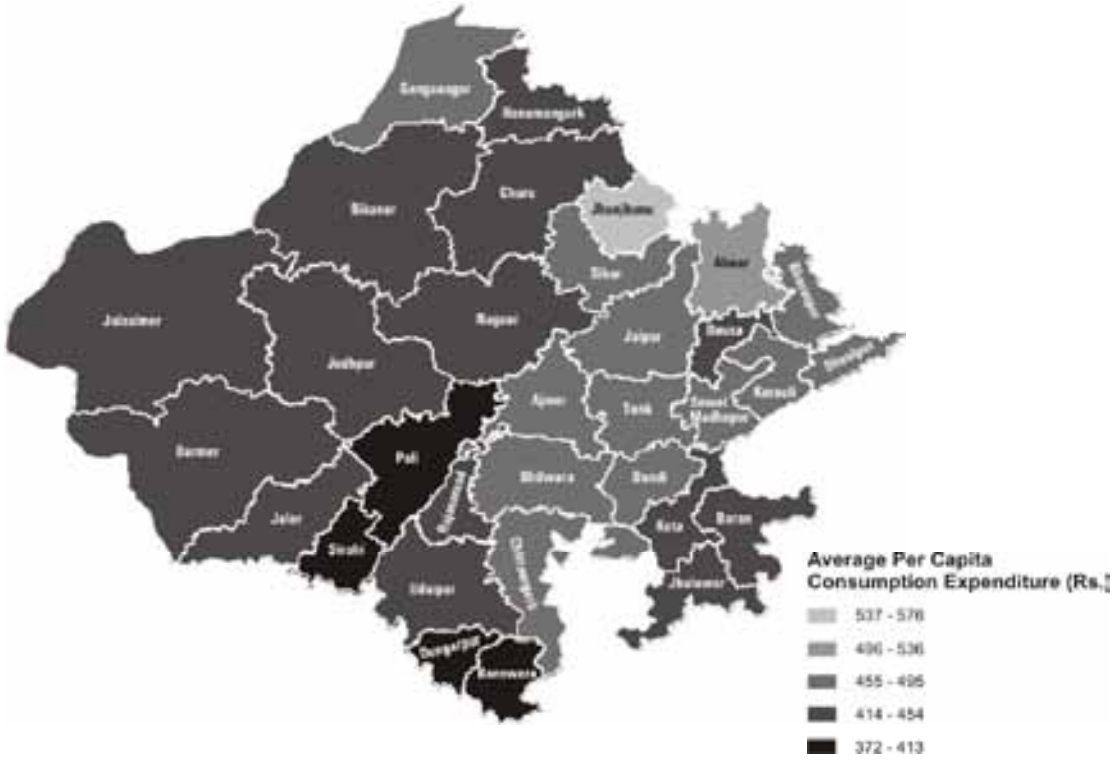
The district analysis shows that average per capita consumption expenditure varies from Rs. 576 to Rs. 372 across the districts (Table 5.4). In the majority of the districts, the per capita consumption expenditure was found to be low. Among these, it was severely low in four districts - Sirohi, Pali, Banswara and Dungarpur. Broadly, these districts have a high concentration of poor SC/ ST households. In 14 districts, consumption expenditure was also very low. These districts are part of western Rajasthan where acute scarcity of water resulted in low agricultural and livestock production (see Table 4.3 and

Table 5.4: Monthly Per Capita Consumption Expenditure by District, 2004-05 (Rs.)

High		Moderate		Low		Very Low		Extremely Low	
District	Value	District	Value	District	Value	District	Value	District	Value
Jhunjhunu	576	Alwar	523	Bundi	484	Baran	451	Pali	396
				Chittaurgarh	484	Jhalawar	451	Sirohi	396
				Dhaulpur	477	Kota	451	Banswara	372
				Karauli	477	Barmer	444	Dungarpur	372
				S.Madhopur	477	Jaisalmer	444		
				Jaipur	474	Jalor	440		
				Sikar	472	Rajsamand	435		
				Bharatpur	470	Udaipur	435		
				Bhilwara	466	Hanuman garh	431		
				Ajmer	461	Bikaner	428		
				Tonk	461	Churu	428		
				Ganganagar	460	Dausa	425		
						Jodhpur	418		
						Nagaur	414		

Source: *As stated in Table 3.4, Variable b4.*

Map 5.2: Status of Consumption Expenditure



4.4). This also caused low household income which resulted in low consumption expenditure. Only two districts, Jhunjhunu and Alwar, fall in the two top consumption categories. This shows that rural consumption is low over almost the entire state (Map 5.2).

5.3 Agricultural Labourers

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; or, the more the cultivators in a district, the better will be the food security situation. It is assumed that cultivated land is positively related to food security. Beside consumption as a whole, there is a particular concern with the earnings of agricultural labour. The understanding is that agricultural labour, without the backing of self-produced food, is particularly vulnerable to food insecurity.

Rajasthan has the lowest proportion of agricultural labourers in workforce among the major states of India (Table 5.5). There are only 12.3 per cent of agricultural labourers in Rajasthan, which is nearly one-third of the national average and almost four times lower than Bihar which has the highest proportion of agricultural labourers in its workforce.

Table 5.5: Proportion of Agricultural Labourers in Workforce 2001

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

Source: *As stated in Table 3.4, Variable b1.*

Among districts, the proportion of workers in non-agricultural sectors was substantially higher in the areas where the agriculture sector has certain constraints in further absorption of the available labour force. This is attributed to unfavourable agro-climatic conditions on the one hand and availability of non-farm activities on the other. Besides, growing urbanization has also contributed considerably in certain areas. In districts where concentration of tribal population is high, the size of land holdings is so small that it pushed the rural labour force to non-farm activities. It can further be noted that in the

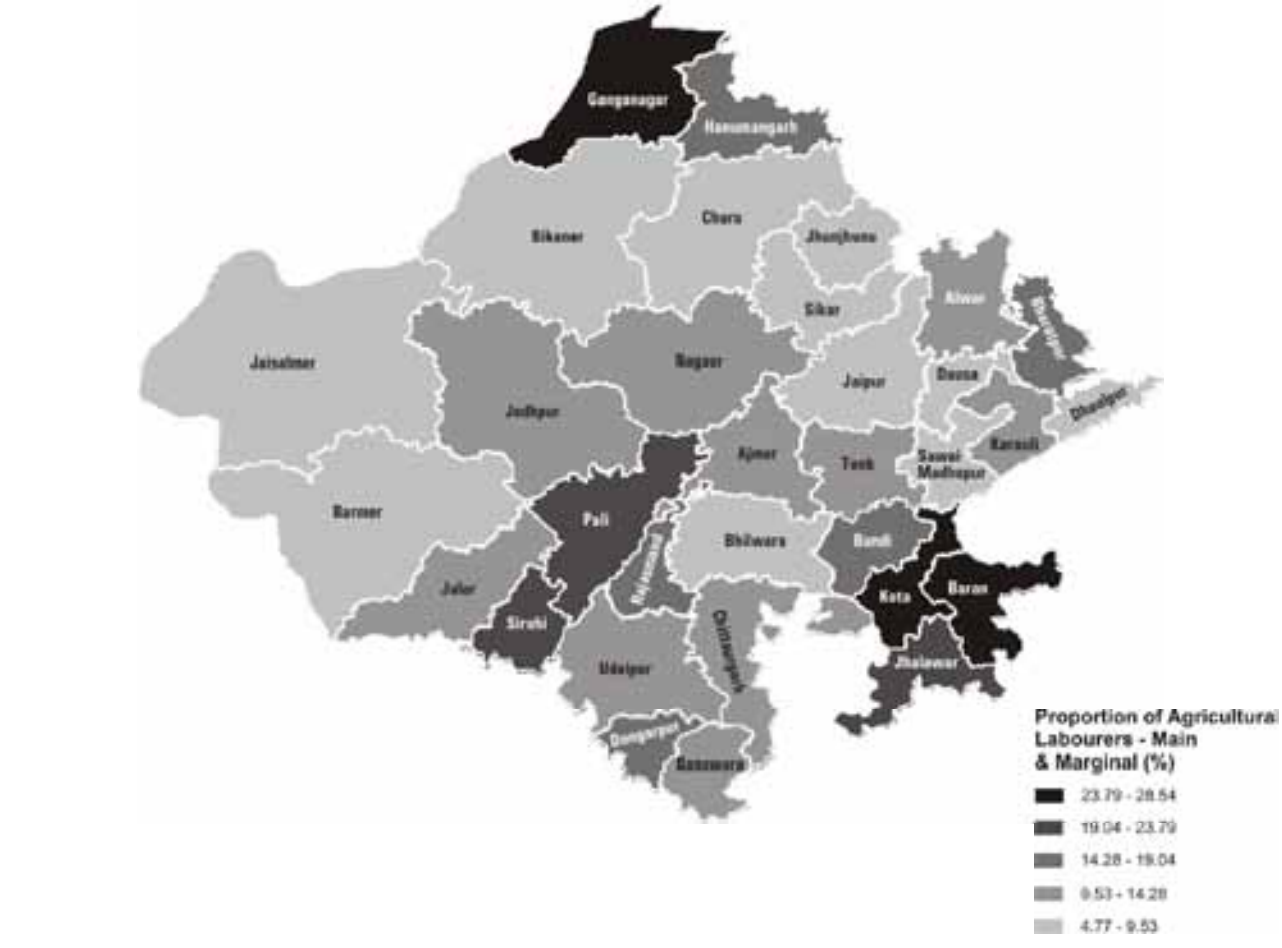
Table 5.6: Share of Agricultural Labour Force in Rajasthan, 2001 (%)

High		Moderate		Low		Very Low		Extremely Low	
District	Value	District	Value	District	Value	District	Value	District	Value
Baran	28.54	Pali	23.01	Hanuman-garh	17.70	Ajmer	14.08	Sawai Madhopur	9.27
Ganga-nagar	27.89	Jhalawar	22.95	Dungarpur	16.56	Jodhpur	12.73	Jaisalmer	9.05
Kota	25.80	Sirohi	20.60	Bundi	15.01	Udaipur	12.45	Bhilwara	8.09
				Rajsamand	14.72	Tonk	11.92	Jhunjhunu	7.95
				Bharatpur	14.30	Jalor	11.51	Dhaulpur	7.94
						Nagaur	11.50	Bikaner	7.22
						Chittaurgarh	11.40	Jaipur	7.08
						Karauli	10.93	Dausa	6.96
						Banswara	10.75	Sikar	6.55
						Alwar	9.57	Churu	4.96
								Barmer	4.77

**Here we have taken 100-% agricultural labour*

Source: As stated in Table 3.4, Variable b1.

Map 5.3: Share of Agricultural Labourers in Total Working Population



irrigated north-western plains and humid south-eastern plain, there was a concentration of workers involved in agricultural operations (Table 5.6 and Map 5.3). In other words, there was a lower proportion of non-agricultural labour. The reason being the availability of irrigation, which has contributed substantially to the development of the agriculture sector in these districts.

5.4 Proportion of Scheduled Tribes and Scheduled Castes Population

Scheduled Castes and Scheduled Tribes form the large marginalized community, particularly in the rural areas. While the Scheduled Tribes are marginalized mostly on account of their location, the Schedule Castes have faced historical discrimination, which accounts for their marginalized and vulnerable status. The assumption is that greater proportion of non-ST and non-SC population in a district will be associated with better food security.

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

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

Source: Census of India, 2001.

The proportion of Scheduled Castes in rural Rajasthan is 17.9 per cent which is equal to the national average. However, the proportion of Scheduled Tribes in Rajasthan is 15.5 per cent, which is 5.1 per cent points higher than the national average (Table 5.7). The proportion of Scheduled Castes and Scheduled Tribes in Rajasthan is moderate in comparison to the other states of India.

The district level analysis shows that in a majority of the districts, the concentration of SC/ST population was very low i.e. less than 30 per cent. In six districts, the concentration of such categories varied from two-fifth to one-third of the total population of the district. In three districts located in the southern part of the state, Banswara, Dungarpur and Udaipur, the concentration was high and moderate respectively. The concentration of SC/ST population in other districts like Karauli, Sawai Madhopur, Sirohi and Dausa was substantial (Table 5.8 and Map 5.4). These districts are known as tribal districts in the state.

Table 5.8: Proportion of Scheduled Castes and Scheduled Tribes in the Rural Population in Rajasthan, 2001

High		Moderate		Low		Very Low		Extremely Low	
District	**SC/ST**	**District**	**SC/ST**	**District**	**SC/ST**	**District**	**SC/ST**	**District**	**SC/ST**
Banswara	81.09	Udaipur	62.58	Dausa	50.95	Baran	42.31	Jhalawar	29.34
Dungarpur	72.41			Karauli	49.25	Bundi	42.10	Hanuman garh	28.90
				Sirohi	47.39	Chittaurgarh	39.01	Jaipur	28.59
				Sawai Madhopur	45.99	Ganganagar	38.56	Alwar	27.34
						Kota	37.91	Jalor	27.00
						Tonk	35.11	Bhilwara	26.89
								Rajsamand	26.79
								Dhaulpur	26.57
								Pali	25.09
								Churu	24.78
								Bikaner	24.70
								Bharatpur	23.76
								Barmer	22.24
								Nagaur	21.49
								Jaisalmer	20.95
								Jodhpur	20.67
								Ajmer	19.22
								Sikar	18.84
								Jhunjhunu	18.61

Source: As stated in Table 3.4, Variable b2.

5.5 Ratio of Working Age Population

The proportion of working age population has varied implications for the food security situation in a region. The working age ratio is the ratio between the working age population (15-59 years) and the dependent population (less than 15 years and more than 59 years of age). With development, fertility rates decline and the proportion of population in the working age group increases resulting in a 'bulge' in the working age group. This leads to the hypothesis that the 'demographic dividend' derived from this gain would accelerate economic growth with a more productive population (Chandrasekhar *et al*, 2006[1]).

In Rajasthan the ratio of population in the productive age-group is found to be poor compared to many states as well as to the national average. Only Uttar Pradesh (1.02) and Bihar (1.03) have a lower working age ratio than Rajasthan (1.06) (Table 5.9).

1. 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 5.4: Proportion of Scheduled Castes and Scheduled Tribes in Total Rural Population

The categorization of districts in the context of ratio of working age population does not present a uniform picture. Agriculturally developed districts like Ganganagar, Hanumangarh, Chittaurgarh have a high working age population. A similar situation can be noticed in certain tribal districts. In some parts of the western arid and flood-prone eastern regions, the ratio of working age population is considerably high compared to other districts (Table 5.10). The western districts of Bikaner, Barmer, Jodhpur, Jalor and north-eastern districts of Bharatpur, Dhaulpur and Karauli have a low ratio of working age population (Map 5.5).

Table 5.9: Ratio of Working Age Population, 2001

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

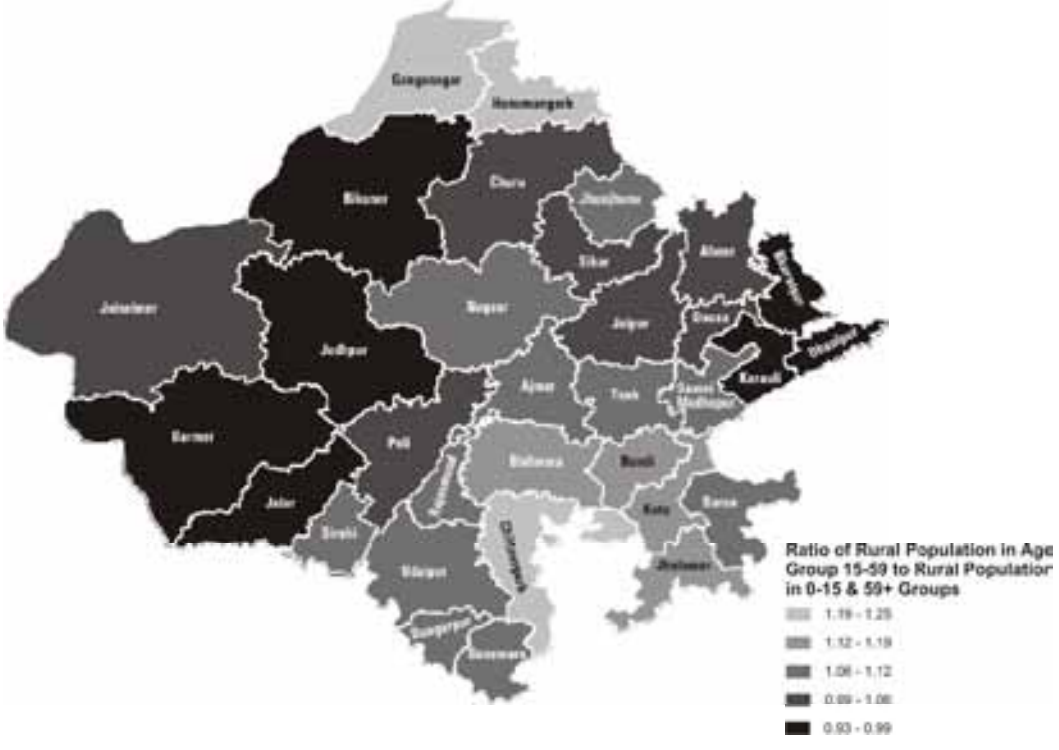
Source: Census of India, 2001

Table 5.10: Ratio of Rural Working Age Population in Rajasthan, 2001

High		Moderate		Low		Very Low		Extremely Low	
District	**Value**	**District**	**Value**	**District**	**Value**	**District**	**Value**	**District**	**Value**
Chittaurgarh	1.25	Bhilwara	1.17	Rajsamand	1.12	Jaipur	1.06	Karauli	0.99
Ganganagar	1.23	Kota	1.17	Udaipur	1.12	Sikar	1.05	Bikaner	0.99
Hanuman garh	1.22	Jhalawar	1.17	Tonk	1.12	Pali	1.03	Barmer	0.99
		Bundi	1.14	Ajmer	1.11	Alwar	1.02	Bharatpur	0.98
				Jhunjhunu	1.10	Dausa	1.02	Jodhpur	0.98
				Baran	1.10	Jaisalmer	1.01	Jalor	0.97
				Dungarpur	1.09	Churu	1.01	Dhaulpur	0.93
				Sawai Madhopur	1.09				
				Banswara	1.09				
				Sirohi	1.07				
				Nagaur	1.07				

Source: As stated in Table 3.4, Variable b3.

Map 5.5: Share of Rural Working Age Population



5.6 Rural Female Literacy

Female literacy has been recognized as the single most important factor contributing to increase in food security and decline in malnutrition and mortality levels (Save the Children, 2008). The rural female literacy in Rajasthan is very poor (37.3 per cent) in comparison to the other states of India. It ranks 14th among the 17 major states of India and is ahead only of Bihar (29.6), Jharkhand (29.9) and Uttar Pradesh (36.9) (Table 5.11).

Table 5.11: Status of Rural Female Literacy, 2001

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

Source: Census of India, 2001

Large disparities are seen across the districts in terms of adult female literacy in rural Rajasthan. The district level rural female literacy in Rajasthan varies from 59.25 per cent in Jhunjhunu to 24.43 per cent in Banswara. In 11 districts, it is extremely low i.e. less than 30 per cent. In eight districts, it is very low and a low status was noticed in six districts (Map 5.6). It may be stated that in large parts of the state, female literacy was low with intra-state variations. The low female literacy rate can be attributed to various factors including lack of awareness, pastoral nature of the rural economy, out-migration of the households, male domination etc.

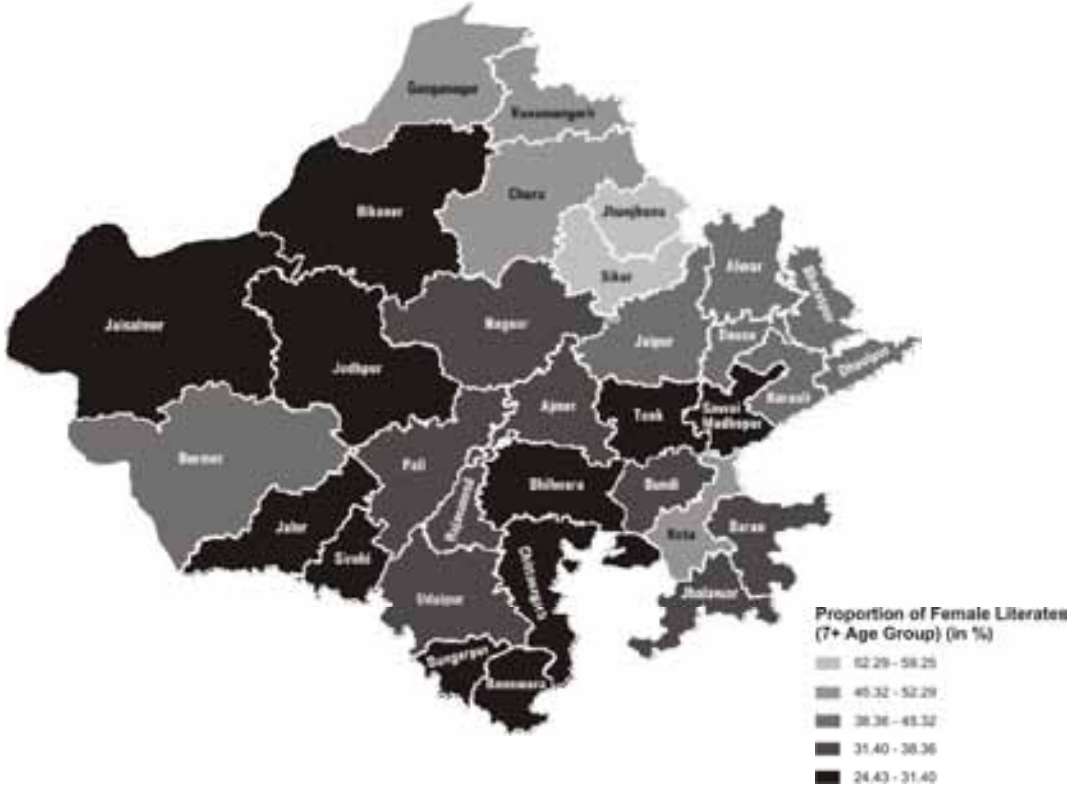
Parts of the Shekhawati region such as Jhunjhunu and Sikar lead in female education. Major industrial houses belong to this area and they have taken various initiatives for the development of educational infrastructure. Besides, people work in the service sector in both informal and formal enterprises, and therefore they have exposure to the rest of the country. This has good implication for human resource development. Districts such as Churu, Ganganagar, Hanumangarh and Kota have a moderate female literacy rate. With the exception of Churu district, these districts have a well-developed agriculture sector which has resulted in increasing the female literacy rate. Kota is also known as an education hub in the country. The people of this region have vast exposure to the rest of the country because of its emergence as an educational hub which played an important role in educational attainment in general and by women in particular. In agriculturally developed districts and some parts of western arid areas with high levels of tourism, the education level is relatively higher compared to tribal and other backward areas (Table 5.12 and Map 5.6).

Table 5.12: Status of Rural Female Literacy in Rajasthan, 2001 (%)

High		Moderate		Low		Very Low		Extremely Low	
District	**Value**	**District**	**Value**	**District**	**Value**	**District**	**Value**	**District**	**Value**
Jhunjhunu	59.25	Churu	50.93	Jaipur	43.86	Baran	37.66	Sirohi	31.29
Sikar	55.27	Kota	49.85	Karauli	42.77	Nagaur	36.85	Chittaurgarh	29.98
		Ganganagar	47.19	Barmer	42.04	Jhalawar	35.25	Sawai Madhopur	29.52
		Hanumangarh	46.27	Dausa	40.02	Udaipur	35.14	Dungarpur	28.86
				Bharatpur	39.06	Rajsamand	33.02	Bikaner	28.44
				Dhaulpur	38.89	Ajmer	32.63	Jaisalmer	27.26
				Alwar	38.54	Bundi	32.46	Bhilwara	26.20
						Pali	31.65	Jalor	26.18
								Tonk	25.66
								Jodhpur	24.75
								Banswara	24.43

Source: *As stated in Table 3.4, Variable b6.*

Map 5.6: Status of Female Literacy



5.7 Women's Work Participation Rate

Women's workforce participation (WWPR) improves the household's access to food, and is also likely to improve the women's own access to food - following Amartya Sen's argument that women's independent income would increase their bargaining power within the household. At the same time, it is generally noted that women's participation in the rural workforce declines with improvements in the household incomes. Women's workforce participation rate tends to be high among agricultural labour households and goes down as one moves up the land cultivating categories. Women's workforce participation (WWPR) is also likely to be related to caste and ethnicity - it is higher among STs and lower as one goes up the caste ladder. Thus, one can expect an inverse relation between women's workforce participation and the household's food security in a rural situation. It is in urban households that the relationship between food security and women's workforce participation may go both ways with increasing educational levels and participation of women in professional and managerial levels. For rural food security, we can continue to use women's workforce participation as being negatively related to the food security situation, with high participation being associated with a poor food security situation.

In the case of Rajasthan, social factors play an important role in determining the level of the women's workforce participation rate. Seasonal migration occurs across the districts because of socio-economic and environmental factors. But, there is no systematic pattern in the women's workforce participation rate across the districts (Table 5.13 and Map 5.7).

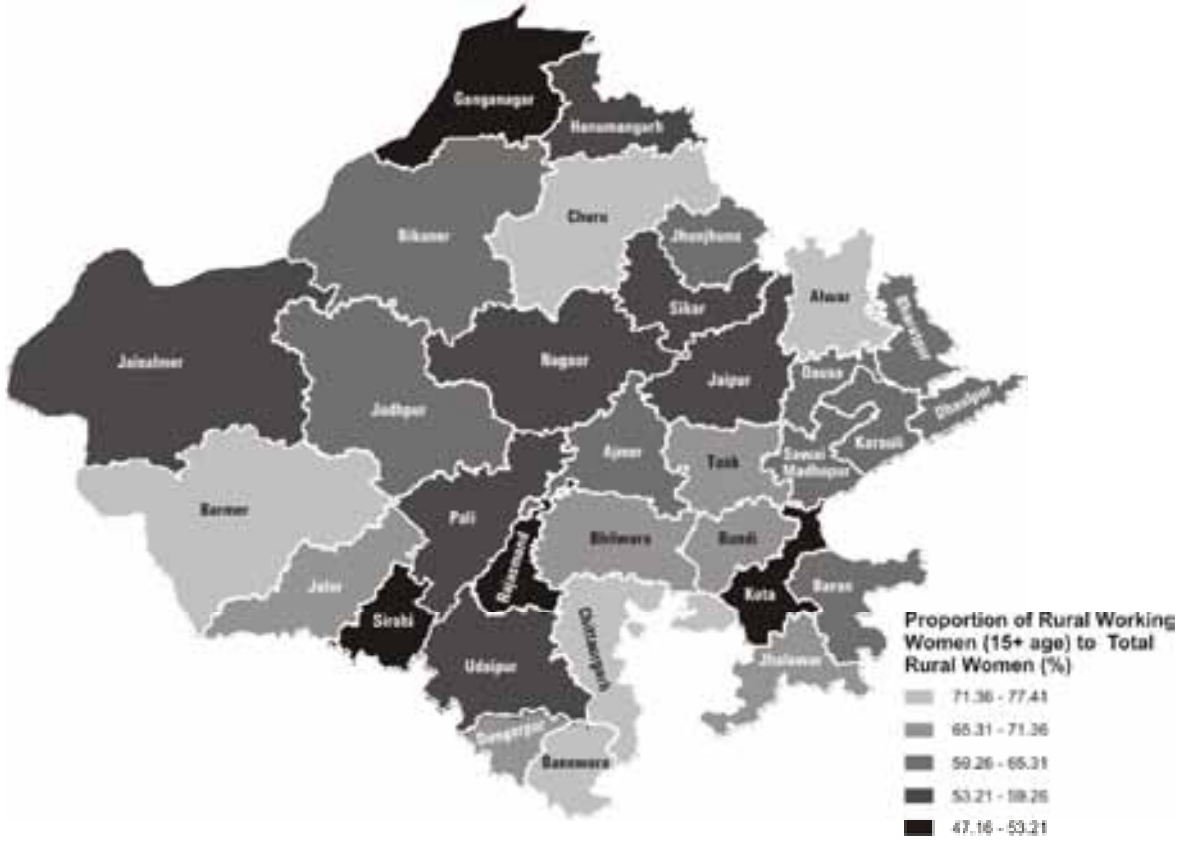
Churu district has the highest women's workforce participation rate (77.41 per cent) whereas Ganganagar has the lowest rate. Other districts which have a high workforce participation rate include

Table 5.13: Women's Work Participation Rate in Rural Rajasthan, 2001 (%)

High		Moderate		Low		Very Low		Extremely Low	
District	**Value**	**District**	**Value**	**District**	**Value**	**District**	**Value**	**District**	**Value**
Churu	77.41	Jalor	70.70	Sawai Madhopur	65.09	Sikar	59.14	Sirohi	52.74
Chittaurgarh	75.21	Bundi	70.15	Bharatpur	64.63	Nagaur	58.99	Rajsamand	49.75
Alwar	74.75	Dungarpur	70.11	Baran	64.13	Udaipur	56.38	Kota	48.63
Banswara	72.90	Jhalawar	67.11	Dausa	63.82	Hanuman garh	55.83	Ganganagar	47.16
Barmer	72.09	Tonk	66.89	Bikaner	63.67	Jaipur	55.39		
		Bhilwara	65.52	Karauli	63.15	Pali	54.35		
				Dhaulpur	63.05	Jaisalmer	54.02		
				Ajmer	60.36				
				Jodhpur	60.03				
				Jhunjhunu	59.63				

Source: *Census of India, 2001.*

Map 5.7: Women Workforce Participation Rate



Chittaurgarh, Alwar, Banswara and Barmer, with women's workforce participation rate of more than 72 per cent. Six districts have a moderate level of WWPR, 10 districts are with low WWPR, 7 districts have very low level of WWPR and another 4 districts have an extremely low level of WWPR.

5.8 Food Access Index

Table 5.14 presents district wise values and ranks of indicators used to compute Food Access Index.

Table 5.15 presents the status of districts in terms of the Food Access Index. Only 6 districts have been identified in the 2 secure categories of food access. The remaining 26 districts are in the 3 different categories of food insecure. Sirohi, Dungarpur and Banswara have been identified as the extremely insecure districts in terms of Food Access Index. At the other extreme, Jhunjhunu is the most secure district with respect to food access index (Table 5.15 and Map 5.8).

Map 5.8: Food Access Map of Rural Rajasthan

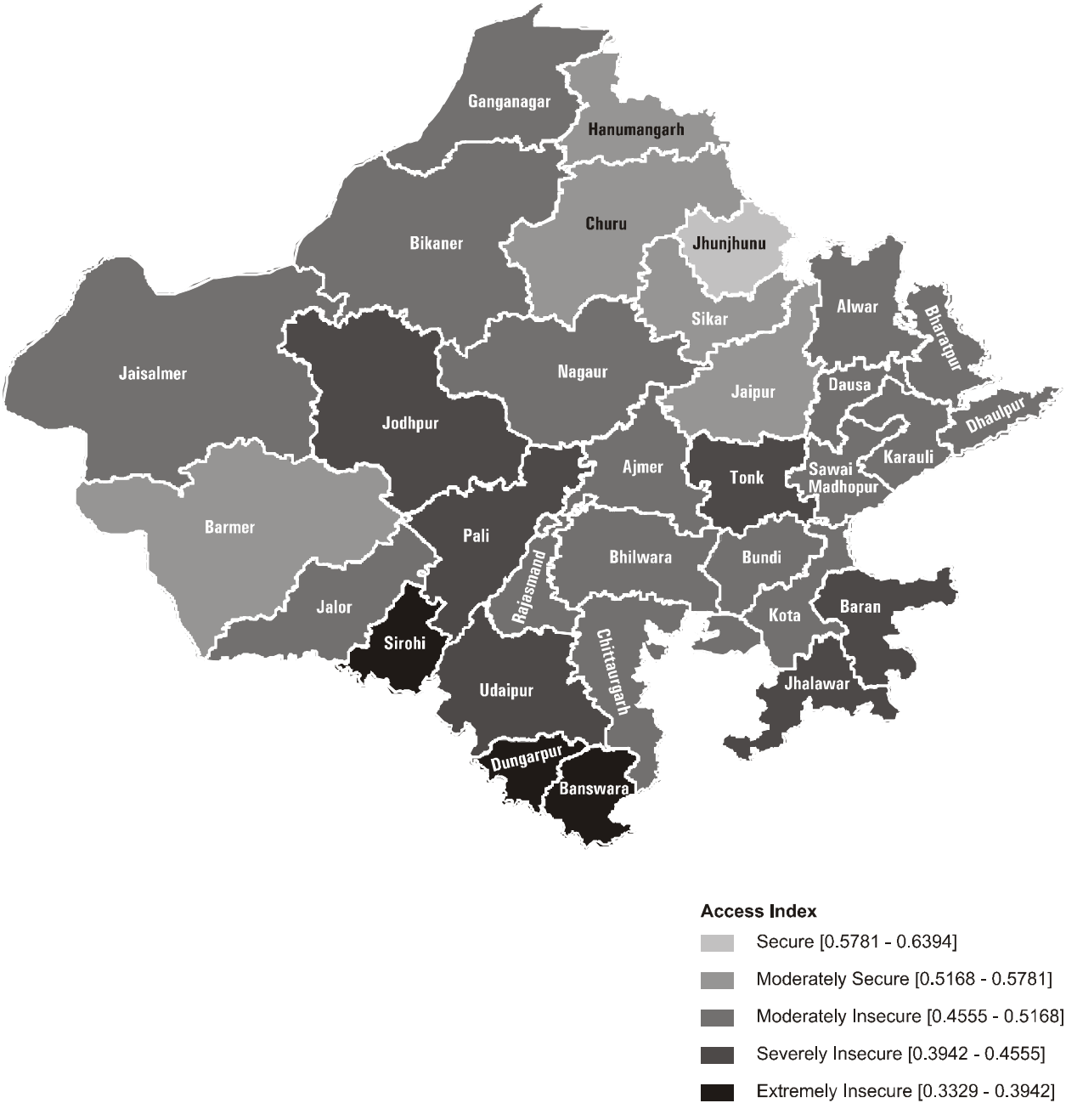


Table 5.14: Indicators Used to Compute Food Access Index in Rajasthan

District	Agricultural Labourers		Proportion of SC & ST		Ratio of Working Age Group Population		Monthly Per Capita Consumption Expenditure		Rural Casual Wage Rate		Rural Female Literacy	
	Value	Rank	Value	Rank	Value	Rank	Value	Rank	Value	Rank	Value	Rank
Ajmer	14.08	21	19.22	3	1.11	11	461	12	54.13	26	32.63	19
Alwar	9.57	12	27.34	16	1.02	22	523	2	59.12	22	38.54	13
Banswara	10.75	13	81.09	32	1.09	16	372	31	48.43	32	24.43	32
Baran	28.54	32	42.31	25	1.10	13	451	15	51.22	30	37.66	14
Barmer	4.77	1	22.24	7	0.99	28	444	18	64.60	11	42.04	9
Bharatpur	14.30	22	23.76	8	0.98	29	470	10	64.29	12	39.06	11
Bhilwara	8.09	9	26.89	14	1.17	4	466	11	54.00	27	26.20	28
Bikaner	7.22	6	24.70	9	0.99	27	428	24	62.83	15	28.44	26
Bundi	15.01	24	42.10	24	1.14	7	484	3	64.08	14	32.46	20
Chittaurgarh	11.40	15	39.01	23	1.25	1	484	3	51.08	31	29.98	23
Churu	4.96	2	24.78	10	1.01	25	428	24	66.23	10	50.93	3
Dausa	6.96	4	50.95	29	1.02	23	425	26	62.10	16	40.02	10
Dhaulpur	7.94	7	26.57	12	0.93	32	477	5	68.87	6	38.89	12
Dungarpur	16.56	25	72.41	31	1.09	14	372	31	52.06	29	28.86	25
Ganganagar	27.89	31	38.56	22	1.23	2	460	14	64.17	13	47.19	5
Hanumangarh	17.70	26	28.90	18	1.22	3	431	23	81.95	2	46.27	6
Jaipur	7.08	5	28.59	17	1.06	19	474	8	67.82	9	43.86	7
Jaisalmer	9.05	10	20.95	5	1.01	24	444	18	70.55	4	27.26	27
Jalor	11.51	17	27.00	15	0.97	31	440	20	70.38	5	26.18	29
Jhalawar	22.95	28	29.34	19	1.17	6	451	15	60.34	18	35.25	16
Jhunjhunu	7.95	8	18.61	1	1.10	12	576	1	92.55	1	59.25	1
Jodhpur	12.73	20	20.67	4	0.98	30	418	27	61.58	17	24.75	31
Karauli	10.93	14	49.25	28	0.99	26	477	5	60.26	19	42.77	8
Kota	25.80	30	37.91	21	1.17	5	451	15	71.58	3	49.85	4
Nagaur	11.50	16	21.49	6	1.07	18	414	28	59.30	20	36.85	15
Pali	23.01	29	25.09	11	1.03	21	396	29	59.03	23	31.65	21
Rajsamand	14.72	23	26.79	13	1.12	8	435	21	59.17	21	33.02	18
Sawai Madhopur	9.27	11	45.99	26	1.09	15	477	5	68.08	7	29.52	24
Sikar	6.55	3	18.84	2	1.05	20	472	9	67.99	8	55.27	2
Sirohi	20.60	27	47.39	27	1.07	17	396	29	52.23	28	31.29	22
Tonk	11.92	18	35.11	20	1.12	10	461	12	56.85	24	25.66	30
Udaipur	12.45	19	62.58	30	1.12	9	435	21	54.49	25	35.14	17

Source: As stated in Table 3.4.

Table 5.15: Status of Districts on Food Access Index

Secure		Moderately Secure		Moderately Insecure		Severely Insecure		Extremely Insecure	
District	**Value**	**District**	**Value**	**District**	**Value**	**District**	**Value**	**District**	**Value**
Jhunjhunu	0.6394	Sikar	0.5710	Alwar	0.5068	Jodhpur	0.4467	Sirohi	0.3823
		Churu	0.5393	Dhaulpur	0.5064	Jhalawar	0.4467	Dungarpur	0.3433
		Jaipur	0.5273	Bharatpur	0.4870	Tonk	0.4447	Banswara	0.3329
		Barmer	0.5232	Jaisalmer	0.4852	Pali	0.4174		
		Hanuman-garh	0.5181	Nagaur	0.4823	Udaipur	0.4102		
				Ajmer	0.4762	Baran	0.3944		
				Bhilwara	0.4749				
				Bikaner	0.4728				
				Kota	0.4723				
				Rajsamand	0.4637				
				Karauli	0.4627				
				Chittaurgarh	0.4609				
				Sawai Madhopur	0.4606				
				Jalor	0.4594				
				Dausa	0.4583				
				Ganganagar	0.4561				
				Bundi	0.4560				

Source: *Census of India, 2001.*

6. Food Absorption

It has been estimated that in developing countries, one out of five people do not have access to safe drinking water, and roughly half are without adequate sanitation (WHO, 2007). Primary health services in the country as a whole are inadequate, particularly in rural areas. There are persistent gaps in human resources and infrastructure, especially in the less developed rural areas. A significant proportion of hospitals do not have adequate personnel, diagnostic and therapeutic services and drugs. In a state like Rajasthan, with a high burden of communicable and non-communicable diseases because of persisting poverty, primary health infrastructure at the village level assumes huge significance. However, a good number of villages in the state are not adequately covered by a Primary Health Centre (PHC), the most critical health facility in rural areas. One PHC has been provided for as many as 25 villages, which hardly serves the purpose in the light of high pressure on limited resources. This compares poorly to a state like Kerala that has excellent health infrastructure in the rural areas (one PHC for every one and half villages). Lack of primary public health facilities forces the vulnerable populations to depend on private health services, often leading to indebtedness in rural areas (Table 6.1).

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.

Access to safe drinking water and sanitation is another important indicator of the health status of a population. Studies have shown that water and sanitation account for a substantial portion of the difference in infant and child mortality rates experienced by the rich and the poor (Leipziger et al 2003). Safe drinking water plays a key role in the body's use of consumed food. Though India has taken huge strides in terms of provision of safe drinking water since independence, the fact remains that more people in India lack this basic minimum necessity now than 50 years ago. Besides, more people are vulnerable to water-borne diseases (Gujja & Shaik, 2005). Empirical studies have shown that water quality is a big problem in rural areas (Krishnan et al, 2003).The availability and quality of potable water is a big factor that affects food insecurity. Almost two million children die each year because of lack of clean water and sanitation (UNICEF, 2007c). As there is no direct method of calculation of access to safe drinking water, we have taken access to tubewell, tap and handpump as safe sources of drinking water. In Rajasthan, 68.3 per cent of the households are having access to safe drinking water. It ranks 13th among the 17 major states of India on this count and is nearly 10 percentage points lower than the national average.

6.1 Access to Primary Health Services

Public health infrastructure helps the local inhabitants deal with the harmful effects of exposure to diseases. In rural areas, all the health services are pivoted around the PHCs, hence we have taken access to PHCs as a major indicator determining absorption of food.

In Rajasthan, very limited efforts have been made to increase access to health care. Till date, only one-fifth of the total villages in the state have access to health facilities within a distance of 5 km. In 4 districts, Baran, Barmer, Bikaner and Jaisalmer, access to health facilities was extremely low, i.e. only about one-tenth of the total villages benefited from the health facilities. Except Baran, these districts are part of the western desert region. There were 8 districts where accessibility to health facilities varied from 13 to 16 per cent, which is also considered as very low. In 12 districts, it was low with 19 to 24 per cent. It may be inferred that a majority of the districts in the state have poor access to health facilities. In 6 districts, access was moderate. Only 3 districts had relatively better access to health facilities. Of these 3 districts, 2 were tribal districts. In these tribal districts, less than one-third of the villages had access to health facilities. As is the case with education and road connectivity, Jhunjhunu district leads on account of access to health facilities (Table 6.2). In some districts of the western arid region, the availability of health facilities is pitiable and needs urgent attention by the programme implementing agencies (see Map 6.1).

Health facilities are available in a limited proportion of the villages i.e. about one-fifth of the total villages. There are some districts, where the human settlements are scattered and the households in these areas have to cover long distances to access the required facilities.

Map 6.1: Access to Health Services in Rural Areas of Rajasthan

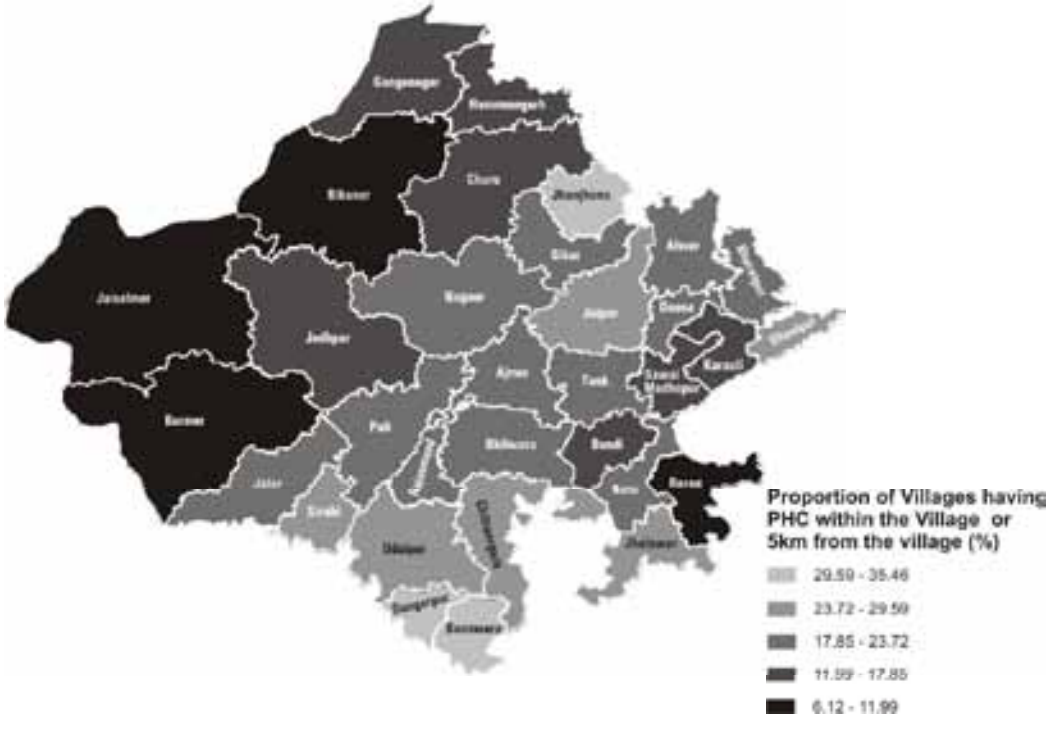


Table 6.2: Access to PHCs in Rajasthan (in per cent of villages), 2001

High		Moderate		Low		Very Low		Extremely Low	
District	PHC	District	PHC	District	PHC	District	PHC	District	PHC
Banswara	35.46	Dhaulpur	28.46	Bharatpur	23.26	Ganganagar	16.69	Baran	11.65
Dungarpur	34.08	Udaipur	26.48	Sikar	22.88	Bundi	16.13	Barmer	10.59
Jhunjhunu	32.47	Sirohi	25.90	Ajmer	21.36	Sawai Madhopur	15.98	Bikaner	8.43
		Chittaurgarh	24.79	Bhilwara	21.32	Jodhpur	15.29	Jaisalmer	6.12
		Jaipur	24.48	Rajsamand	21.27	Churu	14.89		
		Jhalawar	23.80	Dausa	21.02	Hanumangarh	14.83		
				Alwar	19.96	Karauli	13.71		
				Pali	19.87				
				Nagaur	19.73				
				Jalor	19.19				
				Tonk	18.94				
				Kota	18.77				

** PHCs within 5 kms has been taken*

Source: As stated in Table 3.4, Variable c2.

6.2 Access to Safe Drinking Water

Table 6.3 presents percentage of households in a district with access to safe drinking water in rural Rajasthan. Seventeen districts fall under the three categories of low access to safe drinking water. With certain exceptions, most of these districts fall in the western arid region. This region is characterized as water scarce region of the country. Bharatpur district has extremely low level of households with access to safe drinking water. Kota, Chittaurgarh, Bundi and Baran districts have more than 80 per cent of households with access to safe drinking water.

Further, the analysis shows that access to safe drinking water is higher only in regions covered under canal command areas or that have good rainfall conditions. Besides, in certain areas, the provision of safe drinking water has been made through the transfer of water from irrigation projects, e.g. Jawai and IGNP in Jodhpur district and Bisalpur in Tonk and Jaipur districts. In water scarce regions as in the western arid region districts and flood-prone districts, the proportion of access to safe drinking water is considerably lower. (Table 6.3 and Map 6.2). In these districts, members of households, particularly women have to cover long distances to fetch drinking water. In this regard, efforts made by the government

Map 6.2: Access to Safe Drinking Water in Rural Areas

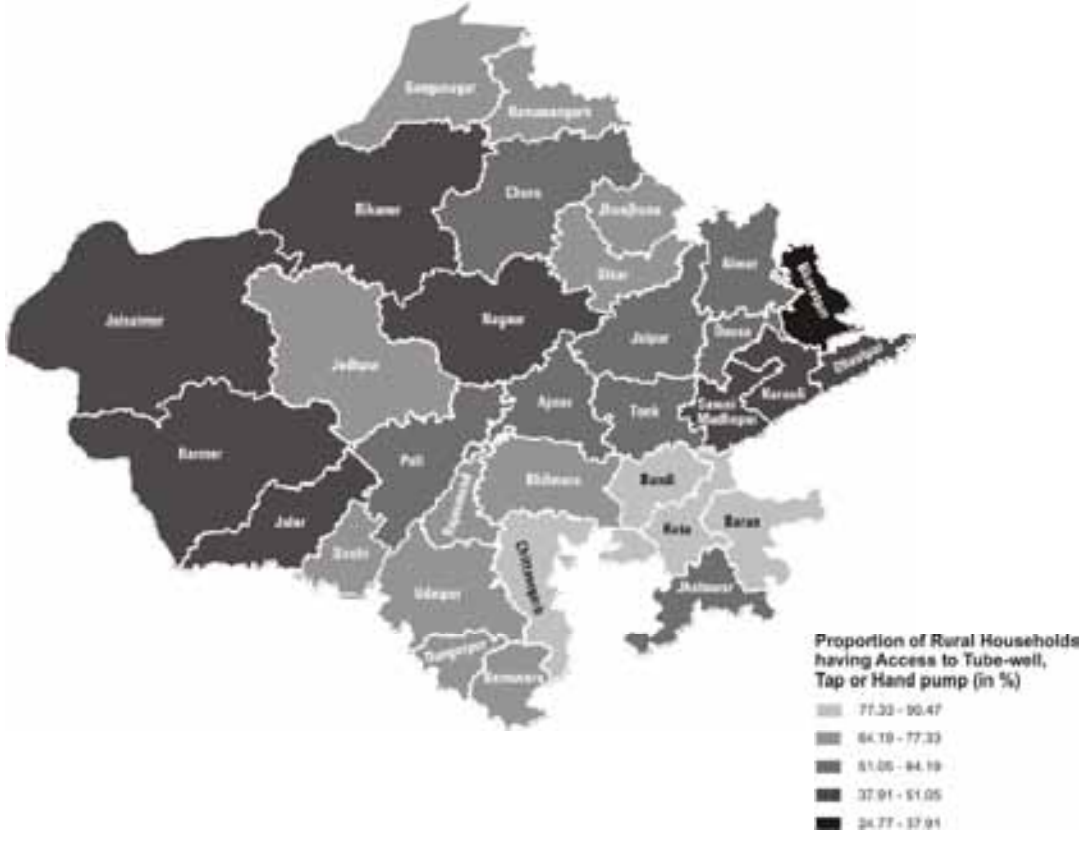


Table 6.3: Access to Safe Drinking Water in Rural Rajasthan (in per cent of Households), 2001

High		Moderate		Low		Very Low		Extremely Low	
District	**Value**	**District**	**Value**	**District**	**Value**	**District**	**Value**	**District**	**Value**
Kota	90.47	Sirohi	74.66	Ajmer	64.15	Sawai Madhopur	51.03	Bharatpur	24.77
Chittaurgarh	85.09	Jhunjhunu	71.65	Jhalawar	62.22	Jalor	48.01		
Bundi	84.42	Dungarpur	71.60	Jaipur	60.32	Dhaulpur	47.77		
Baran	82.58	Rajsamand	68.57	Alwar	58.74	Nagaur	47.62		
		Ganganagar	68.23	Tonk	54.52	Jaisalmer	45.49		
		Bhilwara	67.93	Pali	53.49	Bikaner	44.97		
		Banswara	67.29	Dausa	52.59	Karauli	40.84		
		Jodhpur	66.20	Churu	51.50	Barmer	39.28		
		Hanumangarh	66.19						
		Sikar	65.31						

Source: *As stated in Table 3.4, Variable c1*

under various schemes such as the Rajiv Gandhi Drinking Water Mission have yielded results in large parts of the state. But, there is a need to make sustained efforts in certain areas, particularly the water scarce districts in the western arid hill regions.

6.3 Food Absorption Index

District wise value and ranks of indicators which have been used to compute Absorption Index and resultant absorption index value and ranks have been presented in Table 6.4.

The Food Absorption Index shows that 15 districts are in the two relatively food secure categories of secure and moderately secure. Remaining 17 districts are in the three insecure categories of food absorption index i.e., extremely insecure, severely insecure and moderately insecure (Table 6.4 and Map 6.3).

Geographically, two regions are appearing as critical in terms of food absorption:

a) Western arid regions of Barmer, Jaisalmer, Bikaner and their adjoining districts; and

b) Northeastern region comprising of Bharatpur, Karauli and their adjoining districts.

Southeastern region is relatively secure in terms of food absorption.

Map 6.3: Food Absorption Map of Rural Rajasthan

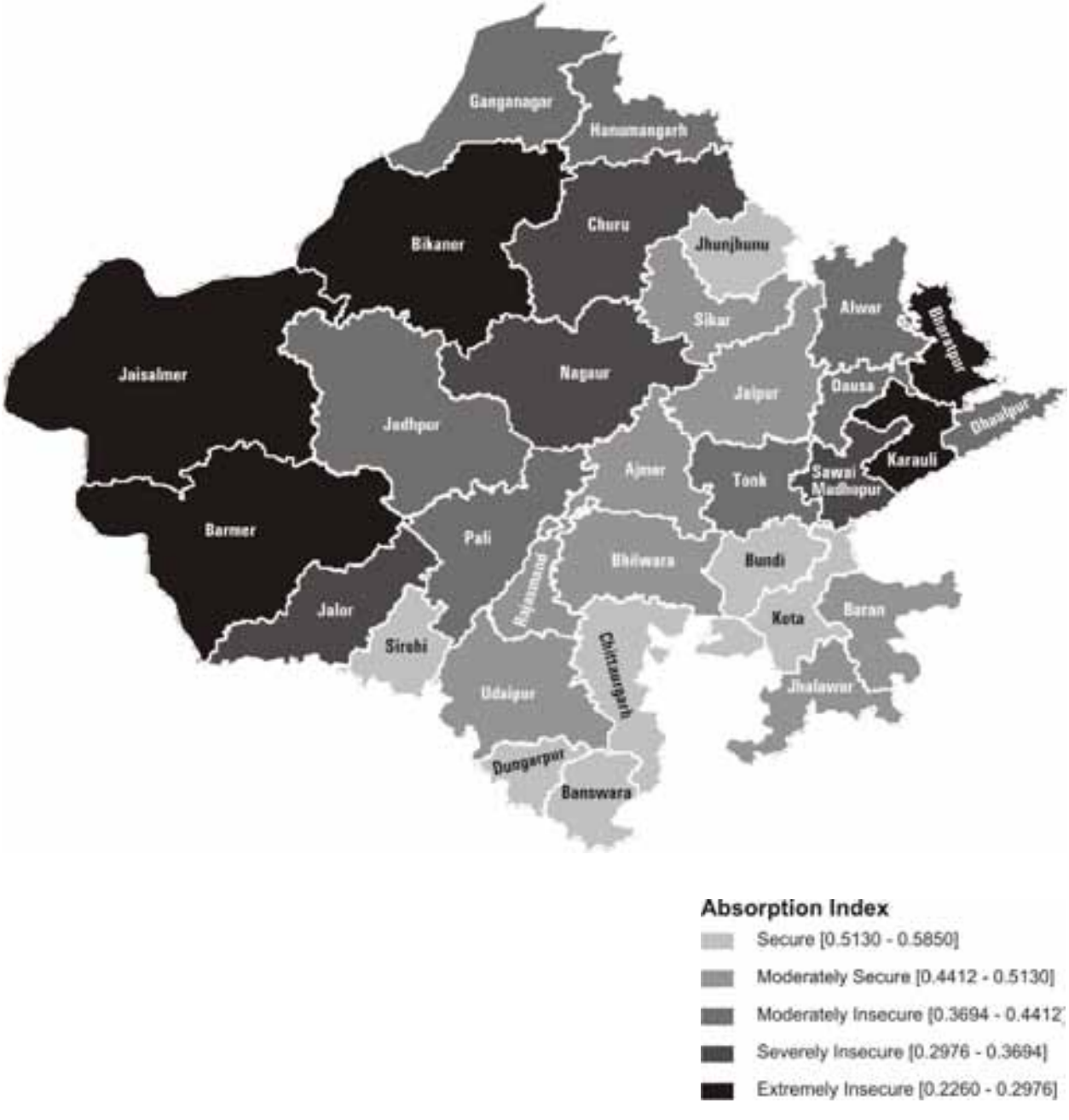


Table 6.4: Indicators Used to Compute Absorption Index

District	Access to Safe Drinking Water		Access to PHC		Absorption Index	
	Value	Rank	Value	Rank	Value	Rank
Ajmer	64.15	16	21.36	12	0.443	15
Alwar	58.74	19	19.96	16	0.403	20
Banswara	67.29	11	35.46	1	0.564	5
Baran	82.58	4	11.65	29	0.474	9
Barmer	39.28	31	10.59	30	0.226	32
Bharatpur	24.77	32	23.26	10	0.238	30
Bhilwara	67.93	10	21.32	13	0.464	11
Bikaner	44.97	29	8.43	31	0.242	29
Bundi	84.42	3	16.13	23	0.517	7
Chittaurgarh	85.09	2	24.79	7	0.585	1
Churu	51.50	23	14.89	26	0.325	27
Dausa	52.59	22	21.02	15	0.376	21
Dhaulpur	47.77	26	28.46	4	0.404	19
Dungarpur	71.60	7	34.08	2	0.578	2
Ganganagar	68.23	9	16.69	22	0.431	16
Hanumangarh	66.19	13	14.83	27	0.407	18
Jaipur	60.32	18	24.48	8	0.445	14
Jaisalmer	45.49	28	6.12	32	0.227	31
Jalor	48.01	25	19.19	19	0.338	25
Jhalawar	62.22	17	23.80	9	0.450	13
Jhunjhunu	71.65	6	32.47	3	0.567	4
Jodhpur	66.20	12	15.29	25	0.410	17
Karauli	40.84	30	13.71	28	0.257	28
Kota	90.47	1	18.77	21	0.570	3
Nagaur	47.62	27	19.73	18	0.339	24
Pali	53.49	21	19.87	17	0.373	22
Rajsamand	68.57	8	21.27	14	0.467	10
Sawai Madhopur	51.03	24	15.98	24	0.331	26
Sikar	65.31	14	22.88	11	0.461	12
Sirohi	74.66	5	25.90	6	0.535	6
Tonk	54.52	20	18.94	20	0.372	23
Udaipur	64.74	15	26.48	5	0.484	8

Source: As stated in Table 3.4.

Table 6.4: Status of Districts in terms of Food Absorption Index

Secure		Moderately Secure		Moderately Insecure		Severely Insecure		Extremely Insecure	
District	**Value**	**District**	**Value**	**District**	**Value**	**District**	**Value**	**District**	**Value**
Chittaurgarh	0.585	Udaipur	0.484	Ganganagar	0.431	Nagaur	0.339	Karauli	0.257
Dungarpur	0.578	Baran	0.474	Jodhpur	0.410	Jalor	0.338	Bikaner	0.242
Kota	0.570	Rajsamand	0.467	Hanuman garh	0.407	Sawai Madhopur	0.331	Bharatpur	0.238
Jhunjhunu	0.567	Bhilwara	0.464	Dhaulpur	0.404	Churu	0.325	Jaisalmer	0.227
Banswara	0.564	Sikar	0.461	Alwar	0.403			Barmer	0.226
Sirohi	0.535	Jhalawar	0.450	Dausa	0.376				
Bundi	0.517	Jaipur	0.445	Pali	0.373				
		Ajmer	0.443	Tonk	0.372				

Food absorption index, however, does not correlate well with the food outcome index in Rajasthan. It can be seen that district with high food absorption index value have low level of food security outcome value which suggests that factors other than access to health infrastructure and safe drinking water is having their influence on the under five mortality and underweight children.

*****

7. Addressing Food Insecurity in Rajasthan

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 prone to food insecurity. These factors were analyzed through the framework of Availability, Access and Absorption in chapters 4 to 6. In this chapter, all these factors are combined to form a food security index (FSI) to explain food security situation across dstricts of Rajasthan. Any strategy to improve the food security status must consider the regional disparities in the incidence of food and nutrition insecurity and develop location specific policies for clusters of hunger hotspots.

7.1 Food Security Index

The overall food security index shows a higher number of districts in the three categories of insecurity than in the two categories of security. Barmer, Sirohi, Dungarpur, Banswara and Udaipur have been identified as extremely insecure districts in Rajasthan. Similarly, most of the central and southwestern districts are in the category of severely insecure (Table 7.1 and Map 7.1). Jhunjhunu and Kota are the two districts in Rajasthan which have been identified in the category of the secure. It is striking to note that 20 of the 32 districts are in the worst two categories. Table 7.2 gives detail on index values by districts.

A large number of programmes dealing with all three components of food security viz. availability, access and absorption, are being implemented in the state of Rajasthan. The analysis in this atlas can help to

Table 7.1: Status of Districts in terms of FSI

Secure	Moderately Secure	Moderately Insecure	Severely Insecure	Extremely Insecure
Jhunjhunu	Ganganagar	Bharatpur	Ajmer	Barmer
Kota	Hanumangarh	Dhaulpur	Bhilwara	Sirohi
	Jaipur	Bundi	Nagaur	Dungarpur
	Sikar	Churu	Baran	Banswara
	Alwar	Dausa	Chittaurgarh	Udaipur
			Bikaner	
			Jalor	
			Sawai Madhopur	
			Jhalawar	
			Tonk	
			Jodhpur	
			Rajsamand	
			Jaisalmer	
			Karauli	
			Pali	

Map 7.1: Food Security Map of Rural Rajasthan

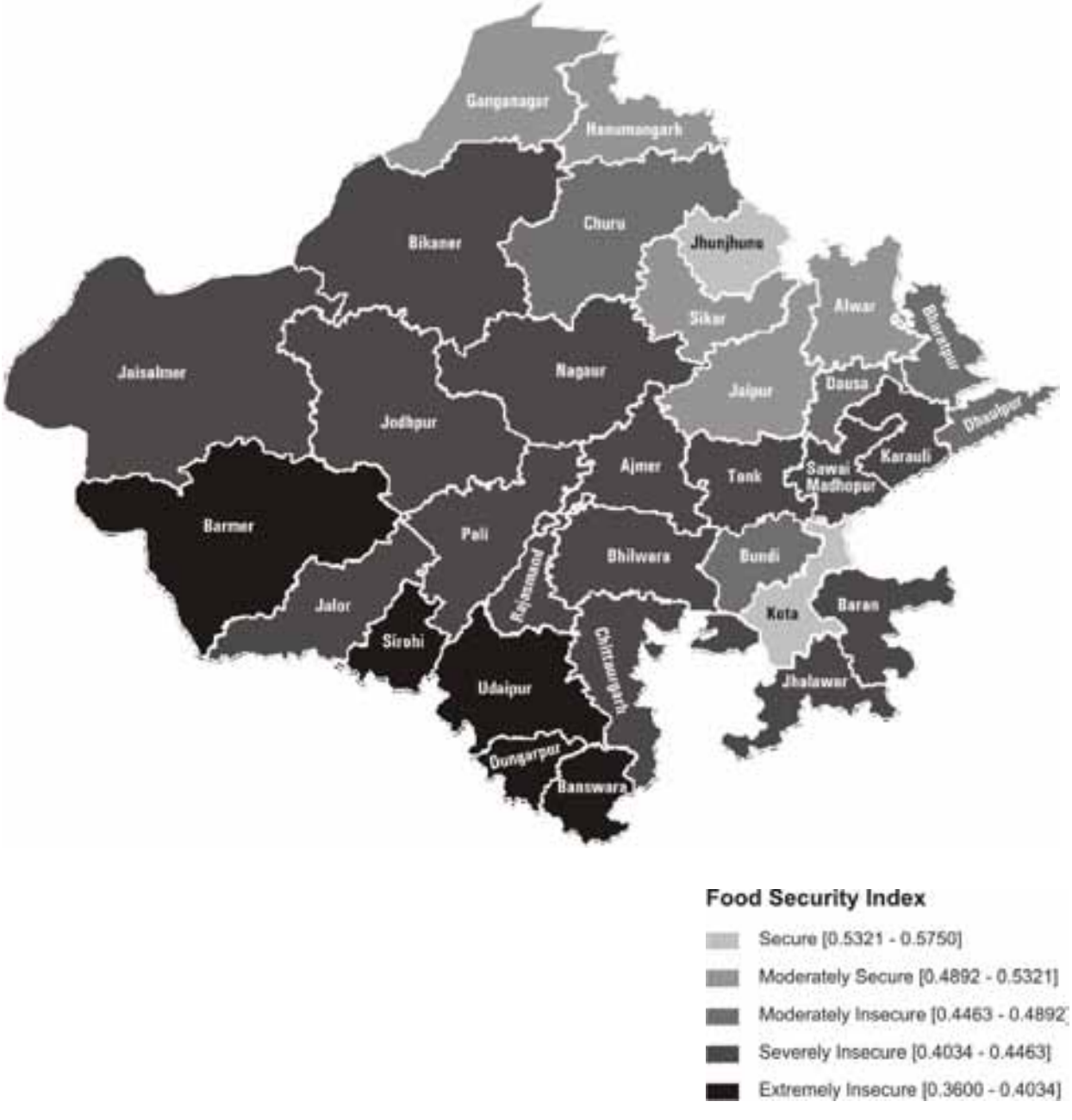


Table 7.2: Ranks of Districts on Composite Food Security Index and Components

Districts	Availability Index		Access Index		Absorption Index		FSI		FSOI	
	Value	Rank	Value	Rank	Value	Rank	Value	Rank	Value	Rank
Ajmer	0.317	26	0.476	12	0.443	15	0.4458	13	0.469	23
Alwar	0.640	3	0.507	7	0.403	20	0.5033	7	0.605	9
Banswara	0.317	25	0.333	32	0.564	5	0.3689	31	0.493	19
Baran	0.587	5	0.394	29	0.474	9	0.4404	16	0.453	25
Barmer	0.198	32	0.523	5	0.226	32	0.4025	28	0.446	26
Bharatpur	0.599	4	0.487	9	0.238	30	0.4794	8	0.656	6
Bhilwara	0.265	28	0.475	13	0.464	11	0.4453	14	0.489	20
Bikaner	0.358	18	0.473	14	0.242	29	0.4378	18	0.620	7
Bundi	0.517	8	0.456	23	0.517	7	0.4694	10	0.497	18
Chittaurgarh	0.336	22	0.461	18	0.585	1	0.4393	17	0.383	31
Churu	0.297	27	0.539	3	0.325	27	0.4567	11	0.588	11
Dausa	0.505	10	0.458	21	0.376	21	0.4562	12	0.579	12
Dhaulpur	0.527	6	0.506	8	0.404	19	0.4748	9	0.479	22
Dungarpur	0.319	24	0.343	31	0.578	2	0.3829	30	0.374	32
Ganganagar	0.686	1	0.456	22	0.431	16	0.5157	3	0.726	3
Hanumangarh	0.52	7	0.518	6	0.407	18	0.5095	4	0.745	2
Jaipur	0.454	12	0.527	4	0.445	14	0.5073	5	0.615	8
Jaisalmer	0.259	29	0.485	10	0.227	31	0.4242	25	0.507	17
Jalor	0.41	15	0.459	20	0.338	25	0.4377	19	0.538	15
Jhalawar	0.385	17	0.447	25	0.45	13	0.4357	21	0.588	10
Jhunjhunu	0.514	9	0.639	1	0.567	4	0.5750	1	0.692	4
Jodhpur	0.326	23	0.447	24	0.41	17	0.4291	23	0.667	5
Karauli	0.496	11	0.463	17	0.257	28	0.4191	26	0.535	16
Kota	0.669	2	0.472	15	0.57	3	0.5374	2	0.567	13
Nagaur	0.345	20	0.482	11	0.339	24	0.4435	15	0.541	14
Pali	0.346	19	0.417	27	0.373	22	0.4064	27	0.480	21
Rajsamand	0.233	31	0.464	16	0.467	10	0.4257	24	0.411	30
Sawai Madhopur	0.437	13	0.461	19	0.331	26	0.4364	20	0.432	28
Sikar	0.427	14	0.571	2	0.461	12	0.5063	6	0.775	1
Sirohi	0.401	16	0.382	30	0.535	6	0.3878	29	0.430	29
Tonk	0.337	21	0.445	26	0.372	23	0.4350	22	0.441	27
Udaipur	0.236	30	0.41	28	0.484	8	0.3604	32	0.469	24

prioritize the geographical targeting of these programmes and suggest interventions that could improve food security by linking short-term access measures with long-term development measures.

7.2 Identifying Priority Districts

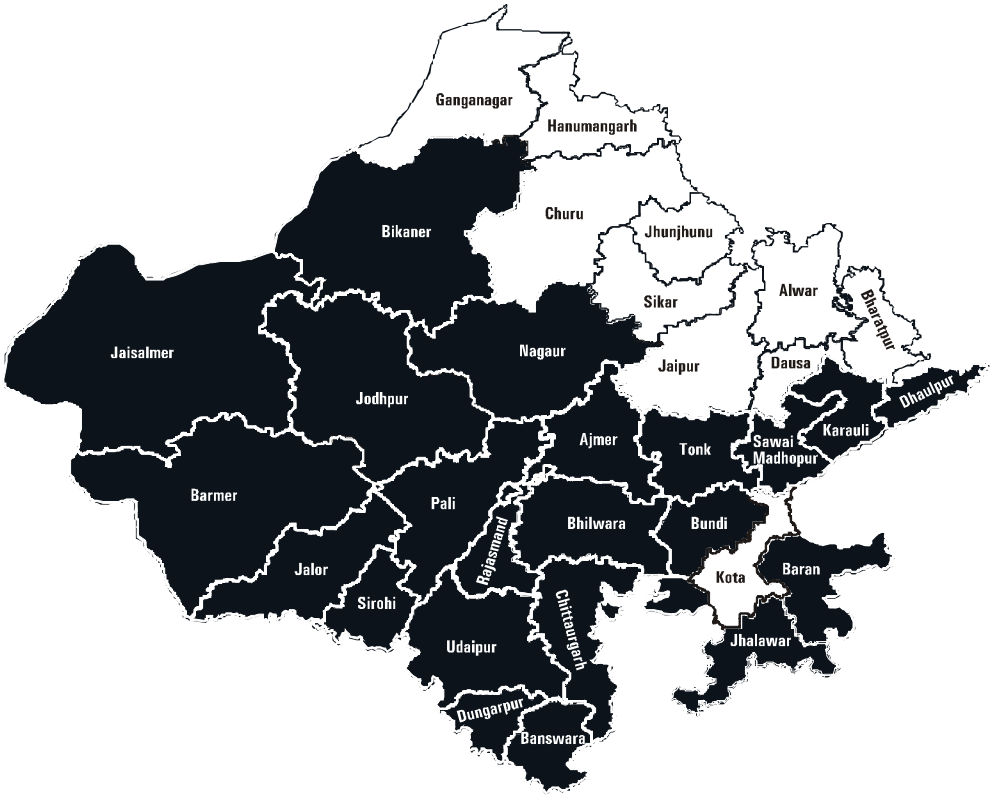
The food security outcome index and food security index discussed earlier provides the option of prioritizing the developmental efforts in the most food insecure districts. The districts in the two lowest categories, that is, the extremely and severely food insecure districts, in both the indices should be prioritized for developmental intervention towards enhancing food security. There are three kinds of such districts - districts common in both FSI and FSOI, districts only by FSI and districts only by FSO. These districts are presented with their ranks in FSI and FSO, criteria of selection and region in which they are located in Table 7.3.

Twenty two districts out of the total 32 districts of Rajasthan have been identified as districts for food

Table 7.3: Priority Food Security Intervention Districts of Rajasthan by Criteria

Districts	FSI Value	Rank	FSOI Value	Rank	Criteria	Region
Ajmer	0.446	13	0.469	23	Both (FSI+FSOI)	North East
Banswara	0.369	31	0.493	19	Both (FSI+FSOI)	Southern
Baran	0.440	16	0.453	25	Both (FSI+FSOI)	South Eastern
Barmer	0.402	28	0.446	26	Both (FSI+FSOI)	Western
Bhilwara	0.445	14	0.489	20	Both (FSI+FSOI)	North East
Chittaurgarh	0.439	17	0.383	31	Both (FSI+FSOI)	South Eastern
Dungarpur	0.383	30	0.374	32	Both (FSI+FSOI)	Southern
Jaisalmer	0.424	25	0.507	17	Both (FSI+FSOI)	Western
Karauli	0.419	26	0.535	16	Both (FSI+FSOI)	North East
Pali	0.406	27	0.480	21	Both (FSI+FSOI)	Western
Rajsamand	0.426	24	0.411	30	Both (FSI+FSOI)	Southern
Sawai Madhopur	0.436	20	0.432	28	Both (FSI+FSOI)	North Eastern
Sirohi	0.388	29	0.430	29	Both (FSI+FSOI)	Western
Tonk	0.435	22	0.441	27	Both (FSI+FSOI)	North Eastern
Udaipur	0.360	32	0.469	23	Both (FSI+FSOI)	Southern
Bikaner	0.438	18	0.620	7	Only FSI	Western
Jalor	0.438	19	0.538	15	Only FSI	Western
Jhalawar	0.436	21	0.588	10	Only FSI	South Eastern
Jodhpur	0.429	23	0.667	5	Only FSI	Western
Nagaur	0.443	15	0.541	14	Only FSI	Western
Bundi	0.469	10	0.497	18	Only FSOI	South Eastern
Dhaulpur	0.475	9	0.479	22	Only FSOI	North Eastern

Map 7.2: Priority Districts for Food Security Interventions in Rural Rajasthan



security priority interventions. Out of the 22 priority intervention districts, 15 districts are common in both FSI and FSOI; five districts have been selected by only FSI and two districts have been selected by only FSOI. Locationwise, six districts are in the northeastern region, four in southeastern region, another four in southern region, and eight districts in the western region. These districts not only have high under five mortality and under nutrition rate but also rank poorly in terms of availability, access and absorption indicators. They need urgent attention of government and policy makers.

7.2.1 Status of Availability Indicators

Among the food insecure districts, the availability indicators show that Baran district is leading in agriculture production but it is still in the category of insecure districts. The ground realities reflect that the productive resources are owned by a limited number of farm families. The proportion of non-forest area was low in 10 districts, at varying levels. The availability of irrigation facilities was also limited in a majority of the districts, and a similar number of districts were facing problems relating to road connectivity.

It emerges from the analysis that to improve the availability of food, it is necessary to improve the irrigation facilities in the concerned districts. Production of food is directly related to the status of irrigation facilities. In the districts, particularly in the arid region, adequate irrigation is not possible due to water scarcity. But in certain districts where there is good rainfall, there are possibilities of expansion of irrigation facilities. In these areas, either there is a need to construct new irrigation projects and/or restore the old one which will help in improving access to irrigation facilities.

Improvement in road connectivity is equally important in food insecure districts. The indicators presented in Table 4.6 show that the limited road connectivity in rural Rajasthan is also responsible for making districts food insecure. Therefore, expansion of road connectivity is essential for increasing food security, as it will help in improving access to food and other economic facilities. There were six food insecure districts having high access to road connectivity and only two categories with medium access. Interestingly, certain efforts made by the government in the tribal and backward districts can be noticed.

Broadly, there are direct linkages between agriculture productivity and livestock productivity. But in the case of Rajasthan, it is found that in certain areas animal husbandry is more important than agriculture from the food security point of view. Experience of Bhilwara Dairy that was initiated on the Anand pattern has yielded encouraging results in the district and adjacent areas. In these areas, access to marketing of livestock products has not only secured the food requirement but also played an important role in increasing the standard of living of the households associated with livestock enterprise. Similarly, provision of marketing and livestock development related intervention will help in improving the food security.

Beside livestock products, animal exchange marketing (AEM) is also a major issue in the state. There are about 260 formalized animal fairs held in the state. Some of them are state level fairs managed by the Department of Animal Husbandry of the state government. Others are categorized as panchayat to district level fairs. Exchange of animals takes place in these fairs (Acharya and Ahuja, 1998). Both buyers and sellers are benefited by purchase and sale of animals of their choice at competitive prices. However, there exist various difficulties in exchage marketing of animals that need attention by the fair organizing agencies. Some of the traders from the neighbouring states such as Gujarat, Uttar Pradesh, Punjab, Haryana and Madhya Pradesh also purchase animals at the local level. Often, such marketing practices are not in favour of the animal owner due to absence of competitive prices, and animal owners get low prices compared to their expectations.

7.2.2 Status of Access Indicators

The analysis shows that in the case of deployment of the labour force in non-agricultural activities, majority of the food insecure districts are lagging behind. So too are the tribal population-dominated districts, except Jaisalmer and Barmer. Almost a similar picture emerges in the case of proportion of SCs/ STs and ratio of working age population. The low position of average per-capita consumption expenditure is noticeable in all the food insecure districts. The rural wage rate was extremely low in

nine districts. In 7 other districts, it was low and very low. The case with status of female literacy rate was similar, with marginal differences. Certain interventions can be made in improving the access to food in rural Rajasthan. These include:

1. Encourage the non-farm sector which may help in reducing the dependency on farm sector.

2. Initiate public policy and intervention which may help in enhancing employment and income opportunities, which will further help in increasing average per-capita expenditure.

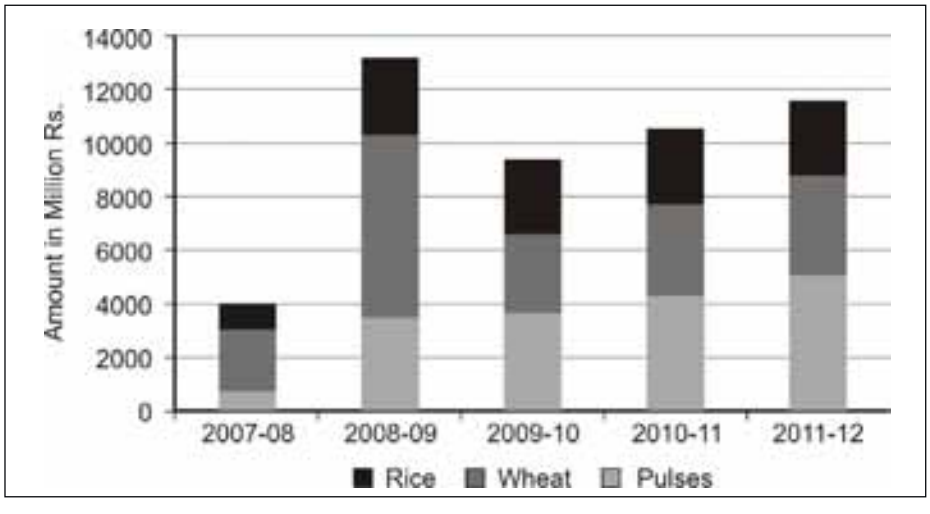
3. Make all possible efforts to improve female literacy rate in those districts where it is low. The government has initiated certain steps in the state to improve the literacy among females; these need to be strengthened.

7.2.3 Status of Absorption Indicators

The absorption indicators show that in seven food insecure districts, the availability of safe drinking water was low or very low. There is water scarcity as well as poor quality of water in these districts. Thus, lack of safe drinking water is one of the major challenges of food security in these districts.

The availability of health facilities is also poor in 11 districts.

Fig 7.1. Allocation Proposed under NFSM



Source: *Economic Survey, 2007-08*

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 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 increasing rural wages and thereby spending on food, 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 for 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 the food security interventions in the state.

7.3.1 Enhancing Availability

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

7.3.1.1 Increasing Food Production: The National Food Security Mission

The dismal rate of growth in the agricultural sector has been a cause for concern – the sector grew at a meagre rate of 1.8 per cent per annum during the 90s. This has been coupled with rising international prices as well as occasional 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), 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 production of rice by 10 million tons, wheat by 8 million tons and pulses by 2 million tons, by the end of the 11th Plan in the country. The targets are to be achieved by restoring soil fertility and hence productivity, which would be complemented by increasing employment opportunities.

The mission would operate at multiple levels from the national level, to state and district levels. At the

grass root level, the Panchayati Raj Institutions (PRIs) would play an active role in the selection of beneficiaries and identification of priority areas and local initiatives.

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

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

In Rajasthan, the districts identified to be developed under the NFSM under the rice and pulses components are given in table 7.4.

The NFSM concentrates on irrigated foodgrains, wheat and rice, and pulses. Other than pulses, non-irrigated crops have been ignored. The NFSM is aimed at revitalizing fertility of degraded lands. But rainfed crops, such as various millets that are grown on hills and other drylands, do not come under its purview. In the context of the plateauing (and even decline) of yields in irrigated crops, it becomes even

Table 7.4: Districts under NFSM in Rajasthan

Rice (15)			
Ajmer	Churu	Jaipur	Nagaur
Barmer	Dausa	Jhunjhunu	Sikar
Bikaner	Ganganagar	Jodhpur	Tank
Chittaurgarh	Hanumangarh	Kota	
Pulses (10)			
Ajmer	Bikaner	Jhalawar	Pali
Banswara	Jaipur	Kota	Sawai Madhopur
Bhilwara	Jalore	Nagaur	Sikar
Sirohi	Tonk	Udaipur	

Source: Govt. of India (2007b).

Box 7.1: National Policy for Farmers, 2007

The National Policy for Farmers is intended to help in rejuvenating the farm sector and bringing lasting improvement in the economic condition of farmers. The Government 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, providing appropriate price policy as well as risk management measures.

The broad areas of the coverage of the recommendations include:

a. Human Dimension: In addition to production and productivity, the economic well being of the farmers to be given prime importance.

b. Asset Reforms: To ensure that every man and woman, particularly the poor, in villages either possesses or has access to a productive asset.

c. Water Use Efficiency: The concept of maximizing yield and income per unit of water to be adopted in all crop production programmes, with stress on awareness and efficiency of water use.

d. Use of Technology: New technologies, which can help enhance productivity per unit of land and water, are needed: Biotechnology, information and communication technology (ICT), renewable energy technology, space applications and nano-technology to provide opportunities for launching an "Evergreen Revolution" capable of improving productivity in perpetuity without harming the ecology.

e. Inputs and Services: 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 dry land farming areas.

f. Credit & Insurance: The financial services to be galvanized for timely, adequate and easy reach to the farmers at reasonable interest rates.

g. Single National Market: To develop a Single National Market by relaxing internal restrictions and controls.

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

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.

7.3.1.2 Improving Connectivity

The rate of growth of rural incomes and reduction in rural poverty are strongly influenced by the provision of rural and district road connectivity. There is a close link between rural connectivity and growth, be it in the area of trade, employment, education or healthcare. States with poor connectivity are also

states that report poor socio-economic indices. Improved connectivity between the growth production centres and the collection centres is vital for livelihood enhancements and that is possible only through the development of roads in remote areas.

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 half a decade, after controlling for factors like household size and education (Deolalikar, 2001).

Pradhan Mantri Gram Sadak Yojana (PMGSY):

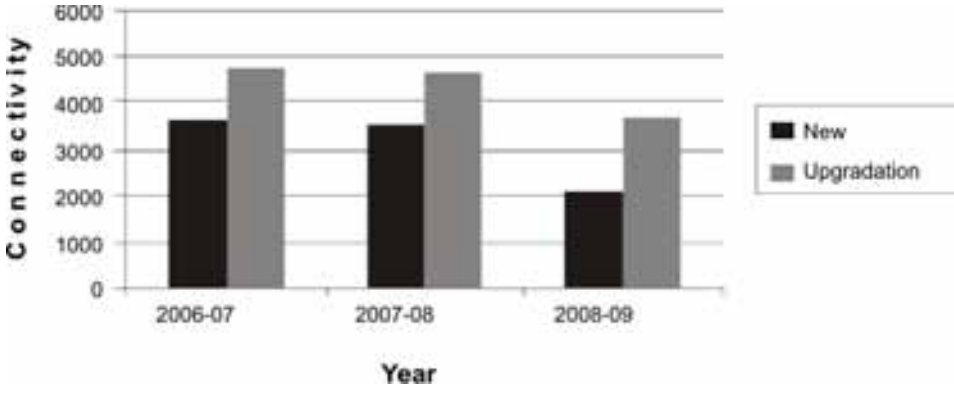
In an impact evaluation the following effects of the PMGSY have been observed (Ministry of Rural Development, Government of India):

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

Bharat Nirman: Rural Roads

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

Figure 7.2: Bharat Nirman Physical Target in Rajasthan (km)



As part of the programme, the government intends that by the end of financial year 2008 – 2009, every village of over 1,000 population, or over 500 in hilly and tribal areas, has an all-weather road. To achieve the targets of Bharat Nirman, 1,46,185 km of road length is proposed to be constructed by 2009. This will benefit 66,802 unconnected eligible habitations in the country. To ensure farm to market connectivity, it is also proposed to upgrade 1,94,132 km. of the existing associated roads.

Position of Rajasthan

The government has estimated certain targets to improve the road connectivity in terms of new construction and restoration of old construction. Importantly, the major focus of connectivity is on restoration of old construction compared to new construction, which not only increases the coverage of the programme but also enhances its efficiency.

7.3.1.3 Forests and Tribals

Out of 12 priority districts, 6 have more than 20 per cent of forest cover. These districts are known as tribal districts. As is well recognized, tribal households own very limited resources and have to be dependent on commonly owned resources as there are continuous restrictions on their usage rights.

This has resulted in the emergence of challenges to rural livelihoods in the case of tribal households. With a view to secure recognition of their usage rights on forest land for livelihood, the tribal community has come forward in a democratic manner. The Forest Rights Act should help the tribal communities develop their livelihoods (Box 7.2).

Box 7.2: The Forest Rights Act

The Scheduled Tribes and Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 was promulgated towards the end of 2006 with a view to correcting the injustices done to the forest dwelling scheduled tribes. The Act recognizes and vests forest rights and occupation on 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 recognized. With implications on R&R issues, the Act recognizes 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 criticized on a number of grounds. One, the Act requires the target population to live 'in' the forests, which could be interpreted in terms of areas 'recorded' as forests. This deems to exclude a vast majority of those forest-dwellers who live in areas recorded as revenue lands but cultivate forest lands and use forest resources. Secondly, investing Gram Sabhas with the power to decide the rights and grants permits may open the doors for corruption and abuse of power, as land ownership 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 land ownership 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.

7.3.2 Improving Access to Food

The access measures in Rajasthan, as in other states, have been along the following lines:

1. The provision of low-priced foodgrains as a method of subsidizing the consumption of the poor. This, done through the Public Distribution System (PDS), has undergone some changes with the current Targeted PDS, where low prices are charged only for Below Poverty Line (BPL) households.
2. Food for Work schemes which is now replaced by the National Rural Employment Guarantee Act (NREGA).
3. The mother and infant supplementary feeding programme through the ICDS.
4. The Mid-day Meal Scheme for children in government-run schools.

Table 7.5: Percentage Share of Poor and Nearly Poor Households who have Ration Card or Benefited from Various Schemes in Rural Rajasthan (2004-05)

Region	Ration card	Food for work	Annapoorna	ICDS	Midday meal
Poor Households					
Western	94.7	20.5	3.4	2.5	41.3
North-Eastern	97.7	6.2	0.9	0.0	23.8
Southern	98.2	33.4	0.0	4.1	42.8
South-Eastern	95.6	6.2	0.0	6.3	24.0
Rajasthan	96.4	18.2	1.7	2.4	35.5
Rural India	80.0	4.2	1.2	8.8	33.2
Nearly Poor Households					
Western	99.1	23.9	4.0	4.3	46.2
North-Eastern	99.7	4.3	1.3	0.0	20.5
Southern	97.1	29.7	0.0	4.1	14.5
South-Eastern	100.0	0.0	0.0	9.0	39.3
Rajasthan	99.0	15.8	1.9	3.0	29.8
Rural India	82.9	2.8	1.1	6.7	29.5

The latest (2004-05) NSS round gives information on the extent to which these schemes reach the poor in Rajasthan, and thus contribute something to food security, though it does not show us how much they add to food entitlements (Table 7.5).

Box 7.3: 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 Yojana:* The scheme aims at improving the nutritional, health and development status of adolescent girls (11-18 years), promote awareness of health, hygiene, nutrition and family care, link them to opportunities for learning life skills, going back to school, help them gain a better understanding of their social environment and take initiatives to become productive members of the society. The scheme is currently being executed in all the states of the country covering a total of 6118 blocks of which 274 blocks are in Rajasthan.

2. *Udisha:* In 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 Help Groups (SHGs) with emphasis on converging services, developing access to micro credit and promoting micro enterprises.

In Table 7.5 we have also separately included “nearly poor” households, i.e. those whose per capita consumption level is within 10% above the poverty line. In the crucial southern zone, both the poor and nearly-poor have relatively more access to Food for Work schemes than the poor and nearly-poor in other zones.

The analysis shows that in Rajasthan, proportion of households who have ration cards in both poor and nearly poor households is considerably higher than the national level estimates. Interestingly, the contribution of the national Food for Work programme was also higher than in the country as a whole. Within the state, the southern region has benefited to a larger extent compared to other regions. This is because this programme was launched in districts which are located in this region. Overall, the mobilization of the poor to benefit from various government schemes to increase the access of the poor is better in Rajasthan than at the all-India level.

Surprisingly, the state government is lagging behind in the implementation of the ICDS programme as compared to other programmes relating to food security. It is far behind the national level estimates in ICDS coverage for both poor and nearly poor households. Both poor and nearly poor households have benefited from the mid-day meal scheme (MDM). Households belonging to the western region are major gainers from MDM scheme as compared to other regions.

Box 7.4: Improved Targeting in the Public Distribution System: An Example from Orissa

The Targeted Public Distribution System is perhaps the largest food safety net in the world. Yet, as surveys have revealed, its success is tarnished by several shortcomings. A pilot project launched by WFP in collaboration with the Government of Orissa 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 with support from WFP.

The project involves the following: -

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

The Project has helped in improved management and targeting of TPDS to the beneficiaries and has a great potential for replication elsewhere in the country.

Table 7.6: Status of Public Interventions (ICDS Coverage)

District	Index	Rank	District	Index	Rank
Ajmer	0.359	10	Jaipur	0.303	26
Alwar	0.305	13	Jaisalmer	0.391	13
Banswara	0.443	3	Jalor	0.301	27
Baran	0.540	2	Jhalawar	0.381	14
Barmer	0.395	8	Jhunjhunu	0.224	32
Bharatpur	0.304	14	Jodhpur	0.309	22
Bhilwara	0.432	4	Karauli	0.357	18
Bikaner	0.290	16	Kota	0.395	12
Bundi	0.413	6	Nagaur	0.304	25
Chittaurgarh	0.573	1	Pali	0.363	16
Churu	0.300	15	Rajsamand	0.528	3
Dausa	0.331	12	Sawai Madhopur	0.300	29
Dhaulpur	0.369	9	Sikar	0.318	21
Dungarpur	0.425	5	Sirohi	0.279	31
Ganganagar	0.402	7	Tonk	0.442	5
Hanumangarh	0.336	11	Udaipur	0.408	9

Source: *As stated in Table 3.4, Variable d1.*

The index of public interventions which is based on the percentage of ICDS beneficiaries to total project population is presented in Table 7.6. Some of the tribal dominated districts, Chittaurgarh and Baran, rank quite high in status of public interventions.

7.3.2.1 National Rural Employment Guarantee Scheme (NREGS)

The National Rural Employment Guarantee Scheme (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 on February 2, 2006 covering 200 selected (backward) districts of the country and was extended to 130 more districts from April 1, 2007. With effect from April 1, 2008 the Government of India has decided to extend NREGA to all rural areas of all districts of the country. The Act provides a legal guarantee of 100 days of wage employment in a financial year to one person of every rural household whose adult members volunteer to do unskilled manual work at the minimum wage rate notified for agricultural labour

Table 7.7: NREGS Performance, April 2008

India	
Households Demanded Employment	31.1 million
Households provided employment	30.8 million
Persondays [in millions]:	
Total	1268.5
SCs	334.0 (26.33%)
STs	367.4 (28.96%)
Women	879.7 (69.35%)
Others	567.1 (44.71%)

Source: http://nrega.nic.in, 3 April, 2008.

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 government information, the scheme has therefore been able to provide employment to almost all the people among the job card holders who demanded work. Under this scheme, people are mainly

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 earnings from NREGS on food-related consumption items. In Bihar 67% of the earning from NREGA is being spent on food while in Jharkhand, the percentage is 71. However in case of STs and SCs, who are generally more vulnerable to food insecurity because of low and irregular income, the spending on food from earning received for the NREGS work undertaken is more than the state level averages. Given the finding 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.

Table 7.8: NREGA Statistics of Rajasthan, April 2008

Employment demanded by households:	2.105274 million
Employment provided to households:	2.102121 million
Persondays [in million]:	
Total:	151.171
SCs:	28.739 [19.01%]
STs:	69.345 [45.87%]
Women:	103.864 [68.71%]
Others:	53.087 [35.12%]
Total fund:	12615.9 million
Expenditure:	12263 million
Total works taken up:	59624
Works completed:	9323
Works in progress:	50301

Source: *http://nrega.nic.in, 3 April, 2008.*

provided with work related to creating or improving rural connectivity, water conservation, land development, drought proofing, micro-irrigation, renovation of traditional water bodies, land development, etc.

In Rajasthan, a large number of the beneficiaries under the scheme are women: close to 69 per cent of them as on 3 April, 2008 (Table 7.8). As pointed out elsewhere in the report, women spend more of their income than men on essential consumption needs of the family, education of children and health care requirements, all of which are supportive of improving the nutritional status of their households.

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

The participation of STs in NREGS employment in Rajasthan is quite high. In fact, the proportion is higher than the all-India proportion. Higher proportion of women in NREGS indicates that it is likely that women have been taking up low-wage NREGS employment, something that they can also combine with looking after the household, while men have been migrating for higher-wage employment (See Table 7.8).

Reports show that there are leakages and corruption in the implementation of NREGS (CSE, 2008). This could be reduced through organization of the workers in these schemes, use of the Right to Information (RTI), and social audits (*jan sunvai*), in the use of both of which Rajasthan has been a pioneer. 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 improving food security.

Box 7.6: Innovative Food Security Initiatives: The Food for Work Programme in Tribal Development Projects

Despite being blessed with bountiful natural wealth and rich in human resources, the forest and tribal-dominated areas in the country are, highly food insecure and are characterized by degraded natural resources, stark poverty, chronic hunger, high indebtedness and heavy out-migration. For the sustainable development of some of these regions, Tribal Development Programmes are being implemented in the states of **Chhattisgarh, Jharkhand and Orissa**. These were launched by the state governments 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 (WFP). WFP provides food assistance for a food for work (FFW) component of these livelihood support activities. The Food For Work (FFW) activity has become enormously popular in these areas. Payment for FFW includes a cash component and 3 kg 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 household food insecurity is high.

Participatory Processes and Community Ownership

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

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

The most marginalized are for the first time in their lives finding a platform for articulating their views. It is for this reason, that most community assets created under the programme are located so as to benefit poor hamlets and households and there is a significant impact on the food security of a desperately poor population living in remote and inaccessible areas. Similar activities can be initiated in the tribal dominated backward regions of Rajasthan for alleviation of seasonal food insecurity and sustainable livelihood generation in Rajasthan.

Food for Work Activities

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

The list of activities taken up under FFW is very long and, *inter alia*, includes land development, earth-bunding, stone-bunding, gully-plugging, pond construction and restoration, backyard plantations, plant nurseries, digging wells and building canals, trenches and check dams. These activities have helped to irrigate large areas. For the first time people have been able to

get a second crop of wheat apart from the single rain-fed crop of rice that they used to harvest earlier. Many farmers have cultivated vegetables for the first time in generations. '*Neither our fathers nor our grandfathers ever cultivated these crops'* they say with obvious pride.

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

Enhanced Production and Productivity

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

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

Impact on Migration and Indebtedness

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

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

Strengthening of Local Institutions

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

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

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

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

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 Food For Work 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)

7.3.2.2 Empowerment of Women

From the analysis of variables affecting overall food security (FSI) foregoing discussions, it emerges that female literacy in rural areas is the most significant factor determining food security of the rural population. This can be corroborated by the fact that most of the districts in the most food insecure category rank very poorly in terms of rural female literacy. Thus, it is imperative that girls' literacy be prioritized and all barriers to their access to education be effectively tackled. This should be coupled with the provision of quality education, especially for girls from the poor and marginalised communities.

Women's workforce participation improves the household's access to food, and is also likely to improve the woman's own access to food – following Amartya Sen's argument that women's independent income will increase their bargaining power within the household.

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

The food insecure are usually thought to be non-bankable or not credit-worthy. But, they do access credit from moneylenders, at very high rate of interest per month. They frequently end up in inter-linked market transactions, selling their advance labour or non-timber forest products (NTFP) for much less than market prices. Such inter-linked market transactions often occur at times of acute distress, such

as when medical emergencies require immediate credit, or when drastic fall in the ability to acquire food lead to a need for credit. In such situation, if credit were available, these inter-linked market transactions could be avoided.

It hardly needs to be repeated that financial services, both savings and credit, are required by the poor, both to enable consumption smoothening and to utilize market opportunities. Whether through the Indian SHG-model or the Bangladesh Grameen Bank model, micro-financial services need to be provided. Through an increased use of educational facilities and of credit to utilize growing market opportunities, micro-finance programmes can lead to increased food security with development. The food security impact of micro-finance is also increased because of women empowerment in the household.

7.3.3 Enhancing Absorption

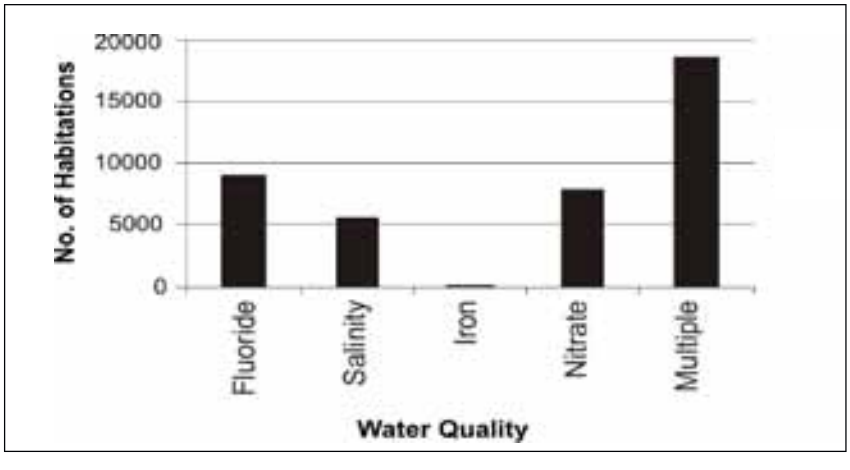
Increasing the nutrient intake of the poor is not the ultimate solution of food security. The capacity of body to utilize the increased intake of nutrients is very important. This depends closely on complementary measures, such as access to safe drinking water and hygienic sanitation. These two inputs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

7.3.3.1 Rural Water Supply

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,

Figure 7.3: Water Quality Affected Habitations



Government of India provides funds under ARWSP which is a centrally sponsored programme (CSP). It has been proposed to provide Rupees 5.5 million as the state share in the State Plan under ARWSP during the 11th Plan Period. It has been decided to cover all not-covered and partially-covered habitations, rural schools and quality affected habitations from 2005-06 to 2008-09 in a phased manner to achieve the goal of Bharat Nirman.

Swajaladhara:

The Rural Drinking Water Supply Programme has been launched in the state from December 2002. The purpose of this scheme is to ensure community participation and to shift from supply driven to demand driven approach. The scheme envisages 10% 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 the remaining 90 per cent of capital cost to be borne by Central government through the District Water Supply and Sanitation Mission.

Bharat Nirman: Rural Water Supply

The norms for coverage under Rural Drinking Water supply are:

1. 40 litres per capita per day of safe drinking water for human beings.
2. One hand pump or stand post for every 250 persons.
3. The water source should exist within 1.6 km in the plains and within 100 meter elevation in the hilly areas.

Position of Rajasthan

Coverage of Drinking Water Supply: According to available provisional survey estimates, about 79,000 habitations are to be covered under the Rural Water Supply Scheme. About three-fourths of the habitations have not been covered so far and one-fourth are partially covered.

Quality of Water: Poor quality of drinking water supply is one of the major problems in Rajasthan. Nearly 41,000 habitations were identified as having drinking water of poor/infected quality. About 46 per cent of the habitations had multiple factors affecting their water quality. In about one-fifth of the habitations water is contaminated/ polluted by fluoride and nitrate contents. The problem of iron contamination was found in a limited number of habitations.

A number of schemes that require Rs. 10,000 crore are pending completion, but there is a provision of funds to the tune of only Rs. 1,600 crore. Presently, there are seven schemes underway, such as Chambal Sawai Madhopur, Nagaur Lift Yojana, Narmada canal project, Mata-Jayal scheme, and the Bisalpur-Dudu-Fulera Supply Scheme. Another drinking water supply project, Barmer Lift Yojana is concerned with quality purification.

Box 7.7: Meeting the Nutritional Needs of Vulnerable Groups

Infants and Young Children

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

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

In order to address the prevalence of widespread malnutrition and the high infant mortality rate that impede human development, there is a need for developing low-cost supplementary food.

7.4 Improving Performance

In Rajasthan, the Right-to-Food movement has used the Right to Information Act (RTI) for bringing information about government programmes in open. 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, creating awareness and mobilizing the community against non-performance and corruption in government schemes.

There is an important role for political mobilization of the poor in improving implementation of the ICDS, MDM, NREGS and other such schemes. Implementation of these schemes has been decentralized down to the panchayat level. But panchayats can be corrupt and dominated by local power-brokers. A pilot social audit held in Bolangir district of Orissa in November 2001 showed substantial and relatively open corruption at panchayat level (de Haan and Dubey, 2005, fn. 39, p. 2329) Studies in other states have shown that when women are in panchayats, or lead panchayats, the panchayats perform better in administering food-related interventions. In IFAD projects in Andhra Pradesh too, it was observed that women's SHGs performed better in undertaking small infrastructure projects than those managed by men and saved more money for the community than the latter. Therefore, increasing involvement of women in Panchayats can be a useful tool in Rajasthan to reduce corruption and improve their performance.

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 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 (above poverty-line) households. More recently, the Central government is reported to have pointed out to the West Bengal government that there has been diversion of cheap PDS grain to the Bangladesh market. Many newspaper reports point out that even in the midst of

starvation, the Food Corporation of India's godowns remain full of grains. If there is insufficient purchasing power with the poor in a district, even the supply of grain at subsidized prices is unlikely to be accessed by the poor, and there will inevitably be a tendency for this grain to flow to markets, whether within the locality or outside, where prices are higher (Jos Mooij, 2001).

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

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

Another way of enabling the poor to acquire their public entitlement of grain would be to provide work, through schemes such as NREGS, which allows the poor to acquire the money needed for purchase of food. A combination of a coupon system with NREGS could improve the functioning of the PDS system.

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, some nutritional gaps can be addressed. But, any solution to food insecurity requires an increase in the sustained access to food in sufficient quantity and quality. This requires an increase in the production and earning capacity of the households and individuals too, given that there are gender-based discriminations in the distribution of food and allied health-care services within households. It is important, therefore, that food security schemes be linked with development activities.

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8. Conclusion: Towards a Food Secure Rajasthan

The analysis in previous chapters shows that ensuring food security and improving nutritional status is a challenge for the state as a whole. Various schemes and initiatives in recent years show commitment of the government to improve the situation. Through this report we have endeavoured to bring out the performance of districts in each of the food security related indicators, clearly indicating the well and poor performing districts. Priority districts for food security intervention have also been identified to draw attention to the need for more inclusive growth efforts and special interventions to bridge the divide between the regions and districts of the state. The state has made progress on certain indicators which is reflected in discussions on the interventions in the states and the results of the same should be evident in subsequent rounds of Census and NFHS. The analysis also takes into account the information from the state government which makes the policy recommendations of this atlas pertinent for immediate use and provides scope for further upgrades with availability of new datasets.

Reducing Child Mortality and Under-nutrition

In Chapter 3 of the report, Food Security Outcome Index based on Under-Five Mortality and Proportion of Underweight Children is presented. The higher incidence of under-five mortality and higher proportion of underweight children in most of the districts of Rajasthan do indicate a grim picture as far as the Food Security Outcome is concerned. The national figure for under-five mortality is 74.3 per 1,000 live births. Whereas all the districts in the state have under-five mortality figures above the national average. As many as 24 districts out of the total 32 have mortality figures above 100. Banswara, Bhilwara, Chittaurgarh, Dungarpur, Pali and Udaipur have under five mortality rate of more than 150. Similarly, proportion of under-weight children is also very high. Almost all the districts except Banswara has the proportion of underweight children more than the national average of 42.5 per cent. On the whole 24 districts have been found to appear in the three insecure categories of the Food Security Outcome Index.

It is a fact that any improvement in nutritional level 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 under-nutrition, mother and child health and nutrition programmes have a considerable role in improving production capabilities. But, the implementation of such programmes, including issues of reaching those with severe under-nutrition depends very much on the demand from the community for these services. In the absence of such demand from the most undernourished beneficiaries, the benefits of such programmes are very likely to be captured by the better-off in the village. This also leads to leakages in the system. Decentralization of the implementation of programmes has to be combined with enhanced participation of the community and awareness on issues of under-nutrition, in order for the benefits to reach the target group for whom it is intended.

Another issue that might need urgent attention in terms of mitigating persisting high malnutrition is the departmental mode of implementation of programmes. All the issues related to child and women malnutrition are solely vested with the department of Women and Child Development. The issue may not be solved unless there is complete support and accountability from the departments of Health and Family Welfare, Rural Development and Panchayati Raj. This calls for a synergy in action and

convergence in planning and implementation for handling such issues.

The Women and Child Development department of Rajasthan has implemented some innovative schemes like Purak poshahar for children and Suraaj for pregnant women in order to reduce the vulnerability among children and pregnant women, wherein some efforts of convergence are evident. However, as per NHFS-III (2005-06) the coverage of services under ICDS has been very poor. Low rates of Immunization, ante-natal and health check up, supplementary nutrition also highlight the need for improvement in convergence between the Department of Women and Child Development (DWCD) and Health and Family Welfare. To avoid micro-nutrient deficiencies, supply of fortified food should be explored as a viable option to be integrated into the existing schemes. Proper utilization of such innovative attempts is needed to bring the child mortality and malnutrition under control. It has been found that there is a long and frequent disruption in the supply of nutrition to highly vulnerable children and mothers. There is a need to strengthen transparent procedures to improve the efficiency in implementation of such programmes with community involvement to reduce misutilization. At the same time, improving outcomes with regard to malnutrition is very much a matter of addressing food security as such, which needs to be acted upon simultaneously.

Reducing Nutritional & Food Insecurity: Improving Availability, Access and Absorption

The food security index based on the three dimensions, viz availability, access and absorption, is discussed in detail in chapters 4 to 6. The three indicators which formed the **Food Availability Index** in this report are irrigation extent (proportion of net irrigated area to net sown area), per capita value of agricultural output, and rural road connectivity. Rajasthan has a vast tract of arid areas. In Rajasthan, nearly one-third of the net sown area is irrigated. The districts with high irrigation, good rainfall and good condition of aquifers are all in canal command areas. These districts also have high per capita value of agricultural output. Districts in the arid western plain and transitional plain of the inland drainage regions have the lowest proportion of irrigated land. Per capita value of agricultural output therefore is low in these districts. In terms of rural connectivity, Jhunjhunu, Ganganagar and Pali occupy the leading position in road connectivity where more than two-thirds of the villages have access. Districts located around the Aravalli hills have a low proportion of road connectivity. Overall, Ganganagar, Kota, Alwar and Bharatpur have been identified as secure in terms of the food availability index. On the other hand Bhilwara, Jaisalmer, Udaipur, Rajsamand and Barmer are extremely insecure. In all, 11 districts fall in secure and moderately secure categories in the availability index and the remaining 21 districts have been identified as insecure. Broadly, northern, northeastern and eastern part of the state are relatively secure in terms of availability index in comparison to the western, southern and south southwestern part.

The average rainfall is very low to low in most parts of the state and its variability is very high over time and space. Therefore, there is a need for more effective conservation and utilization of water resources in these regions. The watershed programmes have a significant role to play in this regard (Sen et al.,

2007). Revitalizing the agrarian economy in the districts with rain fed 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 like RGMWM, NWDPRA etc. Appropriate diversification to high-value crops could also be undertaken. These measures would increase productivity and income of small and marginal farmers. National Policy for Farmers (2007) has been formulated and approved by the Government of India to improve the economic viability of farming by substantially improving the net income of farmers in addition to improving productivity, land, water and support services, formulation of an appropriate price policy and risk management measures are also required for improving the agriculture in the state. What is important is to pay attention to existing areas of rain fed agriculture. In forest areas, security of tenure is needed to create conditions favorable for investment to enhance production or to take up new forms of cultivation. The implementation of the Forest Rights Act (FRA), with titles given jointly to men and women, becomes crucial in this respect. But, bringing about changes in production systems also requires an enhancement of capabilities of both women and men.

In Rajasthan, it is found that in certain areas animal husbandry plays a more important role than agriculture from the food security point of view. Experience of Bhilwara dairy that was initiated on the Anand pattern has yielded encouraging results in the district and adjacent areas. Provisioning of marketing and livestock development related interventions will help in improving food security.

At the same time, productivity needs to be increased in the vast common property resources (CPRs) classified as watersheds. Further, distribution of land to the landless including women, would improve the food security and could also serve as an incentive to increase productivity. The access of landless and women to these CPRs would increase.

Another core area of concern is rural roads. Rural connectivity is very poor in most of the districts of Rajasthan. Fifty three per cent of villages in Rajasthan are connected with paved roads where as the remaining 47 per cent are not. The vast size of the state with neglected interiors and difficult, hilly and desert terrain, pose tremendous challenge for maintenance and upkeep of roads. NREGA and other food-for-work schemes can be channelized to improve the key areas of village road connectivity and small-scale irrigation. Village approach 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. Improvements in rural connectivity can improve the terms of access to markets. Improved communication will also enable rural producers to produce for the wider market, whether regional, national or global, as also larger pools of knowledge. The central government programmes such as PMGSY and Bharat Nirman with the objective of making all weather roads to connect all villages are good opportunities for the state. There is a need to speed up and strengthen the process of implementation of these programmes.

In a relatively open economy, there should 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 communication and transport infrastructure, this also requires a more educated workforce. A higher level of education would

enable producers to take up opportunities available through connections with the wider economy and also improve the types of jobs they can avail on migrating. Migration is important, for 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 (so as to increase the access to food of small and marginal farmers in rain fed agriculture), but to point out that options are not limited to agricultural development.

The **Food Access Index** has been formed with the help of six indicators – proportion of agricultural labourers, proportion of Scheduled Castes and Scheduled Tribes, average monthly per capita expenditure, rural wage rate, ratio of working age population and rural female literacy. The analysis shows that in case of deployment of the labour force in non-agricultural activities, the majority of the food insecure districts are lagging behind. So too are the tribal population-dominated districts, except Jaisalmer and Barmer. Almost a similar picture emerges in the case of the proportion of SCs/ STs and the ratio of working age population. The low position of average per-capita consumption expenditure is noticeable in all the food insecure districts. The rural wage rate was extremely low in nine districts. In seven other districts it was low and very low. The case of status of female literacy rate was similar, with marginal differences. Certain interventions can be made in improving the access to food in rural Rajasthan, which include:

- Encourage the non-farm sector which may help in reducing the dependency on farm sector which is one of the major factors responsible for food insecurity.

- Initiate public policy and intervention which may help in enhancing employment and income opportunities which will further will help in increasing average per-capita expenditure.

- Make all possible efforts to improve female literacy rate in those districts where it is low. The government has initiated certain steps in the state to improve the literacy among females; which should be strengthened.

Access measures in Rajasthan has been addressed through three flagship programmes – TPDS, Food for Work schemes (now carried out under the NREGA), ICDS and Mid Day Meals Scheme. As is evident from the analysis, the reach of these programmes in poor and nearly poor households is very low. There is a need to intensify implementation of these programmes with improved monitoring to make it effective in addressing issues related to access and absorption.

There is an important role for mobilization and participation of the poor in improving implementation of the ICDS, MDMS, NREGS and other such schemes. Studies in other states have shown that when women are in panchayats, the panchayats perform better in administering food based interventions. All these efforts provide safety nets against household deficit in food. However, a long term solution to food insecurity requires an increase in the regular access, through income or self-production, to food in sufficient quantity and quality. This requires an increase in the production and earning capacity of the households and individuals too.

Given women's general responsibility for food security in rural areas of developing countries, and given the pervasive gender bias in these societies, one way of reducing gender bias is the empowerment of the poor. However more sensitive approaches would be needed to address gender power relations at the household consumption level to address gender imbalance in terms of access. Consequently, food security approaches need to increasingly pay attention to the elimination of gender inequality and to women's empowerment as important preconditions.

While security of tenure would allow an increase in investments on land thus higher incomes, complementary steps need to be taken to enhance women's 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 status in the household. This along with literacy could also pave the way for women to have more say in the disposition of household income - away from wasteful areas (e.g., alcohol consumption) and improve household distribution of food.

Empowerment of poor women, or of the poor as a whole, is not only a matter of individual agency 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.

It is well known that the Dalits and STs are concentrated among the agricultural labourers in most of the Indian states. Agricultural labourers are an important category of the food insecurity in Rajasthan. Agricultural wages and the number of days of employment are two issues which 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 role of employment and food based programmes comes in for supporting those who newly acquire land to invest labour in improving their lands. Employment schemes directed towards that end would be effective.

Food Absorption Index, which is the combination of safe drinking water and availability of health, facilities presents two distinct regions that appear to be in critical state. First are the western arid region of Barmer, Jaisalmer, Bikaner. Second is Karauli and Bharatpur districts in northeastern Rajasthan. These regions have lowest access to safe drinking water and health facilities. The southern and southeastern part of the state are relatively secure in terms of absorption index.

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.

According to available provisional survey estimates, about 79,000 habitations are to be covered under the Rural Water Supply Scheme. About three-fourth of the habitations have not been covered so far and one-fourth are partially covered. Poor quality of drinking water is one of the major problems of Rajasthan. Nearly 41,000 habitations were identified as having drinking water of affected quality. About 46 per cent of the habitations had multiple factors affecting their water quality. In about one-fifth of the habitations water is contaminated/ polluted by fluoride and nitrate contents. The problem of iron contamination was found in a limited number of habitations.

A number of schemes that are currently on require approximately Rs. 10,000 crore to be completed, but there is a provision of funds to the tune of only Rs. 1600 crores. Presently, there are seven schemes underway, such as Chamble- Sawai Madhopur, Nagaur Lift Yojana, Narmada canal project, Mata-Jayal scheme, and the Bisalpur-Dudu-Fulera Supply Scheme. Another drinking water supply project, the Barmer Lift Yojana is concerned with quality purification.

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 organized through CBOs, NGOS or traditional tribal bodies. They play a very important role by insisting on the adequate implementation of these schemes and ensure that benefits are reaching the right beneficiaries. 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 ensure effective implementation of the schemes and policies.

Along with the interventions outlined above, to improve access to and absorption of food, it is also necessary to increase the information and knowledge on improved nutritional and health/ hygiene practices. Elementary measures like exclusive breast-feeding of infants till the age of six months, age appropriate complementary feeding for children between 6 months to 2 years, washing hands after defecation, combined with knowledge of nutritionally superior foods, are needed to supplement improved access conditions.

Key Interventions in Priority Districts

In this report an attempt has been made to see areas of interventions for priority districts of the state. Food Security Outcome Index and Food Security Index have helped in identifying priority districts which need special attention and interventions from the policy makers and state government. However, since the unit of analysis is district which is one of the basic administrative units where the programmes are implemented, Table 8.1 shows the districts lagging behind on specific indicators so that specific intervention can be framed in order to reduce food insecurity in the region.

Table 8.1 shows that the western region of Rajasthan requires priority interventions in maximum number of food security indicators. In this region, the food availability, access and absorption indicators require equal interventions. Bikaner requires interventions in 8 out of 11 indicators. Barmer, Jaisalmer and

Table 8.1: Key Interventions in Priority Districts

NSS Regions	District	Irrigation Extent	Per Capita Value of Agricultural Output	Rural Connectivity	Rural Wage Rate	Average Monthly Per Capita Expenditure	Agricultural Labourers	Proportion of SCs and STs	Ratio of Working Age Group Population	Rural Female Literacy	Access to Safe Drinking Water	Access to PHC
North Eastern	Ajmer	√	√		√					√		
	Bhilwara	√	√	√	√					√		
	Dhaulpur		√						√		√	
	Karauli		√		√				√		√	√
	Sawai Madhopur		√							√	√	√
	Tonk	√		√	√					√		
South Eastern	Baran			√	√	√				√		√
	Bundi				√					√		√
	Chittaurgarh	√		√	√					√		
	Jhalawar			√	√	√				√		
Southern	Banswara	√	√		√	√		√		√		
	Dungarpur	√	√		√	√		√		√		
	Rajsamand	√	√		√	√				√		
	Udaipur	√	√	√	√	√		√		√		
Western	Barmer	√	√		√	√			√		√	√
	Bikaner	√	√		√	√			√	√	√	√
	Jaisalmer	√	√			√			√	√	√	√
	Jalor	√	√			√			√	√	√	
	Jodhpur	√	√		√	√			√	√		√
	Nagaur	√	√		√	√				√	√	
	Pali	√	√		√	√			√	√		
	Sirohi		√		√	√				√		

Jodhpur, which are arid regions of the state, are also performing poorly in almost 7 of the indicators. In southern region, irrigation and agricultural productivity among the availability indicators require priority attention. Among the access indicators, rural wage rates, monthly per capita consumption expenditure, proportion of Scheduled Castes and Scheduled Tribes and female literacy need to be improved. The absorption indicators of safe drinking water and health facilities are relatively better in the priority districts in the southern region and do not require priority interventions. Priority districts in the southeastern region of Rajasthan have poor road connectivity among the availability indicators. Among the access indicators, these districts require priority interventions for rural wage rate and rural female literacy. Absorption indicators are relatively good but Baran and Bundi do require interventions in terms of health facilities. In the northeastern priority districts, per capita value of agricultural production is low and requires interventions. Among the access variables, rural wage rates and rural female literacy rate together with ratio of working age population do require interventions in different priority districts. Access to safe drinking water in Dhaulpur, Karauli and Sawai Madhopur and access to health facilities in Karauli and Sawai Madhopur requires interventions in the absorption indicators.

The analysis of the districts in rural Rajasthan reveals that the situation of food insecurity is quite vicious in the sense that the priority districts identified appear to be performing poorly on many of the indicators. A strong comprehensive strategy is required in order to move towards a food secure state on all parameters discussed in the atlas and not just focusing on limited aspects of deprivation.

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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 not automatically 'trickled down' in benefits to all. Even a reasonably high rate of growth, like India's 6 per cent or so over the period 1995-2004, has not brought about a commensurate reduction in the proportion of those who are undernourished. The existence or acceptance of a right to food would make the exertion of pressure to adopt and implement a policy that secures this right more likely. But is there a right to food?

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

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

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

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

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

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

Right to Food in India

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

The establishment of a 'right to food' in India was substantially carried forward by the April 2001 petition of the People's Union for Civil Liberties (PUCL), Rajasthan, (PUCL vs Union of India and Others, Writ Petition (Civil) 196 of 2001) and the orders of the Supreme Court of India in response to this and subsequent petitions. In the context of the then-prevailing drought in Rajasthan, the argument of the PUCL[1] was simple – that Article 21 of the Constitution of India guarantees the 'right to life' and imposes on the state the duty to protect this right to life. In elaborating the right to life, the Supreme Court in past decisions had held that this right also includes the right to live with dignity and all that goes to make this up, including the right to food.

The petition argued that in the context of the drought in Rajasthan, the actions or inactions of the Governments of India and of the State of Rajasthan, constituted a violation of this right to food and, thus, of the right to life. Specifically, the violation of the right to food was seen in two aspects. First,

1. *This account of the PUCL's petition and related matters is based on* Legal Action for the Right to Food: Supreme Court Orders and Related Documents, *January 2004, downloaded from* www.righttofood.org *now replaced by the website* www.righttofoodindia.org.

was the failure of the Public Distribution System (PDS), in terms of the exclusion of various Below Poverty Line (BPL) households from its scope. Second, was the inadequacy of the quantities delivered through the PDS as the monthly quota could not meet the household's nutritional standards set by the Indian Council of Medical Research (ICMR).

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

The different orders of the Supreme Court:

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

At the level of rights this is a reasonably comprehensive scheme with rights, ways of achieving them, responsibilities for achieving them, all fairly well specified. Given the fact that there is a clear

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

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

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

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

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

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

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

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

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

Name of Variable and Description	Sources	Reference Year
(a) Availability		
1. Proportion of net irrigated area to net sown area	Agricultural Statistics of Rajasthan, 2003-04	2003-04
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 item is derived by multiplying the amount of production with its price obtained from all-India prices of these items at constant 1993-94 prices. Adding the value of each and every food and non-food item, gives the overall value of agricultural output for a year. The per capita value of agricultural output is calculated by dividing the average value of agricultural output by total population in the midpoint year.	Department of Agriculture, Government of Rajasthan http://rajasthankrishi.gov.in/Departments/Agriculture/main.asp?t= statics_top.htm &p=statics_index_new.htm	2002-03 to 2004-05

Name of Variable and Description	Sources	Ref. Year
3. Percentage of inhabited villages having access to paved roads. This is calculated as a share of total number of villages in the district	Census of India, 2001	2001
4. Percentage of forest area to total geographical Area	Department of Forest, Government of Rajasthan	2003
(b) Access		
1. Percentage of agricultural labour to total workers. Agricultural labour comprises both main and marginal workers*	Census of India, 2001	2001
2. Proportion of ST and SC population to total population*	Census of India,	2001
3. Dependency ratio This is calculated as rural population in the age group (15-59) divided by the sum of the (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*(1-Gini).	61st NSS round	2004-05
5. Rural casual wage rate. This is calculated as average daily wage rate for the age group 15-59	61st NSS round	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
(c) Utilization		
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	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	2001
(d) Public Entitlement		
1. 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.	Department of Women and Child Development, Government of Rajasthan	2006

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

Max-Min Approach

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

$$\text{Variable Index} = \frac{(Xi - \min X)}{(\text{Max } X - \text{Min } X)}$$

where Xi- Value of the variable

min X- Minimum value of X in the scaling

max X- Maximum value of X in the scaling

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

The details of normative values used are given in Appendix III.

Construction of Food Security Index

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

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

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., $X - \overline{X}$); by dividing the actual values by

their respective means (i.e., $X / \overline{X}$) and by the deviation of the value of a variable from the mean which is then divided by standard deviation {i.e., $(X - \overline{X})/\sigma$}. 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 PCA in the Food Security Index for those states where the correlation between indices derived through the RE method and PCA method is highly correlated.

Food Security Outcome (FSO)

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

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

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

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

Grouping of Districts

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

Table A3.1:
Index Values and Normative Value of Availability Variables

District	% Net Irrigated Area to Net Sown Area	Per Capita Value of Agricultural output	Paved Road
Ajmer	0.126	0.080	0.745
Alwar	0.876	0.267	0.776
Banswara	0.329	0.100	0.524
Baran	0.810	0.553	0.397
Barmer	0.058	0.047	0.489
Bharatpur	0.753	0.320	0.725
Bhilwara	0.224	0.121	0.451
Bikaner	0.099	0.188	0.787
Bundi	0.686	0.372	0.493
Chittaurgarh	0.287	0.289	0.431
Churu	0.040	0.114	0.737
Dausa	0.717	0.207	0.590
Dhaulpur	0.662	0.250	0.668
Dungarpur	0.266	0.045	0.648
Ganganagar	0.706	0.538	0.815
Hanumangarh	0.382	0.393	0.786
Jaipur	0.470	0.214	0.679
Jaisalmer	0.080	0.131	0.567
Jalor	0.310	0.154	0.766
Jhalawar	0.521	0.389	0.244
Jhunjhunu	0.505	0.210	0.825
Jodhpur	0.101	0.135	0.742
Karauli	0.545	0.228	0.714
Kota	0.789	0.613	0.606
Nagaur	0.198	0.178	0.660
Pali	0.158	0.081	0.798
Rajsamand	0.097	0.022	0.581
Sawai Madhopur	0.579	0.251	0.481
Sikar	0.415	0.158	0.707
Sirohi	0.388	0.056	0.758
Tonk	0.279	0.283	0.450
Udaipur	0.182	0.058	0.469
Lowest Range	***0***	***200***	***10***
Highest Range	***100***	***7000***	***80***

Table A3.2:
Index Values and Normative Value of Access Variables

District	% Other than agricultural labourer to all labourers	% of non (SC+ST) population to total	Ratio of Working Age Population	Monthly Per Capita Consumption Expenditure	Rural Casual Wage Rate	Rural Female Literacy
Ajmer	0.718	0.808	0.267	0.478	0.263	0.323
Alwar	0.809	0.727	0.223	0.574	0.301	0.408
Banswara	0.785	0.189	0.257	0.342	0.219	0.206
Baran	0.429	0.577	0.262	0.463	0.240	0.395
Barmer	0.905	0.778	0.204	0.452	0.343	0.458
Bharatpur	0.714	0.762	0.198	0.492	0.341	0.415
Bhilwara	0.838	0.731	0.302	0.486	0.262	0.231
Bikaner	0.856	0.753	0.207	0.428	0.329	0.263
Bundi	0.700	0.579	0.283	0.514	0.339	0.321
Chittaurgarh	0.772	0.610	0.345	0.514	0.239	0.285
Churu	0.901	0.752	0.214	0.428	0.356	0.585
Dausa	0.861	0.491	0.223	0.423	0.324	0.429
Dhaulpur	0.841	0.734	0.171	0.503	0.376	0.413
Dungarpur	0.669	0.276	0.258	0.342	0.247	0.269
Ganganagar	0.442	0.614	0.332	0.477	0.340	0.531
Hanumangarh	0.646	0.711	0.324	0.433	0.477	0.518
Jaipur	0.858	0.714	0.242	0.498	0.368	0.484
Jaisalmer	0.819	0.790	0.214	0.452	0.389	0.247
Jalor	0.770	0.730	0.192	0.445	0.388	0.231
Jhalawar	0.541	0.707	0.298	0.463	0.310	0.361
Jhunjhunu	0.841	0.814	0.264	0.656	0.558	0.704
Jodhpur	0.745	0.793	0.198	0.413	0.320	0.211
Karauli	0.781	0.507	0.207	0.503	0.310	0.468
Kota	0.484	0.621	0.300	0.463	0.397	0.569
Nagaur	0.770	0.785	0.247	0.406	0.302	0.384
Pali	0.540	0.749	0.228	0.378	0.300	0.309
Rajsamand	0.706	0.732	0.276	0.439	0.301	0.329
Sawai Madhopur	0.815	0.540	0.257	0.503	0.370	0.279
Sikar	0.869	0.812	0.235	0.495	0.369	0.647
Sirohi	0.588	0.526	0.249	0.378	0.248	0.304
Tonk	0.762	0.649	0.272	0.478	0.283	0.224
Udaipur	0.751	0.374	0.273	0.439	0.265	0.359
Lowest Range	***50***	***0***	***0.6***	***150***	***20***	***10***
Highest Range	***100***	***100***	***2.5***	***800***	***150***	***80***

Table A3.3:
Index Values and Normative Value of Absorption Variables

District	% HH Access to safe drinking water	PHCs	District	% HH Access to safe drinking water	PHCs
Ajmer	0.602	0.285	Jaisalmer	0.394	0.061
Alwar	0.542	0.264	Jalor	0.422	0.253
Banswara	0.637	0.492	Jhalawar	0.580	0.321
Baran	0.806	0.142	Jhunjhunu	0.685	0.448
Barmer	0.325	0.126	Jodhpur	0.624	0.195
Bharatpur	0.164	0.313	Karauli	0.343	0.172
Bhilwara	0.644	0.284	Kota	0.894	0.247
Bikaner	0.389	0.095	Nagaur	0.418	0.261
Bundi	0.827	0.208	Pali	0.483	0.263
Chittaurgarh	0.834	0.335	Rajsamand	0.651	0.283
Churu	0.461	0.190	Sawai Madhopur	0.456	0.206
Dausa	0.473	0.280	Sikar	0.615	0.307
Dhaulpur	0.420	0.389	Sirohi	0.718	0.351
Dungarpur	0.684	0.472	Tonk	0.495	0.249
Ganganagar	0.647	0.216	Udaipur	0.608	0.360
Hanumangarh	0.624	0.189	***Lowest Range***	***10***	***2***
Jaipur	0.559	0.331	***Highest Range***	***100***	***70***

Table A3.4:
Key Food Security Interventions inDistricts of Rajasthan

NSS Regions	District	Irrigation Extent	Per Capita Value of Agricultural Output	Rural Connectivity	Rural Casual Wage Rate	Average Monthly Per Capita Expenditure	Agricultural Labourers	Proportion of SCs and STs	Ratio of Working Age Group Population	Rural Female Literacy	Access to Safe Drinking Water	Access to Primary Health Centres	No. of Indicators
North Eastern	Ajmer	√	√		√					√			4
	Alwar				√				√				2
	Bharatpur				√				√		√		3
	Bhilwara	√	√	√	√					√			5
	Dausa		√		√	√			√				4
	Dhaulpur		√						√		√		3
	Jaipur		√						√				2
	Jhunjhunu		√										1
	Karauli		√		√				√		√	√	5
	Sawai Madhopur		√							√	√	√	4
	Sikar		√						√				2
	Tonk	√		√	√					√			4
South Eastern	Baran			√	√	√	√			√		√	6
	Bundi				√					√		√	3
	Chittaurgarh	√		√	√					√			4
	Jhalawar			√	√	√	√			√			5
	Kota					√	√						2
Southern	Banswara	√	√		√	√		√		√			6
	Dungarpur	√	√		√	√		√		√			6
	Rajsamand	√	√		√	√				√			5
	Udaipur	√	√	√	√	√		√		√			7

The **Food Security Atlas of Rural Rajasthan** is part of the series of eight Atlases produced by the Institute for Human Development (IHD) and the UN World Food Programme (WFP). The other states covered in this series are: Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Maharashtra, Orissa 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.

Institute for Human Development (IHD)
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