Food Security Atlas

Of RURAL UTTAR PRADESH

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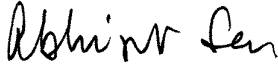
Food Security has now taken centre stage in policy discussions around the world. Along with issues of food production there are also clearly issues of access of the poor to food. In India, despite high GDP growth rates over the past decade or so, the record in reducing hunger is not so impressive. This 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 per cent 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; 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; Ms. Pradnya Paithankar, Mr. Bal Paritosh Dash and Mr. Animesh Kumar for providing their critical inputs.

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

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Acknowledgements

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List of Abbreviations

ADAPT	Area Development Approach for Poverty Termination
AIDIS	All-India Debt and Investment Survey
APL	Above Poverty Line
ARWSP	Accelerated Rural Water Supply Programme
BMI	Body Mass Index
BPL	Below Poverty Line
CAGR	Compound Annual Growth Rate
CMR	Child Mortality Rate
CSO	Central Statistical Organization
CV	Coefficcient of Variation
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
HH	Households
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
NIA	Net Irrigated Area
NREGA	National Rural Employment Guarantee Act
NREGS	National Rural Employment Guarantee Scheme
NSA	Net Sown Area
NSDP	Net State Domestic Product

NSS	National Sample Survey
NTFP	Non-Timber Forest Product
OBC	Other Backward Class
PCVAO	Per Capita Value of Agricultural Output
PDS	Public Distribution System
PESA	The Panchayats (Extension To Scheduled Areas) Act
PHC	Primary Health Centre
PMGSY	Pradhan Mantri Gram Sadak Yojana
RLTAP	Revised Long Term Action Plan
RTI	Right to Information Act
SC	Scheduled Caste
SCA	Special Central Assistance
SCP	Special Component Plan
SHG	Self-Help Group
ST	Scheduled Tribe
TE	Triennium Ending
TSP	Tribal Sub Plan
UNICEF	United Nations' Children Fund
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 even more of the access of households and individuals to sufficient nutritious food. The absorption of food as nutrition in the body is further mediated by access to safe drinking water, sanitation facilities, health and hygienic practices, etc. Consequently, food security is analysed along the axes of availability, access and absorption. The importance of entitlements in food security is 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 reaching the above goals, the Institute for Human Development (IHD) and the UN World Food Programme (WFP) have together undertaken an analysis of the dimensions of food security at the sub-state or district level, for 8 states of India – Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Maharashtra, Orissa, Rajasthan and Uttar Pradesh. The purpose of this exercise is to:

- Identify the regions and social groups most affected by food insecurity; and,

- Suggest policy interventions appropriate to improving food security for those regions and social groups.

Recognising that reduction of acute poverty is the key to reducing hunger, the analysis began by choosing the likely variables that affect food security along the three axes of availability, access and absorption. The composite index is based on 12 identified indicators which reflect these three dimensions. The availability related variables considered here are agricultural production in per capita value terms, proportion of forest area, extent of irrigation and rural connectivity in terms of villages with access to paved roads. The six variables considered for the access to food dimension include proportion of agricultural labourers, proportion of Scheduled Castes and Scheduled Tribes, ratio of working age population, monthly per capita consumption expenditure, casual wage rate of rural persons and female literacy rate. Access to safe drinking water and primary health services are the two variables considered for the absorption index. The values of districts on each of these 12 variables were combined to develop a 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, under-five mortality and underweight children. The FSO can allow us to rank districts on the basis of nutrition performance, with the caveat that on the whole, nutritional status in India is poor, and therefore, the variation between districts may not be very much. The FSI, on the other hand, also allows us to judge the relative importance of variables in the differences between districts.

Our analysis shows that a contiguous zone of acute food insecurity exists in Uttar Pradesh - many districts of southern region adjoining Bundelkhand and central region, which extends from Lalitpur to Pilibhit and the eastern Gangetic region up to Maharajganj. Besides, districts of Sonebhadra and Mirzapur in the southern part of the eastern region and Bulandshahar, Aligarh and Hathras (Mahamaya Nagar) in the western region are two stand alone zones of food insecurity. Together they form the 'geography

of hunger' in Uttar Pradesh. Out of the total 70 districts in Uttar Pradesh 28 require priority attention from the Government to ensure food security in the state. The districts are inhabited by substantial Scheduled Caste (SC) population and high proportion of agricultural labourers with low wage rates. Female literacy rate is also low in these priority districts. Rural connectivity is also poor in most of the food insecure districts.

Priority Districts for Food Security Interventions

Central	Eastern	Southern	Western
Fatehpur	Bahraich	Banda	Aligarh
Hardoi	Balrampur	Chitrakoot	Auraiya
Kanpur Dehat	Kaushambi	Hamirpur	Bulandshahr
Kheri	Maharajganj	Jhansi	Farrukhabad
Rae Bareli	Mirzapur	Lalitpur	Hathras
Sitapur	Shrawasti	Mahoba	Mainpuri
Unnao	Siddharthnagar		Pilibhit
	Sonbhadra		

In general, the districts of Uttar Pradesh fare poorly on nutritional outcomes, with only the more urbanised and industrialised districts doing better. Thus, ensuring food security and improving the nutritional status is a challenge for the state of Uttar Pradesh. The identification of certain districts for priority action does not mean that resources or efforts can slacken in other districts, but only draws attention to the need for more inclusive growth efforts and special efforts to bridge the divide between different regions and districts of the state.

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

Develop location specific policies and take measures for **development of livelihoods of rural and agriculture based population**. This should comprise specific measures, such as putting in place the following special interventions for **Scheduled Castes, other agricultural labourers and small farmers in the Gangetic plains of eastern UP**:

1. Distribution of **land to the landless (including women)**, large numbers of whom would be from the Scheduled Castes

2. Development of **non-farm enterprises and agricultural diversification**, so as to increase absorption of labour

3. Increasing the productivity of land

The Bundelkhand plateau is somewhat different from the Gangetic plains. It is semi-arid with low irrigation. It requires:

1. Expansion of **irrigation in a manner appropriate to hill and plateau regions**

2. Improvement of **rural connectivity**, so as to reduce transaction and transport costs and increase economic opportunities

3. Investment to enable a shift in cropping pattern from the traditional crops to production of **high value crops**

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

Our analysis shows 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, the proposed measures include:

1. Improvement in women's **literacy**

2. Securing women's **right to land** and other productive assets

3. Establishment of Grain and Seed banks through SHG's

4. Increasing access to **micro-finance**

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

1. Reduce the incidence of inter-linked transactions, which result in very low net income

2. Improve the food security situation by enabling borrowing for critical needs

3. Improve the share of household income under the control of women

The above are medium-term development measures that would have a positive impact on the access to food by the poorest. There is an urgent need to **increase the reach and improve the functioning of short-term food access measures**, such as under the National Rural Employment Guarantee Act (NREGA) or the Mid-Day Meals Scheme, and **link them with the above interventions**. It is through such schemes of employment and schooling, along with the Public Distribution System (PDS), that the Right to Food is realisable. The challenge is also to link schemes of short-term food access with medium-term development interventions, which alone can provide a stable basis for food security. Realising the Right to Food and improving the functioning of government schemes, however, are not just the matter of improving administration but even more of people, women and men, mobilising to assert their democratic will over the political and administrative processes. Enhancing capabilities, through rights, access to resources, and training, will open the road for building the **capacity** to aspire – aspirations for a better life exist, but the means or capacity to realise those aspirations are lacking.

1. Introduction

In 1995, the World Food Summit (WFS) and subsequently the Millennium Development Goals adopted at the UN, recognised the importance of achieving food security or, to put it in a more traditional way, reducing incidence of hunger by half by the year 2015.

A 2003 assessment as a part of the follow-up to the WFS, "World Food Summit – *five years later"*, pointed out that, using the incidence of malnutrition as the measure of the incidence of hunger, there has been a decrease in hunger at the rate of 8 million per year across the world. But in order to even achieve the goal of reducing world hunger by half by 2015, it is necessary to reduce the incidence of malnutrition by 15 million per year. What this shows is that continuing to implement the economic, political and social policies now in place will not enable the world to reach the goal. A mid-course correction in economic, political and social policies is needed in order to achieve the stated goals.

This is true for India as well. Despite India's recent record of high rates of economic growth, there is a major concern with the failure of that growth to translate itself into proportionate reduction in poverty and malnutrition. The problem of famine-related starvation deaths seems to have been largely resolved, due to a combination of a vigilant civil society and media, both print and electronic. Nonetheless, there are periodic reports of malnutrition and starvation from different parts of the country, particularly affected are the marginalised social groups – the Scheduled Tribes (STs) and Scheduled Castes. Besides the hunger, these groups are affected by pervasive incidence of malnutrition, particularly among 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 food grains. The fact that they occur within a situation of adequate food grain availability (domestic food grain production plus amounts released from government stocks plus imports made possible by India's burgeoning foreign exchange reserves), serves to underline the importance of framing adequate policies and interventions to secure food security, or access to food for not just households, but also individuals. It also provides the rationale for this report.

The UN World Food Programme and the MS Swaminathan Research Foundation had earlier collaborated in analysing the food insecurity situation in different states in the country. Using chosen indicators to map the relative status 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 release of the *Food Insecurity Atlas of Urban India* in 2002. The second edition of these atlases were released during 2009-10. The third in the series, the *Atlas of Sustainability of Food Security* was launched in 2004. The atlases raised the bar in the analysis and understanding of food security across states. At the same time, the Atlases posed fresh challenges. They brought into focus the need for analysis at the sub-state level. States in India are typically large and diverse. Intra-state disparities in socio-economic development impact the food security status of households. For effective policy and focused intervention, identifying and mapping the food insecure areas

is important. Following the pathbreaking national level atlases, it was decided to extend the analysis to the district level, where the food security interventions are implemented.

The need for such disaggregated analysis is matched by the dearth of data at such levels. To take one example, we do not have estimates of an important indicator like poverty for a district. Strengthening planning and performance requires availability of more data 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. As a step towards reaching the above goals, the Institute for Human Development (IHD) and the UN World Food Programme (WFP) have together undertaken an analysis of the dimensions of food security at the sub-state or district level, for eight states of India: Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Maharashtra, Orissa, Rajasthan and Uttar Pradesh. This report documents the food security situation in Uttar Pradesh based on the findings from a recent exercise, with the following underlying objectives:

> To identify the regions and social groups in Uttar Pradesh most affected by food insecurity;

> To analyse the nature and dynamics of the food security situation at the sub-state level; and

> To suggest policy interventions appropriate to improving food security for those regions and social groups.

It is hoped that the Atlas will stimulate action and further analysis. The issue of food security needs to be brought to the forefront of the development agenda not only at the Centre, but also at the state/ sub-state level.

1.1   Definitions and Significance of 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…[1]' (UN, Report of the World Food Conference, Rome 5-16 November 1975, New York: UN). But the 1981 publication of Amartya Sen's ***Poverty and Famines: An Essay on Entitlement and Deprivation*** (Oxford: Clarendon Press) brought forward a new understanding of the problem of hunger or food security. Rather than just the 'availability' of food, Sen emphasised on '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.[2]

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

2.   In a sense, Sen's emphasis on entitlements is similar to Keynes' notion of 'effective demand'. Both entitlement and effective demand are quite different from need. Since Keynes was dealing with a fully capitalist market economy, with only two classes, employers and workers, all effective demand was related to monetary income. But Sen is dealing with the '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 their respective 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) or 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.

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

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 objectives for which food is consumed, which 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 (well-being) and to do various things one wants to do.

At one level, some health questions, like the prevalence of intestinal parasites, affect the very ability of the human body to absorb nutrients. Health concerns, focused on the availability of clean water and access to health facilities, are as much a part of the very concept of food security itself. At another level, some health questions, like AIDS most dramatically but also endemic malaria, affect the ability of the individual / household to engage in those livelihood activities that could ensure food security. Consequently, in order to deal with food security, it is not sufficient to pay attention to food alone, but also access to, at least, clean water and sanitation which affect the ability to absorb food, or turn consumption of food into nutrition. Without going further into the inter-relations of nutrition, and health services, one may just put them all together 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 in themselves are goals of a meaningful life. But they are also instrumentally important, as those without self-respect or social capital may not be able to achieve food security. Consequently, achieving self-respect or playing a meaningful part in social life, both may be necessary to achieve food security. This leads to the proposition that food security is not just a matter of some external organisation, of the state or society, providing food, but of the enhancement of the agency of the hungry or poor. Thus, some level of complex capabilities, like agency, is required to reach adequate levels of primary well-being.

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

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

In its historical dimension, responsibility for provision of sufficient food was viewed as that of individuals themselves or that of the household to which an individual belonged. But, with advancement in the conceptualisation of governance and growth of international co-operation, it has come to be increasingly recognised that provision of food cannot be relegated to the background as the sole responsibility of individuals or their households, but governments of different nations as also the international community must take appropriate measures to help in achieving food sufficiency for all. In this context, food security has come to the forefront of the agenda of most governments. The World Food Summits of 1995 and 2003, inclusion of food security as part of the Millennium Development Goals (MDGs) and the United Nations World Food Programme are reflections of the growing global concern about the achievement of adequate food security.

Figure 1.1: Food Utilisation Model
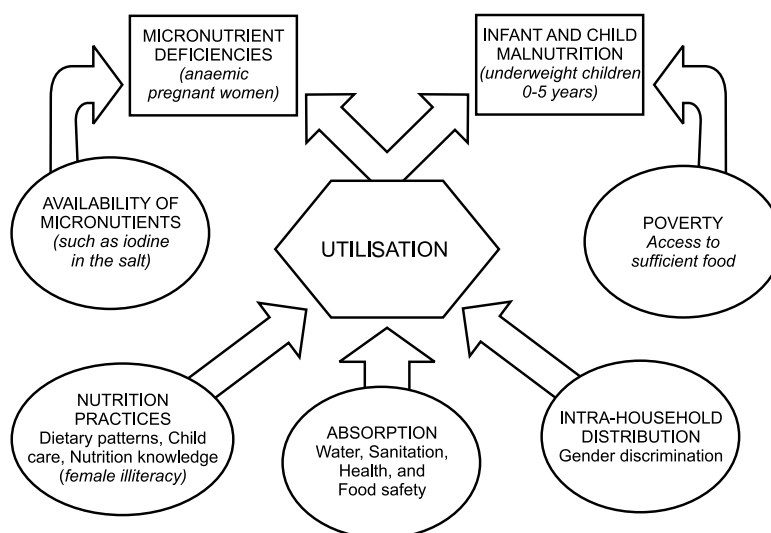
As we have seen earlier, a reasonably good level of health status of the population is essential to facilitate adequate conversion of food into a higher nutrition level for the body. The ultimate outcome of food security over the long run for a number of indicators of health is critical. Absence of food security over the long run results in outcomes which manifest themselves in the form of morbidity, low body-mass ratio and higher level of mortality which result in low expectancy of life. The entire process can be portrayed in an input-output flow chart as given in the figure 1.1.

Whereas the inputs into food security can be steered in the relatively short run, the outcomes take a longer time to manifest themselves. Moreover, from the policy point of view, the inputs into food security are more relevant since they are based on variables that can be influenced by the state, while outcomes are an end product of food security and availability of health facilities, nutritional practices specifically for child population.

In what follows, we shall first examine output or outcome measures of food security and then come to measurement of input dimensions of food security.

Overview of the Report

This report is an effort to provide a district level profile of food security in Uttar Pradesh. As the country moves towards greater devolution and decentralisation, data at disaggregated levels still remains a stumbling block. District level data is notoriously inadequate and this report urges for greater attention to be paid to data collection and dissemination at sub-state levels. The next chapter–Chapter 2—provides an overview of the state and places it in the context of other states in the country. In line with the current—and correct—approach that emphasise 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. Chapters 4 to 6 analyse the food security situation along the dimensions of availability, access and absorption. The most food insecure districts both in terms of outcomes and in terms of the factors that contribute to it are given in Chapter 7. This Chapter also discusses strategies for action that emerge from our analysis. They are placed in the context of the broader state and national strategic interventions already in place. This is most significant from the perspective of policy. Chapter 8 wraps up the report with the final conclusions.

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2. A Profile of the State of Uttar Pradesh

A snapshot of the socio-economic profile of the state and the changes that have occurred in its economy are important to comprehend and map the multiple dimensions of food security in Uttar Pradesh (UP). This chapter highlights the geographical features of the state and chalks out its relative position in key areas of the economy and health.

2.1 Profile of State- A Snapshot

UP covers 2,40,928 sq. kms. and accounts for 7.3 per cent of total area of the country, while its share in the country's population is 16.2 per cent. UP comprises 70 districts, 300 *tehsils* and 813 development blocks. There are 52,028 village *panchayats* in the State covering 97,134 inhabited villages. The majority of UP's villages are small, with an average population of around 3,194 per *panchayat.* Situated in the Indo-Gangetic plain and intersected by rivers, UP has had a long history of human settlement. The fertile plains of the Ganga have led to a high population density and the dominance of agriculture as an economic activity. As in other parts of India, land is the single most important resource. However, per capita availability of land has been declining. It stood at a meagre 0.10 hectare in 2001-02. The average size of land holdings in the State in 1995-96 was only 0.86 hectare, with nearly three - fourth holdings

Map 2.1: Uttar Pradesh: Regional Boundaries
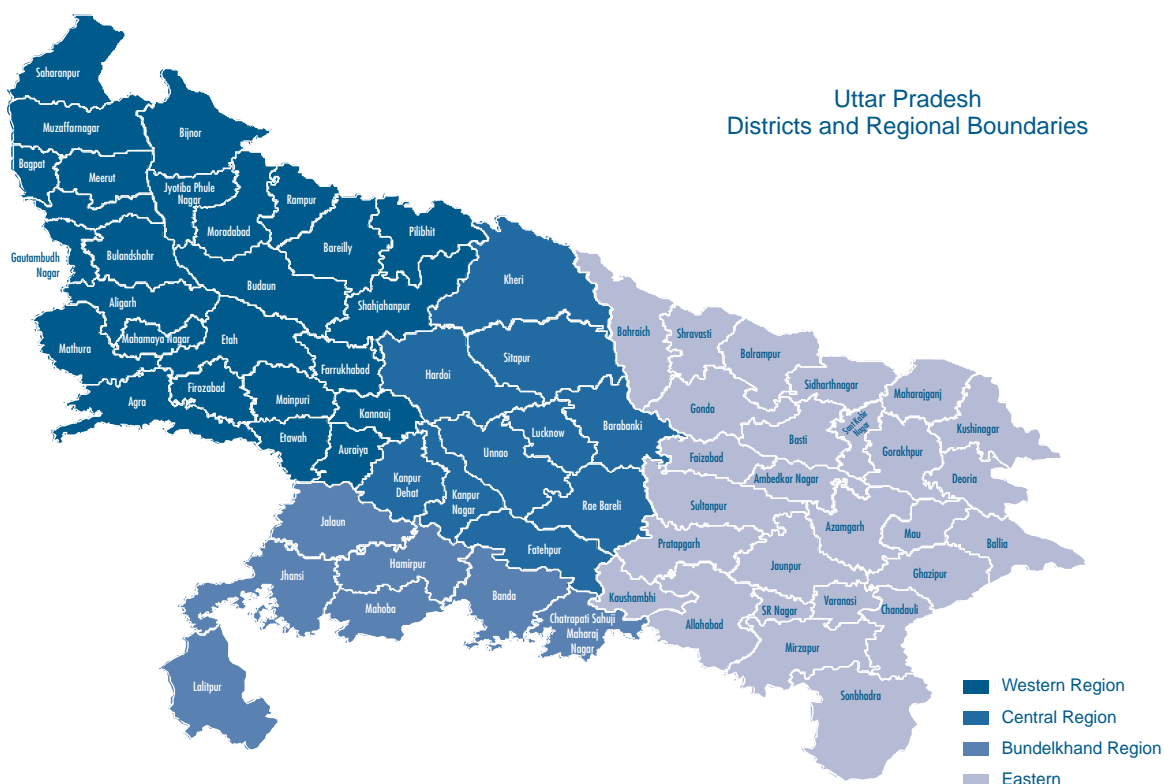
Source: Human Development Report, Uttar Pradesh, 2003.

falling below one hectare. Smaller land-holdings continue to be a major obstacle in the development of capital formation and growth in agriculture and hence is one of the reasons for widespread poverty.

After the creation of Uttarakhand, UP's forest area declined from 5.2 million hectares to 1.69 million hectares, creating a serious imbalance. Today, even the 5 per cent of the total area which is under forest has suffered extensive environmental degradation. The state is, however, rich in surface and ground water resources. Over three-fourth of the sown area is irrigated mostly through tubewells. UP also has a fairly large canal network.

In development literature, undivided Uttar Pradesh has been divided into five separate regions. These are the hill region, which is now in Uttarakhand comprising the Himalayan districts in the north and the foothills; the western region, comprising old Meerut, Agra, Rohilkhand administrative divisions; the central region, which includes the capital Lucknow and its largest city – Kanpur; the eastern region; and the southern region of Bundelkhand which lies in the plateau of the Vindhyas. On November 9, 2000, 13 districts of the hill region as well as the district of Haridwar in the west were reconstituted into the new state of Uttarakhand and now the state comprises of four regions i.e western, central, eastern and Bundelkhand.

Table2.1: Net State Domestic Product and Poverty Status

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

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

The western and the eastern regions are the most populous, together comprising 76.9 per cent of UP's population. Of these regions, the western region is relatively developed with a per capita income double that of the poorest eastern region. Industries are located mainly in the western and central regions. The highly productive western region is part of the granary of India, although some of the backward regions such as eastern UP are slowly catching up. Land resources are most abundant (in per capita terms) in the Bundelkhand region, followed by the western region, but the former region has the lowest irrigation intensity.

2.2 POVERTY

The predominance of small land holdings constitutes a major obstacle in the development of capital formation and growth in agriculture and is one of the prime reasons for widespread poverty in the state.

Poverty levels are relatively high in Uttar Pradesh. However, poverty levels have gone down in the state over time, declining from 57 per cent in 1973-74 to 32.2 per cent in 2004–05. During the corresponding period, poverty at the national level declined from 54.9 per cent to 27.5 per cent. Despite the substantial decline in the poverty ratio, the absolute number of poor has remained high in the state. Almost 60 million people in UP were living below the poverty line in 2004-05, constituting over one-fifth of the total poor in the country on the basis of uniform recall period.

Considerable variations in poverty levels are observed across regions of the state. The relatively developed western region has a lower incidence of poverty, while the eastern region has much higher incidence. Bundelkhand had the highest proportion of population below poverty line in 1993-94. However, the 1999-00 NSS survey shows a much sharper reduction in poverty in this region, while the central region shows the highest incidence of poverty. Variations in population pressure, resource endowment and productivity levels lie behind the regional variations in poverty levels.

Table 2.2: Head Count Ratio of Poverty in Uttar Pradesh

Poverty Measure	1993-94 (50th Round)			2002-03 (PSMS II)			2004-05 (NSS61st Round)		
	Overall	Rural	Urban	Overall	Rural	Urban	Overall	Rural	Urban
Poverty Line (in nominal rs.)	–	213.0	258.7	–	346.4	460.2	–	365.8	483.3
Headcount Poverty Rate (%)	40.9	42.3	35.1	29.2	28.5	32.3	32.8	33.4	30.6
Povert Gap	10.1	10.4	9.0	5.1	4.7	6.5	6.5	6.3	7.1
Squared Poverty Gap	3.5	3.5	3.3	1.3	1.2	1.9	1.9	1.8	2.3
No. of Poor (millions)	59.3	49.5	9.9	48.8	38.4	10.3	59.0	47.3	11.7

Source: NSS 50th round Central sample, PSMS-II and NSS 61st Round.

2.2.1 Poverty at the District Level

NSS sample design is not aimed at measuring poverty at the district level. The Below Poverty Line (BPL) Survey of the Ministry of Rural Development, however, makes it possible to study district level variations in poverty. The advantage of the BPL Survey is that it is based on a complete census of rural households and identifies BPL households on the basis of multiple indicators of deprivation. The results of the BPL Survey are, however, not comparable with poverty ratios derived from NSS data on consumer expenditure.

Table 2.3: Districts Classified According to Proportion of Rural Population Below Poverty Line (%)

Very High (Above 50%)		High (40% To 50 %)		Moderate (20% To 40%)		Low (Below 20%)	
District	%	District	%	District	%	District	%
Kaushambi	74.65	Kanpur (Nagar)	49.93	Gonda	36.95	Moradabad	19.77
Hardoi	74.00	Pratapgarh	49.09	Kannauj	35.85	Agra	19.43
Bahraich	72.11	Lucknow	49.06	Balrampur	35.69	Gautam Budh Nagar	19.00
Mirzapur	68.38	Ghazipur	48.50	Azamgarh	32.87	Hathras	17.91
Sonbhadra	64.53	Jalaun	48.34	Farukkhabad	32.64	Etah	17.26
Kanpur Dehat	60.87	Faizabad	48.22	Rampur	31.83	Mathura	16.24
Shravasti	60.53	Basti	47.64	Maharajganj	30.76	Aligarh	14.64
Unnao	59.51	Etawah	46.34	Lalitpur	30.47	Firozabad	13.61
Ambedkar Nagar	59.15	Barabanki	46.15	Jhansi	29.19	Budaun	12.24
Rae Bareli	57.78	Sant Kabir Nagar	45.99	Gorakhpur	28.24	Muzaffarnagar	11.68
Sitapur	57.46	Hamirpur	45.32	Allahabad	28.17	Deoria	11.67
Chitrakoot	55.13	Pilibhit	45.23	Bareilly	27.50	Bulandshahar	10.34
Sultanpur	54.62	Jaunpur	43.65	Saharanpur	24.56	Meerut	8.38
Shahjahanpur	54.11	Mau	43.34	Jyotiba Phulle Nagar	24.45	Ghaziabad	7.12
Ballia	51.55	Orraiya	43.23	Varanasi	24.24	Baghpat	6.66
Lakhimpur Kheri	51.01	Chandauli	43.10	Bijnor	23.67		
		Fatehpur	42.77	Sant Ravidas Nagar	22.74		
		Siddharth Nagar	42.74	Mahoba	21.33		
		Kushi Nagar	42.66				
		Mainpuri	42.52				
		Banda	40.85				

Source: Ministry of Rural Development, Government of India, BPL Survey 2002 as reported in Human Development Report, Uttar Pradesh, 2003.

Table 2.3 arranges districts according to the level of poverty according to 2002 BPL survey. The variations in poverty levels among districts are very stark, ranging from a low of 6.7 per cent in Baghpat to as much as 74.7 per cent in Kaushambi. In 16 districts poverty levels are above 50 per cent. These districts mostly belong to central UP and Bundelkhand. In another 21 districts poverty ratios are high (between 40 and 50 per cent). Majority of these districts fall in eastern UP. In 18 districts poverty levels are between 20 and 40 per cent. Poverty levels are relatively low (below 20 per cent) in 15 districts. All these districts except one belong to western UP (Human Development Report, Uttar Pradesh, 2003).

Because of the variation in livelihood conditions, wide inter-district disparity is observed in Uttar Pradesh. It is generally low in the western zone which offers a variety of economic opportunities to a large section of its population where demand for labour is also usually high. This is the reason that the incidence of poverty is low in Baghpat, Ghaziabad, Meerut, Bulandshahar, etc. which is experiencing higher economic development. Poverty is very high in Kaushambi, Hardoi, Sonebhadra, Kanpur Dehat, Shravasti, etc. which are among the deprived districts in terms of economic development.

Map 2.2: Uttar Pradesh: Per cent of population below Poverty Level

Categories

- below 10.00
- 10.00 - 20.00
- 20.00 - 30.00
- 30.00 - 40.00
- 40.00 - 50.00
- 50.00 and above
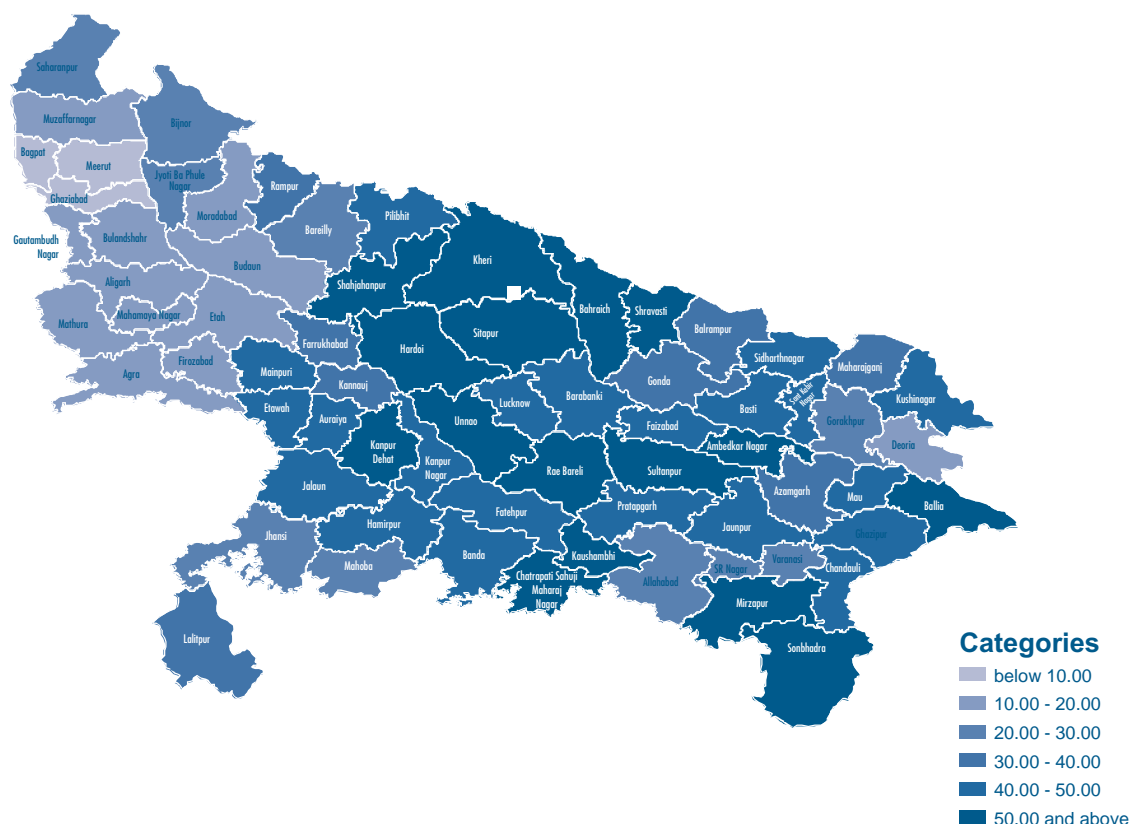
2.2.2 Poverty among Social Groups

The incidence of poverty is very high among Scheduled Castes, Scheduled Tribes and OBC categories. The agricultural labourers and artisans are also affected by poverty. Wide variations in poverty levels are observed across regions and districts of the state.

Nearly 60 per cent of SC households were below the poverty line in UP during 1993-94, which declined to 43 per cent in 1999-00. Poverty in Uttar Pradesh, like in the country as a whole, is concentrated among the SC/ ST category. More than half of them live below poverty line. A larger percentage of SCs/ STs in Uttar Pradesh are poor than at the all India level. However, the pace of decline of poverty was faster for the SC/ST households as compared to other households during this period.

Table 2.4: Poverty Rates (%) by Social Group for Rural Uttar Pradesh (2004-05)

Region	ST/SC	OBC	Others	All
Western	32.41	55.87	11.72	24.07
Central	41.61	47.67	10.72	30.12
Eastern	33.82	55.11	11.07	41.37
Bundelkhand	32.02	54.01	13.97	38.87
Uttar Pradesh	34.62	54.04	11.34	33.32

Source: Sch 1.0, NSS 61st Round, 2004-05.

The incidence of poverty differs also on the basis of occupation. It is high among the labour class and low among the proprietary class or among others which include the regular salaried. But this difference is less pronounced in Uttar Pradesh than at the all India level. At the all-India level, around 26 per cent of the households are agricultural labourers while around 41 per cent of the poor households belong to this category. In Uttar Pradesh, of all households, only 14.24 per cent of the households are agricultural labourers whereas around 24.19 per cent of the poor households are agricultural labourers. In Uttar Pradesh, 38.01 per cent of the households and around 48.55 per cent of the poor households are

Table 2.5: Percentage Share of Poor and All Households by
Household Type for Rural Uttar Pradesh (2004-05)

Region	Self-employed in Non-agriculture	Agricultural Labour	Other Labour	Self-Employed in Agriculture	Others	Total
Poor Households						
Uttar Pradesh	18.8	24.2	14.0	38.0	5.0	100
India	12.8	41.5	12.1	26.5	7.1	100
All Households						
Uttar Pradesh	18.4	14.2	9.6	48.6	9.2	100
India	15.6	26.7	10.7	35.5	11.4	100

Source: Sch 1.0, NSS 61st Round, 2004-05.

self-employed in agriculture while at the all-India level, around 35 per cent of the households are self-employed in agriculture but only around 26 per cent of the poor households belong to this occupational category.

The main reasons for high incidence of poverty among the self-employed in agriculture in Uttar Pradesh are the low productivity of agriculture and small size of landholding of the farmers. Though in comparison to the all-India level a smaller percentage of households, are landless. More than three - fourth households have less than one hectare of land. Nearly 21 per cent of the households in India and 24 per cent of the households in UP have more than one hectare of land. At the all India level, there are nearly 3 per cent of households with more than four hectares of land, where as for UP it is less than 2 per cent.

Table 2.6: Percentage Share of Poor and All Households by
Land Cultivation Categories for Rural Uttar Pradesh (2004-05)

Region	0.000-0.004	0.005-0.40	0.41-1.00	1.01-2.00	2.01-4.00	4.01 & above	Total
Poor Households							
Uttar Pradesh	10.4	51.7	24.5	10.9	1.7	0.8	100
India	46.1	23.7	16.9	8.6	3.8	0.9	100
All Households							
Uttar Pradesh	9.7	38.0	27.9	15.4	7.1	1.9	100
India	41.7	19.4	17.7	11.6	6.7	2.9	100

Source: Sch 1.0, NSS 61st Round, 2004-05

The literacy rate in Uttar Pradesh is much less than the all-India level for both the poor and non-poor. But, the gender difference in literacy in Uttar Pradesh is almost similar to that at the all-India level.

Table 2.7: Literacy Rate for Individuals from Poor and All Categories
by Gender for Rural Uttar Pradesh 2004-05

Region	Male		Female		Person	
	Poor	All	Poor	All	Poor	All
Uttar Pradesh	51.01	59.49	30.15	37.55	40.70	48.89
India	65.3	76.4	42.2	53.2	53.7	65.1

Source: Sch 1.0, NSS 61st Round, 2004-05

2.3 Economic Growth

Uttar Pradesh not only ranks among the poorest states of the country, but the average rate of growth of its economy is also among the worst. Between 1993-94 and 2004-05, the state economy has grown at a meagre rate of 4.3 per cent per annum. It is much less than that of the developed states of the country – for instance, Gujarat grew at an average rate exceeding 7 per cent while Karnataka grew at 6.9 per cent per annum in this period. In UP, the growth trend during the period was only 2.6 per cent per annum in case of the primary sector, around 5.2 per cent in case of the secondary sector and

Table 2.8: CAGR and Percentage Share of GSDP
by Sectors in Uttar Pradesh during 1993-94 to 2004-05 at 1993-94 Prices

Sl. No.	Sector/ Sub-Sectors	CAGR (1993-94 to 2004-05)	% Share in GSDP (1993-94)	% Share in GSDP (2004-05)	% Change in Share 1993-94 to 2004-05
1	Agriculture	2.22	37.94	30.48	-7.46
2	Forestry & logging	11.65	0.63	1.34	0.71
3	Fishing	7.06	0.46	0.61	0.15
4	Mining & quarrying	6.63	0.76	0.98	0.21
a	**Sub Total of Primary**	**2.63**	**39.80**	**33.40**	**-6.39**
5	Manufacturing	4.86	13.66	14.52	0.86
6	Construction	7.75	4.20	6.02	1.82
7	Electricity, gas and Water supply	2.82	3.59	3.07	-0.52
b	**Sub Total of Secondary**	**5.19**	**21.45**	**23.61**	**2.16**
8	Transport, storage & communication	9.08	5.34	8.77	3.43
9	Trade, hotels and restaurants	2.99	13.51	11.78	-1.73
10	Banking & Insurance	10.17	2.53	4.63	2.10
11	Real estate, ownership of dwellings and business services	2.95	6.85	5.95	-0.90
12	Public administration	5.33	4.44	4.95	0.51
13	Other services	5.49	6.08	6.90	0.82
c.	**Sub Total of Tertiary**	**5.27**	**38.75**	**42.98**	**4.23**
14	State domestic product	4.28	100.00	100.00	0.00

Source: Calculated from CSO, 2004-05.

5.3 per cent in case of the tertiary sector. Slow growth of the economy was coupled with large fluctuations in growth rate in all the sectors of the economy, largely emanating from the fluctuations in the agricultural output (see Table 2.8).

The sectoral composition of economy is a good indicator of the level of economic development of the state. While the tertiary sector is the most important sector for India and most of its states, contributing more than half of their NSDP, it contributes slightly more than 40 per cent of NSDP of Uttar Pradesh. Primary and secondary sectors contributes 36.86 per cent and 19.56 per cent of its NSDP respectively. Chief contributor to the primary sector is agriculture. It contributed around 30 per cent to GSDP in 2004-05 (Table 2.9).

The primary sector contributes around 30.48 per cent to the GSDP of Uttar Pradesh in 2004-05. Though the contribution of primary sector on the whole has declined by around 6.4 percentage points in the last eleven years, the contribution of agriculture has remained above 30 per cent. The decline in contribution of primary sector is mainly because of the fall in contribution of agriculture itself (7.46 percentage points), while all other sub-sectors of this sector have shown signs of marginal improvement. The share of the secondary sector has increased and that of the tertiary sector has also shown an upward surge in the last eleven years. 43 per cent of the state Gross Domestic Product is generated by tertiary sector and

Table 2.9: 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

Note: *NSDP at Factor Cost at 1993-94 prices

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

around 24 per cent by the secondary sector. The contribution of the secondary sector has increased by around 2.16 percentage points in the last eleven years mainly because of an increase in the contribution made by registered manufacturing and construction sectors (See Table 2.9).

The change in the share of different sectors of the economy is because of their differential growth rate. Agriculture grew at a rate less than that of GSDP on the whole (agriculture grew at 2.2 per cent per annum while as also discussed above, GSDP grew at 4.3 per cent during1993-94 and 2003-04 at 1993-94 prices). Similarly, the rate of growth of the primary sector remained 1.65 percentage points less than that of GDSP. This is because of the poor performance of the agricultural sectors. The tertiary sector on the whole grew at a rate above that of GSDP, in particular banking and insurance, storage, real estate, communication, and public administration jumped appreciably during this period. The formation of a new state, pay revision of the employees of government, public sector and other enterprises, the communication revolution brought about by the technological revolution and deregulation of this sector played significant roles in the development of these sub-sectors of the tertiary sector. The secondary sector also grew at a rate faster than the GSDP. Within this sector, the registered manufacturing and

Figure 2.2: CAGR of GSDP of Uttar Pradesh (1993-94 to 2004-05)
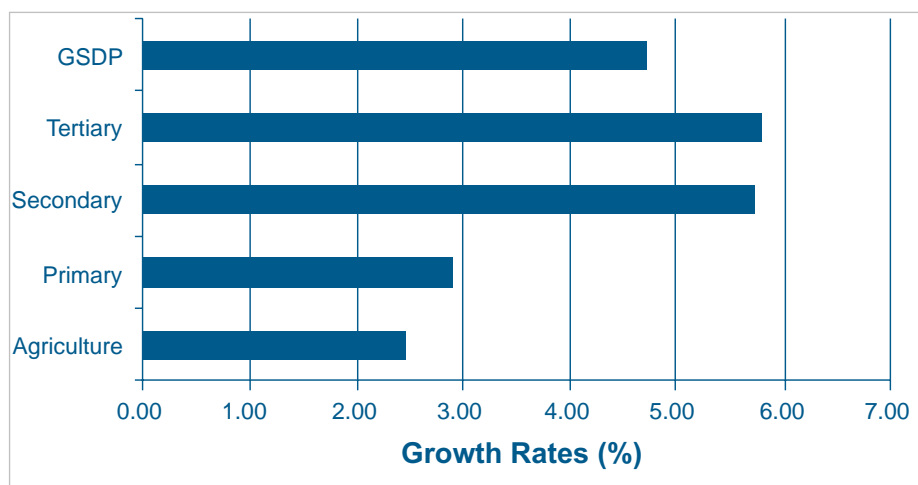
Note: Compound annual growth rate of average sub sectoral GSDP from 1993-94 to 2004-05.

construction made remarkable progress. A rate of growth of 7.75 per cent in the construction sector is mainly because of a spurt in construction activities and explains the improvement in the contribution of this sector to the GSDP (see Table 2.8).

Most of the workers in this state, like elsewhere in the country, are engaged in the agriculture sector. Like the rest of India, in Uttar Pradesh too the productivity of labour is least in the agriculture sector. Above 70 per cent of the workers are engaged in the agriculture sector and contribute 30 per cent to the

Table 2.10: Percentage of Workers and their Share in GSDP in Uttar Pradesh, 2004-05

Sector	Workers				% Share in GSDP
	Usual Principal Status (UPS)		Usual Principal and Subsidiary Status (UPSS)		
	Rural	Urban	Rural	Urban	
Agriculture, etc.	68.5	8.6	72.8	10.5	30.48
Mining & Quarrying	0.3	0	0.2	0.1	0.98
Primary	0	0	0	0	33.40
Manufacturing	9.7	11.5	8.9	28.4	14.52
Construction	6.4	10.9	5.3	7.4	6.02
Secondary	0	0	0	0	23.61
Finance, Business, Real Estate, etc	0.4	3	0.4	3.4	
Public Admn., Health, education, etc.	4.7	28.6	4.1	14.3	
Tertiary					42.98

Source: Workers: NSS 61st Round and GSDP CSO.

GSDP of the state. On the other hand only around one per cent of the workers are engaged in mining and quarrying but contribute one per cent to the GSDP, and 20 per cent of the workers are engaged in manufacturing but contribute 15 per cent to the GSDP (see Table 2.10).

2.4   Health and Nutritional Status

It is a well known fact that the health status of an individual is directly influenced by his/her economic status. Given the fact that a healthy person has a higher capacity to work, the former also has a direct impact on the latter. All economic activity is carried forth with the human being as the core, and health is the basic component. This issue of health and nutritional status could be measured with the help of various indicators. While mortality under age one (infant mortality) is an indicator of poor reproductive health facilities and antenatal care, mortality under age five is closely linked with immunisation and overall poverty levels. 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. UP shows the highest figure (96) for under five mortality, followed by Madhya Pradesh and Jharkhand. In all the nutritional indicators, the figures for Uttar Pradesh remain consistently poor, and could be as the worst performing state in quite a few of the indicators and close to worst performing in all of them.

High malnutrition levels, coupled with high mortality among children, also 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.

Table 2.11: Mortality and Nutritional Status of Children and Women[1]

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

Source: National Family Health Survey, 2005-06

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

A brief look at the same states in terms of consumption levels gives an interesting picture for Uttar Pradesh. It lies ahead of the national average in terms of per capita per day calorie intake and also per capita per day protein intake. The public intervention for mitigating undernutrition among children, in terms of food supplements under the Integrated Child Development Services (ICDS) programme, is seen to be lower in the state as compared to most other states (Table 2.12). In food security outcomes, under-five mortality in particular, it lies well below the national average. The disjunction between the average level of calorie and protein consumption and a below-average outcome in under-five mortality, could be explained by a high level of inequality of consumption in the state. As seen earlier, there is a high proportion of ST/ SC population in the state and the ST dominated districts are also those with the poorest nutrition outcomes. Further, there is also a higher proportion of agricultural labourers and petty farmers in the rural population who have poor nutrition outcome because of single cropping and low agricultural wages. This points to the importance of paying attention to the condition of the ST/ SCs and of agricultural labourers and petty farmers.

There is also a need to pay attention to gender relations in order to strengthen women's agency in dealing with food security. Taking women's literacy rate as an indicator of gender relations, it is much less than that of men in Uttar Pradesh. Rural women's literacy rate, as we will see later, points to high regional differences within the state.

Table 2.12: Status of Consumption

	Per Capita per Day Intake of Calorie (kcal)	Per Capita per Day Intake of Protein (gm)	% given Vit 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
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.

The nutritional status of children of Uttar Pradesh is not only bad but, by and large, has also deteriorated. The percentage of stunted children has declined from 55.7 in NFHS-II to 46.0 per cent in NFHS-III, but the percentage of wasted children has increased from 11.2 to 13.50 per cent. The percentage of underweight children has also shown improvement from NFHS-II to NFHS-III i.e. from 51.8 to 47.30 per cent. The nutritional status of children of Uttar Pradesh is in fact worse than the all India average. As a result the gap between the status of children of the state and India is mostly negative (Table 2.13).

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

Variable	NFHS III			NFHS II
	Total	Urban	Rural	Total
Uttar Pradesh				
Children under 3 years who are stunted (%)	52.4	46.6	53.6	60.7
Children under 3 years who are wasted (%)	19.5	16.5	20.3	16.9
Children under 3 years who are underweight (%)	41.6	31.8	43.7	48.1
India				
Children under 3 years who are stunted (%)	44.9	37.4	47.2	51.0
Children under 3 years who are wasted (%)	22.9	19.0	24.1	19.7
Children under 3 years who are underweight (%)	40.4	30.1	43.7	42.7
Point Gap				
Children under 3 years who are stunted (%)	-7.5	-9.2	-6.4	-9.7
Children under 3 years who are wasted (%)	3.4	2.5	3.8	2.8
Children under 3 years who are underweight (%)	-1.2	-1.7	0.0	-5.4

Source: NFHS II, III

Table 2.14: Nutrition Status of Children in Uttar Pradesh

		Uttar Pradesh	India
Height-for age	Percentage below -3SD	32.4	23.7
	Percentage below -2SD	56.8	48
Weight for height	Percentage below -3SD	5.1	6.4
	Percentage below -2SD	14.8	19.8
	Percentage above +2SD	1.2	1.5
Weight for age	Percentage below -3SD	16.4	15.8
	Percentage below -2SD	42.4	42.5
	Percentage above +2SD	0.1	0.4

Source: NFHS III

The incidence of mild anaemia among the children of Uttar Pradesh, is almost equal to the all-India average; but the incidence of moderate and severe anaemia is more among its children than the all-India average (Table 2.15).

Table 2.15: Anaemia Status by Haemoglobin Level among Children

Status	Uttar Pradesh	India
Mild (10.0-10.9 g/dl)	25.4	26.3
Moderate (7.0-9.9 g/dl)	45.0	40.2
Severe (<7.0 g/dl)	3.6	2.9
Any Anaemia (<11.0 g/dl)	73.9	69.5

Source: NFHS III

Early childhood mortality in Uttar Pradesh is very high, much higher than the all-India average. Mortality among under five year old children in the state is 96.4 per thousand, while it is 74.3 at the all-India level. The incidence of neonatal, post neo natal, infant and child mortality in Uttar Pradesh is also higher than the all-India level (see Table 2.16).

Table 2.16: Early Childhood Mortality Rate, 2005-06

State	Neonatal mortality (NN)	Post-neonatal mortality1(PNN)	Infant mortality(1q0)	Child mortality (4q1)	Under-five mortality (5q0)
Uttar Pradesh	47.6	25.0	72.7	25.6	96.4
All-India	39	18	57	18.4	74.3

Source: NFHS III.

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

*****

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

(a) Food availability of the household, which results from own production of food retained for household consumption, plus food purchased from the market through sale of other commodities, whether labour time or products, and any non-production based entitlements to food.

(b) Household's access to food, depending upon socio-economic status and factors governing intra-household food distribution.

(c) Capacity of an individual to absorb the consumed food - a factor affected by access to safe drinking water and health facilities.

3.1   Measuring Food Security Status

Given the 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, lack of appropriate child health and nutrition care and inequitable distribution of food within the household. The measurement of nutritional status of children is done through anthropometric methods including weight-for-age; height-for-age and weight-for-height. Each of these indices provides 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, 2006).

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 proportion of underweight children as

the indicator for capturing malnutrition among children. The primary reason being that weight-for-age is a composite measure that takes into account both chronic and acute under nutrition. Secondly, while information on stunting and wasting are available at the state-level from the NFHS, the same is not available at 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 she is severely underweight and two and a half times more likely to die if she is moderately underweight, as compared to an average weighed 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, in this report, another indicator used for measuring food insecurity outcome is child mortality. The under-five mortality rate or child 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 child mortality ratio as an indicator of food insecurity. Child mortality portrays an 'outcome' of the development process rather than an 'input', such as per capita calorie or protein consumption or access to medical facilities – which are means to an end. Child mortality is known to be the outcome of a wide variety of factors, for instance, mother's nutritional status, food availability in the family, level of immunisation, availability of maternal and child health services, economic status, availability of safe drinking water, basic sanitation and so on (UNICEF, 2005). Thus, child mortality encompasses a number of facets, most of which have been used as explanatory indicators, as already enumerated and discussed later.

The significance of child 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 the 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 simply, it is much more difficult for a wealthy minority to affect a region's child mortality ratio, and therefore it puts forward a more accurate picture of the health and nutritional status of the children of that region (UNICEF, 2007b).

The UN explicitly mentions reduction of child mortality (children under five) by two-thirds by 2015 as one of its primary targets under the' Millennium Development Goals (MDG-4). The interrelation between nutritional status and child mortality can be gauged from the fact that undernutrition contributes up to 50 per cent of all child deaths (WHO & UNICEF, 2006). Improving nutrition and achieving MDG-1 (eradicate extreme poverty and hunger) would substantially help avert child deaths from diarrhoea, pneumonia, malaria, HIV, measles, etc. Thus, improving nutritional status is a prerequisite for achieving MDG-4 (UNICEF, 2008).

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 their survival beyond the age of five.

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

As many as 60 countries across the globe have been prioritised for urgent action, based on two criteria – countries with more than 50,000 deaths of children under five and countries with an annual child mortality of at least 90 per 1000 live births. In 2005, these 60 countries accounted for 93 per cent of all deaths of children under five. India prominently figures among these countries and shares place along with four other South Asian countries. Remarkably, India doesn't 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 a significant negative correlation between micronutrient intake and proportion of underweight children and under-five mortality, thereby implying

Table 3.1: Correlation between Micro-nutrient 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

*** significant at .01 level.*   ** significant at .05 level.*

Table 3.2: Indicators Used to Compute Food Security Outcome Index (FSOI)

District	Under Five Mortality	Rank	Underweight Children	Rank	FSOI	Rank
Agra	121.50	22	33.10	1	0.721	4
Aligarh	141.00	47	70.30	62	0.450	64
Allahabad	146.00	52	43.20	5	0.573	31
Ambedkar Nagar	121.00	21	46.80	13	0.651	13
Auraiya	126.00	27	76.90	65	0.473	59
Azamgarh	123.00	24	53.70	30	0.607	21
Baghpat	92.00	2	86.00	68	0.556	34
Bahraich	155.00	61	44.90	9	0.530	42
Ballia	95.00	4	50.50	21	0.731	3
Balrampur	169.00	70	55.80	39	0.419	66
Banda	139.00	44	57.70	46	0.524	43
Barabanki	153.00	57	48.20	14	0.520	44
Bareilly	129.00	29	48.50	15	0.611	18
Basti	129.00	29	56.00	40	0.571	32
Bijnor	119.60	18	39.10	4	0.697	6
Budaun	155.90	64	50.20	19	0.499	51
Bulandshahr	144.00	50	96.00	70	0.303	70
Chandauli	111.00	11	49.40	17	0.675	10
Chitrakoot	142.00	48	61.10	50	0.495	52
Deoria	118.00	17	53.10	28	0.629	15
Etah	156.50	65	48.90	16	0.503	49
Etawah	105.00	9	62.20	55	0.631	14
Faizabad	116.00	16	58.40	47	0.609	20
Farrukhabad	132.00	35	84.00	67	0.413	67
Fatehpur	145.00	51	61.40	52	0.481	56
Firozabad	134.60	39	45.70	10	0.604	23
Gautam Buddha Nagar	102.00	7	35.20	2	0.785	1
Ghaziabad	89.00	1	69.20	61	0.656	11
Ghazipur	102.00	7	50.70	23	0.703	5
Gonda	129.00	29	50.30	20	0.601	25
Gorakhpur	98.00	5	58.40	47	0.678	9
Hamirpur	138.00	43	61.10	50	0.510	46
Hardoi	163.20	69	46.60	12	0.489	53
Hathras	142.00	48	71.20	63	0.441	65

(Continued...)

Jalaun	125.00	26	52.30	25	0.606	22
Jaunpur	133.00	38	51.70	24	0.579	28
Jhansi	134.90	40	57.20	43	0.542	36
Jyotiba Phule Nagar	122.00	23	68.10	60	0.535	39
Kannauj	132.00	35	46.50	11	0.610	19
Kanpur Dehat	155.00	61	54.40	34	0.480	57
Kanpur Nagar	130.00	32	53.70	30	0.580	27
Kaushambi	148.00	54	63.20	56	0.460	61
Kheri	156.50	65	56.90	42	0.461	60
Kushinagar	109.00	10	55.00	36	0.654	12
Lalitpur	159.00	67	64.60	58	0.411	69
Lucknow	113.40	13	57.60	44	0.623	17
Maharajganj	149.00	55	58.90	49	0.479	58
Mahoba	132.00	35	61.50	53	0.531	41
Mainpuri	126.50	28	88.10	69	0.412	68
Mathura	113.00	12	57.60	44	0.625	16
Mau	93.00	3	44.80	8	0.769	2
Meerut	101.00	6	82.60	66	0.539	38
Mirzapur	131.00	34	61.90	54	0.533	40
Moradabad	120.00	19	72.70	64	0.518	45
Muzaffarnagar	114.60	14	65.60	59	0.576	29
Pilibhit	160.20	68	55.10	37	0.456	62
Pratapgarh	123.00	24	56.00	40	0.595	26
Rae Bareli	147.00	53	55.10	37	0.507	47
Rampur	137.00	42	44.30	7	0.602	24
Saharanpur	120.90	20	39.00	3	0.692	7
Sant Kabir Nagar	140.00	45	53.00	27	0.545	35
Sant Ravidas Nagar Bhadohi	140.00	45	54.00	32	0.540	37
Shahjahanpur	154.40	59	49.70	18	0.507	48
Shrawasti	155.00	61	50.50	21	0.500	50
Siddharthnagar	153.00	57	54.30	33	0.488	54
Sitapur	154.40	59	53.60	29	0.486	55
Sonebhadra	130.00	32	54.40	34	0.576	30
Sultanpur	135.00	41	52.70	26	0.566	33
Unnao	149.40	56	64.10	57	0.450	63
Varanasi	115.00	15	43.50	6	0.691	8

Map 3.1: Food Security Outcome Map of Rural Uttar Pradesh
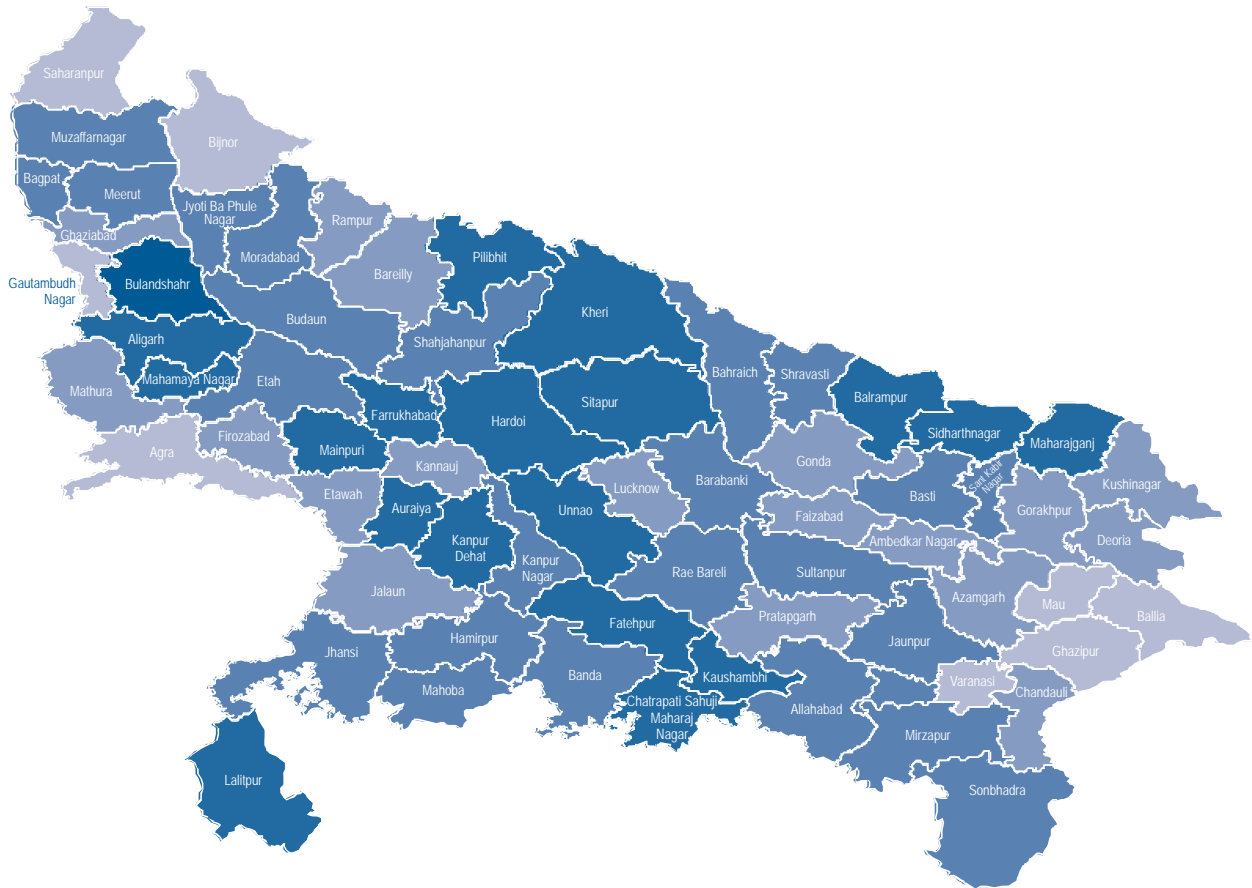
Food Security Outcome Index

- Extremely Insecure [0.303-0.400]
- Severely Insecure [0.400-0.496]
- Moderately Insecure [0.496-0.592]
- Moderately Secure [0.592-0.688]
- Secure [0.688-0785]

that an increased intake of micronutrient, i.e. high food security, significantly reduces the risk of under nutrition, which in turn, as discussed, contributes to reduction in child mortality (Table 3.1).

3.2 The Food Security Outcome Index

The Food Security Outcome Index (FSOI) can be assessed in terms of morbidity rate, body-mass index (BMI) and life expectancy. Data for some of these variables do not exist at the district level, while in case of others they cannot be readily accessed. In the absence of the relevant district level data, one has to draw upon district level variables which can act as the nearest proxies. There is abundant evidence that child-related outcome indices are very closely related to food security. This is particularly true in case

Table 3.3: Status of Districts in Food Security Outcome Index (FSOI)

Secure	Moderately Secure	Moderately Insecure	Severely Insecure	Extremely Insecure
Gautam Buddha Nagar	Gorakhpur	Kanpur Nagar	Chitrakoot	Bulandshahar
Mau	Chandauli	Jaunpur	Hardoi	
Ballia	Ghaziabad	Muzaffarnagar	Siddharthnagar	
Agra	Kushinagar	Sonebhadra	Sitapur	
Ghazipur	Ambedkar Nagar	Allahabad	Fatehpur	
Bijnor	Etawah	Basti	Kanpur Dehat	
Saharanpur	Deoria	Sultanpur	Maharajganj	
Varanasi	Mathura	Baghpat	Auraiya	
	Lucknow	Sant Kabir Nagar	Kheri	
	Bareilly	Jhansi	Kaushambi	
	Kannauj	Sant Ravidas Nagar Bhadohi	Pilibhit	
	Faizabad	Meerut	Unnao	
	Azamgarh	Jyotiba Phule Nagar	Aligarh	
	Jalaun	Mirzapur	Hathras	
	Firozabad	Mahoba	Balrampur	
	Rampur	Bahraich	Farrukhabad	
	Gonda	Banda	Mainpuri	
	Pratapgarh	Barabanki	Lalitpur	
		Moradabad		
		Hamirpur		
		Rae Bareli		
		Shahjahanpur		
		Etah		
		Shrawasti		
		Budaun		

of third world countries like India where the demographic structure is such that children constitute a very high proportion of total population. There are two child-related variables for which the District Level Household Survey of Reproductive and Child Health provides data at the district level and which are fairly accurate indicators of food security outcomes. These are under-five mortality rate for children and child under-nutrition as reflected in the proportion of underweight children. They have also been used for the World Hunger Index, prepared by International Food Policy Research Institute (IFPRI). Thus, the district level Food Security Outcome Index (FSOI), is based on these two indicators (Table 3.2).

These two indicators have been converted into indices using the Range Equalisation Method. The composite Food Security Outcome Index is the simple average of the two indices. A high value of this index would reflect a low level of food security outcome, since both variables, i.e. under-five mortality rate and proportion of underweight children are high where food security is poor. However, in Table 3.3 and Map 3.1, the FSOI has been presented as "1-Composite FSO index value" and the values of districts have been presented in five different categories of food insecurity from Secure to Extremely Insecure; viz Secure (S), Moderately Secure (MS), Moderately Insecure (MIS), Severely Insecure (SIS) and Extremely Insecure (EIS). The classification has been done on the basis of five equal divisions of values lying between the maximum and minimum overall Food Security Outcome Index values.

Our analysis shows that there are eight districts which are secure in terms of FSOI, 18 districts are moderately secure, 25 districts are moderately insecure, 18 districts are severely insecure and one district is extremely insecure. So, together there are 19 districts which are severely and extremely insecure. There are wide inter-district variations in FSOI both in terms of their status in the two used indicators as well as their geographical spread. Most of these insecure districts are spread over the southern and eastern part of the state. As Map 3.1 shows, there are regional clusters of insecurity in terms of FSOI starting from Pilibhit, Kheri, Sitapur, Hardoi, Farrukhabad to Mainpuri and again from Unnao, Fatehpur, Kaushambi and Chitrakoot to Lalitpur.

There are a group of districts in the eastern part namely, Ballia, Ghazipur, Mau and Varanasi which have better FSOI and have been categorised as secure. Similarly, there are also districts in the western part of the state namely Saharanpur, Bijnor, Gautam Buddha Nagar and Agra which have also been categorised as secure in FSOI. But, one thing that is uncommon in the two groups of secure districts is the fact that while eastern secure districts have performed better in both the FSOI indicators, the western secure districts have performed better only in underweight children.

3.3   Explaining Food Security

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

However, food security indicators can draw attention to the factors that distinguish the food secure from the food insecure districts. Of course, such association between indicators in an index cannot tell us what is the causal relation between these variables and food security. For instance, if we find that female literacy is consistently higher in food secure districts and consistently lower in food insecure districts, that only shows a correlation between female literacy and food security. Whether it is empowerment of women agency contributing to a better utilisation of household income, or through literate women having a better knowledge of improved nutritional practices, or some other relation – it is for analysis to bring out these relations. But the indicators can draw attention to the issues for which significant differences exist. It would even be possible to rank these variables, a rank that would point to the extent to which these variables are different across 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 purchase) that market failures take place, requiring public intervention of different kinds.

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 while 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 (Kabeer, 1991). 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. The operation of various schemes, such as mother and child services, the Mid-Day Meal in schools, etc. do have substantial impact on the access and absorption of food among children, girls and boys and women. Studies of these schemes show that their performance depends substantially on demand from below for provision of these services and also on the involvement of women in local governance. In our analysis the entitlements that come through special interventions have been separated from those that provide the "normal" entitlements to food. We have also tried to see whether there is a connection, as there ought to be, between the food security status of a district and the public interventions in that district.

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

1. Production factors (at the district level) influencing *availability*;

2. Household and individual *access* to food; and

3. Ability to *absorb* food.

3.3.1 Food Availability

The concern for food availability stems from production and related aspects that sustain a desired level of food production. 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 is no perfect substitute for it (Chand, 2007). Food grains are also the cheapest source of energy and proteins as 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 Output:** 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 household food security, since it limits the extension of agricultural production.

3. **Irrigation Extent:** Irrigation has a key role in both stabilising agricultural production and, through an increase in cropping intensity and an associated increase in productivity, improving a district's food security position. It also provides 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 realised 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 to the rural poor, have all contributed to reduction in rural poverty and improvement in agricultural productivity. Marginal government expenditure on roads, in particular, has been found to be having the largest positive impact on productivity growth (Fan, et al 1999).

3.3.2 Food Access

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

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

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

2. **Proportion of Scheduled Tribes and Scheduled Castes:** The ST and SC households are generally food insecure, largely on account of their economic and social backwardness – the former on account of geographical marginalisation while the latter due to historical deprivation and exclusion from mainstream population – all resulting into political marginalisation. Therefore, to represent this marginalisation, the proportion of ST and SC population in a district has been taken as an indicator.

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 dependents population. 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 on food, adjusted for inequality, are taken as the primary measure of household access to food. We have also taken the value of agricultural output per capita 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 mean that non-agricultural income, including remittances from migrants, play a role in enabling consumption to be higher than agricultural production. This is only way in which we can bring migration, which is such a crucial component of households' food security strategies, into the analysis.

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, for example access to medical services, also has a bearing on the nutritional status of females, women and girls. That such gender-based inequality in household consumption exists is attested by numerous case studies (see those reviewed in Bina Agarwal, 1994). Further, the very high incidence of the existence 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 the 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.

6. **Wage Rate of Rural People:** The casual workers constitute about one-fifth of the workers in the unorganised non-agricultural sector while almost all the agricultural labourers are casual workers (NCEUS, 2007). Besides consumption as a whole, there is a particular concern with the earnings of agricultural labour. 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.

3.3.3 Food Absorption

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

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

1. **Access to Safe Drinking Water:** Reduction in the proportion of people without access to safe drinking water by half has been mentioned as part of the seventh Millennium Development Goal. Polluted and contaminated water undermines the safety and the nutritional well-being of individuals. Studies have shown that water and sanitation accounts for a substantial portion

Table 3.4: Uttar Pradesh – Indicators Used to Analyze Food Security

Name of Variable		Sources	Ref. Year
(a).	**Availability**		
1.	Per capita value of agricultural output	Agricultural Statistics of India Ministry of Agriculture Government of India	1997-98 to 1998-99
2.	% villages with paved road	Census of India, 2001	2001
3.	% forest area to total geographical area	Sankhyiki Patrika, Government of Uttar Pradesh downloaded on 1st September 2007 http://upgov.nic.in	
4.	Proportion of net irrigated area to net sown area	Fertilizer and Agriculture Statistics, 2004-05 Fertilizer Association of India	1997-98
(b).	**Access**		
1.	Female literacy rate	Census of India	2001
2.	Percentage of agricultural labour to all labour	Census of India	2001
3.	Proportion of ST and SC population to total population	Census of India	2001
4.	Ratio of working age population	Census of India	2001
5.	Monthly per capita consumption expenditure	61st NSS Round	2004-05
6.	Wage rate of agricultural labour	61st NSS Round	2004-05
(c).	**Absorption**		
1.	% of HH having safe drinking water	Census of India	2001
2.	% Villages having PHC within <5 km distance	Census of India	2001
(d).	**Public Interventions**		
1.	% of midday meal beneficiaries out of total children (age group 6-11)	Directorate of Primary Education, Department of HRD, Government of Uttar Pradesh, Lucknow	2006-07

of the difference in infant and under-five 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 and nutrition security.

Although India has taken huge strides in terms of provision of safe drinking water since Independence, the fact remains that more people in India now lack this basic minimum necessity more than 50 years ago. This is besides the fact that more people are vulnerable to waterborne diseases (Gujja & Shaik, 2005). Empirical studies have shown that water quality is a big problem in rural areas (Krishnan et al. 2003). Almost two million children die each year because of lack of clean water and lack of sanitation (UNICEF, 2007c). The availability and quality of potable

water is a big factor that affects food insecurity. As there is no direct method for calculating access to safe drinking water, we have considered access to tube-wells, taps and hand-pumps 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 Primary Health Centres (PHCs), hence we have taken access to them as an indicator determining food absorption.

3.4   Food Security Index (FSI)

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

Beside these three groups of factors, an additional component i.e. public entitlement, has been used to explain how this influences food security. But the public entitlement factor is not included in the index of food security. The reason is that public entitlements enter to make up for deficiencies in normal, private entitlements. The lower the level of food security, the greater should be public intervention. For each of the dimensions, as discussed earlier, some relevant variables have been chosen. Table 3.4 gives the indicators, source of information and the reference year.

All indicators used in the calculatoin of 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). Each indicator has been categorised into five levels of food security i.e. secure (S), moderately secure (MS), moderately insecure (MIS), severely insecure (SIS) and extremely insecure (EIS). The method used for making class intervals is 'equal intervals' method.

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This chapter analyses food availability across a number of components. 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 Uttar Pradesh vis-à-vis other states, and then analyse and map for inter-district disparities. The chapter also shows the position of each district with respect to the selected indicators and the composite index and map of food availability.

4.1 Agricultural Growth

Uttar Pradesh economy is dominated by agriculture, which employs about two-thirds of the work force and contributes about one-third of the State income. The average size of holding is only 0.86 hectare, and that 75.4 per cent of holdings are below one hectare is a known fact. Uttar Pradesh is a major food grain producing state and its specialisation is in rice, wheat, chickpea and pigeon pea. Around one-sixth of the cropped area is under commercial crops. Sugarcane is the principal commercial crop of the state, largely concentrated in the western and central belts. UP is also a major producer of vegetables, fruits and potato.

The average yield of major crops in the State are considerably lower than those in the agriculturally developed states like Punjab and Haryana. A number of factors are responsible for low productivity and slow growth of agriculture in the state, the most important factor being the small size of holdings (see Box 4.1).

Around three-fourth of the cropped area in the state is irrigated. Tube wells are the major source of irrigation followed by canals. However, the cropping intensity in the state is only 154 per cent, much lower in comparison to states like Punjab and Haryana, which have a cropping intensity of 192 and 173 respectively.

Box 4.1: Major Constraints Inhibiting Agricultural Growth

Small and fragmented size of land holdings

Lack of proper management and maintenance of surface irrigation system for reaping the benefit of maximum potential.

Decline in public investment in agriculture

Inadequate research and development

Underdeveloped credit flow and institutional finance

Inadequate participation of private sector in the commercialisation of agricultural sector.

Human Development Report, Uttar Pradesh, 2003.

Agriculture in the state showed dynamism during the seventies and the eighties in the wake of the green revolution technology. However, since early nineties the performance of the agricultural sector in the state has been rather slowed down as reflected by the declining growth rates of the production and productivity for all crops. Sharp yearly fluctuation in food grain output and total agricultural produce have also been observed in the State, indicating the dependence of agriculture on monsoons despite the fact that a high proportion of cultivated area in UP is irrigated (Table 4.7).

In comparison to India on the whole or its major states, Uttar Pradesh experienced impressive growth in agricultural GSDP during the decade 1993-94 to 2003-04 with 2.18 per cent. While states like Kerala and Tamil Nadu experienced a negative growth and Punjab, Haryana, Maharashtra, a very low rate of growth, Uttar pradesh achieved a high growth rate of 3.76 per cent per annum.

Table 4.1: Level of Agricultural Development

State	% of National Production		Yield (TE 2005-06)		Instability in 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)

4.1.1 Production

A comparison with the major agricultural states of the country[1] sheds light on the state of agriculture in Uttar Pradesh. The average yield of food grains is high (2129 kg per ha) and ranks fifth in the series. It is much above the national average of 1714 kg per hectare. The extent of irrigation is above 73 per cent which is 34 per cent points above the national average. This has resulted in a high cropping intensity in the state.

Table 4.2: Growth of Agricultural GSDP and GSDP across States

State	Growth Rates			
	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.

Agriculture growth in Uttar Pradesh has slowed down. This decline is due to a slow down in the crop sector. Agricultural production has been fluctuating over the years and there has not been much growth in the last decade (Table 4.3). Total production of paddy in 2004-05 was less than what had been

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1.   States contributing to at least one percent to aggregate national production have been considered. All the states with population above 20 m, except Kerala, are here.

Table 4.3: Agricultural Production in UP over the last ten years (000 tonnes)

Crop	Rice	Total Kharif Foodgrain	Wheat	Total Rabi Foodgrain	Total Foodgrain	Oilseeds	Pulses
1995-96	9788	12967	21077	23705	36672	1389	2163
1996-97	11197	14374	23287	26321	40695	1520	2591
1997-98	11678	15082	22147	24939	40021	984	2282
1998-99	10826	13212	22781	25612	38824	1070	2308
1999-00	12633	15681	25551	28580	44261	1268	2551
2000-01	11679	14998	25168	27777	42775	1145	2160
2001-02	12856	15877	25498	28310	44187	1110	2377
2002-03	9596	12003	23748	26370	38373	851	2182
2003-04	13022	25996	25567	28442	44438	928	2380
2004-05	9559	12498	22514	25305	37803	946	2366

Source: Taken from Kumar, 2005.

Figure 4.1: Agricultural Production in Uttar Pradesh
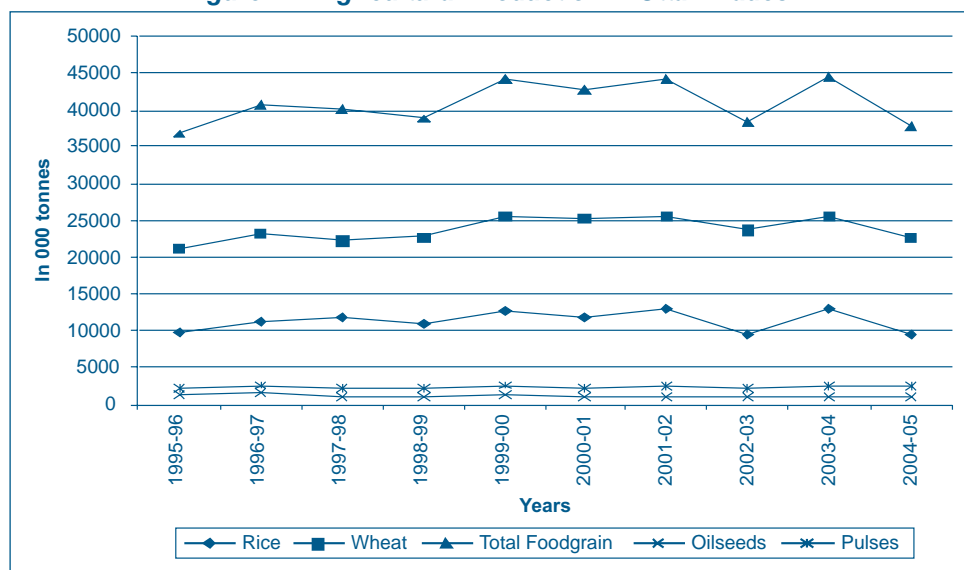
Source: Taken from Kumar, 2005.

achieved even in the year 1995-96. Data in Table 4.3 clearly points out that there has not been much increase in total Kharif and Rabi food grain production over the years.

Table 4.3 reflects the production of paddy and wheat in the state and the Figure 4.1 reflects stagnation or very little growth. Further, production of both main crops has been dipping with fluctuation in rainfall.

4.1.2 Productivity

Even with respect to crop productivity, it is apparent from data in Table 4.4 that there is almost a stagnation with the highest yield of paddy being achieved way back in 1996-97, of wheat in 1999-00, oilseeds in 1996-97 and pulses in 1999-00. In all other years, crop productivity has been fluctuating at times, quite sharply.

Uttar Pradesh is a major producer of diverse agricultural products in the country. It is the largest producer of wheat, pulses, sugarcane, tobacco, potato and milk; the second largest producer of rice, fruits and vegetables; and the third largest producer of coarse grains (Joseph M, 2004). For wheat, sugarcane, potato and tobacco, the share of Uttar Pradesh varies from 30 to 40 per cent of the country's production. While Uttar Pradesh is a major producer of a large number of agricultural crops, productivity levels are the highest for Punjab and Haryana. Uttar Pradesh has the highest yield in the country for pulses and tobacco and third highest yield in potato and onion (Joseph M, 2004).

Table 4.4: Crop Productivity in Uttar Pradesh (quintals/ha)

Crop	1995-96	1996-97	1997-98	1998-99	1999-2000	2000-01	2001-02	2002-03	2003-04	2004-05
Rice	18.54	22.21	21.46	19.42	21.85	19.77	21.27	18.41	21.87	17.9
Total Kharif Food Grain	16.06	17.74	18.29	16.04	18.73	17.53	18.25	15.74	18.27	16.01
Wheat	24.69	27	25.25	25.51	28.03	27.24	27.55	25.91	27.94	25.02
Total Rabi Food Grain	21.02	23.39	21.99	22.15	24.55	23.59	24.14	22.79	24.75	22.05
Total Foodgrain	18.95	21.02	20.43	19.61	22.12	21.04	21.63	19.99	21.95	19.6
Oilseeds	8.67	8.98	6.08	7.01	8.74	8.25	8.69	7.72	8.19	8.4
Pulses	7.74	9.32	8.27	8.29	9.57	8.03	8.86	8.26	8.9	8.5

Source: Taken from Kumar Sunil "A Note on Farm Sector in Uttar Pradesh", Dept. of Planning, Govt. of UP, October, 2005.

4.1.3 Diversification of Production

Beside low productivity growth, there has been little diversification of crops in Uttar Pradesh. Uttar Pradesh has no noticeable production of commercial crops (except for vegetables). Cereals account for around 80 per cent of the total value of agricultural production in Uttar Pradesh.

Wheat is the most important crop in Uttar Pradesh contributing around 69 per cent to total agricultural production, followed by rice contributing 34 per cent of total production. It is likely that a large part of Uttar Pradesh's rice production is not commercial, i.e. it is mainly meant for self-consumption in subsistence production. This might explain the high per capita consumption of cereals (meaning rice in this case) in Uttar Pradesh compared to other states with higher per capita incomes and higher per capita production of cereals. It also means that there is less diversification of food consumption in Uttar Pradesh compared to other states.

As Table 4.5 shows, there is little diversification of agricultural output. There is very little cultivation of oilseeds, pulses and other cash crops. But vegetables make a substantial contribution to the state's total value of agricultural production as well as to the income of farmers.

Table 4.5: Proportion of Crops in Total Production in Uttar Pradesh and India 1999-2000

Crop	Uttar Pradesh	India
Rice	16.26	18.39
Maize	1.25	1.55
Wheat	26.77	12.07
Total Cereals	46.39	35.03
Oilseed	2.79	7.48
Pulses	6.14	4.74
Total Cash Crop	16.00	6.40
Fruits & Vegetables	13.78	22.55
Total value of production	100.00	100.00

Source: CSO, 2008.

Uttar Pradesh is the largest sugarcane producing state in the country. It contributes 44 per cent to the country's total sugarcane production and is also the largest producer of sugar in the country. About 2.25 million hectare are under sugarcane cultivation, and 124.02 million tonnes of sugarcane were produced in the state in 2004-05. The average yield of sugarcane has increased from 54.40 tonnes per hectare to 60.65 tonnes per hectare in 2004-05. Farmers are receiving over Rs. 60 billion from the sugar mills as payment for sugarcane purchased by the sugar mills. This sector is contributing about 18 per cent to the State Domestic Product through its agriculture sector. By increasing productivity, there is scope for further increasing the share of sugarcane to the State Domestic Product.

India is one of the world's largest producers of farm commodities. The farm sector takes care of 66 per cent of the population. At present, horticulture contributes 28 per cent of the agricultural income and 54 per cent of the agricultural exports. The horticulture sector includes fruits, vegetables, spices, medicinal & aromatic plants, flowers, mushroom and a variety of plantation crops like coconut, arecanut, cashewnut and cocoa, which have been contributing significantly to the GDP in agriculture (28.5 per cent from 8.5 per cent area). The objectives of the National Horticulture Mission are double the horticulture production, i.e. to achieve a production of 300 million tonnes by 2011-12. The present share of Uttar Pradesh in total horticulture production of the country is about 30 per cent (48 million tonnes).

4.2 Per Capita Agricultural Output

There is a wide inter district variation in per capita value of agricultural output in Uttar Pradesh. It varies from around Rs. 528 in Sant Ravidas Nagar to around Rs. 3,258 in Pilibhit. The districts with low agricultural land (because of forest, waste land, mines, industries or urban expansion) or low agricultural productivity generally have low per capita value of agricultural output (Table 4.6 and Map 4.1).

4.2.1 Returns to Cultivation

An examination of profitability of cultivation in terms of returns to cultivation reveals the poor status of Uttar Pradesh. The return to cultivation measured in terms of return to area as well as households is found to be at a very low level in comparison to Punjab, Kerala or Assam. Despite low productivity, the return to area is less than in most states because of a very low monetary cost of cultivation in Uttar Pradesh. The farmers here cultivate their land with family or *madait* (exchange) labour with little dependence on market purchased inputs. The cost of hired labour is also very low because of the low agricultural wage rate in most of the areas. The return per farming household is low because of small size of land holding.

4.3 Irrigation Extent

The extent of irrigation, represented by the percentage of the net area irrigated to the net area sown, is very high – around 75 per cent. This is 35 percentage points above the national average of around 40

Table 4.6: Per Capita Value of Agricultural Output by Districts

High		Moderate		Low		Very Low		Extremely Low	
District	PCVAO	District	PCVAO	District	PCVAO	District	PCVAO	District	PCVAO
Basti	5254	Farrukhabad	2710	Mahoba	2125	Gautam Buddha Nagar	1610	Sultanpur	1070
Pilibhit	3258	Jalaun	2687	Etah	2098	Banda	1603	Mau	1059
Meerut	3071	Shah jahanpur	2656	Bulandshahar	2091	Kanpur Nagar	1601	Siddharthnagar	1046
Bijnor	2974	Jyotiba Phule Nagar	2583	Budaun	2070	Balrampur	1567	Deoria	998
Muzaffar nagar	2965	Hathras	2326	Etawah	2057	Bahraich	1552	Kaushambi	994
Kheri	2905	Jhansi	2317	Bareilly	2040	Gonda	1442	Ghazipur	976
Baghpat	2714	Mathura	2307	Ghaziabad	2008	Chitrakoot	1439	Shrawasti	968
		Saharanpur	2266	Agra	2006	Fatehpur	1392	Azamgarh	944
		Rampur	2234	Hamirpur	1964	Kushinagar	1355	Allahabad	943
		Kannauj	2220	Moradabad	1949	Ambedkar Nagar	1352	Mirzapur	941
				Firozabad	1927	Faizabad	1285	Lucknow	939
				Aligarh	1888	Unnao	1260	Gorakhpur	889
				Lalitpur	1881	Chandauli	1164	Sonebhadra	885
				Auraiya	1840	Sant Kabir Nagar	1111	Jaunpur	876
				Kanpur Dehat	1822	Rae Bareli	1081	Ballia	873
				Mainpuri	1799			Pratapgarh	867
				Mahrajganj	1790			Varanasi	576
				Sitapur	1713			Sant Ravidas Nagar Bhadohi	528
				Hardoi	1673				
				Barabanki	1657				

Map 4.1: Status of Agricultural Production

Per capita Value of Agricultural Output (in Rs.)

- 2713 - 5254
- 2167 - 2712
- 1621 - 2166
- 1075 - 1620
- 528 - 1074
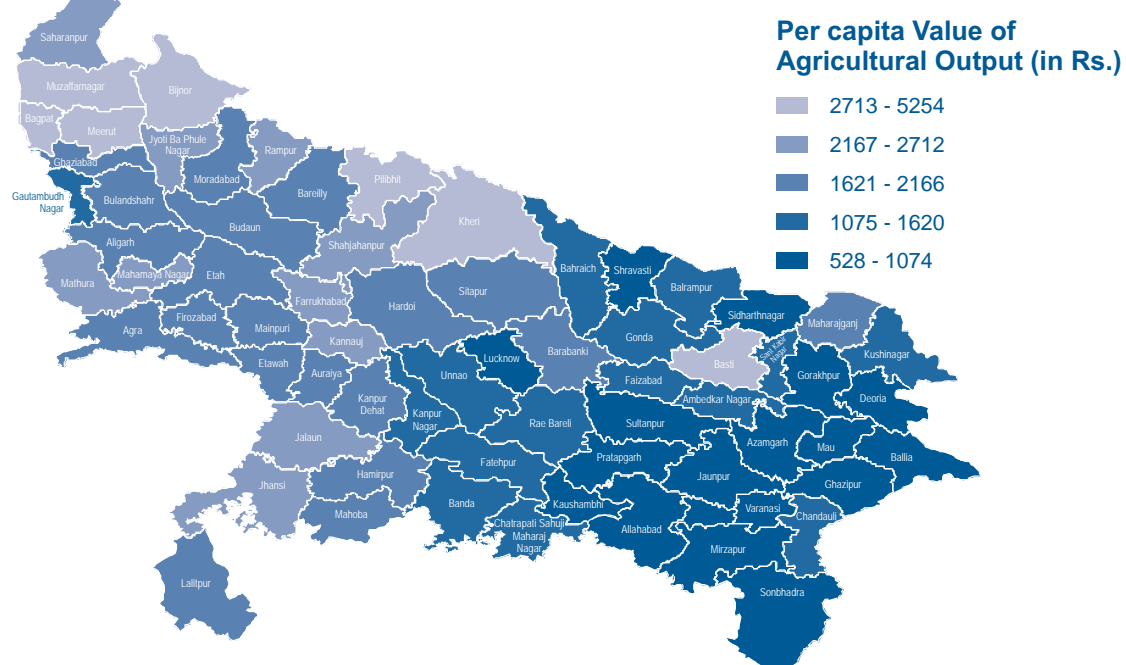
Figure 4.2: Returns to Cultivation, 2002-03

Gross returns per Ha (Rs)   Returns per farmer HH (Rs.)
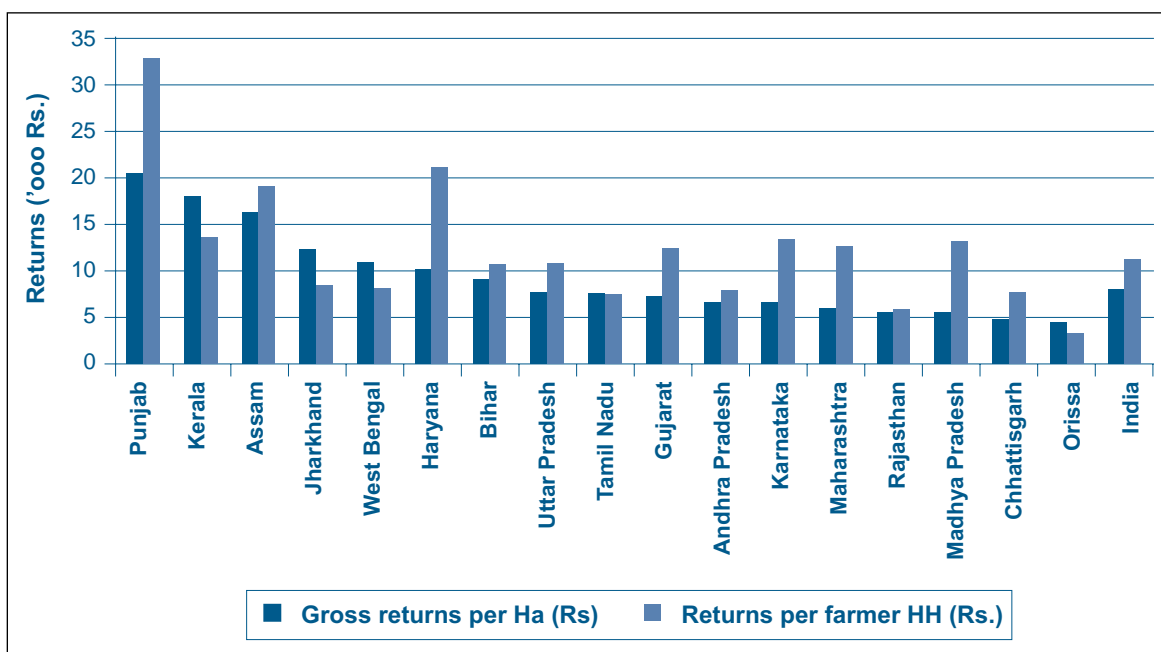
Source: Situation Assessment Survey of Farmers, National Sample Survey, 59th Round, Computed in Mishra (2007).

Map 4.2: Share of Irrigated Area

Proportion of Net Irrigated Area to Net Sown Area (%)

- 85.00 - 99.65
- 70.36 - 85.00
- 55.71 - 70.36
- 41.07 - 55.71
- 26.43 - 41.07
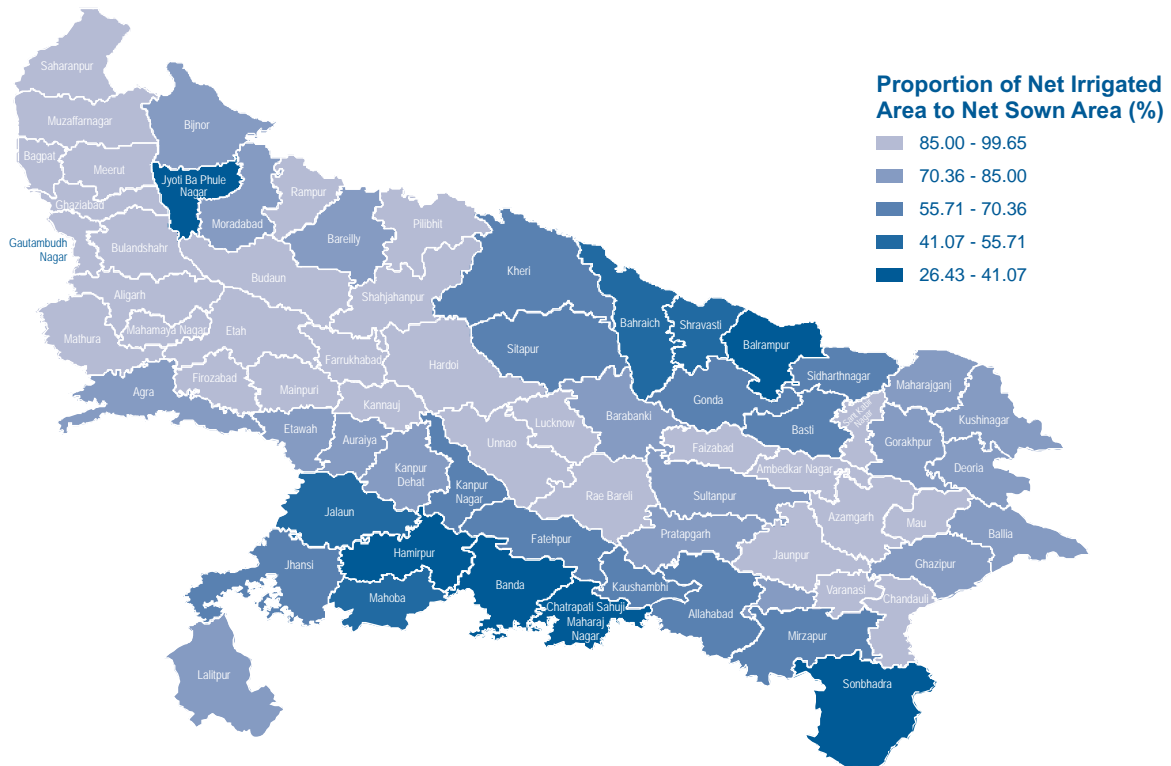
per cent. There is wide inter district variation in irrigation coverage. It varies from 26 per cent in Chitrakoot to around 97 per cent in Baghpat. In Uttar Pradesh, the high coverage of irrigation is concentrated in the western and central regions of the state. The extent of irrigation in Bundelkhand is less than that in the Central or Western part of the state (Table 4.7 and Map 4.2).

4.4   Forests

This variable has been used for the calculation of FSI in case of other states, but for UP it has been dropped since forests have an insignificant presence (6 per cent) in the state as a whole (see Table 4.8). Table 4.9 however provides the district level forest cover, with Sonebhadra (53), Chandauli (31), Chitrakoot (26), Mirzapur (24), and Pilibhit (22) as those having a higher proportion of forest area.

The state used to have a high coverage of forest but after the division of state, only 6 per cent of the forest remained in Uttar Pradesh. Kerala (40 per cent), Chhattisgarh (41 per cent), Assam (36 per cent) and Orissa (31 per cent) have a higher percentage of area under forest than Uttar Pradesh. It is much less than the national average (22 per cent). The wastelands cover 7 per cent of the total geographical area of the state. The extent of net area cultivated is 69 per cent of the total reported area of the state, which is far above the national average of 45 per cent.

Table 4.7: Percentage of Net Irrigated Area to Net Sown Area

High		Moderate		Low		Very Low		Extremely Low	
Districts	% NIA to NSA	Districts	% NIA to NSA	Districts	% NIA to NSA	Districts	% NIA to NSA	Districts	% NIA to NSA
Baghpat	99.65	Barabanki	84.37	Allahabad	70.09	Jalaun	45.75	Balrampur	39.17
Muzaffarnagar	99.37	Ghazipur	83.30	Kanpur Nagar	68.78	Mahoba	42.88	Jyotiba Phule Nagar	35.07
Hathras	99.10	Bijnor	83.29	Kheri	67.48	Bahraich	42.86	Hamirpur	33.91
Mathura	98.79	Pratapgarh	83.05	Kaushambi	66.99	Shrawasti	42.12	Banda	32.27
Mainpuri	98.15	Ballia	82.28	Fatehpur	63.47			Sonebhadra	28.06
Shahjahanpur	98.04	Agra	82.28	Gonda	62.79			Chitrakoot	26.43
Aligarh	97.55	Sant Ravidas Nagar Bhadohi	81.85	Basti	62.66				
Firozabad	97.50	Bareilly	80.96	Mirzapur	61.05				
Rampur	96.89	Gorakhpur	80.34	Siddharthnagar	58.25				
Etah	96.81	Etawah	79.46	Jhansi	57.38				
Pilibhit	96.07	Moradabad	78.84	Sitapur	56.90				
Ghaziabad	95.60	Deoria	78.76						
Meerut	95.49	Auraiya	78.46						
Chandauli	94.42	Kushinagar	77.65						
Ambedkar Nagar	93.86	Mahrajganj	75.31						
Budaun	93.11	Sultanpur	74.31						
Azamgarh	92.90	Kanpur Dehat	74.05						
Saharanpur	90.79	Lalitpur	73.58						
Mau	89.76								
Kannauj	88.35								
Lucknow	88.21								
Unnao	88.13								
Sant Kabir Nagar	87.54								
Bulandshahar	87.34								
Varanasi	87.13								
Gautam Buddha Nagar	87.12								
Jaunpur	86.57								
Faizabad	86.29								
Hardoi	86.00								
Farrukhabad	85.64								
Rae Bareli	85.42								

Table 4.8: Environmental Limitations to Agricultural Development

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

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

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

The area under forests varies greatly within the state. In the districts located in the eastern and central part of the state more than 40 per cent of the area is under forests. Forest presence in Uttar Pradesh suffered due to the division of the state into Uttarakhand with the new state containing most of the forest resources.

4.5   Connectivity

Roads in rural areas act as feeder roads serving such areas where agriculture is the predominant occupation, connecting them with the urban market centres. These roads also play a significant role in opening up backward areas and accelerating socio-economic development. Most of the districts of the state have good rural connectivity. Districts of the Western region show good connectivity. It is the prime reason for their development too. Muzzafarnagar, Meerut, Saharanpur and Mathura top the ranking and have good rural connectivity in terms of villages having access to paved roads. Among the least ranked, Chitrakoot has only 40 per cent village connectivity to the paved roads. At the lower end, 17 districts of UP have 40-50 per cent villages connected to the paved roads (Table 4.10 and Map 4.3).

Table 4.9: Share of Forest Area (%)

Districts	Value	Rank	Districts	Value	Rank
Agra	11.40	13	Jaunpur	0.02	68
Aligarh	0.72	50	Jhansi	6.74	18
Allahabad	3.61	25	Jyotiba Phule Nagar	5.47	21
Ambedkar Nagar	0.15	62	Kannauj	2.29	31
Auraiya	1.36	39	Kanpur Dehat	3.25	27
Azamgarh	0.03	67	Kanpur Nagar	0.53	52
Baghpat	1.13	45	Kaushambi	0.50	53
Bahraich	13.93	12	Kheri	21.13	6
Ballia	0.00	69	Kushinagar	0.28	59
Balrampur	18.14	7	Lalitpur	14.95	10
Banda	1.14	44	Lucknow	8.33	17
Barabanki	1.63	35	Mahoba	4.74	22
Bareilly	0.06	65	Mahrajganj	15.64	9
Basti	1.48	36	Mainpuri	0.79	49
Bijnor	9.43	15	Mathura	0.45	57
Budaun	1.33	40	Mau	0.33	58
Bulandshahar	2.10	32	Meerut	9.71	14
Chandauli	30.58	2	Mirzapur	23.88	4
Chitrakoot	26.19	3	Moradabad	0.06	64
Deoria	0.10	63	Muzaffarnagar	4.21	23
Etah	0.70	51	Pilibhit	22.44	5
Etawah	14.67	11	Pratapgarh	0.16	61
Faizabad	1.44	38	Rae Bareli	1.08	46
Farrukhabad	0.46	56	Rampur	2.80	29
Fatehpur	1.45	37	Saharanpur	9.31	16
Firozabad	3.57	26	Sant Kabir Nagar	0.87	48
Gautam Buddha Nagar	0.20	60	Sant Ravidas Nagar Bhadohi	0.04	66
Ghaziabad	1.23	41	Shahjahanpur	2.29	30
Ghazipur	0.00	69	Shrawasti	17.79	8
Gonda	3.22	28	Siddharthnagar	1.19	42
Gorakhpur	1.72	34	Sitapur	1.01	47
Hamirpur	6.04	19	Sonebhadra	53.32	1
Hardoi	1.74	33	Sultanpur	0.47	54
Hathras	1.17	43	Unnao	3.67	24
Jalaun	5.64	20	Varanasi	0.47	55
			Total	6.98	

Source: Sankhyiki Patrika, Government of Uttar Pradesh, 2007.

Map 4.3: Status of Rural Connectivity

Proportion of Villages having Access to Paved Roads (%)
- 82.50 - 93.09
- 71.91 - 82.50
- 61.33 - 71.91
- 50.74 - 61.33
- 40.15 - 50.74
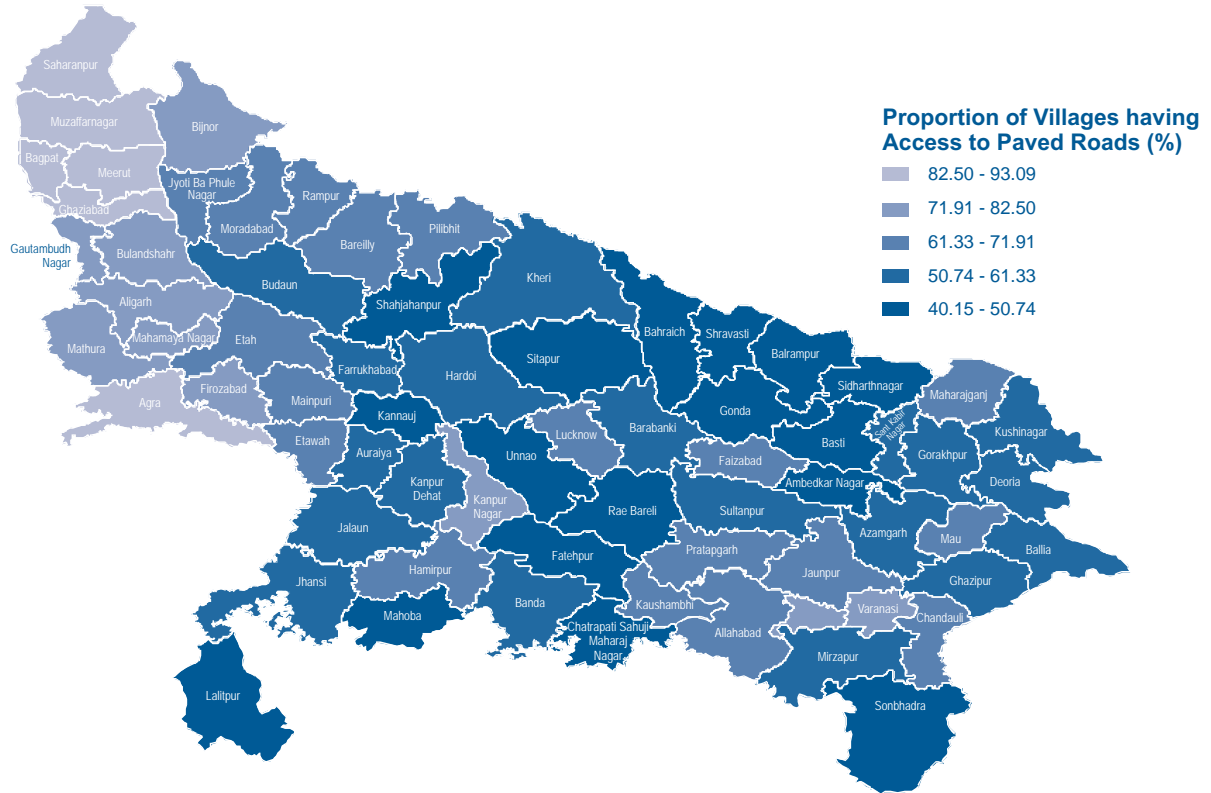
4.6 Ecological Factors

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

Global climate change, in particular, has come up as the major cause that might affect agricultural production. Empirical evidence has shown that an increase in temperature affects crop production both directly and indirectly.[2] It has been estimated that cereal yields in tropical regions like India are going to decline for even a marginal increase (1-2°C) in temperatures (IPCC, 2007).

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2.   Temperature increases have been found to be reducing crop duration, increasing crop respiration rates, developing new equilibrium between crops and pests, increasing 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 4.10: Percentage of Villages having Access to Paved Roads

High		Moderate		Low		Very Low		Extremely Low	
District	**Paved Roads**	**District**	**Paved Roads**	**District**	**Paved Roads**	**District**	**Paved Roads**	**District**	**Paved Roads**
Muzaffarnagar	93.09	Mathura	82.49	Kaushambi	71.88	Sultanpur	61.24	Sitapur	50.50
Meerut	92.40	Bijnor	81.01	Etawah	71.20	Deoria	60.74	Fatehpur	50.19
Ghaziabad	88.95	Aligarh	77.98	Moradabad	71.12	Auraiya	60.60	Balrampur	48.79
Baghpat	86.17	Sant Ravidas Nagar Bhadohi	76.25	Allahabad	70.82	Ballia	60.56	Mahoba	48.00
Saharanpur	85.76	Kanpur Nagar	75.92	Lucknow	70.80	Kushinagar	59.24	Rae Bareli	47.87
Agra	83.48	Varanasi	75.70	Rampur	70.64	Mirzapur	58.75	Shahjahanpur	47.41
Bulandshahar	82.50	Hathras	75.12	Hamirpur	69.88	Azamgarh	58.18	Gonda	46.75
		Gautam Buddha Nagar	74.42	Bareilly	69.26	Jhansi	58.16	Siddharthnagar	46.61
		Firozabad	73.61	Mau	68.96	Kanpur Dehat	56.54	Kannauj	45.65
				Jyotiba Phule Nagar	67.36	Gorakhpur	56.48	Unnao	45.64
				Pilibhit	66.02	Farrukhabad	55.96	Bahraich	45.31
				Chandauli	64.43	Banda	55.91	Shrawasti	45.17
				Pratapgarh	63.22	Jalaun	55.56	Lalitpur	44.33
				Etah	62.75	Hardoi	54.77	Ambedkar Nagar	44.07
				Mainpuri	62.58	Barabanki	54.47	Basti	43.18
				Faizabad	62.18	Sant Kabir Nagar	53.64	Sonebhadra	42.58
				Jaunpur	61.94	Kheri	52.47	Chitrakoot	40.15
				Maharajganj	61.45	Budaun	51.90		
						Ghazipur	51.56		

Source: Census of India, 2001.

4.7 Availability Index

As mentioned above the agricultural economy in Uttar Pradesh is still at a low level of development. As a result the whole of the state has been considered a food deficit state. But, there is inter-district variation in availability of food. The districts of the western region appear to be far ahead of the rest of the state in terms of food availability, while those of southern and eastern regions lag behind. In the

Table 4.11: Indicators used to Compute Availability Index

Districts	% Non- forest area to geographical area	Rank	Per Capita Value of Agricultural output	Rank	% NIA to NSA	Rank	Paved Road	Rank	Availability (without forest)	Rank
Agra	88.60	58	2006	25	82.28	37	83.48	6	0.606	14
Aligarh	99.28	21	1888	29	97.55	7	77.98	10	0.635	10
Allahabad	96.39	46	943	61	70.09	50	70.82	20	0.462	41
Ambedkar Nagar	99.85	9	1352	47	93.86	15	44.07	67	0.456	46
Auraiya	98.64	32	1840	31	78.46	44	60.60	37	0.489	33
Azamgarh	99.97	4	944	60	92.90	17	58.18	41	0.494	32
Baghpat	98.87	26	2714	7	99.65	1	86.17	4	0.712	3
Bahraich	86.07	59	1552	42	42.86	63	45.31	64	0.281	67
Ballia	100.00	1	873	67	82.28	36	60.56	38	0.461	42
Balrampur	81.86	64	1567	41	39.17	65	48.79	56	0.283	66
Banda	98.86	27	1603	39	32.27	68	55.91	46	0.288	65
Barabanki	98.37	36	1657	37	84.37	32	54.47	49	0.478	38
Bareilly	99.94	6	2040	23	80.96	39	69.26	24	0.543	19
Basti	98.52	35	5254	1	62.66	56	43.18	68	0.506	30
Bijnor	90.57	56	2974	4	83.29	34	81.01	9	0.641	8
Budaun	98.67	31	2070	21	93.11	16	51.90	52	0.517	27
Bulandshahar	97.90	39	2091	20	87.34	24	82.50	7	0.624	11
Chandauli	69.42	69	1164	50	94.42	14	64.43	28	0.535	22
Chitrakoot	73.81	68	1439	44	26.43	70	40.15	70	0.194	69
Deoria	99.90	8	998	56	78.76	43	60.74	36	0.455	48
Etah	99.30	20	2098	19	96.81	10	62.75	30	0.577	15
Etawah	85.33	60	2057	22	79.46	41	71.20	18	0.547	18
Faizabad	98.56	33	1285	48	86.29	28	62.18	32	0.501	31
Farrukhabad	99.54	15	2710	8	85.64	30	55.96	45	0.534	23
Fatehpur	98.55	34	1392	45	63.47	54	50.19	55	0.371	59
Firozabad	96.43	45	1927	28	97.50	8	73.61	16	0.618	12
Gautam Buddha Nagar	99.80	11	1610	38	87.12	26	74.42	15	0.569	16
Ghaziabad	98.77	30	2008	24	95.60	12	88.95	3	0.678	4
Ghazipur	100.00	1	976	58	83.30	33	51.56	53	0.432	52
Gonda	96.78	43	1442	43	62.79	55	46.75	60	0.356	62
Gorakhpur	98.28	37	889	64	80.34	40	56.48	44	0.438	50
Hamirpur	93.96	52	1964	26	33.91	67	69.88	23	0.368	60
Hardoi	98.26	38	1673	36	86.00	29	54.77	48	0.486	34
Hathras	98.83	28	2326	12	99.10	3	75.12	14	0.647	7
Jalaun	94.36	51	2687	9	45.75	61	55.56	47	0.384	57
Jaunpur	99.98	3	876	66	86.57	27	61.94	33	0.483	35

(Continued...)

Districts	% Non- forest area to geographical area	Rank	Per Capita Value of Agricultural output	Rank	% NIA to NSA	Rank	Paved Road	Rank	Availability (without forest)	Rank
Jhansi	93.26	53	2317	13	57.38	59	58.16	42	0.422	54
Jyotiba Phule Nagar	94.53	50	2583	11	35.07	66	67.36	26	0.389	56
Kannauj	97.71	40	2220	17	88.35	20	45.65	62	0.480	36
Kanpur Dehat	96.75	44	1822	32	74.05	48	56.54	43	0.455	47
Kanpur Nagar	99.47	19	1601	40	68.78	51	75.92	12	0.507	29
Kaushambi	99.50	18	994	57	66.99	53	71.88	17	0.457	45
Kheri	78.87	65	2905	6	67.48	52	52.47	51	0.461	43
Kushinagar	99.72	12	1355	46	77.65	45	59.24	39	0.460	44
Lalitpur	85.05	61	1881	30	73.58	49	44.33	66	0.405	55
Lucknow	91.67	54	939	63	88.21	21	70.80	21	0.529	26
Mahoba	95.26	49	2125	18	42.88	62	48.00	57	0.317	64
Mahrajganj	84.36	62	1790	34	75.31	46	61.45	34	0.479	37
Mainpuri	99.21	22	1799	33	98.15	5	62.58	31	0.569	17
Mathura	99.55	14	2307	14	98.79	4	82.49	8	0.676	5
Mau	99.67	13	1059	54	89.76	19	68.96	25	0.532	24
Meerut	90.29	57	3071	3	95.49	13	92.40	2	0.738	2
Mirzapur	76.12	67	941	62	61.05	57	58.75	40	0.378	58
Moradabad	99.94	7	1949	27	78.84	42	71.12	19	0.539	21
Muzaffarnagar	95.79	48	2965	5	99.37	2	93.09	1	0.751	1
Pilibhit	77.56	66	3258	2	96.07	11	66.02	27	0.639	9
Pratapgarh	99.84	10	867	68	83.05	35	63.22	29	0.475	39
Rae Bareli	98.92	25	1081	52	85.42	31	47.87	58	0.429	53
Rampur	97.20	42	2234	16	96.89	9	70.64	22	0.617	13
Saharanpur	90.69	55	2266	15	90.79	18	85.76	5	0.658	6
Sant Kabir Nagar	99.13	23	1111	51	87.54	23	53.64	50	0.462	40
Sant Ravidas Nagar Bhadohi	99.96	5	528	70	81.85	38	76.25	11	0.510	28
Shahjahanpur	97.71	41	2656	10	98.04	6	47.41	59	0.542	20
Shrawasti	82.21	63	968	59	42.12	64	45.17	65	0.253	68
Siddharthnagar	98.81	29	1046	55	58.25	58	46.61	61	0.322	63
Sitapur	98.99	24	1713	35	56.90	60	50.50	54	0.362	61
Sonebhadra	46.68	70	885	65	28.06	69	42.58	69	0.186	70
Sultanpur	99.53	17	1070	53	74.31	47	61.24	35	0.443	49
Unnao	96.33	47	1260	49	88.13	22	45.64	63	0.438	51
Varanasi	99.53	16	576	69	87.13	25	75.70	13	0.530	25
Total	93.02		1692		75.01		60.29		0.469	

Table 4.12: Status of Districts in Availability Index

Secure	Index Value	Moderately Secure	Index Value	Moderately Insecure	Index Value	Severely Insecure	Index Value	Extremely Insecure	Index Value
Muzaffarnagar	0.751	Aligarh	0.635	Budaun	0.517	Lalitpur	0.405	Banda	0.288
Meerut	0.738	Bulandshahar	0.624	Sant Ravidas Nagar Bhadohi	0.510	Jyotiba Phule Nagar	0.389	Balrampur	0.283
Baghpat	0.712	Firozabad	0.618	Kanpur Nagar	0.507	Jalaun	0.384	Bahraich	0.281
Ghaziabad	0.678	Rampur	0.617	Basti	0.506	Mirzapur	0.378	Shrawasti	0.253
Mathura	0.676	Agra	0.606	Faizabad	0.501	Fatehpur	0.371	Chitrakoot	0.194
Saharanpur	0.658	Etah	0.577	Azamgarh	0.494	Hamirpur	0.368	Sonebhadra	0.186
Hathras	0.647	Gautam Buddha Nagar	0.569	Auraiya	0.489	Sitapur	0.362		
Bijnor	0.641	Mainpuri	0.569	Hardoi	0.486	Gonda	0.356		
Pilibhit	0.639	Etawah	0.547	Jaunpur	0.483	Siddharthnagar	0.322		
		Bareilly	0.543	Kannauj	0.480	Mahoba	0.317		
		Shahjahanpur	0.542	Mahrajganj	0.479				
		Moradabad	0.539	Barabanki	0.478				
		Chandauli	0.535	Pratapgarh	0.475				
		Farrukhabad	0.534	Sant Kabir Nagar	0.462				
		Mau	0.532	Allahabad	0.462				
		Varanasi	0.530	Ballia	0.461				
		Lucknow	0.529	Kheri	0.461				
				Kushinagar	0.460				
				Kaushambi	0.457				
				Ambedkar Nagar	0.456				
				Kanpur Dehat	0.455				
				Deoria	0.455				
				Sultanpur	0.443				
				Gorakhpur	0.438				
				Unnao	0.438				
				Ghazipur	0.432				
				Rae Bareli	0.429				
				Jhansi	0.422				

Map 4.4: Food Availability Map of Rural Uttar Pradesh
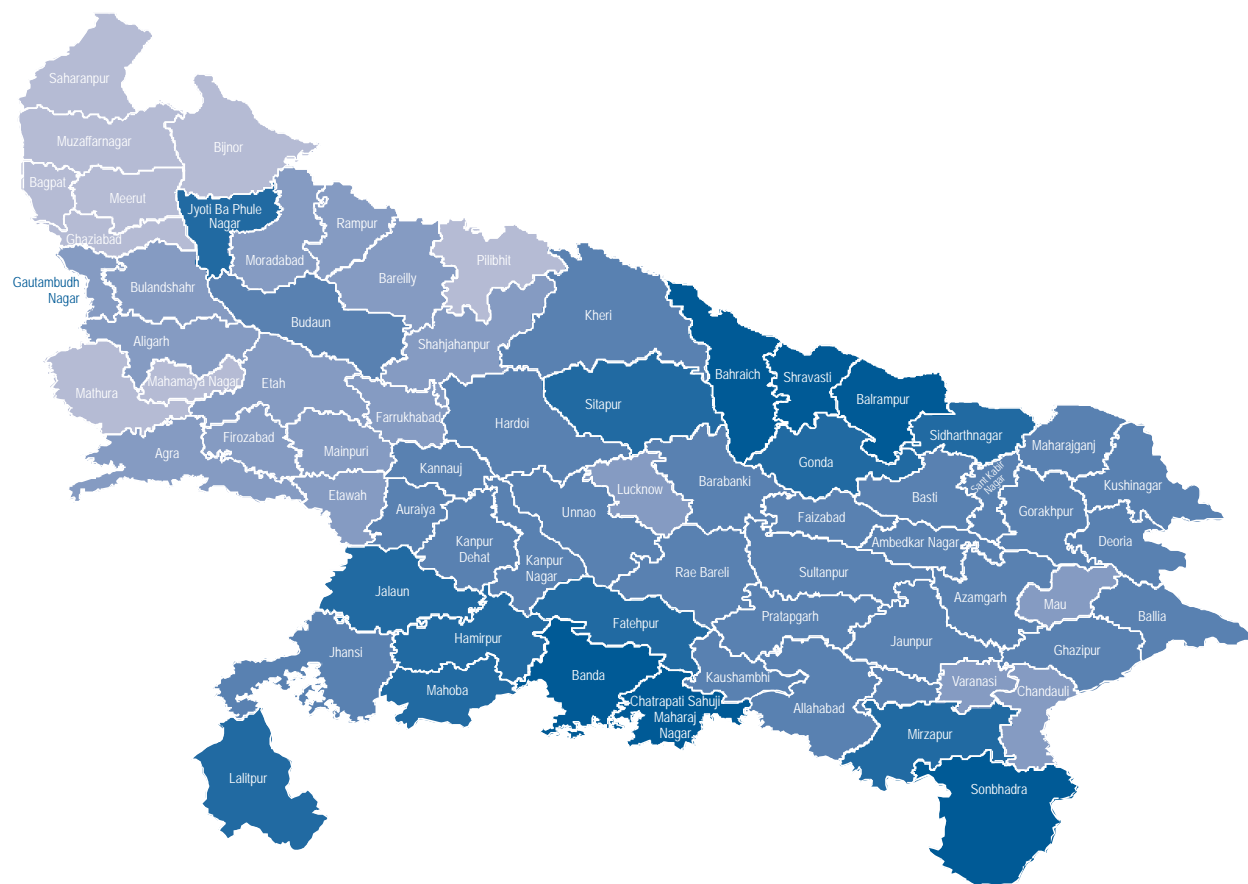
Availability Index

- Secure [0.638 - 0.751]
- Moderately Secure [0.525 - 0.638]
- Moderately Insecure [0.412 - 0.525]
- Severely Insecure [0.299 - 0.412]
- Extremely Insecure [0.186 - 0.299

western region Baghpat, followed by Muzaffarnagar and Hathras have a large area under irrigation, and Basti, Pilibhit and Meerut have a very high per capita value of agricultural output. Extent of irrigation coverage has in all the cases not been translated into per capita value of agricultural output. Baghpat having a high irrigation coverage has the highest level of per capita value of agricultural output while Chitrakoot has a low irrigation coverage, low paved road and hence lowest availability status.

Out of the 70 districts, many of the western districts are in the category of secure to moderately secure. All other districts, no matter in which region, fall in the category of severely to extremely food insecure. The districts of Banda, Balrampur, Bahraich, Shrawasti, Chitrakoot and Sonebhadra are also extremely food insecure (Table 4.12 and Map 4.4).

The availability of food depends not only on its production, expressed in terms of per capita value of agricultural output, but also on the factors which help in growth of food market through transport of food from surplus producing areas to deficit areas and linking the habitations to the market.

5. Access to Food

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

Collective strength and organised action are often called the 'weapons of the weak'. Access of those who may individually lack the ability is often bolstered through unions, community groups and self help groups. The ability to form and take action in groups is also a part of one's entitlements.

Historic injustice and cumulative discrimination faced by the scheduled castes and tribes and by women and other marginalised groups are well documented. This discrimination permeates all aspects of life, including their livelihood, 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, proportion of agricultural labourers, proportion of Scheduled Castes and Scheduled Tribes, ratio of rural working age population, rural female literacy, women's workforce participation rate and urbanization. The overall status of Uttar Pradesh in relation to other states is presented first and thereafter we discuss the disparities across the districts. Finally, we present the overall index of food access across districts and the map of food access.

Access to food is dependent basically upon purchasing power available to the population which is directly or indirectly dependent upon several factors which are discussed below.

5.1. Rural wages

Casual workers tend to be the least protected and have the lowest level of earnings. The NSS defines a casual wage worker as one who was casually engaged in others' farm or non-farm enterprises (both household and non- household) and, in return, received wages according to the terms of the daily or periodic work contract. It can be seen from Table 5.1 that Uttar Pradesh ranks 7th among the major states of India in rural casual wage rates. The rural casual wage rate of Uttar Pradesh is Rs 51.25 which is though more than the national average of Rs. 48.89 but lower than states like Kerala (Rs. 119.51), Punjab (Rs. 73.12), Haryana (Rs. 72.20), Rajasthan (Rs. 62.12), Assam (Rs. 60.18), etc.

The casual wage rate depends on the availability of economic opportunities in the state. Therefore, the districts in the developed Western region like Hathras, Bulandshahar, Ghaziabad, Aligarh, Saharanpur

Map 5.1: Wage Rates of Rural Population

Rural Casual Wage Rate (in Rs.)
- 66 - 72
- 60 - 65
- 53 - 59
- 47 - 52
- 39 - 46
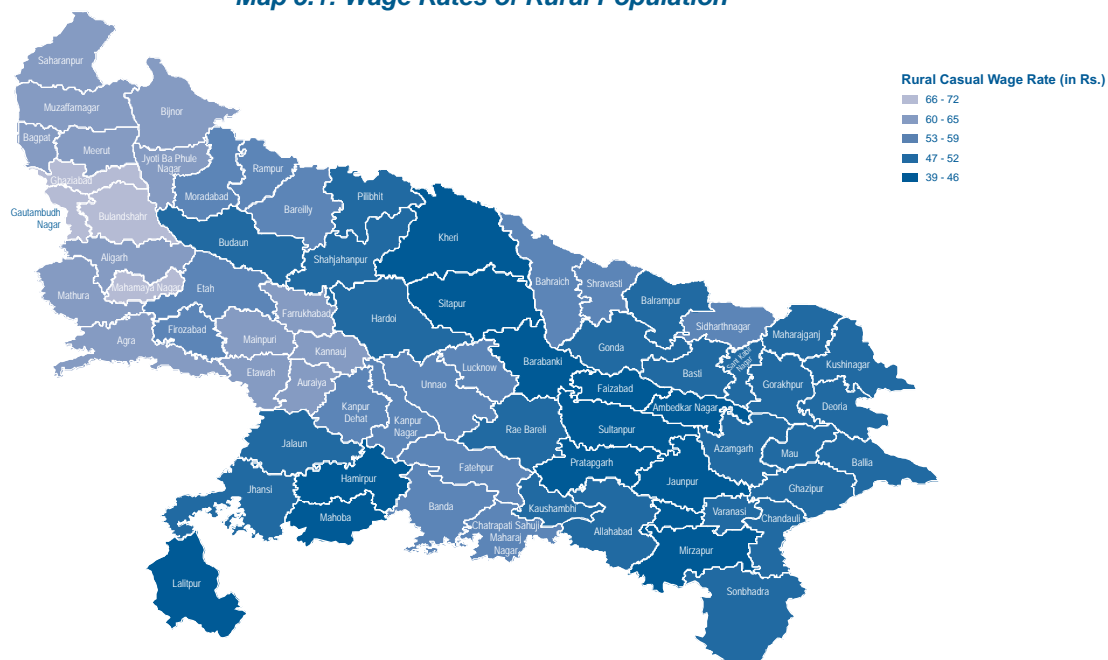
and many more have a high wage rate, much higher than the state or national average. The wage rate is lower than the national average in districts of eastern and southern regions and a few of the central region, and points towards one of the correlates of poverty in these regions (Table 5.2 and and Map 5.1).

5.2 Monthly Per Capita Expenditure

The monthly per capita consumption expenditure (MPCE) on food is directly related to average income per capita and hence exercises a positive influence on access to food. Low income levels directly affect consumption. The per capita consumption expenditure in absolute terms is a good indicator of food security in rural areas. Uttar Pradesh ranks fifth in terms of consumption expenditure among the major states of India. The value of per capita consumption expenditure in the

Table 5.1: Wage Rate of Casual Workers by State

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

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

Table 5.2: Rural Casual Wage Rate by Districts (in Rs.)

High		Moderate		Low		Very Low		Extremely Low	
District	**Rural Casual Wage Rate**	**District**	**Rural Casual Wage Rate**	**District**	**Rural Casual Wage Rate**	**District**	**Rural Casual Wage Rate**	**District**	**Rural Casual Wage Rate**
Hathras	71.76	Aligarh	64.45	Bijnor	59.69	Lucknow	52.90	Jalaun	46.92
Bulandshahar	66.09	Saharanpur	63.48	Baghpat	59.43	Banda	52.52	Jhansi	46.92
Gautam Buddha Nagar	66.09	Auraiya	62.96	Muzaffarnagar	59.43	Chitrakoot	52.52	Allahabad	46.70
Ghaziabad	66.09	Etawah	62.96	Moradabad	58.28	Ghazipur	52.00	Basti	46.62
		Mainpuri	62.96	Etah	55.31	Deoria	51.05	Azamgarh	46.46
		Farrukhabad	61.97	Firozabad	55.31	Varanasi	50.59	Pilibhit	46.29
		Kannauj	61.97	Bareilly	55.14	Budaun	50.01	Shahjahanpur	46.29
		Jyotiba Phule Nagar	61.76	Fatehpur	54.35	Rae Bareli	49.96	Hardoi	45.80
		Meerut	61.76	Kanpur Dehat	54.35	Sant Kabir Nagar	49.07	Gorakhpur	45.78
		Agra	61.15	Kanpur Nagar	54.35	Kushinagar	47.62	Mahrajganj	45.78
		Mathura	61.15	Siddharth nagar	54.32	Ballia	47.33	Mirzapur	45.19
				Rampur	54.06	Mau	47.33	Sant Ravidas Nagar Bhadohi	45.19
				Unnao	53.97	Balrampur	47.25	Hamirpur	45.14
				Bahraich	53.57	Gonda	47.25	Lalitpur	45.14
				Shrawasti	53.57	Kaushambi	47.24	Mahoba	45.14
						Sonebhadra	47.00	Jaunpur	44.56
						Chandauli	47.00	Pratapgarh	42.08
								Sultanpur	42.08
								Barabanki	41.37
								Sitapur	39.75
								Kheri	39.70
								Ambedkar Nagar	39.45
								Faizabad	39.45

state (Rs. 346) is more than the national average (Rs. 307) but remains lower in comparison to Kerala (Rs. 456), Haryana (Rs. 419), Punjab (Rs. 416) and Assam (Rs. 358).

Table 5.3: Monthly Per Capita Expenditure in Rural Areas

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

Source: NSS 61st Round, 2004-05.

Although the state as a whole has consumption levels far above the national average, there are stark disparities in consumption levels within the state. This can be adjudged from the fact that the average monthly food consumption expenditure of the western region is again found to be higher and much above than that of Kerala, Haryana or Punjab - the high ranking states - thus corroborating the fact that even Uttar Pradesh can achieve good status if this disparity is resolved (Table 5.4 and Map 5.2).

Map 5.2: Status of Consumption Expenditure

Average Per Cap
- 459 - 503
- 415 - 458
- 371 - 414
- 326 - 370
- 281 - 325
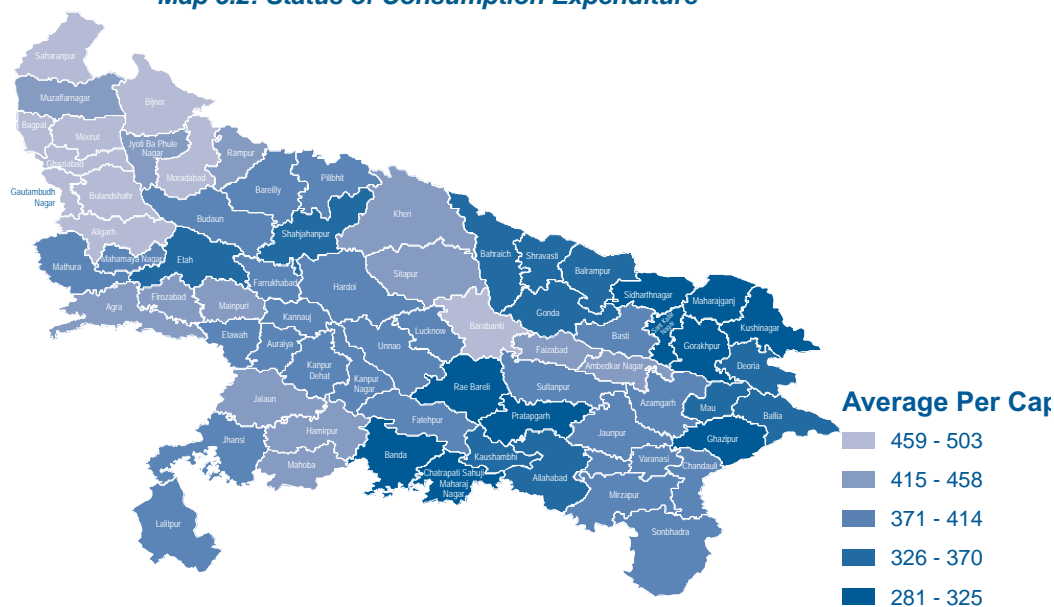
Table 5.4: Average Rural Monthly Per capita Consumption Expenditure by District (Rs.)

Districts	MPCE	Rank	Districts	MPCE	Rank
Agra	436	8	Jaunpur	393	18
Aligarh	503	1	Jhansi	400	11
Allahabad	362	26	Jyotiba Phule Nagar	443	4
Ambedkar Nagar	422	11	Kannauj	392	19
Auraiya	399	15	Kanpur Dehat	395	16
Azamgarh	383	21	Kanpur Nagar	395	16
Baghpat	480	4	Kaushambi	362	26
Bahraich	346	29	Kheri	419	9
Ballia	351	27	Kushinagar	312	32
Balrampur	338	30	Lalitpur	400	11
Banda	320	33	Lucknow	398	13
Barabanki	483	3	Mahoba	422	8
Bareilly	390	18	Mahrajganj	313	31
Basti	414	14	Mainpuri	415	10
Bijnor	464	7	Mathura	377	25
Budaun	380	22	Mau	351	28
Bulandshahar	503	1	Meerut	480	2
Chandauli	388	19	Mirzapur	379	23
Chitrakoot	320	33	Moradabad	480	1
Deoria	346	28	Muzaffarnagar	440	6
Etah	364	25	Pilibhit	390	20
Etawah	399	15	Pratapgarh	281	34
Faizabad	422	11	Rae Bareli	313	30
Farrukhabad	392	17	Rampur	443	4
Fatehpur	387	20	Saharanpur	466	3
Firozabad	415	13	Sant Kabir Nagar	312	32
Gautam Buddha Nagar	479	5	Sant Ravidas Nagar Bhadohi	379	23
Ghaziabad	479	5	Shahjahanpur	358	27
Ghazipur	300	35	Shrawasti	338	29
Gonda	329	31	Siddharthnagar	281	35
Gorakhpur	324	32	Sitapur	429	7
Hamirpur	422	9	Sonebhadra	388	21
Hardoi	379	23	Sultanpur	397	15
Hathras	377	24	Unnao	398	13
Jalaun	422	9	Varanasi	381	22

Source: As stated in Table 3.4, Variable b6.

Table 5.5: Proportion of Agricultural Labourers in Workforce by State

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

Source: Census of India, 2001.

5.3. Agricultural Labourers

Uttar Pradesh ranks sixth among the 17 major states in terms of proportion of agricultural labourers. The proportion of agricultural labourers in the state (28.9 per cent) is lower than the national average (33 per cent). Rajasthan has the lowest proportion of agricultural labourers followed by Assam, Haryana, Kerala and Punjab. Bihar has the highest proportion (51 per cent) of agricultural labourers. Andhra Pradesh and Tamil Nadu follow Bihar in terms of proportion of agricultural labourers. As discussed in Chapter 3, a high proportion of agricultural labourers is characterised by extremely poor physical and human capital and also the highest poverty levels (NCEUS, 2007).

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

Proportion of Agricultural Labourers – Main & Marginal (%)

- 40.00 - 46.56
- 33.45 - 40.00
- 26.90 - 33.45
- 20.34 - 26.90
- 13.79 - 20.34
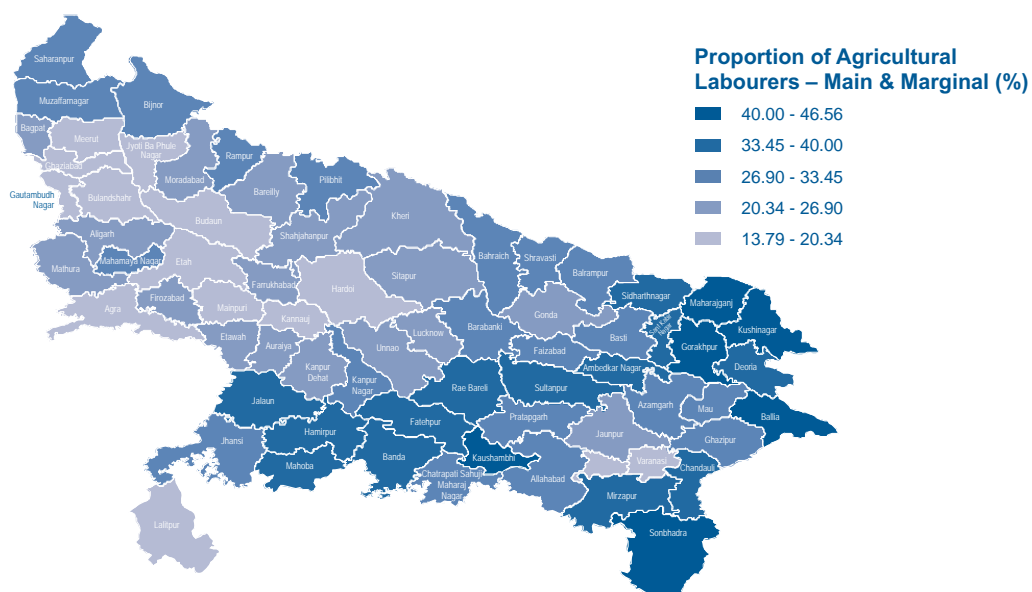
Table 5.6: Proportion of Agricultural Labourers in Workforce by District (per cent)

High		Moderate		Low		Very Low		Extremely Low	
District	Percentage of Agricultural Labourers	District	Percentage of Agricultural Labourers	District	Percentage of Agricultural Labourers	District	Percentage of Agricultural Labourers	District	Percentage of Agricultural Labourers
Kushinagar	46.56	Sant Kabir Nagar	39.40	Balrampur	32.95	Etawah	26.80	Hardoi	20.19
Mahrajganj	45.12	Hamirpur	38.73	Bijnor	32.93	Lucknow	26.53	Etah	20.17
Kaushambi	44.25	Chandauli	38.33	Bahraich	32.44	Kanpur Dehat	26.39	Agra	19.97
Sonbhadra	43.91	Jalaun	37.84	Mau	31.83	Shah jahanpur	25.89	Buland shahar	18.71
Ballia	42.32	Siddharth nagar	37.16	Faizabad	31.71	Kheri	25.52	Budaun	18.65
Gorakhpur	41.48	Mirzapur	36.87	Saharanpur	31.68	Auraiya	25.26	Meerut	18.63
		Rae Bareli	36.66	Pratapgarh	31.57	Aligarh	24.99	Lalitpur	18.44
		Ambedkar Nagar	35.70	Kanpur Nagar	31.10	Gonda	24.92	Jyotiba Phule Nagar	18.23
		Mahoba	34.61	Allahabad	30.29	Bareilly	23.74	Mainpuri	17.47
		Fatehpur	34.47	Rampur	29.52	Unnao	23.57	Kannauj	17.03
		Banda	34.16	Azamgarh	29.38	Sitapur	23.33	Sant Ravidas Nagar Bhadohi	16.84
		Sultanpur	33.93	Ghazipur	29.13	Moradabad	22.22	Varanasi	15.98
		Deoria	33.52	Pilibhit	29.01	Jaunpur	21.57	Gautam Buddha Nagar	14.33
				Hathras	28.89	Mathura	21.29	Ghaziabad	13.79
				Basti	28.44	Farrukhabad	20.75		
				Muzaffar nagar	28.43	Baghpat	20.75		
				Shrawasti	28.18	Firozabad	20.72		
				Chitrakoot	28.16				
				Barabanki	28.03				
				Jhansi	27.98				

The proportion of agricultural labourers in the workforce by district has been presented in Table 5.6. One can see a pattern in Map 5.3 where there is a preponderance of agricultural labourers in the eastern and Southern parts of the state and as one goes towards western part of the state, the proportion of agricultural labourers declines.

5.4. Proportion of Scheduled Tribes and Scheduled Castes

While the Scheduled Tribes get marginalised mostly on account of their location, the Scheduled Castes have faced historical discrimination which accounts for their marginalisation and vulnerability status. 23.4 per cent of the total rural population of Uttar Pradesh is Scheduled Caste whereas the proportion of Scheduled Tribes in the state is negligible (0.1 per cent). Out of the 17 major states of India, only three states – Punjab (33.0 per cent), West Bengal (26.9 per cent) and Tamil Nadu (23.8 per cent) – have a higher proportion of Scheduled Castes than Uttar Pradesh.

Within the state, there are acute differences across districts in the composition of the population by social group.

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

India/Staes	Proportion of Scheduled Castes		Proportion of 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.

Table 5.8: District-wise of Proportion of Scheduled Caste and Scheduled Tribe Population

Extremely Low		Very Low		Low		Moderate		High	
District	% of SC & ST Popu-lation	District	% of SC & ST Popu-lation	District	% of SC & ST Popu-lation	District	% of SC & ST Popu-lation	District	% of SC & ST Popu-lation
Baghpat	11.62	Shrawasti	19.20	Lalitpur	26.71	Hardoi	34.13	Sonebhadra	48.60
Bareilly	15.19	Ghaziabad	19.33	Azamgarh	26.87	Sitapur	34.90		
Muzaffarnagar	15.33	Gautam Buddha Nagar	19.63	Kanpur Nagar	27.02	Kaushambi	37.27		
Balrampur	15.40	Kannauj	19.77	Chitrakoot	27.23	Lucknow	40.13		
Bahraich	15.84	Firozabad	19.78	Mahoba	27.43				
Rampur	16.12	Jyotiba Phule Nagar	19.81	Jalaun	28.65				
Gonda	16.35	Mainpuri	19.87	Barabanki	28.78				
Siddharthnagar	16.80	Mahrajganj	19.92	Kheri	28.84				
Pilibhit	16.94	Shahjahanpur	20.04	Mirzapur	28.93				
Ballia	17.16	Meerut	21.10	Auraiya	29.64				
Farrukhabad	17.25	Basti	21.23	Rae Bareli	31.44				
Varanasi	17.80	Agra	21.48	Jhansi	32.00				
Etah	17.81	Banda	21.73	Unnao	33.54				
Budaun	18.38	Sant Kabir Nagar	21.90						
Kushinagar	18.53	Mathura	22.00						
Moradabad	18.66	Ghazipur	22.27						
Deoria	18.96	Pratapgarh	22.61						
		Bulandshahar	22.64						
		Sultanpur	22.87						
		Jaunpur	22.95						
		Hamirpur	23.09						
		Aligarh	23.18						
		Sant Ravidas Nagar Bhadohi	23.20						
		Gorakhpur	24.39						
		Allahabad	24.50						
		Faizabad	24.64						
		Chandauli	25.22						
		Bijnor	25.37						
		Kanpur Dehat	25.49						
		Etawah	25.78						
		Mau	25.95						
		Ambedkar Nagar	25.96						
		Saharanpur	26.17						
		Fatehpur	26.29						
		Hathras	26.35						

Map 5.4: Proportion of Scheduled Castes and Scheduled Tribes

Proportion of Rural

- 41.20 - 48.60
- 33.81 - 41.20
- 26.41 - 33.81
- 19.02 - 26.41
- 11.62 - 19.02
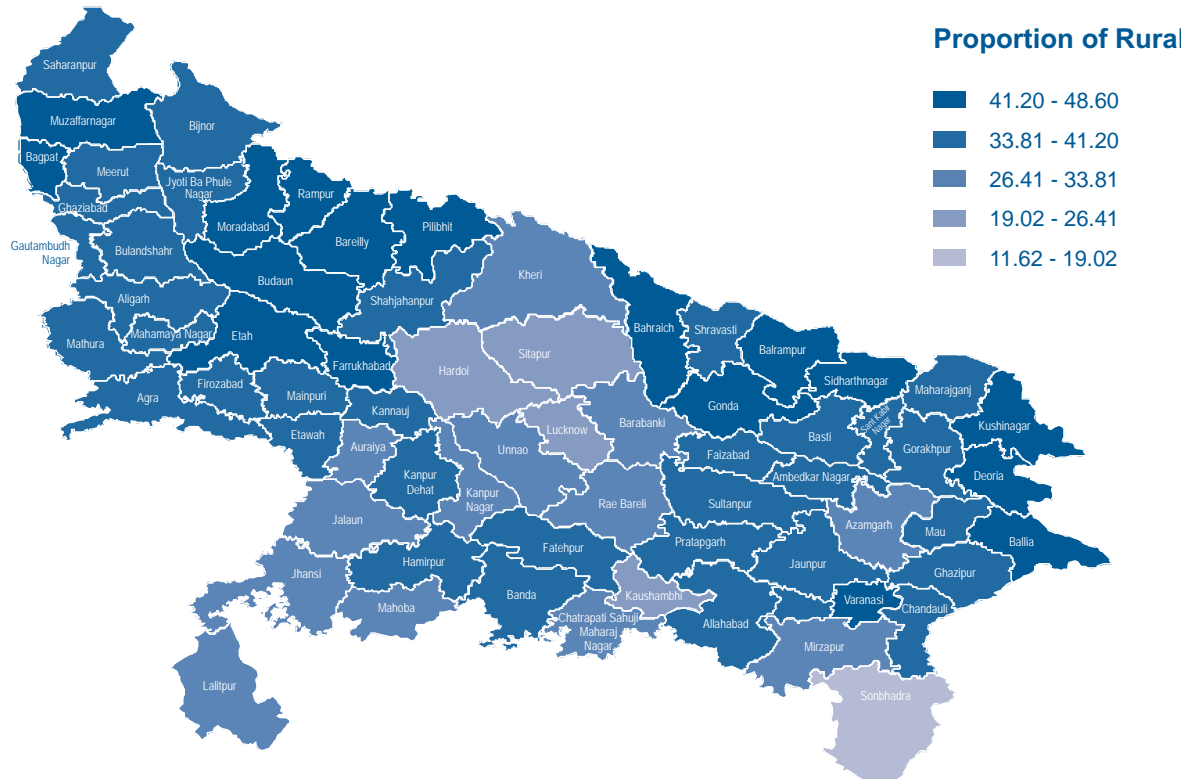
Districts like Sonebhadra and Kaushambi in the eastern region and Hardoi, Sitapur, and Lucknow in the central region and a few other surrounding districts show a very high proportion of Scheduled Caste population, constituting more than 40 per cent of the total rural population. On the other hand, there are districts like Baghpat, Bareilly, Muzaffarnagar, Balrampur, Bahaich which have a lower proportion of Scheduled Caste in their rural population than the national average. (Table 5.8 and Map 5.4).

Historically, caste is believed to be the major factor in fostering inequalities in India. Caste determines the position in society and members of backward castes have faced cumulative deprivation in access to job, education, health and other areas as well. The poverty rates for the SC's remained higher than that of the rest of the population in rural areas.

5.5 Ratio of Rural Working Age Population

The proportion of working age population has varied implications for the food security situation in a region. The working age ratio is the ratio between the working population (15-59 years) and the dependent population (less than 15 years and more than 59 years of age). The demographic transition from a high fertility and mortality to low fertility and mortality has several phases. With socio-economic

Table 5.9: Ratio of Working Age Population by State

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

Source: Census of India, 2001

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, 2006[1]).

The situation in Uttar Pradesh in terms of the ratio of working age population is found to be poor in comparison to other states as well as the national average. The southern states in general are seen to be having a better working age ratio than the northern states. None of the major states of the country have a ratio of working age population less than Uttar Pradesh (1.02). The best performing state – Kerala (1.70) – is way ahead of it while the second worst performing state – Bihar (1.03) – is only marginally ahead of it. A low working age ratio implies a greater dependence on the existing productive population, and may also be related to high out-migration.

A district-wise analysis in the state of Uttar Pradesh shows high disparity between the agriculturally developed and backward areas. In none of the districts, the ratio of working age population is close to the best performing states of Kerala, Tamil Nadu or Andhra Pradesh. It is high in industrial and mining districts like Jhansi (1.21), Kanpur Nagar (1.16), Jalaun (1.15) and Ghaziabad (1.09) whereas it is less than 1 in 16 districs like Agra (0.99), Sonebhadra (0.99), Bhadoi (0.99), Jyotiba Phule Nagar (0.98) to name a few (Table 5.10 and Map 5.5).

The differential ratio between the developed and backward regions can probably be explained by out-migration from the latter region to former. The change in working age population is highly influenced by movement of population in this age group. In a developing region, the young people move out in search of employment. As a result, the developing districts of the state have a lower proportion of working

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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.

Table 5.10: Ratio of Working Age Population by Districts

High		Moderate		Low		Very Low		Extremely Low	
District	Ratio of Working Age Population	District	Ratio of Working Age Population	District	Ratio of Working Age Population	District	Ratio of Working Age Population	District	Ratio of Working Age Population
Jhansi	1.21	Kanpur Nagar	1.16	Kanpur Dehat	1.11	Bahraich	1.05	Aligarh	1.00
		Jalaun	1.15	Ghaziabad	1.09	Kheri	1.05	Deoria	1.00
				Unnao	1.09	Chandauli	1.05	Kaushambi	1.00
				Barabanki	1.09	Kannauj	1.05	Agra	0.99
				Auraiya	1.09	Lalitpur	1.05	Sonebhadra	0.99
				Shrawasti	1.09	Mainpuri	1.05	Sant Ravidas Nagar Bhadohi	0.99
				Mahoba	1.09	Ballia	1.05	Jyotiba Phule Nagar	0.98
				Baghpat	1.09	Bulandshahar	1.04	Ghazipur	0.98
				Fatehpur	1.08	Muzaffarnagar	1.04	Mau	0.98
				Hamirpur	1.08	Gonda	1.04	Jaunpur	0.98
				Meerut	1.08	Shahjahanpur	1.03	Mathura	0.97
				Lucknow	1.08	Allahabad	1.03	Chitrakoot	0.97
				Etawah	1.07	Sultanpur	1.03	Azamgarh	0.97
				Faizabad	1.07	Banda	1.03	Budaun	0.97
				Farrukhabad	1.07	Bijnor	1.02	Bareilly	0.96
				Rae Bareli	1.07	Firozabad	1.02	Siddharth nagar	0.95
				Hardoi	1.06	Varanasi	1.02	Moradabad	0.95
				Sitapur	1.06	Hathras	1.01	Sant Kabir Nagar	0.94
				Gautam Buddha Nagar	1.06	Ambedkar Nagar	1.01	Rampur	0.94
				Saharanpur	1.06	Pilibhit	1.01		
						Pratapgarh	1.01		
						Balrampur	1.01		
						Basti	1.01		
						Kushinagar	1.01		
						Mahrajganj	1.01		
						Mirzapur	1.01		
						Gorakhpur	1.01		
						Etah	1.01		

Map 5.5: Ratio of Rural Working Age Population

Ratio of Rural Population in Age Group 15-59 to Rural Population in 0-15 & 59+ Groups

- 1.16 - 1.21
- 1.11 - 1.16
- 1.05 - 1.11
- 1.00 - 1.05
- 0.94 - 1.00
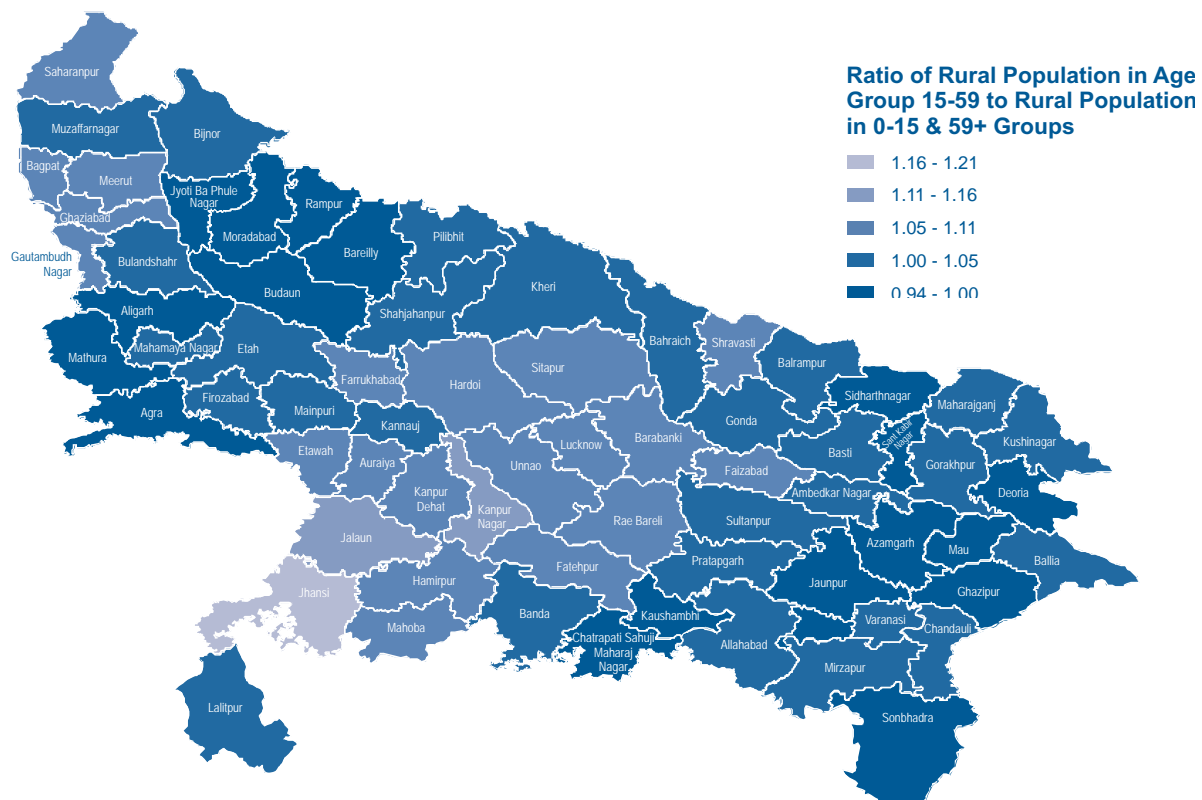
age population compared to the developed districts. On the other hand, movement of working age population to the industrialised and urbanised districts seems to have caused a high ratio of working age to dependent age population in the districts like Lucknow, Kanpur Nagar and Ghaziabad.

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

5.6 Rural Female Literacy

Women's empowerment involves self assertion which is closely related to formal and informal sources of education. The principal strategy suggested for this by a large number of intellectuals and activists was education for women. As the Human Development Report 1995 observed, the returns from educating girls have few parallels in any other type of social investment. Enhancing female literacy has been

Table 5.11: Rural Female Literacy by State

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

Source: Census of India, 2001.

recognised as the single most important factor contributing to increase in food security and decline in malnutrition and mortality levels (Save the Children, 2008).

Rural female literacy in Uttar Pradesh is 36.9 per cent, which is only better than two states – Bihar and Jharkhand. Hence it ranks 15th among the 17 major states of the country. Data from Uttar Pradesh shed light upon the deplorable condition of rural female literacy. It is around 10 percentage points less than the national average and little less than half of the best performing state of Kerala.

According to the 2001 Census, Uttar Pradesh has 44.08 million illiterate women. On the positive side, in the previous decade Uttar Pradesh recorded a healthy growth in female literacy and a recent encouraging trend in female to male ratio in the population. Women have benefited from the expansion of higher education and made their mark in cultural, educational and administrative fields.

There are large disparities in literacy rates, as also in female literacy rates across the state. Rural female literacy is generally very low in the north-eastern part, and the western region exhibits the highest literacy with Auraiya, Kanpur Nagar, Kanpur Dehat and Etawah topping the list with above 50 per cent literacy (Table 5.12 and Map 5.6).

Low literacy rates of women, low enrolment rates in schools and high drop out rates of the girls highlight how women have been denied education. Household responsibilities and domestic chores are a part of the life of a young girl in the rural area. There is inequality within families evidenced by long hours of unvalued domestic work.

Table 5.12: Rural Female Literacy Rate by District (in %)

High		Moderate		Low		Very Low		Extremely Low	
District	Rural Female Literacy Rate	District	Rural Female Literacy Rate	District	Rural Female Literacy Rate	District	Rural Female Literacy Rate	District	Rural Female Literacy Rate
Auraiya	56.27	Chitrakoot	48.41	Deoria	40.26	Barabanki	32.19	Moradabad	24.77
Kanpur Nagar	54.49	Ghaziabad	48.26	Pratapgarh	40.26	Shah jahanpur	32.19	Sonebhadra	24.24
Kanpur Dehat	53.66	Meerut	47.71	Lucknow	40.10	Kheri	32.17	Gonda	24.20
Etawah	53.55	Firozabad	47.44	Fatehpur	39.52	Banda	31.95	Rampur	21.42
Mainpuri	48.69	Kannauj	47.29	Sultanpur	39.40	Pilibhit	31.27	Budaun	20.35
		Baghpat	47.25	Buland shahar	39.10	Mahoba	31.23	Balrampur	18.80
		Gautam Buddha Nagar	46.47	Faizabad	38.52	Sitapur	30.87	Bahraich	18.43
		Saharanpur	45.75	Jhansi	38.24	Jyotiba Phule Nagar	30.82	Shrawasti	17.70
		Varanasi	45.58	Aligarh	38.04	Kushinagar	28.25		
		Mau	45.56	Agra	37.96	Kaushambi	28.24		
		Jalaun	45.26	Unnao	37.87	Lalitpur	27.20		
		Muzaffarnagar	44.53	Allahabad	37.73	Bareilly	26.63		
		Farrukhabad	44.38	Gorakhpur	36.54	Mahrajganj	26.23		
		Hathras	43.88	Rae Bareli	36.52	Siddharth nagar	25.87		
		Ambedkar Nagar	43.38	Mathura	36.27				
		Bijnor	43.31	Hamirpur	36.11				
		Jaunpur	42.53	Sant Ravidas Nagar Bhadohi	36.08				
		Ghazipur	42.36	Mirzapur	36.00				
		Azamgarh	41.85	Etah	35.69				
		Chandauli	41.65	Basti	34.89				
		Ballia	41.45	Hardoi	33.77				
				Sant Kabir Nagar	33.43				

Source: As stated in Table 3.4, Variable b1.

Map 5.6: Status of Rural Female Literacy

Proportion of Rural Female Literates (7+ Age Group) (in %)

- 48.55 - 56.27
- 40.84 - 48.55
- 33.13 - 40.84
- 25.41 - 33.13
- 17.70 - 25.41
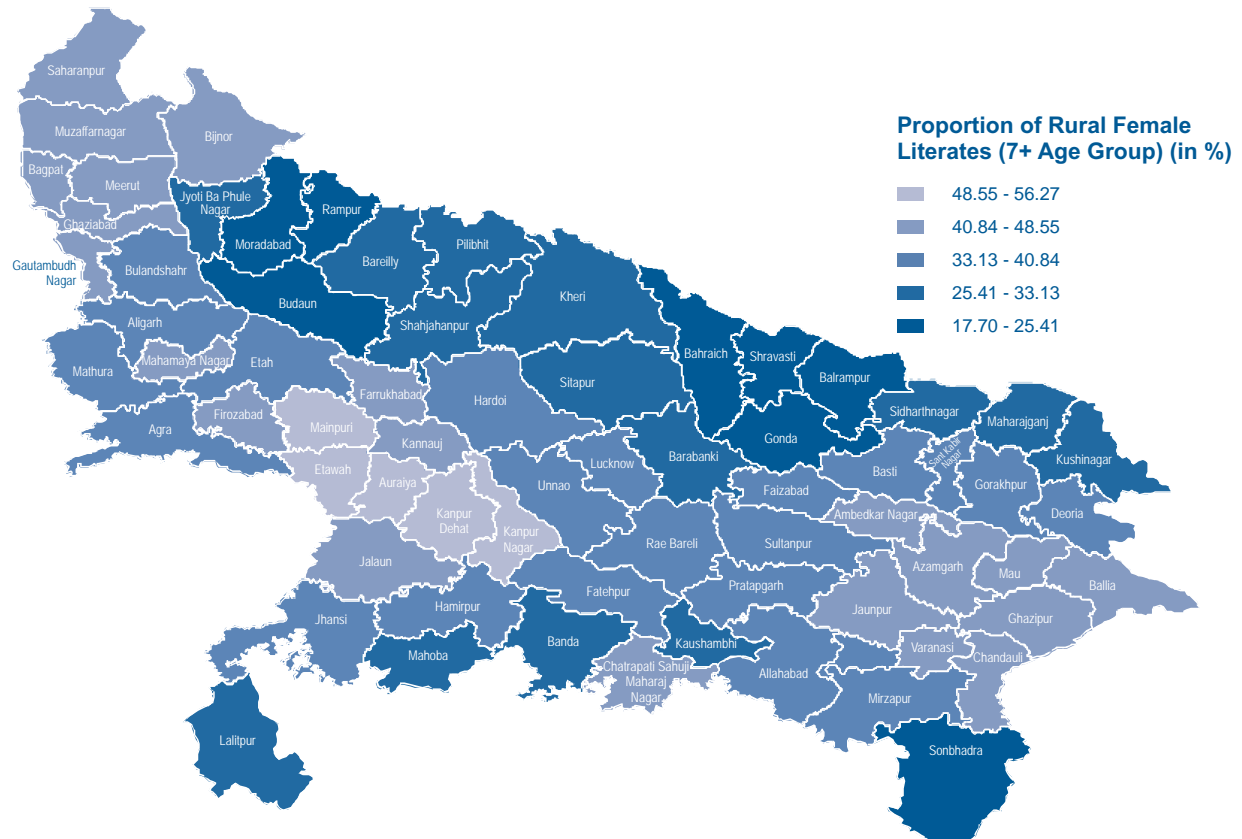
5.7 Women's Workforce Participation

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

Map 5.7: Women's Workforce Participation Rate

**Proportion of Rural Worki...
(15+ age) to Total Rural W...**
- 54.97 - 66.83
- 43.12 - 54.97
- 31.26 - 43.12
- 19.40 - 31.26
- 7.54 - 19.40
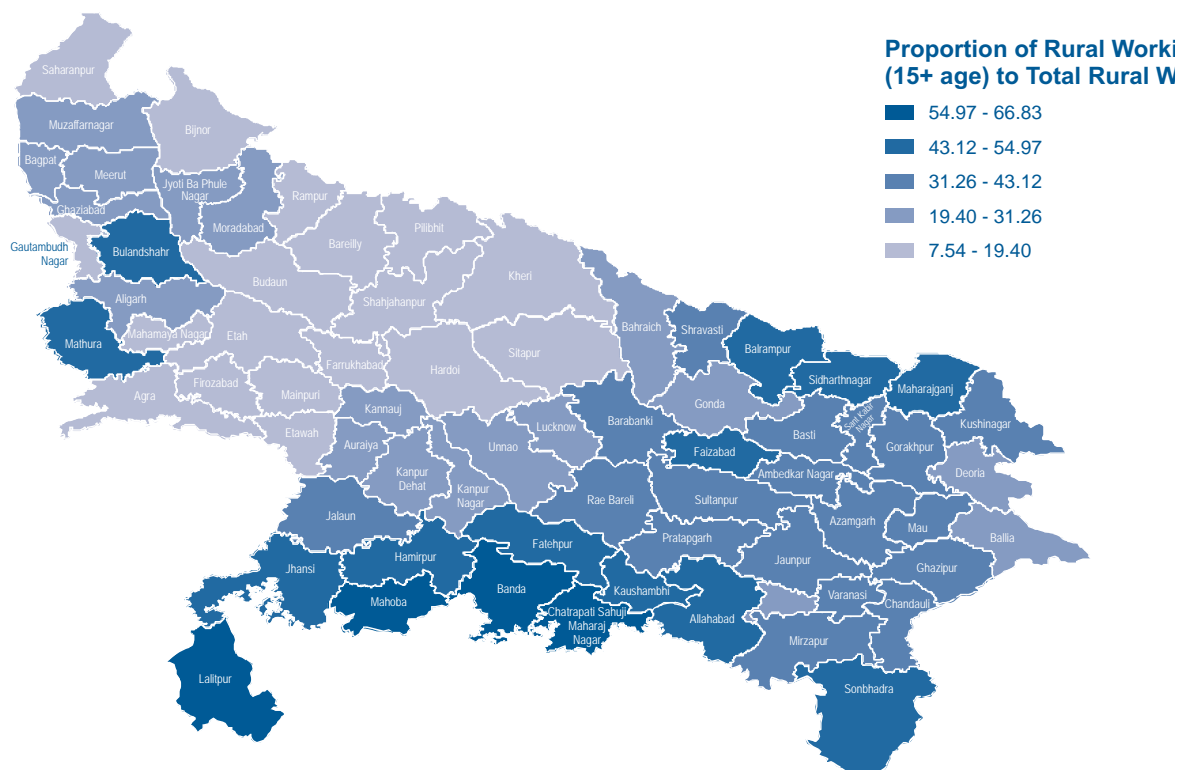
security situation. In Uttar Pradesh, women's workforce participation is usually high in less food secure districts and where proportion of Scheduled Caste population is also present (Map 5.7 and Table 5.13).

Our analysis reveals that the female work participation in rural areas of Uttar Pradesh is higher in the Southern and Eastern regions of the State. In fact, all the districts where female participation is higher are the most backward districts of the state accompanied by high level of poverty and low levels of consumption expenditure. On the other hand, the agriculturally developed Western region does not show such high level of female involvement in the workforce – showing that it is poverty that is driving females to work and add to the household incomes, thereby improving access to food security.

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

Table 5.13: Women's Workforce Participation Rate

High		Moderate		Low		Very Low		Extremely Low	
District	Female Work Force Partici-pation	District	Female Work Force Partici-pation	District	Female Work Force Partici-pation	District	Female Work Force Partici-pation	District	Female Work Force Partici-pation
Chitrakoot	66.83	Balrampur	53.92	Shrawasti	41.42	Unnao	29.67	Hathras	18.24
Lalitpur	65.25	Kaushambi	52.46	Sant Kabir Nagar	40.41	Bahraich	28.20	Gautam Buddha Nagar	18.17
Mahoba	62.65	Bulandshahar	51.35	Pratapgarh	39.94	Deoria	28.14	Bareilly	17.63
Banda	56.79	Mahrajganj	51.20	Rae Bareli	38.81	Muzaffarnagar	27.91	Hardoi	16.99
		Mathura	51.03	Basti	38.76	Aligarh	27.25	Bijnor	15.40
		Sonebhadra	50.57	Jalaun	38.70	Kanpur Nagar	26.93	Kheri	14.69
		Hamirpur	50.39	Kushinagar	38.11	Baghpat	26.47	Sitapur	14.22
		Jhansi	49.64	Mirzapur	37.93	Auraiya	26.37	Budaun	14.11
		Faizabad	48.04	Ambedkar Nagar	37.44	Lucknow	26.26	Agra	14.05
		Siddharthnagar	47.80	Mau	36.66	Gonda	26.18	Etah	13.61
		Allahabad	45.21	Jaunpur	36.39	Sant Ravidas Nagar Bhadohi	26.12	Farrukha-bad	12.36
		Fatehpur	44.41	Ghazipur	35.50	Jyotiba Phule Nagar	26.02	Rampur	11.79
				Varanasi	34.29	Meerut	25.88	Saharanpur	11.57
				Barabanki	33.68	Ballia	25.70	Firozabad	11.22
				Azamgarh	33.55	Moradabad	24.72	Etawah	10.90
				Chandauli	33.19	Kanpur Dehat	24.31	Mainpuri	10.69
				Gorakhpur	31.99	Kannauj	23.48	Pilibhit	9.34
				Sultanpur	31.75	Ghaziabad	20.39	Shah-jahanpur	7.54

(Srivastava & Sasikumar, 2003).

5.8 Urbanisation

Because of the low industrial activities, Uttar Pradesh is less urbanised than most of the major states. The level of its urbanisation is lower than the national average and almost half of the most urbanised states – Tamil Nadu, Maharashtra and Gujarat.

Table 5.14: Level of Urbanisation in Major States

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

Source: Census of India, 2001.

Most of the districts in Uttar Pradesh have a very low level of urbanisation. However, a comparison across districts throws a very interesting observation. The level of urbanisation in the highly urbanised districts of the state is comparable to the most urbanised states of the country, whereas the least urbanised districts can be compared to the least urbanised states of the country. So, the two extremes

Map 5.8: Level of Urbanization

Proportion of Urb

- 54.30 - 67.10
- 41.40 - 54.30
- 28.50 - 41.40
- 15.70 - 28.50
- 2.80 - 15.70
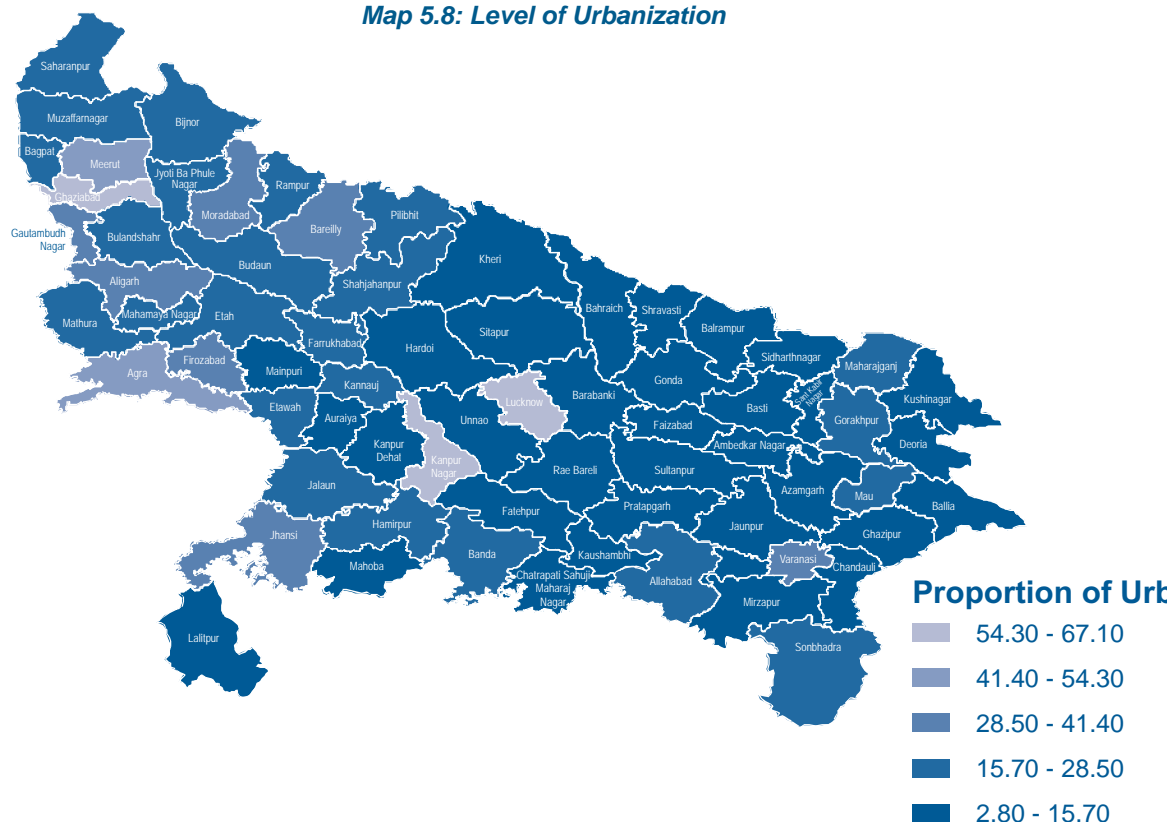
Table 5.15: Level of Urbanization by Districts

High		Moderate		Low		Very Low		Extremely Low	
District	Urbani-zation Rate (%)	District	Urbani-zation Rate (%)	District	Urbani-zation Rate (%)	District	Urbani-zation Rate (%)	District	Urbani-zation Rate (%)
Kanpur Nagar	67.1	Meerut	48.4	Jhansi	40.8	Mathura	28.3	Unnao	15.2
Lucknow	63.6	Agra	43.3	Varanasi	40.2	Saharanpur	25.8	Mainpuri	14.6
Ghaziabad	55.2			Gautam Buddha Nagar	37.4	Muzaffar nagar	25.5	Lalitpur	14.5
				Bareilly	32.9	Rampur	25.0	Auraiya	14.3
				Moradabad	30.5	Jyotiba Phule Nagar	24.6	Mirzapur	13.5
				Firozabad	30.3	Allahabad	24.4	Faizabad	13.5
				Aligarh	28.9	Bijnor	24.3	Sant Ravidas Nagar Bhadohi	12.8
						Jalaun	23.4	Hardoi	12.0
						Buland shahar	23.2	Sitapur	12.0
						Etawah	23.0	Kheri	10.8
						Mahoba	21.9	Chandauli	10.6
						Farrukhabad	21.7	Fatehpur	10.3
						Shahjahanpur	20.6	Bahraich	10.0
						Hathras	19.8	Chitrakoot	10.0
						Baghpat	19.7	Deoria	9.9
						Gorakhpur	19.6	Ballia	9.8
						Mau	19.4	Rae Bareli	9.5
						Sonebhadra	18.8	Barabanki	9.3
						Budaun	18.2	Ambedkar Nagar	8.9
						Pilibhit	17.9	Balrampur	8.1
						Etah	17.3	Ghazipur	7.7
						Kannauj	16.7	Azamgarh	7.5
						Hamirpur	16.7	Jaunpur	7.4
						Banda	15.9	Kaushambi	7.1
								Sant Kabir Nagar	7.1
								Gonda	7.0
								Kanpur Dehat	6.9
								Basti	5.6
								Pratapgarh	5.3
								Mahrajganj	5.1
								Sultanpur	4.7
								Kushinagar	4.6
								Siddharthnagar	3.8
								Shrawasti	2.8

Source: Census of India, 2001.

simultaneously exist in Uttar Pradesh. Kanpur Nagar, Lucknow and Ghaziabad have an urbanisation level of more than 50 per cent. At the other extreme, there are 20 districts of the southern and eastern region where the urbanisation level is less than 10 per cent. Shravasti, Sidharthnagar, Kushinagar and Sultanpur have an urbanisation rate of less than 5 per cent (Map 5.8 and Table 5.15).

Urbanisation offers opportunities for a variety of livelihood options. Migration is also influenced by the extent of urbanisation. Households who have temporary or seasonal access to work in nearby towns have higher incomes than those who lack that access (World Bank, 2007).[2] Unfortunately not only is the level of urbanisation in the state low, the pace of urbanisation is also very slow.

5.9 Access Index

Based on the proportion of Scheduled Castes and Scheduled Tribes population, ratio of working population, rural female literacy, monthly per capita expenditure, rural wage rate and proportion of agricultural labourers, an index of food access has been calculated. Districts are divided into the five categories of extremely insecure, severely insecure, moderately insecure, moderately secure and secure.

Kushinagar, Maharajganj, Kaushambi and Sonebhadra are the extremely insecure districts in food access index in Uttar Pradesh. The districts of the Western region like Ghaziabad, Gautambudh Nagar, Baghpat, Meerut, Mainpuri, Bulandshahar and Kannauj are the only districts in Uttar Pradesh which can be termed as food secure in terms of access to food. Ghaziabad is a highly urbanised district marked by a high level of industrial activities. The industrial and economic activities associated with urban areas offer employment and income opportunities to a large number of its population, as a result of which the per capita consumption expenditure, rural wage rate and proportion of non-agricultural workers are very high in this district. These along with some other associate indicators like high female literacy, have made it secure in terms of access to food. The districts of Auraiya, Farrukhabad, Firozabad, Etawah, Varanasi, Aligarh, Muzaffarnagar, Agra, Saharanpur, Hathras, Jyotiba Phule Nagar, Bijnor, Mathura and Etah in the western region and Kanpur Dehat and Kanpur Nagar in central region are moderately secure in access to food, though barring a few, most of these districts are secure in availability of food. Because the agricultural production and productivity of the sector in this state is very low, the districts which are more dependent on agricultural activities generally, have low per capita consumption expenditure, low agricultural wages and low proportion of non-agricultural labourers. So, such districts though secure in availability of food are insecure in access to food (see Table 5.15 and Map 5.9).

The districts of Chandauli, Gonda, Ballia, Pratapgarh, Shrawasti, Mirzapur, Bahraich, Balrampur, Gorakhpur, Sant Kabir Nagar and Siddharthnagar of the eastern region and Banda, Hamirpur, Mahoba in the southern region are severely insecure in access to food.

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2.   It has been estimated from NSS 55th round by World Bank that the migrant workers' average monthly expenditure is 17 percent higher than that of the non-migrants.

Table 5.16: Indicators Used to Compute Index of Accessibility

District	% of SC & ST Popu-lation	Rank	Ratio of Working Age Popu-lation	Rank	Rural Female Literacy Rate	Rank	MPCE (in Rs.)	Rank	Rural Casual Wage Rate (in Rs.)	Rank	Per-centage of Agricul-tural Lab-ourers	Rank	Access Index	Rank
Agra	21.48	42	0.99	55	37.96	36	436	14	61.15	14	19.97	12	0.501	16
Aligarh	23.18	32	1.00	52	38.04	35	503	1	64.45	5	24.99	25	0.506	13
Allahabad	24.50	29	1.03	35	37.73	38	362	51	46.70	50	30.29	43	0.426	46
Ambedkar Nagar	25.96	22	1.01	42	43.38	20	422	19	39.45	69	35.70	57	0.425	49
Auraiya	29.64	9	1.09	8	56.27	1	399	27	62.96	7	25.26	26	0.519	8
Azamgarh	26.87	17	0.97	64	41.85	24	383	42	46.46	52	29.38	41	0.435	38
Baghpat	11.62	70	1.09	11	47.25	11	480	5	59.43	17	20.75	16	0.555	3
Bahraich	15.84	66	1.05	24	18.43	69	346	57	53.57	29	32.44	49	0.393	61
Ballia	17.16	61	1.05	30	41.45	26	351	54	47.33	41	42.32	66	0.411	55
Balrampur	15.40	67	1.01	45	18.80	68	338	58	47.25	43	32.95	51	0.378	63
Banda	21.73	41	1.03	37	31.95	52	320	62	52.52	32	34.16	54	0.402	58
Barabanki	28.78	12	1.09	7	32.19	49	483	3	41.37	66	28.03	33	0.439	35
Bareilly	15.19	69	0.96	66	26.63	60	390	37	55.14	22	23.74	23	0.447	29
Basti	21.23	43	1.01	46	34.89	46	414	24	46.62	51	28.44	37	0.441	32
Bijnor	25.37	26	1.02	38	43.31	21	464	10	59.69	16	32.93	50	0.476	21
Budaun	18.38	57	0.97	65	20.35	67	380	44	50.01	37	18.65	10	0.431	43
Bulandshahar	22.64	36	1.04	31	39.10	32	503	2	66.09	2	18.71	11	0.534	6
Chandauli	25.22	27	1.05	26	41.65	25	388	39	47.00	47	38.33	62	0.419	52
Chitrakoot	27.23	15	0.97	63	48.41	6	320	63	52.52	33	28.16	34	0.449	28
Deoria	18.96	54	1.00	53	40.26	27	346	56	51.05	35	33.52	52	0.432	41
Etah	17.81	58	1.01	51	35.69	45	364	50	55.31	20	20.17	13	0.474	23
Etawah	25.78	24	1.07	16	53.55	4	399	28	62.96	8	26.80	31	0.513	11
Faizabad	24.64	28	1.07	17	38.52	33	422	20	39.45	70	31.71	47	0.431	42
Farrukhabad	17.25	60	1.07	18	44.38	18	392	35	61.97	10	20.75	17	0.518	9
Fatehpur	26.29	20	1.08	12	39.52	30	387	41	54.35	23	34.47	55	0.437	36
Firozabad	19.78	49	1.02	39	47.44	9	415	22	55.31	21	20.72	15	0.514	10
Gautam Buddha Nagar	19.63	51	1.06	22	46.47	12	479	7	66.09	3	14.33	2	0.567	2
Ghaziabad	19.33	52	1.09	5	48.26	7	479	8	66.09	4	13.79	1	0.576	1
Ghazipur	22.27	38	0.98	59	42.36	23	300	68	52.00	34	29.13	40	0.433	40
Gonda	16.35	64	1.04	33	24.20	65	329	60	47.25	44	24.92	24	0.414	54
Gorakhpur	24.39	30	1.01	50	36.54	39	324	61	45.78	56	41.48	65	0.376	64
Hamirpur	23.09	33	1.08	13	36.11	42	422	16	45.14	60	38.73	63	0.416	53
Hardoi	34.13	5	1.06	20	33.77	47	379	45	45.80	55	20.19	14	0.436	37
Hathras	26.35	19	1.01	41	43.88	19	377	48	71.76	1	28.89	38	0.483	20
Jalaun	28.65	13	1.15	3	45.26	16	422	17	46.92	48	37.84	61	0.441	31

(Continued...)

District	% of SC & ST Popu-lation	Rank	Ratio of Working Age Popu-lation	Rank	Rural Female Literacy Rate	Rank	MPCE (in Rs.)	Rank	Rural Casual Wage Rate (in Rs.)	Rank	Per-centage of Agricul-tural Lab-ourers	Rank	Access Index	Rank
Jaunpur	22.95	34	0.98	61	42.53	22	393	34	44.56	63	21.57	19	0.467	25
Jhansi	32.00	7	1.21	1	38.24	34	400	25	46.92	49	27.98	32	0.447	30
Jyotiba Phule Nagar	19.81	48	0.98	58	30.82	56	443	11	61.76	12	18.23	7	0.492	19
Kannauj	19.77	50	1.05	27	47.29	10	392	36	61.97	11	17.03	5	0.531	7
Kanpur Dehat	25.49	25	1.11	4	53.66	3	395	32	54.35	24	26.39	29	0.503	15
Kanpur Nagar	27.02	16	1.16	2	54.49	2	395	33	54.35	25	31.10	44	0.493	18
Kaushambi	37.27	3	1.00	54	28.24	58	362	52	47.24	45	44.25	68	0.336	69
Kheri	28.84	11	1.05	25	32.17	51	419	21	39.70	68	25.52	27	0.425	48
Kushinagar	18.53	56	1.01	47	28.25	57	312	66	47.62	40	46.56	70	0.349	67
Lalitpur	26.71	18	1.05	28	27.20	59	400	26	45.14	61	18.44	8	0.440	33
Lucknow	40.13	2	1.08	15	40.10	29	398	29	52.90	31	26.53	30	0.440	34
Mahoba	27.43	14	1.09	10	31.23	54	422	18	45.14	62	34.61	56	0.409	56
Mahrajganj	19.92	46	1.01	48	26.23	61	313	65	45.78	57	45.12	69	0.343	68
Mainpuri	19.87	47	1.05	29	48.69	5	415	23	62.96	9	17.47	6	0.540	5
Mathura	22.00	39	0.97	62	36.27	41	377	49	61.15	15	21.29	18	0.475	22
Mau	25.95	23	0.98	60	45.56	15	351	55	47.33	42	31.83	48	0.433	39
Meerut	21.10	44	1.08	14	47.71	8	480	6	61.76	13	18.63	9	0.550	4
Mirzapur	28.93	10	1.01	49	36.00	44	379	46	45.19	58	36.87	59	0.394	60
Moradabad	18.66	55	0.95	68	24.77	63	480	4	58.28	19	22.22	20	0.468	24
Muzaffarnagar	15.33	68	1.04	32	44.53	17	440	13	59.43	18	28.43	36	0.505	14
Pilibhit	16.94	62	1.01	43	31.27	53	390	38	46.29	53	29.01	39	0.431	45
Pratapgarh	22.61	37	1.01	44	40.26	28	281	69	42.08	64	31.57	45	0.402	57
Rae Bareli	31.44	8	1.07	19	36.52	40	313	64	49.96	38	36.66	58	0.387	62
Rampur	16.12	65	0.94	70	21.42	66	443	12	54.06	27	29.52	42	0.425	47
Saharanpur	26.17	21	1.06	23	45.75	13	466	9	63.48	6	31.68	46	0.494	17
Sant Kabir Nagar	21.90	40	0.94	69	33.43	48	312	67	49.07	39	39.40	64	0.375	65
Sant Ravidas Nagar Bhadohi	23.20	31	0.99	57	36.08	43	379	47	45.19	59	16.84	4	0.463	26
Shahjahanpur	20.04	45	1.03	34	32.19	50	358	53	46.29	54	25.89	28	0.431	44
Shrawasti	19.20	53	1.09	9	17.70	70	338	59	53.57	30	28.18	35	0.399	59
Siddharth nagar	16.80	63	0.95	67	25.87	62	281	70	54.32	26	37.16	60	0.372	66
Sitapur	34.90	4	1.06	21	30.87	55	429	15	39.75	67	23.33	21	0.421	51
Sonebhadra	48.60	1	0.99	56	24.24	64	388	40	47.00	46	43.91	67	0.314	70
Sultanpur	22.87	35	1.03	36	39.40	31	397	31	42.08	65	33.93	53	0.424	50
Unnao	33.54	6	1.09	6	37.87	37	398	30	53.97	28	23.57	22	0.457	27
Varanasi	17.80	59	1.02	40	45.58	14	381	43	50.59	36	15.98	3	0.511	12

Map 5.9: Food Access Map of Rural Uttar Pradesh

Access Index

- Secure [0.524 - 0.576]
- Moderately Secure [0.471 - 0.524]
- Moderately Insecure [0.419 - 0.471]
- Severely Insecure [0.366 - 0.419]
- Extremely Insecure [0.314 - 0.366]
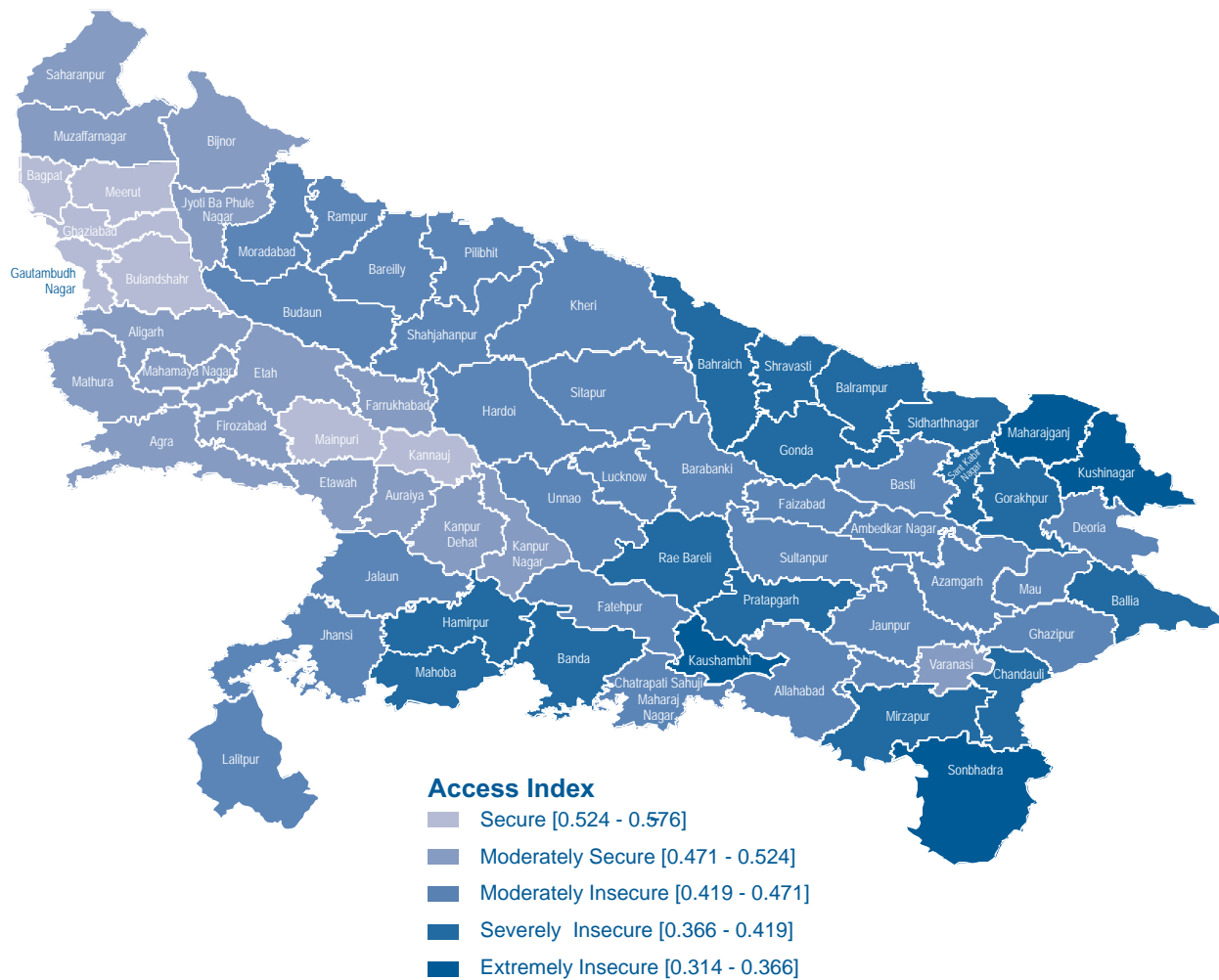
Table 5.17: Status of Districts in Access Index

Secure	Index Value	Moderately Secure	Index Value	Moderately Insecure	Index Value	Severely Insecure	Index Value	Extremely Insecure	Index Value
Ghaziabad	0.576	Auraiya	0.519	Moradabad	0.468	Chandauli	0.419	Kushinagar	0.349
Gautam Buddha Nagar	0.567	Farrukhabad	0.518	Jaunpur	0.467	Hamirpur	0.416	Mahrajganj	0.343
Baghpat	0.555	Firozabad	0.514	Sant Ravidas Nagar Bhadohi	0.463	Gonda	0.414	Kaushambi	0.336
Meerut	0.550	Etawah	0.513	Unnao	0.457	Ballia	0.411	Sonebhadra	0.314
Mainpuri	0.540	Varanasi	0.511	Chitrakoot	0.449	Mahoba	0.409		
Bulandshahar	0.534	Aligarh	0.506	Bareilly	0.447	Pratapgarh	0.402		
Kannauj	0.531	Muzaffarnagar	0.505	Jhansi	0.447	Banda	0.402		
		Kanpur Dehat	0.503	Jalaun	0.441	Shrawasti	0.399		
		Agra	0.501	Basti	0.441	Mirzapur	0.394		
		Saharanpur	0.494	Lalitpur	0.440	Bahraich	0.393		
		Kanpur Nagar	0.493	Lucknow	0.440	Rae Bareli	0.387		
		Jyotiba Phule Nagar	0.492	Barabanki	0.439	Balrampur	0.378		
		Hathras	0.483	Fatehpur	0.437	Gorakhpur	0.376		
		Bijnor	0.476	Hardoi	0.436	Sant Kabir Nagar	0.375		
		Mathura	0.475	Azamgarh	0.435	Siddharthnagar	0.372		
		Etah	0.474	Mau	0.433				
				Ghazipur	0.433				
				Deoria	0.432				
				Faizabad	0.431				
				Budaun	0.431				
				Shahjahanpur	0.431				
				Pilibhit	0.431				
				Allahabad	0.426				
				Rampur	0.425				
				Kheri	0.425				
				Ambedkar Nagar	0.425				
				Sultanpur	0.424				
				Sitapur	0.421				

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It has been estimated that in developing countries, one out of five people do not use safe water, and roughly half are without adequate sanitation (WHO, 2007). Primary health services in the country as a whole are found to be utterly lacking, particularly in the rural areas. There are persistent gaps in manpower and infrastructure, disproportionately affecting the less developed rural areas. A significant proportion of hospitals do not have adequate personnel, diagnostic and therapeutic services and drugs. In a state like Uttar Pradesh, with high burden of communicable and non-communicable diseases because of persisting poverty, the significance of 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 the rural areas. Table 6.1 shows that only one PHC has been provided for as many as 29 villages, which is poorer than the national average of a PHC on 27.6 villages. This compares poorly in comparison to a state like Kerala that has excellent health infrastructure in the rural areas (one PHC for every one and half village), followed by Tamil Nadu, Haryana, Gujarat, Karnataka, Andhra Pradesh and so on. Lack of primary health facilities forces the vulnerable population to depend on private health services, often leading to indebtedness in rural areas.

Table 6.1: Factors determining Status of Absorption

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

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

Access to safe drinking water and sanitation is another indicator of health status of a population. Provision of safe drinking water (calculated in terms of availability of a tube well, hand pump or tap) reduces the occurence of a number of diseases and, at the same time, ensures effective absorption of food, ultimately leading to improved nutrition. In Uttar Pradesh, around 87.8 per cent of the households in the rural areas have access to safe drinking water. It ranks 3rd among the 17 major states of the country in the provision of safe drinking water facilities. Punjab and West Bengal are the other two states which have better access to safe drinking water.

Sanitation facilities, as reflected here in terms of existence of a toilet facility in the house, are poor in Uttar Pradesh. Only 19 per cent of the households in rural areas have a toilet in their house, which is even below the national average of 22 per cent. Inadequate integration of public interventions in the area of drinking water and sanitation with public health programmes ensure a failure to exploit potential synergies that reinforce health attainments of people.

6.1 Access to Safe Drinking Water

Despite the fact that access to safe drinking water in the state is better, there is a district level variation. Districts like Mahoba do not provide safe drinking water to nearly two-thirds of its households. Similarly,

Map 6.1: Access to Safe Drinking Water in Rural Areas

Proportion of Rural Households having Access to Tube-well, Tap Hand pump (in %)

- 85.90 - 99.23
- 72.57 - 85.90
- 59.240 - 72.57
- 45.90 - 59.24
- 32.57 - 45.90
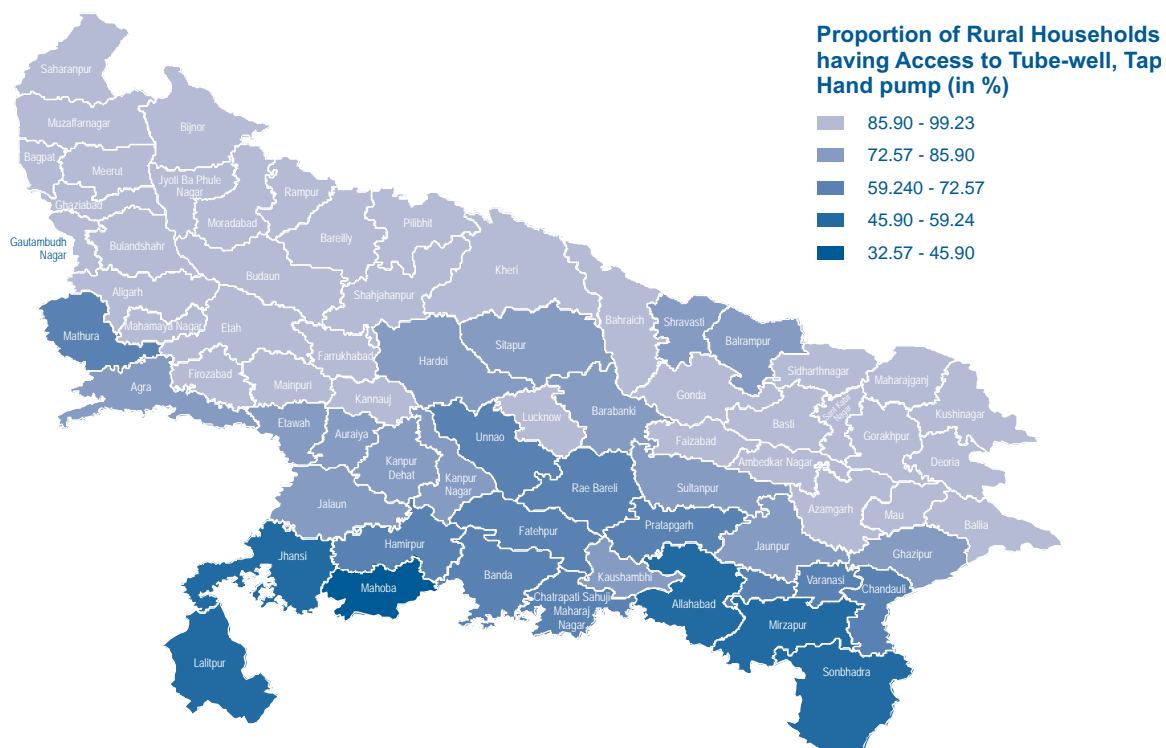
Table 6.2: Access to Safe Drinking Water in Rural Uttar Pradesh (%)

High Districts	% HH Access to safe drinking water	Moderate Districts	% HH Access to safe drinking water	Low Districts	% HH Access to safe drinking water	Very Low Districts	% HH Access to safe drinking water	Extremely Low Districts	% HH Access to safe drinking water
Jyotiba Phule Nagar	99.23	Ghazipur	85.81	Banda	72.38	Mirzapur	57.86	Mahoba	32.57
Rampur	99.20	Agra	85.50	Pratapgarh	72.28	Allahabad	57.80		
Deoria	99.10	Shrawasti	83.39	Hamirpur	72.06	Jhansi	56.32		
Moradabad	98.93	Balrampur	82.31	Rae Bareli	71.87	Sonebhadra	56.04		
Muzaffarnagar	98.93	Kanpur Nagar	81.34	Unnao	71.09	Lalitpur	49.81		
Mahrajganj	98.93	Jalaun	80.56	Mathura	68.51				
Mau	98.72	Etawah	80.34	Chandauli	65.32				
Ambedkar Nagar	98.65	Kaushambi	79.77	Varanasi	65.11				
Azamgarh	98.55	Hardoi	78.11	Fatehpur	62.58				
Kushinagar	98.51	Kanpur Dehat	77.85	Chitrakoot	60.53				
Ghaziabad	98.46	Auraiya	77.59	Sant Ravidas Nagar Bhadohi	59.56				
Bareilly	98.41	Barabanki	76.87						
Meerut	98.26	Sultanpur	76.41						
Gautam Buddha Nagar	98.23	Jaunpur	74.49						
Gorakhpur	98.23	Sitapur	74.45						
Bulandshahar	98.19								
Bijnor	98.12								
Budaun	98.11								
Pilibhit	98.09								
Sant Kabir Nagar	97.97								
Baghpat	97.82								
Saharanpur	97.32								
Basti	97.17								
Siddharthnagar	96.65								
Aligarh	96.52								
Ballia	96.44								
Farrukhabad	95.39								
Gonda	95.14								
Kannauj	95.08								
Hathras	94.95								
Firozabad	94.49								
Kheri	93.63								
Shahjahanpur	93.58								
Mainpuri	92.51								
Etah	92.16								
Bahraich	90.94								
Faizabad	88.19								
Lucknow	86.88								

access to safe drinking water in Lalitpur is less than 50 per cent. Besides, Sonebhadra, Jhansi, Allahabad, Mirzapur, Bhadohi, Chitrakoot, etc. are also stressed in terms of providing safe drinking water to the households. Most of these districts are in the Bundelkhand region. On the other hand, districts like Jyotibaphule Nagar, Rampur, Deoria, Moradabad, Muzaffarnagar, Maharajganj, Mau, Ambedkar Nagar, Azamgarh etc. have high access to safe drinking water (Table 6.2 and Map 6.1). Most of these districts lie in the courses of the rivers Yamuna and Ganga or its tributaries.

6.2 Access to PHC

As discussed earlier, the status of health facilities in the state is poor. Moreover, there is also a regional disparity in access to health services. For instance, 45.4 per cent of the villages of Muzaffarnagar have access to health facilities within 5 km distance whereas at the other extreme, in Lalitpur district there are only 6.7 per cent villages with access to a PHC within a 5 km distance. As is evident from Table 6.3 and Map 6.2, the access to PHC is quite low in most of the districts. Districts in the north western region have relatively better access to health facilities in comparison to the central and southern parts.

Map 6.2: Access to Health Services in Rural Areas
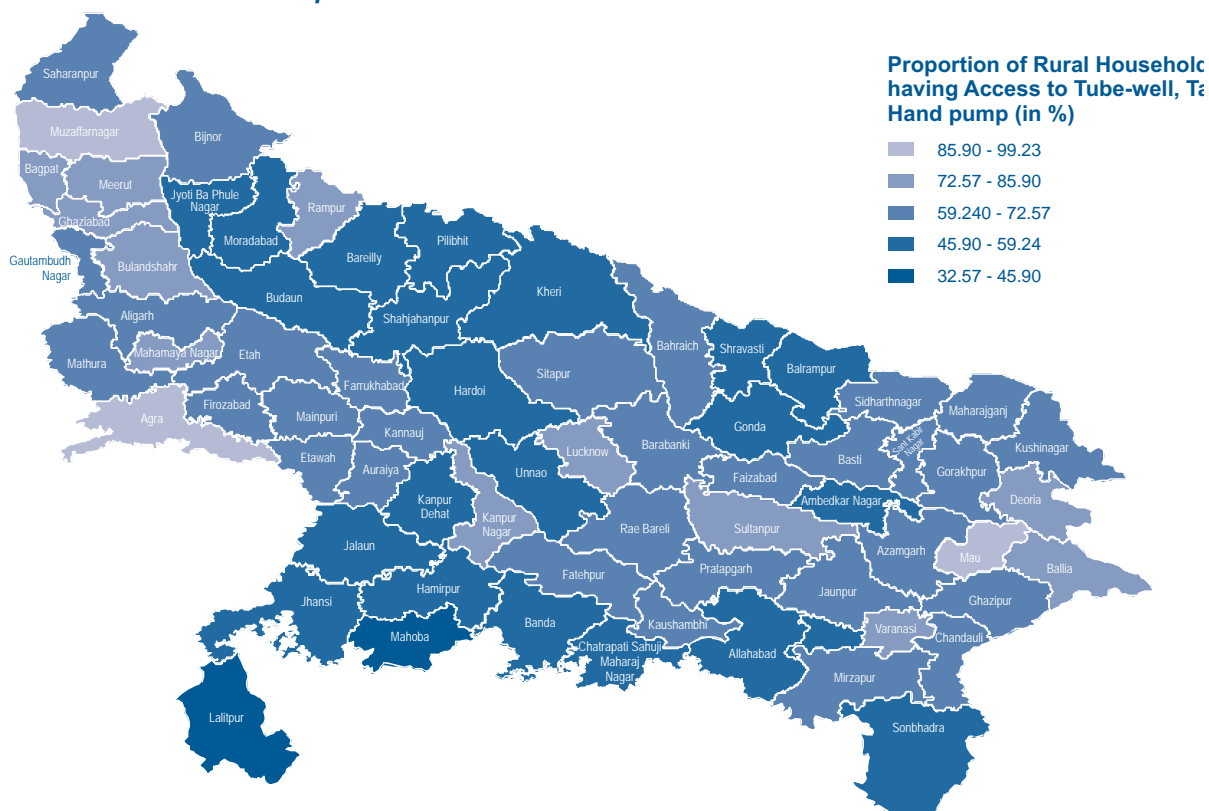
Table 6.3: Percentage of Villages having Access to PHCs within Five km Distance

High		Moderate		Low		Very Low		Extremely Low	
District	PHC Access	District	PHC Access	District	PHC Access	District	PHC Access	District	PHC Access
Muzaffarnagar	45.39	Hathras	36.56	Saharanpur	29.86	Moradabad	22.14		9.25
Agra	38.69	Ballia	36.25	Gautam Buddha Nagar	29.72	Kheri	21.92	Lalitpur	6.72
Mau	37.93	Baghpat	35.82	Ghazipur	29.58	Allahabad	21.87		
		Ghaziabad	35.50	Kushinagar	28.65	Ambedkar Nagar	21.82		
		Kanpur Nagar	32.00	Bijnor	28.09	Bareilly	21.50		
		Deoria	31.79	Gorakhpur	28.04	Shahjahanpur	21.26		
		Meerut	31.74	Rae Bareli	27.70	Jyotiba Phule Nagar	21.07		
		Sultanpur	30.80	Chandauli	27.17	Budaun	20.62		
		Rampur	30.68	Firozabad	27.02	Sant Ravidas Nagar Bhadohi	20.56		
		Lucknow	30.54	Azamgarh	26.53	Gonda	20.16		
		Bulandshahar	30.45	Aligarh	26.45	Kanpur Dehat	20.02		
		Varanasi	30.11	Faizabad	26.22	Chitrakoot	19.12		
				Sitapur	26.16	Shrawasti	18.87		
				Farrukhabad	26.03	Pilibhit	18.67		
				Mathura	25.49	Unnao	18.62		
				Mirzapur	25.39	Jhansi	18.08		
				Barabanki	25.07	Sonebhadra	17.97		
				Sant Kabir Nagar	25.02	Hamirpur	17.27		
				Auraiya	24.87	Balrampur	17.10		
				Siddharthnagar	24.58	Jalaun	16.78		
				Basti	24.40	Banda	15.61		
				Kaushambi	24.14	Hardoi	14.79		
				Mahrajganj	23.92				
				Jaunpur	23.81				
				Bahraich	23.62				
				Fatehpur	23.34				
				Pratapgarh	22.83				
				Mainpuri	22.82				
				Etah	22.44				
				Etawah	22.37				
				Kannauj	22.32				

These two sets of data however should be analysed cautiously. The very existence of a well, tube-well or a tap doesn't imply that they are functioning or if functioning the quality of water is good. Similarly the availability of PHC does not mean that the doctors and other staff visit them regularly. High levels of malnutrition and child deaths from these regions coupled with high incidences of vector diseases are a pointer towards poor drinking water and health facilities in these villages. The secondary data do not reflect them. It therefore calls for an in-depth examination.

6.3 Status of Districts on Absorption Index

Based on the twin indicators of access to safe drinking water and primary health centres, an absorption index has been calculated and has been presented in Tables 6.4 and 6.5. Map 6.3 presents the districts on the basis of the value of the absorption index. The map shows a clear regional pattern of the Food

Table 6.4: Indicators used to Compute Absorption Index

Districts	Access to Safe Drinking Water		Access to PHC		Absorption Index	
	Value	Rank	Value	Rank	Value	Rank
Agra	85.50	40	38.69	2	0.694	13
Aligarh	96.52	25	26.45	26	0.662	18
Allahabad	57.80	66	21.87	49	0.383	65
Ambedkar Nagar	98.65	8	21.82	50	0.638	26
Auraiya	77.59	49	24.87	34	0.531	44
Azamgarh	98.55	9	26.53	25	0.676	17
Baghpat	97.82	21	35.82	6	0.747	4
Bahraich	90.94	36	23.62	40	0.604	38
Ballia	96.44	26	36.25	5	0.742	5
Balrampur	82.31	42	17.10	65	0.497	51
Banda	72.38	54	15.61	67	0.423	62
Barabanki	76.87	50	25.07	32	0.528	45
Bareilly	98.41	12	21.50	51	0.633	29
Basti	97.17	23	24.40	36	0.650	23
Bijnor	98.12	17	28.09	20	0.686	16
Budaun	98.11	18	20.62	54	0.624	30
Bulandshahar	98.19	16	30.45	14	0.705	10
Chandauli	65.32	60	27.17	23	0.473	57
Chitrakoot	60.53	63	19.12	58	0.377	66
Deoria	99.10	3	31.79	9	0.722	7

(Continued...)

Districts	Access to Safe Drinking Water		Access to PHC		Absorption Index	
	Value	Rank	Value	Rank	Value	Rank
Etah	92.16	35	22.44	44	0.602	39
Etawah	80.34	45	22.37	45	0.528	46
Faizabad	88.19	37	26.22	27	0.608	35
Farrukhabad	95.39	27	26.03	29	0.652	22
Fatehpur	62.58	62	23.34	41	0.425	61
Firozabad	94.49	31	27.02	24	0.654	21
Gautam Buddha Nagar	98.23	14	29.72	17	0.700	11
Ghaziabad	98.46	11	35.50	7	0.749	3
Ghazipur	85.81	39	29.58	18	0.621	31
Gonda	95.14	28	20.16	56	0.602	40
Gorakhpur	98.23	15	28.04	21	0.686	15
Hamirpur	72.06	56	17.27	64	0.434	60
Hardoi	78.11	47	14.79	68	0.452	58
Hathras	94.95	30	36.56	4	0.735	6
Jalaun	80.56	44	16.78	66	0.483	54
Jaunpur	74.49	52	23.81	39	0.503	50
Jhansi	56.32	67	18.08	62	0.342	67
Jyotiba Phule Nagar	99.23	1	21.07	53	0.635	28
Kannauj	95.08	29	22.32	46	0.619	32
Kanpur Dehat	77.85	48	20.02	57	0.493	53
Kanpur Nagar	81.34	43	32.00	8	0.613	33
Kaushambi	79.77	46	24.14	37	0.539	43
Kheri	93.63	32	21.92	48	0.607	37
Kushinagar	98.51	10	28.65	19	0.693	14
Lalitpur	49.81	69	6.72	70	0.209	69
Lucknow	86.88	38	30.54	13	0.636	27
Mahoba	32.57	70	9.25	69	0.122	70
Mahrajganj	98.93	6	23.92	38	0.657	20
Mainpuri	92.51	34	22.82	43	0.607	36
Mathura	68.51	59	25.49	30	0.479	56
Mau	98.72	7	37.93	3	0.770	2
Meerut	98.26	13	31.74	10	0.716	8
Mirzapur	57.86	65	25.39	31	0.412	63
Moradabad	98.93	4	22.14	47	0.642	25

(Continued...)

Districts	Access to Safe Drinking Water		Access to PHC		Absorption Index	
	Value	Rank	Value	Rank	Value	Rank
Muzaffarnagar	98.93	5	45.39	1	0.833	1
Pilibhit	98.09	19	18.67	60	0.608	34
Pratapgarh	72.28	55	22.83	42	0.481	55
Rae Bareli	71.87	57	27.70	22	0.519	48
Rampur	99.20	2	30.68	12	0.714	9
Saharanpur	97.32	22	29.86	16	0.695	12
Sant Kabir Nagar	97.97	20	25.02	33	0.660	19
Sant Ravidas Nagar Bhadohi	59.56	64	20.56	55	0.383	64
Shahjahanpur	93.58	33	21.26	52	0.601	41
Shrawasti	83.39	41	18.87	59	0.518	49
Siddharthnagar	96.65	24	24.58	35	0.648	24
Sitapur	74.45	53	26.16	28	0.522	47
Sonebhadra	56.04	68	17.97	63	0.340	68
Sultanpur	76.41	51	30.80	11	0.572	42
Unnao	71.09	58	18.62	61	0.439	59
Varanasi	65.11	61	30.11	15	0.496	52
Total	85.46		25.10		0.582	

Map 6.3: Food Absorption Map of Rural Uttar Pradesh
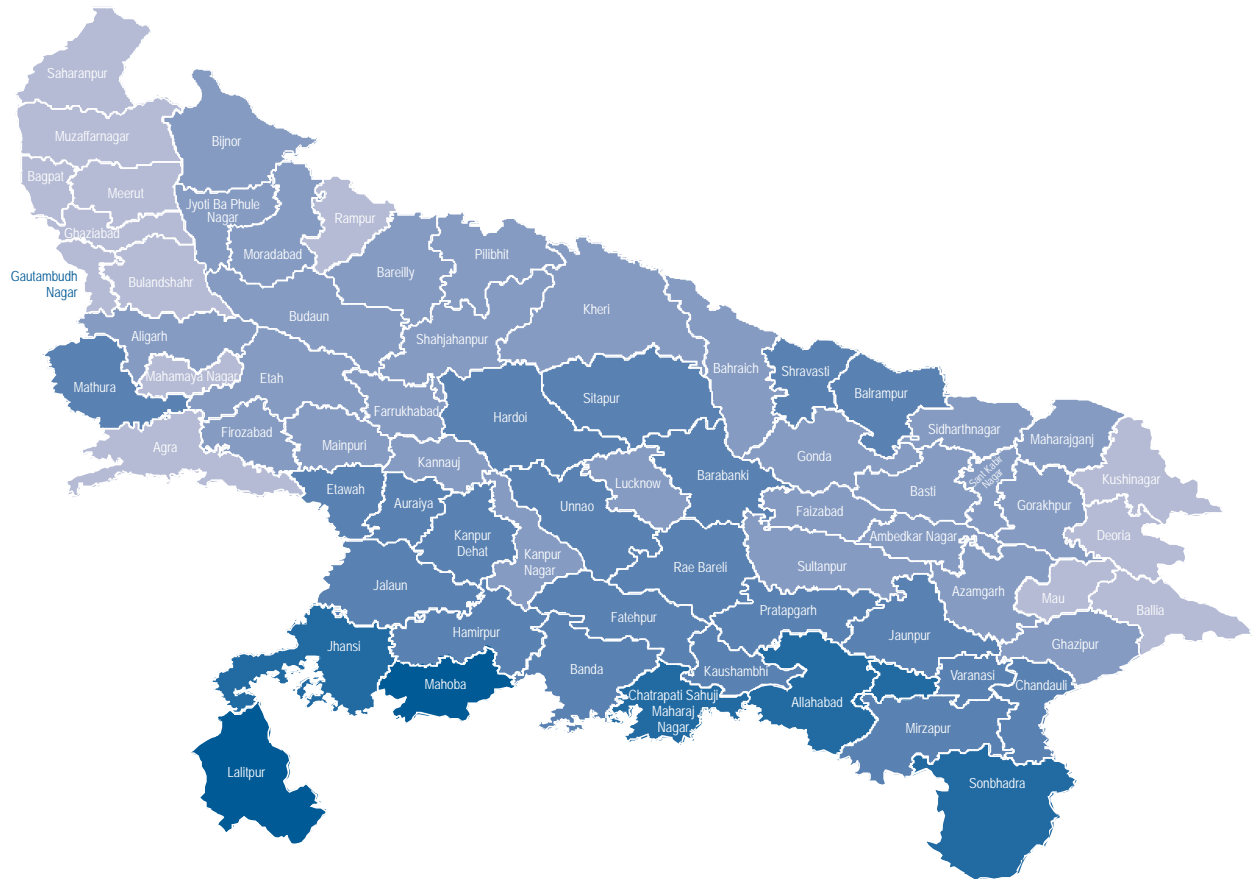
Absorption Index

- Secure [0.690 - 0.833]
- Moderately Secure [0.548 - 0.690]
- Moderately Insecure [0.406 - 0.548]
- Severely Insecure [0.264 - 0.406]
- Extremely Insecure [0.122 - 0.264]

Table 6.5: Status of Districts on Absorption Index

Secure	Index Value	Moderately Secure	Index Value	Moderately Insecure	Index Value	Severely Insecure	Index Value	Extremely Insecure	Index Value
Muzaffar nagar	0.833	Gorakhpur	0.686	Kaushambi	0.539	Sant Ravidas Nagar Bhadohi	0.383	Lalitpur	0.209
Mau	0.770	Bijnor	0.686	Auraiya	0.531	Allahabad	0.383	Mahoba	0.122
Ghaziabad	0.749	Azamgarh	0.676	Barabanki	0.528	Chitrakoot	0.377		
Baghpat	0.747	Aligarh	0.662	Etawah	0.528	Jhansi	0.342		
Ballia	0.742	Sant Kabir Nagar	0.660	Sitapur	0.522	Sonebhadra	0.340		
Hathras	0.735	Mahrajganj	0.657	Rae Bareli	0.519				
Deoria	0.722	Firozabad	0.654	Shrawasti	0.518				
Meerut	0.716	Farrukhabad	0.652	Jaunpur	0.503				
Rampur	0.714	Basti	0.650	Balrampur	0.497				
Bulandshahar	0.705	Siddharthnagar	0.648	Varanasi	0.496				
Gautam Buddha Nagar	0.700	Moradabad	0.642	Kanpur Dehat	0.493				
Saharanpur	0.695	Ambedkar Nagar	0.638	Jalaun	0.483				
Agra	0.694	Lucknow	0.636	Pratapgarh	0.481				
Kushinagar	0.693	Jyotiba Phule Nagar	0.635	Mathura	0.479				
		Bareilly	0.633	Chandauli	0.473				
		Budaun	0.624	Hardoi	0.452				
		Ghazipur	0.621	Unnao	0.439				
		Kannauj	0.619	Hamirpur	0.434				
		Kanpur Nagar	0.613	Fatehpur	0.425				
		Pilibhit	0.608	Banda	0.423				
		Faizabad	0.608	Mirzapur	0.412				
		Mainpuri	0.607						
		Kheri	0.607						
		Bahraich	0.604						
		Etah	0.602						
		Gonda	0.602						
		Shahjahanpur	0.601						
		Sultanpur	0.572						

Absorption index. The southern region is insecure whereas the western and north eastern region are relatively secure in terms of the food absorption index. Districts of the western region like Muzaffarnagar, Ghaziabad, Baghpat, Meerut, Rampur, Bulandshahar, Gautam Buddha Nagar and Saharanpur are secure, while the districts of the southern part (Sant Ravidas Nagar, Allahabad and Sonebhadra), Bundelkhand region (Lalitpur, Jhansi, Chitrakoot and Mahoba) are severely insecure and extremely insecure in terms of absorption of food. Out of 70 districts, 28 districts show moderately, severely and extremely insecure status in absorption of food index (Table 6.4 and Map 6.3).

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7. Addressing Food Insecurity in Uttar Pradesh

Chapter 3 developed an index to show the ranks of districts by outcomes of food insecurity. The next step was to look at factors that contribute to making these districts so prone to food insecurity. These factors were analysed in terms of the Availability, Access and Absorption framework in Chapters 4 to 6. In this chapter, all these factors are taken together to explain food security across districts and are combined to form a single index, called the Food Security Index (FSI). Map 7.1 shows districts by their rank on the FSI and Table 7.2 gives the corresponding figures. The critical question is: is there an overlap between the ranks of districts on the food security outcome index and the ranks on the food security index? In other words, do the districts that have poor outcomes also have low availability, access and absorption? If indeed there is an overlap, and we show that there is, it means that the factors or indicators that are included in the composite FSI do, indeed, contribute to food insecurity, and any strategy to improve the food security status must address them.

7.1 Food Security Index (FSI)

In this section, we bring together all the selected indicators to explain food insecurity. The indicators hitherto clubbed into three sets – availability, access and absorption – have now been clubbed together into one index, called the Food Security Index (FSI) to show the combined effect of all the indicators. Further, comparison with the individual sets of indices would reveal their relative significance in the overall FSI.

Table 7.2 and Map 7.1 presents the status of the districts in terms of the Food Security Index (FSI). Ranking of the districts of Uttar Pradesh on the basis of all the 12 indicators reveal that *Ghaziabad, Baghpat, Meerut, Muzaffarnagar, Gautam Buddha Nagar, Bulandshahar, Saharanpur, Hathras, Aligarh and Firozabad* are the food secure districts of the state. About 18 districts were found to be moderately secure, 14 districts are severely insecure and 2 Mahoba and Sonebhadra extremely insecure. Sonebhadra, which is a fairly urbanised district due to power generation plants, is moderately insecure in outcome and extremely insecure in food absorption, food availability and access to food indices. This is a reflection of the rural-urban inequalities as well.

Map 7.1 presents the geography of food security in the state. Out of the four NSS regions in the state, only the Western region seems to be relatively secure in terms of food security. All the remaining three regions namely the central, Bundelkhand and eastern regions are by and large insecure. Districts in the Bundelkhand region in particular, are among the worst performer in the food security index.

If we compare the classification of districts by the output and input approaches as given in Table 3.3 and Table 7.2, two points attract immediate attention. The two least secure categories, i.e. extremely insecure and severely insecure, which demand urgent attention comprises of 16 districts (2 EIS + 14 SIS) according to the input method as against 19 districts (1 EIS + 18 SIS) according to the output approach. Secondly, out of the 16 districts of the two most insecure categories of FSI, only seven districts appear in the two least secure categories of the output approach. All the remaining districts are in the moderately insecure categories of FSOI.

**Table 7.1: Index Value and Ranks of Districts on Composite
Food Security Index (FSI) and its Components**

Districts	Availability Index		Access Index		Absorption Index		Food Security Index		Food Security Outcome Index	
	Index Value	Rank	Index Value	Rank	Index Value	Rank	Index Value	Rank	Index Value	Rank
Agra	0.606	14	0.501	16	0.694	13	0.564	11	0.721	4
Aligarh	0.635	10	0.506	13	0.662	18	0.569	9	0.450	64
Allahabad	0.462	41	0.426	46	0.383	65	0.428	54	0.573	31
Ambedkar Nagar	0.456	46	0.425	49	0.638	26	0.472	38	0.651	13
Auraiya	0.489	33	0.519	8	0.531	44	0.513	24	0.473	59
Azamgarh	0.494	32	0.435	38	0.676	17	0.495	29	0.607	21
Baghpat	0.712	3	0.555	3	0.747	4	0.633	2	0.556	34
Bahraich	0.281	67	0.393	61	0.604	38	0.401	62	0.530	42
Ballia	0.461	42	0.411	55	0.742	5	0.485	35	0.731	3
Balrampur	0.283	66	0.378	63	0.497	51	0.373	67	0.419	66
Banda	0.288	65	0.402	58	0.423	62	0.375	66	0.524	43
Barabanki	0.478	38	0.439	35	0.528	45	0.466	41	0.520	44
Bareilly	0.543	19	0.447	29	0.633	29	0.507	26	0.611	18
Basti	0.506	30	0.441	32	0.650	23	0.497	28	0.571	32
Bijnor	0.641	8	0.476	21	0.686	16	0.559	13	0.697	6
Budaun	0.517	27	0.431	43	0.624	30	0.490	33	0.499	51
Bulandshahar	0.624	11	0.534	6	0.705	10	0.590	6	0.303	70
Chandauli	0.535	22	0.419	52	0.473	57	0.461	43	0.675	10
Chitrakoot	0.194	69	0.449	28	0.377	66	0.366	68	0.495	52
Deoria	0.455	48	0.432	41	0.722	7	0.491	31	0.629	15
Etah	0.577	15	0.474	23	0.602	39	0.526	18	0.503	49
Etawah	0.547	18	0.513	11	0.528	46	0.525	19	0.631	14
Faizabad	0.501	31	0.431	42	0.608	35	0.482	36	0.609	20
Farrukhabad	0.534	23	0.518	9	0.652	22	0.547	14	0.413	67
Fatehpur	0.371	59	0.437	36	0.425	61	0.417	58	0.481	56
Firozabad	0.618	12	0.514	10	0.654	21	0.568	10	0.604	23
Gautam Buddha Nagar	0.569	16	0.567	2	0.700	11	0.592	5	0.785	1
Ghaziabad	0.678	4	0.576	1	0.749	3	0.635	1	0.656	11
Ghazipur	0.432	52	0.433	40	0.621	31	0.467	40	0.703	5
Gonda	0.356	62	0.414	54	0.602	40	0.433	53	0.601	25
Gorakhpur	0.438	50	0.376	64	0.686	15	0.449	47	0.678	9
Hamirpur	0.368	60	0.416	53	0.434	60	0.406	60	0.510	46
Hardoi	0.486	34	0.436	37	0.452	58	0.452	45	0.489	53
Hathras	0.647	7	0.483	20	0.735	6	0.574	8	0.441	65

(Continued....)

Districts	Availability Index		Access Index		Absorption Index		Food Security Index		Food Security Outcome Index	
	Index Value	Rank	Index Value	Rank	Index Value	Rank	Index Value	Rank	Index Value	Rank
Jalaun	0.384	57	0.441	31	0.483	54	0.433	52	0.606	22
Jaunpur	0.483	35	0.467	25	0.503	50	0.478	37	0.579	28
Jhansi	0.422	54	0.447	30	0.342	67	0.421	57	0.542	36
Jyotiba Phule Nagar	0.389	56	0.492	19	0.635	28	0.490	32	0.535	39
Kannauj	0.480	36	0.531	7	0.619	32	0.533	15	0.610	19
Kanpur Dehat	0.455	47	0.503	15	0.493	53	0.488	34	0.480	57
Kanpur Nagar	0.507	29	0.493	18	0.613	33	0.519	23	0.580	27
Kaushambi	0.457	45	0.336	69	0.539	43	0.406	61	0.460	61
Kheri	0.461	43	0.425	48	0.607	37	0.468	39	0.461	60
Kushinagar	0.460	44	0.349	67	0.693	14	0.442	49	0.654	12
Lalitpur	0.405	55	0.440	33	0.209	69	0.388	64	0.411	69
Lucknow	0.529	26	0.440	34	0.636	27	0.500	27	0.623	17
Mahoba	0.317	64	0.409	56	0.122	70	0.332	69	0.479	58
Mahrajganj	0.479	37	0.343	68	0.657	20	0.437	50	0.531	41
Mainpuri	0.569	17	0.540	5	0.607	36	0.560	12	0.412	68
Mathura	0.676	5	0.475	22	0.479	56	0.530	16	0.625	16
Mau	0.532	24	0.433	39	0.770	2	0.521	20	0.769	2
Meerut	0.738	2	0.550	4	0.716	8	0.632	3	0.539	38
Mirzapur	0.378	58	0.394	60	0.412	63	0.393	63	0.533	40
Moradabad	0.539	21	0.468	24	0.642	25	0.519	22	0.518	45
Muzaffarnagar	0.751	1	0.505	14	0.833	1	0.631	4	0.576	29
Pilibhit	0.639	9	0.431	45	0.608	34	0.520	21	0.456	62
Pratapgarh	0.475	39	0.402	57	0.481	55	0.437	51	0.595	26
Rae Bareli	0.429	53	0.387	62	0.519	48	0.423	56	0.507	47
Rampur	0.617	13	0.425	47	0.714	9	0.530	17	0.602	24
Saharanpur	0.658	6	0.494	17	0.695	12	0.575	7	0.692	7
Sant Kabir Nagar	0.462	40	0.375	65	0.660	19	0.451	46	0.545	35
Sant Ravidas Nagar Bhadohi	0.510	28	0.463	26	0.383	64	0.462	42	0.540	37
Shahjahanpur	0.542	20	0.431	44	0.601	41	0.492	30	0.507	48
Shrawasti	0.253	68	0.399	59	0.518	49	0.381	65	0.500	50
Siddharthnagar	0.322	63	0.372	66	0.648	24	0.408	59	0.488	54
Sitapur	0.362	61	0.421	51	0.522	47	0.423	55	0.486	55
Sonbhadra	0.186	70	0.314	70	0.340	68	0.284	70	0.576	30
Sultanpur	0.443	49	0.424	50	0.572	42	0.456	44	0.566	33
Unnao	0.438	51	0.457	27	0.439	59	0.449	48	0.450	63
Varanasi	0.530	25	0.511	12	0.496	52	0.513	25	0.691	8

Map 7.1: Food Security Map of Rural Uttar Pradesh

Food Security Index

- Secure [0.565 - 0.635]
- Moderately Secure [0.495 - 0.565]
- Moderately Insecure [0.424 - 0.495]
- Severely Insecure [0.354 - 0.424]
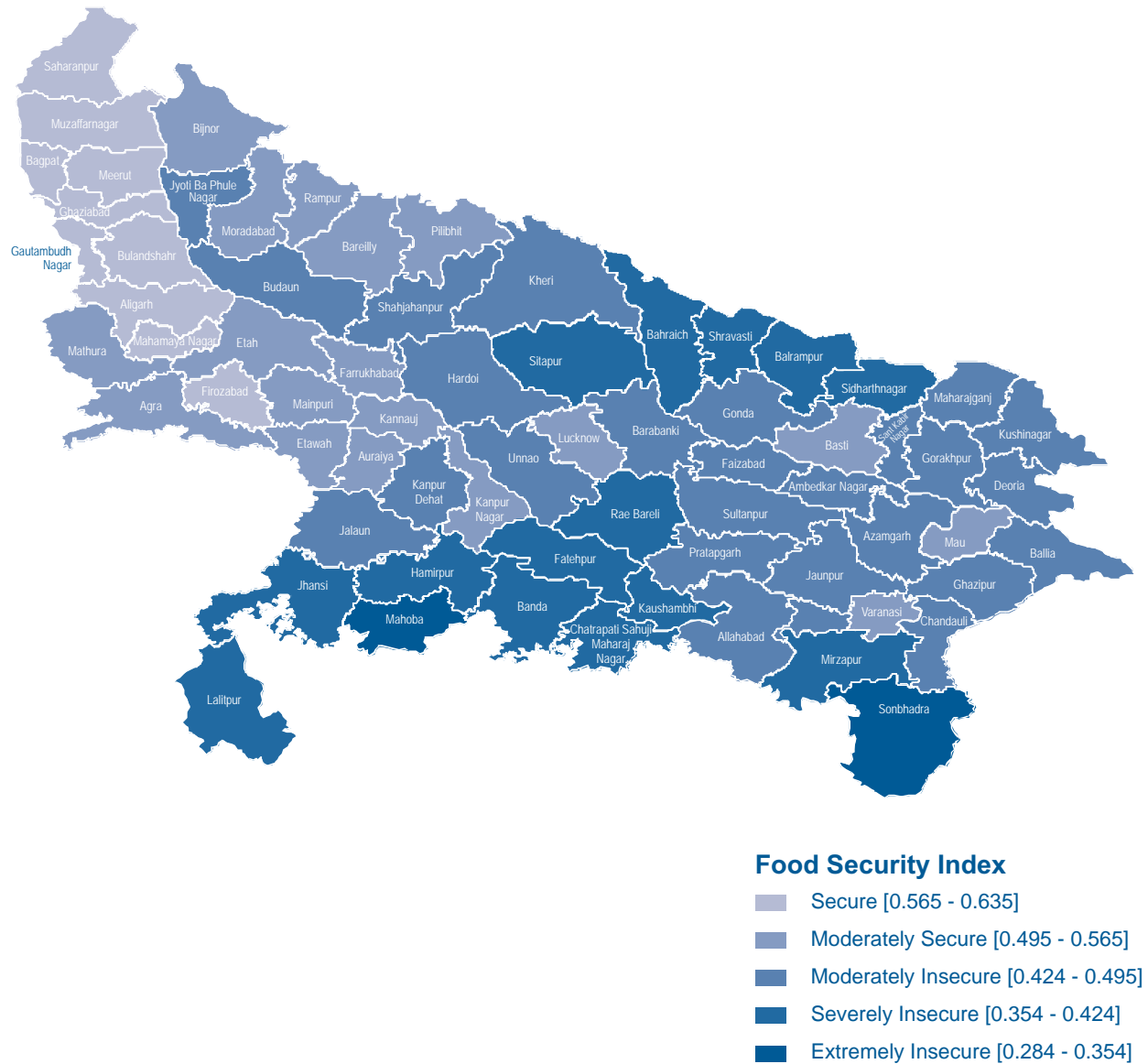- Extremely Insecure [0.284 - 0.354]

Table 7.2: Status of Districts on Food Security Index

Secure	Index Value	Moderately Secure	Index Value	Moderately Insecure	Index Value	Severely Insecure	Index Value	Extremely Insecure	Index Value
Ghaziabad	0.635	Agra	0.564	Azamgarh	0.495	Sitapur	0.423	Mahoba	0.332
Baghpat	0.633	Mainpuri	0.560	Shahjahanpur	0.492	Rae Bareli	0.423	Sonbhadra	0.284
Meerut	0.632	Bijnor	0.559	Deoria	0.491	Jhansi	0.421		
Muzaffarnagar	0.631	Farrukhabad	0.547	Jyotiba Phule Nagar	0.490	Fatehpur	0.417		
Gautam Buddha Nagar	0.592	Kannauj	0.533	Budaun	0.490	Siddharthnagar	0.408		
Bulandshahar	0.590	Mathura	0.530	Kanpur Dehat	0.488	Hamirpur	0.406		
Saharanpur	0.575	Rampur	0.530	Ballia	0.485	Kaushambi	0.406		
Hathras	0.574	Etah	0.526	Faizabad	0.482	Bahraich	0.401		
Aligarh	0.569	Etawah	0.525	Jaunpur	0.478	Mirzapur	0.393		
Firozabad	0.568	Mau	0.521	Ambedkar Nagar	0.472	Lalitpur	0.388		
		Pilibhit	0.520	Kheri	0.468	Shrawasti	0.381		
		Moradabad	0.519	Ghazipur	0.467	Banda	0.375		
		Kanpur Nagar	0.519	Barabanki	0.466	Balrampur	0.373		
		Auraiya	0.513	Sant Ravidas Nagar Bhadohi	0.462	Chitrakoot	0.366		
		Varanasi	0.513	Chandauli	0.461				
		Bareilly	0.507	Sultanpur	0.456				
		Lucknow	0.500	Hardoi	0.452				
		Basti	0.497	Sant Kabir Nagar	0.451				
				Gorakhpur	0.449				
				Unnao	0.449				
				Kushinagar	0.442				
				Mahrajganj	0.437				
				Pratapgarh	0.437				
				Jalaun	0.433				
				Gonda	0.433				
				Allahabad	0.428				

Table 7.3: Status of Priority Districts on FSI and FSOI

Districts	FSI Rank	FSO Rank	Criteria	Region	Districts	FSI Rank	FSO Rank	Criteria	Region
Fatehpur	58	56	By Both	Central	Chitrakoot	68	52	By Both	Southern
Sitapur	55	55	By Both	Central	Lalitpur	64	69	By Both	Southern
Rae Bareli	56	47	By FSI	Central	Mahoba	69	41	By FSI	Southern
Unnao	48	63	By FSO	Central	Banda	66	43	By FSI	Southern
Hardoi	45	53	By FSO	Central	Hamirpur	60	46	By FSI	Southern
Kheri	39	60	By FSO	Central	Jhansi	57	36	By FSI	Southern
Kanpur Dehat	34	57	By FSO	Central	Auraiya	24	59	By FSO	Western
Balrampur	67	66	By Both	Eastern	Pilibhit	21	62	By FSO	Western
Kaushambi	61	61	By Both	Eastern	Farrukhabad	14	67	By FSO	Western
Siddharthnagar	59	54	By Both	Eastern	Mainpuri	12	68	By FSO	Western
Sonbhadra	70	30	By FSI	Eastern	Aligarh	9	64	By FSO	Western
Shrawasti	65	50	By FSI	Eastern	Hathras	8	65	By FSO	Western
Mirzapur	63	40	By FSI	Eastern	Bulandshahar	6	70	By FSO	Western
Bahraich	62	42	By FSI	Eastern					

7.2 Identifying Priority Districts (28 Districts)

After categorising districts by both Food Secure Index (FSI) and Food Secure Outcome Index (FSOI) and identifying districts which are insecure, one can now prepare a list of districts from the state as a whole which require priority attention and interventions to reduce and mitigate food insecurity.

The districts in the two lowest categories, that is, extremely and severely food insecure, should be prioritised for development interventions for enhancing food security. On the basis of this, we have used three criteria to select priority districts in the state. Firstly, districts which are common in the last two categories of insecurity in both FSI and FSOI have been selected. Secondly, the remaining districts which are in the last two categories of insecurity in only FSI, and thirdly the remaining districts of the lowest two categories of FSO have been selected to identify priority districts.

On the basis of these three criteria, we have selected 28 districts from all over the state which are in need of priority interventions. Table 7.3 presents the list of these 28 districts together with their FSI and FSO ranks, criteria of selection and the NSS region in which they fall. Out of the 28 selected priority districts, seven have been selected on the basis of both, nine only on the basis of FSI and 12 only on the basis of FSO.

If one sees the distribution of the priority districts by NSS regions, there are eight priority districts in the eastern region of Uttar Pradesh, seven each in the central and western regions and six in the southern region of the state.

7.3 Strategies for Promoting Food Security

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

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

7.3.1 Enhancing Availability

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

The low to middle levels of irrigation show that there could be scope for increase in irrigated area. Of course, this would be location specific and depend on the topography. But even small areas of irrigated

Fig 7.1: Allocation Proposed under NFSM
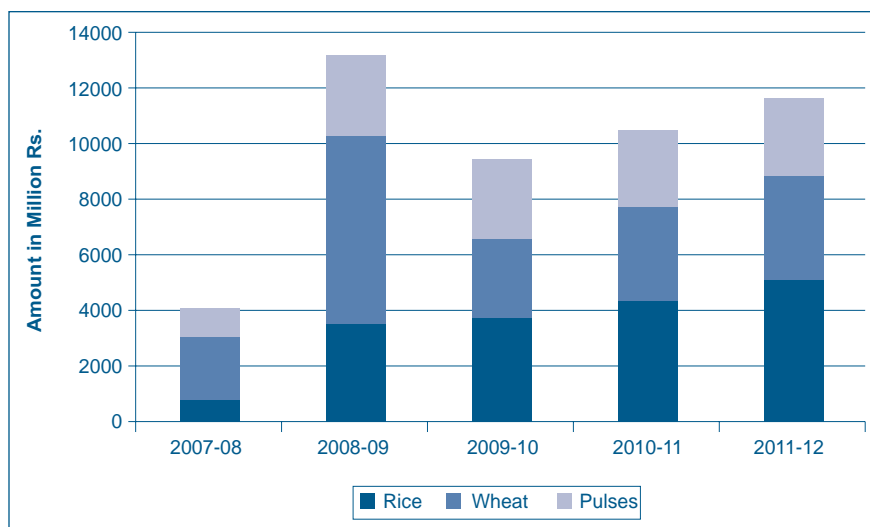
Source: Economic Survey, 2007-08

rice land have been seen to have substantial effects on food security and on making the transition from subsistence to accumulation.

Increasing Food Production: The National Food Security Mission

The dismal rate of growth in the agricultural sector in the country has been a cause for concern – the sector grew at a meagre rate of 1.8 per cent per annum during the 1990s. This coupled with rising international prices as well as wheat imports, have brought into question the food security of the country. With a view to increase 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

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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" was formulated and approved by the Government of India. The policy, among other things, aims to improve the economic viability of farming by substantially improving the net income of farmers in addition to improving productivity, profitability, land, water and support services and providing appropriate price policy, risk management measures.

The 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 maximising yield and income per unit of water to be adopted in all crop production programmes, with stress on awareness and efficiency of water use.

d.   Use of Technology: New technologies, which can help enhance productivity per unit of land and water, are needed: Biotechnology, information and communication technology (ICT), renewable energy technology, space applications and 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 galvanised 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 operationalise the implementation of the policy.

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estimated outlay of over Rs. 50 billion (Figure 7.1). The programme specifically aims at increasing the production and productivity of three crops – rice, wheat and pulses. Ongoing related schemes like Integrated Cereal Development Programme (ICDP Rice/Wheat) and Integrated Scheme on Pulses, Oilseeds and Maize (ISOPOM Pulse) would cease to operate in the identified districts once the relevant component of NFSM comes into execution in respective districts.

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

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

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

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

Two points may be noted about this Mission. Firstly, it aims at enhancing food production, which results in increased availability of food crops. In the approach to food security in this Report, food security of individuals is dependent on three dimensions, namely availability, access and body-absorption of food. No doubt, as argued by us earlier, availability of food is of prime importance, but access to food is almost equally important. Therefore, the mission objective forms only one component of food security.

Secondly, the districts which are chosen for implementing the scheme are not based on adequacy or inadequacy of food available there, but on the basis of their production potential in the three specified crops. Efforts will be made to enhance farm productivity through extension of improved technologies and enhancing capacity of farmers to use these technologies in these districts. This is essentially an outcome of the primary objective of the Mission, which is to raise production of three food crops.

The districts which have been earmarked for enhancing production of the three crops in Uttar Pradesh are listed in Table 7.4. The 16 least food secure districts are in bold font. It may be observed that in the case of 26 NFSM Rice districts, 10 belong to the least food secure districts. In case of 38 NFSM-wheat districts, 15 are from the least food secure category while in case of pulses, the number of such districts is 12 out of 19. This confirms that whereas the Mission will help to raise food security in the state, it will serve the cause of raising food security in the most food insecure areas only to a limited extent.

> **Box 7.2: Uttar Pradesh Agricultural Policy**
>
> Uttar Pradesh government had endorsed a new Agriculture Policy to deal with the 'onslaught' of the World Trade Organisation (WTO) regime under previous regime. Under the new policy, crops would have been diversified and better quality control to deal with international competition in the light of the WTO regime would have been ensured. It would also find out ways for better marketing of agricultural produce to help farmers compete in the global agro market. Cutting of production costs was also be stressed in order to increase the income of the farmers. Farmers could grow flowers or other cash crop besides the regular produce, to generate more income and experience the new dimension of agriculture. However, farmers of the state resisted this policy and the government had to withdraw it.

The NFSM does not deal with the issues of increasing food and agricultural production in the two major food insecure regions of UP, eastern UP and Bundelkhand. There is a major difference between western and eastern Uttar Pradesh, both in terms of production and resultant food security. Eastern UP was under the permanent settlement of British India. Their experiences after the abolition of *Zamindari* in the 1950s have been quite different. While western UP became one of the early Green Revolution regions (after Punjab and Haryana), eastern UP considerably lagged behind the West. In eastern UP, as pointed out by the Planning Commission's Study Team report on Agricultural Stagnation in eastern India, large areas of land continued to remain in the hands of non-cultivating castes. The correspondingly high level of concealed and insecure tenancy inhibited private investment in land improvement (such as tube wells) and restricted the growth of production. This has begun to change, but the legacy of concealed tenancy still remains. Consequently, in order to increase agricultural production in eastern UP, it is necessary to deal with providing security to tenants. This is in addition to the problems of landless labourers, which is common across UP as a whole.

In the other food insecure region of UP, the Bundelkhand plateau, the problems of increasing agricultural production are somewhat different. In Bundelkhand, irrigation is low and agricultural production is mainly of the rainfed variety. The NFSM unfortunately does not deal with matters of increasing production in rainfed areas.

In the Bundelkhand region, there is a need to increase the extent of irrigation and moisture retention, through methods appropriate to hills and a plateau with low and variable rainfall. Further, there is also a need to promote less water-using crops, unlike cereals, which generally require more water. Within the less water-using crops, there is a need to search for and promote higher value crops, so that farmers' incomes could increase.

Table 7.4: NFSM Districts in Uttar Pradesh

Rice (26)	Wheat (38)	Pulse (19 Districts)
Azamgarh	Allahabad	Badaun
Badaun	Ambedkar Nagar	**Bahraich**
Bahraich	Azamgarh	**Balarampur**
Ballia	**Bahraich**	Ballia
Balrampur	Ballia	**Banda**
Banda	**Balrampur**	Barabanki
Bareilly	Barelly	Chandauli
Basti	Basti	**Chitrakoot**
Deoria	Chandauli	**Fatehpur**
Fatehpur	**Chitrakoot**	**Hamirpur**
Ghazipur	Deoria	Jalaun
Gonda	Faizabad	**Jhansi**
Gorakhpur	**Fatehpur**	Kanpur (dehat)
Hardoi	Gazipur	**Kaushambi**
Mainpuri	Gonda	Kheri
Mau	Gorakhpur	**Lalitpur**
Mirzapur	**Hamirpur**	**Mahoba**
Raebareli	Hardoi	**Mirzapur**
Rampur	Jaunpur	**Sitapur**
Saharanpur	**Jhansi**	
Shravasti	Kaushambi	
Siddharthnagar	Lalitpur	
Sitapur	Lucknow	
Sonbhadra	Maharajganj	
Sultanpur	**Mahoba**	
Unnao	Mau	
	Mirzapur	
	Pratapgarh	
	Rae Bareli	
	Ravidasnagar	
	Santkabir Nagar	
	Shravasti	
	Siddharthnagar	
	Sitapur	
	Sonbhadra	
	Sultanpur	
	Unnao	
	Varanasi	

In Uttar Pradesh, the National Horticulture Mission has been launched in 26 districts of the state. Presently, it is estimated that horticulture and sugarcane contribute 18.3 per cent each to agricultural income in the state. Studies show that one hectare of land under horticulture creates 863 man days of employment while it is only 160 man days in case of cereals. Production of vegetables in UP increased from 9.6 million tonnes in 1991-92 to 13.5 million tonnes in 1998-99. Uttar Pradesh is the second largest producer of vegetables in the country after West Bengal. Significant increase in area under vegetables has been recorded on small and marginal farms. Studies have revealed that small and marginal farmers were diversifying a part of their land to extra short duration crops like vegetables to augment and stabilise their income over seasons. Further, vegetable production engages more labour from vulnerable population groups such as women. It is also beneficial to soil health and utilises water more efficiently in terms of both production and economic efficiency. In eastern Uttar Pradesh and central Uttar Pradesh, there is tremendous scope to increase vegetable and fruit production, as in several districts, upto 90 per cent of farmers are small and marginal farmers and 70-75 per cent holdings are of one acre or less. The Potato Agri-Export Zone at Agra, Mango Agri-Export Zone at Lucknow and Saharanpur and a Vegetable Agri-Export Zone at Lucknow have already been set up in the State.

Improving Infrastructure: Rural Roads

The road infrastructure is essential not only for facilitating movement of goods and people among important urban centres where production activities are concentrated, but for providing arterial connection among all geographical areas as well. Without such arterial infrastructure, it is not possible to integrate the relatively prosperous urban areas with the economically backward rural areas. 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 percent) which remain unconnected. Other forms of rural infrastructure are also important as they help in widening the opportunities and choice of alternatives. Research into rural road investments suggests that the construction of a new road in a village raised the per capita income of households by 30 per cent over a half-decade period, after controlling for factors like household size and education (Deolalikar, 2001).

Pradhan Mantri Gram Sadak Yojana

Under the *Pradhan Mantri Gram Sadak Yojana*, projects for construction and upgradation of 21,228 km of roads with estimated cost of Rs. 29.16 billion covering 9,564 habitations have been approved by Government of India. Rs.21.94 billion have been released to the State against cumulative allocation of Rs.19.45 billion. Construction/upgradation of 13,441 km of roads has been completed. Connectivity has been provided to 5611 habitations.

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

1. Use of chemical fertilisers and HYV seeds have 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 have been observed.

3. The farmers get higher price for their products due to better access to wholesale market.

4. There has been substantial increase in the dairy and poultry production in those villages with close proximity to the newly constructed roads.

5. There has been substantial increase in the employment opportunities, both in the agricultural and non-agricultural sectors in the villages located close to the roads constructed under PMGSY.

6. Substantial achievements have also been made on the health front. Frequency of health workers visiting the village has increased, institutional deliveries have increased, and the 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 time bound action plan for rural infrastructure 2005 and which was implemented between 2005 and 2009. The scheme proposed upgrading of infrastructure like irrigation, road, rural housing, rural water supply, rural electrification and rural telecommunication connectivity, in partnership with the state governments and PRIs. The aim is to provide connectivity to all habitations of population over 1,000 (500 in hill and tribal areas) by 2009, 4,902 habitations are to be connected by 7,795 km new roads in the State, and over 28,523 km of roads are to be upgraded and renewed.

As part of the programme, the government of Uttar Pradesh intended that by end of financial year 2008 – 2009, every village of over 1,000 population would have an all-weather road. To achieve the targets of Bharat Nirman, 1,400 km of new road length was proposed to be constructed by 2009. This would benefit 700 unconnected eligible habitations in the State of Uttar Pradesh. To ensure full farm to market connectivity, it was also proposed to upgrade 6600 km. of the existing Associated Through Routes.

Box 7.3: Bharat Nirman: An Infrastructural Development Plan

"Bharat Nirman will be a time-bound business plan for action in rural infrastructure for the next four years (2005-2009). Under Bharat Nirman, action is proposed in the areas of irrigation, road, rural housing, rural water supply, rural electrification and rural telecommunication connectivity. We have set specific targets to be achieved under each of these goals so that there is accountability in the progress of this initiative."

Dr. Manmohan Singh
Prime Minister

Box 7.4: Bharat Nirman: Tasks

Every village to be provided electricity: remaining 1,25,000 villages to be covered by 2009 as well as connect 2.3 crore households.

Every habitation over 1000 population and above (500 in hilly and tribal areas) to be provided an all-weather road: remaining 66,802 habitations to be covered by 2009.

Every habitation to have a safe source of drinking water: 55,067 uncovered habitations to be covered by 2009. In addition all habitations which have slipped back from full coverage to partial coverage due to failure of source and habitations which have water quality problems to be addressed.

Every village to be connected by telephone; remaining 66,822 villages to be covered by November 2007.

10 million hectares (100 lakh) of additional irrigation capacity to be created by 2009.

60 lakh houses to be constructed for the rural poor by 2009. While the agenda is not new, the effort here is to impart a sense of urgency to these goals, make the programme time-bound, transparent and accountable. These investments in rural infrastructure will unlock the growth potential of rural India.

Figure 7.2: Total Habitation under Bharat Nirman (Rural Roads)
in Uttar Pradesh- Target & Achievement
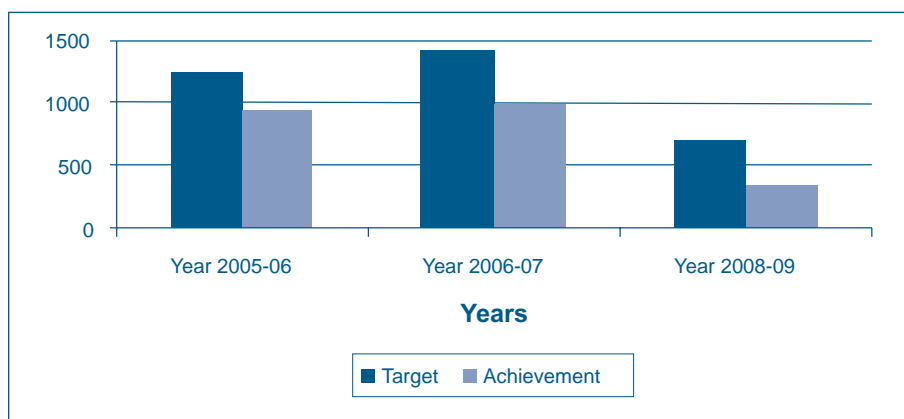
Note: 2008-09 figure is up to June 2008

7.3.2 Improving Access to Food

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

1. The provision of low priced food grains, as a method of subsidising the consumption of the poor. This is done through the Public Distribution System (PDS) and now with the current Targeted PDS, where low prices are charged only for Below Poverty Line (BPL) households.

2. Food for Work schemes now carried out under 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.

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

Access to Annapoorna scheme and the ICDS is better in southern Uttar Pradesh, that is the Bundelkhand region. But, the possession of the ration card by the poor households is lowest in this region. In the case of the Mid-day Meal Scheme, it is western and southern Uttar Pradesh where the access is better. Given the extent of attention paid to the problems of poverty and hunger in southern Uttar Pradesh, this is not a surprising result. But the poor result for the schools' scheme shows that there is not much connection between coping with food insecurity and development.

The reach of the ICDS to the poor is again relatively better in the southern region. But again, at just 1.85 per cent, it is far from sufficient. What is important to note, from a development point of view, is that the reach of the Mid-Day Meals Scheme is second in rank (at 25.93 per cent) in the southern region after the reach of western region with 30.19 per cent, much above that in the other two regions, with a reach more than 30 per cent. With the reach to the nearly-poor households also being just 10.5 per cent (as against more than double that in the other zones) the figures clearly show a poorly-functioning government school system

In Table 7.5, we have also separately included 'nearly poor' households, i.e. those whose per capita consumption level is within 10 per cent above the poverty line. Most of the poor and nearly poor households in Uttar Pradesh have ration cards and their percentage is slightly above the all-India

Table 7.5: Region-wise Poor Households who have Ration Cards or Benefited from Various Schemes in Rural Uttar Pradesh (2004–05) (in %)

Region	Possess ration card	Food for Work	Annapoorna	ICDS	MiddayMeal
Western	84.15	1.5	1.28	0.43	30.19
Central	79.61	0.66	1.97	0.98	20.98
Eastern	84.26	0.27	2.53	0.63	21.69
Bundelkhand	76.85	0.0	4.63	1.85	25.93
Rural Uttar Pradesh	83.12	0.61	2.27	0.71	23.81
Rural India	80	4.2	1.2	8.8	33.2

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

average. However a very small percentage of such households are benefited from other schemes. The percentage of beneficiaries of most of these schemes in Uttar Pradesh is lower than the beneficiaries at all-India level.

An analysis of the possession of ration cards by social groups reveals the poor state of affairs in the state. Almost 80 per cent of Scheduled Caste and Scheduled Tribe population does possess a ration card. The figure among the Scheduled Caste population is more. Though the proportion of BPL (Below Poverty Line) and *Antyodaya* card holders is found to be higher for Others and SCs/STs, in absolute terms and compared to their relative position, it is far from adequate (Figure 7.3).

Figure 7.3: Proportion of Households Possessing Ration Cards, 2004-05
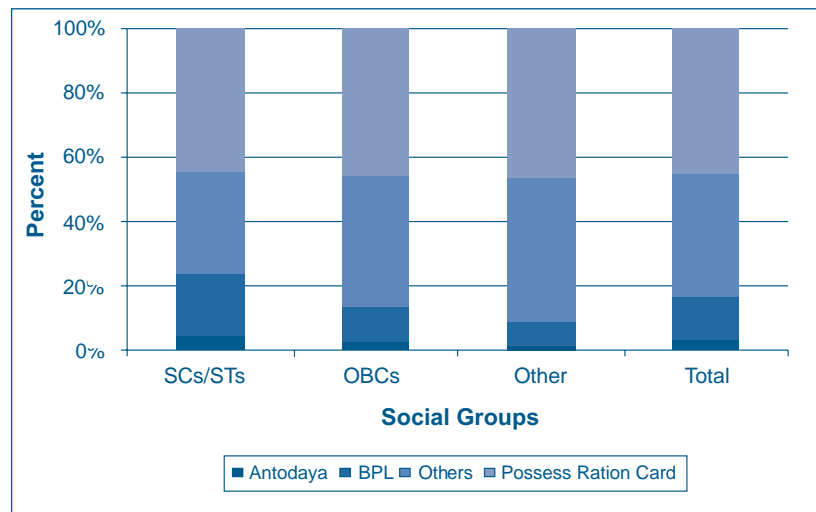
The relatively low reach of food-based programmes to the poor, as revealed by NSSO figures, should be contrasted with the generally high reach shown by official government figures. The reach of the ICDS which is routinely reported by government agencies is close to 100 per cent. The ICDS coverage among the districts of Uttar Pradesh generally varies from around 40 (Jhansi) to 98 (Hamirpur) per cent.

An index of public interventions has been prepared on the basis of ICDS coverage in each district of Uttar Pradesh. Table 7.6 and Map 7.2 present an index for public interventions in the district. The districts in bold font are the priority districts. It can be seen that out of the 28 priority districts, 19 districts are in the three categories of low level of public interventions and only 9 districts are in medium to high level of public intervention. In a properly designed policy system, public interventions would be higher where food security is lower. But, that does not seem to be the case in Uttar Pradesh. It is likely that political influence rather than the intensity of food insecurity affects the level of public interventions in Uttar Pradesh.

Table 7.6: Index of Public Intervention

High	Value	Medium	Value	Low	Value	Very Low	Value	Extremely Low	Value
Hamirpur	0.972	**Kanpur Dehat**	0.825	**Hathras**	0.685	Sultanpur	0.536	**Mahrajganj**	0.397
Shrawasti	0.924	Barabanki	0.816	Kushinagar	0.673	**Mirzapur**	0.536	**Bahraich**	0.368
Kanpur Nagar	0.918	Chandauli	0.816	Mau	0.663	Agra	0.531	Azamgarh	0.346
Mahoba	0.863	Saharanpur	0.815	Meerut	0.663	Muzaffarnagar	0.530	Ambedkar Nagar	0.344
Lucknow	0.833	Ballia	0.804	**Badaun**	0.655	Faizabad	0.521	Moradabad	0.339
		Bijnor	0.794	Ghazipur	0.646	Sant Kabir Nagar	0.520	**Kaushambi**	0.330
		Shahjahanpur	0.787	Jyotiba Phule Nagar	0.640	**Aligarh**	0.490	Basti	0.329
		Rae Bareli	0.779	Sant Ravidas Nagar Bhadohi	0.639	**Unnao**	0.483	**Jhansi**	0.260
		Rampur	0.771	**Sitapur**	0.637	Etawah	0.483		
		Deoria	0.751	Jaunpur	0.637	Jalaun	0.467		
		Bareilly	0.750	**Hardoi**	0.629	Mathura	0.461		
		Chitrakoot	0.742	**Mainpuri**	0.623	**Pilibhit**	0.439		
		Firozabad	0.738	Pratapgarh	0.616	**Sonbhadra**	0.409		
		Auraiya	0.734	**Balrampur**	0.616	Gautam Buddha Nagar	0.406		
		Varanasi	0.717	**Bulandshahar**	0.608				
		Kheri	0.715	Allahabad	0.595				
		Etah	0.710	Baghpat	0.592				
		Gorakhpur	0.702	Gonda	0.579				
		Fatehpur	0.696	**Lalitpur**	0.576				
				Ghaziabad	0.571				
				Farrukhabad	0.564				
				Kannauj	0.563				
				Siddharth nagar	0.560				
				Banda	0.555				

Improving Performance

One of the main avenues of enabling the poor to access food is through the Public Distribution System (PDS). The role of the PDS becomes particularly important in a situation of rising food prices. There are numerous inadequacies in the PDS – inadequate coverage of the poor with BPL ration cards (as illustrated in Table 7.7), insufficient grains acquired through the PDS, and so on.
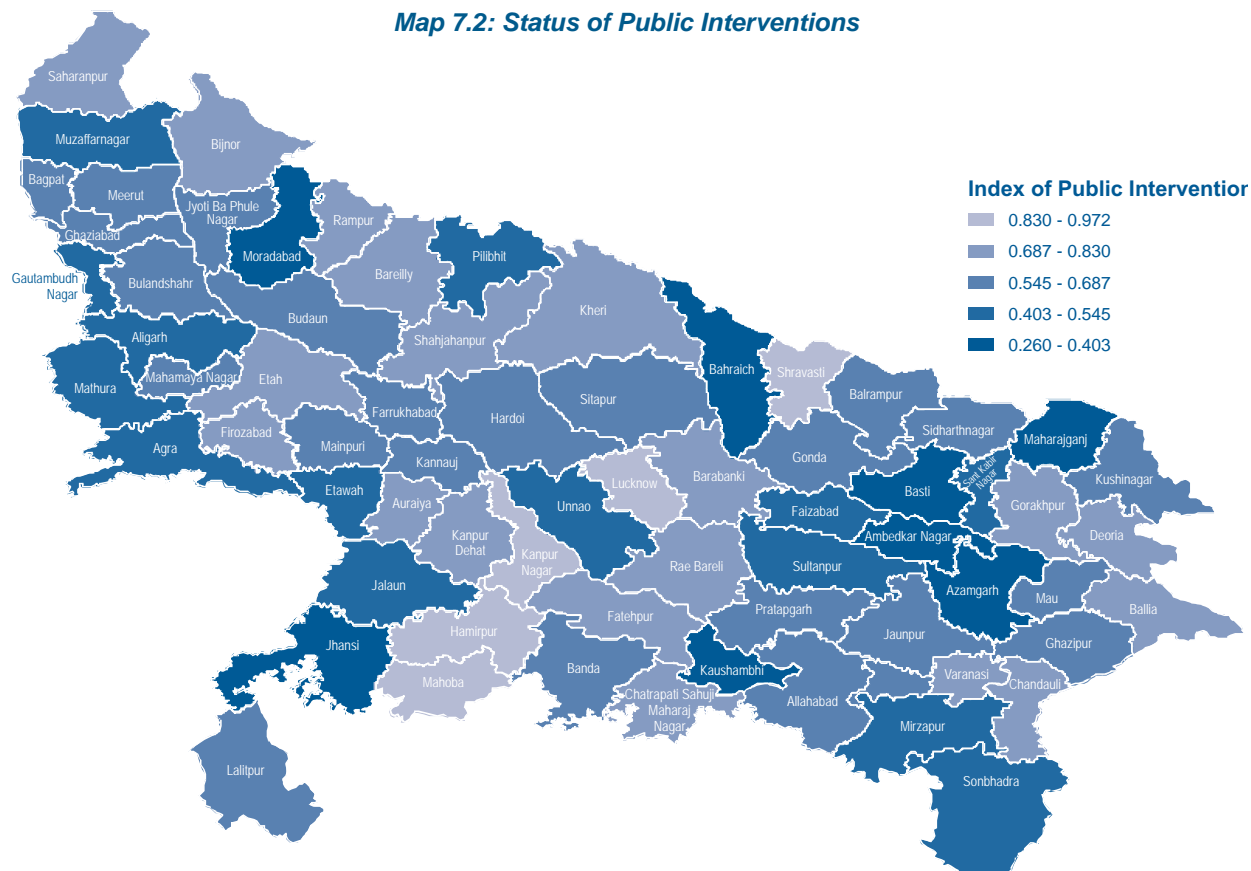
Map 7.2: Status of Public Interventions

Index of Public Intervention

- 0.830 - 0.972
- 0.687 - 0.830
- 0.545 - 0.687
- 0.403 - 0.545
- 0.260 - 0.403

Table 7.7: Percentage Share of Poor and Nearly Poor Households who have Ration Card or benefited from various Schemes, 2004-05.

Region	Poor Households				
	Ration card	Food for work	Annapoorna	ICDS	Midday meal
Uttar Pradesh	83.12	0.61	2.27	0.71	23.81
India	80.0	4.2	1.2	8.8	33.2
	Nearly Poor Households				
Uttar Pradesh	83.49	0.54	1.96	0.92	23.62
India	82.9	2.8	1.1	6.7	29.5

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

In the lowest consumption (MPCE) class (<Rs. 265.84), only 49 per cent of households are in either Antyodaya or BPL categories. There is obviously a large error of exclusion here. At the same time, there is also an error of inclusion, as 12 per cent of the households in the highest consumption class are included in either Antyodaya or BPL (*Suryanarayana*, 2008).

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

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

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

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

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

The problem of diversion of foodgrains increases when there is a partial subsidy, such as with the PDS. Grain is supplied at a lower than market price, but the buyer has to have the money to buy the lower-priced grain. If the person just does not have the required money, or does not have it at the time the grain is made available, the person cannot benefit from the subsidy. This points to two critical issues in the functioning of the PDS: Firstly the dual price system that it brings about, encourages diversion of foodgrain from the lower BPL price to the higher open market price. Second, many poor households are unable to utilise their quotas because of inadequate purchasing power.

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

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

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

Increasing Wages and Employment

The critical importance of wage incomes in ensuring access to food is demonstrated dramatically through the experience of Uttar Pradesh. One of the studies shows that Uttar Pradesh is a food surplus state, but malnutrition rates are high. The abundance of food does not translate into access to food for all, because widespread poverty constrains the purchasing power of the poor and other vulnerable sections (Nisha Srivastava 2003:257). Taking another example, Kerala, is highly deficient in food production relative to consumption of food. But that says nothing at all about food security in Kerala.

Provided that areas are not cut off from the markets, the supply of food grains, even in deficit areas, can be taken care of by market forces, supplemented by the PDS. Interventions are needed to reduce transport and other transactions costs, and thus improve the functioning of markets and the PDS and, most of all, measures to increase incomes. In particular, the food insecure often have to operate in inter-

linked markets (e.g. selling in advance in order to secure grain on credit), and intervention is needed to help the poor break the inter-linking of the credit and product markets.

Wage rates for casual labour employment are extremely low in the state. All food insecure districts in Uttar Pradesh except a few, have low levels of wages. The highest wage rate is found in Etawah, Ghaziabad, Kannauj, Gautambudh Nagar and Saharanpur which itself is more than Rs. 60 per day, far below the National Minimum Wage of Rs. 66. However in Saharanpur it was Rs. 63. In fact, Uttar Pradesh, along with Madhya Pradesh and Orissa has the highest percentage of casual non-agricultural workers receiving wages below the minimum wages in both rural and urban areas. The state of agricultural labourers, who form almost the entire proportion of rural casual labourers, is much worse. Low wage rates and thus low incomes lead to lower levels of consumption. This coupled with a higher dependency ratio means lower consumption for the entire family resulting in food insecurity. At the same time, possession of even a small patch of land can improve the food security position of those who are now landless.

The Planning Commission points out in the Approach to the 11th Plan, '… there is clear evidence that even a tiny plot that provides livelihood fallback for families to stay behind and children to go to school as men migrate, can be a powerful enabler for the poor to diversify occupations without jeopardising the capability of future generations. There are also a number of examples where women have been able to cultivate their tiny plots co-operatively and thereby secure required economies of scale. Such efforts must be supported as also attempts to provide a homestead plus a little more to all the poor' (Planning Commission, 2007).

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

National Rural Employment Guarantee Scheme (NREGS)

The National Rural Employment Guarantee Scheme (NREGS) has been devised as a public work programme and has a key role to play in providing assured employment to one person in a 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 create durable assets in villages, leading to overall development of the rural economy; and empowering rural women through the opportunity to earn income independently and to participate in social groups.

Table 7.8: NREGS Performance, April 2008
National Bulletin – All-India

Households Demanding Employment	31.1 Million
Households Provided Employment	30.8 Million
Persondays [in million]:	
Total:	1268.5
SCs:	334.0 [26.33%]
STs:	367.4 [28.96%]
Others:	567.1 [44.71%]
Women:	879.7 [69.35%]

Source: NREGA website, 3 April, 2008.

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

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

A large number of beneficiaries under the scheme are women, close to 70 per cent of them as on 10th September, 2008. As pointed out 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 worthwhile to note that a large share of the earnings received from the NREGS works have been utilised for food related expenses. A study undertaken by the IHD has actually documented this finding on the contributions from the NREGS being expended by the villagers on food related consumption needs (see Box 7.5).

In Uttar Pradesh, 2.05 million persons have been provided employment under the scheme.

Box 7.5: NERGA: A Safety Net for 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 per cent of the earnings from NREGA are being spent on food while in Jharkhand, the percentage is 71. However in case of Scheduled Tribes and Scheduled Castes, who are generally more vulnerable to food insecurity because of low and irregular income, the spending on food from earnings received for the NREGS work undertaken is more than the state average. 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 7.9: NREGS Performance in Uttar Pradesh

Employment provided to households:	2.05 Million
Persondays [in million.]:	
Total:	62.45
SCs:	34.47 [55.2%]
STs:	1.14 [1.83%]
Women:	7.98 [12.79%]
Others:	26.8 [42.97%]
Total fund:	18614.6
Expenditure:	9490.7
Total works taken up:	164794
Works completed:	32187
Works in progress:	132607

*Source: NREGA website, 10th September, 2008.*

The participation of STs of the state is not very high in employment, in fact the proportion is less than the all-India proportion. The proportion of women in this employment is also much less than at the all-India level. The large proportion of men seeking NREGS employment here certainly shows that the scheme must have had a substantial impact on distress migration (since it is unlikely that women would migrate, leaving men and children behind).

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

Improving Gender Relations

The results of our analysis show that female literacy in rural areas is the most significant factor determining food security of the rural population. This can be corroborated by the fact that all the districts in the most food insecure category rank very poorly in terms of rural female literacy. Figure 7.4 shows correlation between an increase in rural female literacy and a reduction in child mortality in Uttar Pradesh. Thus, it is imperative that girls' literacy be prioritised and all barriers to their access to education be effectively

Fig. 7.4: Relationship between Rural Female Literacy and Child Mortality Rate in UP
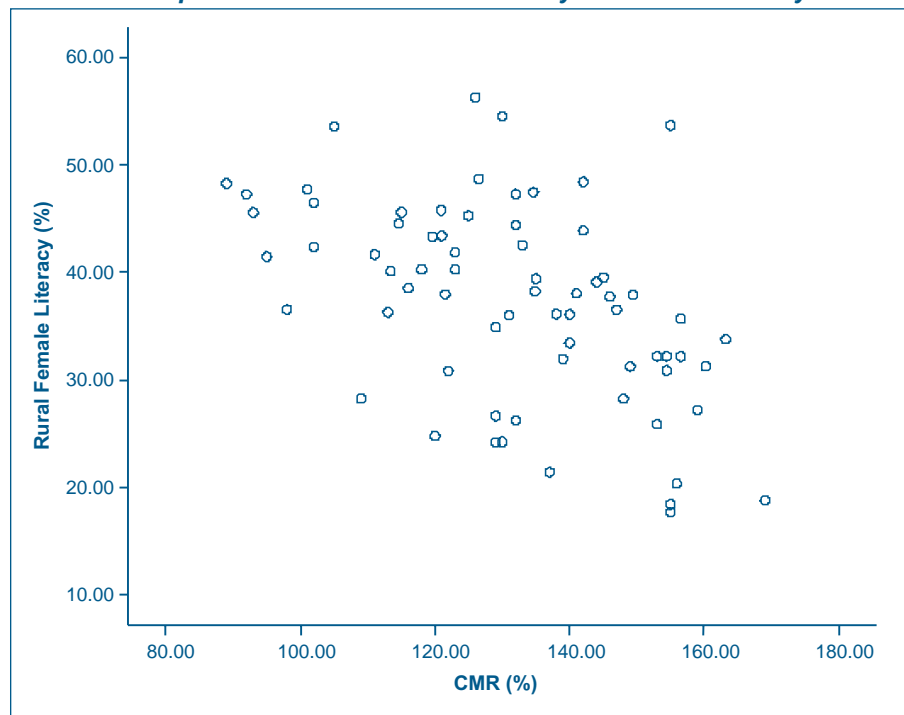
tackled, taking care to see that girls from the poorest and most marginalised communities get priority attention. This should be coupled with the provision of quality education.

Household Micro-Credit

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

It hardly needs to be repeated that financial services for the poor, both savings and credit, are required, both to enable consumption smoothening and to utilise market opportunities. Whether through the Indian Self Help Group (SHG) model or the Bangladesh Grameen Bank model, micro-financial services need to be provided. Through an increased use of educational facilities and credit to utilise growing market opportunities, micro-finance programmes can link increased food security with development. The food security impact of micro-finance is also increased by its contributing to enhancing women's agency in the household. In a more general sense, what can be said is that women's empowerment is directly related to improved food security. One key factor in empowerment can be the acquiring of land rights.

7.3.3 Enhancing Absorption of Food

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

Clean Drinking Water: Rural Water Supply

Accelerated Rural Water Supply Programme:

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. The Government of India provides funds under the ARWSP for implementation of rural water supply schemes.

Swajaladhara:

The Rural Drinking Water Supply Programme was launched in the state from 25 December, 2002 to ensure community participation and shift from supply driven to demand driven approach. The scheme envisages 10 per cent of the capital cost of the project to be borne by the community along with the responsibility for operation and maintenance of water supply projects and 90 per cent capital cost to be borne by central government through the District Water Supply and Sanitation Mission.

Bharat Nirman: Rural Water Supply

Rural water supply is one of the six components of Bharat Nirman. During the Bharat Nirman period, 55,067 uncovered habitations and about 331 thousand slipped-back habitations are to be covered and 217 thousand quality-affected habitations are to be addressed. Under Bharat Nirman, for water quality problems, tackling arsenic and fluoride contamination has been given priority.

The norms for coverage under Rural Drinking Water supply are:

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 metres elevation in the hilly areas.

Nutritional Practices

One factor in food absorption, besides the above-mentioned factors of improved water and health facilities, is that of nutritional practices. Nutritional practices here refer to those inputs (for example, proteins or micro-nutrients) that are both available and accessible, but not consumed in desirable quantities; it also refers to behavioural practices (for example, breastfeeding) that are not practiced as required. But as the widespread problem of under-nourishment in India shows, nutritional problems affect not just the category of those with severe problems of food security, but also those with reasonable levels of food security, in terms of their consumption of adequate food and sufficient nutrition. The Indian experience of the last 15 years shows that despite the reduction in the incidence of poverty, there may not be a corresponding improvement in the nutritional indicators of a large section of the population.

It is interesting to note that Vietnam during the period 1992-93 to 1997-98 had a experienced similar trend: a sharp fall in poverty without a corresponding reduction in under-nourishment. This, however, changed during the period 1997-98 to 2003-04, when there were sharp declines in both poverty and under-nourishment. This, as argued in *Vinod Mishra and Ranjan Ray (2007)*, was brought about by a combination of policy intervention through information campaigns to promote desired changes

in dietary patterns, and direct nutrient enhancing programmes. All this took place in a situation of increasing literacy and educational attainment, which would be expected to generally increase nutritional awareness (see also Box 7.5).

India has programmes for providing nutrition supplements, for example ICDS. Adequate diversification of food to include superior calories such as proteins can be promoted through information campaigns along with providing supplements in processed foods, such as flour. There is a clear need for improvements in nutritional practices even among those who can afford to acquire the right types of food.

Box 7.6: Innovative Schemes for Ensuring Nutritional Security

The Department of Women and Child Development is the nodal agency for the formulation and execution of programmes directed towards the holistic development of women and children. The department also aims at implementing different social welfare schemes meant for persons with 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 to improve the nutritional, health and development status of adolescent girls (11-18 years), promote awareness of health, hygiene, nutrition and family care, link them to opportunities for learning life skills, going back to school, help them gain a better understanding of their social environment and take initiatives to become productive members of the society. The scheme is currently being executed in all the states of the country covering a total of 6118 blocks of which 326 blocks are in Orissa.

2. *Udisha:* With technical collaboration with UNICEF, the scheme envisages a spectrum of locally relevant training interventions for achieving women and child development goals- rather than training of only ICDS functionaries. It has a new emphasis on decentralised 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.

7.4 National Rural Health Mission in Uttar Pradesh

The National Rural Health Mission is aimed at ensuring effective and quality healthcare, especially to the poor and vulnerable sections of the society. It is being implemented in the State with the aim of reducing infant mortality rate and maternal mortality ratio, ensuring population stabilisation, prevention and control of communicable and non-communicable diseases. Significant progress has been made in terms of implementation of various activities under NRHM. A number of new schemes have also been launched, such as, the Saubhagyawati Surakshit Matretev Yojana, a scheme to promote institutional deliveries by involving private sector providers. The overall objective of the State is to have the highest attainable standards of services at public health institutions, coupled with the recent technical advances in terms of well equipped facilities and adequate skilled manpower at every level. Till June 2009, a total of 252 PHCs had been strengthened with three staff nurses to make them functional for 24x7 services. Overall

62 CHCs were functioning on 24X7 basis and facility survey completed in 169 health institutions at below district level. Total number of 53 DHs, 68 CHCs and other levels were functioning as FRUs. No Mobile Medical Units (MMU) was functional in the state. A total of 1, 34,434 ASHAs had been selected and 1, 08,223 were trained upto 4th Module. In total 1,24,309 ASHAs had been provided with drug kits. Total 17323 sub-centres are functional with an ANM and 1158 SCs are strengthened with 2nd ANM. In the state 428 contractual AYUSH doctors have been appointed. To augment the manpower contractual appointments of 189 specialists, 2250 staff nurses, 1411 ANMs and 138 paramedics had been done under NRHM. There was a need to strengthen the positioning of MBBS doctors. Because of the strengthening of institutional and manpower setup, there had been significant improvement in the various health indicators. However, there are areas for further improvements:

- Second ANM needed at sub-centres.

- FRUs and Mobile Medical Units need to be operationalised

- Mapping of human resource and redistribution for rationalisation of services at different levels following IPH standards is recommended.

- Creation of a public health cadre is required.

- Huge shortage of nurses and specialists.

- Need to improve AYUSH facilities at the institutions.

- Encourage involvement of NGOs.

- Strengthening the MIS processes.

7.5   Improving Performance of Government Scheme

How can the performance of these government schemes be improved? Political mobilisation of the poor can play an important role in improving implementation of ICDS, MMS, NREGS and other such schemes. Implementation of these schemes has generally been decentralised down to the panchayat level. In Uttar Pradesh, people in general and women in particular have not been properly involved in implementation of these schemes.

If the poor are to be given grains at below market rates, a better scheme would be to give the equivalent of the subsidy amounts as a grant, either in cash or as grain. If, say, the subsidy equals the price of 5kg grain, the person could be given that amount of grain, without the requirement of producing any supplementary money, as PDS now requires. In this fashion, the subsidy is more likely to reach the intended beneficiary. There would be the usual diversion problems, but there would not be the problem of non-utilisation of subsidy by the poor. A direct transfer would make sure that the person/household

actually benefited, since it is not conditional on the beneficiary having to provide some collateral amount. Further, as discussed, food-schemes need to be linked with development activities.

Box 7.7: Need for Special Plan in Eastern Uttar Pradesh

With high population, frequent recurrence of floods and droughts and low productivity in agriculture, the eastern districts in Uttar Pradesh were regarded as a low-income area in the second five year plan requiring special attention in planned economic and social development. …

Report of the Joint Study Team of Uttar Pradesh (Eastern Districts), 1964, Planning Commission, Govt. of India.

Access variables

From the foregoing discussions, particularly the analysis of the correlation matrix of individual factors, 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 most food insecure category rank very poorly in terms of rural female literacy.

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

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

Source: Save the Children, 2006

Another policy implication from the indicators used for enhancing food security is reducing the dependency ratio. All the food insecure districts in terms of outcome indicators and 10 out of 11 food insecure districts in terms of overall indicators have a high dependency ratio. Improvement in female literacy no doubt will reduce dependency as both are closely related but a conscious effort to propagate a small family norm should also be made.

Another policy intervention for enhancing food security is the betterment of the plight of the vulnerable populations, the Scheduled Tribes and Scheduled Castes. Most of the food insecure districts in Uttar Pradesh are dominated by districts with higher proportion of Scheduled Tribes/ Scheduled Castes who suffer from geographical and social marginality. The SC/ ST are marginalised on account of social discrimination and untouchability. Lucknow and Jalaun have extremely high concentration of SC/ST population. On the other hand food secure districts have a low proportion of SC/ST population. Thus, it can be said that the districts dominated by SC/ST population are the ones that are food insecure. This points to the marginalisation of the SC/ST population and the necessity of dealing with it.

Ambedkar Nagar, Chandauli, Gorakhpur, Deoria, Jalaun and Kushinagar, have very high level of agricultural labour. Agricultural labour is high even in western Bijnor and Saharanpur. Distribution of even a small patch of land to the landless agricultural labourers in these districts can improve their food security position. Since the productivity of agriculture sector is very low in these districts the development of non-farm sector/ employment in these districts is also needed to improve their food security status. Since these districts are rich in natural resources, there is ample scope of development of such employment.

Status of Absorption Indicators

The correlation matrix has shown to a weak relation between availability of safe drinking water and food security, which is quite dubious. The reason for this anomaly can be found in the difference between the existence of such infrastructure, like a tap, tube-well or hand-pump, and their actual functioning. The food insecure districts of Uttar Pradesh, however, have low availability of both drinking water and primary health centres. Half of the food insecure districts have low access to safe drinking water. Districts such as Ghaziabad, Kushinagar, Mau, Rampur, Azamgarh, and Barielly, have good condition of drinking water. All the food insecure districts have low coverage of PHCs. Half of them have extremely low coverage. Jalaun has extremely low access to both safe drinking water and PHCs. Improvements in these two basic infrastructures will definitely ensure food security in these insecure districts.

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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. This report brings out the performance of districts in each of the food security related indicators and clearly indicates the good 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 the special interventions to bridge the divide between the regions and districts of the state.

Reducing Child Mortality and Undernutrition

In Chapter 3 of the report, the 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 Uttar Pradesh 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 - except Baghpat, Ballia, Ghaziabad, Gorakhpur - have under-five mortality figures above 100 per 1,000 live births. As many as 13 districts have mortality figures above 150, which is quite alarming. Similarly, proportion of under-weight children is also very high with 21 districts having figures higher than 60 per cent, while the national average of under-weight children is 42.5 per cent.

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 undernutrition, Integrated Child Development Services (ICDS) have a considerable role in improving production capabilities. But, the implementation of such programmes, including issues of reaching those with severe undernutrition 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 or to leak in various ways. Decentralisation of the implementation of programmes has to be combined with enhanced participation of the community and awareness on issues of undernutrition, in order for the benefits to reach the intended target group.

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 children and women's 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 Department 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.

To avoid micro-nutrient deficiencies, supply of fortified food should be explored as a viable option to integrate it into the existing schemes. Proper utilisation of such innovative attempts is needed to bring the child mortality and child 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 need to strengthen transparent procedures to improve the efficiency in implementation of such programmes with community involvement to reduce mis-utilisation. 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 and Food Insecurity: Improving Availability, Access and Absorption

The analysis in this report based on the three dimensions of availability, accessability and absorption, provides insights into areas of lacunae or gaps which propel a district into being food insecure. The three indicators which form 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. Uttar Pradesh is a major producer of diverse agricultural crops in the country. While it is a major producer of a large number of agricultural crops, productivity levels are the highest in Punjab and Haryana. Within the state, there are widespread variations. The western region of the state has high productivity level in comparison to the eastern part of the state. In Uttar Pradesh the National Horticulture Mission has been launched in 26 districts. This has helped in diversifying the agriculture in the state. In eastern and central Uttar Pradesh, there is a tremendous scope to increase vegetable and fruit production as in several districts upto 90 per cent of farmers are small and marginal farmers and 70-75 per cent holdings are of one acre or less. Agri-export zones are also a good sign of agricultural development in the state.

With most part of the state receiving medium to high level of rainfall, the main issue is not the adequacy of rainfall per se, but more of effective conservation and utilisation of water resources in these regions. The watershed programmes have a significant role to play in this regard (Sen et al., 2007). Revitalising 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. 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 and providing appropriate price policy and risk management measures. What is important is to pay attention to existing areas of rain fed agriculture and help in improving output as well as productivity. But, bringing about changes in the production systems also requires an enhancement of capabilities of both women and men.

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 be an incentive to increase productivity. The access of landless and women to these CPRs would increase.

Another core area of concern is rural roads. Districts of western region such as Muzaffarnagar, Meerut, Sharanpur, Mathura etc. have good paved road connectivity. On the other hand districts adjoining the Bundelkhand region like Chitrakoot, Sonebhadra, Mahoba, Lalitpur and Kannauj have low level of paved road connectivity. Another region with poor road connectivity is the eastern region, comprising Balrampur, Basti, Gonda, Sidharthnagar, etc.

NREGA and other food-for-work schemes can be channelised to improve the key areas of village road connectivity and small-scale irrigation. Village approach roads to main roads, and small irrigation schemes (e.g. check dams in valleys, or moisture retention works (on sloping lands), can both increase economic opportunities and productivity. Improved roads would also provide better access to both health and educational facilities. 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 PMGSY and Bharat Nirman programme of the central government with the objective of making all weather roads to connect all villages of 1,000 population or over 500 persons in hilly and tribal areas should be taken up by the state. There is a need to speed up and strengthen the process of implementation of these programmes.

In a relatively open economy, reliance should not sole by rest 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 not only enable producers to take up opportunities available through connections with the wider economy but also improve the types of jobs they can try to get 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 SCs and STs, average monthly per capita expenditure, rural wage rate, ratio of working age population and rural female literacy. The composite impact of these selected indicators depicting access shows a grim scenario for the southern and eastern districts of the state, whereas the western region is relatively well off in almost all the indicators of access.

Access measures in Uttar Pradesh have been addressed through three flagship programmes – TPDS, Food for Work schemes (now carried out under the NREGA), ICDS and Mid Day Meals Scheme. From the analysis, it is clear that the possession of ration card is lower in Bundelkhand and central regions. Similarly, in terms of reach of Food for Work and Annapoorna schemes, a very small proportion of poor households get the benefit (NSS, 2004-05). There is also a need to intensify implementation of the ICDS programme with improved monitoring to make it effective in addressing issues related to access and absorption.

The Mid Day Meal Scheme on the other hand, has relatively better performance in the state. There is an important role for mobilisation and participation of the poor in improving implementation of the ICDS, MDMS, NREGS and other such schemes. Studies in other states have shown that those panchayats women are at the helm, where 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 the importance of women's 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 agency 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 and 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 investments in land improvement through enhancement of their status in the household. This, along with literacy could also pave the way for women having more say in the disposition of household income, which would avoid wasteful expenditure like alcohol consumption and improve household level 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 in bringing about adequate attention on 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 insecure in Uttar Pradesh. Agricultural wages and the number of days of employment are the 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. Employment and food based programmes can support the labour improving their newly acquiring land. Employment schemes directed towards this end would be effective.

The Food Absorption Index which is a combination of safe drinking water and availability of health facilities presents two distinct regions that appear to be in a critical state. The western region has

emerged as secure in terms of both the indicators. The southern and northeastern region is relatively insecure and have the lowest access to safe drinking water and health facilities.

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 can 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. The ARWSP programme has been a milestone in providing safe drinking water in the state. On the other hand, the NRHM has been implemented in order to improve the health infrastructure in the state.

However, improvement in the implementation of these schemes depends, at one level, on improvement in administration and governance systems. But more important is the role of the people who are to benefit from the schemes, whether organised through CBOs, NGOs or traditional tribal bodies. They play a very important role by insisting on the adequate implementation of these schemes and ensure that benefits are reaching the targeted beneficiaries. Framing adequate policies is only the first step. What is crucial is that both 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 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 or hand-washing after defecation, combined with knowledge of nutritionally superior foods, are needed to supplement improved access conditions.

Key Interventions in Priority Districts

An attempt has been made to have areas of interventions for priority districts of the state. The 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 the district level and also since the district 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.

As can be seen in Table 8.1, the eastern and southern regions of Uttar Pradesh require major interventions for almost all the food security indicators. Out of 11 indicators studied and presented, five or more indicators require specific interventions in order to improve the food security situation in the eight priority districts of eastern region. Similarly, the southern region, which is part of Bundelkhand region, also needs priority interventions in majority of the indicators. The central region is next to the eastern and southern regions where policy interventions are needed in order to improve the food security situation

Table 8.1: Key Interventions in Priority Districts

NSS Regions	District	Irrigation Extent	Per Capita Value of Agricultural Output	Rural Connectivity (Paved Road)	Rural Casual Wage Rate	Average Monthly Per Capita Expenditure	Proportion of Agricultural Labourers	Proportion of SCs and STs	Ratio of Working Age Group Population	Rural Female Literacy	Access to Safe Drinking Water	Access to PHC	No. of Indicators
Central	Fatehpur		√	√			√						3
	Hardoi			√	√			√				√	4
	Kanpur Dehat			√								√	2
	Kheri			√	√				√	√		√	5
	Rae Bareli		√	√	√	√	√						5
	Sitapur			√	√			√	√	√			5
	Unnao		√	√								√	3
Eastern	Bahraich	√	√	√			√		√	√			6
	Balrampur	√	√	√	√	√			√	√		√	8
	Kaushambi		√		√	√	√	√	√	√			7
	Maharajganj				√	√	√		√	√			5
	Mirzapur		√	√	√		√		√		√		6
	Shrawasti	√	√	√		√				√		√	6
	Siddharthnagar		√	√		√	√		√	√			6
	Sonbhadra	√	√		√		√	√		√	√	√	9
Southern	Banda	√	√	√	√	√	√		√	√		√	9
	Chitrakoot	√	√	√	√	√			√			√	7
	Hamirpur	√			√		√					√	4
	Jhansi			√	√						√	√	4
	Lalitpur			√	√				√	√	√	√	6
	Mahoba	√		√	√		√			√	√	√	7
Western	Aligarh								√				1
	Auraiya			√									1
	Bulandshahar								√				1
	Farrukhabad			√									1
	Hathras								√				1
	Mainpuri								√				1
	Pilibhit				√				√	√		√	4

in the state. As can be seen from the Table, only the southern region has been identified as an area where very few indicators require priority attention.

It is also to be noted here that most of the districts of the western and central regions that have been identified for priority interventions are so identified on the basis of the food security outcome index. However, those in the eastern and southern regions are mainly on the basis of the food security index.

The analysis of the districts in rural Uttar Pradesh 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. This requires a big push in order to move towards a food secure state on all parameters discussed in the atlas and not just focusing on limited aspects of deprivations.

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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 of whether there is a right to food. The kind of economic growth that the world has been undergoing has been seen to not automatically 'trickle down' in benefits to all. Even a reasonably high rate of growth, like India's 6 per cent or so over the period 1995-2004, has been seen not to bring about a commensurate reduction in the proportion of those who are undernourished. The existence or acceptance of a right to food would make it more likely that there can be pressure to adopt and implement a policy that secures this right. 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 in 1966 two covenants, 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 human rights law.

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

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

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

Rights require state action with regard to the obligations to respect, protect and fulfil (Shue, 1980 in Gaiha 2003). These obligations require setting up of administrative, police, and judicial structures to enable rights to be realised. Consequently all rights have a cost in their being realised. And the costs of the right to food may not be as much as they seem, since it is only in certain circumstances that it involves state provision of food (Gaiha, 2003, 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 realisation 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 national level. 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 at the national level 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 Government of India and of the state of Rajasthan, constituted a violation of this right to food and, thus, of the right to life. Specifically, the violation of the right to food was seen in two aspects. First, was the failure of the Public Distribution System (PDS), in terms of the exclusion of various Below Poverty Line (BPL) households from its scope. Second, was the inadequacy of the quantities delivered through

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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..

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) that 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 subsidised prices, the relevant governments should consider giving them free grain;

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 operationalise 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 concretise 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 starvation deaths, it is necessary to turn to the political economy of food security. Paying attention to political economy is not to treat structures as binding constraints, but to draw attention to the constraints that have to be overcome in order to realise the right to food.

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

The FSI is a composite index covering three dimensions, i.e., Availability 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 A2.1: Indicators Used to Analyse Food Insecurity

	Indicator	Method of Calculation	Source
Food Availability	1. Per Capita Value of Agricultural Production (in Rs.)	Total value of production of all crops has been calculated by multiplying the total production with constant 1993-94 all India prices of the crop. Triennium averages of value of production have been used. Finally, the per capita value of production is obtained by dividing it by the mid year rural population.	Dept. of Agriculture
	2. Irrigation Extent (in percentage)	Proportion of net irrigated area to net sown area	Dept. of Agriculture
	3. Rural Connectivity (in percentage)	Proportion of villages having access to paved road to total number of villages in the district.	Census, 2001

Food Access	1. Proportion of Agricultural Labourers (in percentage)	Sum of agricultural labourers (main and marginal) is divided by total workers. This has been used as a negative indicator in the index.	Census, 2001
	2. Proportion of ST and SC population (in percentage)	Sum of rural ST and SC population is divided by rural population of the district. This has been used as a negative indicator in the index.	Census, 2001
	3. Proportion of Working-age Population (as ratio)	Rural population in the age group 15-59 years is divided by the sum of 0-14 years population and 59+ years population.	Census, 2001
	4. Per Capita Food Consumption Expenditure (in Rs.)	Inequality adjusted consumption expenditure on food has been used.	NSS, 2004-05
	5. Wage Rate of Rural Labour (in Rs.)	Wage rate for casual labour in rural areas has been used.	NSS, 2004-05
	6. Female Literacy (in percentage)	Proportion of literate females in rural areas (in 7 + age population) to rural female population in the same age group	Census, 2001
Food Absorption	1. Access to Safe Drinking Water (in percentage)	Proportion of rural households having access to any or all of three sources of drinking water such as tube well, tap and hand pump.	Census, 2001
	2. Access to Primary Health Services (in percentage)	Proportion of villages in the district having access to a Primary Health Centre (PHC) within the village or within 5 KM from the village	Census, 2001

Max-Min Approach

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

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

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.

Construction of Food Security Index

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

After calculating the index of each variable, we have averaged them to provide 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 normalised values of the variables. In general, normalisation can be done by three methods, i.e., by deviation of the variables from their respective means (i.e.,); by dividing the actual values by their respective means (i.e.,); and by the deviation of the value of a variable from the mean which is then divided by standard deviation {i.e., ()/s}. We have applied the second method. The basic objective of using PCA is to find the factor loading of each and every variable. Factor loading gives us the amount of total variation explained by a particular variable.

We have used 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

Districts	Percapita Value of Agricultural Output	% Net Irrigated Area to to Net Sown Area	Paved Road
Agra	0.222	0.803	0.794
Aligarh	0.206	0.973	0.725
Allahabad	0.083	0.668	0.635
Ambedkar Nagar	0.137	0.932	0.301
Auraiya	0.200	0.761	0.508
Azamgarh	0.084	0.921	0.477
Baghpat	0.314	0.996	0.827
Bahraich	0.163	0.365	0.316
Ballia	0.074	0.803	0.507
Balrampur	0.165	0.324	0.360
Banda	0.169	0.247	0.449
Barabanki	0.176	0.826	0.431
Bareilly	0.226	0.788	0.616
Basti	0.643	0.585	0.290
Bijnor	0.347	0.814	0.763
Budaun	0.230	0.923	0.399
Bulandshahar	0.233	0.859	0.781
Chandauli	0.112	0.938	0.555
Chitrakoot	0.148	0.183	0.252
Deoria	0.091	0.764	0.509
Etah	0.233	0.965	0.534
Etawah	0.228	0.772	0.640
Faizabad	0.128	0.848	0.527
Farrukhabad	0.313	0.840	0.450
Fatehpur	0.142	0.594	0.377
Firozabad	0.211	0.972	0.670
Gautam Buddha Nagar	0.170	0.857	0.680
Ghaziabad	0.222	0.951	0.862
Ghazipur	0.088	0.814	0.394
Gonda	0.148	0.587	0.334
Gorakhpur	0.077	0.782	0.456
Hamirpur	0.216	0.266	0.623
Hardoi	0.178	0.844	0.435
Hathras	0.263	0.990	0.689

Jalaun	0.310	0.397	0.444
Jaunpur	0.075	0.851	0.524
Jhansi	0.262	0.526	0.477
Jyotiba Phule Nagar	0.297	0.279	0.592
Kannauj	0.249	0.871	0.321
Kanpur Dehat	0.198	0.712	0.457
Kanpur Nagar	0.169	0.653	0.699
Kaushambi	0.090	0.633	0.648
Kheri	0.338	0.639	0.406
Kushinagar	0.137	0.752	0.490
Lalitpur	0.205	0.706	0.304
Lucknow	0.083	0.869	0.635
Mahoba	0.237	0.365	0.350
Mahrajganj	0.194	0.726	0.518
Mainpuri	0.195	0.979	0.532
Mathura	0.261	0.987	0.781
Mau	0.099	0.886	0.612
Meerut	0.360	0.950	0.905
Mirzapur	0.083	0.567	0.484
Moradabad	0.214	0.765	0.639
Muzaffarnagar	0.346	0.993	0.914
Pilibhit	0.384	0.956	0.575
Pratapgarh	0.074	0.812	0.540
Rae Bareli	0.101	0.838	0.348
Rampur	0.251	0.965	0.633
Saharanpur	0.255	0.898	0.822
Sant Kabir Nagar	0.105	0.862	0.420
Sant Ravidas Nagar Bhadohi	0.030	0.798	0.703
Shahjahanpur	0.306	0.978	0.343
Shrawasti	0.087	0.357	0.315
Siddharthnagar	0.097	0.536	0.333
Sitapur	0.183	0.521	0.381
Sonbhadra	0.076	0.201	0.282
Sultanpur	0.100	0.715	0.516
Unnao	0.125	0.868	0.321
Varanasi	0.036	0.857	0.696
Minimum Range	300	10.00	20.00
Maximum Range	8000	100.00	100.00

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

Districts	% of non (SC+ST) population to total	Non dep ratio	Female literacy (adult)	APCE	Wage	% other than agricultural lab to all lab
Agra	0.785	0.247	0.430	0.440	0.374	0.728
Aligarh	0.768	0.252	0.431	0.543	0.404	0.637
Allahabad	0.755	0.265	0.427	0.325	0.243	0.540
Ambedkar Nagar	0.740	0.257	0.514	0.418	0.177	0.442
Auraiya	0.704	0.294	0.712	0.383	0.391	0.632
Azamgarh	0.731	0.235	0.490	0.359	0.241	0.557
Baghpat	0.884	0.293	0.573	0.508	0.358	0.714
Bahraich	0.842	0.277	0.130	0.301	0.305	0.501
Ballia	0.828	0.273	0.484	0.310	0.248	0.321
Balrampur	0.846	0.255	0.135	0.289	0.248	0.492
Banda	0.783	0.263	0.338	0.262	0.296	0.470
Barabanki	0.712	0.295	0.341	0.512	0.194	0.581
Bareilly	0.848	0.232	0.256	0.369	0.319	0.659
Basti	0.788	0.254	0.383	0.407	0.242	0.574
Bijnor	0.746	0.262	0.512	0.483	0.361	0.492
Budaun	0.816	0.233	0.159	0.354	0.273	0.752
Bulandshahar	0.774	0.272	0.448	0.543	0.419	0.751
Chandauli	0.748	0.276	0.487	0.366	0.245	0.394
Chitrakoot	0.728	0.237	0.591	0.262	0.296	0.579
Deoria	0.810	0.251	0.466	0.301	0.282	0.482
Etah	0.822	0.253	0.395	0.329	0.321	0.724
Etawah	0.742	0.286	0.670	0.383	0.391	0.604
Faizabad	0.754	0.286	0.439	0.418	0.177	0.514
Farrukhabad	0.827	0.286	0.529	0.372	0.382	0.714
Fatehpur	0.737	0.292	0.454	0.364	0.312	0.464
Firozabad	0.802	0.261	0.576	0.408	0.321	0.714
Gautam Buddha Nagar	0.804	0.279	0.561	0.507	0.419	0.830
Ghaziabad	0.807	0.297	0.589	0.507	0.419	0.840
Ghazipur	0.777	0.240	0.498	0.230	0.291	0.561
Gonda	0.836	0.270	0.219	0.275	0.248	0.638
Gorakhpur	0.756	0.253	0.408	0.268	0.234	0.337
Hamirpur	0.769	0.292	0.402	0.418	0.229	0.387
Hardoi	0.659	0.281	0.366	0.353	0.235	0.724

District						
Hathras	0.737	0.257	0.521	0.349	0.471	0.566
Jalaun	0.713	0.326	0.542	0.418	0.245	0.403
Jaunpur	0.770	0.238	0.500	0.374	0.223	0.699
Jhansi	0.680	0.357	0.435	0.384	0.245	0.582
Jyotiba Phule Nagar	0.802	0.240	0.320	0.450	0.380	0.759
Kannauj	0.802	0.276	0.574	0.372	0.382	0.781
Kanpur Dehat	0.745	0.303	0.672	0.377	0.312	0.611
Kanpur Nagar	0.730	0.330	0.684	0.377	0.312	0.526
Kaushambi	0.627	0.249	0.281	0.325	0.248	0.286
Kheri	0.712	0.277	0.341	0.414	0.179	0.627
Kushinagar	0.815	0.254	0.281	0.250	0.251	0.244
Lalitpur	0.733	0.274	0.265	0.384	0.229	0.756
Lucknow	0.599	0.288	0.463	0.382	0.299	0.608
Mahoba	0.726	0.294	0.327	0.418	0.229	0.462
Mahrajganj	0.801	0.253	0.250	0.251	0.234	0.271
Mainpuri	0.801	0.274	0.595	0.408	0.391	0.773
Mathura	0.780	0.237	0.404	0.349	0.374	0.704
Mau	0.740	0.240	0.547	0.310	0.248	0.512
Meerut	0.789	0.290	0.580	0.508	0.380	0.752
Mirzapur	0.711	0.253	0.400	0.352	0.229	0.420
Moradabad	0.813	0.225	0.227	0.508	0.348	0.687
Muzaffarnagar	0.847	0.271	0.531	0.447	0.358	0.574
Pilibhit	0.831	0.256	0.327	0.369	0.239	0.563
Pratapgarh	0.774	0.256	0.466	0.202	0.201	0.517
Rae Bareli	0.686	0.284	0.408	0.251	0.272	0.424
Rampur	0.839	0.221	0.176	0.450	0.310	0.554
Saharanpur	0.738	0.279	0.550	0.486	0.395	0.515
Sant Kabir Nagar	0.781	0.222	0.360	0.250	0.264	0.374
Sant Ravidas Nagar Bhadohi	0.768	0.245	0.401	0.352	0.229	0.785
Shahjahanpur	0.800	0.267	0.341	0.319	0.239	0.620
Shrawasti	0.808	0.294	0.118	0.289	0.305	0.579
Siddharthnagar	0.832	0.226	0.244	0.201	0.312	0.415
Sitapur	0.651	0.280	0.321	0.430	0.180	0.667
Sonbhadra	0.514	0.245	0.219	0.366	0.245	0.292
Sultanpur	0.771	0.265	0.452	0.381	0.201	0.474
Unnao	0.665	0.295	0.429	0.382	0.309	0.662
Varanasi	0.822	0.261	0.547	0.355	0.278	0.800
Minimum Range	0.00	0.50	10.00	150	20	40.00
Maximum Range	100.00	2.50	75.00	800	130	95.00

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

	% HH Access to safe drinking water	PHCs
Agra	0.819	0.569
Aligarh	0.956	0.368
Allahabad	0.473	0.293
Ambedkar Nagar	0.983	0.292
Auraiya	0.720	0.342
Azamgarh	0.982	0.369
Baghpat	0.973	0.522
Bahraich	0.887	0.322
Ballia	0.955	0.529
Balrampur	0.779	0.215
Banda	0.655	0.190
Barabanki	0.711	0.345
Bareilly	0.980	0.287
Basti	0.965	0.334
Bijnor	0.977	0.395
Budaun	0.976	0.273
Bulandshahar	0.977	0.434
Chandauli	0.567	0.380
Chitrakoot	0.507	0.248
Deoria	0.989	0.456
Etah	0.902	0.302
Etawah	0.754	0.301
Faizabad	0.852	0.364
Farrukhabad	0.942	0.361
Fatehpur	0.532	0.317
Firozabad	0.931	0.377
Gautam Buddha Nagar	0.978	0.422
Ghaziabad	0.981	0.516
Ghazipur	0.823	0.419
Gonda	0.939	0.265
Gorakhpur	0.978	0.394
Hamirpur	0.651	0.218
Hardoi	0.726	0.177
Hathras	0.937	0.534

Jalaun	0.757	0.209
Jaunpur	0.681	0.325
Jhansi	0.454	0.231
Jyotiba Phule Nagar	0.990	0.280
Kannauj	0.939	0.300
Kanpur Dehat	0.723	0.263
Kanpur Nagar	0.767	0.459
Kaushambi	0.747	0.330
Kheri	0.920	0.294
Kushinagar	0.981	0.404
Lalitpur	0.373	0.045
Lucknow	0.836	0.435
Mahoba	0.157	0.086
Mahrajganj	0.987	0.327
Mainpuri	0.906	0.309
Mathura	0.606	0.352
Mau	0.984	0.556
Meerut	0.978	0.455
Mirzapur	0.473	0.351
Moradabad	0.987	0.297
Muzaffarnagar	0.987	0.679
Pilibhit	0.976	0.241
Pratapgarh	0.653	0.309
Rae Bareli	0.648	0.389
Rampur	0.990	0.437
Saharanpur	0.967	0.424
Sant Kabir Nagar	0.975	0.345
Sant Ravidas Nagar Bhadohi	0.495	0.271
Shahjahanpur	0.920	0.283
Shrawasti	0.792	0.244
Siddharthnagar	0.958	0.337
Sitapur	0.681	0.363
Sonbhadra	0.451	0.229
Sultanpur	0.705	0.439
Unnao	0.639	0.240
Varanasi	0.564	0.428
Minimum Range	20.00	4.00
Maximum Range	100.00	65.00

The **Food Security Atlas of Rural Uttar Pradesh** is one of a 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, Rajasthan and Orissa. 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.