



**SOCIAL AND ECONOMIC  
CHANGE MONOGRAPHS 2**

**COARSE CEREALS IN A  
DROUGHT-PRONE REGION:  
A STUDY IN KARNATAKA**

**R. S. DESHPANDE  
V. M. RAO**

**INSTITUTE FOR SOCIAL AND ECONOMIC CHANGE  
BANGALORE  
2004**

## **SOCIAL AND ECONOMIC CHANGE MONOGRAPH SERIES**

**Number 2**

**January 2004**

**Series Editor : G. K. KARANTH**

© 2004, Copyright Reserved

The Institute for Social and Economic Change  
Bangalore

*Institute for Social and Economic Change (ISEC) is engaged in interdisciplinary research in analytical and applied areas of social sciences, encompassing diverse aspects of change and development. ISEC works with central, state and local governments as well as international agencies by undertaking systematic studies of resource potential, identifying factors influencing growth and examining measures for reducing poverty. The thrust areas of research include state and local economic policies, issues relating to sociological and demographic transition, environmental issues and fiscal, administrative and political decentralization and governance. It pursues fruitful contacts with other institutions and scholars devoted to social science research through collaborative research programmes, seminars, etc.*

*The Social and Economic Change Monograph Series provide an opportunity for ISEC faculty, visiting fellows and PhD scholars to disseminate their ideas and research work. Monographs in the series present empirical analyses and generally deal with wider issues of public policy at a sectoral, regional or national level.*

Publication of this Monograph has been made possible through the generous support of Sir Ratan Tata Deferred Endowment Fund.

## Foreword

Coarse Cereals have been traditionally the main components of the food basket of the poor in India. Predominantly grown in the resource fragile agro-climatic regions of the country, these crops include jowar, ragi, bajra, *save*, *harka* and other small millets. These are cultivated more in Karnataka, Maharashtra, Tamil Nadu, Madhya Pradesh, Rajasthan and Gujarat. When it comes to research on technology and promotion, coarse cereals as a crop group has received little attention in agriculture as well as social sciences, hence also in the policy matrix. The area under coarse cereals has been declining in most of the regions growing these crops and as a result the crop group is relegated as 'inferior crops'. The neglect of this crop group is also quite strong on the economic front as the relative price structure as well as the market conditions are not very favourable for it. Above all, these crops are grown by the small and marginal farmers residing in such regions having repercussions of changes upon their household economy.

Coarse cereals have been known for their rich nutrient contents and drought resistance quality. These are comparable and at times even better than wheat and rice in their calorie and other nutrients contents. As these crops tolerate longer moisture stress, they are preferred as well as predominated the cropping pattern of drought-prone areas in Central India. Ecologically these are well suited to the drought-prone regions of Deccan plateau. Above all, the cost of production has also been quite low and thus they become affordable for consumption as well as production for the rural poor. The crops also offer a good potential in food processing industry and as a promising exportable commodity.

Keeping in view the specific nature of the crop group this study was undertaken at the instance of the Commission on Agricultural Costs and Prices (CACP), Government of India by Dr. R. S. Deshpande, Professor and Head, Agricultural Development and Rural Transformation (ADRT) Unit of ISEC and Prof. V. M. Rao, National Professor, ICSSR, and Former Member, CACP. The study is essentially focussed on locating the growth trends in coarse cereals, and identifying the constraints in cultivation, technology and marketing. Karnataka being a predominant region growing this crop group, the study incorporates both secondary as well as primary level data from the State to understand the decision-making behaviour of the farmers as well as other stakeholders. An attempt has also been made here to understand the price responses of coarse cereals at the micro-level

as well as the behaviour of the crops in the domestic market. The study comes out with quite a few interesting results including a disaggregated food distribution system incorporating local level production of coarse cereals and the existing network of Panchayat Raj Institutions.

This is the second in the Social and Economic Change Monograph Series, being brought out by ISEC. I am sure that this work will be of interest to policy makers as well as the researchers in the field.

December 31, 2003

**Gopal K. Kadekodi**  
Director  
Institute for Social and Economic Change

# CONTENTS

List of Tables

List of Graphs

List of Appendix Tables

Acknowledgements

<b>CHAPTER I</b>	<b>INTRODUCTION</b>	1
	1.1 Introduction	1
	1.2 Objectives	3
	1.3 Methods and Materials	3
	1.4 Limitations	7
<b>CHAPTER II</b>	<b>COARSE CEREALS: STATUS AND GROWTH</b>	8
	2.1 Introduction	8
	2.2 Growth Performance: A Country Level Analysis	8
	2.3 Analysis Across States	13
	2.4 Export of Coarse Cereals	19
	2.5 Emerging Issues	24
<b>CHAPTER III</b>	<b>COARSE CEREALS IN KARNATAKA</b>	30
	3.1 Introduction	30
	3.2 Trends in Coarse Cereals at the State Level	30
	3.3 District Level Analysis	35
	3.4 Price Behaviour	41
	3.5 Consumption and Public Distribution System	42
	3.6 Summing Up	48
<b>CHAPTER IV</b>	<b>MICRO-LEVEL ANALYSIS</b>	52
	4.1 Introduction	52
	4.2 Importance of Coarse Cereals in the Crop Economy	53
	4.3 Productivity Differentials	57
	4.4 Parameters Governing Decisions	59
	4.5 The Role of Prices	59
	4.6 Coarse Cereals in the Consumption Pattern	61
	4.7 Differential Market Access	62
	4.8 Conclusions	63
<b>CHAPTER V</b>	<b>COARSE CEREALS: TOWARDS A POLICY FRAME</b>	65
	5.1 Introduction	65
	5.2 Focus on Major Findings	65
	5.3 Characteristics of the Present Food Security System	68
	5.4 An Alternative System - Features and Feasibility	70
	5.5 Concluding Observations	75
	<b>BIBLIOGRAPHY</b>	76

## LIST OF TABLES

1.1	Information on Selected Talukas and Villages at a Glance	6
2.1	Share of Major Crops in Gross Cropped Area: India	9
2.2	All-India Compound Growth Rates of Area, Production and Yield of Principal Crops	11
2.3	Major Seven States — Area-wise Under Coarse Cereals	13
2.4	Exports of Coarse Cereals from India	19
3.1	Share of Major Crops in Gross Cropped Area: Karnataka	31
3.2	Growth Rates of Area, Production and Principal Crops in Karnataka — 1972-73 to 1994-95	32
3.3	Major Seven Districts by Area of Major Crops in Karnataka	36
3.4	Farm Harvest Prices of Different Crops: Karnataka	42
3.5	Changes in Consumption Pattern of Cereals in Rural Areas of Karnataka	47
3.6	Growth Rates in Consumption Expenditure on Coarse Cereals by Quantities — 1972-73 to 1993-94	47
4.1	Distribution of Sample Households and Size of Holding	53
4.2 (a)	Cropping Pattern of Sample Households	54
4.2 (b)	Cropping Pattern of Sample Households: A Decade Ago	55
4.3	Consumption and Marketing of Coarse Cereals	56
4.4	Crop-wise Productivity of Cereals	57
4.5	Yield Gap of Coarse Cereals	58
4.6	Prices Received by the Farmers, Their Expected Prices and the Cost of Cultivation	60
4.7	Share of Cereals and Pulses in the Consumption Pattern	62
4.8	Differences between Villages with Easy Access to Market and Interior Villages	63

## LIST OF GRAPHS

2.1	Trends in Area, Production and Yield of Cereals in India 1980-81 to 1997-98 Based on the Index of Five Year Moving Averages	12
2.2 (a)	Trends in Area, Production and Yield of Jowar in Major Producing States of India (Maharashtra, Karnataka, Madhya Pradesh)	14
2.2 (b)	Trends in Area, Production and Yield of Jowar in Major Producing States of India (Andhra Pradesh, Rajasthan, Tamil Nadu)	15
2.3 (a)	Trends in Area, Production and Yield of Bajra in Major Producing States of India (Rajasthan, Maharashtra, Gujarat)	16
2.3 (b)	Trends in Area, Production and Yield of Bajra in Major Producing States of India (Uttar Pradesh, Haryana, Karnataka)	17
2.4 (a)	Trends in Area, Production and Yield of Ragi in Major Producing States of India (Karnataka, Maharashtra, Tamil Nadu)	20
2.4 (b)	Trends in Area, Production and Yield of Ragi in Major Producing States of India (Uttar Pradesh, Andhra Pradesh, Bihar)	21
2.5 (a)	Trends in Area, Production and Yield of Maize in Major Producing States of India (Uttar Pradesh, Rajasthan, Madhya Pradesh)	22
2.5 (b)	Trends in Area, Production and Yield of Maize in Major Producing States of India (Bihar, Gujarat, Karnataka)	23
2.6 (a)	Export of Coarse Cereals from India - 1980-89 (avg) - 1996-97	25
2.6 (b)	Export of Cereals Other than R W M, Rice and Wheat from India	26
2.7	Procurement Prices of Coarse Cereals, Rice and Wheat Announced by the Government of India	28
3.1	Trends in Area, Production and Yield of Major Crops in Karnataka (Coarse Cereals and Foodgrains)	31
3.2 (a)	Trends in Area, Production and Yield of Major Crops in Karnataka (Jowar, Bajra, Ragi)	33

3.2 (b)	Trends in Area, Production and Yield of Major Crops in Karnataka (Rice, Wheat, Maize)	34
3.3 (a)	Trends in Area, Production and Yield of Jowar in Major Producing Districts of Karnataka	37
3.3 (b)	Trends in Area, Production and Yield of Ragi in Major Producing Districts of Karnataka	38
3.3 (c)	Trends in Area, Production and Yield of Bajra in Major Producing Districts of Karnataka	39
3.3 (d)	Trends in Area, Production and Yield of Maize in Major Producing Districts of Karnataka	40
3.4 (a)	Movement of Farm Harvest Prices of Coarse Cereals and Paddy: Karnataka	43
3.4 (b)	Movement of Farm Harvest Prices of Coarse Cereals and Wheat: Karnataka	44
3.5 (a)	Relative Prices of Coarse Cereals in Karnataka Relative to Paddy	45
3.5 (b)	Farm Harvest Prices of Coarse Cereals in Karnataka Relative to Wheat Prices	46

## **LIST OF APPENDIX TABLES**

2.1	Percentage of Off-take under PDS in Major States in India from April 1999 to December 1999	29
3.1	Percentage of Off-take from PDS in the Districts of Karnataka	50
3.2	Number of Ration Cards in the Districts of Karnataka in March 1999	51

## ACKNOWLEDGEMENTS

This volume is the outcome of a study conducted at the Agricultural Development and Rural Transformation (ADRT) Unit of the Institute for Social and Economic Change, Bangalore. This study was sponsored by the Commission on Agricultural Costs and Prices (CACP), Government of India. We gratefully acknowledge their financial support and encouragement received while carrying out this study. We must mention Prof. Abhijit Sen, Former Chairman, CACP, Prof. Mungekar, Former Member, CACP, Dr. Haque, Chairman, CACP, Dr Raghavan, Former Director, CACP, and Dr Roy, Member-Secretary, CACP, who took keen interest in this study. We are thankful to them.

We are grateful to the encouragement and support we received from Prof. Govinda Rao, Former Director of ISEC and Prof. G.K. Kadekodi, Director of ISEC. The fieldwork for the project and the subsequent tabulation were done by Sri Dharmaraj N. Bagali. His ungrudging research assistance and late working hours helped us in completing the work on this study.

The findings of this study were presented at a seminar held at the Institute. In addition, a paper was also presented at a seminar on *Food Security in India: The Emerging Challenges in The Context of Economic Liberalisation*, held at CESS, Hyderabad. This has been published in the proceedings of the seminar under the title 'Towards A Food Secure India — Issues and Policies', published recently by the Institute for Human Development, New Delhi, and Centre for Economic and Social Studies, Hyderabad. We are grateful to the participants of these seminars for useful suggestions. We have attempted to incorporate the suggestions of an anonymous referee of the project report received earlier. In addition to this, Professor S.K. Ray, Retd. Professor, Institute of Economic Growth, New Delhi, went through the manuscript of this monograph and gave a number of suggestions to improve the contents and presentation. We are grateful to him for his comments and suggestions. The work of Word Processing of the report was done by Mr. M.K.Mohan Kumar and we are grateful to him for his support.

**December 23, 2003**

**R.S. Deshpande  
V.M. Rao**

# CHAPTER I

## INTRODUCTION

### 1.1: Introduction

At the turn of the millennium we are confronted with quite a delicate situation in the agricultural sector. Given the population pressure and the liberalisation scenario, the agricultural sector has presently a greater responsibility to shoulder. Gross capital formation in the agricultural sector has been showing a declining trend that has become a matter of wide concern. At the same time, superior cereals which were vanguards of the technological change during the mid-seventies, have been exhibiting signs of reaching a technological plateau in yield rates and hold little promise for immediate growth push. On the resource front, in at least some regions of the country, irrigation development seems to have reached its optimum economic level of utilisation. Exploring for higher irrigation potential in these pockets is neither economically viable nor permissible from the environment point of view. In the process of irrigation development, the potential of the most promising regions of the country has been more or less reached to their economically feasible optimum output from the point of view of capital output ratios. In such a situation, only a technological breakthrough can help in effecting a shift in the growth curve. In the entire process, the bypassed regions and the bypassed crops have always remained neglected in terms of research inputs, investible resources, as well as technological breakthrough. These crops and regions do not necessarily suffer from the pessimism of impossibility in technological calculus but have received scant attention on the policy front. A large potential exists for these crops and regions in terms of crop production, allied agricultural activities, as well as participation in the market. During the current decade and in the wake of the new development philosophy, stemming from the export-led growth, it has become necessary that the bypassed regions and the crops participate in the mainstream process of development.

In India, the rainfed regions, coarse cereals, pulses and oilseeds did not receive many of the advantages of the seed-water-fertiliser technology during the mid-seventies and even beyond that. Sometimes the relative neglect of these crops is also interpreted as the negative externality of the 'green revolution'. Growth of these crops suffered on account of area augmentation, lack of comparable improvement in yield and the most needed factor namely, economic incentives. Similarly, the bypassed regions were also affected mainly on account of the crop pattern-related decisions (pre-

dominated by low-value-low yield crops) as well as the resource availability. The rainfed farming technology could not achieve the comparable level of adoption like the superior cereals mainly because of the unattractive quantum of yield gap and incremental income attached with the recommended technology. Similarly, the coarse cereals, pulses and oilseeds as a group could not take advantage of the available technology because of the access and input requirements of the technology. However, the well-received programmes with wide coverage such as the National Pulses Development Programme (NPDP), National Oilseeds Development Programme (NODP) and Oilseed Production Programme (OPP) did help to improve the conditions to some extent and achieved some breakthrough for the oilseed sector. Such a breakthrough could not be obtained in the case of pulses. In the case of coarse cereals, no serious attempt was made.

Among these three crop groups, coarse cereals have been neglected on the policy front for a long time despite the intrinsic advantages that these crops have in the context of the Indian cropping system. At least five important aspects highlighting the role of coarse cereals in the aggregate cropping system need to be underscored here: (i) In the rainfed regions of the country coarse cereals form the staple diet of a majority of the poor; Bajra, Jowar, Ragi, Sorghum, Harka, etc. (the minor millets as a group) are largely consumed by the poor of Rajasthan, Gujarat, Maharashtra, Karnataka, Andhra Pradesh and Tamil Nadu. (ii) Being an important diet component of the poor, these crops are the lowest priced cereals and thus are affordable by the poor (comparable to the cereals supplied through the Public Distribution System (PDS)). (iii) These crops have a proven record of drought resistance and are less amenable to common diseases and pests. Therefore, the risk factor being marginal, small and marginal farmers show preference towards these crops and cultivate them with traditional ease. (iv) The resource requirement of these crops has also been extremely frugal as they require minimum cash component in their total cost of cultivation. (v) It is well known that coarse cereals provide the richest source of calories among the cereals and hence can provide at the lowest cost, the same units of nutrients as rice or wheat. In addition to these factors, coarse cereals also form an important component of feed for livestock. Despite these factors and mainly due to the absence of economic incentives, coarse cereals have remained neglected crops in the country. In sum, coarse cereals have been traditionally playing an important role in the farming calculus of the small and marginal farmers, in the consumption basket of the poor, as a livestock feed and sustaining the rainfed economy. This calls for an analysis leading to policy steps towards these crops.

## **1.2: Objectives**

The present study investigates the economy of coarse cereals in the drought-prone region of Karnataka with the following objectives:

- i) to analyse the growth trends of coarse cereals in India and Karnataka and the prospects for these crops in a rainfed environment;
- ii) to locate the role of coarse cereals in the international trade as feed stock;
- iii) to analyse the price behaviour of coarse cereals in India and Karnataka;
- iv) to understand the decision-making behaviour of farmers regarding the coarse cereals; and
- v) to study the consumption pattern and significance of coarse cereals in order to examine the feasibility of incorporating coarse cereals at the local level PDS.

## **1.3: Methods and Materials**

This study utilises both primary as well as secondary data. At the country and state levels we have utilised the secondary data on area, production and yield of principal coarse cereals. The crops included in our analysis are ragi jowar, bajra and maize, In addition to the analysis of these crops, with the help of secondary data, we have also included wheat, rice and other crops wherever a comparative perspective was needed . The analysis of the prices is based on the data of farm harvest prices and wholesale price indices. In order to smoothen the year to year fluctuations we have used five year moving averages and indexed these series. This process has avoided any bias in the choice of year.

For the purpose of analysis at the primary level, two districts of Karnataka state growing coarse cereals were selected. The choice of the districts, one from South Karnataka and another from North Karnataka region, was guided by the intensity of cultivation of coarse cereals as well as the need for getting the perspective of two distinct cropping systems prevailing in two agro-climatological regions of Karnataka. It was noted that in South Karnataka, Chitradurga district had a large share of gross cropped area under coarse cereals. Whereas, in north Karnataka, Bijapur district dominated in the coarse cereals led cropping system. One block (taluka) each from these two districts and two villages from each of the blocks were selected, guided by the concentration of coarse cereals in the cropping pattern. But below the block level the choice of villages was guided by two considerations: First, the village which faced difficulty to access market infrastructure was expected to have a self-sufficiency-dominated approach in its cropping as well as consumption decisions. The adoption of

the latest technology would also be quite slow in such cases. The second type of village selected for the purpose of analysis was one well connected with the main town in the region. This helped capture the influence of market-led decision parameters. Moreover, the consumption pattern and consequently, the cropping pattern in such a village got determined by the availability of foodgrains in the market. The access to technology-based information was also quite easy and thus technology adoption could be expected to be faster in such a situation. The following table gives the differential situation that is being analysed.

Sl. No.	Market Access Situation	Self-Sufficient Village Situation
1	Production decisions guided by market forces	Production decision taken mainly to maintain self-sufficiency
2	Respond to price incentives	Slow response to price incentives
3	Technology adoption due to immediate availability of information and inputs	Constraints on input availability
4	Consumption guided by the availability of grains in the market	Consumption guided by local staples.
5	Monetisation of the wage market and hence reduced role of foodgrains in wage payments.	Prevalence of the role of foodgrains in wage payments.

This table presents a distinct picture of the two regions along with two different types of villages. Table 1.1 gives basic information about the selected blocks and villages. Even though we expected *a-priori* that the village with distant access to the town may have developed a process akin to self-sufficiency, observations do not fully support this view.

Chitradurga district comes under the rainfed region of Southern Karnataka. The average annual rainfall of the district is 566 mms and the cropping pattern is dominated by coarse cereals. Challakere taluka is a typical representation of the district of Chitradurga with low annual average rainfall, meagre irrigation facilities and a cropping pattern dominated by low value crops. The average size of holding is 1.74 hectares. The proportion of area under coarse cereals is about 12 per cent but a large share of the area has been shifted to cultivation of rainfed groundnut due to price factor. The villages selected for the purpose of micro-level analysis are Chikkammanhalli and Bommanakunte. Of these two villages, Chikkammanahalli falls in the category of having a good market access whereas Bommanakunte is an interior village with a large share of tribal population. The PDS outlet for Bommanakunte is about 2.5 kms. away in a neighbouring village but Chikkammanahalli has a PDS shop. Bommanakunte has a slightly larger share of agricultural labourers.

**Table 1.1: Information on Selected Talukas and Villages at a Glance**

Particulars	Challakere	Chikka- mmana	Bomman- kunte	Bilagi	Korti	Chikkal- gundi
Total Population (1991 Census) (in thousands)	279.3	1.4	1.0	119.0	1.8	3.6
Male (%)	51.5	52.1	53.1	50.0	44.1	44.7
Female (%)	48.6	47.9	46.5	50.0	46.2	45.5
SC/ST (%)	0.5	47.3	19.9	21.8	9.7	12.7
Density of Population (Per Sq.Kms)	135.0	112.7	108.6	152.0	51.3	131.8
Total Geographical Area (in thousand ha)	194.4	1.3	0.9	78.2	3.6	2.7
Cultivable Area (%)	77.5	80.5	86.8	55.3	82.4	93.5
Forest Area (%)	3.6	2.0	3.5	15.0	1.2	1.5
Irrigated Area (%)	8.7	25.0	16.0	30.1	41.0	34.5
<b>Proportion of area under different crops in 1996-97 (% of total area)</b>						
Jowar	3.5	13.7	10.5	35.2	43.1	39.1
Bajra	4.7	2.7	1.8	11.3	8.1	10.7
Maize	0.4	3.6	-	10.8	3.2	20.6
Ragi	2.8	6.8	6.5	-	-	-
Wheat	0.1	0.4	2.7	3.6	14.1	15.3
Paddy	4.5	3.0	18.6	0.0	-	-
Groundnut	74.6	68.7	58.4	5.5	25.5	10.4
Cotton	0.1	1.0	1.4	3.8	-	-
Gram	-	-	-	2.2	-	-
HYV Seeds	9.4	-	-	27.6	-	-
Total Area (in hect)	100	100	100	100	100	100
<b>Public Distribution System (in September 1999)</b>						
No. of PDS shops	106	1	*	74	1	1
No. of Card holders	44,725	315	101	31,607	409	456
Allotments (in quintal Per month)	4,818	93.46	47.1	2,552.4	34	37.3

\* This village is attached to Korlakunte village.

Bijapur is a well known chronic drought-prone district. Historically, drought has been quite frequent (once in every four years) in Bijapur district. Thanks to the various schemes presently undertaken by the Government of Karnataka the intensity of drought is not felt so severely in the district as that in the earlier years. Bilagi taluka also has a history of drought but in the recent past some protective irrigation has been provided. This has changed the crop economy of the taluka significantly. The selected villages in Bilagi taluka, viz., Chikkalgundi and Korti are mainly rainfed regions. Some protective irrigation has been made available to a few farmers in the villages in recent years. Korti is situated on the main road with access to market whereas Chikkalgundi is an interior village. Both the villages have PDS outlets and the consumption pattern is dominated by jowar.

We selected 25 households from each village out of which 10 households were landless agricultural labourers. The remaining 15 households were spread over three landholding classes, viz., below 2.5 ha., between 2.5 and 5.0 ha., and above 5 ha. This has given us a four dimensional view of consumption, utilisation and production of coarse cereals.

#### **1.4 Limitations**

This is an exploratory study and therefore, has no broad-based sample. However, the study utilises the insights gathered during the fieldwork and therefore, yields a number of issues for the purpose of analysis. Many times while reporting the consumption, farmers have not reported the actual consumption by the members of the household but included in it the food given to the labourers permanently working with the family. This item of data had to be cleaned by assuming the consumption of the labourers. Another important feature that came out of the field survey is the reporting of yields. There is a practice of disposing a portion of the produce at the time of harvest itself and hence, the actual estimates need to be arrived at by eliciting related information from the wholesalers as well as other farmers in the village.

## CHAPTER II

### COARSE CEREALS: STATUS AND GROWTH

#### 2.1: Introduction

Immediately after the initial euphoria of the Green Revolution settled down, two important issues emerged in the context of the new found path of growth. The possibility of deceleration in the growth performance of the crop productivity was voiced during the early eighties (Sawant 1983). Almost at the same time, the bypassed regions and crops which recorded lower rates of growth dominated the discussions in the context of slow growth crops (ISAE, 1982). The performance of coarse cereals, pulses and oilseeds came under scrutiny and policy steps were taken in terms of initiating the National Oilseeds Development Programme, Oilseeds Technological Mission, National Pulses Development Programme and Coarse Cereals Development Programme. But the results in the case of pulses and coarse cereals were not encouraging as against those of oilseeds (AFC 1998; Khare 1995). While reviewing the performance of coarse cereals Jodha (1974) pointed towards the moisture stress where these crops were grown, their low unit value, the market demand and the resource poor cultivators as the permanent constraints. But the argument that these were permanent constraints blurs the technological feasibility and strengthens the policy neglect that historically confronted these crops. Nadkarni (1986) pointed out the institutional and technological constraints of slow growth crops and indicated the promise that these crops held. In addition to this, it was pointed out that the demand factors were mainly responsible for the slow growth of coarse cereals and therefore it was felt necessary to operate on price as well as on the demand front (Ray 1984). In the present context, we are turning towards these issues in an economically charged agricultural sector with new vistas of growth and technology. Our attempt in this chapter is to review and analyse the aggregate growth performance of coarse cereals in the country as well as at the state level along with the prospects of growth.

#### 2.2: Growth Performance: A Country Level Analysis

Coarse cereals occupied about 40 million hectares of area during the early fifties, which formed about 30 per cent of the gross cropped area. The decline in the actual area under coarse cereals as well as their share in the gross cropped area was more sharp during the late seventies to mid eighties. Table 2.1 shows the declining importance in the gross cropped area of coarse cereals. The proportion of area under paddy and wheat

increased by 1.3 and 5.6 per cent points, respectively over the period. The share of area under jowar declined from 11.8 per cent to 6.2 per cent marking the highest decline. Area under bajra was about 8 per cent in the early fifties and this came down to 5.2 per cent during the last quinquennium recording a decline of above 3 per cent. In terms of share, the decline in area under ragi seems to be miniscule but over the last 45 years, the area under ragi has come down by 318 thousand hectares. The overall trends in area allocation suggest a leaning away from foodgrain crops and increase in the area under non-foodgrains by about 10 per cent points. Two points emerge very clearly from this table - the proportion of area allocated to non-foodgrains has been increasing as well as the area allocated to superior cereals.

**Table 2.1: Share of Major Crops in Gross Cropped Area: India**  
(Per cent to GCA )

Sl. No.	Crops	Five Year Moving Average Centred at				
		1955-56	1965-66	1975-76	1985-86	1995-96
1	Jowar	11.8	11.4	9.6	9.1	6.2
2	Bajra	7.9	7.6	6.9	6.0	5.2
3	Ragi	1.6	1.6	1.5	1.4	0.8
4	Maize	2.6	3.1	3.5	3.3	3.3
5	Coarse Cereals	29.8	28.4	25.7	22.3	17.0
6	Paddy	21.7	22.6	23.0	23.1	23.0
7	Wheat	8.2	6.6	11.8	13.3	13.8
8	Food grains	75.2	74.1	74.3	71.8	65.9
9	Non-Food grains	24.8	25.9	25.7	28.2	34.1
10	Gross Cropped Area	100.00	100.0	100.0	100.0	100.0

Source: GOI (1999). *Agricultural Statistics at a Glance*, Ministry of Agriculture, Govt of India, New Delhi, For Ragi – Estimates of Area, Production and Productivity of Principal Crops (For Various Years), Ministry of Agriculture, Govt. of India, New Delhi.

The area share of coarse cereals has been declining and the decline is quite sharp in jowar and bajra compared to ragi. Maize being a coarse millet, the promise of agro-processing has increased its area share.

The share of area indicates the allocation decisions, whereas the performance of the crop can be judged from the growth performance. The growth rates of major crops along with coarse cereals are given in Table 2.2. We have obtained the growth rates for three sub-periods in order to locate the changes in the growth pattern during these phases. During 1949-50 to 1964-65 the growth rates in production of coarse cereals had kept

pace with the growth rates of superior cereals. Growth rates in production of jowar, bajra, ragi and maize were 2.51, 2.34, 3.08 and 3.88 per cent per annum, respectively, as against the growth rates in production of rice and wheat recorded at 3.50 and 3.98 per cent per annum, respectively. The growth rates in productivity of jowar, bajra, maize and ragi were 1.49, 1.24, 1.18 and 2.23 per cent per annum respectively, compared with the growth rates of paddy and wheat pegged at 2.25 and 1.27 per cent, respectively. This reveals that to begin with, till 1967-68, the coarse cereals were not lagging far behind rice and wheat in terms of productivity growth. However, the scene changed due to technological breakthrough in the production of rice and wheat as well as due to institutional support that these crops received. The result was quite obvious and growth rates during 1967-68 to 1980-81 reflected a substantial decline in the growth of production of these crops, even though there was a positive rate of change in the productivity of coarse cereals. The picture of coarse cereals across states differs widely. Only the Central Indian states having large rainfed areaa have higher concentration of coarse cereals.

We have presented in Graph 2.1 the trends in area, production and yield of cereals from 1982-83 to 1995-96. These trends are based on indexes of five year moving averages and therefore, avoid year to year fluctuations. A clear break can be seen around 1986-87 and 1987-88 in the trends in coarse cereals. The area has been either reduced or stagnated at the level of 1982-83, but the productivity has improved significantly during the eighties. This comes out from the aggregate area under coarse cereals as well as for jowar, bajra and ragi. Maize has a totally different kind of behaviour and its production growth matches more with growth in productivity. The growth in the superior cereals seems to be similar.

**Table 2.2: All-India Compound Growth Rates of Area, Production and Yield of Principal Crops**

(Base: T.E. 1981-82=100)

(Per cent per annum)

Crop	1949-50 to 1964-65			1967-68 to 1980-81			1980-81 to 1996-97*		
	A	P	Y	A	P	Y	A	P	Y
Rice	1.21	3.50	2.25	0.77	2.22	1.46	0.52	3.16	2.63
Wheat	2.69	3.98	1.27	2.94	5.65	2.62	1.01	3.67	2.91
Total Cereals	1.25	3.21	1.77	0.37	2.61	1.70	-0.32	2.88	2.69
Jowar	0.99	2.51	1.49	-1.15	2.04	3.22	-2.52	-0.56	2.01
Bajra	1.08	2.34	1.24	-1.15	-0.38	0.77	-1.09	1.62	2.74
Maize	2.67	3.88	1.18	0.01	0.02	-	0.25	2.60	2.34
Ragi	0.84	3.08	2.22	0.91	3.38	2.45	-2.45	-0.29	2.22
Small Millets	-0.30	-0.20	0.09	-1.18	-0.81	0.38	-5.60	-4.51	1.16
Barly	-0.64	-0.28	0.36	-3.88	-2.72	1.21	-5.00	-2.06	3.09
Coarse Cereals	0.90	2.25	1.23	-1.03	0.67	1.64	-1.96	0.55	2.35
Total oilseeds	2.67	3.20	0.30	0.26	0.98	0.68	2.43	5.75	2.53
Total Foodgrains	1.35	2.82	1.36	0.38	2.15	1.33	-0.29	2.68	2.52
Non Foodgrains	2.44	3.74	0.89	0.94	2.26	1.19	2.02	4.46	2.25
All Crops	1.58	3.15	1.21	0.51	2.19	1.28	0.31	3.37	2.38

Notes: (\*) - Provisional for non food rains and all crops.

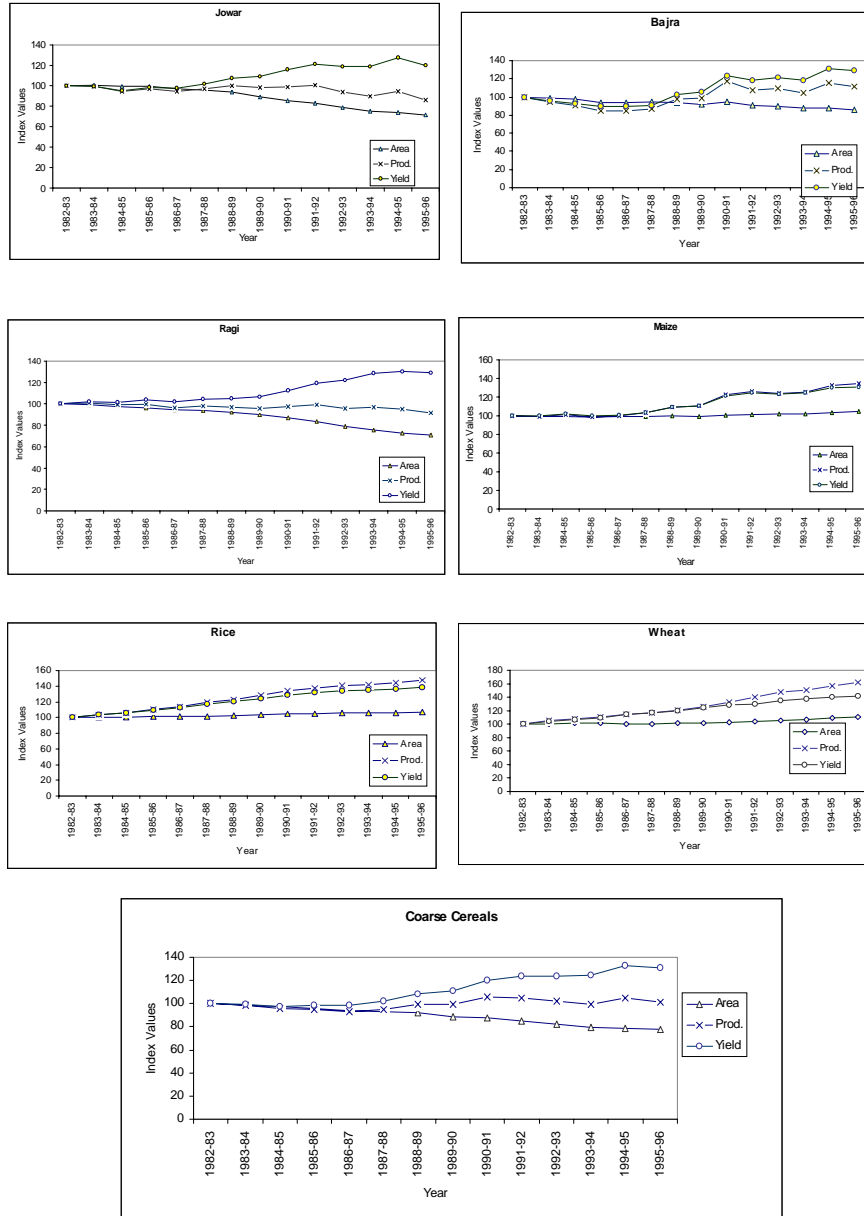
\$ - Growth rates for the period from 1970-71

A - Growth rates in area under the crop

P - Growth rates in the production of the crop

Y - Growth rates in the yield of the crop

**Graph 2.1: Trends in Area, Production and Yield of Cereals in India, 1980-81 to 1997-98**  
**Based on Index of Five Years Moving Averages**  
**(Base 1980-82 to 1994-96)**



### 2.3: Analysis Across States

In order to understand the geographical distribution of the states growing coarse cereals, the five-year averages of area under these crops for the major states of the country was computed. Based on the share of area under these crops to the total gross cropped area of the state, the first six dominant states growing coarse cereals were chosen (See Table 2.3).

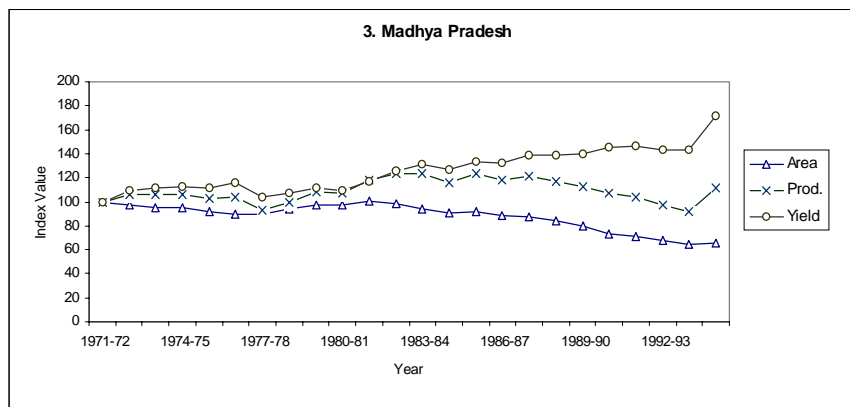
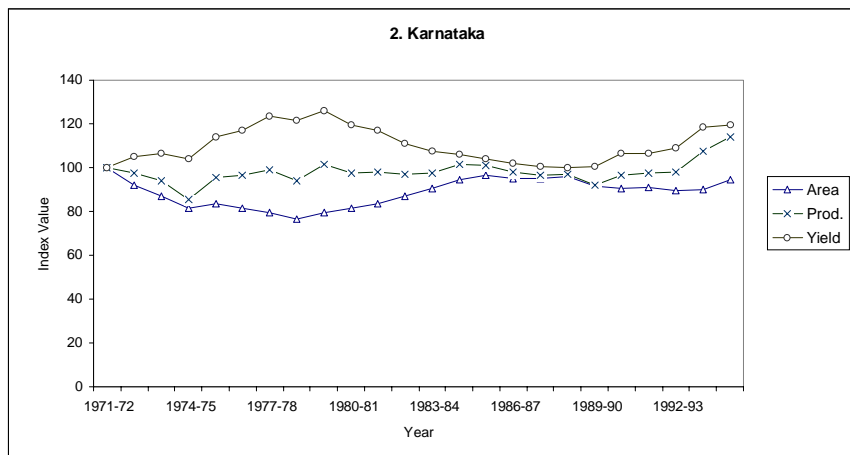
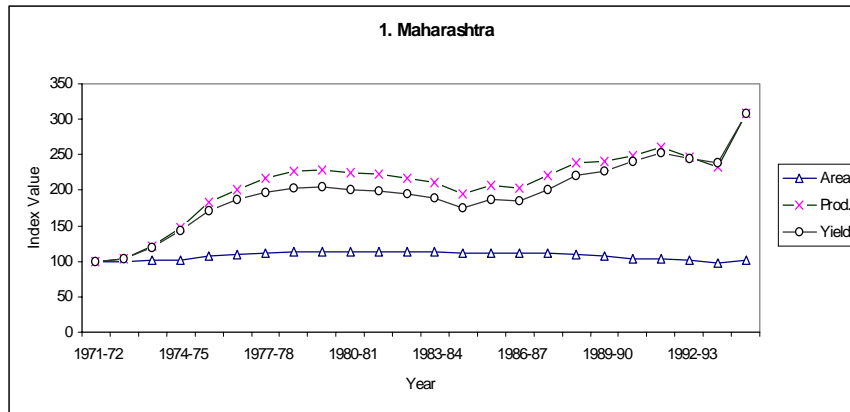
**Table 2.3: Major Seven States – Area-wise under Coarse Cereals**

Sl. No.	Jowar	Bajra	Maize	Ragi
I	Maharashtra	Rajasthan	Uttar Pradesh	Karnataka
II	Karnataka	Maharashtra	Rajasthan	Maharashtra
III	Madhya Pradesh	Gujarat	Madhya Pradesh	Tamil Nadu
IV	Andhra Pradesh	Uttar Pradesh	Bihar	Uttar Pradesh
V	Rajasthan	Haryana	Gujarat	Andhra Pradesh
VI	Tamil Nadu	Karnataka	Karnataka	Bihar
VII	Uttar Pradesh	Tamil Nadu	Andhra Pradesh	Orissa

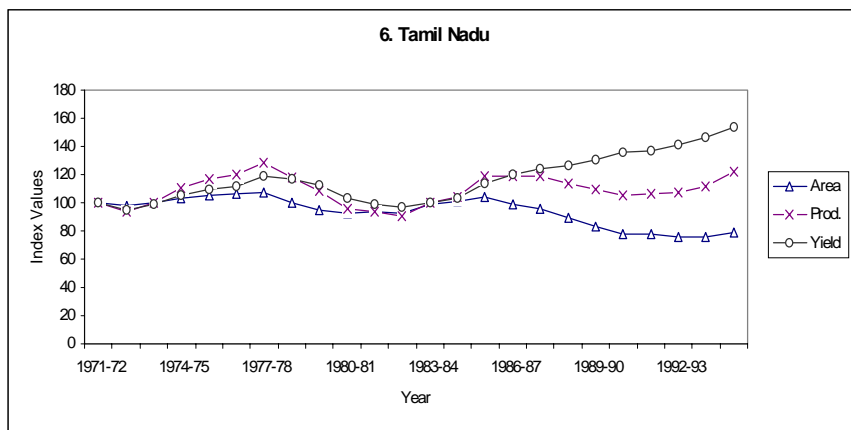
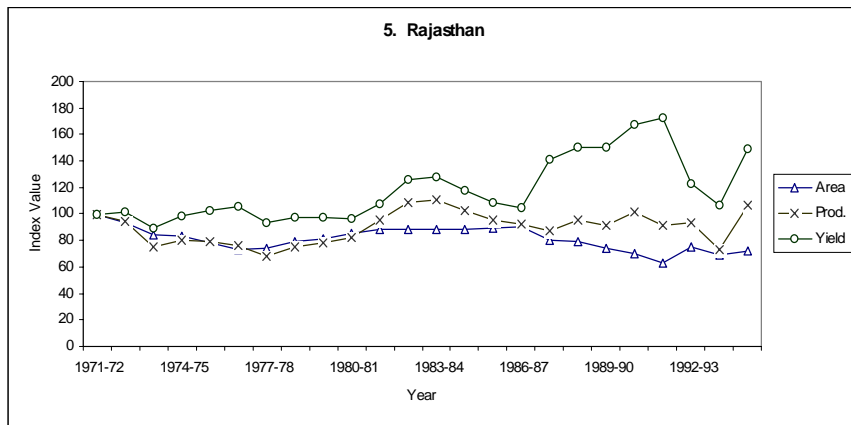
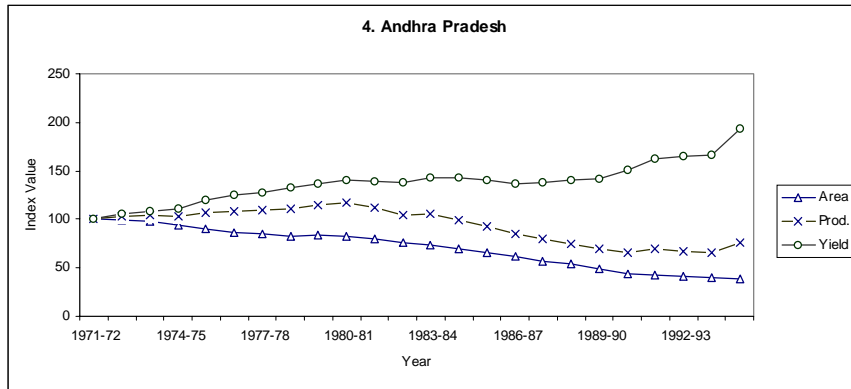
Note: Computed from the data (Centre for Monitoring of Indian Economy (CMIE) Agriculture, Mumbai, September 1999) based on five year average area under the crop ending 1996-97

The analysis of growth trends across the states is attempted here in terms of crops. Jowar is a major crop in Maharashtra, Karnataka, Madhya Pradesh, Andhra Pradesh, Rajasthan and Tamil Nadu. The production performances of Maharashtra and Karnataka have been better as compared to stagnation experienced in Rajasthan and Tamil Nadu. The production of jowar is significantly going down in the case of Andhra Pradesh. In Andhra Pradesh, the area under sorghum may have declined due to the cheap availability of rice under Two-Rupee Rice Scheme. The stagnation as well as decline is contributed more by the area decline than by the performance of productivity. The productivity performance of jowar is relatively better in Andhra Pradesh, Maharashtra, Tamil Nadu and Madhya Pradesh. Therefore, the crop has larger scope to grow in Maharashtra, Karnataka, Madhya Pradesh and Rajasthan. It is necessary, however, to note the yield fluctuations in the state of Rajasthan

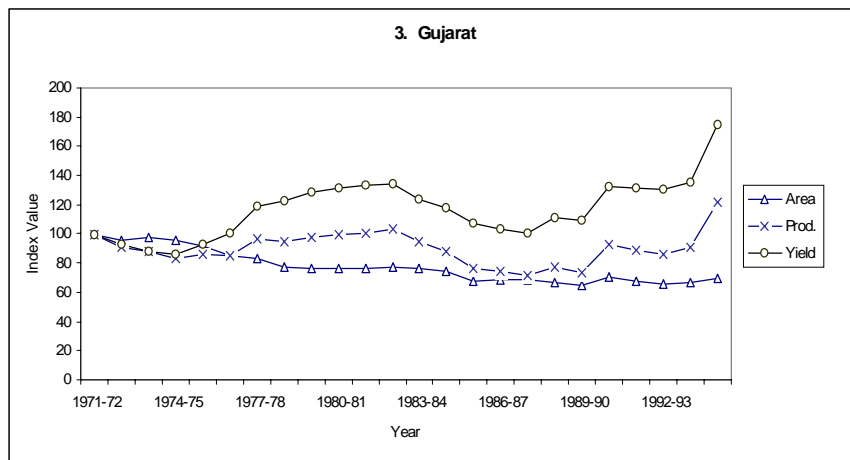
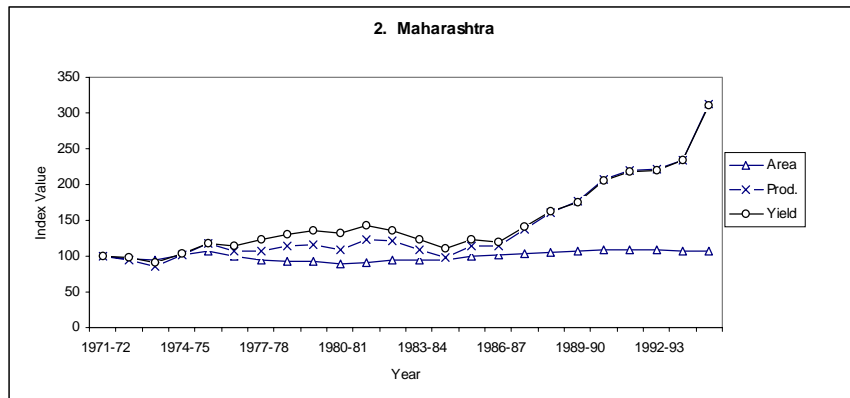
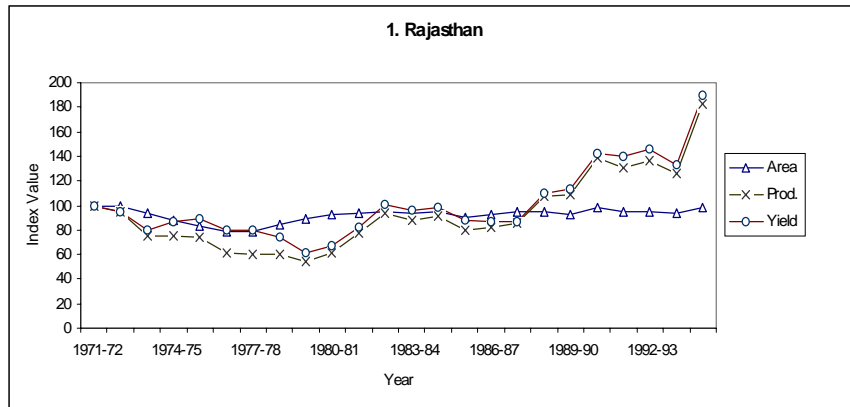
**Graph 2.2 (a): Trends in Area, Production and Yield of Jowar in Major Producing States of India**



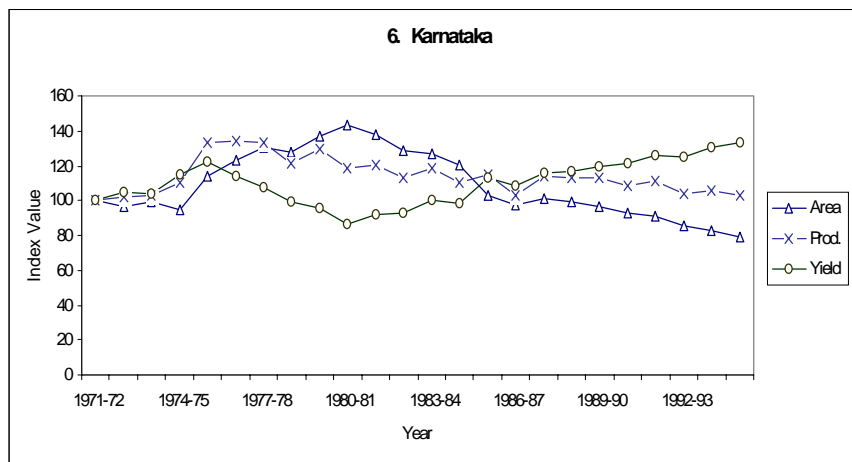
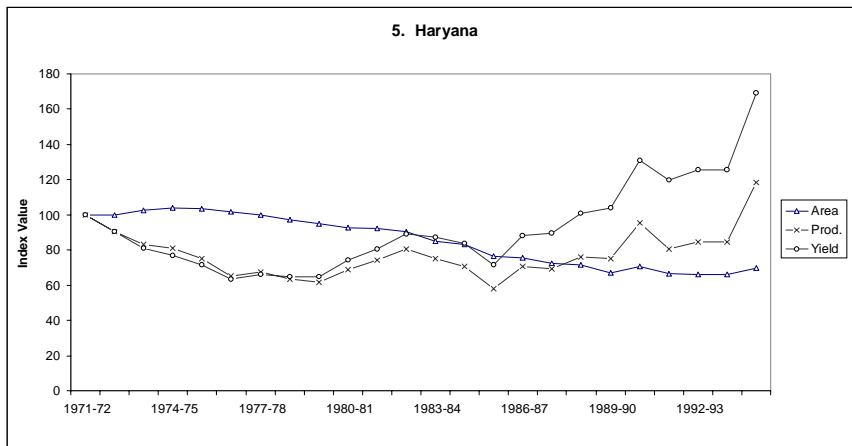
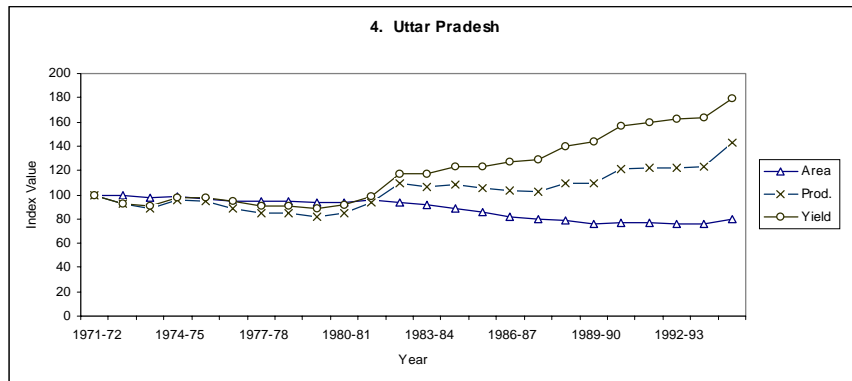
**Graph 2.2 (b): Trends in Area, Production and Yield of Jowar in Major Producing States of India**



**Graph 2.3 (a): Trends in Area, Production and Yield of Bajra in Major Producing States of India**



**Graph 2.3 (b): Trends in Area, Production and Yield of Bajra in Major Producing States of India**



Bajra is mainly consumed in Gujarat, Rajasthan and Maharashtra as well as in parts of Uttar Pradesh and Haryana. Naturally, these are the prominent states growing this crop. Area under bajra in Uttar Pradesh, Maharashtra and Rajasthan has more or less stagnated but it is fluctuating and reducing in Karnataka, Haryana and Guajrat. The production performance of bajra is satisfactory in the case of Uttar Pradesh, Rajasthan and Maharashtra. Gujarat has been picking up in the case of production. The recovery in bajra yield growth can be noted from mid-eighties onwards. The productivity has been growing at a significantly high rate in Uttar Pradesh, Mahararashtra, Rajasthan and Haryana, whereas it is stagnating in Karnataka and Gujarat. It is necessary to note here that bajra has better cultivars available as compared to the other coarse cereals.

Ragi is an important crop of South and Central India including the hill regions and has a significant presence in Uttar Pradesh and Bihar. Karnataka has the distinction of having the largest share of area under ragi. The area under ragi has been stagnating in Karnataka and Maharashtra whereas, it has clear declining trends in Bihar, Andhra Pradesh, Uttar Pradesh and Tamil Nadu. The production of the crop, however, has increased significantly in Karnataka and Maharashtra; stagnating in Uttar Pradesh and Tamil Nadu but declining in Andhra Pradesh and Bihar. The productivity trends have been quite encouraging in most of the states except Andhra Pradesh (Graphs 2.4 (a) and (b)).

Maize has a totally different behaviour as well as purpose in the context of coarse cereals. Maize is mainly grown for the starch industry in many of the states. Therefore, the behaviour of maize as against other cereals has to be carefully looked into. There has been exemplary increase in the area of maize in Karnataka over the years. It is also increasing in the states of Gujarat, Madhya Pradesh and Rajasthan but the area under the crop has been declining in Bihar and Uttar Pradesh. In all the six states under consideration, production of maize has been increasing significantly. The productivity of maize has also shown a positive rate of growth in most of the states except Karnataka.

This analysis clearly indicates that coarse cereals have shown a general trend of decline in area across all states. However, production has not declined due to increase in the productivity of these crops. The states indicate a mixed performance across coarse cereals but it is essential to note that the area under these cereals has been settling down to a level of equilibrium. The states in which this crop group gets support from the improvement in productivity have performed exceedingly well in terms of

retaining production trends. Therefore, it is possible that this crop group has a potential to benefit from improvement in technology. Apart from the pure technological angle, the crops have also not gained from institutional support in terms of price behaviour. It is possible to sustain the area of coarse cereals and improve their production with the given area by adopting better technologies and creating proper economic incentives.

#### 2.4: Export of Coarse Cereals

Coarse cereals have been featuring as an important crop in international trade. These are being exported either as animal feeds or for the purpose of processing. The average export of coarse cereals from India during the period 1980-81 to 1989-90 was only 6.79 thousand tonnes. It increased to 124 thousand tonnes during 1993-94 and in 1996-97 it came down to 68.96 thousand tonnes (Table 2.4). Among the coarse cereals, jowar and maize are prominent crops which are being exported. However, the exports form a miniscule percentage of the total share of exports of cereals in the country. Moreover, the exports are fluctuating significantly over the years and this does not promise a sustained presence in the international market.

**Table 2.4: Exports of Coarse Cereals from India**

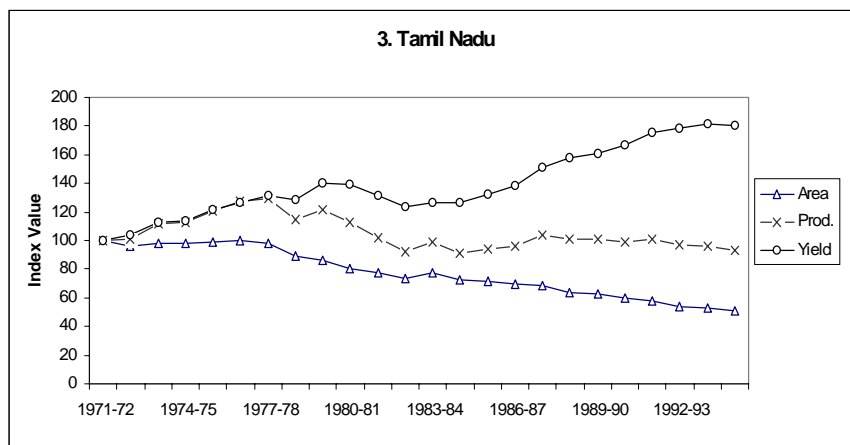
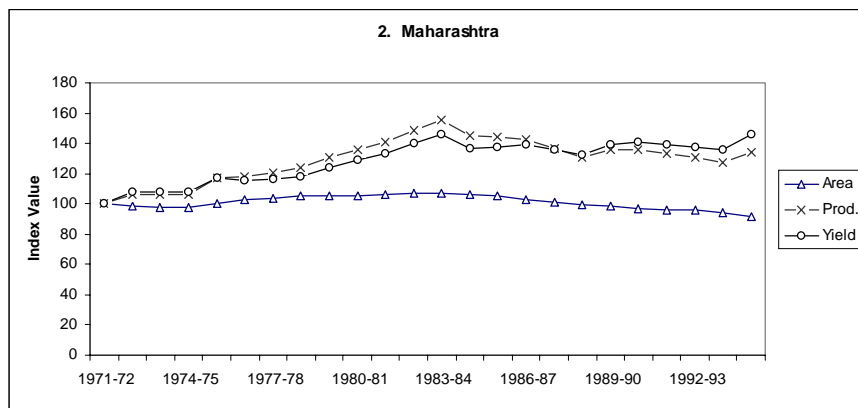
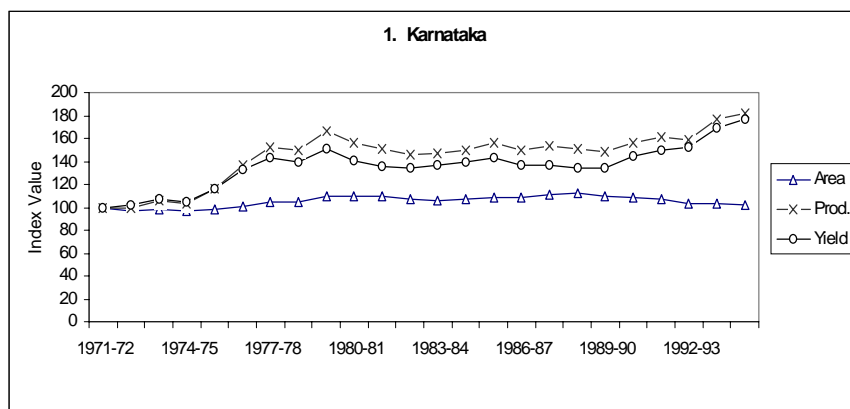
(In '000 tonnes)

Sl. No.	Year	Jowar	Bajra	Maize	Ragi	Total
1	Avg. 1980-81 to 1989-90	1.66	4.21	3.45	-	9.32
2	1990-91	4.25	2.78	-	-	7.03
3	1991-92	7.48	5.83	-	0.47	13.78
4	1992-93	5.34	8.54	-	2.66	16.54
5	1993-94	71.93	25.41	26.67	0.52	124.53
6	1994-95	57.92	6.38	18.9	0.6	83.8
7	1995-96	3.16	5.13	18.75	0.77	27.81
8	1996-97	7.26	5.11	55.36	1.23	68.96

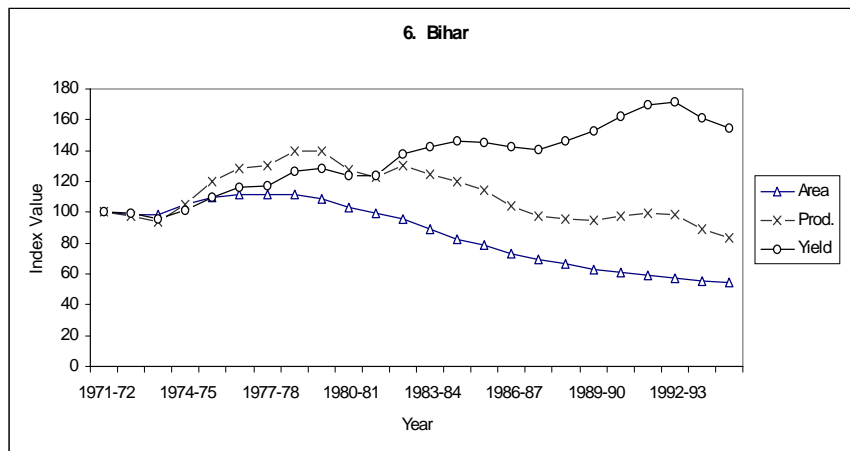
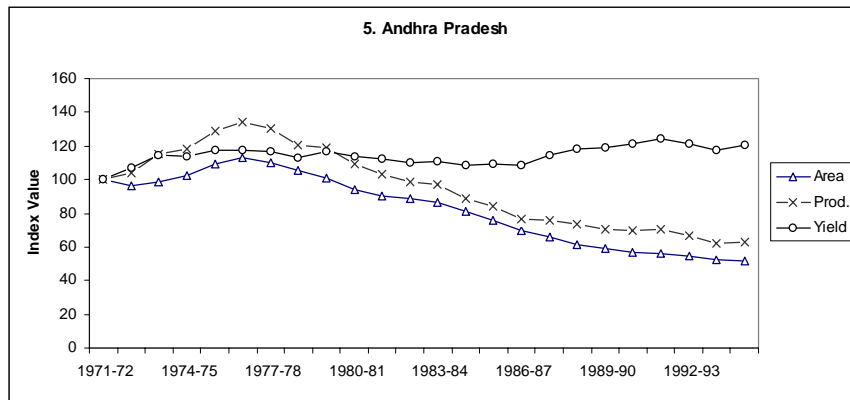
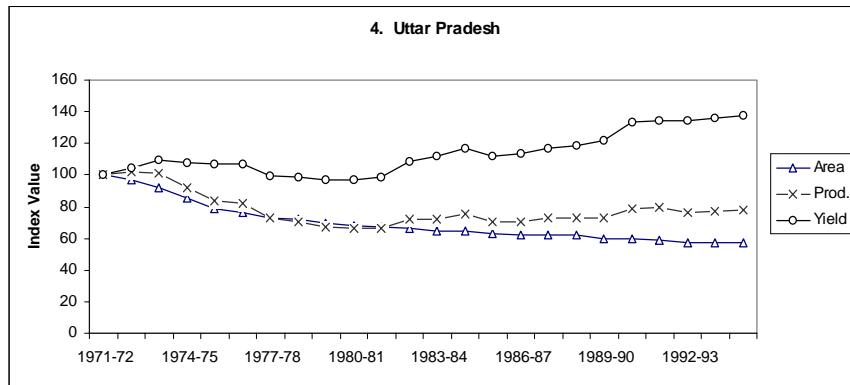
Source: FAO Statistics Obtained from [www.fao.org](http://www.fao.org)

Another important feature which can be noted from Table 2.4 is that there is no definite trend in the export of coarse cereals and is violently fluctuating, probably responding to the demand pulls. This particular observation comes out very clearly from Graphs 2.6 (a) and (b).

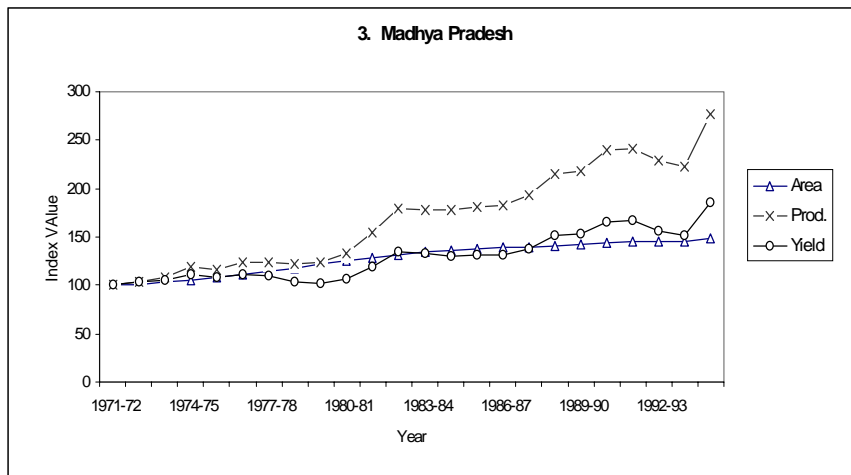
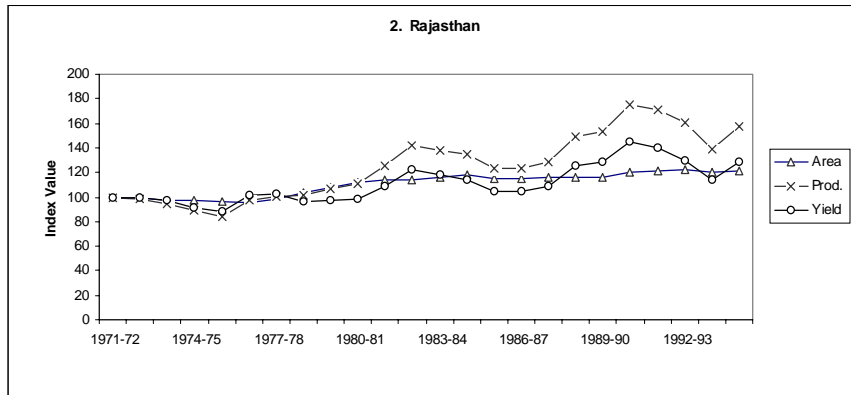
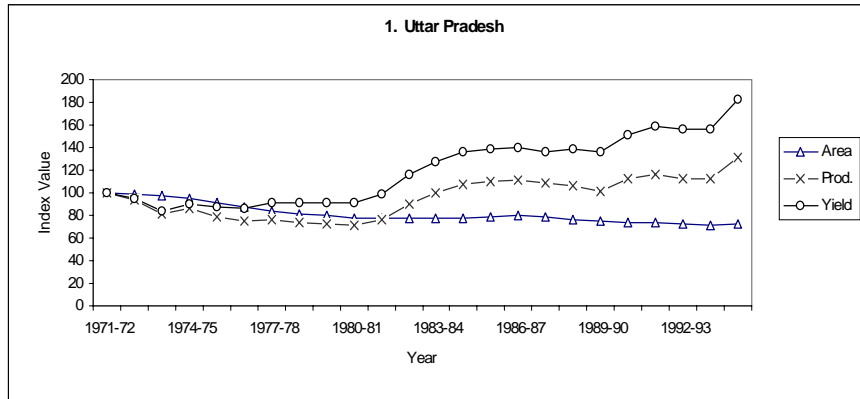
**Graph 2.4 (a): Trends in Area, Production and Yield of Ragi in Major Producing States of India**



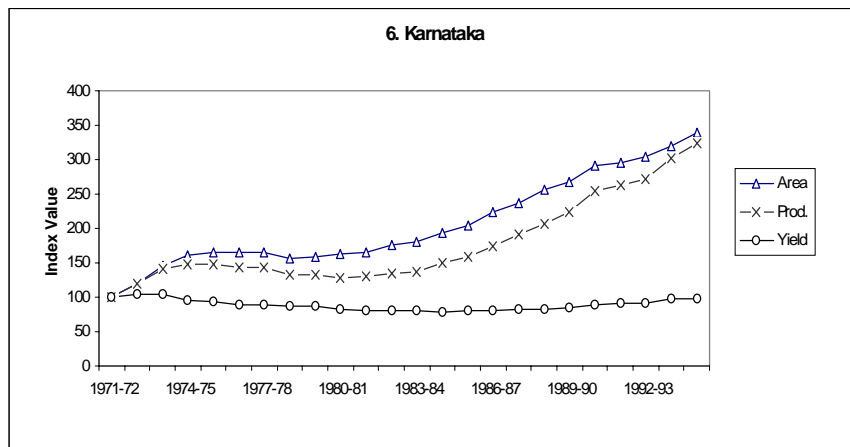
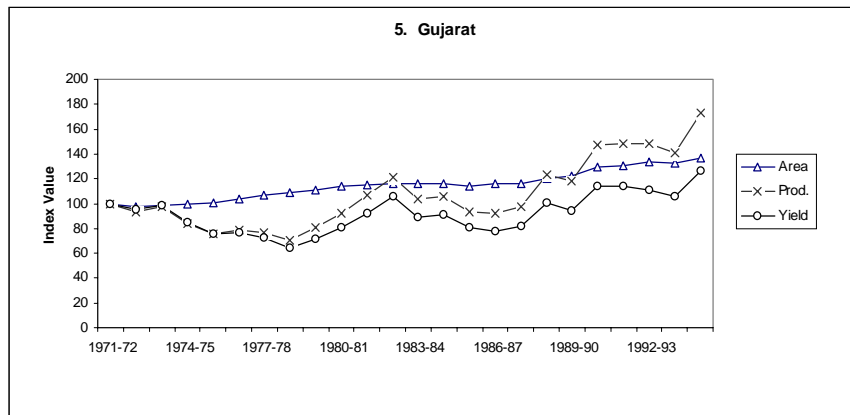
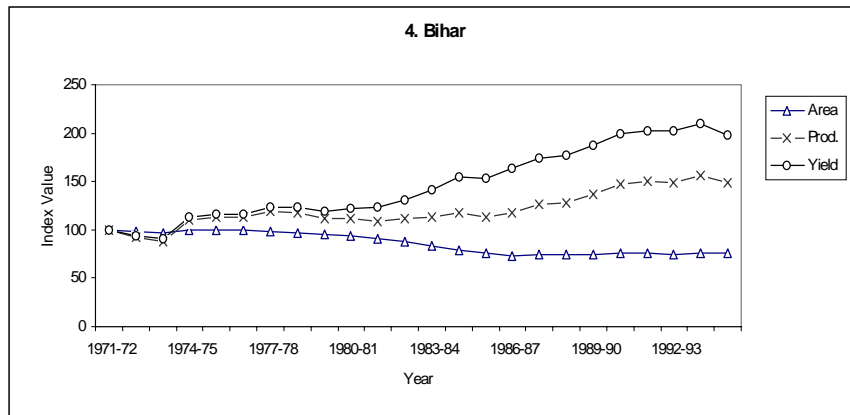
**Graph 2.4 (b): Trends in Area, Production and Yield of Ragi in Major Producing States of India**



**Graph 2.5 (a): Trends in Area, Production and Yield of Maize in Major Producing States in India**



**Graph 2.5 (b): Trends in Area, Production and Yield of Maize in Major producing States in India**



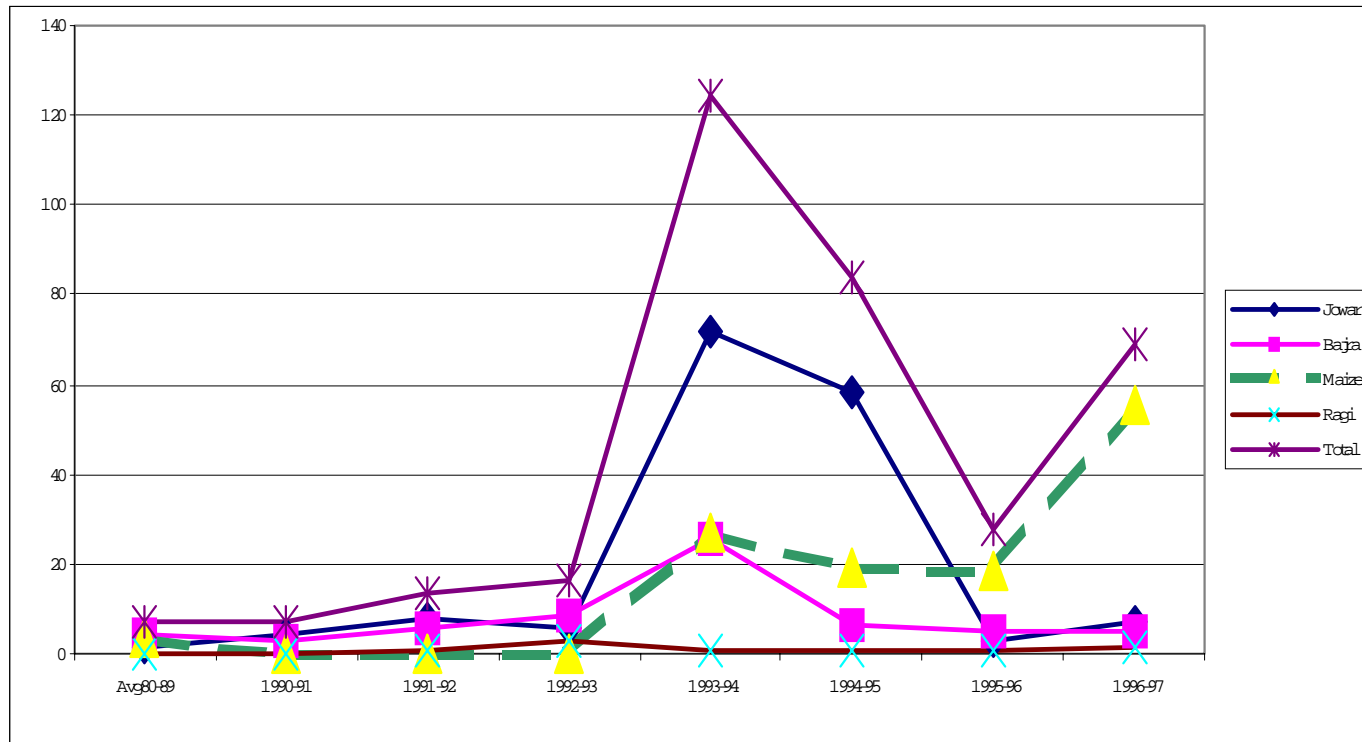
Specifically, the peak in the exports of coarse cereals was obtained during the period 1992-93 to 1995-96. Even though in the year 1995-96 the exports came down sharply, the trends picked up in the following year. Graph 2.6 (b) shows the trends in cereals other than rice, wheat and maize compared to those for rice and wheat. A similar observation can be made from this graph also.

## **2.5: Emerging Issues**

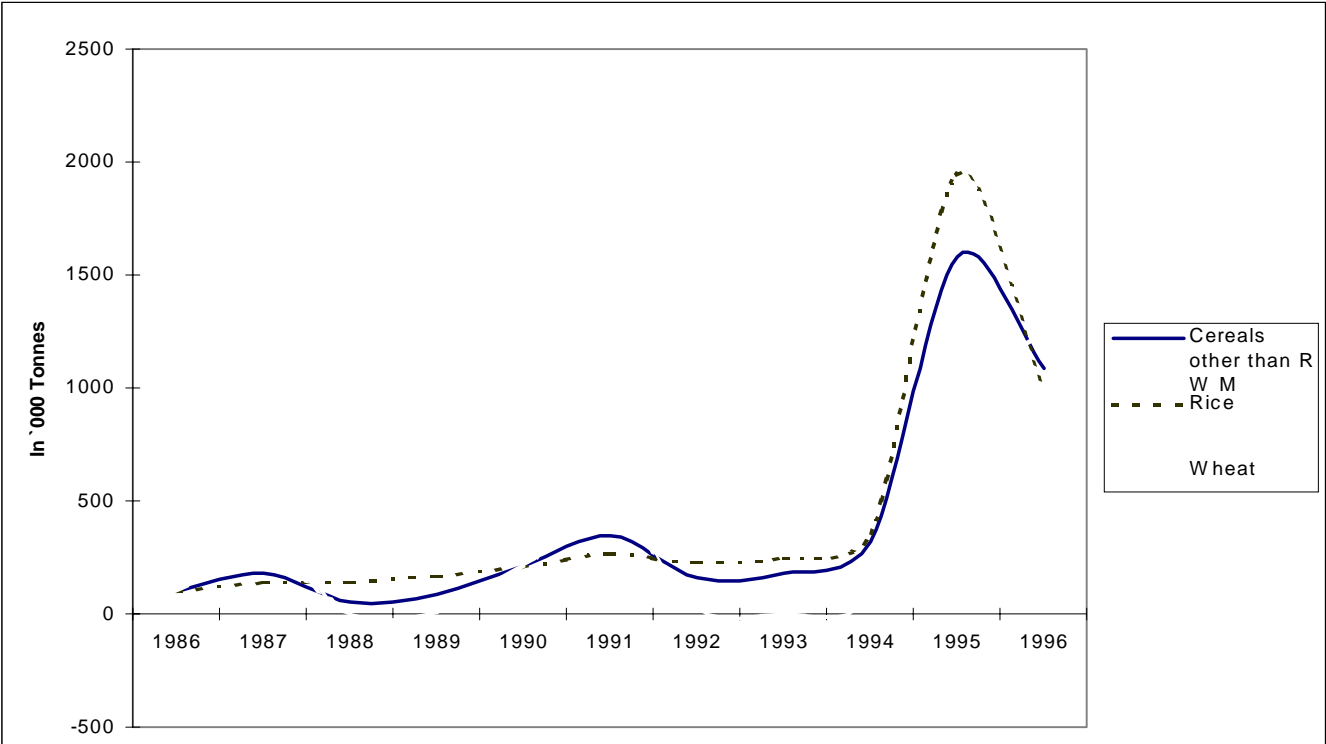
The important issues emerging in the context of coarse cereals involve mainly their future prospects as a crop commodity for domestic market, a consumption item and an export commodity. Speaking about the prospects of coarse cereals as a crop, it is clear from the literature as well as from data analysed that the area under coarse cereals has almost stagnated over the years. The revival of the area trends is a difficult question to answer. But even under the threat of stagnated area, the production of coarse cereals has continued with positive growth rates in quite a few districts of the country (Bhalla and Gurmail Singh, 2000). It has also been observed that coarse cereals have improved significantly in their performance of productivity trends beginning with the mid-eighties. In most of the coarse cereals growing states, productivity of these crops has increased in the post mid-eighties. More specifically, 1986-87 provides a clear indication of a structural break in the growth of coarse cereals.

As an item of consumption, there has been a significant decline in the share of coarse cereals within the total cereals consumption. However, at the aggregate level, cereal consumption itself is coming down as well resulting in the aggregate trends of decline in the calorie intake through cereals. Therefore, it is not correct to say that the consumption of coarse cereals has come down drastically. In the three lower decile groups, the consumption of coarse cereals has come down from about 60 per cent to about 50 per cent and has more or less stabilised at that level especially in the states where these form a major part of the consumption (Suryanarayana 1995). In addition to this, it is essential to see if coarse cereals can be made as a component of the aggregate public distribution system. It is quite obvious that a large proportion of India's poor is located in the drought-prone areas of the country. The major consumption item of this group constitutes coarse cereals. The present Public Distribution System (PDS) provides rice and wheat through the PDS. The quantity as well as the quality of the PDS grains have been questioned quite often. In addition to this, PDS has come under severe criticism on account of the high public subsidy, inefficient operations, improper targeting, and high leakages, being

**Graph 2.6(a) : Exports of Coarse Cereals from India - 1980-89 (avg) - 1996-97**



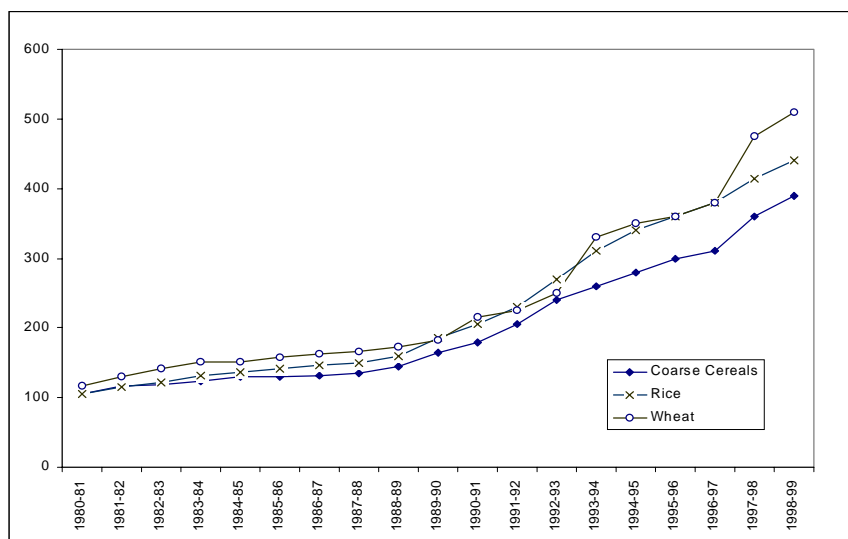
**Graph 2.6 (b) : Exports of Cereals other than R W M, Rice and Wheat from India**



employed to procure the surplus grains of the farmers from green revolution belt and thus providing protection to well-to-do farmers alone. The welfare implications of all these are quite intriguing. Therefore, it is not out of place to argue in favour of incorporating coarse cereals as a commodity on PDS. One important problem of adding coarse cereals in the PDS arises out of the short shelf life of these commodities. In Maharashtra, incorporation of jowar under PDS was tried during early eighties but could not succeed because of the pest infestation of jowar in the godown. Therefore, the mechanism of PDS needs to be carefully worked out.

On the policy front, certainly these crops have received a raw deal. What we can observe from the farm harvest prices at the state level as well as from the minimum support prices declared by the central government, it is clear that the coarse cereals did not proceed with the same rate of change as that of paddy or wheat. During the nineties, the differences between the prices of coarse cereals, on the one hand and wheat and paddy on the other, widened. This is very clearly seen in Graph 2.7. In addition to this, as seen earlier, coarse cereals have been emerging as an important export commodity. Given that the world demand of livestock feed is increasing at a fast rate and if this demand exerts pressure on the domestic production of coarse cereals, probably we will be able to export a larger quantity of coarse cereals.

**Graph 2.7: Procurement Prices of Coarse Cereals, Rice and Wheat Announced by the Govt. of India**



**Appendix Table 2.1 : Percentage of Off-take under P D S in  
Major States in India from April 1999 to December 1999**

Major States	Off-take Percent		
	Rice	Wheat	Total
Andhra Pradesh	96.5	77.9	95.2
Assam	77.5	105.1	87.6
Bihar	2.7	17.7	13.9
Delhi	51.9	7.2	15.0
Gujarat	37.6	25.3	28.6
Haryana	0.0	4.4	4.4
Himachal Pradesh	43.1	29.9	38.1
Karnataka	84.1	42.8	69.3
Kerala	73.1	59.4	70.1
Madhya Pradesh	41.1	1.9	19.5
Maharashtra	103.1	106.5	105.1
Orissa	33.5	40.0	36.2
Punjab	2.0	0.0	0.3
Rajasthan	11.6	9.4	9.5
Tamil Nadu	99.7	46.4	87.5
Uttar Pradesh	32.8	3.2	12.7
West Bengal	41.8	65.2	59.4
All India	76.8	40.6	61.4

## CHAPTER III

### COARSE CEREALS IN KARNATAKA

#### 3.1: Introduction

Coarse Cereals form an important crop group in the crop economy of the State and cover about 30 per cent of the gross cropped area. The coarse grain economy of Karnataka depends mainly on the rainfed areas, consisting of Northern Karnataka and some of the districts of Southern Maidan. The districts of Bellary, Bijapur, Bidar, Gulbarga, Raichur, Chitradurga, Kolar, Tumkur and Mysore have a large part of their cultivated area under the broad drought zone, whereas Dharwad and Belgaum have parts of their areas coming under the drought-prone region. Therefore, on the production side we have Jowar, Bajra, Ragi and Maize as the dominant coarse cereals. Similarly, on the consumption side also the coarse cereals form a major component of the diet of the rural poor in Karnataka. In Northern Karnataka, jowar and bajra are the common staple food crops of the poor, whereas in Southern Karnataka, ragi forms an important part of the diet. Thus, on the production as well as on the consumption side, coarse cereals as a group constitute an important component of the economy. We shall attempt to look into the growth performance of coarse cereals at the state level followed by district level analysis, the analysis of Public Distribution System in Karnataka and the behaviour of prices forming the later part of the analysis of this chapter

#### 3.2: Trends in Coarse Cereals at the State Level

Among the states in India, Karnataka comes under the minority group of states with a distinction of having coarse cereals as a predominant crop group in the cropping pattern. Traditionally, paddy has been one of the extensively grown cereal in the state, but in the last three decades, the advent of wheat and other commercial crops have caused a shift in area under the crops. The advent of commercial crops naturally tilted the area allocation against coarse cereals, in favour of commercial crops and superior cereals. Consequently, the area share of coarse cereals has gone down. The proportion of area under the crop is given in Table 3.1. It can be seen from this table that over the years, the status and importance of coarse cereals in the state's economy get reflected from the declining share of gross cropped area under the crops.

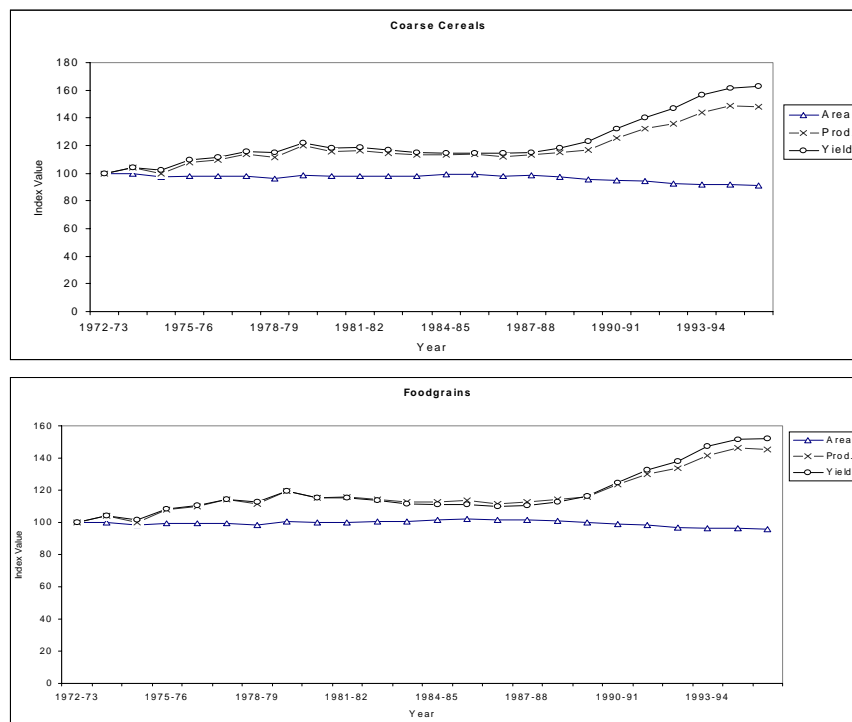
**Table 3.1: Share of Major Crops in Gross Cropped Area:  
Karnataka**

(Per cent to Gross Cropped Area)

Sl. No.	Crops	Five Year Moving Average Centred at				
		1957-58	1965-66	1975-76	1985-86	1995-96
1	Jowar	26.1	26.8	18.8	22.2	15.8
2	Bajra	5.0	4.7	6.1	4.5	2.7
3	Ragi	9.3	10.6	9.5	10.3	8.0
4	Maize	0.1	0.2	1.1	1.7	3.2
5	Four Coarse Cereals	<b>40.5</b>	<b>43.3</b>	<b>35.6</b>	<b>37.7</b>	<b>28.7</b>
6	Total Cereals	57.2	59.8	53.4	54.5	43.6
7	Paddy	10.8	10.8	10.1	10.5	10.7
8	Wheat	2.9	2.7	3.4	2.7	1.8
9	Food grains	<b>69.8</b>	<b>72.1</b>	<b>67.2</b>	<b>69.8</b>	<b>56.9</b>
10	Non-Food grains	30.2	27.9	32.8	30.2	43.1
	Gross Cropped Area	100	100	100	100	100

Source: Government of Karnataka, Directorate of Agriculture, Bangalore, 1999.

**Graph 3.1: Trends in Area, Production and Yield of Major Crops in  
Karnataka**



The decline in the share of area is much sharper in the case of jowar and bajra as against ragi. Graph 3.1 shows the behaviour trend of the coarse cereals as a group and the total foodgrains in Karnataka in terms of the index numbers based on five year moving averages. It is quite clear that the coarse cereals as a group had stagnated till mid-eighties but picked up thereafter in terms of productivity.

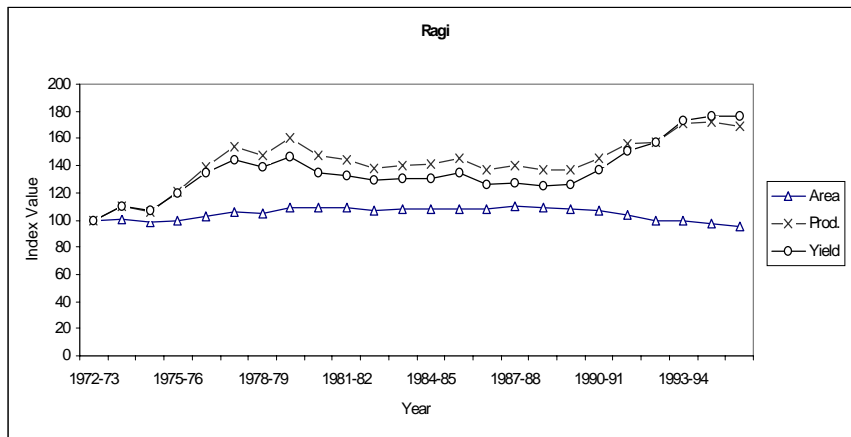
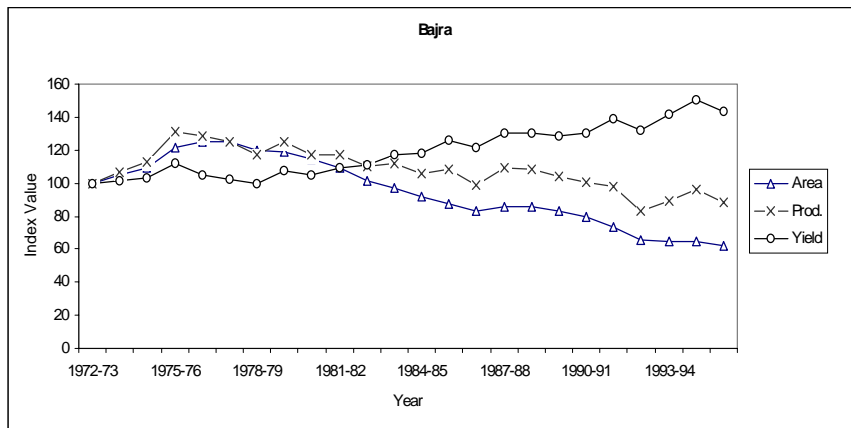
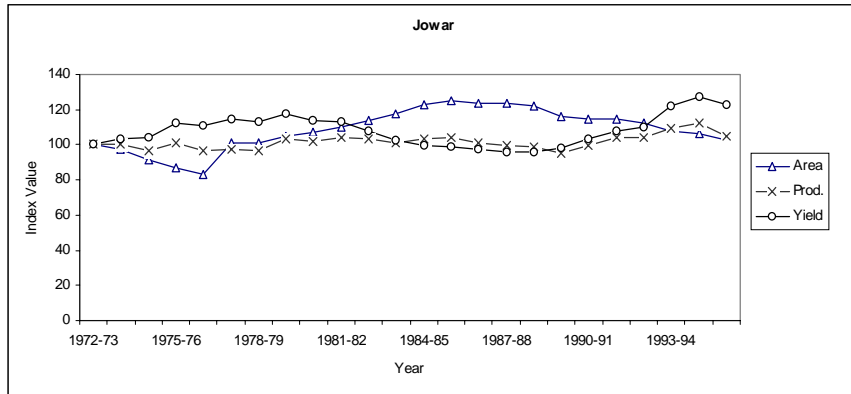
**Table 3.2: Growth Rates of Area, Production and Principle Crops in Karnataka – 1972-73 to 1994-95**

Crops	Area	Prod.	Yield
Rice	0.78	1.95	1.17
Wheat	-2.73	-2.13	0.65
Jowar	0.93	0.31	0.19
Bajra	-2.86	-1.20	1.75
Ragi	-0.02	1.45	1.52
Maize	6.30	6.11	-0.24
Total Cereals	-0.31	1.37	1.70
Total Food grains	-0.11	1.28	1.40
Tur	2.10	-0.48	-2.43
Total Pulses	0.62	0.23	-0.36
Groundnut	1.73	3.26	1.53
Total Oilseeds	4.19	4.92	0.74

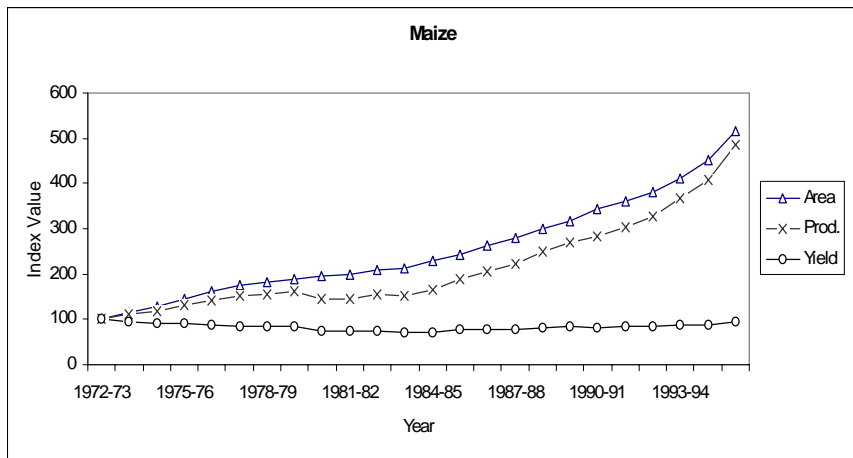
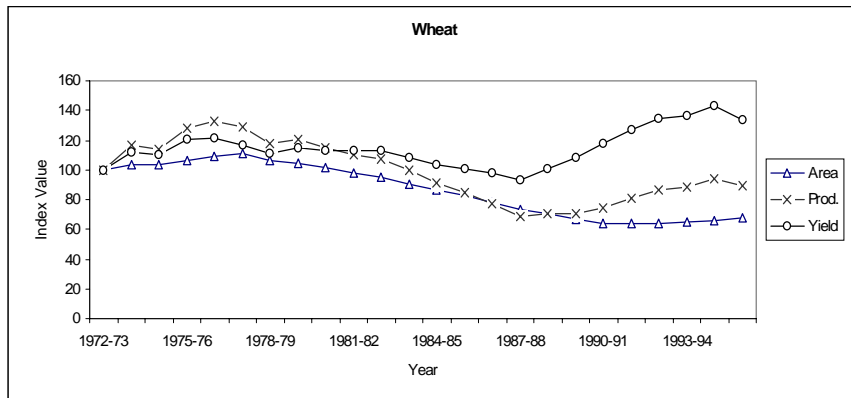
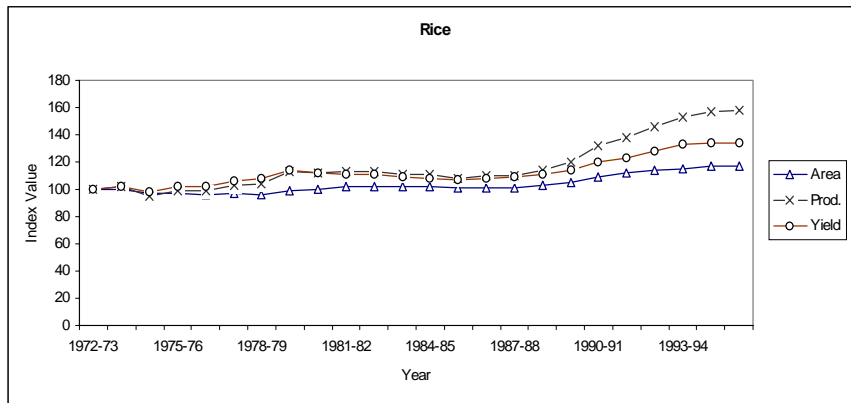
Note: Growth rates based on five year moving averages centered at 1972-73 through 1995-96.

The dominance of coarse cereals in the food economy of Karnataka has been noted earlier and at the same time we can observe that the trends in production are dampened more by area decline. Thus, on the production side it is clear that the state has performed reasonably well in the coarse cereal sector at least during the nineties. However, the area has been declining probably due to the absence of any economic stimuli both through prices and technology. The growth rates in area, production and productivity based on the five-year moving averages are presented in Table 3.2. The area growth rates indicate that these have been declining though at a marginal rate under both total cereals as well as food grains. But such decline is predominant in the case of bajra, wheat and ragi. In Graphs 3.2 (a) and (b) we have shown the trends in coarse cereals over the period 1972-73 to 1995-96 based on the indices of five-year moving averages. It can be easily seen that the area trends have been quite discouraging except

**Graph 3.2(a) :Trends in Area, Production and Yield of Major Crops in Karnataka**



**Graph 3.2(b) : Trends in Area, Production and Yield of Major Crops in Karnataka**



for maize and total oilseeds. Area under ragi has almost stagnated to the level of the early seventies whereas, the area trends of jowar had picked up during the mid eighties to record a decline in the nineties. Bajra has a typical case of a continuously declining trend in area. What is surprising in the case of Karnataka is that the area under maize has been continuously increasing at a fast rate. A similar situation seems to prevail in the case of oilseeds too. The yield trends have more or less the same behaviour for major coarse cereals. The growth in yield has been quite moderate but the stagnation in the growth was quite visible till mid-eighties. It is during the last ten years that the productivity of these crops has been increasing. We can see a clear break in the trends in productivity of coarse cereals around mid eighties, i.e, 1986-87 and 1987-88. This situation is a welcome sign and possibly provides good ground for commercialisation of the production of the crop group and that needs a favourable price situation. However, the picture is not the same throughout the state. There are quite a few differences across districts. Therefore, to analyse the district level picture, we have considered the major districts growing coarse cereals in Karnataka.

### **3.3: District Level Analysis**

In order to focus on the drought-prone regions as well as the area growing coarse cereals we looked into the averages of the last five years of area under these crops. Based on the share of area under coarse cereals we selected the top seven districts predominantly growing these crops in terms of the area share. Table 3.3, presents a list of such districts. It is obvious that there are two broad agro-ecological regions growing coarse cereals, viz., North Karnataka Rainfed Region (Northern Maidan districts) and Southern Karnataka Rainfed Region. Bijapur, Gulbarga, Raichur, Belgaum, Bellary, Dharwad and Bidar are the major districts growing coarse cereals in North Karnataka whereas, Chitradurga, Mysore, Shimoga, Kolar, Mandya and Tumkur are the districts predominantly growing coarse cereals in Southern Karnataka. These districts have low annual average rainfall and high variability. Graphs 3.3 (a), (b), (c) and (d) indicate the trends of area, production and productivity of major coarse cereals producing districts of Karnataka for each of the crops for the period 1972-73 to 1994-95. The trends are based on the index numbers computed on the basis of five-year yield averages. Therefore, the year to year fluctuations have been eliminated and the smoothed time series is obtained. The production growth rates of jowar range between less than 1 per cent to about 3 per cent in the state. The area under jowar has been more or less stagnant in most of the districts with a marked feature of recovery during the eighties.

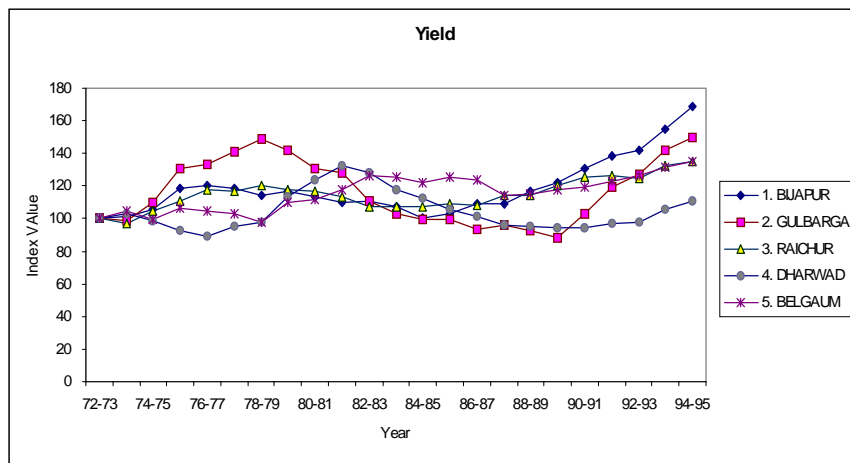
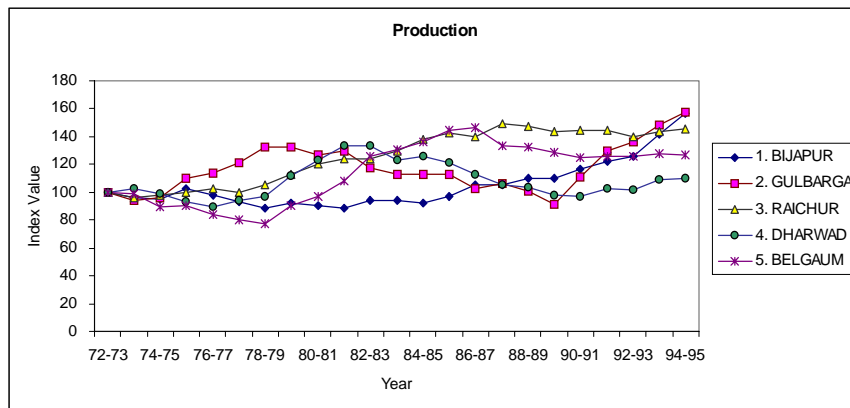
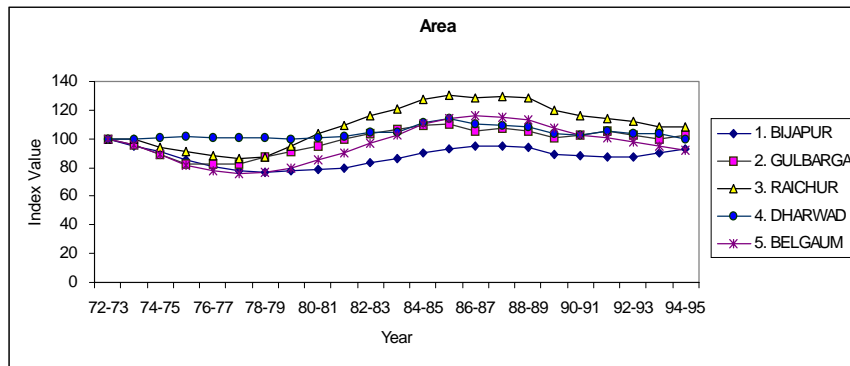
**Table 3.3: Major Seven Districts by Area of Major Crops in  
Karnataka  
(Based on Averages of 1994-95 to 1996-97)**

<b>Sl.No.</b>	<b>Jowar</b>	<b>Bajra</b>	<b>Maize</b>	<b>Ragi</b>
I	Bijapur	Bijapur	Belgaum	Bangalore
II	Gulbarga	Raichur	Dharwad	Tumkur
III	Raichur	Gulbarga	Chitradurga	Hassan
IV	Dharwad	Belgaum	Bijapur	Mysore
V	Belgaum	Bellary	Bellary	Kolar
VI	Bellary	Bidar	Shimoga	Mandya
VII	Bidar	Chitradurga	Mysore	Chitradurga

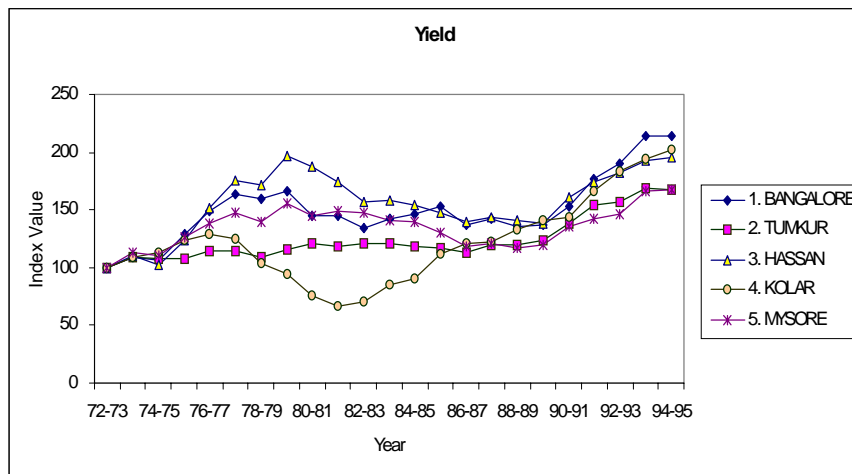
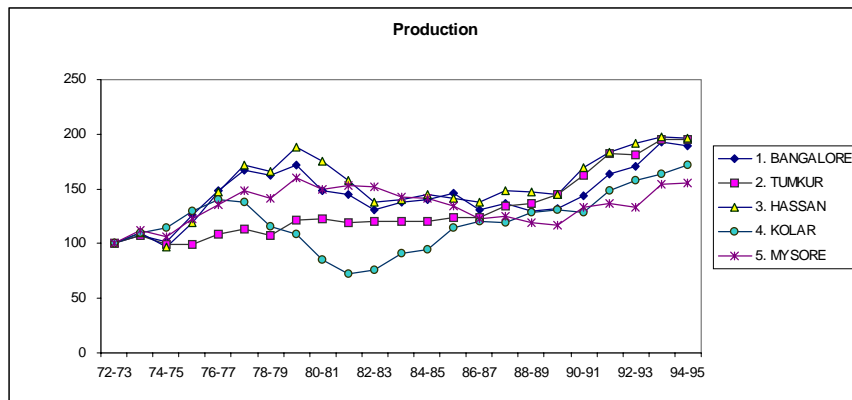
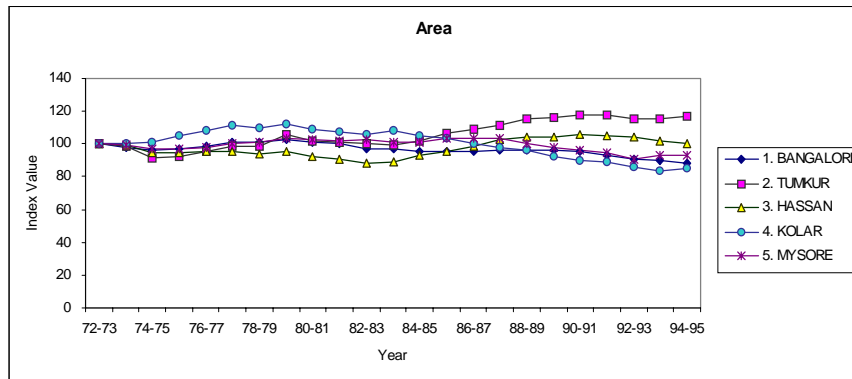
It is interesting to observe that the yield of jowar was almost at the same level till the late eighties and the yield rates started improving during the last decade. Stagnation in production can be visualised in Belgaum, Dharwad and Raichur but Gulbarga and Bijapur districts show a significantly high growth in production through increased yield per hectare.

Ragi is mostly grown in Southern Karnataka. Bangalore, Tumkur, Hassan, Kolar and Mysore districts have this crop as a major crop in their cropping pattern. Typically, the area under ragi has stagnated to the levels of the early eighties (except for Tumkur) but the production trends show three distinct phases. In the first phase beginning 1974-75, there was a spurt in the growth in the production of the crop supported by increase in productivity (excluding Kolar district). The production as well as productivity remained more or less at the same level till late eighties and picked up during the last ten years. A clear break is visible around 1986-87. The area under bajra in Raichur district increased during the late seventies and stayed more or less at the same level. Except for Bijapur and Gulbarga districts, the yield rates of bajra have stagnated to the level of the early seventies. Bajra is not among the staple grains in Northern Karnataka and therefore, despite the availability of new cultivars, the crop seems to have stagnated and even shows declining trends in the districts. Performance of maize is quite distinct as compared to other three coarse cereals. The production growth of this crop is mainly contributed by area under crop and the productivity has remained more or less in the same band as can be visualised during the early eighties. Belgaum and Dharwad districts have shown exemplary growth in the crop.

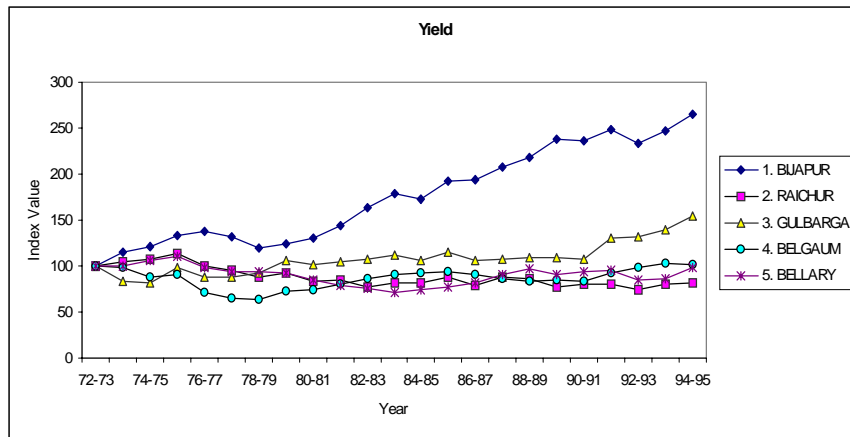
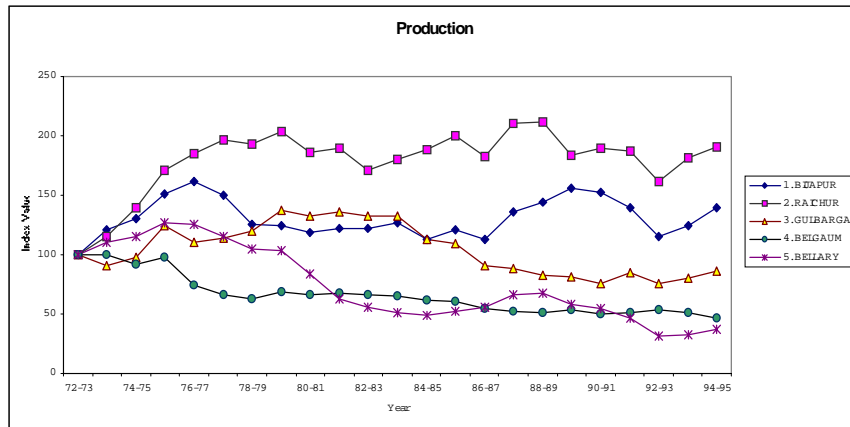
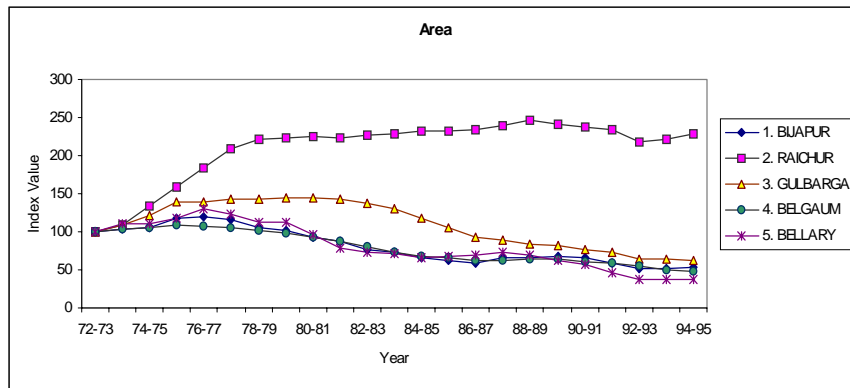
**Graph 3.3(a): Trends in Area, Production and Yield of Jowar in Major Producing Districts of Karnataka**



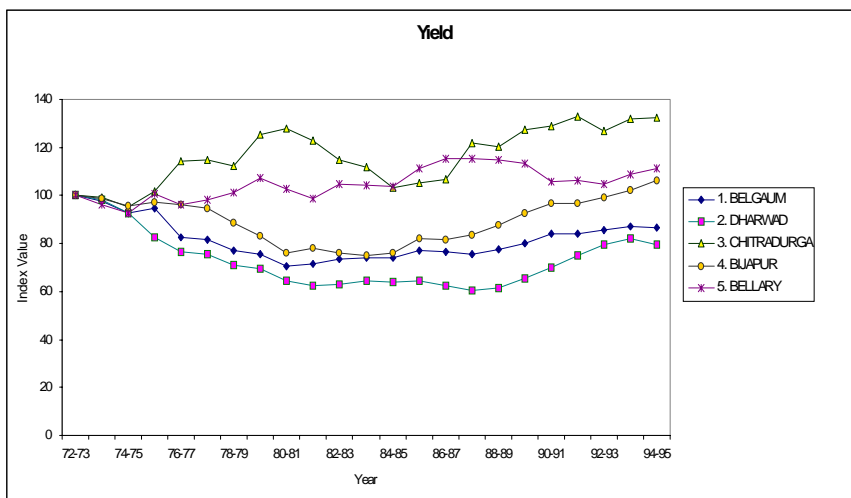
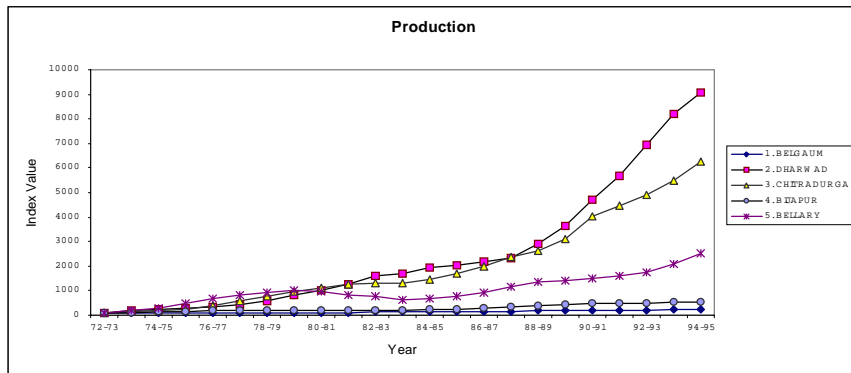
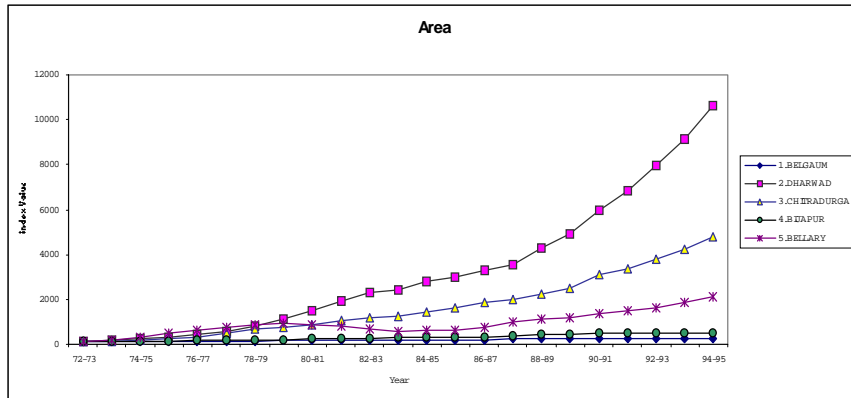
**Graph 3.3(b) :Trends in Area, Production and Yield of Ragi in Major Producing Districts of Karnataka**



**Graph 3.3(c) :Trends in Area, Production and Yield of Bajra in Major Producing Districts of Karnataka**



**Graph 3.3(d) : Trends in Area, Production and Yield of Maize in Major Producing Districts of Karnataka**



The above analysis helps to arrive at a few important observations: (i) Even now the coarse cereals dominate the cropping pattern of the drought-prone areas in Northern as well as Southern Karnataka especially the Maidan regions. Hence, these are closely associated with the agricultural economy of this region; (ii) Area under these crops has more or less stagnated to the level of the eighties but the production has been showing some signs of improvement. If the productivity growth during the last seven years is some indicator a good production of these crops in the coming decade can be easily foreseen; (iii) The crops have been showing good production performance in the districts where the resource constraints do not predominate. More than that, it becomes necessary to see if the crops have been supported by the price incentives.

### 3.4: Price Behaviour

In order to study the price behaviour of different crops we have taken the farm harvest prices and wholesale price indices of these crops. To begin with, the prices of coarse cereals were not necessarily lower than those of paddy and wheat. In the year 1970-71, the farm harvest price of paddy (not rice) per quintal was Rs. 63/- as against Rs. 84/- for jowar, Rs. 62/- for bajra and Rs.66/- for ragi. However, the situation changed during the eighties. The farm harvest prices of the superior cereals are now higher than those of coarse cereals. The data in Table 3.4 shows the farm harvest prices of major crops in Karnataka. The growth rates in the farm harvest prices also show that rice, paddy, wheat have recorded the highest rates of growth as against the coarse cereals. In addition to this, the variation in the prices of coarse cereals is much lower, indicating price stability or stickiness to the central tendency.

**Table 3.4: Farm Harvest Prices of Different Crops: Karnataka**

(Rs. Per Quintal)

Year	Paddy	Wheat	Jowar	Bajra	Ragi	Maize	Groundnut
1970-71	62.91	107.97	84.90	62.37	66.34	61.39	137.08
1975-76	106.07	134.54	126.02	83.73	81.85	89.45	142.22
1980-81	120.49	250.65	169.00	112.00	145.00	115.24	316.00
1985-86	287.33	285.47	189.63	159.31	170.72	143.00	451.54
1990-91	253.03	401.85	259.00	189.80	200.40	205.26	623.40
1995-96	457.91	602.71	644.84	378.16	394.09	350.00	1093.20

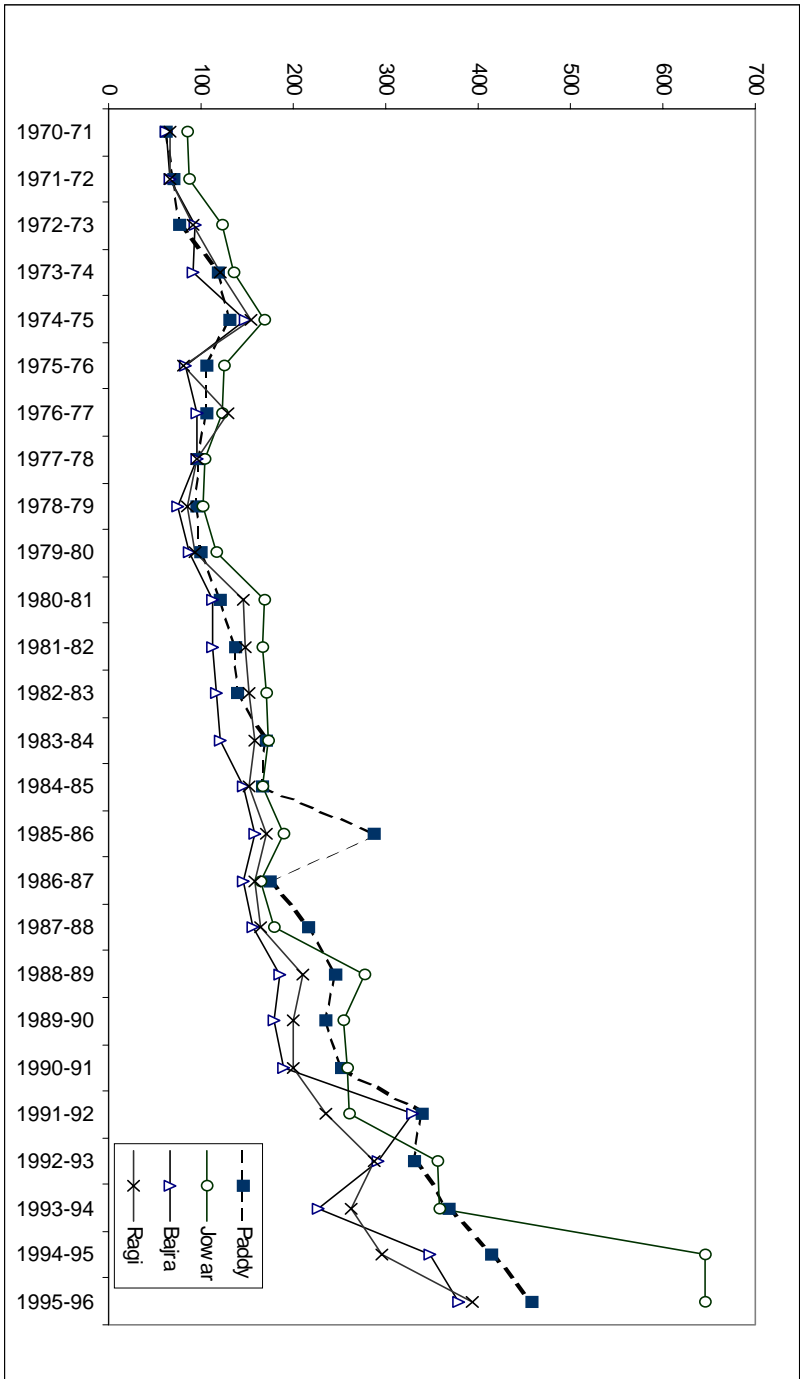
Source: Directorate of Statistics, Government of Karnataka, Bangalore.

The Graphs 3.4 (a) and (b) show the movement of prices of coarse cereals as against paddy and wheat. Even though the fluctuations in the wheat and paddy prices are higher, the trends in the prices of these crops are relatively higher as compared to the other crops. The exception is that of jowar. The prices of jowar improved significantly from 1987-88 and a second spurt in prices of jowar was experienced in 1991-92. Similarly, we have plotted the relative prices of each of the coarse cereals with respect to paddy and wheat in Graphs 3.5 (a) and (b). The behaviour of relative prices has been quite interesting as one can see the changing relative importance of each crop in the market. Coarse cereals have always received lower prices compared to the superior cereals (excluding jowar). All these observations point to the fact that a majority of the coarse cereals have not received the much required price support from the market. When we take up the minimum support prices, these have also not been very conducive to the growth of coarse cereals. The minimum support prices of coarse cereals demonstrate a lower side divergence when compared with paddy and wheat prices. The price analysis may have to be looked from the aspects of market fluctuations acting as depressant, wage trends and reflection of these in the prices of the commodities.

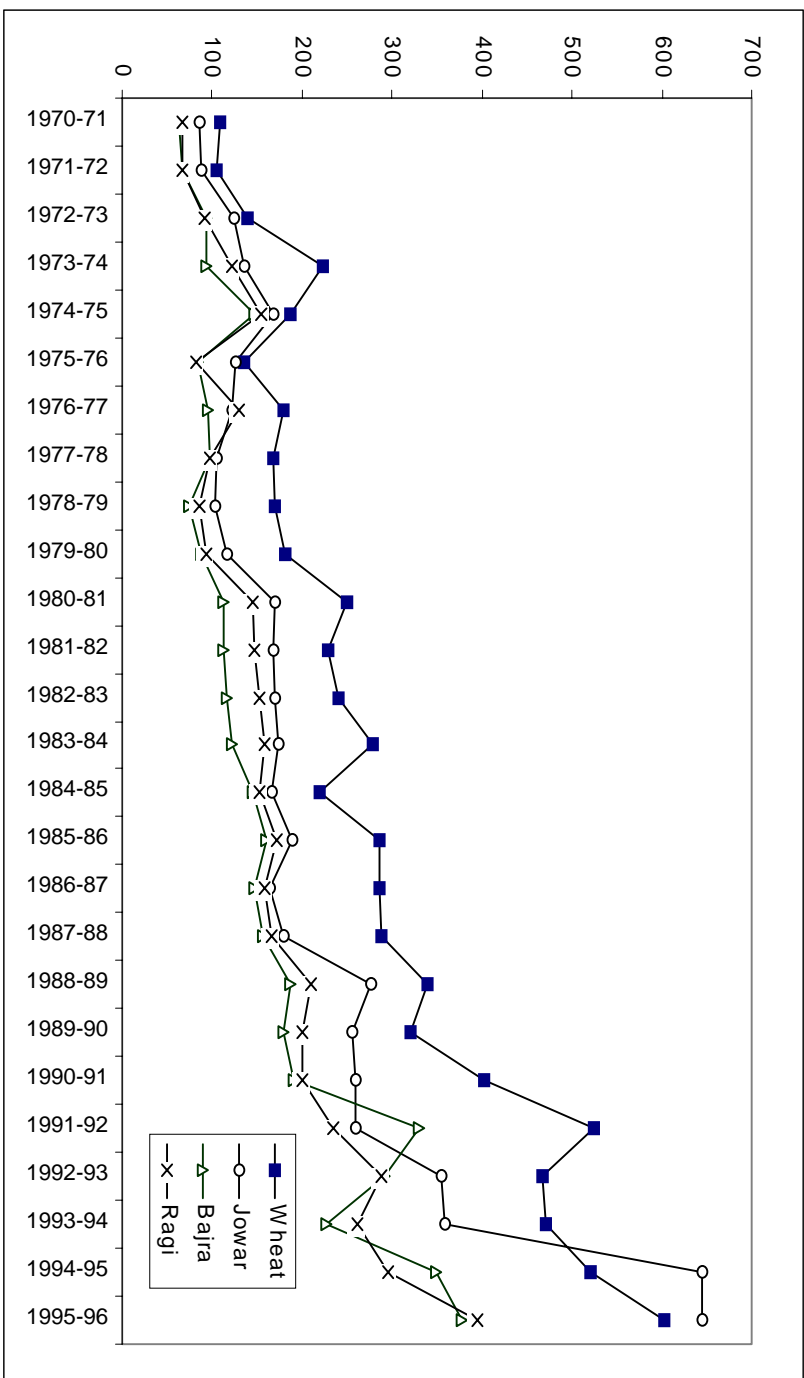
### **3.5: Consumption and Public Distribution System**

Coarse cereals still form a major part of the consumption of cereals as a group though the time series data on consumption of coarse cereals beginning with 1972-73 shows a consistent decline in the share of coarse cereals in the total food consumption. Radhakrishna and Ravi (1991) suggest that wheat is probably replacing coarse cereals and this is attributed to taste effect. Keeping in view the trends in area and production of coarse cereals on the one hand and the trends in consumption on the other it is difficult to believe that coarse cereals will disappear from the diet of the poor. Quite possibly the consumption trend may become asymptotic to stabilise at some level.

It can be seen from Table 3.5 that the share of coarse cereals in the consumption of total cereals has generally gone down. This decline is steep in the case of ragi and jowar compared to maize. It can be seen from Table 3.6 that the consumption of coarse cereals declined in most of the coarse cereals during 1972-73 to 1993-94. Bajra in any case forms a very insignificant share of the total cereals at the state level but probably there are a few pockets in Northern Karnataka where, it forms an important part of the diet.

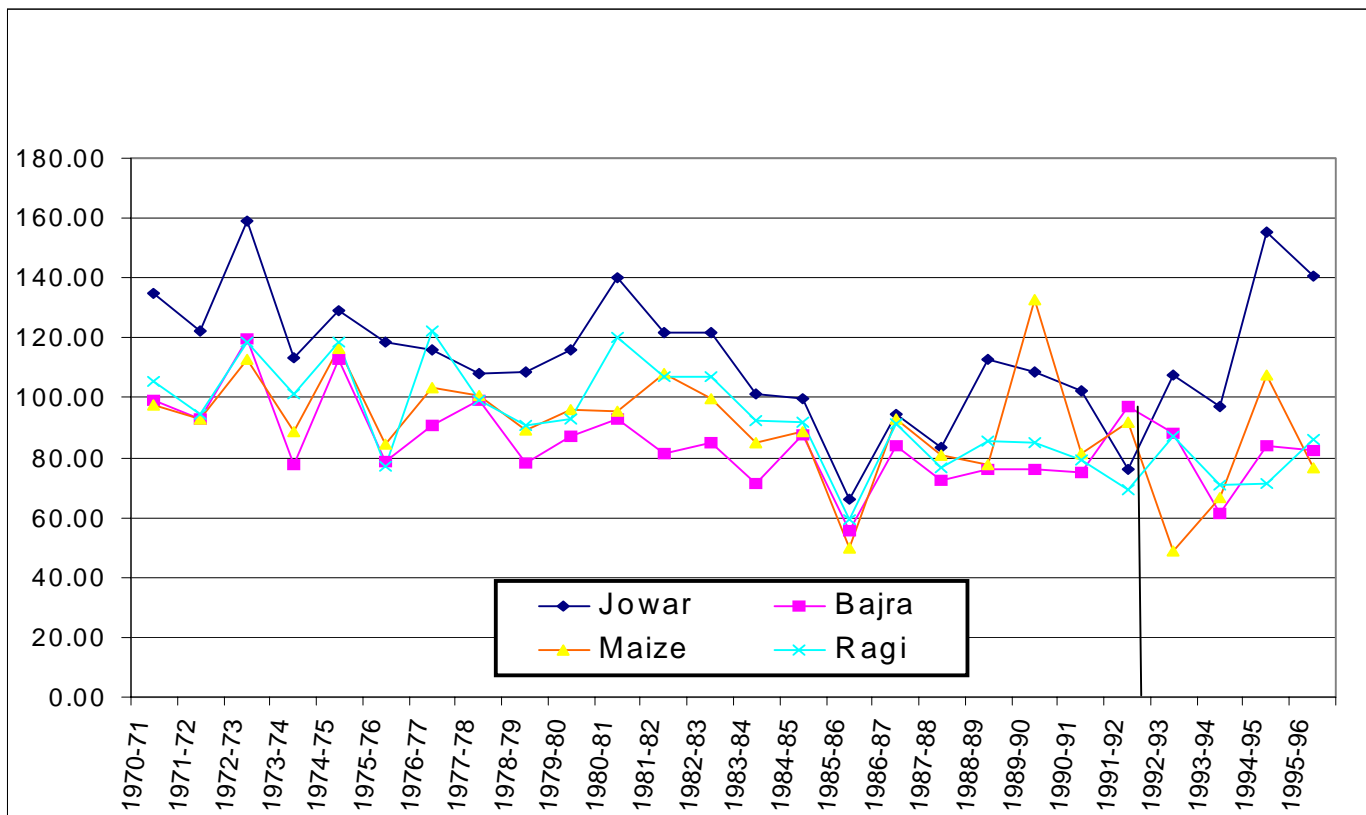


Graph 3.4 (a) : Movement of Farm Harvest Prices of Coarse Cereals and Paddy (in Rs./Qtl): Karnataka

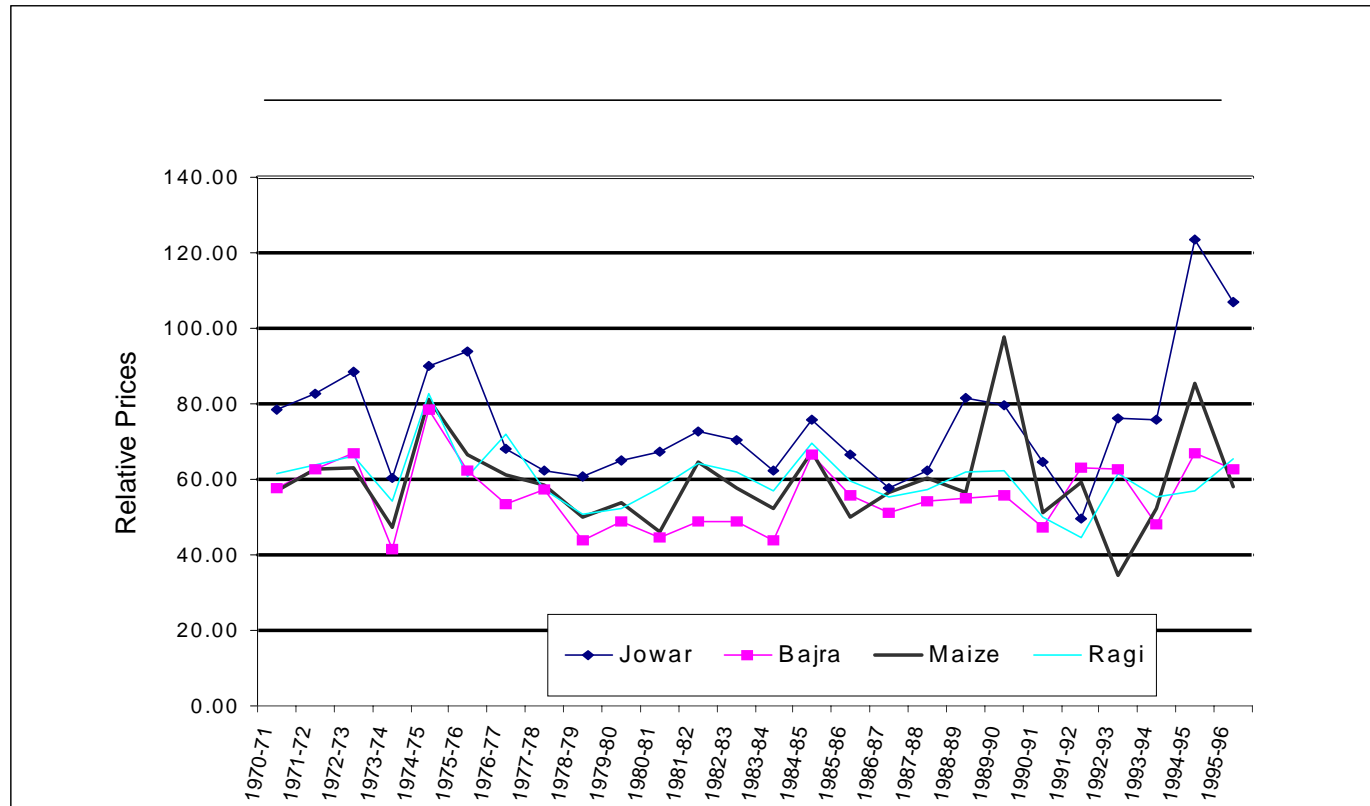


Graph 3.4 (b) : Movement of Farm Harvest Prices of Coarse Cereals and Wheat (in Rs./Qtl): Karnataka

**Graph 3.5 (a) : Relative Prices of Coarse Cereals in Karnataka Relative to Paddy (Per cent)**



**Graph 3.5 (b) : Farm Harvest Prices of Coarse Cereals in Karnataka Relative to Wheat Prices (Per cent)**



**Table 3.5: Changes in Consumption Pattern of Cereals in Rural Areas of Karnataka**

Sl. No.	Cereals	1972-73		1983-84		1993-94	
		% of total	K. Calories	% of total	K. Calories	% of total	K. Calories
1	Rice	29.5	15.90	35.4	18.35	42.1	19.11
2	Wheat	4.5	2.39	3.5	1.81	6.5	2.90
3	Jowar	30.1	16.26	36.2	18.82	30.5	13.87
4	Bajra	0.9	0.51	1.3	0.72	0.8	0.40
5	Maize	3.2	1.74	0.4	0.21	1.5	0.70
6	Ragi	30.5	15.64	22.3	10.98	19.2	8.30
7	Other Millets	1.3	0.71	0.9	0.44	0.1	0.03
8	Total Cereals	100	53.15	100	51.33	100	45.31

Source: Computed on the basis of the data given in M J Bhende (1991). Demand and Supply Perspectives for Foodgrains in Karnataka, *Journal of Social and Economic Development*, 2(2): 287-308.

**Table 3.6: Growth Rates in Consumption Expenditure on Coarse Cereals by Quantities - 1972-73 to 1993-94**

(All India - Rural)

Crops	Qty I	Qty II	Qty III	Qty IV	Qty V
Sorghum	-1.54	-3.09	-3.18	-3.35	-3.37
Bajra	-0.92	-2.85	-3.28	-4.10	-6.73
Maize	-5.90	-7.48	-5.76	-6.33	-6.69
Barley	-12.09	-14.95	-14.43	-12.47	-13.08
Small Millets	-8.11	-10.20	-10.96	-10.38	-8.33
Ragi	-2.60	-4.45	-4.75	-6.71	-7.01
All Cereals	0.25	-0.23	-0.63	-0.99	-1.31

Source: Amresh Hanchate, and Tim Dyson Tim (2000). *Trends in the Composition of Food Consumption and Their Impact on Nutrition and Poverty in Rural India*, London: London School of Economics, Unpublished.

The Public Distribution System in Karnataka serves all the districts and 11 million card holders through a chain of 20.2 thousand shops. This indicates that on an average each shop serves about 545 card holders. Out of the total number of cards provided in rural areas, 74.5 per cent are green cards. Similarly, in urban areas, about 30.6 per cent are Green Cards. The off-take of rice in March 1999 (during 1998-99) was 68.4 thousand tonnes

and that of wheat was 25 thousand tonnes. The proportion of the off-take to allocation worked out to 91 per cent and 71 per cent for rice and wheat, respectively. This worked out to about 6 kgs. of rice and 2.26 kgs. of wheat per card per month. It is quite clear that the provision through PDS forms an extremely low proportion of their total consumption of foodgrains in the household. This should be read with the allocation and off-take figures presented in Appendix Table 3.1 and Appendix Table 3.2. The proportion of the off-take to total allocation is fluctuating over the years. It has been reported to be as low as 32 per cent or 45 per cent in some of the districts. Interestingly, the drought-prone districts have lower off-take when compared to the non-drought-prone districts. The analysis above indicates that PDS does not meet the total requirement of the household and similarly the off-take as proportion of total allotment is quite low in drought-prone districts. The incorporation of ragi, jowar and bajra in PDS may have to be viewed from the point of view of the durability of these grains in stock

### **3.6: Summing Up**

Karnataka is one of the states having a large share of drought-prone areas. The coarse cereals dominate the cropping pattern of the region both due to climatic compulsions and traditional food habits. The entry of commercial crops and horticulture have reduced the area under coarse cereals but the growth in productivity after 1986-87 has not only retained the earlier positive rates of growth but increased it. There is a distinct shift in the growth behaviour of coarse cereals, specifically beginning 1986-87. The district level analysis presents a mixed picture. However, it is clear that over the years the core drought-prone areas have gained on the productivity front. The productivity has improved significantly in a majority of the districts growing coarse cereals. Prices seem to have played a negligible role to boost the economy of coarse cereals at least till mid-eighties. But their role gradually emerged during the last decade. PDS meets only a small share of the total cereal requirement of the household. Therefore, the dependence on market and growing for self-consumption cannot be ruled out in the near future. It is however, necessary to understand the phenomenon at the micro-level.

**Appendix Table 3.1: Percentage of Off-take from PDS in the Districts of Karnataka**

Districts	R I C E					W H E A T				
	1995	1996	1997	1998	1999	1995	1996	1997	1998	1999
Bangalore (U)	98	98	100	56	100	97	100	100	99	100
Bangalore (R)	96	99	99	90	99	94	96	74	100	57
Bagalkot	-	-	-	100	92	-	-	-	100	56
Belgaum	68	87	93	100	86	96	97	75	100	55
Bellary	51	75	77	100	94	75	96	99	100	49
Bidar	60	71	78	100	100	100	106	100	100	64
Bijapur	32	45	55	96	87	80	84	92	100	50
Chamarajnagar	-	-	-	81	95	-	-	-	92	44
Chikmagalur	59	94	100	100	85	71	147	100	100	80
Chitradurga	50	60	100	100	100	90	100	100	100	95
D.Kannada	95	100	93	94	99	99	100	91	100	69
Dharwad	42	78	87	100	100	79	100	100	100	49
Davanagere	-	-	-	100	91	-	-	-	100	69
Gulbarga	39	71	75	100	96	75	120	100	100	52
Gadag	-	-	-	100	83	-	-	-	100	52
Hassan	69	73	70	100	84	84	103	100	100	51
Haveri	-	-	-	100	92	-	-	-	100	55
Kodagu	100	80	79	84	100	100	90	77	85	29
Kolar	43	83	77	90	93	59	94	97	100	49
Koppal	-	-	-	100	100	-	-	-	100	56
Mandya	68	96	95	86	96	86	90	90	88	63
Mysore	71	71	100	88	100	84	98	89	96	56
Raichur	45	100	85	100	91	84	100	87	86	44
Shimoga	78	100	90	100	89	83	100	95	100	57
Tumkur	41	100	88	100	99	62	100	100	100	26
Udupi	-	-	-	100	97	-	-	-	100	44
U. Kannada	77	100	100	100	100	87	100	100	100	77
STATE	55	82	85	93	91	83	99	89	98	71

Source: Directorate of Civil Supplies, Govtl of Karnataka, Bangalore

**Appendix Table 3. 2 : Number of Ration Cards in the Districts of  
Karnataka in March 1999**

Name of Districts	Total No. of	Total No. of	Offtake of	
	Ration Cards ( in '000s )	Fair Price Shops ( in '00s )	Rice	Wheat
			( in '00 Metric tonnes )	
Bangalore (U)	316.6	5.3	21.6	8.9
Bangalore (R)	457.1	9.4	34.0	7.9
Bagalkot	327.3	5.7	19.6	6.2
Bijapur	387.1	7.9	19.7	6.7
Bidar	287.1	7.3	20.8	5.1
Bellary	382.3	6.0	21.6	7.5
Belgaum	927.1	15.4	54.5	17.4
Chamarajnagar	239.7	4.3	16.3	3.9
Chikmagalur	240.2	5.2	16.3	6.0
Chitradurga	287.0	5.7	21.5	8.9
Davanagere	351.8	7.1	20.7	7.9
D.Kannada	322.2	5.8	18.1	4.8
Dharwad	335.9	5.2	23.5	7.2
Gadag	217.6	3.5	13.9	3.4
Gulbarga	664.8	13.2	36.3	12.0
Hassan	356.0	8.0	21.1	5.6
Haveri	297.7	4.1	19.1	5.0
Kodagu	112.8	2.9	8.1	1.0
Kolar	544.6	11.6	38.8	8.3
Koppal	226.8	4.2	14.5	3.9
Mandya	433.5	7.1	23.1	7.6
Mysore	592.2	10.3	35.0	10.0
Raichur	324.5	6.8	15.9	4.2
Shimoga	345.9	6.1	17.6	6.0
Tumkur	592.1	10.9	41.2	48.5
Udupi	193.9	2.9	10.1	2.3
U. Kannada	285.2	4.1	22.7	7.0
<b>State</b>	<b>11,059.9</b>	<b>202.9</b>	6.8	2.5

Source: Same as in Appendix Table 3.1.

## CHAPTER IV

### MICRO-LEVEL ANALYSIS

#### 4.1: Introduction

The trends in the economy of coarse cereals observed at the country and state levels indicate a continuous decline in the importance of this significant crop group. The picture is not very different even in the core drought-prone regions of the state. The revival in the interest about coarse cereals during the nineties came both because of favourable price trends as well as some of the available technological options. As yet the technologies available for the coarse cereals have not been fully and widely adopted. A simple reason for this phenomenon is that the transfer of technology from lab to land requires an enhanced resource base as well as the cost incurred per quintal is much higher than the expected incremental benefits. Therefore, the cautious adoption of the new technology can be attributed to the content of the technology as well as the value added promised by these. It needs no emphasis that there is still large scope for technological improvement. It is essential, therefore, to look into five important aspects at the micro level. Firstly, the relative importance of coarse cereals in the cropping pattern at the farm households needs to be understood clearly. Incidentally, the decline or increase in the importance of coarse cereals becomes an integral part of this. The observations on this issue will offer material to comment on the prospects of coarse cereals. Secondly, we shall try to analyse the productivity obtained at the farm level as against the productivity promised by new technology. In other words, this exercise is undertaken to understand the yield gap between promised technology and the productivity prevailing in the field level. Thirdly, the price sensitivity and market access become important components in the cultivation of coarse cereals. We have tried to get the farmers' expectations about prices as well the market prices and prices received by them. Fourthly, decision-making in the allocation of resources contributes to the relative importance of coarse cereals. Our attempt here is limited to locating the important parameters governing the farmers' decisions in cultivation of coarse cereals. Lastly, the role of coarse cereals in the consumption pattern is a prominent factor in allocating the resources. We have tried to locate here the relative importance of coarse cereals in the consumption pattern. This has been viewed in the background of the Public Distribution System (PDS) and the availability of rice and wheat under PDS.

#### 4.2: Importance of Coarse Cereals in the Crop Economy

In the drought-prone environment, the climatically sturdy crops dominate in the cropping pattern, as the cropping system gets evolved over the years. Jowar, bajra and maize are predominant among the coarse cereals in Northern Karnataka as against jowar, maize and ragi in Southern Karnataka. As indicated earlier, we selected four villages, two each from these two regions. The cropping pattern was ascertained at two points of time, viz., before ten years and the present cropping pattern. This is done in order to understand the changes in the cropping pattern across the farm sizes. In Table 4.1 we have given the average size of a farm across the sample villages. The average farm size in Southern Karnataka is slightly less than that in Northern Karnataka. Even then, the average size of a farm in these villages is higher than the average farm size of the state. It has been observed that drought-prone areas have larger farm size compared to the areas with assured rainfall. Besides, for historical reasons the size of a holding in Northern Karnataka is higher compared to Southern Karnataka and the coastal regions.

**Table 4.1: Distribution of Sample Households and Size of Holding**

	Distribution of Households (%)				Average Size of Holding (Ha)*			
	CHK	BMK	CKG	KOR	CHK	BMK	CKG	KOR
Landless	40.0	40.0	40.0	40.0	-	-	-	-
Below 2.5 ha	16.0	16.0	16.0	24.0	1.8	1.5	1.7	1.4
2.5 to 5.0 ha	20.0	16.0	16.0	8.0	3.2	4.2	3.5	4.2
Above 5.0 ha	24.0	24.0	28.0	28.0	8.0	9.0	7.8	12.6
All	100.0	100.0	100.0	100.0	4.9	5.7	5.1	7.0

Note: 1. CHK – Chikkammanahalli, BMK – Bommanakunte, CKG – Chikkalgundi, KOR – Korti

2. \* - Size of Operational holding

The cropping pattern across the villages is presented in Tables 4.2 (a) and (b). We also asked the farmers their cropping pattern a decade ago. It can be seen that the trends are mixed as far as the coarse cereals are concerned. The preference for commercial crops and cash crops is quite visible in terms of the share of area allocated to these crops. In the sample villages from Southern Karnataka, the share of area under ragi and bajra have been declining but at the same time, the importance of jowar is increasing. It is necessary to note here that jowar is not necessarily the staple food in Southern Karnataka and more often it is grown for the purpose

**Table 4.2 (a): Cropping Pattern of Sample Households**

(Per cent to GCA)

<b>CHK</b>	<b>Jowar</b>	<b>Bajra</b>	<b>Ragi</b>	<b>Maize</b>	<b>Paddy</b>	<b>Wheat</b>	<b>Groundnut</b>	<b>Sunflower</b>
Small	21.1	-	10.5	-	15.8	-	52.6	-
Medium	9.4	-	6.3	6.3	3.1	23.4	51.6	-
Large	10.6	6.3	4.2	10.7	3.2	-	58.1	7.0
<b>BMK</b>	<b>Jowar</b>	<b>Bajra</b>	<b>Ragi</b>	<b>Maize</b>	<b>Paddy</b>	<b>Sunflower</b>	<b>Groundnut</b>	<b>Mulberry</b>
Small	22.1	5.8	3.5	-	11.6	14.3	38.4	4.4
Medium	-	-	12.9	-	19.8	-	67.3	-
Large	22.1	5.8	3.5	-	11.6	14.3	38.4	4.4
<b>CKG</b>	<b>Jowar</b>	<b>Bajra</b>	-	<b>Maize</b>	<b>Cotton</b>	<b>Wheat</b>	<b>Groundnut</b>	<b>Sunflower</b>
Small	29.0	16.1	-	38.8	-	16.1	-	-
Medium	26.4	17.0	-	20.8	-	9.4	26.4	-
Large	30.1	9.7	-	15.1	8.6	10.7	-	25.8
<b>KOR</b>	<b>Jowar</b>	<b>Bajra</b>	-	<b>Maize</b>	<b>Onion</b>	<b>Wheat</b>	<b>Groundnut</b>	<b>Sunflower</b>
Small	20.5	10.4	-	-	12.8	12.8	30.7	12.8
Medium	22.1	15.6	-	5.2	18.1	7.8	20.8	10.4
Large	28.3	8.7	-	7.6	9.2	7.6	20.7	17.9

Note: 1. CHK – Chikkammanahalli, BMK – Bommanakunte, CKG – Chikkalgundi, KOR – Korti

2. Small – Less than 2.5 ha, Medium – 2.5 to 5.0 ha., and Large – Above 5 ha.

**Table 4.2 (b): Cropping Pattern of Sample Households:  
A Decade Ago**

(Per cent to GCA)

<b>CHK</b>	<b>Jowar</b>	<b>Bajra</b>	<b>Ragi</b>	<b>Maize</b>	<b>Paddy</b>	<b>Wheat</b>	<b>Groundnut</b>	<b>Sunflower</b>
Small	18.5	-	14.8	-	22.2	-	44.5	-
Medium	13.9	-	10.9	11.9	7.9	4.0	51.5	-
Large	7.7	9.1	12.5	13.9	13.9	-	41.8	1.11
<b>BMK</b>	<b>Jowar</b>	<b>Bajra</b>	<b>Ragi</b>	-	<b>Paddy</b>	-	<b>Groundnut</b>	<b>Mulberry</b>
Small	-	-	20.3	-	14.6	-	43.5	7.2
Medium	-	20.9	11.9	-	20.9	-	46.4	-
Large	19.4	16.6	6.9	-	29.0	-	43.1	-
<b>CKG</b>	<b>Jowar</b>	<b>Bajra</b>	-	<b>Maize</b>	-	<b>Wheat</b>	<b>Sunflower</b>	<b>Cotton</b>
Small	41.4	13.8	-	27.6	-	17.2	-	-
Medium	50.0	23.9	-	8.7	-	17.4	-	-
Large	38.0	15.3	-	19.7	-	19.7	4.4	2.9
<b>KOR</b>	<b>Jowar</b>	<b>Bajra</b>	-	<b>Maize</b>	<b>Onion</b>	<b>Wheat</b>	<b>Groundnut</b>	<b>Sunflower</b>
Small	26.2	9.5	-	-	19.1	16.7	19.0	9.5
Medium	40.6	25.0	-	-	-	21.9	12.5	-
Large	32.2	14.4	-	19.2	-	10.1	17.3	6.8

Note: As in the earlier tables.

of fodder. In spite of this, there has been some evidence of jowar being incorporated in the regular diet of rural households. In the sample villages of Northern Karnataka, the importance of jowar and bajra in the cropping pattern has been declining at the cost of the commercial crops. The share of jowar and bajra have gone down from an average of around 35 per cent to 27 per cent and at the same time the area under onion, sunflower and cotton has increased. It seems that the farmers prefer either to meet their consumption requirement from the market or the yield improvement is such that it more than compensates the area decline.

In Table 4.3, we have given the village-wise size of holding-wise consumption of coarse cereals as per cent of total production, receipts from PDS as per cent of total consumption of foodgrains, marketable surplus and marketed surplus of coarse cereals as per cent of total production. It can be observed from the table that the consumption requirements are met from the total production of the household.

The first column in Table 4.3 shows that consumption is largely met out of the production of coarse cereals. However, dependence on the Public Distribution System (PDS) continues probably for meeting the requirement of rice and wheat. The first column of the table indicates market surplus as per cent marketable surplus showing larger share of marketable surplus being marketed.

There is some evidence that sample households have purchased some quantity of foodgrains from the market. Many times such purchases are resorted to obtain better quality of grains rather than meeting the shortage between actual consumption and the total household production. More often the coarse cereals are used to provide food to the wage labourer. The differences between the two agro-ecological regions come out specifically in these tables. Similarly, the villages having a clear access to the market (in lieu of their location on the main road) also show larger dependence on the market and thus a possibility of decision behaviour being affected by the market trends.

#### **4.3: Productivity Differentials**

The productivity in dryland agriculture has always been a point of concern. However, with the availability of a little irrigation, the rainfed agriculture attains a very good level of productivity and can live to the expectation of the technological feasibility. It is well known that the technology front in the rainfed agriculture has not received its due share both in terms of the span of cultivars as well as their easy adoption in respect of resource requirements. During the current year the data on

**Table 4.3: Consumption and Marketing of Coarse Cereals**

	Consumption* coarse of Cereals as % of Production	Receipts from PDS % of Total Consum- ption	Marketable Surplus of Coarse Cereals as % of Production	Marketed Surplus as % of Production of Coarse Cereals	Marketed Surplus % of Marketable Surplus of Coarse Cereals
<b>SKM</b>					
Small	82.8	9.3	10.3	5.2	50.49
Medium	55.8	8.1	29.1	23.7	81.44
Large	40.1	5.7	38.2	36.8	96.34
<b>BMK</b>					
Small	54.3	9.1	28.8	20.8	72.22
Medium	53.6	9.9	27.9	22.6	81.00
Large	37.3	8.4	41.1	39.7	96.59
<b>CKG</b>					
Small	56.3	9.1	27.0	24.0	88.89
Medium	46.2	2.8	35.3	32.9	93.20
Large	57.9	2.4	25.3	20.0	79.05
<b>KOR</b>					
Small	72.6	9.3	16.8	10.0	59.52
Medium	25.3	6.5	52.4	47.0	89.69
Large	22.4	3.4	50.6	47.6	94.07

Note: \* Maize is excluded from the computations as it is mainly a crop grown for processing and market

distribution of certified seeds indicates only 4 per cent of the seeds of bajra, 6 per cent of ragi and 24 per cent of jowar as distributed in the state. Moreover, the number of cultivars in wheat, paddy and other commercial crops outnumber many times that available for jowar, bajra or ragi. We have presented the current yield rates obtained across crops and farm groups in Table 4.4. It can be seen from the table that the coarse cereals in the rainfed condition of drought-prone areas have comparable yield rates with those prevailing in the assured rainfall region. Thus, with a little protective irrigation, the rainfed agriculture has good potential to come up. And coarse cereals, as they form the major dietary requirement of the population in these areas, will probably be the natural choice for sustaining food security. The yield obtained by the farmers was checked with the package of practices

**Table 4.4: Crop-wise Productivity of Cereals**  
(in Kgs per ha.)

Category	Jowar	Bajra	Ragi	Maize	Paddy	Wheat
<b>Chikkammanahalli</b>						
Small	3,400*	-	2,700*	-	2,700*	-
Medium	4,800*	-	3,640*	-	3,700*	550
Large	5,290*	1350	4,140*	-	4,000*	-
<b>Bommankunte</b>						
Small	-	-	3,027*	-	4,942*	-
Medium	990	-	2,100	-	4,942*	-
Large	741	-	2,224	-	5,719*	-
<b>Chikkalgundi</b>						
Small	1,360	1,400	-	-	-	1,240
Medium	930	1,525	-	3,270*	-	1,300
Large	1,340	1,870	-	3,000*	-	2,010*
<b>Korti</b>						
Small	1,710	1,240	-	-	-	1,980
Medium	1,360	-	-	2,970*	-	2,350*
Large	1,200	860	-	3,770*	-	2,400*

Note: \* - Yield rates under purely irrigated conditions. All others are average yield rates.

recommended by the Government of Karnataka. It is found that the yields rates reported were quite high and therefore, there was variation in the yield gaps across farm groups. The cleaning of data was not possible as the yield rates were not really infeasible. However, they seem to be on the higher side. The yield gaps obtained from the feasible sample are presented

in Table 4.5. It can be seen that the yield gap ranges between 6 quintals to 10 quintals per hectare. The explanation of the yield gap even though does not form the focus of this study, the possibility of the gap existing due to laboratory conditions and farm conditions cannot be ignored. The possibility of bridging such yield gap with the technology cannot be ruled out. This gap can be covered by optimising the resource use.

**Table 4. 5: Yield Gap of Coarse Cereals**

(In Quintals per hectare)

Crops	Chitradurga			Bijapur		
	Optimum Yield	Farm Yield	Gap	Optimum Yield	Farm Yield	Gap
Jowar-IR	50	44	6	-	-	-
RF	20	14	6	20	13	7
Bajra- IR	-	-	-	-	-	-
RF	20	13.5	6.5	20	13.7	6.3
Ragi –IR	40	29.7	10.3	-	-	-
RF	25	21	4	-	-	-
Maize–IR	-	-	-	60	32	28
RF	-	-	-	-	-	-
Paddy-IR	60	43	17	-	-	-
RF	-	-	-	-	-	-
Wheat-IR	-	-	-	31	22	9
RF	12	5.5	6.5	-	-	-

Note: IR – Irrigated; RF - Rainfed

Source: UAS (1999). Package of Practices, University of Agricultural Sciences, GKVK, Bangalore.

#### 4.4: Parameters Governing Decisions

The decision regarding the shift in the area under coarse cereals hinges mainly upon six parameters, viz.: (i) availability of irrigation, (ii) climatic factors, (iii) constraint on land and subsistence requirement, (iv) price and marketing mechanism, (v) access to market, and (vi) receipt of expected price. It is noted that resource availability in terms of irrigation and subsistence requirement dominated the area allocation decision in Southern Karnataka, whereas in Northern Karnataka, the climatic factors along with land availability and marketing infrastructure acted as the explanatory variable. The low prices of cereals and the cash requirement for other

consumption needs forced the farmers to reduce the area under coarse cereals. It was more or less an unanimous feeling that price and marketing infrastructure was a major bottleneck in the growth of the crop. Apart from the above factors, the yield level, relative prices of crops and the yield risk (in terms of climatic risk) were the other important determinants in the process of decision-making.

#### **4.5: Role of Prices**

Coarse cereals being in the group of sturdy crops and therefore, historically grown in the regions with inadequate natural resources and where quality of soil is not good also receive low prices. Traditionally, these crops are grown for the purpose of home consumption and not for marketing. Therefore, the participation of coarse cereals in the markets is quite low and so also their price response. As a result, these crops never fetch the prices equivalent to the superior cereals. However, there has been substantial change during the last 15 years. Now the cultivators seem to be more concerned about the prices received for the crop and they do sell some portion of their marketable surplus of coarse cereals. Minimum Support Price mechanism has not been effective in this respect as the marketing of the produce is not in bulk and most of the times in the local market. These crops have received unfair treatment on the price front. In the earlier chapter we computed the movement in relative prices of the coarse cereals and noted that till mid-eighties the relative prices of these crops were declining. But there was some evidence of revival in the relative prices of coarse cereals. At the micro level the cultivators were asked about their price expectations and the prices they received for the crop they sold in the market. The results have been presented in Table 4.6.

**Table 4.6: Prices Received by the Farmers, their Expected Prices and the Cost of Cultivation**

<i>CHK</i>	<b>Jowar</b>	<b>Bajra</b>	<b>Ragi</b>	<b>Paddy</b>	<b>Wheat</b>	<b>Maize</b>	<b>Groundnut</b>	<b>Sunflower</b>
<b>PR</b>	725	530	450	800	825	790	680	950
<b>PE</b>	800	650	800	950	950	850	1000	1100
<b>CP(A2)</b>	490	350	400	650	700	580	760	700
<b>BMK</b>	<b>Jowar</b>	<b>Bajra</b>	<b>Ragi</b>	<b>Paddy</b>		<b>Mulberry</b>	<b>Groundnut</b>	<b>Sunflower</b>
<b>PR</b>	0	500	400	636		600	850	900
<b>PE</b>	0	600	700	800		0	900	1000
<b>CP(A2)</b>	0	300	350	500		0	700	650
<b>CHG</b>	<b>Jowar</b>	<b>Bajra</b>	<b>Maize</b>		<b>Wheat</b>	<b>Cotton</b>	<b>Groundnut</b>	<b>Sunflower</b>
<b>PR</b>	630	600	750		540	1450	800	950
<b>PE</b>	746	600	800		750	1600	950	1000
<b>CP(A2)</b>	480	350	560		650		650	680
<b>KOR</b>	<b>Jowar</b>	<b>Bajra</b>	<b>Maize</b>		<b>Wheat</b>	<b>Onion</b>	<b>Groundnut</b>	<b>Sunflower</b>
<b>PR</b>	700	655	800		655	400	690	980
<b>PE</b>	850	750	850		700	500	1000	1200
<b>CP(A2)</b>	540	390	580		675	300	700	730

*Note: PR – Price Received; PE – Price Expected; CP(A2) – Cost of Production A2*

A – Paid out cost as given in the cost of cultivation surveys that includes all cash expenditure in Rs. per hectare

The table presents the prices received (PR) by the farmers, their expected price (PE) and the cost of production (A2). We have specifically taken only the paid cost and not included the opportunity cost of the family labour as cost C2 and cost C3 are very high compared to the expected price quoted by the farmers. Cost C2 in the case of villages is as follows:

Crops	CHK	BMK	CKG	KOR
Jowar	1,590	-	1,280	1,340
Bajra	1,450	1,450	1,150	1,190
Ragi	1,500	1,350	1,560	1,580
Paddy	1,950	1,800	-	-
Wheat	1,850	-	1,550	1,575

Note: Cost C<sub>2</sub> in Rs. per hectare

It seems that the price expectations of the farmers are framed more on the basis of the paid-out cost plus a premium above this expected by the cultivators. It is quite intriguing that the premium is quite lower than the opportunity cost of labour computed at market wage rates. The opportunity cost of labour is lower because of the low wage rates prevailing in the labour market. In any case, the farmers do not receive their expected prices (even this) but most of the times they recover the paid cost at least on quintal to quintal basis. In other words, for the little quantity that they market, the prices received are higher than the paid out cost for such quantity. In all these situations, it comes out clearly that unless the price scenario changes, coarse cereals will not emerge as commercial crops and it will not be out of place to presume that the area under coarse cereals is likely to stagnate at the present level though yield rates may improve with the availability of protective irrigation.

#### 4.6: Coarse Cereals in Consumption Pattern

Being a major crop group of the drought-prone area, coarse cereals constitute the most significant component in the consumption of cereals of rural households. This has been observed even in the time series of NSS data (Suryanarayana 1996) that in Karnataka other cereals (other than rice and wheat) formed 64 per cent of the total cereal consumption in 1961-62. By 1990-91, the proportion of other cereals in the total cereal consumption came down significantly but stayed at 53.61 per cent. Similarly, this proportion for Maharashtra was 52.79 per cent during 1990-91. It is very clear that the predominance of coarse cereals in the diet of rural consumers has been going down but it is more likely to stabilise at about 50 per cent.

Our micro level results also confirm to this reality. In Table 4.7 we have presented the consumption pattern of foodgrains per household. Coarse cereals still dominate the aggregate cropping pattern in the villages of South and North Karnataka. In Southern Karnataka, coarse cereals form 64 to 80 per cent of the total cereals consumption whereas in Northern Karnataka it ranges between 59 to 66 per cent. In other words, the domination of coarse cereals in the consumption pattern is quite clear. We have not presented here the consumption pattern across the size of holding. However, it is very clearly seen that the small, medium holding classes along with the landless labourers predominantly use coarse cereals in their consumption pattern.

**Table 4.7: Share of Cereals and Pulses in Consumption Pattern  
(Per cent to Total Consumption)**

Crop	South Karnataka		North Karnataka	
	CKM	BMK	CKG	KOR
Rice	14.7	30.7	14.8	17.0
Wheat	3.4	2.5	16.1	20.9
Superior Cereals	18.1	33.1	30.9	37.9
Jowar	31.8	22.2	43.1	34.2
Ragi	43.1	29.7	-	-
Bajra	5.6	12.4	22.8	25.3
Coarse Cereals	80.5	64.3	65.9	59.6
Pulses	1.4	2.6	3.2	2.5

#### **4.7: Differential Market Access**

We have chosen the villages for the micro level study based on the market access of these villages. Out of the four villages, two have an easy access road to the nearby market town. The market access can influence the cropping decisions, consumption pattern, marketed surplus and share of commercial crops. In Table 4.8 we have given some basic indicators which clearly show the distinction between the two groups of villages. The average share of coarse cereals in the

**Table 4.8: Differences Between Villages with Easy Access to Market and the Interior Villages**

Sl. No.	Indicator	Average for	
		Villages with easy access to market	Interior villages
1	Size of holding (hectare)	5.9	5.4
2	Share of coarse cereals in the Gross Cropped Area (%)	12.0	17.4
3	Consumption of Coarse Cereals as % of total Production	49.8	50.9
4	Marketable Surplus of Coarse Cereals as % of Total Production	32.9	31.8
5	Share of coarse cereal in the consumption of total cereals (%)	70.0	65.0
6	Marketed Surplus of Coarse Cereals as % of Total Production	28.4	24.6
7	Marketed Surplus as Per cent of Marketable Surplus (%)	36.3	77.4
8	Share of Commercial Crops in the Gross Cropped Area (%)	29.5	24.2

Source: Based on Survey Data

gross cropped area has been lower in villages with market access and consequently there is a higher proportion of area under commercial crops. Similarly, the marketed surplus as well as the marketable surplus of coarse cereals is lower in the interior villages but the difference sharpens in the case of marketed surplus. Market surplus as per cent of marketable surplus is relatively low in the interior villages.

#### **4.8: Conclusions**

Our micro level analysis suggests quite a few important aspects. First of all, the share of area under coarse cereals has been going down but we believe it will have a threshold below which this may not go down. Our judgement is supported by the fact that the poor would continue to consume coarse cereals and its consumption in a few urban pockets will also increase thereby the aggregate consumption may find an asymptotic level close to the level of production. We have emphasised this observation especially keeping in view the tastes and consumption pattern of the rural households in the drought-prone areas. The area decline is more than compensated by yield improvement. The technological options in the coarse cereals have

been quite attractive and promise good productivity. Unlike the usual belief that there has been very little adoption of new technology in the coarse cereals sector, productivity rates were observed to be quite high. Thirdly, excluding consumption at household there seems to be sizeable marketable surplus existing of these cereals, which more often is used for kind loans and feeding the agricultural labourers. Prices and market infrastructure act as major bottlenecks in the growth of these crops. It is therefore quite natural that growth has stunted in the absence of proper price incentives. Given the facts that the productivity growth is satisfactory, the consumption requirements are more or less stabilised. The external demand pull will alone exert pressure on adoption of technology. As there is a sizeable marketable surplus existing, we strongly believe that coarse cereals can be utilised to strengthen the food security system at the local level, because: (i) the coarse cereals form the dominant component of the foodgrain consumption in the drought-prone areas; (ii) technology has a good promise for this group of crops; (iii) there is a sizeable marketable surplus existing which can be used locally for providing food security to the landless rural poor; (iv) the present PDS satisfies only 10 per cent of the total consumption requirement of foodgrains. Most of the rural households either depend on house production or the market for their requirements; and (v) given some price incentive these crops can do as well as any other crop. Unfortunately, these crops have been given a raw deal at the policy front.

## CHAPTER V

### COARSE CEREALS: TOWARDS A POLICY FRAME

#### 5.1: Introduction

The task of providing food security poses many hurdles in drought-prone areas. Backwardness and chronic poverty characterise most of these areas. Given the fragile base of agriculture, growth processes remain sluggish. Shifting to commercial crops and, more recently, hi-tech agriculture are promising sources of growth but their impact on food security can be complex. There are two view points expressed in the literature. First, some of the analysts have argued that the process of commercialisation may cause de-elitisation impact on food security, whereas the second group has strongly monetisation and access to better sources of income would solve the problem of food security in a better manner. Commercial crops not only raise the incomes of farmers but also make them more vulnerable to vagaries of market and fluctuations in production. More important, commercial crops divert land from coarse cereals which are the local staple foodgrains in drought-prone areas. As regards hi-tech agriculture, it usually remains confined to small enclaves. While it would contribute handsomely to the value of agricultural output, it is far from certain that it would have a beneficial impact on the income and employment of the masses of poor. What the drought-prone areas desperately need is a comprehensive watershed development programme to conserve soil and water resources and improve the yield of dryland crops across the board. It would seem that in the absence of watershed development the new technologies and practices generated by research – of which there is an abundance – languish in laboratories. The question of providing food security in the drought-prone areas needs to be looked at keeping in mind the prospects for dryland agriculture in the coming years. Equally relevant to consider are the implications of the reforms being contemplated to promote liberalisation and globalisation of Indian economy including agriculture for food security.

#### 5.2: Focus on Major Findings

The present study was undertaken with the main objective to understand the prospects of coarse cereals in the drought-prone areas of Karnataka. The importance of coarse cereals, especially in terms of the share of area allocated, has been going down but most often this is understood as getting reflected in the quantum of their production. In fact, the decline in area has been more than compensated by the increase in productivity and these crops have recorded positive rates of growth in their production

especially in the period beyond mid-eighties. Our analysis here is spread over three components: Initially, we attempted to look into the trends in the area, production and productivity of coarse cereals at the country level. This was followed by the analysis at the state and district levels for Karnataka. Finally, in order to understand the intricacies in the cultivation and consumption of coarse cereals at the micro level, we selected two core drought-prone regions of Karnataka and carried out field work in four villages. The choice of the villages was directed by the cultivation of coarse cereals in production and their access to road or their access to market.

At the country level we noted that there was virtual stagnation in the growth of coarse cereals owing to the significant decline in area and almost negligible growth in productivity trends before the mid-eighties. But the performance revived beginning with the mid-eighties. Presently, though the area has stagnated, productivity growth will give a boost to the production trends. Among the coarse cereals, maize and bajra did exceedingly well closely followed by jowar. The performance of ragi follows. Maize cannot be really taken as belonging to the same group since the purpose of growing maize is quite different from that of growing jowar, bajra or ragi. Most of the production of maize is used for processing starch, flakes, breakfast cereals and animal feed. The productivity rates of coarse cereals are lower mainly due to three reasons: (i) the innovations of Research and Development (R&D) in the new cultivars of coarse cereals do not cater to the needs of the sector. The indigenous innovations in the rainfed area are not incorporated in the R&D efforts. (ii) Periodic droughts lead to compulsory fallowing, and therefore, the nutrient balance gets automatically maintained. Non-occurrence of such fallowing has consequently affected lowering the yield rates. (iii) The adoption of new varieties of coarse grains is slower mainly because of the low preference to these varieties in the diet of rural masses. Analysis of prices indicate that the coarse grains did not receive the required price support as reflected from the relative prices. It also comes out that the crops have not gained on the technology front and in fact the trends in production come as a result of both technology and prices. It is interesting to note that coarse grains are also emerging as a significant export commodity. In the early nineties, the country exported coarse grains to a sizeable extent. Thus, it is essential to recognise the role of coarse cereals as an important animal feed for the purpose of export.

Karnataka is among the major states growing coarse cereals. The behaviour of trends in coarse cereals in Karnataka is similar to that at the country level. The production growth in jowar, bajra and ragi was not very high over the entire period but there is a revival in the growth trends beginning

with the mid-eighties. This revival cannot be totally attributed to technology alone but the relative prices also have played a significant role. The analysis also indicates an inadequate policy attention (or a relative neglect) on the price front. In terms of consumption behaviour, two specific observations are quite important: (i) the share of coarse cereals in the consumption of total cereals has been declining but this decline is likely to stop at some bare minimum threshold level; (ii) as a general trend, the share of cereals has been declining in the total foodgrains. Therefore, one must view the decline in the consumption of coarse cereals based on these. Even in terms of total calorie consumption, there has been a reduction in the calorie intake from cereals as a group. The analysis of PDS at the state and district levels indicates that there is a continuous problem about the off-take under PDS, apart from other inadequacies. The proportion of the off-take has been fluctuating and this is more so in the core drought-prone areas.

Our micro level analysis indicates quite a few interesting aspects. Coarse cereals have been reducing in their importance in the cropping pattern of the households at the cost of cash crops but the area decline is more than compensated by improvement in the yield per hectare. The achieved productivity levels at the farm level are comparable to those promised by the package of practices. This is no mean an achievement despite the neglect on the policy front. On the consumption side also these grains still muster the largest share with respect to the total cereal consumption even though there is a slight decline in their share. But in any case it will be completely erroneous to assume that these will disappear from the diet of the rural household of the drought-prone region. The availability of cereals (rice and wheat) through PDS does not cover even 10 per cent of the total consumption requirements and for the remaining 90 per cent, the household has to depend either on own farm produce or market. The production of coarse grains meet the consumption demand of the households and still leaves a comfortable surplus available for marketing. There does not appear to be widespread food distress and therefore, the present PDS can easily be substituted by an efficiently managed local food security system covering the staple foodgrains grown locally. The analysis pertaining to expected prices and the prices received by the farmers indicates that there is little incentive available to the cultivators through this source. Thus, the study indicates five important aspects: (i) it is true that the area under coarse cereals has come down over the last three decades but productivity is quite satisfactory and has retained the production level; (ii) the grains are grown mainly by the lower size classes of holding as the

cultivators with better resource base move towards commercial crops; (iii) these grains still form a major part of the diet of rural households and most of their consumption requirement is satisfied by their own production; (iv) the present PDS provides less than 10 per cent of the total consumption needs and hence 90 per cent of their cereal demand is met either through market or production on own farm; and (v) coarse cereals can be brought under the PDS network which can be better managed locally as the Panchayats are mandated to undertake this. This alternative system will work better than the existing system.

### **5.3: Characteristics of the Present Food Security System**

The present Public Distribution System (PDS) has been criticised by researchers and policy analysts for the following reasons: The system is inherently costly as it is based on surpluses of two superior cereals – rice and wheat – generated in a few green revolution pockets like Punjab, Haryana and Western Uttar Pradesh. These surpluses have to be procured, stored and distributed all over the country. The system is far too centralised, hierarchical and bureaucratic to achieve cost-effectiveness, to respond quickly to distress in localised areas and to distinguish those in real need for assistance from those who do not need it. Judged by the yardsticks of coverage of vulnerable groups, quality of food security provided and impact on the conditions of beneficiaries, the performance of the system is poor. The system is practically absent in some of the hardcore poverty areas.

To an observer from outside India, the present food security system must indeed seem paradoxical. Out of a wide range of cereals grown in India, PDS has chosen rice and wheat – two superior cereals preferred by the well-to-do consumers rather than the numerous local staples consumed by the poor for generations. While the system is ostensibly for the benefit of the poor, it is not targetted on the poor and has shown little concern to extend its reach to areas where food distress is widespread among the poor. A food security system should have a dependable provision to ensure that the poor have the capacity to pay for the foodgrains made available to them. This is not the case in India. Employment programmes and PDS operate as separate activities. A link between them could have improved the access of the poor to foodgrains. While food subsidy is growing one cannot be sure that it is really reaching the poor.

The observer, during the seventies on the other hand, would have been full of admiration for the food security system which helped India to overcome one of the worst crises it faced since independence. However, it

originated as an appendage of the Green Revolution whose chief concern was a quick breakthrough in foodgrain production – which necessitated concentrating on rice and wheat - and not with food security for the poor or increase in the production of staples consumed by them. The centre piece of the Green Revolution was the farmer in the green revolution areas. Subsidised inputs and credit, research and extension, price support through procurement by government agencies were all focussed on the green revolution farmer to help him raise yields and production. With increase in production, the dependence on imports and food aid was eliminated. As the upsurge continued, the surpluses became an embarrassment. Simultaneously, the poverty numbers and the deprivation suffered by the poor - particularly their foodgrain needs – assumed a prominent role in Indian policies and in policy research and analysis. The outcome was the coming into being of a countrywide network, the Public Distribution System. Over the decades which have followed, the network has expanded considerably, spatially as well as in terms of quantities of foodgrains handled. However, price support to green revolution farmers continues to be the major objective of the food policy with the poor providing only an excuse for the huge subsidies and physical losses in foodgrains involved in the operations of Food Corporation of India (FCI). The limited purpose here is only to suggest that the present food security system, viewed as a safety net for the poor, needs thorough going changes.

#### **5.4: An Alternative System – Features and Feasibility**

In the light of the preceding discussion, it would be reasonable to expect the alternative system to have the following features:

- The system should be based on the local staples consumed by the poor. This would make it possible to decentralise the food security system and economise on the logistic arrangements needed to operate the system. A further advantage of a local staple would be that it would ordinarily figure low in the preference ranking by the non-poor and, hence, would be less prone to leakages. The policy support given to the local staples as constituent of the food security system would benefit the poor as producers and also stimulate growth in the areas of local staples which are usually backward receiving little policy attention.
- Identification of the poor, selection of those eligible to receive food security assistance and delivery of the assistance to them should be organised by local representative bodies in which representatives of the poor participate. There should be provision for a watchdog body to ensure that the system covers all the eligible households. Beneficiary

groups, local organisations of people, NGOs may be associated with the operation and monitoring of the system.

- Physical handling of foodgrains – purchase, storage, distribution – by the local body organising the food security system may be minimised. For example, in an employment programme linked system, the beneficiary may receive part of wages in the form of food coupons which can be exchanged for foodgrains in a designated local shop. Similarly, the mid day meal programme for school children can be operated by the organisation running the school.
- The scheme will work as follows: Initially, the Panchayat Raj Institutions (PRIs) will assess the availability of surplus in their jurisdiction and operate the Minimum Support Price (MSP) scheme for such cereals on the basis of the MSP declared by the State. The procurement will be made by Primary Agricultural Co-operative Societies with financial support from the Panchayat Raj Institutions (A similar procurement arrangement is presently working in Bihar). Such procurement will be stored locally with the help of PRIs and distributed to the public distribution network within the jurisdiction of PRIs. All these processes will reduce huge transportation cost of grains from distant places as well as eliminate the delays and transaction costs in the process.
- When a disaster arrives, all the tiers of the government – from the central downwards – would get together to handle the crisis. In normal times, the role of the higher tiers would be minimal confined to laying down of norms for assistance, devolution of funds and overall supervision of the working of the system and its results.

Regarding the feasibility of the alternative system outlined above, we first take note of the changing context which has features favourable to the alternative system:

- The years since the early eighties have witnessed the spread of agricultural growth to areas and crops far beyond limited pockets where the Green Revolution took place in the seventies. The yields of most crops improved during the later phase. Two recent studies of the agricultural growth since the early eighties visualise continuation of the trend towards broad-based (area-wise and crop-wise) growth (Sawant and Achuthan 1995; S K Ray 1998). The prospective situation would then be favourable for emergence of local surpluses in wide range of foodgrains provided the policy regime remains conducive to broad-based agricultural growth.

- The coming into being of the third tier (PRI at Village Panchayat level) of government at the district and lower levels (Panchayati Raj Institutions i.e., PRIs) would build up an institutional structure having constitutional status and the powers and resources associated with it. It would be the responsibility of the PRIs to formulate and implement development programmes in their areas including those meant for the poor. PRIs would have to organise the tasks associated with the food security system viz., identification of the poor, location of households eligible for receiving subsidised food assistance and delivery of food assistance to such households. Thus, irrespective of the food security system, its decentralisation now looks certain to occur.
- The present system is likely to move towards a breakdown in the not-too-distant future. Removal of food subsidy and linking of issue prices to economic cost of grains procured and distributed by FCI would lead to reduction in off-take. As the prices charged to the poor for the PDS grains are a fixed proportion of issue price (currently 50 per cent), the poor also would have to pay a higher price for PDS grains and the off-take by them may also decrease. On the other hand, given the political clout of the farmers in green revolution areas, the support prices paid to them would continue to rise in future along with the quantities of grains they offer to the government. It is necessary to remember that FCI has to purchase whatever the farmers offer, which in years of bumper production could be enormous even for the government to handle. It should not be too difficult to see that the growing economic and physical burden caused by the system must eventually cross its capacity to bear.

Our field material has also a few indicators suggesting the feasibility of the alternative system. The important observations in this context from the field are as follows:

- For coarse cereals, production exceeds consumption by a substantial margin in all the four villages and for all the three size groups of farmers. This is also true of superior cereals though the margins are narrower and there are two groups (medium in Chikkammanahalli and large in Korti) showing consumption slightly in excess of production. It would be reasonable to make two propositions based on this clue. First, the farmer households as a whole can be taken as being free from food distress though there may be individual cases subject to such distress. What they need is not so much subsidised foodgrains as opportunities to earn additional incomes, i.e., a wide range of income-augmenting

programmes. Second, the selected villages have surpluses in coarse cereals as well as superior cereals which could serve as the base for a decentralised food security system.

- Coarse cereals are still a significant component in the foodgrain consumption pattern of farm households. However, the pattern does not remain uniform over the villages. In Chikkammanahalli, coarse cereals continue to be dominant, while in Bommanakunte – located in the same block the shift towards superior cereals is quite noticeable. Similar differences in pattern are also observed in the Bijapur villages though both of them are ahead of Chikkammanahalli as regards the shift towards superior cereals. This shift can be taken as another pointer to the food distress among farm households not being widespread but confined to some households during some periods in a year. A decentralised system would be particularly efficient and cost-effective in such a situation.

As the category most vulnerable to food distress is that of the landless, it is important to probe our field material for indicators reflecting the situation of the landless in this respect. Foodgrains consumption per adult unit in different categories of households suggests that in landless households it is likely to be an underestimate owing to the omission of data on meals and snacks received by the members of the household at the work site. Taken by themselves, the consumption figures for the landless households do seem to indicate an intake falling below the norm of 500 gms. per day, which is often used to judge calorie-adequacy of foodgrains consumption. Similarly, the small farm households also depict parallel behaviour. As a second check, we look at the composition of foodgrains consumption in the landless households. In three out of four selected villages – Bommanakunte, Chikkalagundi and Korti – superior cereals account for almost half of the foodgrains consumption in landless households. It is also seen that landless households in these villages augment their PDS quota of rice and wheat with substantial purchases from the market. It does seem rather implausible that households subject to food distress would behave in this manner showing a clear preference for superior cereals. What is more plausible is that the meals and snacks received by the members of landless households at worksite has a substantial coarse cereal content and that, hence, their own purchases shift towards superior cereals. It is only Chikkammanahalli, one out of the four selected villages, which has a composition of foodgrains and also quantum of consumption per adult unit suggestive of prevalence of food distress.

Following is a brief description of how the alternative system visualised by us would operate in drought-prone areas:

- As a part of its mandated function, the village/group of villages at the level of Panchayat would maintain a list of poor households and other households in the area eligible for the development schemes formulated and implemented by the Panchayat. Initially, the schemes would be handed down by the Central/State governments but eventually the Panchayat would play an active role in formulating schemes with adequate financial resources at its disposal.
- Analytically, the schemes formulated by the Panchayats could be put in three categories: (i) Area development programmes guided by the development strategy at the macro level. The issues like potentialities of the schemes in the area or desirable crop pattern for the area would have to be considered within a macro framework for development of the economy; (ii) Area development programmes would indicate the scope and opportunities for employment programmes. The latter could be used as the main instrument to deal with the food distress prevailing in the area as well as with the larger objective of providing income support to the poor. Part of the wages paid to the workers in these programmes could be provided in the form of entitlement to receive a specified quantity of local staple consumed by the poor. The choice in this respect could be left to the worker and the implicit price paid by the worker, by foregoing part of wages, could also be adjusted to introduce an element of subsidy. The Panchayat could evolve a procedure whereby the income support would be provided without direct involvement of the Panchayat in acquisition and distribution of foodgrains, so that these would be left to the normal market channels; (iii) The Panchayat would also organise welfare programmes to meet the food and nutrition needs of vulnerable groups like children, nursing mothers and senior citizens for whom employment programmes would not be appropriate.
- The Panchayat would view provision of food security as a part of the broader objective of development of the area and the rural people. The emphasis would be not so much on providing relief to those subject to food distress as generation of livelihood opportunities which would obviate the need for relief measures, except in times of widespread and extreme distress like famine and drought. The provision of food security would be delinked from giving price support to the farmers. Price support policy will be formulated in terms of criteria appropriate to that

policy. NGOs, beneficiary/user groups and representatives of the poor would participate in all phases of formulation and implementation of development programmes, including programmes to provide food security. Thus, the alternative system outlined in this paper would combine decentralisation with debureaucratisation and depoliticisation.

### **5.5: Concluding Observations**

The present food security system reflects two basic flaws in our policy making for agriculture and rural development: (i) the problems of relatively better off sections of farmers receive far more attention in policy making, than the deprivations suffered by the poor; (ii) while drought-prone areas which are also lagging in development urgently need investment in infrastructure. The emphasis in policies is more often temporary and *ad hoc* relief measures type. It is important to realise that this is not a congenial setting for progress towards decentralisation, debureaucratisation and depoliticisation referred to above. In fact, Panchayat Raj Institutions (PRIs), as visualised in the recent constitutional amendments, would need a long time to become operational even in the few states like Karnataka, regarded as being in the forefront to promote PRIs. Hence, it would be rather naïve to consider the alternative system described here as a pragmatic alternative at the moment. What would be more realistic to assume is that as the present system becomes more and more unwieldy and unsustainable, the policy makers would be under pressure to look for a viable alternative. Simultaneously, political pressures are likely to gather weight at the PRI level for more substantive resources and decision-making powers than they have now. Thus, the present system is likely to drift towards a system approximating the one described. Discussion on the present food security system often revolves around improving it by focussing the PDS on the poor, by excluding the better-off and by reducing leakages and corruption. While improvements in the system are welcome, our plea is that the present food security system needs to be assessed in relation to the broader context of changing the agricultural and poverty scenario in India. The latter seems to suggest that what is urgently required is a thorough going restructuring of the system, rather than piece-meal improvements in it.

## BIBLIOGRAPHY

- Acharya, K.T. (1975). Tackling the Edible Oil Frame. *Economic and Political Weekly*, X(19):
- Bapna, S.L. (1975). Slow Increase in the Production of Coarse Cereals – the Case of Bajra. Hyderabad: ICRISAT. Mimeo.
- Bapna, S.L. (1976). *Production of Coarse Cereals in India: Past Performance and Future Prospects*, ICRISAT, Hyderabad. (mimeo).
- Bhalla, G.S. and Gurmail Singh (1999). Recent Developments in Indian Agriculture – A District Level Study: Conclusions and Policy Suggestions. *Arpan*, III (2).
- Bhalla, G.S., Peter Hazell and John Kerr (1999). *Prospects for India's Cereal Supply and Demand to 2020*, Research Report. Washington: IFPRI.
- Chhatrapati, A.C. (1980). Trends in Oilseed Production. *Economic and Political Weekly*, XV (37).
- Dev, Mahendra, S. (1996). Food Security: PDS Vs EGS, A Table of Two States. *Economic and Political Weekly*, XXXI (27).
- Dev, Mahendra S. and M.H. Suryanarayana (1991). Is PDS Urban Biased and Pro Rich? An Evaluation. *Economic and Political Weekly*, XXVI (41)..
- Ganguly, Hemanga (1991). Market Intervention and Edible Oil Prices. *Economic and Political Weekly*. XXVI (45).
- Geetha S. and M.H. Suryanarayana (1993). Revamping PDS: Some Issues and Implications. *Economic and Political Weekly*, XXVIII (41).
- Government of India (1989). *Technology Mission on Oilseeds, A Report*. New Delhi: Ministry of Agriculture..
- Government of India (1990). *Handbook on Oilseeds and Oil Statistics*. New Delhi: Ministry of Agriculture.
- Government of Karnataka (1993). *Report of the Expert Committee on Stagnation of Agricultural Productivity in Karnataka During 1980s* (T R Satishchandran, Chairman), Bangalore: Government of Karnataka.
- Gulati, I.S. and T.N. Krishnan (1975). Public Distribution and Procurement of Foodgrains: A Proposal. *Economic and Political Weekly*.
- Hanchate, Amresh and Tim Dyson (2000). *Trends in the Composition of Food Consumption and Their Impact on Nutrition and Poverty in Rural India*. London: London School of Economics. Unpublished.
- Indian Society of Agricultural Economics (ISAE) (1982). Annual Conference on Slow Growth Crops. *Indian Journal of Agricultural Economics*, XXXVII (3).
- Jhala, M.L. (1985). Restructuring Edible Oil and Oilseeds Economy of India. *Economic and Political Weekly*. XIX (39).

- Jharwal, S.M. (1998). *Public Distribution System in India Reassessed*. New Delhi: Manak Publications.
- Jodha, N.S. (1974). Prospects of Coarse Cereals : Permanent Constraints of Jowar and Bajra. *Economic and Political Weekly*, IX (52).
- Jodha, N.S. (1979). Dry Farming Technology: Achievements and Obstacles. In C.H.Shah (ed.). *Agricultural Development of India, Policy and Problems*. Bombay: Orient Longman.
- Jodha, N.S. and R.P. Singh (1982). Factors Constraining Growth of Coarse Grain Crops in Semi-Arid Tropical India. *Indian Journal of Agricultural Economics*.
- Khare, M.P. (1995). *Impact of National Pulses Development Programme on Small Cultivators in Maharashtra*. Pune: Gokhale Institute of Politics and Economics, Mimeograph.
- Kumar, Praduman (2000). Productivity and Supply of Cereals in India. A Paper presented at a Seminar on *Food Security in India*. Hyderabad: CESS and IHRD.
- Kumar, Praduman and V.C. Mathur (1996). Agriculture in Future: Demand and Supply Prospectives for the Ninth Five Year Plan. *Economic and Political Weekly*, XXX (39).
- Nadkarni, M. V. (1986). Backward Crops in Indian Agriculture Economy of Coarse Cereals and Pulses. *Economic and Political Weekly*, XXI (38-9).
- Narayana, S. and K.R. Rao. (1982). Estimation of Demand for Coarse Cereals: A New Approach. *Indian Journal of Agricultural Economics*, July-September.
- National Commission on Agriculture (1976). *Report of the National Commission on Agriculture*, Vol. VII. New Delhi: Ministry of Agriculture, Govt. of India.
- Ninan, K.N. (1989a). *Edible Oilseeds — Growth, Area Responses and Prospects*. Bangalore: Institute For Social and Economic Change.
- Ninan, K.N. (1989b). Self-Sufficiency in Oilseeds: Within Grasp or Elusive Goal, *Economic and Political Weekly*, XXIV (39).
- Ninan, K.N. (1995). Oilseed Development and Policy. *Economic and Political Weekly*, XXX (12).
- Parikh, Kirit S. (1994). Who Gets How Much from PDS: How Effectively Does it Reach the Poor, *Sarvekshana*, XVII (3).
- Radhakrishna, R. and C. Ravi (1991). *Food, Nutrition and Prices: Some Macro Issues*. Working Paper No. 22. Hyderabad: Centre for Economic and Social Studies.
- Ray, S.K. (1984). *Sources of Change in Crop Output*. Delhi: Institute of Economic Growth.

- Roy, Shyamal (1984). Problems of Coarse Grains in India: Policy Implications. *Management and Labour Studies*, 9(2).
- Sarma, J.S. and Shyamal Roy (1960-77). Behaviour of Foodgrain Production & Consumption in India. *World Bank Staff Working Paper No.339*, Washington DC: The World Bank.
- Sawant, S.D. and C.V. Achuthan (1995). Agricultural Growth Across Crops and Regions: Emerging Trends and Patterns. *Economic and Political Weekly*, XXX(2).
- Sharma, K.G. (1998). *Promotion of Oilseed (Safflower) in Non-Traditional Areas of Madhya Pradesh*. Jabalpur: Agro-Economic Research Centre for Madhya Pradesh,.
- Shenoi, P.V. (1989). *Oilseeds Situation in India*. New Delhi: Ministry of Agriculture, Govt. of India.
- Srivastava, H.S. Bhaskaran, S. Bharatendra Vatsya. and K.K.G. Menon (1985). *Oilseed Production Constraints and Opportunities*. New Delhi: Oxford and IB H.
- Sukhatme, P.V. (1965). *Feeding India's Growing Millions*. Bombay: Asia Publishing House.
- Suryanarayana, M.H. (1995) PDS. Beyond Implicit Subsidy and Urban Bias – The Indian Experience. *Food Policy*, 20(4).
- Suryanarayana, M.H. (1996). Food Security and Calorie Adequacy Across States: Implications for Reform. *Journal of the Indian School of Political Economy*, VIII (2).
- Swaminathan, Madhura (1999). Understanding the Costs of the Food Corporation of India. *Economic and Political Weekly*, XXXIV (52).
- Vivekananda, M. (1999). Problems and Prospects of Agricultural Development in Karnataka, *NABARD Working Paper*, Mumbai: NABARD.
- Vyas, V.S. and S.C. Bandyopadhyay. (1975). National Food Policy in the Framework of a National Food Budget. *Economic and Political Weekly*.
- World Bank (1996). *India's Public Distribution System: A National and International Perspective*, Washington DC: Poverty and Social Policy Department, The World Bank (Reprinted as R. Radhakrishna and K. Subbarao, *World Bank Discussion Paper*, No. 380, 1997).

## **ABOUT THE AUTHORS**

Prof. R. S. Deshpande is Professor and Head, Agricultural Development and Rural Transformation Unit of the Institute. Earlier, he was associated with the Gokhale Institute of Politics and Economics, Pune. Dr. Deshpande was a Member of the Expert Committee on Farmers' Suicide in Karnataka, and of the WTO Cell set up by the Government of Karnataka. He is also a Member of the Expert Committee constituted by the Ministry of Commerce, Government of India, to advise on Impact of WTO on Indian Agriculture. He has published several research articles in national and international journals.

Prof. V. M. Rao was an ICSSR National Fellow during 1998–2000. He was a Member of the Commission for Agricultural Costs and Prices, Government of India, during 1991–95 and prior to that, Professor and Head of the Rural Economics Unit in the Institute. He is a well-known authority on rural development and agricultural economics in India. He has worked in several policy bodies during the last four decades. He has to his credit several books and papers in reputed national and international journals.