Policy Paper 26

Instability and Regional Variation in Indian Agriculture

Ramesh Chand
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NATIONAL CENTRE FOR AGRICULTURAL ECONOMICS AND POLICY RESEARCH
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NEW DELHI-110 012

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Published
June 2011

Published by
Dr.. Ramesh Chand
Director, NCAP, New Delhi

Printed at
Chandu Press
D-97, Shakarpur
Delhi - 110 092

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Foreword

Indian agriculture is known for wide year-to-year fluctuations in crop output, crop yield, crop intensity and input use across regions of the country. The temporal instability and spatial variation result from a number of factors some of which are in the realm of policy, institutions and technology evolution. Therefore, different set of policies, technologies and institutions need to be used to manage instability and spatial variations in agriculture.

Since the factors affecting instability have undergone changes over time, a need has been felt to update and compare instability during various phases of technology and policy. Besides instability, the regional variations assume significant importance in a country like India due to their size and agro-diversity. It is being felt for a long time that modifications in technologies and formulation of some government policies have uneven effect across various regions which is a major cause for the persistence of regional disparities in agriculture and farm-income. To address this issue there is a need to have reliable estimates of agricultural productivity for recent years at district level for the whole country so as to provide support to the planning of appropriate strategies for the development of low productivity regions of the country. In this connection, this paper provides the recent estimates of district level agricultural productivity which are important because several new districts have been created in the recent years in some states of the country.

I am glad that NCAP, drawing upon the earlier work carried out by the ICAR National Professor team at this Centre, along with other available material, has prepared a policy paper which addresses the key problems of instability in Indian agriculture and fills the gap in terms of providing estimates of productivity at the micro level for a better comprehension of regional variations in agricultural productivity. I am sure the paper will be useful to a wider section of the society in undering the issues and evolving appropriate measures needed to mitigate the problems in Indian agriculture.

Ramesh Chand
Director

Acknowledgements

The paper has used the database available in the ICAR National Professor Project awarded to Dr Ramesh Chand at NCAP. The major responsibility of preparing the data set for the paper was shared by Amit Jaiswal, Pawan Yadav and Samina. Computer setting of the matter in this paper was undertaken by Digvijay Singh Negi, Umeeta Ahuja and Deepak Tanwar. We acknowledge their help in the preparation of this paper. Some of the material included in this paper has been published in *Indian Journal of Agricultural Economics and Agricultural Economics Research Review.* We thank these Journals for according permission to include the material in this paper.

We would like to place on record our thanks to Indian Council of Agricultural Research (ICAR) for the financial support provided for the study as a part of the National Professor Project. We gratefully acknowledge the support received from National Centre for Agricultural Economics and Policy Research (NCAP) in various forms.

Authors

Acronyms And Abbreviations

CACP	Commission on Agricultural Costs and Prices
CMIE	Centre for Monitoring Indian Economy
CSO	Central Statistical Organisation
CV	Coefficient of Variation
FVA	Fruits and Vegetable Area
GIA	Gross Irrigated Area
GoI	Government of India
HYVs	High- Yielding Varieties
ICRISAT	International Crops Research Institute for the Semi- Arid Tropics
MSP	Minimum Support Price
NIA	Net Irrigated Area
NSA	Net Sown Area
VCO	Value of Crop Output

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Executive Summary

In Indian agriculture, year-to-year fluctuations in output and variations in productivity across space have remained issues of significant concern for researchers as well as policy makers. The adoption of green revolution technologies not only led India towards attainment of self-sufficiency in foodgrains production but also invoked a large number of researchers to see its effect on agricultural instability and regional variations therein. Most of these studies have covered only the intial phase of green revolution and a few that extend up to the recent years have not employed sound analytical framework. Similarly, estimates of regional variations in agricultural productivity in the recent years which capture the entire crop sector and cover current geographic formations of districts in different states are not available. This study has made an attempt towards filling these gaps. It has taken up two seemingly different but connected aspects of Indian agriculture, the first part dealing with the analysis of agricultural instability at the national and state levels and the second part dealing with analysis of variations in agricultural productivity at the district level.

The instability analysis has compared the situation prevailing in Indian agriculture before green revolution (1951-1965) with post-green revolution period (1966-2007), which has been divided into early adoption period (1966-1988) and period of widespread diffusion and maturing of green revolution (1989-2007).

At the all-India level, instability in area under foodgrains has been found low during the pre- green revolution but it increased in the first phase of the green revolution and afterwards saw a slight decline. The instability in foodgrain production declined after the adoption of innovative technologies in Indian agriculture. With the spread of the green revolution technology to a wider area, the variability in agricultural production declined further. This instability in production across crops has been found to depend significantly on the 'irrigation coverage' of a crop. In most of the crops, their area and instability have depicted an inverse relationship after 1987-88. This implied that expansion of production base of a crop brings in stability whereas a shrinking production base leads to instability in agriculture.

Due to variations in climatic conditions, natural resource endowments, institutions, infrastructural developments, population density, etc. pattern of agricultural growth and reaction to various stimulus have varied across states -- some states have followed the same pattern as at the national level while others have depicted a pattern totally of their own. The state level data shows that yield instability has been a major source of instability in foodgrains production in most of the states. Agricultural production has been obsereved most stable in Punjab, followed by Kerala. States like Uttar Pradesh and West Bengal have also been able to bring down instability in foodgrain production in the second period (1988-2007). The main factor behind inter- state variations in instability in area, production and yield seemed to be the variation in access to irrigation.

Variations in annual rainfall have also been analysed for different periods to ascertain the trend in rainfall. However, no apparent increase or decrease has been obsereved in amount of rainfall received over a longer period. The difference in average amount of rainfall received during the three selected periods is not obsereved to be statistically significant. The analysis does not support the largely- perceived notion that rainfall variation is increasing over time.

The instability status in agriculture has also been assessed at the disaggregate level by using district level data for the state of Andhra Pradesh. Despite progress in irrigation and other infrastructural developments in agriculture, the instability in agricultural production has shown an increase after early- 1990s in major crops grown in the state of Andhra Pradesh. In contrast to this observation, farm harvest prices of groundnut have recorded a decline in instability during 1995-2009, compared to 1981-1995. The paper has indicated that in a large state like Andhra Pradesh, the instability status in agriculture as perceived through state-level data may be vastly different from that experienced at the disaggregate level.

In terms of regional variations in agricultural productivity it has been observed that crop productivity per unit of net sown area in some of the most-productive districts in India is more than 30- times the productivity in some of the districts having low productivity. Concentration of districts in low-productivity categories has been obsereved much higher than in the top categories.

The study has attempted to identify the important factors that affect productivity. Crop productivity per agricultural worker in different categories has closely followed land productivity, although variations in land productivity have been found to be somewhat higher than labour productivity. Another interesting feature of land productivity is that it very closely follows variation in per hectare fertilizer-use. Irrigation coverage and crop intensity have also shown increase with increase in productivity.

A strong relationship has been observed between land productivity and incidence of or prevalence of poverty. The paper has obsereved that increase in agricultural productivity and shift of work force from agriculture to other sectors are very strong determinants of rural poverty. Among various factors, per hectare fertilizer-use has depicted strongest effect on per hectare productivity and area under fruits and vegetables has been obsereved to be the second most important factor in causing variation in agriculture productivity across districts. Variations in availability of irrigation water and fertilizer and diversification towards high- value crops have been obsereved to have a significant effect on variation in district-level productivity in Indian agriculture. The latter has a stronger influence on productivity. A considerable variation has been recorded in the productivity level of various districts within a state.

The most significant observation made by this policy paper is that when a little longer period is taken into consideration, which witnessed spread of improved technology to large area, the inference of increase in agriculture instability due to adoption of green revolution technologies gets totally refuted. Infact, the production of foodgrains and total crop sector have been obsereved to become more stable in the recent period (1989-2007) compared to pre -green revolution period (1951-1965) and first two decades of green revolution (1968-1988) in the country. This indicates that Indian agriculture has developed a resilience to absorb various shocks in supply caused by climatic and other factors.

The paper has obsereved a large variation in instability in foodgrain production across states. Very high risk is involved in foodgrain production in the states of Maharashtra, Tamil Nadu, Orissa, Madhya Pradesh, Rajasthan and Gujarat. Even in a large states like Andhra Pradesh, and which is the case for most states of India, the instability status as perceived through the state-level data may be vastly different from that experienced at the disaggregate level.

The study has revealed a vast variation in the productivity of crop sector across districts in the country and within the states. The analysis has specially highlighted important features of districts stuck in low agriculture productivity. In general, very low and low productivity districts are characterized by low rainfall, and low irrigated area which also result in a lesser amount of fertilizer- use. The strong relationship obsereved between agricultural and rural poverty highlights the need of shifting labourforce from farm to non- farm activities.

The paper has concluded that the state level analysis does not reflect a complete picture of shocks in agricultural production, and, shocks in production underestimate the shocks in farm income. The study has stressesed the need for addressing risks in farm income by devising area-specific crop insurance or some other suitable mechanisms.

The estimates of district level productivity presented in the paper have provided a snapshot view of the productivity regimes across the whole country which can be used effectively to delineate various districts for effective and specific interventions.

1

Introduction

Regional disparities and instability in agriculture have remained the subject of deep concern in the area of agricultural economics in India. Instability in agricultural production raises the risk involved in farm production and affects farmers' income and decisions to adopt high-paying technologies and make investments in farming. It also affects price stability and the consumers, and increases vulnerability of low - income households to market. Instability in agricultural and food production is also important for food management and macro economic stability (Chand and Raju, 2009). Besides instability, Indian agriculture is also known for sharp variations in agricultural productivity across space which results in various types of disparities. Such regional variations are partly due to disparities in resource endowments, climate and topography and also due to historical, institutional and socio-economic factors. Policies followed in the country and the nature of technology that became available over time have reinforced some of the variations resulting from the natural factors. As a consequence, production performance of agriculture sector has followed an uneven path and wide gaps have developed in productivity between different geographic locations across the country.

Adoption of green revolution technology, which is considered a landmark event in the post- independence India, has attracted special interest of researchers in terms of its impact on agricultural growth and instability in farm output. It is widely acknowledged that the new and improved technologies helped India in achieving a substantial increase in food production within a short period and brought the country close to attainment of food self- sufficiency by early -1980s. However, the impact of new technologies on instability in agriculture and food production has not been quite clear and has remained a matter of concern. Most of the studies which covered the period of 10 to 20 years since the adoption of technologies have concluded that instability in agricultural production had increased with the adoption of these technologies (Mehra 1981; Hazell 1982; Ray 1983a; Rao *et al.*, 1988). In contrast to the findings of these studies, Mahendradev (1987) has reported a progressive but marginal decline in instability in foodgrain production at all-India level, and mixed results at the state level following adoption of green revolution technology. All these studies have covered the period up to late 1970s or mid 1980s, which represent the initial phase of adoption of green revolution technology.

Another set of studies on instability in Indian agriculture, extended over a longer post- green revolution period, or, covering the recent years, has appeared recently. One of these studies (Larson *et al.* 2004) concludes that green revolution has been instrumental in increasing production of foodgrains and other crops in India, but this has come at a cost of greater instability in production and yield. This study has estimated the impact of green revolution technology on production variability by comparing the instabilities in agricultural production during the periods 1950-51 to 1964-65 and 1967-68 to 2001-02. The study has not differentiated between different phases of technology adoption like 'early and limited adoption' and 'widespread adoption'. In contrast to the findings of this study, another study by Sharma *et al*. (2006) using the same methodology as used by Larson *et al.* (2004) concludes that the production of individual crops and total foodgrains had become more stable during the 1990s compared to 1980s. This highlights the fact that variability in crop production may turn out to be different if the post-green revolution period were divided into different sub-periods. The study by Sharma *et al.* starts from the year 1980-81; it did not cover the initial phase of green revolution nor did it cover pre-green revolution period. Therefore, findings of this study could not be used to draw inference on the effect of green revolution technology on variability in agricultural production.

The survey of literature on the subject has shown that different studies provide conflicting evidences of changes in instability in agricultural output due to adoption of new technologies. No attempt has been made to examine whether instability in production, which increased in the initial years of green revolution in the country according to most of the studies, witnessed any significant change with its spread to more farmers, more areas and more crops. It is important to draw this distinction as use of modern inputs associated with improved technologies witnessed much higher increase after 1987-88 compared to 1967-68 to 1987-88. This study is an attempt to clear the confusion about changes in instability in agricultural production due to adoption of innovative technologies. It estimates instability in agriculture by dividing the entire post-green revolution period into two phases: (a) two decades from 1968 to 1988, representing the initial phase of improved technologies, and (b) two decades after 1988, representing the period of wider dissemination of innovative technologies, and compares it with the pre-green revolution period. This would help in settling the issue whether adoption of innovative technologies of green revolution raised or reduced variability in production in the long-run, and whether short-term and long-term effects of improved technologies on production instability are different.

Like instability, spatial variability has also remained a subject of concern for a couple of reasons. A large variation in productivity leads to regional disparities and is generally considered as discriminatory. It is against the democratic polity to leave some regions behind others in achieving economic progress. Identification of various levels of agricultural productivity helps to analyse the reasons for variations in performance and in developing location-specific strategies for the future growth and development. Variations in productivity also indicate towards the scope to raise production and attain growth.

The variations in agricultural performance and productivity in India have been studied mostly at the state level, although a few district–level studies also exist. States are the appropriate administrative units to study regional variations in many aspects. However, agricultural performance generally differs widely within a state due to varying regional characteristics in terms of resource endowments and climate. Therefore, need for a lower administrative unit becomes apparent. Recognising the importance of district level approach for agricultural development, Planning Commission, Government of India, has asked the states to prepare district level plan for agriculture to get funding for development of agricultural sector during XI Plan.

The first district-wise analysis of performance of agriculture was attempted by Bhalla and Alagh (1979). The second major attempt on district-level analysis of agricultural productivity at national level was made by Bhalla and Singh (2001) which extends to early 1990s. District-level estimates of productivity were also prepared and published by the Centre for Monitoring Indian Economy for some years in their publication on *"Profiles of District"*. The last estimates of district-wise value of output from CMIE are available for the year 1995 (CMIE, 2000). These studies did not include output of fruits and most of the vegetables which has become increasingly important over time. Second, a large number of new districts have been carved out by reorganising the existing districts after early 1990s. This has changed the geographic boundaries of many districts besides creating new administrative units. No study is seen in the literature that provides estimates of agricultural productivity for the recent years at the district level for whole of the country. This paper is an attempt towards filling this gap. The main purpose of this study was to develop a database on the value of crop output and productivity per unit of land

and per worker at the district-level which can be utilized by policymakers and planners to develop strategy for agricultural growth as well as for development of low productivity regions.

This paper estimates instability for the aggregate of the crop sector as well as for the sub-sectors and important commodities at the national and state level. Besides instability analysis, the study has also prepared estimates of the value of crop output for 551 rural districts in the country by using data and information for the years 2003-04 and 2004-05. This has been used to prepare district-wise estimates of agricultural productivity per unit of land and per worker in agriculture. Alongwith the estimates of value of crop output per hectare area, the paper also provides information on fertilizer-use, irrigation, crop intensity, normal rainfall, and some demographic features of each of the district in the country. Efforts have also been made to analyse the factors that explain inter-district variations in crop productivity in the country. The paper has classified districts according to the levels of productivity in Indian agriculture and based on some other typologies.

1.1 Organization of the Study

The policy paper has been organized into seven chapters, including Introduction. The second chapter provides a brief review of various studies on instability in Indian agriculture and discusses the need to update the analysis on instability. Data and methodology used in the earlier studies, and the measure of instability adopted in this study have been presented in Chapter 3. This chapter also describes coverage of crops, etc. and sources and definitions of data used in estimating district level productivity. The fourth Chapter presents and discusses estimates of instability at the national and state levels. This chapter also includes analysis of agricultural instability at the disaggregate level by using district-level data for the state of Andhra Pradesh. Chapters 5 and 6 focus on the district-level estimates of agricultural productivity. Chapter 5 presents a broad pattern of productivity, maps productivity with other characteristics, presents classification of districts in major productivity categories and identifies broad factors affecting variations in agricultural productivity. State-wise productivity profile of various districts has been discussed in Chapter 6. Main findings, conclusions and policy implications following from the study have been presented in Chapter 7.

2

Review of Literature

Potential of green revolution technologies in increasing productivity and production of various crops in India was recognized in the very early stages of adoption of this technology. Along with this, a concern arose whether increase in production, brought about by crop technology, was accompanied by a rise in year-to-year variability in production. The first serious attempt to examine the effect of new seed-fertilizer technology, known as green revolution technology, on year-to-year fluctuations in crop output was made by Mehra (1981). The study has compared variabilities in production, across crops and regions in India, during the period 1949-50 to 1964-65 and 1964-65 to 1978-79, to find changes in instability in the period before and after introduction of high-yielding technologies. The analysis shows that during the ten- year period since the adoption of innovative technologies, the standard deviation and coefficient of variation of production of all the crop aggregates increased as compared with the period 1949-50 to 1964-65. Variability was measured in terms of deviations between actual and estimated trend values. Sum of these squared deviations was termed as variance; and the under-root of this variance was divided by mean of the variable and it was termed as coefficient of variation[1]. The so-called "coefficient of variation" was then compared between the two periods to test if there was significant change in the variance or standard deviation prior to and after introduction of new crop technologies.

Soon after this, Hazell (1982) came out with another study which made use of the same data set as used by Mehra (1981), but adopted improved analytical framework to analyse variability.[2] Hazell (1982) confirmed the findings of Mehra (1981), and went a step further in concluding that

1 This measure is same as variance of residuals divided by mean of the dependent variable (Y_t). Mehra (1981) did not divide standard deviation in the detrended variable by the mean of detrended variable (as it was zero) to arrive at CV as per the standardized definition of CV; she rather divided the SD in detrended variable by mean of the variable (Y_t) and termed this expression as CV.

2 Hazell (1982) also used residuals derived from the deviation between actual and trend values to estimate instability but he did not use mean of dependent variable in place of mean of residuals (which is zero) to get estimate of CV as done by Mehra (1981). Hazell constructed a detrended variable (Z_t) by centering the residuals (e_t) on mean area and yield ($\bar{z}$) as follows: $Z_t = e_t + \bar{z}$. The detrended data on production was obtained by multiplying the detrended area and detrended yield. CV in the detrended data (Z_t) was used as a measure of instability.

increase in production instability was an inevitable consequence of rapid agricultural growth and there is little that can be done about it. Both these studies attributed the increase in instability to the new seed–fertilizer technology. The results at the regional level show that in Punjab, where high-yielding varieties (HYVs) were grown on more than 80 per cent area under cereals, the yield variability in all the selected crops remained constant or declined. This contradiction between what was observed at the state level and country level indicated that it could be too early to attribute increase in instability in food production, at the country level, to new technology. The area under HYVs of cereals in the country had reached only 37 per cent of the total area under cereals by 1977-78, which was taken as the last year of adoption of innovative technologies in the studies by Mehra (1981) and Hazell (1982). As these technologies had reached very small area by 1977-78, the conclusion based on experience of this limited period relating to fluctuations in output has a limited relevance.

Another paper around the same time by Ray (1983a) went a little deeper to probe causes of instability in Indian agriculture during the period 1950 to 1980. The paper adopted a very simple but highly robust indicator of fluctuations in output. This was given by standard deviation in annual output growth rates over a specified period. The study found that instability in production increased in the 1960s and rose further during the 1970s for most of the crops and crop aggregates. An interesting finding of this paper was that instability in wheat production, which was experiencing highest coverage under HYVs among all crops, also increased markedly during the 1960s, but its production increased at a fairly stable rate during the 1970s.

Based on the detailed analysis of various factors affecting growth and instability, Ray (1983a) strongly refuted the assertion made by Hazell (1982) that "production instability is an inevitable consequence of rapid agricultural growth and there is little that can be affectively done about it". According to Ray (1983a), the magnitude of production instability is essentially a function of the environment which can be considerably moulded through human efforts. The author suggested that causes for increase in production instability after adoption of green revolution technology were (i) increase in the variability of rainfall and prices and (ii) increase in sensitivity of production to variation in rainfall, and not the growth in production.

In another similar but more detailed study by Ray and two more authors it was found that amplitude of fluctuations in output for all categories of crops, except wheat, have increased significantly in the post-green revolution period, 1966-1985 or 1968-1985 (Rao *et al.* 1988). The study concluded that since wheat benefited to the greatest extent from green revolution technology, the observed increase in variability in foodgrains and all crops output cannot be attributed to green revolution technology as such. Like Ray (1983a), this study has also attributed rising vulnerability of agricultural output to increase in sensitivity of output to variations in rainfall traceable to the high complementarity of new seed-fertilizer technology with water. Both, Ray (1983a) and Rao *et al*. (1988), on one hand refute the impact of green revolution technology on variations in output for some crops, and, on the other hand, ascribe it to the increase in sensitivity of output and complementarity of new technology with irrigation – which are indeed a part of the new technology. However, in conclusion, the authors clearly state that the instability in agricultural production has increased in post-green revolution period (Rao *et al.* 1988, p. 143).

In order to distinguish between the effects of technology and rainfall variations on fluctuations in output, Mahendradev (1987) analyzed weather-adjusted and unadjusted growth rates in foodgrain output for all the major states of the country. Based on the standard deviation in year-to-year change in output, the study concluded that there was a progressive but marginal decline in instability at the all-India level. At the state level, there was a decline in some cases and an increase in some other states. Other important findings of this study relevant to the debate on instability were: after 1979-80 instability in foodgrain production at all-India level dropped to 8.18 per cent, but it showed only a marginal decline from 11.41 per cent during 1960-61 to 1969-70 to 11.16 per cent during 1970-71 to 1979-80. Though the decline after 1979-80 refers to a very short period (1980-81 to 1984-85), it does indicate that the instability could turn out to be different after the initial years of adoption of new technology. Second, as the conclusions of this study were different from the earlier studies, the author felt that these were due to differences in the selection of time periods. To overcome this, Mahendradev (1987) prepared estimates of instability based on 9 years moving standard deviation in annual growth rates of foodgrain production beginning from the period 1960-61 to 1969-70, which shows an increase in instability in some states and decrease in others. The trend fitted to estimate instability in all-India production of foodgrains during 1960-61 to 1984-85 did not show any significant growth. As this finding was in contrast to the earlier studies, the issue of effect of new technology on year-to-year fluctuations in agricultural output at the country level remained unsettled.

Another set of studies on this issue appeared recently and these have included the period beyond mid-1980s (Larson *et al.* 2004; Sharma *et al.* 2006). Both these studies have used the measure of instability developed and used by Hazell (1982). Larson *et al.* (2004) have examined instability in area, yield and production for the major crops in India by dividing the period 1950-51 to 2001-02 into pre-green revolution (1951-1965) and post-green revolution (1968 - 2002) periods. The paper has reported that production instability for foodgrains increased by 153 per cent and yield instability increased by 244 per cent between the two sub-periods (Larson *et al.* Table 2 p. 264). Based on this, the authors have concluded that widespread adoption of green revolution technology increased instability in yield and production of foodgrains. There was a serious inconsistency in the results on instability in foodgrain production reported in this paper. While instability in production of cereals and pulses was reported to have declined between pre- and post-green revolution periods by 10 and 5 per cent, respectively, the instability in the production of foodgrains, which is sum of cereals and pulses, was reported to have increased by 153 per cent in the same period.[3] Further, this study did not divide post-1968 period into sub-periods to find out if there was any change in instability with progress of green revolution technology.

In contrast to the choice by Larson *et al*. (2004) to keep entire post-green revolution period as one set, Sharma *et al.* (2006) have estimated variability in production and yield by choosing smaller set of years, viz. 1981-82 to 1990-91 and 1991-92 to 2000-01. This is helpful if the variable (instability) changes over time. The authors concluded that the production of individual crops and total foodgrains had become more stable in the 1990s compared with the 1980s. As this study was based on a limited period of 1980-81 to 1991-92, it did not provide any clue about the effect of new crop technology on variability in agricultural or food production. Further, the results of the two studies on instability are somewhat contradictory in the sense that Larson *et al.* have reported a

[3] This raised our suspicion about the accuracy of the results relating to instability reported by Larson *et al.* Estimation of CV of detrended data series by us shows that the instability estimate for foodgrains reported by Larson *et al.* were totally wrong. The correct figure for period II comes to be 5.5 and not 15.48 as reported by Larson *et al.* based on the figures estimated by us there is a decline in instability of foodgrain production in the period 1967-68 to 2001-02 compared to the period 1950-51 to 1964-65. It is higly surprising that the authors did not care to check why instability in foodgrains was showing totally different pattern as compared to the pattern observed for total cereals and total pulses, that comprise foodgrains. Had Larson *et al*. checked the accuracy of their estimates, their inference on effect of green revolution technology on instability in foodgrain production would have been entirely opposite of what they had concluded in their paper. Similarly, the CV for yield in period II comes out to be 5.30 instead of 15.54 reported by the authors.

rise in the instability over time, whereas Sharma *et al.* have reported a decline in instability over time.

The review of literature indicates that there is no consensus in the literature on the changes in instability in agricultural production in different periods and there is a big gap in research about the changes in instability of agricultural production in relation to the progress in spread of innovative technologies in the country.

As mentioned before, the variations in agricultural performance and productivity in India have been studied mostly at the state level, although a few district–level studies also exist. The first district- wise analysis of performance of agriculture covering the whole country was attempted by Bhalla and Alagh (1979). This was a pioneering work which not only prepared the estimates of productivity but also provided detailed analysis of agricultural growth at the disaggregate level of crops. This analysis has covered the period up to 1970-73. The second major attempt on district- level analysis of agricultural productivity at the national level has been made by Bhalla and Singh (2001) which extends to the early-1990s. District-level estimates of productivity were also prepared and published by the Centre for Monitoring Indian Economy for some years in their publication on *"Profiles of District"*. The last estimates of district-wise value of output from CMIE are available for the year 1995 (CMIE, 2000). Lot of changes have been experienced in Indian agriculture after early-1990s. These changes have influenced different parts of the country in different ways (Chand *et al.* 2007). Second, a large number of new districts have been carved out by reorganising the existing districts after early-1990s. This has changed the geographic boundaries of many districts besides creating new administrative units. No study is seen in the literature that provides estimates of agricultural productivity for the recent years at the district-level for whole of the country.

3

Data and Methodlogy

In this paper, two sets of data have been used to measure instability in Indian agriculture. These include (a) index number of area, production and yield of foodgrains, non-foodgrains and all crops, and (b) physical production of individual commodities or group of commodities and their decomposition into area and yield.

The post-Independence period beginning with the year 1950-51 has been divided into three phases. These have been termed as (1) pre-green revolution period, (2) first phase of green revolution or new technologies, and (3) green revolution or wider dissemination of green revolution technology. The cut-off year for each phase was identified after a look at the raw data series on agricultural GDP and crop output. A visual examination of the series showed that the first break in output growth occurred in the mid-1960. Therefore, the first phase has been taken as 1951 to 1965. The output during 1966 and 1967 was much lower than the trend and a new trend started from the year 1968. This phase continued till 1988, after which the trend in output witnessed an upward jump. Therefore, the second phase has been taken from 1968 to 1988. The third phase has covered the period 1989 to 2006 or 2007, depending upon the availability of data.

3.1. Measures of Instability in Agriculture

The measure that is used to estimate instability in a variable over time should satisfy two minimum conditions. First, it should not include deviations in the data series that arise due to secular trend or growth. Two, it should be comparable across data sets having different means.

One way to exclude variations in a data series due to the trend is to fit a suitable trend (for example, $Y_t = a + bT + e_{t;}$ where Y is a dependent variable like yield, area or production; T refers to the time/year, a is the intercept, b is the slope and e_t is the residual term) and de-trend the series. This is done by computing residuals [e_t = Y- (a + bT)], i.e. deviations between actual and estimated trend values, and estimating instability based on e_t. As mean of e_t values is always zero, their standard deviation is used to measure instability. The main problem with this is comparability across data sets having different mean values. This necessitates the use of coefficient of variation, instead of standard deviation, to measure dispersion. As "mean" of de-trended residuals is zero, it is not possible to compute CV of residuals (e_t); however, researchers have developed some methods to compute CV that are based on residuals. Mehra (1981) used standard deviation in residuals divided by mean of the variable (area, production or yield) to compute and compare instability in agricultural production before and after introduction of innovative technologies. He termed the estimate as coefficient of variation even though it does not follow the standard definition of CV[4]. Hazell (1982) developed a new method to make use of residuals to estimate instability, which was slightly different from the measure developed by Mehra (1981). Hazell de-trended the data and constructed a variable (Z_t) which was computed by adding mean of the dependent variable to residuals e_t as under: $Z_t = e_t + \bar{y}$. The coefficient of variation of Z_t was used as a measure of instability[5]. The measures of instability proposed by Mehra (1981) and Hazell (1982) are based on de-trended data, they are unit free and impart comparability. However, these methodologies have been criticized for measuring instability around an arbitrarily assumed trend line which greatly influences inference regarding changes in instability[6] (Ray, 1983a p: 463).

Ray (1983b) developed a very simple measure of instability given by the standard deviation in annual growth rates. This method satisfies the properties like instability based on de-trended data and comparability. Moreover, the methodology does not involve actual estimation of the trend, computation of residuals and de-trending, but all these are taken care in the standard deviation of annual growth rates.

This method also does not suffer from the limitations like arbitrary choice of assumed trend line initially proposed and used by Hazell (1982) and subsequently applied by Larson *et al*. (2004) and Sharma *et al.* (2006). This paper has preferred to use the method proposed by Ray (1983b) and applied by Ray (1983a), Mahendradev (1987) and Rao *et al.* (1988) to estimate the instability in agricultural production. This method is given by the relation:

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4 Also see footnote 1.

5 Also see footnote 2.

6 For instance, manipulation of residuals by adding mean implies that detrending is done around the sum of estimated/trend value and instead of doing it around alone. The variable Z constructed by adding to e_t does not satisfy statistical criterion of best fit.

Instability index = Standard deviation of natural logarithm of (Y_{t+1}/ Y_t)

Where, Y_t is the area / production / yield in the current year and, Y_{t+1} is same for the next year. This index is unit free and very robust, and it measures deviations from the underlying trend (log linear in this case). When there are no deviations from the trend, the ratio of Y_{t+1}/ Y_t is constant and thus standard deviation is zero. As the series fluctuates more, the ratio of Y_{t+1} and Y_t also fluctuates widely, and the standard deviation increases.

3.2. Effect of Choice of Period on Instability in Agriculture

It is pertinent to point out that the selection or length of period can result in significant changes in instability, particularly if two sub-periods with different dimensions of instability are pooled into one. This has been demonstrated in Table 1 for foodgrains at all-India level. The Table 1 presents estimates of instability (CV) derived from de-trended yield, de-trended production and production taken as product of the de-trended area and de-trended yield, as used by Hazell (1982), Larson *et al.* (2004) and Sharma *et al.* (2006).

Instability in foodgrain yield measured by the CV in de-trended yield has been found to be 4.50 in pre-green revolution period (same as reported by Larson *et al.* 2004) and, it increased to 5.06 in the post-green revolution period that covers the period 1968 to 1988. Variability in yield dropped to 3.72 after 1989, indicating a decline of 26.5 per cent in the second phase of green revolution as compared to the first phase and a decline of 17.3 per cent compared to pre-green revolution period. If both these sub-periods are pooled, then instability in yield turns out to be 5.50 which is 22.2 per cent higher than in the pre-green revolution period. These differences lead to a compeletly different type of inference about the effect of new technology on instability in foodgrain productivity. According to the pooled data for post-green revolution (1968 to 2007), spread of innovative technologies was accompanied by an increase in yield variability, whereas, dividing post-green revolution period into two sub-periods shows increase in variability in the initial years of adoption of new technology and a sharp decline with spread of new technology after 1988. Another conclusion that follows from these results is that there could be a complete change in the effect of factors like new technology between short- and long- terms.

Table 1: Coefficient of variation (%) in detrended yield and production of foodgrains in India during different periods

Period	Production	Production = Detrended A*detrended Y	Yield
1951-65	6.11	5.73	4.50
1968-88	6.32	6.43	5.06
1989-07	4.94	5.02	3.72
1968-02	5.47	5.51	5.30
1968-07	6.30	6.52	5.50

Source: Agricultural Statistics at a Glance 2008, Ministry of Agriculture, GoI, New Delhi

Almost a similar pattern is observed in the case of production of foodgrains whether we use data on detrended production or we use detrended production data obtained by multiplying detrended area and detrended yield. Instability in foodgrain production during 1951 to 1965 was 6.11 (same as reported by Larson *et al.*, 2004), and it increased with the introduction of new technology in India. Foodgrain production has shown much higher fluctuations in post-green revolution period compared to pre-green revolution period when no distinction is made between different sub-periods. When a distinction is drawn by splitting post-green revolution period into sub-periods, the conclusion on the effect of new technology on production variability changes altogether (Table 1). This formed the basis for us to examine instability in agricultural production by dividing the period after introduction of new technology into two phases.

For the second part of the analysis dealing with regional variations in agriculture, data on crop -wise area and production, land use statistics, rainfall, irrigation, and fertilizer-use were taken from *Statistical Abstracts* of each state. Those states for which *Statistical Abstracts* were not available, the data were noted down from other official publications or official records available with state level offices of Economic and Statistical Adviser, Directorate of Agriculture/Horticulture. Some of the data on area and production were also taken from Agriculture Production Commissioner, Ministry of Agriculture, Government of India and data on fertilizer-use for some of the districts were taken from *Fertilizer Statistics* of Fertilizer Association of India, New Delhi. All data on area, production, fertilizer-use, and irrigation refer to the years 2003-04 and 2004-05. Instead of taking the average of three years, we prefered to take average of two years, since a good year and a bad year generally follow each other. Two years average even out the effect of good or bad year more effectively than three years, average.

Physical output was converted into value term by using state level implicit prices of various agricultural crops. These prices were generated by dividing the state level value of output of each crop estimated by Central Statistical Organisation (CSO) by the output of the crop for the year 2003-04 and 2004-05. According to CSO methodology, such prices represent farm gate prices.

The value of output for the crops considered in the study was multiplied by ratio of GCA_t/GCA_c, where GCA_t is the reported gross cropped area and GCA_c is the sum of area under the crops considered in the study to arrive at estimate of Value of Crop Output (VCO) for GCA_t. This figure was then divided by NSA to arrive at per hectare productivity. The advantages of taking productivity per hectare of net sown area instead of gross cropped area is that NSA also includes effect of crop intensity on productivity and provides estimate of productivity based on the output for the whole year. Thus, output/ha of net sown area refers to output/ha/year.

Alongwith the estimate of per hectare productivity, the paper also provides information on other relevant aspects at the district-level. This includes estimate of productivity per worker, fertilizer-use per hectare of net sown area, average/normal rainfall, crop intensity, share of fruits and vegetables in the total cropped area, area under irrigation, and percentage of rural population under poverty.

Data on fertilizer were taken from *Fertilizers Statistics* published by Fertilizer Association of India. Data on irrigation were taken from state level publications of the respective states or noted down from their official records. Information on rainfall was collected from several sources and it generally refers to normal rainfall in a district. Most of the states provide this information in their publications. For the other states, this data was taken from the district level statistical data compiled by ICRISAT, Hyderabad. In some cases average rainfall for the recent five years was taken from either state level publications or the official websites. District-level data on poverty were taken from the paper by Chaudhuri and Gupta (2009).

It was hypothesized that agricultural productivity in a district depends upon the levels of fertilizer-use, irrigation intensity, area under fruits and vegetables (high-value crops) and rainfall. It was further hypothesized that agricultural productivity is a significant factor in reducing rural poverty. As agriculture income per person is affected by both productivity as well as number of persons dependent on same size of land or conversely land available per person, therefore poverty was also hypothesized to be affected by the number of workers per hectare of net sown area. These effects were estimated by using a simultaneous equation model consisting of following two equations:

3.3. The Model

Rural poverty (%) =	(Productivity/ha NSA, Number of agricultural workers/ ha of NSA) ....(1)
Productivity/ha NSA =	(Fertilizer use/ha NSA, Net irrigated area (%), Rainfall, and share of fruit and vegetable in total crop area) ....(2)

3.4. Data Limitations and Proxies

The paper covers almost all the districts in the country, except the urban districts where crop production and fram area is almost nil, and some districts in the North-East region for which required data were not available. This way, out of 618 districts in the country, 551 districts have been covered by the study.

For a few districts, the data on net irrigated area and gross irrigated area were not available for the years 2003-04 and 2004-05. In such cases area under irrigation in the previous year, 2002-03, was used. Similarly, data on area under fruits and vegetables crops for some districts were available only for the aggregate and in some cases, it was missing for the reference year. Further, in some of the districts sum of areas under the crops considered in the study was lower than gross cropped area figure for the district and in a few districts, area under crops considered in the study exceeded reported figure for GCA of the district. This was taken care while preparing estimates of productivity.

The districts of small states Sikkim (East Sikkim, North Sikkim, South Sikkim and West Sikkim) and Tripura (Dhalai, North Tripura, South Tripura and West Tripura) have not been included in the study because of non-availability of data. The Union territories of Andaman & Nicobar, Chandigarh, Dadra & Nagar Haveli, Daman & Diu, Delhi (Central Delhi, North Delhi, South Delhi, East Delhi, North-East Delhi, New Delhi, North-West Delhi, South-West Delhi and West Delhi) and Lakshadweep have been excluded for the same reason. Some other districts dropped due to non-availability of proper data because of various reasons are: Arunachal Pradesh (Dibang Valley, Kurung Kamey, Lower Dibang Valley, Anjaw), Andra Pradesh (Hyderabad), Haryana (Punchkula, Mewat), Himachal

Pradesh, (Kullu, Shimla), Jharkhand (Jamatra, Latehar, Saraikela, Simdega), Karnataka (Banglore, Kodagu), Maharashtra (Mumbai, Mumbai Suburban, Gondia), Meghalaya (West Kashi Hills), Mizoram (Lawngtlai, Serchip), Orissa (Balasore), Pondicherry (Karaikal, Mahe, Pondicherry), Tamil Nadu (The Nilgiris, Chennai), West Bengal (24 Paragans (south), Nadia).

Data on NIA or GIA for the years 2003-04 and 2004-05 were not available for some of the districts of a few states like Andhra Pradesh, Haryana, Kerala, Maharashtra, Manipur, Orissa, Punjab and West Bengal. This missing data were taken from the previous available year's data for these states.

There were serious deficiencies in the data on area and production of different fruits and vegetables. In some of such cases, the data for the immediate preceding year was used.

Crops included in the study for estimating productivity are:

1.	Rice	2.	Wheat	3.	Jowar
4.	Bajra	5.	Barley	6.	Maize
7.	Ragi	8.	Small millets; other cereals	9.	Gram
10.	Arhar	11.	Urad	12.	Moong
13.	Masoor	14.	Horsegram	15.	Groundnut
16.	Sesamum	17.	Rapeseed & mustard	18.	Linseed
19.	Castor	20.	Coconut	21.	Safflower
22.	Nigerseed	23.	Soybean	24.	Sunflower
25.	Sugarcane	26.	Cotton	27.	Jute
28.	Sanhemp	29.	Mesta	30.	Tobacco
31.	Cardamom	32.	Dry chillies	33.	Black pepper
34.	Ginger	35.	Turmeric	36.	Arecanut
37.	Garlic	38.	Coriander	39.	Banana
40.	Potato	41.	Sweet potato	42.	Tapioca
43.	Onion	44.	Fruits & vegetables	45.	Guarseed

4

Instability in Agriculture at National and Disaggregate Levels

The main focus of this chapter is on examining how year-to-year fluctuations in crop output changed from one period to the other period, and what was the effect of new agricultural technologies on the instability in crop output. Accordingly, instability in area, production and yield of important crops and crop aggregates has been studied at the national as well as state levels during the three selected periods, viz. pre-green revolution (1951-1965), green revolution (1968-1988), and the post green revolution (1989-2006/7). Further, the analysis has been extended to disaggregate level using district level data for the state of Andhra Pradesh. As there are vast variations in the agro-climatic conditions across states and districts, a disaggregate analysis has been conducted to find instability at the micro level which is more relevant for producers and consumers.

4.1. Institutional Measures and Diffusion of Technology

The pre-green revolution period (1951 to 1965) is marked by major policy initiatives like land reforms and development of irrigation infrastructure. Legislations for the abolition of *Zamindari* were enacted by all the states and the whole process was completed within the decade of 1950-60 (Dandekar, 1994). Under this act, 20 million tillers could gain control over the land they were cultivating. The tenancy reforms also provided for the regulation of rent and security of tenure, beside conferment of ownership on tenants. Another land reforms measure was the legislation to impose ceilings on the maximum land that a household could own. Apart from these, efforts were also made to minimize the exploitation of cultivators by money lenders and traders through expansion of the cooperative credit system (Rao, 1996).

From mid-1960s (green revolution period) the focus of policies shifted to adoption of new agricultural technologies. It was considered vital to provide remunerative prices to farmers to encourage the use of modern inputs and adoption of new technologies. To achieve this, new institutions like Food Corporation of India (FCI) and Agricultural Prices Commission, later renamed as Commission on Agricultural Costs and Prices (CACP) were created. The CACP has been entrusted the task of announcing Minimum Support Prices (MSP) for selected agricultural commodities and the Food Corporation of India implements the MSP by procuring paddy and wheat at those prices. Public sector market intervention was also extended to some other crops by creating national and state level institutions (Acharya, 2001). This period also witnessed a strong emphasis on agricultural R&D, expansion of institutional credit, and creation of modern input manufacturing industry.

After mid-1980s, policy intervention became more and more price-centric. This period witnessed major surge in subsidies and a sharp fall in public investments in agriculture (Chand, 2008). Another significant policy change during this period relates to liberalization of agricultural trade.

Adoption of green revolution technology in mid-1960s started with a shift in area from traditional varieties to high-yielding crop varieties. By the year 1987-88, high-yielding varieties of cereals were grown on 55 per cent of total area under cereals in the country. However, spread of HYVs across states was highly uneven, as can be seen from Table 2. Coverage of HYVs was below 42 per cent in seven out of 17 major states, whereas it was more than 75 per cent in states like Punjab, Haryana and Tamil Nadu. After 1987-88, new agricultural technologies spread to wider areas. By the year 1996-97, 14 out of 17 states cultivated HYVs of cereals on more than 70 per cent of the area. The major expansion took place in those states where area under HYVs remained low during the first phase of green revolution. The coefficient of variation in coverage under HYVs among major states declined to almost half between 1987-88 and 1996-97.At the national level, area under HYVs of cereals increased from 54 million hectares during 1987-88 to 76 million hectares during 1997-98. During these 10 years, the area under HYVs increased from 55 per cent to 76 per cent of the total area under all cereals.

Another important indicator of technology adoption is the use of inorganic fertilizers. Per hectare use of fertilizers (NPK) increased by mere 0.28 kg per year in the pre-green revolution period. During the two decades of first phase of green revolution (1967-68 to 1987-88), fertilizer-use per hectare of net sown area increased by 55 kg or 2.75 kg per year. The next 19 years show an increase of 87 kg or 4.58 kg per year. Like HYVs,

Table 2: Spread of new technology in Indian agriculture as revealed by area under HYVs and fertilizer-use

	Area under HYVs of cereals (%)			
State	**1987-88**	**1996-97**	**1987-88**	**2005-06**
Andhra Pradesh	56.2	82.5	92.3	247.2
Assam	39.1	58.9	8.8	71.1
Bihar	71.2	83.1	65.0	140.8
Gujarat	40.8	72.8	47.0	129.9
Haryana	79.7	78.1	121.8	320.0
Himachal Pradesh	51.8	76.1	43.9	88.7
Jammu & Kashmir	63.5	83.3	53.2	122.7
Karnataka	35.0	75.3	52.9	145.2
Kerala	41.1	92.2	82.5	93.9
Madhya Pradesh	38.6	63.4	26.3	66.6
Maharashtra	61.0	85.5	40.8	112.5
Orissa	38.1	67.0	25.5	68.8
Punjab	92.4	96.9	267.4	397.6
Rajasthan	28.2	42.4	18.6	53.3
Tamil Nadu	75.7	100.7	117.5	215.7
Uttar Pradesh	61.7	83.4	99.8	204.5
West Bengal	51.9	77.5	105.1	207.7
C.V. (%)	33.1	18.3	81.6	60.8

All India

Year	**Area under HYVs (%)**	**NPK (kg/ha)**
1967-68	6.1	11.0
1987-88	54.6	65.6
1996-97	75.6	100.2
2006-07	NA	153.0

Source: 1. *Agricultural Statistics at a Glance* (various issues), Ministry of Agriculture, GoI, New Delhi,

2. *Indian Agriculture in Brief* (various issues), Ministry of Agriculture, GoI, New Delhi.

growth in fertilizer-use after 1987-88 was much higher in those states where fertilizer-use was low previously. This is indicated by a decline in coefficient of variation in per hectare fertilizer use across states from 81.6 per cent to 60.8 per cent between 1987-88 and 2005-06.

Rapid progress of area under HYVs and fertilizer-use show that improved technologies spread across much wider areas after 1987-88. Accordingly, instability has been examined by dividing the entire period after 1950-51 into three sub-periods.

4.2. Instability in Agriculture at National Level

Estimates of instability in area, production and productivity of food grains, non-foodgrains and all crops computed from the all-India index numbers are presented in Table 3. Table 3 contains two sets of results, one covering all the years of the three sub-periods and the second, excluding two extreme years, viz. 1979-80 and 2002-03 which experienced very serious droughts. Crop output in these two years dropped by 13 per cent and 12 per cent over the previous years, respectively. Droughts were experienced in some other years also, like 1987-88, but their intensity was moderate.

Instability in crop area under foodgrains was quite low during the pre-green revolution as growth rates have shown standard deviation of 2.51 per cent. The instability in area increased to 3.39 in the first phase of green revolution and slightly declined after 1988. Instability in the yield of foodgrains was more than three-times the instability in area during the pre-green revolution period. Adoption of new technologies marked a decline in instability in yield from 9.05 per cent to 8.05 per cent between pre-green revolution and first phase of green revolution. When improved technologies spread to larger areas, the variability in productivity declined further. Instability in production of foodgrains has shown a small increase with the adoption of new technologies from 10.05 per cent to 10.31 per cent. However, when extreme years of 1979-80 and 2002-03 were excluded from the data set, the variability in foodgrain output showed a large decline. Instability in foodgrain production witnessed a significant decline after 1988. The decline is found more pronounced when extreme years 1979-80 and 2002-03 are excluded from the data set. Variability in foodgrain production after 1989 was 14 per cent lower compared to that in pre-green revolution period and 16 per cent lower compared to the first phase of green revolution. When extreme years were removed, the decline in variability during 1989 -2007 turned out to be 46 per cent lower than in pre-green revolution period and 33 per cent lower compared to the first phase of green revolution.

Table 3: Instability in area, production and yield of foodgrains and non-foodgrains group of crops and all crops in different periods at all- India level (in per cent)

Crop group	Period	Including extreme years			Excluding extreme years 1979-80 and 2002-03		
		Area	Production	Yield	Area	Production	Yield
Foodgrains	1951 to 1965	2.51	10.05	9.05	2.51	10.05	9.05
	1968 to 1988	3.39	10.31	8.05	3.49	8.64	6.08
	1989 to 2007	3.26	8.70	6.38	1.96	5.46	4.45
Non-food grains	1951 to 1965	3.96	7.59	7.04	3.96	7.59	7.04
	1968 to 1988	3.54	6.87	5.01	3.40	6.36	4.68
	1989 to 2007	4.33	7.75	6.65	3.18	5.76	4.43
All crops	1951 to 1965	1.86	8.30	7.93	1.86	8.30	7.93
	1968 to 1988	3.19	8.35	6.43	3.23	6.95	4.97
	1989 to 2007	3.06	7.96	6.61	1.36	5.02	4.65

Source: 1. Agricultural Statistics at a Glance (various issues), Ministry of Agriculture, GoI, New Delhi,

2. Indian Agriculture in Brief (various issues), Ministry of Agriculture, GoI, New Delhi.

These results are in complete disagreement with the findings of earlier studies by Mehra (1981); Hazell (1982); Ray (1983a) and Rao *et al.* (1988). The reason is that all these studies have covered the initial 10 to 15 years of adoption of green revolution technologies. With the passage of time, adoption of green revolution technology spread to much larger area and several improvements in various aspects of technology took place. As the benefit of these advancements got translated at the farm, the variability in yields of foodgrains declined and that led to a decline in variability of foodgrains production as well. Other factors which might have contributed to the decline in variability in yield and production of foodgrains could be (i) expansion of irrigation, (ii) improvement in availability of other inputs and institutional credit, and (iii) institution of policy of minimum support prices that provided stable economic environment to induce investments in production.

Instability in area and production of non-foodgrain crops has shown a pattern different from foodgrains. Instability in area under non-foodgrain crops declined from 3.96 per cent in the pre-green revolution to 3.54 per cent in the first phase of green revolution period, but increased thereafter. Similarly, instability in production of non-foodgrain crops declined from 7.59 per cent to 6.87 per cent between pre-green revolution and first phase of green revolution. In the third period, i.e. after 1988, instability in output of non-foodgrain crops not only increased but turned out to be higher also even as compared to pre-green revolution period. However, when extreme years 1979-80 and 2002-03 were taken out, then instability in area as well as production of non-foodgrain crops showed a decline as we move up from one period to the other period.

It is also interesting to observe that instability in area remained higher under non-foodgrain crops than foodgrain crops in all the three periods, while instability in productivity of non-foodgrains was lower than foodgrains in the first and second periods but not in the third period. The net impact of instability in area and yield on production clearly indicates that foodgrain production remained more unstable as compared to combined production of non-foodgrain crops.

The area under all crops, i.e. including foodgrain and non-foodgrain, has shown a big increase in instability during 1968 to 1988 as compared to the period 1951 to 1966. The period after 1988 has shown a slightly lower instability as compared to the first phase of green revolution, but it was much higher as compared to the pre-green revolution period. Instability in productivity of crop sector on the whole declined by about 20 per cent between pre-green revolution period and first phase of green revolution. Instability in yield index of all crops increased by 2.8 per cent after 1988 but it was lower by 17 per cent as compared to pre-green revolution period. Instability index in crop production was 8.30 during 1951 to 1965 and remained at that level during 1968 to 1988. Instability in production declined by 5 per cent in the third phase viz. 1989 to 2007. Instability in production of total crops has shown a very sharp decline over time when the two extreme years are taken out from the data sets.

The index number approach was followed to compare instability in production between groups of foodgrain and non-foodgrain crops. Due to a large heterogeneity in non-foodgrain crops, aggregation of output of individual crops can give a misleading picture of output of the group. Therefore, their production scenario is better captured by index number. This problem is less severe for foodgrains and oilseeds. Therefore, quantity of output was used to estimate instability in production of individual crops and different subgroups of foodgrains and oilseed crops. The results of instability in foodgrains, cereals, pulses and oilseeds have been presented in Table 4. Changes in area, production and yield during this period can be seen from Annexure 1.

Table 4: Instability in area, production and yield of major crop groups in different periods at all-India level (in percent)

Crop group	Area			Production			Yield		
	1951-1966	1968-1988	1989-2007	1951-1966	1968-1988	1989-2007	1951-1966	1968-1988	1989-2007
Cereals	2.30	3.00	2.95	9.58	9.43	8.21	7.75	7.33	5.51
Pulses	4.35	5.96	6.00	14.70	13.90	14.18	12.91	10.54	9.76
Food grains	2.59	3.39	3.26	10.00	9.65	8.48	8.06	7.28	5.62
Oil-seeds	5.01	5.51	6.30	12.74	17.06	18.36	12.07	13.01	15.89

Source: 1. Agricultural Statistics at a Glance (various issues), Ministry of Agriculture, GoI, New Delhi,

2. Indian Agriculture in Brief (various issues), Ministry of Agriculture, GoI, New Delhi.

Production of foodgrains has shown a decline in instability in the second period compared to the first period and in the third period compared to the second period even when extreme years were included in the data set. Instability in area under cereals as well as pulses turned out to be much higher in the first phase of green revolution compared to pre-green revolution period and remained at almost the same level during the third phase.

Instability in area under oilseeds increased by 10 per cent between pre-green revolution and first phase of green revolution and further by 14 per cent during recent period. Instability in yield during the corresponding periods an increased by about 8 per cent and 22 per cent. Oilseeds production witnessed an increase in instability from 12.74 per cent during 1951-1966 to 17.06 per cent during 1968 -1988 and further to 18.36 per cent during 1989-2007. Yields of cereals and pulses were more stable after pre-green revolution period, whereas it was reverse for oilseeds.

Instability in production of total cereals during the first phase of green revolution declined by 1.5 per cent and after 1988, the decline turned out to be 13 per cent. In the case of pulses, the first phase of green revolution experienced a decline in instability to the extent of 5.4 per cent but post-1988 period witnessed an increase of 2 per cent. Between cereals and pulses, the latter has shown higher instability during all the periods and in all respects. Instability in production and productivity of oilseeds remained higher than even of pulses after 1968.

Table 5: Instability in area, production and yield of selected crops in different periods between 1950-51 and 2006-07 at all-India level

(in per cent)

	Area			Production			Yield		
Crop	**1951-1966**	**1968-1988**	**1989-2007**	**1951-1966**	**1968-1988**	**1989-2007**	**1951-1966**	**1968-1988**	**1989-2007**
Paddy	2.13	3.38	2.74	12.18	13.62	9.63	10.96	11.05	7.24
Wheat	6.61	4.59	3.69	12.93	8.97	7.12	10.56	6.58	5.00
Jowar	3.93	3.80	5.08	16.11	13.32	20.20	14.84	11.32	17.03
Bajra	5.89	10.10	11.41	18.30	39.54	40.48	15.32	32.55	30.72
Maize	3.44	3.06	2.80	10.81	18.44	11.77	9.19	16.74	10.13
Gram	8.05	10.42	15.69	20.14	21.68	21.56	17.95	16.94	10.91
Arhar	3.71	5.31	3.72	18.81	14.34	16.91	18.97	14.28	15.97
Ground-nut	9.52	4.12	5.85	14.07	23.00	29.81	15.19	20.18	28.27
Rape-seed/ Mustard	7.97	9.66	13.76	20.31	21.26	21.88	20.98	18.20	16.63
Coconut	3.12	3.11	3.13	7.21	6.87	5.64	5.82	5.81	5.81
Cotton	5.71	4.76	7.47	17.25	16.51	17.84	15.31	14.52	15.84
Sugar-cane	10.90	9.27	7.59	14.67	11.64	9.28	9.47	6.78	4.71
Potato	3.70	6.95	5.62	16.24	14.00	13.39	13.81	10.72	11.18
Tobacco	11.17	10.48	16.41	15.24	13.29	19.80	9.35	7.29	7.45

Source: 1. Agricultural Statistics at a Glance (various issues), Ministry of Agriculture, GoI, New Delhi,

2. Indian Agriculture in Brief (various issues), Ministry of Agriculture, GoI, New Delhi.

Instability in area, production and yield of individual crops has been presented in Table 5. The coconut has shown the minimum instability across all the selected crops in almost all respects during pre-green revolution and first phase of green revolution. In terms of instability in production, it remained at the bottom even during the third period. However, sugarcane yield has shown least instability, followed by wheat in the third period. Maize has shown the minimum instability in area among the selected crops which also declined over time. Among cereals, bajra has shown highest instability in all the periods and in all respects. Adoption of green revolution technology could reduce yield instability in wheat by 38 per cent. The main factor for this reduction was increase in wheat area brought under irrigation, which increased from 43 per cent during 1965-66 to 77 per cent during 1987-88.

In paddy, the initial years of adoption of new technologies did not help in reducing instability in yield or production. On the contrary, the first phase of green revolution showed higher instability as compared to the pre-green revolution period. The main reason for difference in variability between wheat and rice was that expansion of irrigation was far lower in rice than wheat. Between 1965 and 1988, the coverage of rice area under irrigation increased from 37 per cent to 43 per cent only. The wider dissemination of technology after 1988 helped in reducing instability in yield as well as production of rice. Instability in production of bajra more than doubled while in maize it increased by 70 per cent in the first phase of green revolution. The period after 1988 witnessed a very sharp decline in variability of maize production, but variability in production of bajra remained high (around 40 %). The decline in variability of maize production after 1988 was resulted from the decline in yield instability. Despite this, instability in maize production remained higher than in pre-green revolution period. Instability in yield and production showed of jowar has shown a decline during 1968 to 1988, but a big increase during 1989 to 2007.

Among pulses, instability in area under gram increased over time but instability in its yield declined sharply after 1988. Because of these counteracting factors, instability in production of gram in all the three periods remained around 21 per cent. Area under arhar has shown a remarkably low instability but its yield has shown quite high year-to-year variability. There was a decline in variability in arhar output from 18.8 per cent during 1951-1966 to 14.34 per cent during 1968-1988 which again increased to 16.91 per cent during 1989–2007.

Variability in groundnut has shown two interesting features. One, variability in its area declined to less than half during the first phase of green revolution and then increased by 42 per cent after 1988. Second, variability in its productivity increased from 15.19 per cent during 1951-1966 to 20.18 per cent during 1968-1988 and, further to 28.27 per cent during 1989-2007. A similar increase was experienced in the case of its production. The experience in rapeseed & mustard is totally different from that of groundnut. Its area has shown a substantial increase in variability over time, whereas productivity has shown a decline in variability. Production of rapeseed & mustard has shown an inter-year variability of about 21 per cent with a small increase over time.

Inter-year variations in production of coconut were quite small and it has shown a decline over time. Similarly, sugarcane, another perennial crop, has also shown a decline in instability in area, yield and production, over time. In the case of cotton, variability in area witnessed a decline during 1968-1988 as compared to pre-green revolution, but then it increased steeply. The variability in yield of cotton varied around 15 per cent with little changes between different periods. Its production has shown variability of around 17 per cent.

Area variability in potato turned out to be much higher during post- green revolution than pre-green revolution period. However, its production has shown a decline in instability over time. Instability in area and production of tobacco followed a small decline in the first phase of green revolution, but then increased sharply.

Instability in production across crops is found to depend significantly on the irrigation coverage of a crop. Crops like wheat, sugarcane and paddy are grown mostly under irrigated conditions which impart lot of stability to their production. It may be noted that area covered under irrigation is more than 90 per cent for sugarcane, around 88 per cent for wheat and 53 per cent for rice. In contrast, irrigation coverage is < 10 per cent for bajra, around 20 per cent for maize, around 31 per cent for gram and around 17 per cent for groundnut.

Changes in instability in some cases have shown a common pattern with changes in area, production and yield. Some of these patterns are captured by comparing the estimates of instability presented in Table 5 with trends in area, production and yield presented in Annexure 1. In most of the crops, area and instability moved in the same direction after 1987-88. This implies that expansion of production base for a crop brings in stability, whereas a shrinking production base becomes more unstable.

However, gram, rapeseed & mustard and cotton were the exceptions to this pattern.

4.3. Instability in Agriculture at State Level

Instability in crop production is expected to vary over space, i.e. across regions and states. There are wide variations in climatic conditions, natural resource endowments, institutions, infrastructural facilities, population density and several other factors across states. Because of these variations, pattern of agricultural growth and development and response to various stimulus and inducements vary widely across states. Accordingly, instability in agriculture is expected to show different patterns in different agro- ecological settings prevailing in different states. Some states may exhibit the same pattern as seen at the national level while others may depicts totally different picture.

The state level estimates of instability in area, production and yield were prepared for foodgrains for two periods, viz. 1968 to 1988 (first phase of green revolution) and 1989 to 2006 (period of wider dissemination of technology). The results are presented in Table 6.

The area under foodgrains showed high instability in the first phase of green revolution in the states of Gujarat, Karnataka, Rajasthan and Tamil Nadu. Out of these states, the year-to-year variations followed a decline in Gujarat and Karnataka, but witnessed a small increase in Tamil Nadu and a large increase in Rajasthan. The other states which have witnessed an increase in instability in area under foodgrains are: Andhra Pradesh, Orissa, Kerala, Jammu & Kashmir and Uttar Pradesh. Despite increase, instability in foodgrains area was quite low in Uttar Pradesh and Jammu & Kashmir. The states which have shown below 4 per cent year-to-year deviations from growth trend are: Bihar, Kerala, Himachal Pradesh, Punjab, Uttar Pradesh and West Bengal.

Compared to area, variations in yield have been much wider. Instability in yield of foodgrains exceeds 20 per cent in Gujarat, Maharashtra, Orissa and Rajasthan in both the periods. It varied around 10 per cent in Andhra Pradesh, Assam, Bihar, Himachal Pradesh, and Jammu & Kashmir. Yield variability in foodgrains in Haryana, Uttar Pradesh and West Bengal reduced to less than half after 1988. A large increase in yield instability was seen in Andhra Pradesh, Assam, Madhya Pradesh, Orissa and Rajasthan.

Table 6: State-wise instability in area, production and yield of foodgrains during 1968-1988 and 1989-2006.

State	Period	Area	Production	Yield
Andhra Pradesh	I	5.99	12.94	8.87
	II	8.04	16.82	9.61
Assam	I	4.87	12.16	9.69
	II	4.11	11.22	11.97
Bihar including Jharkhand	I	4.66	16.43	12.92
	II	3.33	14.16	11.77
Gujarat	I	12.49	40.47	30.41
	II	9.76	35.54	27.66
Haryana	I	10.23	17.54	12.68
	II	5.68	8.57	6.67
Himachal Pradesh	I	1.98	13.73	12.95
	II	1.39	13.04	12.79
Jammu & Kashmir	I	1.60	12.19	11.78
	II	2.31	8.73	9.68
Karnataka	I	10.15	22.27	14.11
	II	4.95	17.80	14.75
Kerala	I	3.20	6.07	4.61
	II	3.56	7.56	5.48
Madhya Pradesh including Chattisgarh	I	2.54	18.70	17.55
	II	5.61	23.85	19.05
Maharashtra	I	8.21	27.45	20.89
	II	4.28	23.16	20.76
Orissa	I	5.97	25.34	20.42
	II	7.61	32.87	28.38
Punjab	I	3.56	5.00	5.09
	II	1.92	5.57	4.68
Rajasthan	I	10.97	27.89	21.33
	II	18.35	38.92	23.12
Tamil Nadu	I	10.19	25.97	18.35
	II	11.22	20.15	13.97
Uttar Pradesh including Uttarakhand	I	1.98	14.77	13.77
	II	2.46	7.78	6.46
West Bengal	I	4.69	15.46	12.55
	II	3.90	6.66	5.48

Note: Period I is 1968-88 and Period II is 1989-2006.

Source: 1. Agricultural Statistics at a Glance (various issues), Ministry of Agriculture, GoI, New Delhi,

2. Indian Agriculture in Brief (various issues), Ministry of Agriculture, GoI, New Delhi.

Yield instability was a major source of instability in foodgrain production in most of the states. Production was most stable in the state of Punjab, followed by Kerala. Haryana, Uttar Pradesh and West Bengal were able to bring down instability in foodgrain production sharply in the second period. Instability in production remained very high in Maharashtra and Tamil Nadu, despite reduction over time. Apart from these two states, instability exceeded the scale of 20 per cent in Orissa, Madhya Pradesh, Rajasthan and Gujarat. Though Orissa is located in high rainfall eastern region, its agriculture shows high instability like states in the dryland arid region. Variations in instability and changes in area, production and yield of foodgrains in different states have shown a mixed pattern, as can be seen from Annexure II.

The main factor for inter-state variations in instability in area, production and yield seems to be the variations in access to irrigation. Instability in foodgrain production during 1989 to 2006 was less than 9 per cent in Uttar Pradesh, Punjab and Haryana, where more than 70 per cent area under foodgrains is irrigated. In contrast, instability in foodgrain production exceeded 23 per cent in Maharashtra, Orissa, Madhya Pradesh, Rajasthan and Gujarat where less than 40 per cent area under foodgrains has access to irrigation.

4.4. Rainfall Variations in Different Periods

Some studies have attributed the changes in instability of crop output to the variations in rainfall (Ray, 1983b). In order to ascertain whether variation in annual rainfall is increasing over time, we have examined the level and standard deviation in rainfall in different periods since 1950-51. The trend in rainfall, presented in Figure 1, reveals that there is no apparent increase or decrease in the amount of rainfall received over a longer period though some variations can be seen over a short period.

The average rainfall received during one agricultural year and its standard deviation during the three periods for which instability in crop output has been studied, are presented in Table 7. The average rainfall during 1950-51 to 1964-65, i.e. pre-green revolution period was 112.5 cm. In the second period, i.e. 1967-68 to 1987-88, the average rainfall received in the country was 107.2 cm. Next 21 years received the average rainfall of 115.4 cm. The difference in average amount of rainfall received during the three periods was not statistically significant.

Table 7: Average rainfall and its variability in different periods: All-India level

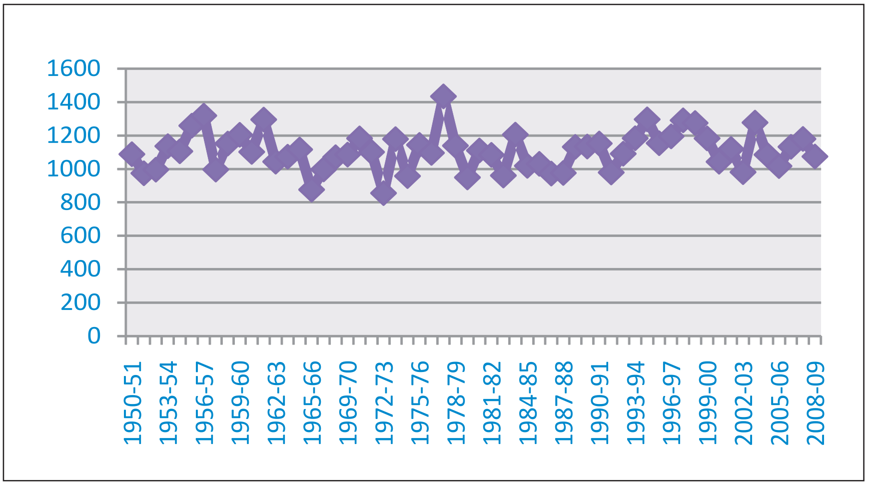
Annual rainfall (cm)

Period	Average	Standard deviation
1951 to 1965	112.5	10.7
1968 to 1988	107.2	12.5
1989 to 2009	115.4	10.2

As the rainfall data did not show any time trend, its variability can be adequately estimated from the standard deviation in the amount of rainfall in a given period. There was very small increase in rainfall variation between first phase of green revolution period and pre-green revolution period. During the recent years, standard deviation in rainfall has shown a small decline. These results relating to rainfall amount and year-to-year variations do not support the assertion that rainfall variation is increasing over time.

Figure.1: Annual rainfall (June -May) during 1950-51 to 2008-09

Unit: millimeters



4.5. Agricultural Instability in Andhra Pradesh

Variability in agricultural production consists of variations in area and yield and their interactions. Variation in area under a crop occurs mainly in response to distribution, timeliness and variations in rainfall and other climatic factors, expected price and availability of crop-specific inputs. All these factors also affect the variations in yield. Further, yield is also affected by the outbreak of diseases, pests and other natural or man-made hazards like floods, droughts and many other factors. Different events may affect the crop area and yield in the same, opposite or different way.

Instability in area, production and yield of rice, cotton and groundnut experienced at the state level in Andhra Pradesh during 14 years before and after 1994-95 has been presented in Table 8. Instability index for area has shown an increase after 1994-95 for all the selected crops. It increased from 10.6 per cent to 14.4 per cent in rice and from 16.6 per cent to 20.2 per cent in cotton. During both the periods, instability in area was lowest in groundnut. Rice, which is generally grown under irrigated conditions, has shown somewhat higher increase in area instability as compared to groundnut. Area under cotton has shown more than double the fluctuations in area under groundnut.

Table 8: Instability in area, production, yield, farm harvest prices and gross revenue from important crops in Andhra Pradesh: 1980-81 to 2008-09 (in per cent)

Crop	Period	Area	Production	Yield	Farm harvest price	Gross returns
Rice	1980-81 to 1994-95	10.6	15.3	8.3	7.3	20.0
	1994-95 to 2008-09	14.4	20.0	8.5	10.5	19.7
Groundnut	1980-81to 1994-95	8.1	25.7	21.7	14.4	28.6
	1994-95 to 2008-09	9.8	47.7	40.8	9.6	48.4
Cotton	1980-81 to 1994-95	16.6	23.9	27.9	23.9	36.8
	1994-95 to 2008-09	20.2	27.7	23.6	25.0	35.5

Instability has been found lower in yield than area in the case of rice, whereas yields of groundnut and cotton have shown much wider fluctuations than in area. The instability index of yield did not increase much over time in the case of rice, whereas it almost doubled in groundnut, from 22 to 41, between 1980-1995 and 1995-2009. Despite lot of concern about susceptibility of cotton to various pests in recent years, its productivity has shown fewer fluctuations after 1995 than before 1995.

Instability in production of rice was almost double than in its yield during the period 1981-1995. In the next 14 years, it increased further. In the case of cotton, deviations from trend growth were lower in production than yield, but higher than area during 1981-1995. After 1995, production instability in cotton increased despite less unstable yield. Volatility in production of groundnut doubled after 1994-95 and it was as high as 48 per cent in terms of standard deviation from trend. Among the three crops, groundnut production showed the highest year-to-year fluctuations.

Besides fluctuations in production, price received by the farmers for their produce is equally important in causing variations in farm income. Therefore, it is important to consider fluctuations in farm income to understand and address risks in this income. It is important to point out that farm harvest prices showed much lower fluctuations than those in yield and production. Second, instability in farm harvest prices has shown a decline over time in the case of groundnut and small increase in the case of rice and cotton. Among the three crops, farm harvest prices of paddy have shown the lowest instability, 7.3 per cent. The decline in price fluctuations in groundnut after 1995 seems to be the result of increased integration and improvements in agricultural markets in the country. The reason for small increase in price instability of rice seems to be the result of liberalization of rice trade after 1995, which was earlier very tightly regulated by the government.

Generally, prices and production are expected to have a negative co- variance as increase in production puts downward pressure on price and a decrease in production should result in an increase in price. It is generally expected to have a some effect on gross return from a crop. But, this expectation is met if negative covariance in fluctuations between farm harvest prices and production exceeds the variance of either price or production.

Although, price instability has shown a decline in groundnut over time, it has depicted a rise in the case of rice and cotton over time. It was very high in production and prices on farm income represented by gross returns showed that instability in area, production, yield and prices did not negate each other. Rather, their impact got accumulated to some degree because of which instability in farm income was found higher than that in area, production and prices in all the cases, and it had not changed over time.

4.5.1. Agricultural Instability at District Level in Andhra Pradesh

To see if instability in agriculture at the disaggregate level presents a different picture than that at the aggregate level, instability in selected dimensions was estimated for each district in the state of Andhra Pradesh. Rather than presenting instability results for each district, estimates have been presented in terms of range, frequency of decline and increase or no significant change between the two periods selected for the study (Table 9). These results have then been compared with those revealed by the aggregate data.

A perusal of Table 9 revealed that there was not only a wide variation in instability across districts, in some cases the range of instability at district level narrowed down also, in contrast to the increase at the state level. A similar pattern was observed in the case of production, yield, farm harvest price and gross returns. In some cases, instability shown by the state aggregate was found lower than the minimum value in the range of instability across districts.

Table 9. Range of instability in area, production, yield, farm harvest prices and gross revenue at disaggregate level (in per cent)

Crop	Period	Area	Production	Yield	Farm harvest prices	Gross returns
Rice	1981-94	8 to 55	16 to 80	9 to 40	6 to 17	19 to 73
	1994-09	10 to 42	16 to 69	8 to 43	8 to 19	19 to 91
Groundnut	1981-94	8 to 52	17 to 64	13 to 49	10 to 20	17 to 64
	1994-09	6 to 55	18 to 91	17 to 93	9 to 20	16 to 91
Cotton	1981-94	7 to 88	31 to 129	36 to 126	21 to 76	43 to 147
	1994-09	12 to 69	28 to 84	21 to 64	22 to 39	36 to 93

These results indicate that in a large state like Andhra Pradesh, the state-level estimates of risks, prices and returns involved in agricultural production, highly under-estimate instability at the disaggregate level. These state-level estimates have provided an indication of shock in supply of agricultural output at the aggregate level, by which they have completely concealed the volatility to which the sub-region was subjected.

The district -level instability estimates have shown that the range of instability in production and gross returns narrowed down for rice, and cotton, but widened for groundnut.

Another way to examine the appropriateness of state- level estimates of instability to reflect the changes at district level is to compare the changes in instability over time at state level with those at district level. This has been accomplished in Table 10. It shows the distribution of districts in Andhra Pradesh which have seen increase or decrease in instability in area, production, yield, farm harvest prices and gross revenue, and those which have not seen any ‘significant’ change in the level of instability on these aspects. The significant change was defined as the change of more than one percentage point.

A perusal of Table 10 reveals that for rice, the decline in instability was witnessed by 36 per cent districts in area, by 41 per cent districts in production, and by 50 per cent districts in yield, whereas, the state-level estimates have shown only 'increase' in instability. Similarly, in groundnut, compared to the increase at the state level, only 59 per cent of the districts have shown an increase in instability in gross return. The state -level data indicated a decline in instability in cotton yield, but district-level data indicated an increase in 22 per cent of the districts. The most striking variation in state and district-levels data was found in the case of instability in gross return from cotton which showed very a small change at the state level but a decline in 83 per cent districts.

Table 10. Distribution of districts based on significant* changes in level of instability **(in per cent)**

Category	Crops	Area	Production	Yield	Farm harvest price	Gross returns
Districts experienced increase in instability	Rice	54.5	54.5	40.9	54.5	45.5
	Groundnut	59.1	63.6	72.7	22.7	59.1
	Cotton	27.8	33.3	22.2	16.7	11.1
Districts experienced decrease in instability	Rice	36.4	40.9	50.0	18.2	45.5
	Groundnut	36.4	36.4	27.3	50.0	31.8
	Cotton	61.1	66.7	77.8	66.7	83.3
Districts experienced change less than one percentage point	Rice	9.1	4.5	9.1	27.3	9.1
	Groundnut	4.5	0.0	0.0	27.3	9.1
	Cotton	11.1	0.0	0.0	16.7	5.6

*A change of more than one percentage point was taken as a significant change.

As mentioned earlier, fluctuations in income caused due to fluctuations in production get smoothened to some extent if variation in prices received by farmers is opposite to that in production. However, prices are not a local phenomenon as they are likely to be affected by the level of production in the other regions. Prices at the district level can be strongly influenced by the production in the same district if markets are segmented, or, if market integration is not of high order. Secondly, prices and production in the same district can be negatively correlated if production in a given district is strongly correlated with production in other regions which influence the price. In order to test the influence of local production on local farm harvest prices, correlation coefficients were computed between year- to-year changes in prices with change in production expressed in percentage terms. The results have been presented in Table11.

Table 11. Correlation coefficient between changes in production and farm harvest prices: 1994-95 to 2008-09

District	Paddy	Groundnut
Adilabad	0.027	0.193
Ananthapur	-0.427	-0.009
Chittoor	-0.475	-0.176
Cuddapah	-0.334	-0.147
East Godavari	0.309	0.145
Guntur	-0.018	-0.031
Karimnagar	0.035	-0.161
Khamman	-0.057	0.047
Krishna	0.099	-0.339
Kurnool	-0.476	-0.676
Mahbubnagar	-0.248	0.178
Medak	0.007	0.351
Nalgonda	-0.746	-0.317
Nellore	-0.295	0.399
Nizamabad	-0.053	-0.182
Prakasam	-0.491	0.003
Rangareddi	-0.557	-0.345
Srikakulam	-0.350	-0.560
Visakhapatnam	-0.368	0.059
Vizianagaram	0.014	0.174
Warangal	-0.327	0.014
West Godavari	0.088	0.011
Frequency distribution of correlation		
Negative	15	11
Positive	7	11

It has been observed that out of the 22 districts of Andhra Pradesh, the change in prices showed a negative correlation with change in production in 15 districts for rice and in 11 districts for groundnut (Table 11). These results indicate that local production influences local prices and movement in prices moderate ‘to some extent’ the fluctuations in gross returns caused by the fluctuations in production. As the correlation in most of the cases is weak, local prices are also affected by other factors and production outside the district.

4.5.2. Factors Affecting Instability

Factors that affect instability over time vary from crop to crop. The main reason for increase in instability in area and production of cotton after 1994-95 seems to be the extension of its cultivation to non-traditional areas where cotton has replaced jowar, pulses and other cereal crops (see Table 12). Cotton cultivation has been extended to red chalka soils, though these are not considered quite suitable for cotton cultivation (Chand and Raju, 2008).

The major cause of increase in instability and its high level in groundnut yield was the occurrence of frequent and severe droughts during period II (1994-95 to 2008-09). In 9 out of 14 years of this period, successive droughts were reported in Anantapur and its neighbouring districts which were the major groundnut-growing areas. In one year, excessive rains caused the failure of crop in two or three districts. Further, a decline in area under irrigation had also contributed to the increase in yield instability. Groundnut producers suffered not only due to increase in year-to-year fluctuations, but also due to lower yields during the period II.

Increase in instability in area and production of rice was mainly due to erratic, irregular and insufficient power supply for irrigation purpose and highly erratic rainfall distribution during period II. In the case of cotton, expansion in irrigation seems to have lowered the yield instability, but not area and production instabilities.

Despite progress in irrigation and other infrastructural developments in agriculture, the instability in agricultural production has shown an increase after early-1990s in the major crops grown in Andhra Pradesh. In contrast, farm harvest prices of groundnut and cotton have shown a decline in instability during 1995-2009 than during 1981-1995. Instability status perceived through the state -level data may be vastly different from that experienced at the disaggregate level. In some cases, the state -level estimates may be completely misleading, as has been seen in the case of instability in cotton production in Andhra Pradesh, which has shown an increase at the state level but a decrease in two-third districts of the state.

The study has indicated that in a large state like Andhra Pradesh, the effect of technology in stabilizing the yield varies across districts. Yield

Table 12. Factors related to instability in agricultural in Andhra Pradesh

Crop	Period	Area ('000ha)	Yield (kg/ ha)	Irrigated area (%)
Rice	1981-94	3726	2206	94.65
	1994-09	3770	2838	96.37
Groundnut	1981-94	1886	881	18.86
	1994-09	1855	788	18.04
Cotton	1981-94	570	246	11.38
	1994-09	1042	316	18.68

variability in cotton has declined in more than 75 per cent of the districts after 1995, despite increase in rainfall deviations. Among the three crops selected for the study, groundnut has been observed to be the most risky crop in respect of production as well as gross returns.

The net effect of fluctuations in production and prices on farm income has depicted that instabilities in area, production, yield and prices do not negate each other. The instability has been found higher in farm income than in area, production and prices in all the cases, and it has not changed over time. This underscores the need for addressing risks in farm income by devising area-specific crop insurance or some other suitable mechanisms.

5

Agricultural Productivity at District Level in India

In this chapter, agricultural productivity has been studied at the district level across 551 districts of the country for the years 2003-04 and 2004-05 (2003-05). The per hectare productivity during this period has been observed to range from less than Rs 3,000 in the Barmer district of Rajasthan to more than Rs 1.5 lakh in the Lahaul Spiti district of Himachal Pradesh. In the plain region of the country, highest productivity was recorded in the Howrah district where one hectare of area under cultivation produced crop output worth Rs 1.14 lakh. Crop productivity per unit of net sown area in some of the most productive districts in India was more than 30-times the productivity in some of the districts having low productivity.

In order to see the distribution of districts in different productivity ranges, all the districts of the country were grouped according to two types of classification. The first classification is based on a large number of categories representing a productivity range of Rs 5,000 per hectare. Frequency distribution of districts based on this classification is presented in Figure 2 and Table 13. The second classification is much broader and it contains only five productivity categories.

The distribution based on class interval of Rs 5,000 /ha includes 21 productivity classes. The bottom category includes districts having productivity below Rs 5,000 /ha and the top category includes districts having productivity of more than Rs 1 lakh /ha during 2003-05 at current prices. It can be seen from Figure 2 that concentration of districts in low-productivity categories is much higher than that in the high–productivity categories. The maximum number of districts fall in the productivity range of Rs 25,000-Rs 30,000 /ha NSA.

Figure 2: Frequency distribution of districts according to different productivity ranges

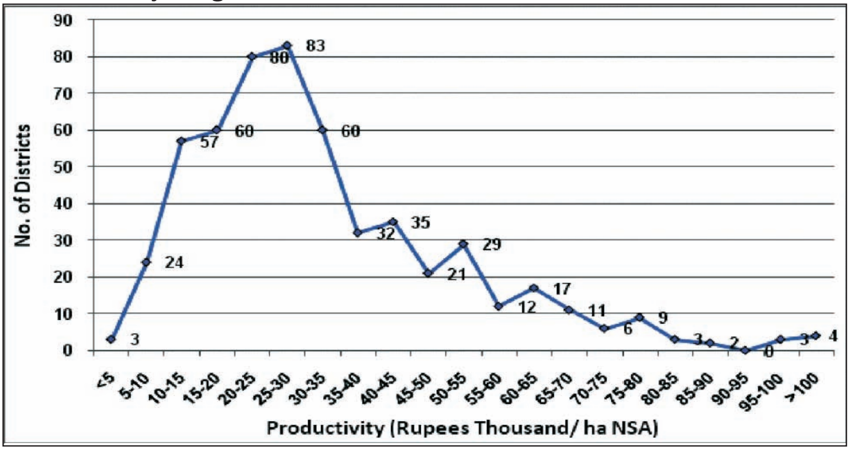


Table 13 provides information on the number of districts in different productivity categories alongwith distribution of net sown area and share in the value of crop output in those categories. The per hectare productivity was below Rs 5,000 /ha in only three districts of the country. About five per cent districts recorded productivity below Rs 10,000 /ha and the same percentage of districts recorded productivity above Rs 70,000/ha. Five per cent districts at the bottom level of productivity have accounted for 10.4 per cent of the total area of the country but have contributed only 2.7 per cent of the crop output. In contrast to this, top 5 per cent (27) districts at the top have contributed 10 per cent of the total crop output from all the districts while accounting for 3.38 per cent of net sown area.

Low- productivity districts are generally found to be larger in area compared to the high productivity districts which are generally of smaller size. About 62 per cent of the districts of the country fall in the productivity range of Rs 10,000 to Rs 35,000 /ha. While three districts in the country have productivity below Rs 5,000/ha, there are four districts which have productivity more than Rs 1 lakh /ha.

This distribution shows that crop productivity per hectare of area differs very widely across districts. A complete set of data on productivity level in each district arranged in ascending order of productivity along with other relevant variables has been presented in Annexure III. Productivity and other characteristics for various districts in each state arranged alphabetically are given in Annexure IV.

Table 13: Distribution of districts in different productivity ranges

Productivity range	No. of districts	Cumulative % of districts	Share in NSA	Cumulative share in NSA	Share in VCO	Cumulative share in VCO
< 5	3	0.54	2.28	2.28	0.29	0.29
5-10	24	4.90	8.14	10.43	2.42	2.71
10-15	57	15.25	14.05	24.48	6.34	9.06
15-20	60	26.13	11.46	35.94	6.90	15.96
20-25	80	40.65	14.95	50.89	11.69	27.65
25-30	83	55.72	13.24	64.13	12.52	40.17
30-35	60	66.61	9.14	73.27	10.37	50.54
35-40	32	72.41	4.83	78.10	6.26	56.80
40-45	35	78.77	4.39	82.49	6.52	63.32
45-50	21	82.58	3.81	86.30	6.27	69.59
50-55	29	87.84	4.18	90.49	7.73	77.32
55-60	12	90.02	1.72	92.21	3.48	80.80
60-65	17	93.10	2.74	94.95	5.91	86.71
65-70	11	95.10	1.67	96.62	3.93	90.64
70-75	6	96.19	1.28	97.91	3.25	93.89
75-80	9	97.82	1.04	98.94	2.76	96.65
80-85	3	98.37	0.33	99.27	0.93	97.58
85-90	2	98.73	0.50	99.77	1.55	99.12
90-95	0	98.73	0.00	99.77	0.00	99.12
95-100	3	99.27	0.09	99.86	0.30	99.42
>100	4	100.00	0.14	100.00	0.58	100.00
All	**551**		**100.00**		**100.00**	

NSA: Net Sown Area
VCO: Value of Crop Output

5.1. Distribution of Districts in Broad Productivity Categories

In this classification, all the districts have been categorized into five productivity levels, viz. very low, low, average, high and very high. The average productivity has included all those districts with productivity in the range of mean + 0.25 standard deviation in productivity. The next two lower classes have been formed by taking the range as bottom of the average productivity less 0.5 and 1.0 times the standard deviation. High and very high categories have been selected by 1.0 and 2.0 times the standard deviation to the upper limit of average productivity range (Table 14). According to this distribution, 120 districts in the country have been found to have very low productivity (below Rs 18,199/ha NSA) and 161 districts have low productivity (Rs 18,199 - Rs 27, 955/ha NSA). On the other hand, 105 districts fall in productivity range of Rs 37,713 - Rs 57,225/ha NSA and 63 districts have productivity of more than Rs 57,225/ ha. Frequency distribution of districts according to productivity status is shown in Figure 3.

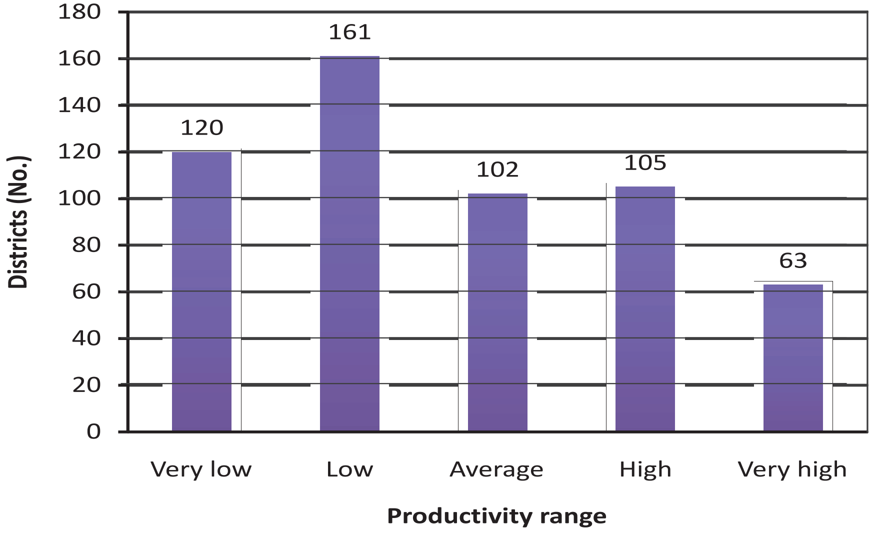
Table 14: Distribution of districts in broad agricultural productivity categories

Productivity category	Range (Rs/ha NSA)	No. of districts	Share in NSA (%)	Share in VCO (%)
Very low	< 18199	120	31.46	13.00
Low	18199 – 27955	161	28.38	22.86
Average	27956 – 37712	102	15.86	17.71
High	37713 – 57225	105	15.06	24.28
Very high	> 57225	63	9.24	22.15
Overall	32834	551	100.00	100.00

Districts in low -productivity category account for 31.5 per cent of net sown area of all the districts, but they contribute only 13 per cent of the value of crop output. In contrast to this, very high- productivity districts account for less than one -third of the area under low -productivity districts but contribute 70 per cent more output than by low-productivity districts.

Simple average for all the 551 districts has shown that one hectare of land under cultivation in the country generated crop output of Rs 32,834 during the period 2003-05. Weighted average of productivity, when net sown area was used as a weight, turned out to be Rs 28,812. The standard deviation in productivity was Rs 19,513 and coefficient of variation was 59.4 per cent. Out of 551 districts included in the study, 102 districts that came into the average category, covered 15.86 per cent of total area under cultivation and contributed 17.71 per cent output. Low and very low productivity districts accounted for 60 per cent area but contributed 36 per cent of crop output in the country. In contrast to this, 168 districts in top two categories contributed 46 per cent of output with area share of 24.3 per cent.

Figure 3: Distribution of districts in different agricultural productivity ranges



5.2. Factors Affecting Crop Productivity

Productivity of crop sector per unit of area and per worker is affected by several factors. We have attempted to identify some factors which are considered as most important. Initially, we examined, through tabular analysis, the pattern of productivity per unit area and per worker and factors like rainfall, irrigation levels, fertilizer-use and diversification towards high-value horticultural crops. The information on cropping intensity which matters for productivity but which itself is affected by rainfall and irrigation, has been presented Table 15. It was interesting to observe from Table 15 that crop productivity per agricultural worker in different categories closely followed land productivity, though variation in land productivity was found to be somewhat higher than labour productivity. Another interesting feature of land productivity is that it very closely followed variation in per hectare fertilizer-use. Irrigation coverage and crop intensity also showed increase with increase in productivity. The area allocated to fruits and vegetables showed a positive association with per hectare value of crop output.

In the bottom category of productivity, fertilizer-use was 53 kg / ha, area under irrigation was 24 per cent and crop intensity was 122 per cent. In the average productivity category, fertilizer-use increased to 101 kg/ ha, irrigation coverage increased to 146 per cent and 34 per cent area was sown more than once. Area allocated to fruits and vegetables increased from 2.3 per cent to 5.7 per cent as one moves from very low-productivity districts to low-productivity districts. Land productivity between average and bottom categories showed the ratio of 1: 2.49, while labour productivity showed a ratio of 1: 1.65. The ratio of fertilizer application between these two categories was 1: 2.34. Land productivity in top category was 128 per cent higher than the average category. Whereas, labour productivity in top category was 250 per cent higher than the average category. These results show that per hectare labour use increases faster than increase in land productivity as we move from very low productivity districts to average productivity districts. However, as we move from the average productivity districts to high productivity districts, the use of labour follows a lower increase than increase in land productivity.

Table 15: Productivity levels and characteristics for different productivity categories

Productivity category	Productivity /ha NSA (Rs)	Fertilizer use/ ha NSA (kg)	Productivity/ agriculture worker (Rs.)	Net irrigated area (%)	Rainfall (mm)	No. of agriculture workers/ km^2 NSA	Area under fruits & vegetables (%)	Cropping intensity (%)	Rural poor (%)
Very low	12910	53	9852	24	935	161	2.3	122	36
Low	23442	101	14053	46	1189	215	5.7	134	31
Average	32192	124	16278	50	1224	246	9.2	140	29
High	46360	193	26837	58	1212	254	12.9	150	23
Very high	73284	259	56679	64	1507	181	17.3	164	18
Average of all districts	32834	132	20964	46	1193	213	8.5	139	29

Districts having very low productivity receive lowest rainfall (93.5 cm per year), whereas, districts having very high productivity receive high rainfall (150.7 cm per year). Rainfall did not show a clear pattern in the middle categories. For instance, districts with average per hectare productivity of Rs 32,191 /ha receive normal rainfall of 122 cm /year compared to 121 cm /year in high productivity districts having average productivity of Rs 46,360/ha. The reason for high productivity despite lower rainfall seems to be better irrigation facilities. As can be seen from the Table 15, the effect of irrigation dominated small variations in rainfall. Eventhough the districts in high-productivity category get lower rainfall than the districts in the average productivity category, the irrigation coverage in the latter is 15 per cent higher than in the former, which explains the variations in agricultural productivity.

A very strong relationship has been observed between land productivity and poverty across productivity classes. More than one-third of rural population is under poverty in 120 districts of the country which have very low agricultural productivity. On the other hand, less than one-fifth of rural population suffered from poverty in the districts having very high agricultural productivity. Within these two extremes, poverty has shown a decline with increase in crop productivity level.

Finally, the variations caused by various factors in the productivity of the districts of India and the effect of agricultural productivity and concentration of workforce in agriculture on the rural poverty at district level were estimated using a simultaneous equation econometric model described under methodology in the Chapter 3.

5.3. Effect of Various Factors on Crop Productivity and Poverty

The effect of various factors on per hectare productivity of the crop sector and on poverty was estimated by using two-stage simultaneous equation model. All the variables were defined in the logarithmic form. As agro-climatic factors in mountainous areas differed significantly from the plains, it was decided to exclude mountainous states and districts from the data set used in the regression analysis. Another reason for excluding these districts was that many of them were outliers in terms of productivity or some other factors and their size happened to be very small.

For instance some of the districts in Himachal Pradesh and Jammu & Kashmir have less than 10,000 ha of NSA. A small unit having extreme value of some of the variables was likely to affect reliability of the estimates of regression analysis. Therefore, all the districts in the Western Himalayan region and all the districts in North East region except Assam, were excluded from the data set used in the regression analysis. Districts of Darjeeling in West Bengal and Nilgiri in Tamil Nadu were also excluded from the data set. The estimated equation has considered only those districts for which complete information on all the variables included in the model was available.

The estimates of the econometric model have been presented in Table 16 and the elasticity estimates of per hectare productivity and rural poverty with respect to various factors have been presented in Table 17. As can be

Table 16: Estimates of simultaneous equation model on effect of various factors on productivity and rural poverty

Estimation Method: Two-Stage Least Squares

Sample: 1 to 472

Included observations: 388

Total system (unbalanced) observations: 773

	Particulars	Coefficient	Std. error	t-statistic	Probability
C(1)	Intercept Eq.(1)	9.390203	0.977908	9.602342	0.0000
C(2)	Per hectare productivity	-0.649235	0.096690	-6.714583	0.0000
C(3)	Number of workers / hectare	0.571621	0.086110	6.638254	0.0000
C(11)	Intercept Eq.(2)	7.535282	0.320741	23.49332	0.0000
C(12)	Fertilizer	0.323808	0.028716	11.27639	0.0000
C(13)	Area under fruits and veg.	0.179189	0.015913	11.26066	0.0000
C(14)	Irrigation	0.066936	0.029215	2.291164	0.0222
C(15)	Rainfall	0.104101	0.042607	2.443293	0.0148
Determinant residual covariance			0.089791		

Equation: RUPOORPER = C(1) +C(2)*VCOPH +C(3)*WRKRPERHA

Instruments: FERTPH FRUITVEGPER NIAPER RAIN WRKRPERHA C

Observations: 385

R-squared	0.168330	Mean dependent variable	3.039948
Adjusted R-squared	0.163975	S.D. dependent variable	0.944329
S.E. of regression	0.863442	Sum of squared residuals	284.7931
Durbin-Watson stat	1.494649		

Equation: VCOPH = C(11) +C(12)*FERTPH+C(13)*FRUITVEGPER+C(14) *NIAPER+C(15)*RAIN

Instruments: FERTPH FRUITVEGPER NIAPER RAIN WRKRPERHAC

Observations: 388

R-squared	0.632217	Mean dependent variable	10.20684
Adjusted R-squared	0.628376	S.D. dependent variable	0.578497
S.E. of regression	0.352657	Sum of squared residuals	47.63267

seen from Table 16, the value of R^2 for both the equations was highly significant and all the variables included in the estimated equation were also significant at 0.2 per cent or lower level of significance.

Elasticity estimates presented in Table 17 show that one per cent increase/decrease in per hectare productivity across the selected districts results in 0.65 per cent decline/rise in rural population under poverty. On the other hand, one per cent increase in pressure of work force on agricultural land results in 0.57 per cent increase in rural poverty. These results show that an increase in agricultural productivity and shift of work force from agriculture to other sectors are very strong determinants of rural poverty.

Among various factors, per hectare use of fertilizer has shown the strongest affect on per hectare productivity. One per cent increase/decrease in fertilizer-use results in 0.32 per cent increase/decrease in per hectare productivity. Area under fruits & vegetables has turned out to be the second most important factor in causing variation in productivity across districts. Elasticity of per hectare productivity with respect to area under fruits and vegetables has been found as 0.18. The effect of rainfall variation on per hectare productivity of crop sector has turned out to be stronger than the effect of net irrigated area. While one per cent variation in rainfall causes 0.104 per cent variation in productivity and in the same direction the effect of one per cent variation in net irrigated area (per cent) is 0.067. These estimates show that variation in availability of water through either irrigation or rainfall causes a significant variation in district-level productivity of agriculture. However, fertilizer and diversification towards high-value crops have caused a much stronger influence on agricultural productivity.

Table 17: Estimates of elasticity of per hectare productivity and rural poverty with respect to various factors based on district level data excluding hilly districts, 2003-04 and 2004-05

Elasticity of rural poverty		Elasticity of per hectare productivity	
Variable	**Coefficient**	**Variable**	**Coefficient**
Per hectare productivity	-0.6492	Per hectare fertilizer	0.3238
Agricultural worker/ ha	0.5716	Area under fruits & vegetables	0.1792
		Net irrigated area	0.0669
		Rainfall	0.1041

6

District-Level Productivity Analysis at State Level

There is a considerable variation in productivity level of various districts within a state. Even in relatively smaller states like Haryana which has high productivity, there are pockets of districts with low productivity. Distribution of districts according to productivity status for each state has been presented in Table 18. State-wise list of districts in different productivity categories has been given in Annexure V.

Out of 22 districts in Andhra Pradesh, productivity has been found high in two districts and an equal number of districts have shown very low productivity. About one-third districts in this state have shown low or very low productivity that is less than Rs 27,995 per hectare. All the twelve districts in Arunachal Pradesh for which estimates could be prepared have average or lower than average productivity. Sixty per cent of the districts in Assam come in the low productivity category. Only one district out of twenty-three in this state has recorded high productivity. No district in Assam has shown very low or very high productivity. Two districts out of thirty-seven in Bihar come under very low category and about half are in the low productivity category. Seven districts in the Bihar state have harvested crop output of more than Rs 37,000 during the years 2003-04 and 2004-05.

All the sixteen districts in Chattisgarh come in the category of below average productivity with 81 per cent showing very low and 19 per cent showing low productivity. Gujarat has a mix of all kinds of districts with varying productivity. Out of twenty-five, five districts have shown very low and one district has shown very high productivity. Thirty per cent districts each come in low and average productivity ranges in Gujarat.

In Madhya Pradesh and Maharashtra, a majority of the districts have per hectare productivity below Rs 18,199. Except two cases, all other districts in Madhya Pradesh have either low or very low productivity. Not even a single district in these two states comes in very high productivity range.

In Haryana, more than one-fourth districts have very high and more than half have high productivity. Only one district out of 19 comes in low productivity category. All the districts in Himachal Pradesh have above average productivity with 50 per cent districts in very high productivity category. In contrast to this, majority of the districts in Jammu & Kashmir and Uttarakhand have average or low productivity. The majority of districts in Jharkhand, for which estimates could be prepared, were classified in low or average category. In Orissa, one-third districts each come in low, average and high productivity categories.

Like Arunachal Pradesh, distribution of districts in Meghalaya, Mizoram and Nagaland has concentrated in low and very low categories.

In southern India, the majority of districts in Karnataka have very low or low productivity. Compared to this, 50 per cent districts in Tamil Nadu and all the districts in Kerala have either high or very high productivity. Like Kerala, all districts in Punjab have depicted high or very high productivity and more than two-third districts in each of these states come in very high productivity category.

Highest percentage of districts in very high productivity category has been found in West Bengal, where, 14 out of 18, i.e. about 77 per cent, districts harvest more than Rs 57,000 /ha NSA during 2003-05. Uttar Pradesh has presented a mixed picture with some concentration towards above average productivity.

District-wise productivity in each of the states in the country has been presented in Figures 4 to 27 and is briefly discussed below.

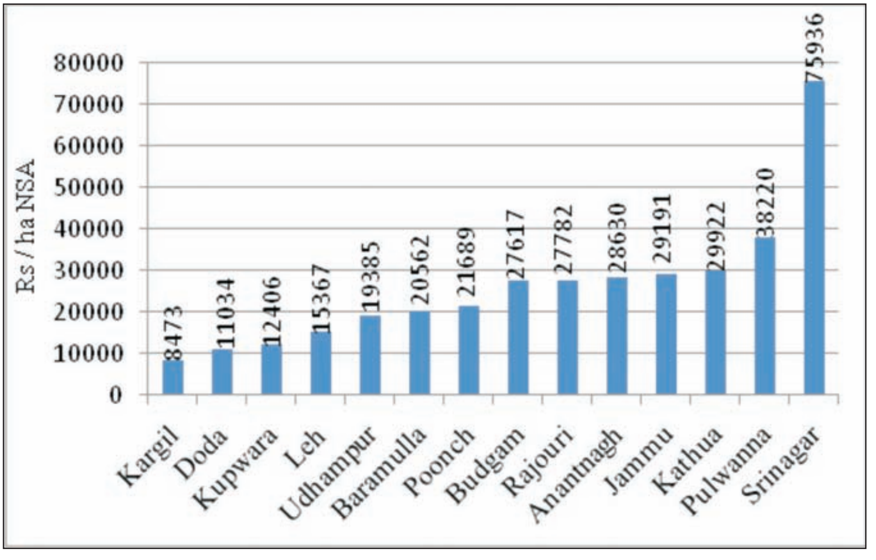
Table 18: Distribution of districts in different states according to their productivity

State	Categories of productivity (Rs / ha NSA)					
	Very low <18199	Low 18199 - 27955	Average 27955 - 37712	High 37712 - 57225	Very High >57225	Overall
Andhra Pradesh	2	5	9	4	2	22
Arunachal Pradesh	7	3	2	0	0	12
Assam	0	16	6	1	0	23
Bihar	2	18	10	7	0	37
Chhattisgarh	13	3	0	0	0	16
Gujarat	5	7	7	5	1	25
Haryana	0	1	4	9	5	19
Himachal Pradesh	0	0	2	4	6	12
Jammu & Kashmir	4	5	3	1	1	14
Jharkhand	2	8	8	3	1	22
Karnataka	9	8	2	5	2	26
Kerala	0	0	0	4	10	14
Madhya Pradesh	26	20	1	1	0	48
Maharashtra	16	7	6	2	0	31
Meghalaya	1	3	1	1	0	6
Mizoram	1	5	0	0	0	6
Nagaland	5	3	0	0	0	8
Orissa	0	10	10	10	0	30
Punjab	0	0	0	6	11	17
Rajasthan	19	11	2	0	0	32
Tamil Nadu	1	5	6	15	2	29
Uttar Pradesh	5	21	18	19	7	70
Uttarakhand	1	2	4	5	1	13
West Bengal	0	0	1	3	14	18
All-India	120	161	102	105	63	551

Jammu & Kashmir

Except in district Srinagar, productivity in all other districts in this state is either low or medium. Per hectare productivity in Srinagar is close to Rs 76,000/ha, which is almost double the productivity in the district which ranked second. Lowest productivity is reported for Kargil district where one hectare of land generated output worth Rs 8,473 only.

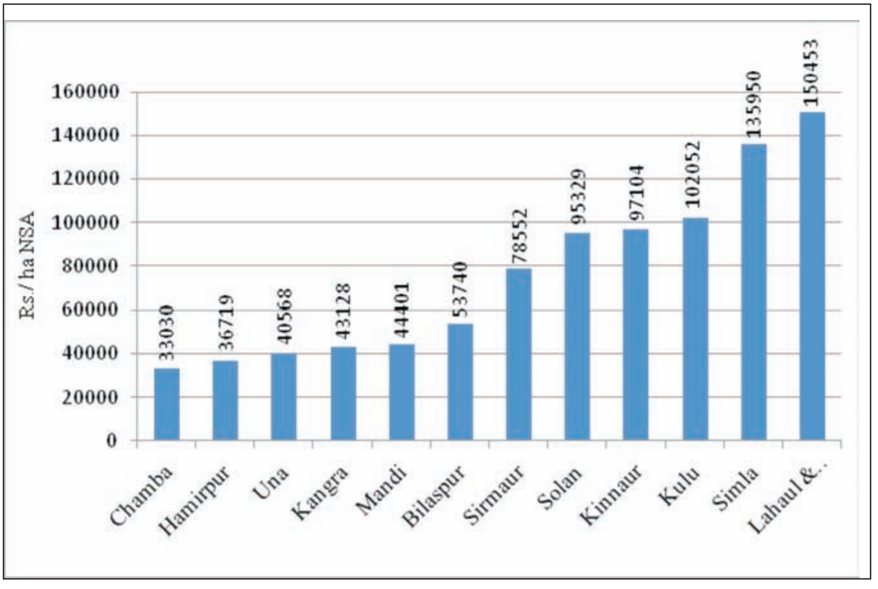
Figure 4: District-wise agricultural productivity in Jammu & Kashmir



Himachal Pradesh

Productivity level in various districts of Himachal Pradesh has ranged between Rs 33,000/ha to Rs 1,50,000/ha. Three districts in this mountainous state recording per hectare productivity of more than Rs 1,00,000 are: Kulu, Shimla and Lahaul & Spiti. Productivity level in Sirmaur, Solan and Kinnaur, varied between Rs 78,000 and 97,000. These are the districts located in mid to high altitude and are known for diversification towards fruit and off-season vegetables which fetch higher prices. Productivity in the remaining six districts of the states is below Rs 54,000/ha. Districts having large area in low hills like Una, Hamirpur and Chamba have shown low productivity.

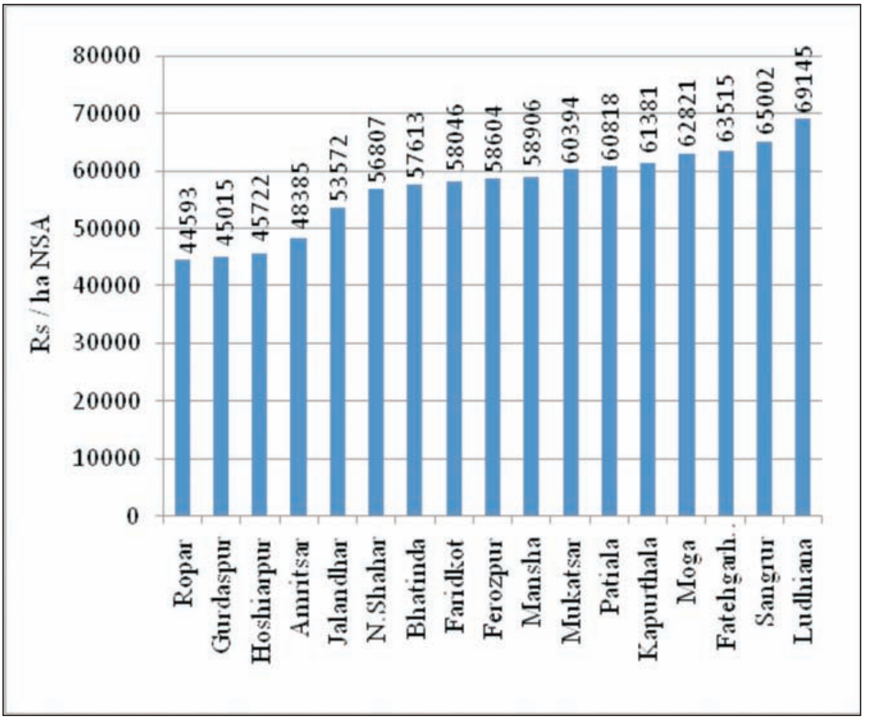
Figure 5: District-wise agricultural productivity in Himachal Pradesh



Punjab

Punjab is agriculturally most progressive state of India. The green revolution technology has seen its highest adoption in this state. The difference between highest and lowest productivity districts has found less than 60 per cent. Three districts which are located in sub-mountain zone and the district Amritsar have shown productivity of less than Rs 50,000. District Ropar (Rupnagar) comes at the bottom with productivity level of Rs. 44,600/ha and Ludhiana comes at the top with productivity exceeding Rs 69,000/ha.

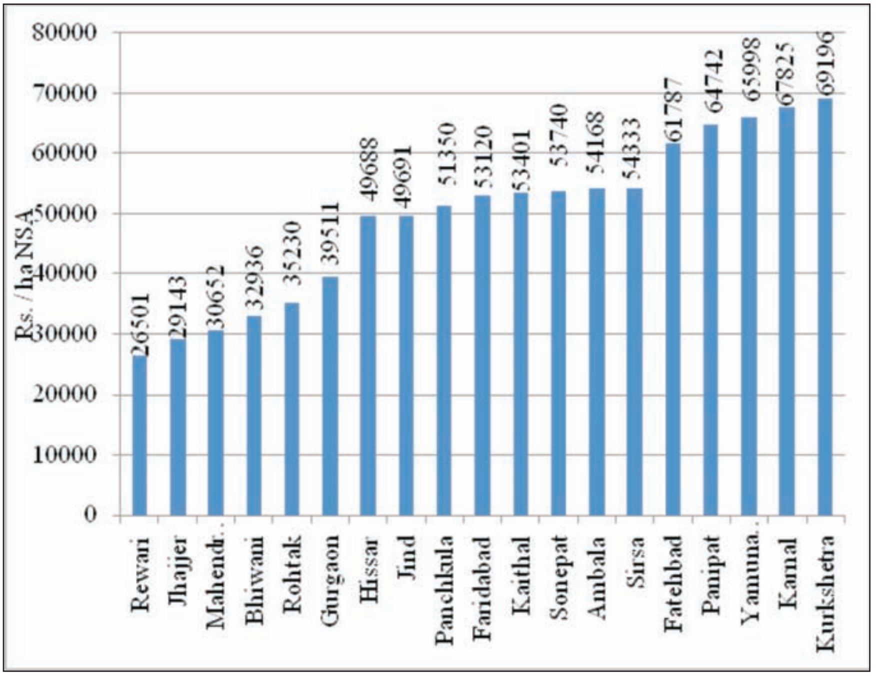
Figure 6: District-wise agricultural productivity in Punjab



Haryana

The states of Haryana and Punjab are located in fertile plains of north-west India and have assured irrigation resources. District-wise agriculture productivity in Haryana ranges from Rs 26,500 to Rs 69,200. Kurkshetra comes at the top and Rewari at the bottom in agricultural producitivy. The districts of Haryana can be clearly divided into 3 categories of productivity. Rewari, Jhajjer, Mahendra Garh, Bhiwani, Rohtak and Gurgaon come under relatively low productivity districts whereas Fatehbad, Panipat, Yamuna Nagar, Karnal and Kurkshetra are high productivity districts. Hissar, Jind, Panchkula, Fridabad, Kaithal, Sonepat, Ambala and Sirsa come in the middle category of agricultural peoducity.

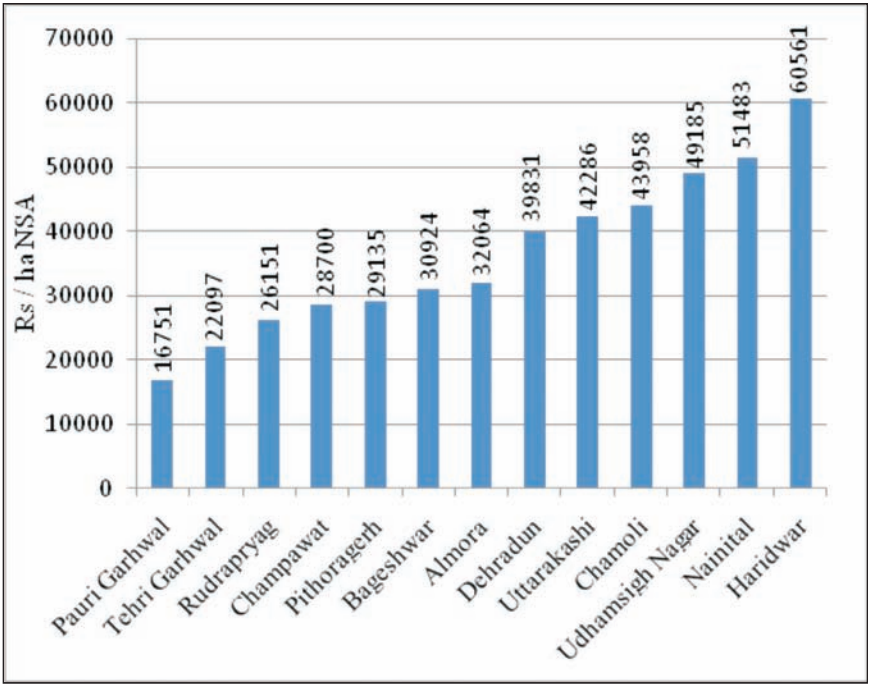
Figure 7: District-wise agricultural productivity in Haryana



Uttarakhand

Haridwar has been found to be the most productive district of Uttarakhand with per hectare crop output of above Rs 60,000 and Pauri Garhwal comes at the bottom with productivity less than Rs. 17,500/ha. Udhamsingh Nagar and Nainital are among high productivity districts along with Haridwar. Productivity level in Tehri Garhwal is below Rs. 22,100/ha and it ranks second from the bottom. Though Uttarakhand has climate and agro-ecological conditions similar to state of Himachal Pradesh, it lags far behind in agricultural productivity compared to Himachal Pradesh.

Figure 8: District-wise agricultural productivity in Uttarakhand



Uttar Pradesh

Uttar Pradesh is a very big state and has largest number of districts than in any state of the country. District-wise productivity for seventy districts in the state has been shown in Figure 9. Sonebhadra has come at the bottom with productivity of Rs 14,600/ha, while Meerut has topped with productivity exceeding Rs 81,000/ha. Besides Sonebhadra, per hectare productivity has been observed below Rs 16,500 in Chitrakut, Mahoba, Banda and Hamirpur. On the other hand, productivity has been found above Rs 77,000 in Muzaffarnagar and Baghpat districts besides district Meerut. In general, productivity declines as one move from western part of the state towards the eastern part. The whole state may be is divided into four different regions as under:

List of districts in different regions of Uttar Pradesh

Region	Districts
Western Region	Agra, Mainpuri, Firozabad, Aligarh, Bareilly, Badaun, Bulandshahr, Etah, Etawah, Farrukhabad, Mathura, Meerut, Ghaziabad, Muradabad, Pilibhit, Rampur, Muzaffarnagar, Saharanpur, Bijanor, Shahjahanpur, Bagpath, Gautam Buddha Nagar, Hathras, J.B. Phule Nagar, Kannauj, Auraiya.
Central Region	Barabanki, Fatehpur, Hardoi, Kanpur, Khiri, Lucknow, Rai Bareli, Sitapur, Unnao
Eastern Region	Allahabad, Kaushambi, Azamgarh, Maunath Bhanjan, Ballia, Bahraich, Basti, Siddharthnagar, Deoria, Faizabad, Gazipur, Gonda, Gorakhpur, Maharajganj, Jaunpur, Mirzapur, Sonbhadra, Pratapgarh, Sultanpur, Varanasi, Bhadoi, Balarampur, Shravasti, Chandauli, Sant Ravi Das Nagar, Kushingar, Sant Kabir Nagar, Ambedkar Nagar
Bundelkhand Region	Jhansi, Jalaun, Hamirpur, Mohaba, Banda, Chitrakut, Lalitpur

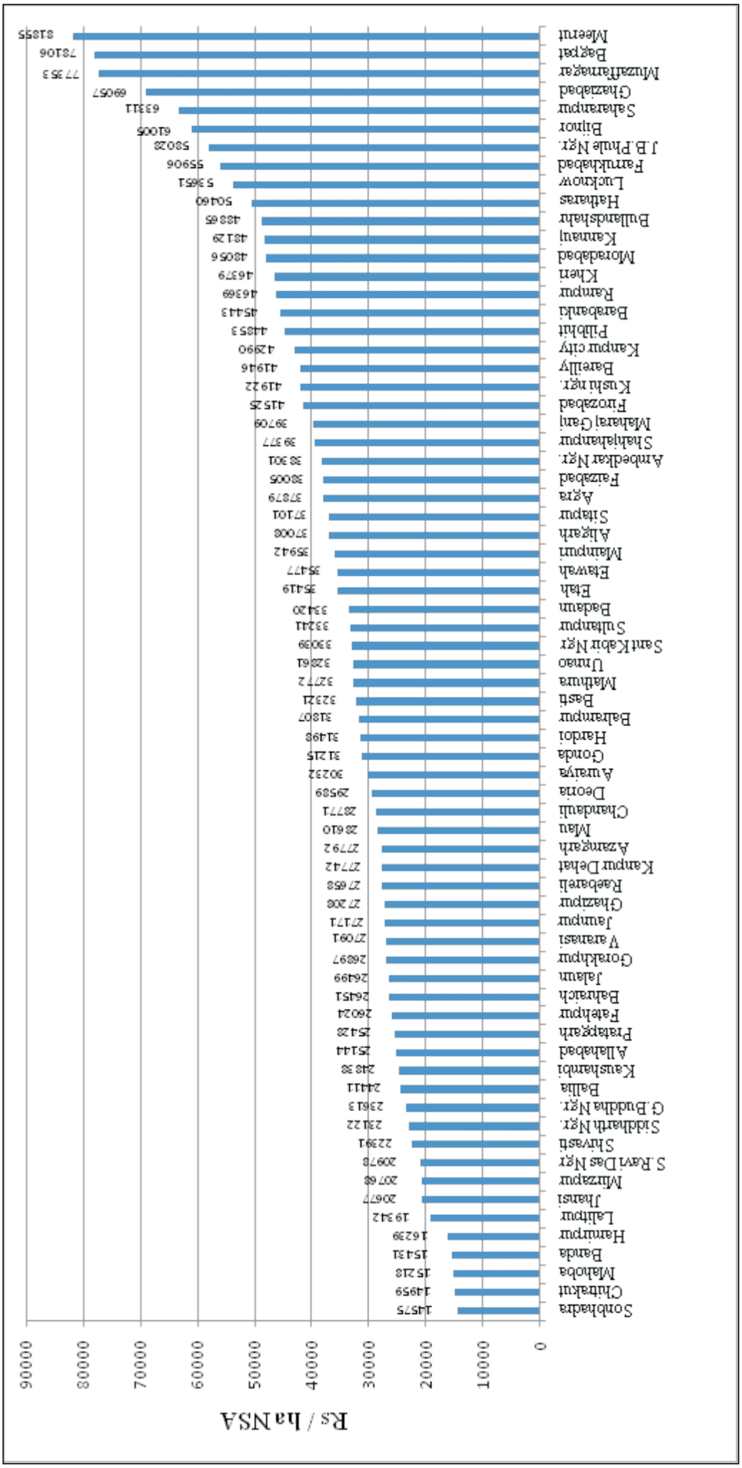
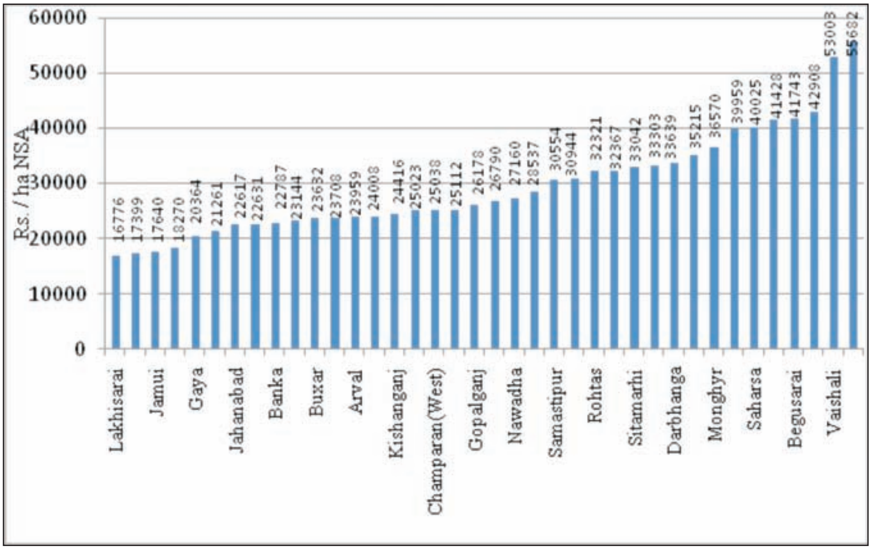


Figure 9: District-wise agricultural productivity in Uttar Pradesh

Bihar

The agricultural productivity level in various districts in Bihar ranges from Rs 16,776/ha to Rs 55,682/ha. The lowest productivity has been recorded in Lakhisarai which harvested crop output worth Rs 16,776/ha during the period 2003-04 and 2004-05. Vaishali has figured at the top with productivity level close to Rs. 56,000/ha followed by Sivhar with productivity level close to Rs. 53,000/ha Maximum number of districts fall in the productivity range of Rs 20,000-Rs 30,000 /ha . The districts of Saharsa, Muzaffarpur, Begusarai, Madhepura and Vaishali have obtained productivity level above Rs 40,000 /ha NSA. The districts having productivity level higher than Rs 30, 000/ha are mainly situated in the rich fertile plains of rivers Ganga, Kosi and Gandak. So, these districts have characteristtic natural advantage over some south Bihar districts like Lakhisarai, Jamui, Gaya, etc. which have shown low productivity.

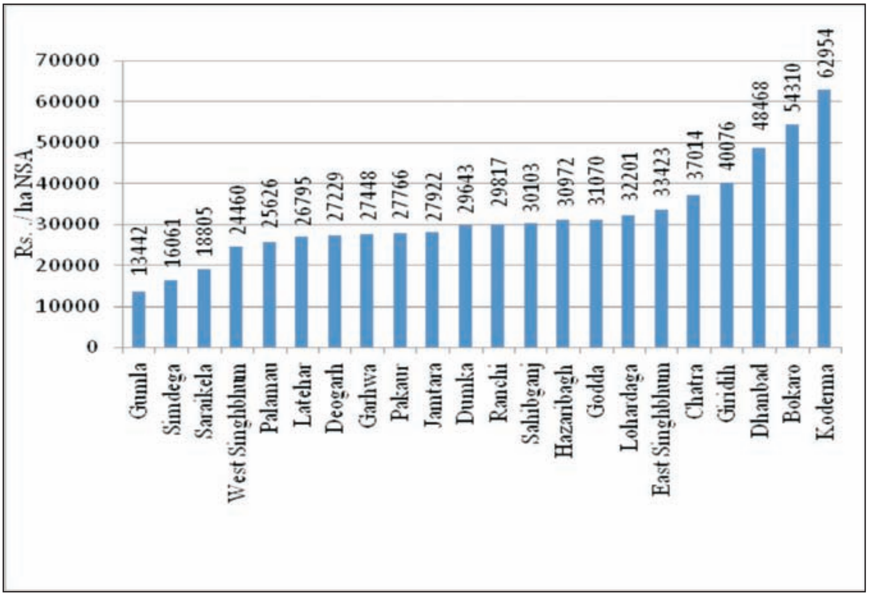
Figure 10: District-wise agricultural productivity in Bihar



Jharkhand

The per hectare productivity across various districts in Jharkhand has been in the range of Rs 13,000 to Rs 63,000, represented by Gumla at the bottom and Koderma at the top. A big difference has been observed in the productivity among four top districts, namely Giridih, Dhanbad, Bokaro and Koderma. Three districts in this state, namely Gumla, Simdega and Saraikala, have productivity below Rs 19,000/ha. Sixteen districts in the state have shown a productivity range of Rs 24,000 to Rs 40,000 / ha.

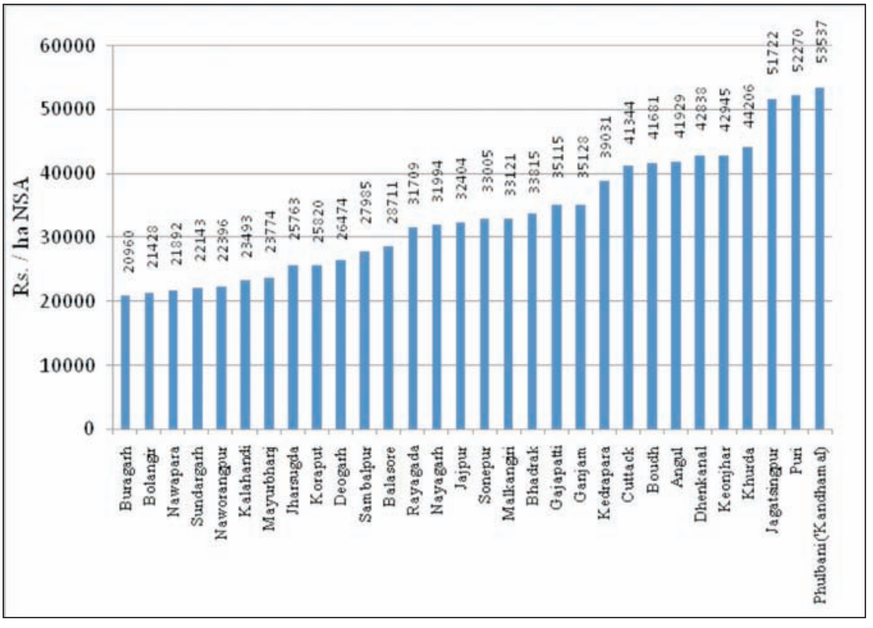
Figure 11: District-wise agricultural productivity in Jharkhand



Orissa

The productivity level across various districts in this state has not shown large variations. The ratio of productivity in having lowest and highest productivity districts has been found as 1: 2.5. Buragarh district is at the bottom with productivity close to Rs 21,000/ha and Phulbani is at the top with productivity level of Rs 53,500/ha. Other districts with productivity more than Rs 50,000/ha are Jagatsinghpur and Puri. Besides Buragarh, producitivity is below Rs 25,000/ha in districts of Bolangir, Naworangpur, Nawapara, Sundergarh, Kalahandi and Mayurbhanj.

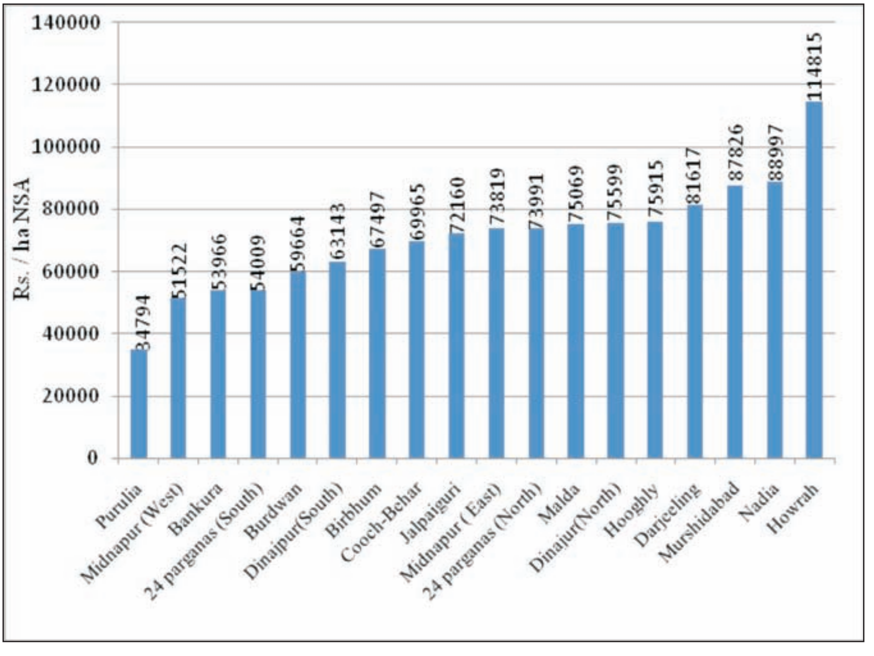
Figure 12: District-wise agricultural productivity in Orissa



West Bengal

West Bengal being situated in the fertile plains of the river Ganga, is agriculturally one of the most developed states of India. Out of its 18 districts for which productivity has been estimated, seven districts have productivity higher than Rs 76,000/ha. Some of the districts like Howrah, Nadia, Murshidabad, and Darjeeling are among the top productivity districts in the country. Lowest productivity has been recorded in Purulia where one hectare of net sown area could provide crop output worth Rs 35,000 only. The next district from the bottom,viz. Midnapur West has productivity of more than Rs 50,000/ha . In other words, except Purulia all districts in West Bengal have productivity above Rs 51,000/ha. Howrah district has been found to have the highest productivity in the country among all the districts in the plains.

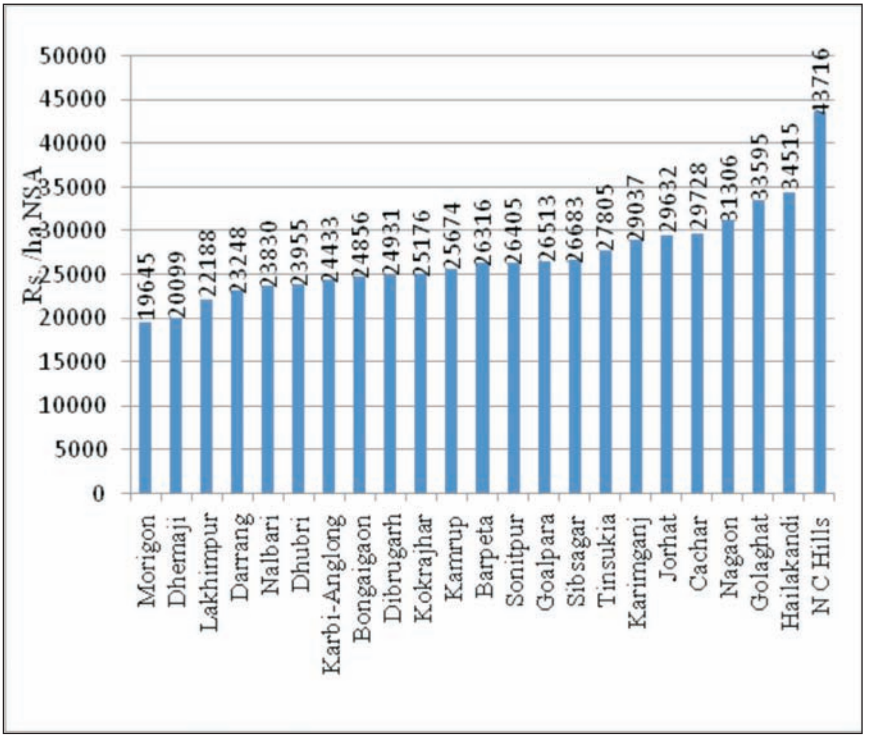
Figure13: District-wise agricultural productivity in West Bengal



Assam

The productivity level in different districts of Assam has not shown large variations. The value of crop output per hectare has been found close to Rs 20,000 in the districts of Morigon and Dhemaji. North Cachar Hills has come at the top with productivity of Rs 43,700/ha. Hailakandi ranks second, though its productivity is much lower than of North Cachar Hills district.

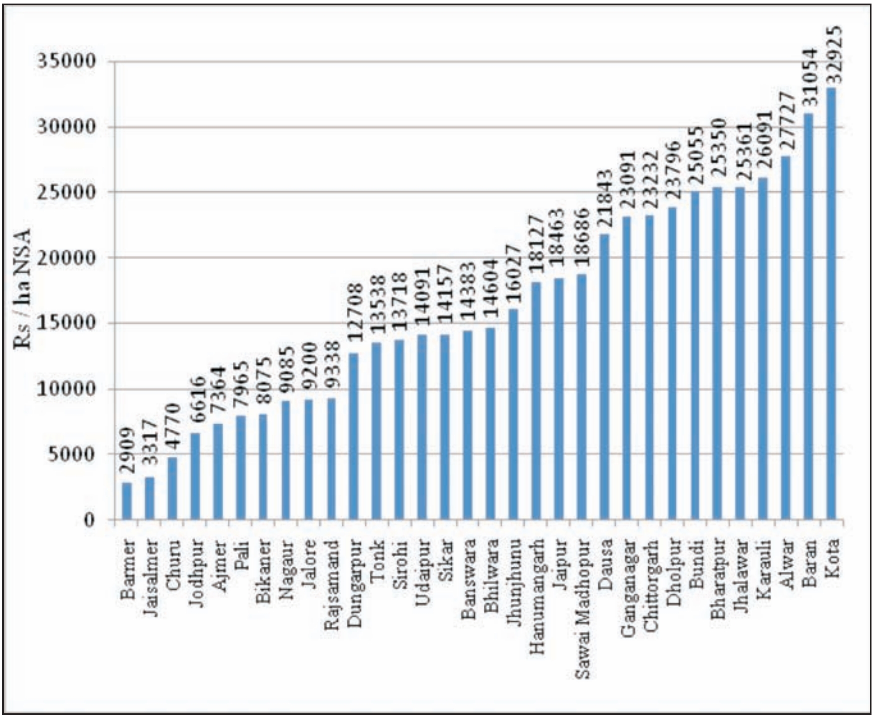
Figure 14: District-wise agricultural productivity in Assam



Rajasthan

Rajasthan has shown extreme variations in productivity with the ratio of 1: 11 between lowest and highest productivity districts. Districts like Barmer, Jaisalmar and Churu located in the Thar Desert are among the lowest productivity districts of the country. Extreme climate and soil type are the main factors for the low productivity in these districts. One hectare of land has been found to generate crop output of value less than Rs 5,000. Productivity is more than Rs 31,000/ha in the districts of Baran and Kota.

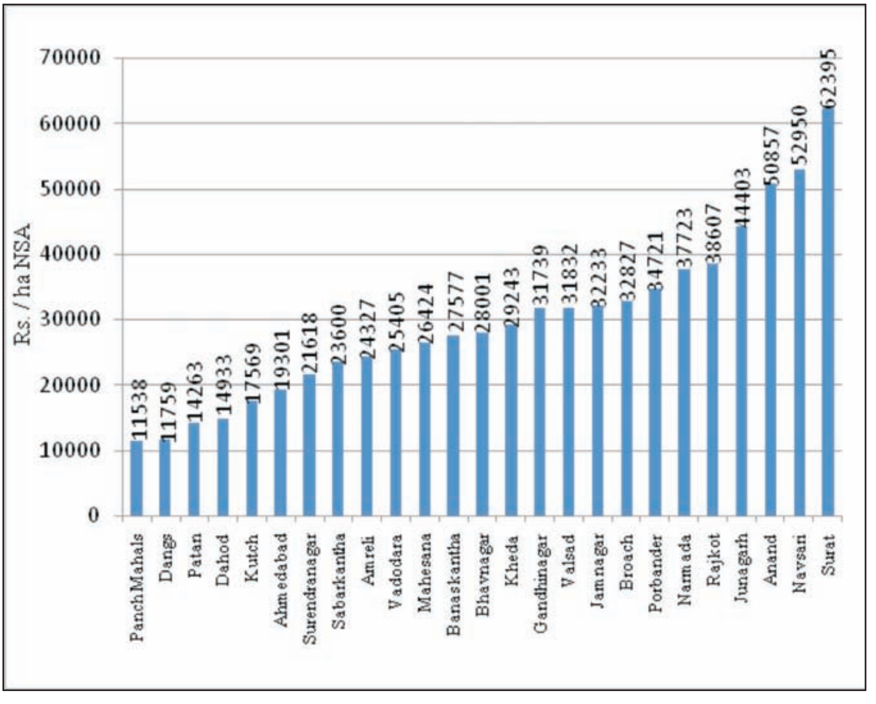
Figure 15: District-wise agricultural productivity in Rajasthan



Gujarat

In Gujarat, the productivity level ranges from Rs 11,500/ha to 62,400/ ha of NSA. The Surat district comes at the top and Panch Mahal district comes at the bottom in terms of productivity level. Most of the districts fall in the productivity range of Rs 10,000-Rs 20,000 / ha. Besides Surat, productivity level has been found more than Rs 50,000 / ha in Anand and Navasari districts. Junagarh is at the fourth place from the top with productivity level of Rs 44, 000/ha.

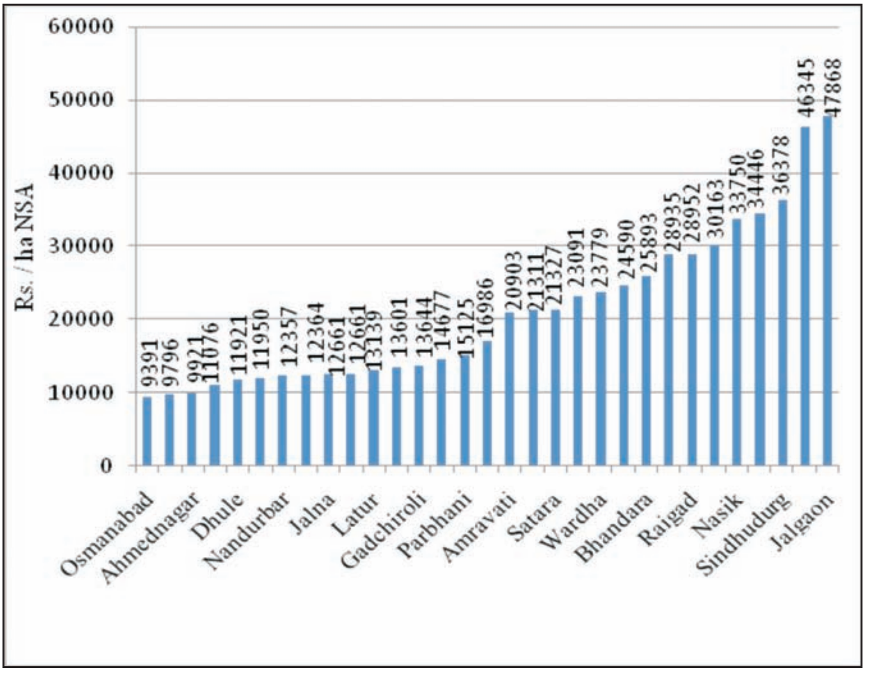
Figure 16: District-wise agricultural productivity in Gujarat



Maharashtra

In Maharashtra, Jalgaon has been found to be the most productive district in the state with crop output of Rs 47,800/ha. It is followed by districts of Ratnagiri and Sindhudurg with productivity levels of Rs 46,345/ ha and Rs 36,378 / ha of net sown area. The majority of the districts in Maharashtra have shown productivity between Rs 9,000/ ha and Rs17,000/ha. Osmanabad, Beed, and Nandurbar districts come at the bottom with productivity level below Rs 10,000 / ha.

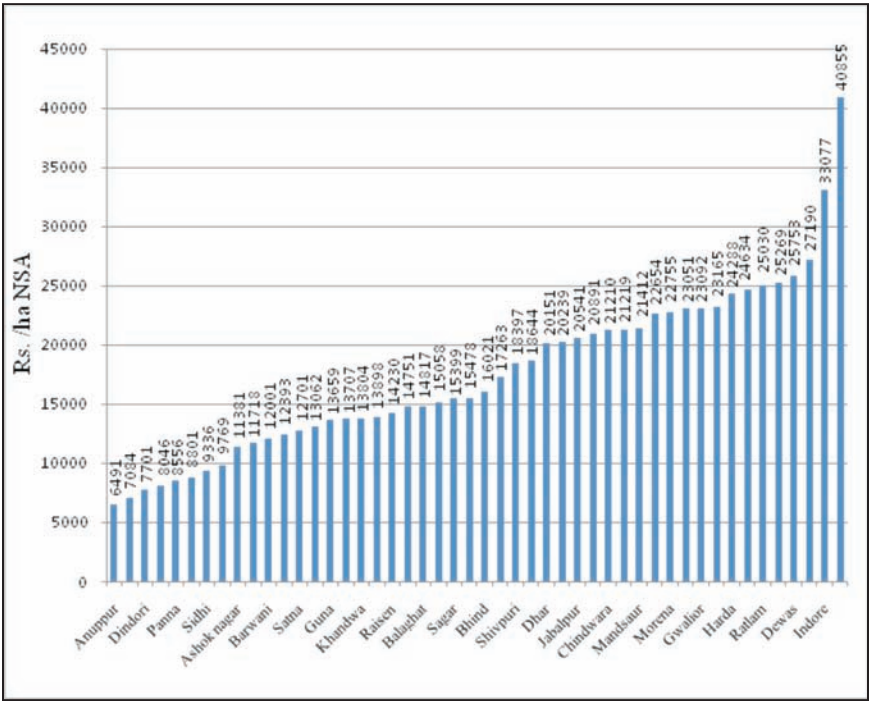
Figure 17: District-wise agricultural productivity in Maharashtra



Madhya Pradesh

The average productivity level in Madhya Pradesh is low. Except Indore and Burhanpur, all other districts have productivity below Rs 28,000/ha. Burhanpur is different from all other districts with recorded productivity of Rs 40,800 /ha followed by Indore which has productivity of Rs 33,077/ha . The majority of the districts come in productivity range of Rs 10,000-Rs 20,000 /ha of NSA. The lowest productivity level has been recorded in Anuppur (Rs 6,491/ha) and next to it are Umaria, Dindori, Shahdol districts. The productivity level of 8 districts in the state is below Rs 10,000 /ha of NSA.

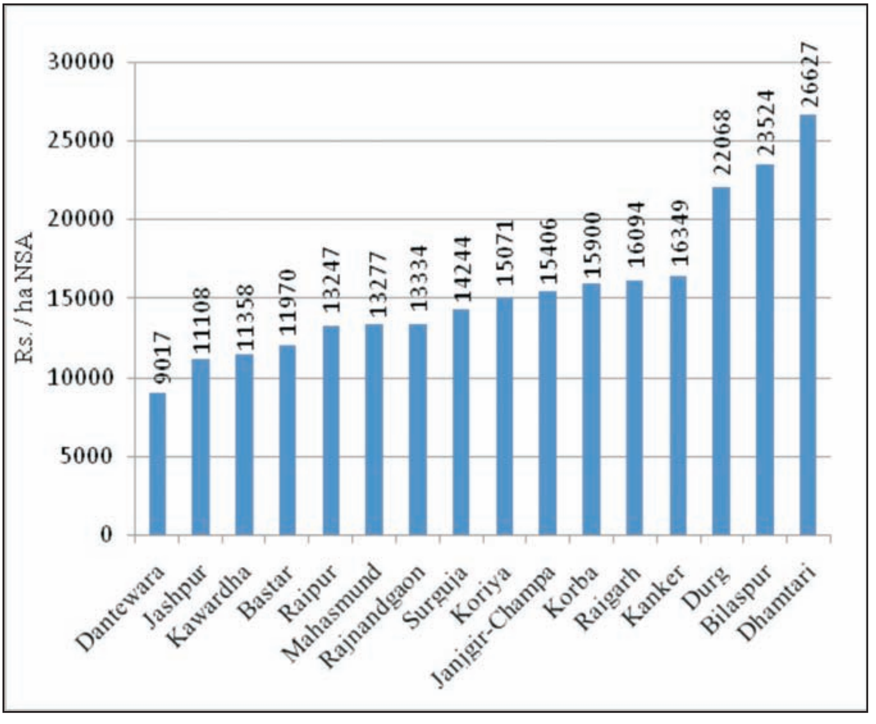
Figure 18: District-wise agricultural productivity in Madhya Pradesh



Chhattisgarh

All districts in this state have shown low level of agricultural productivity. Highest productivity of Rs 26,627/ha only has been seen in district Dhamtari. Relatively better placed districts like Bilaspur and Durg have shown productivity level between Rs 22,000 and Rs 24,000. All the remaining districts have productivity below Rs 16,500/ha. The level of productivity is below Rs 10, 000/ha in Dantewara district which is in the plateau region.

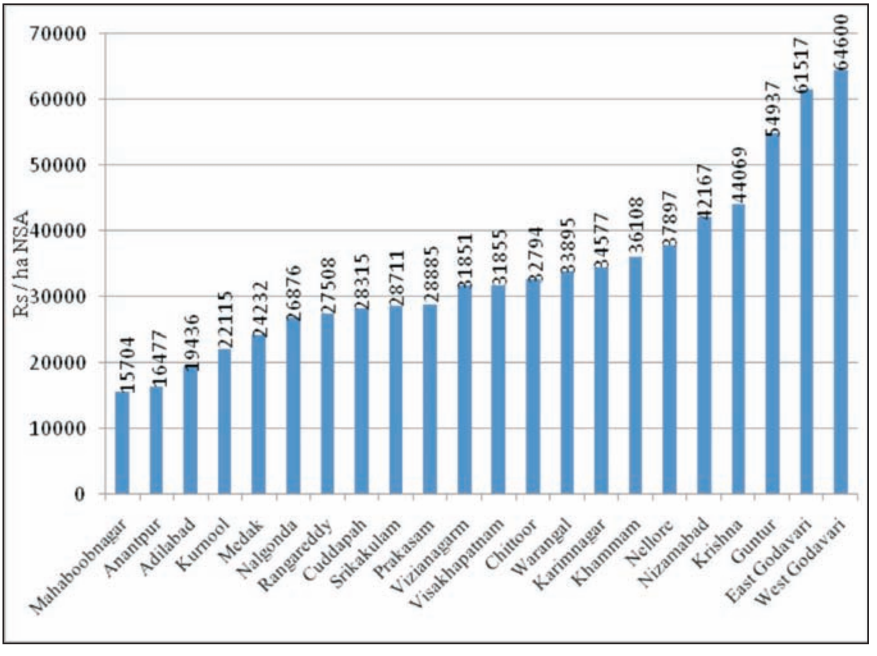
Fig. 19: District-wise agricultural productivity in Chhattisgarh



Andhra Pradesh

Agricultural productivity in various districts of Andhra Pradesh ranges from Rs 15,000/ha to Rs 65,000/ha. District Mehboobnagar has come at the bottom with productivity of Rs 15,715 /ha. West Godavari has topped where one hectare of net sown area could produce crop output worth Rs 64,600. The maximum numbers of districts fall in the productivity range of Rs 20,000 – Rs 40,000/ha of NSA. Agricultural productivity in three districts- Guntur, West Godavari and East Godavari - is much higher than the other districts which is more than Rs 54,000/ha, whereas the productivity level in three districts- Mahaboobnagar, Anantapur and Adilabad - falls below Rs 20,000/ ha The highest productive districts are situated in the fertile land of Andhra plains which have natural superiority over the plateau region districts (three lowest productive districts) of Andhra Pradesh in terms of productivity level.

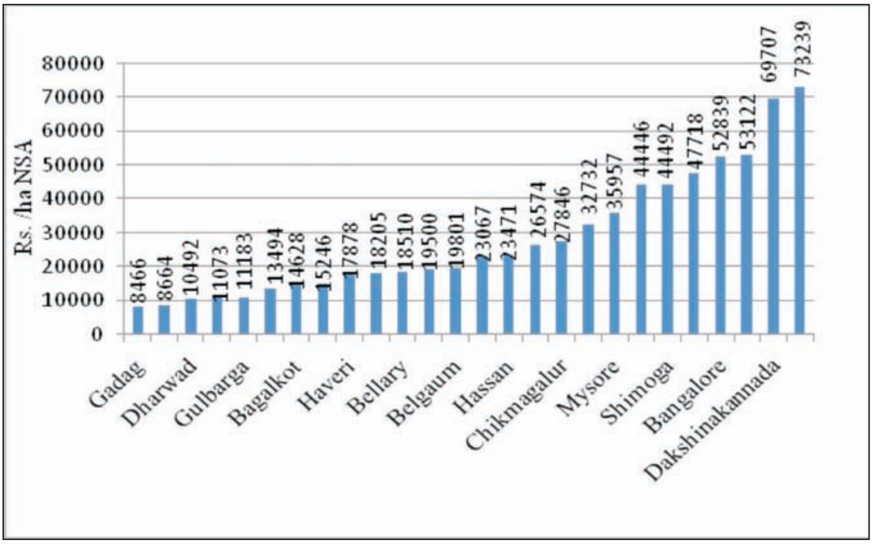
Figure 20: District-wise agricultural productivity in Andhra Pradesh



Karnataka

The average agricultural productivity level in Karnataka has shown a much wider range than Andhra Pradesh. Coorg district has come at the top with productivity of Rs 73,239 /ha of NSA, followed by Dakshina Kanada (Rs 69,700/ha). Bangalore and Kolar have produced output worth about Rs 53,000/ha during 2003-04 and 2004-05. Maximum number of districts come in the category of Rs 10,000- Rs 30,000/ha. The per hectare productivity has been below Rs 10,000 in Gadag and Bijapur districts.

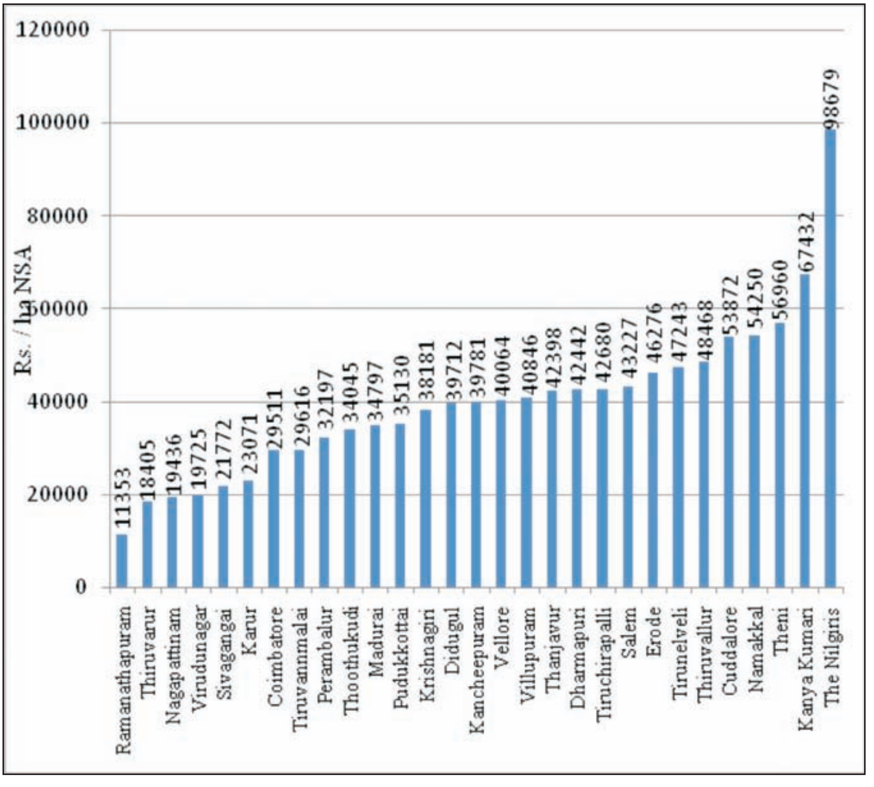
Figure 21: District-wise agricultural productivity in Karnataka



Tamil Nadu

The range of agricultural productivity in Tamil Nadu is found to be Rs 11,300 - Rs 98,700/ha of NSA. The Nilgiri district has shown exceptionally high productivity estimated at Rs 98,700/ha. Kanya Kumari comes second with per hectare productivity about two- third of that in the Nilgiris. The district Ramanathpuram has come at the bottom and quite below the district which has ranked second from the bottom. In most of the districts the level of productivity varies from Rs 32,000/ha to Rs 47,000/ha.

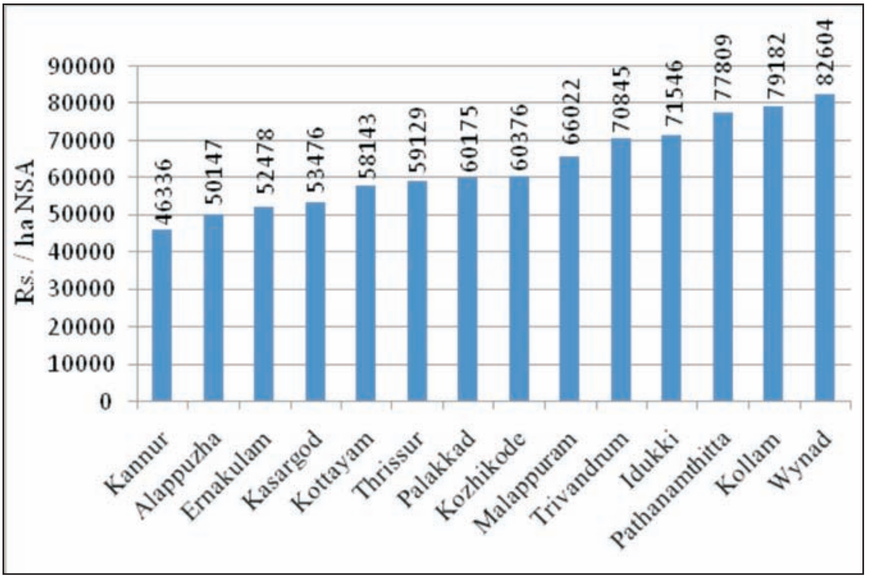
Figure 22: District-wise agricultural productivity in Tamil Nadu



Kerala

Kerala is among the high productivity states of India mainly due to high share of plantation crops in the area under cultivation. Every district has the productivity level of more than Rs 46,000 /ha. The lowest productivity has been recorded in Kannur district which is still higher than the highest productivity district in some of the states. Except Kannur district, the productivity level has been observed higher than Rs 50,000/ha in all the districts. Wynad has come at the top with productivity exceeding Rs 82,600/ha. Likewise, productivity has been observed more than Rs 70,000/ha in Trivandrum, Iduki, Pathanamthitta and Kollam districts of the state.

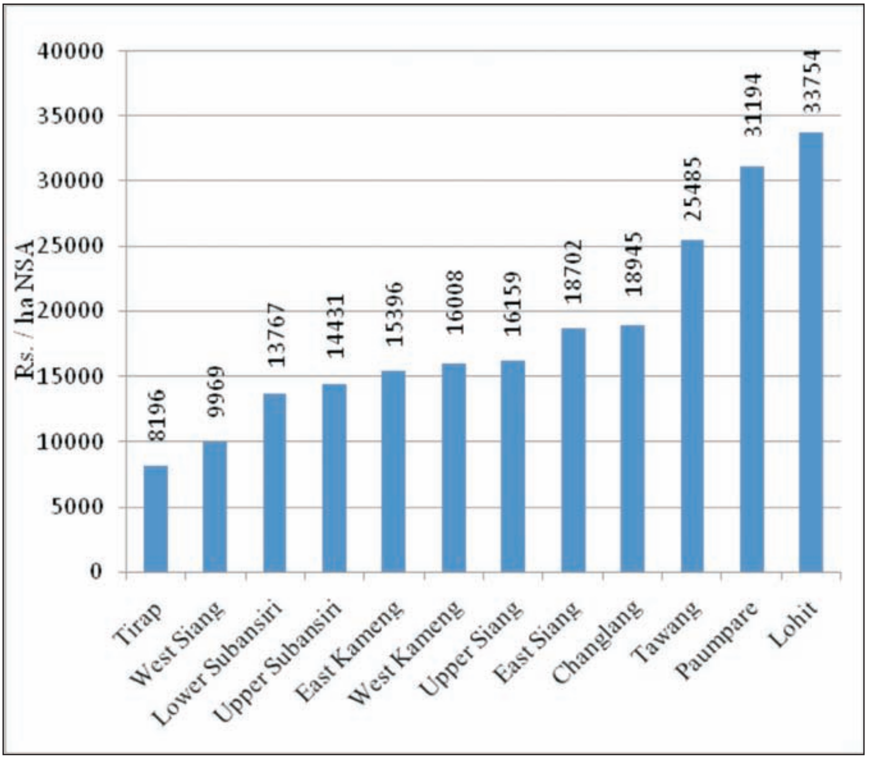
Figure 23: District-wise agricultural productivity in Kerala



Arunachal Pradesh

Out of 12 districts in Arunachal Pradesh, per hectare productivity has been observed higher than Rs 29,000 in two districts and lower than Rs 19,000 in 9 districts. Tirap and West Siang have come at the bottom with productivity less than Rs 10,000/ha. On the other hand, Paumpere and Lohit have harvested crop output valued at more than Rs 31,000 from one hectare area.

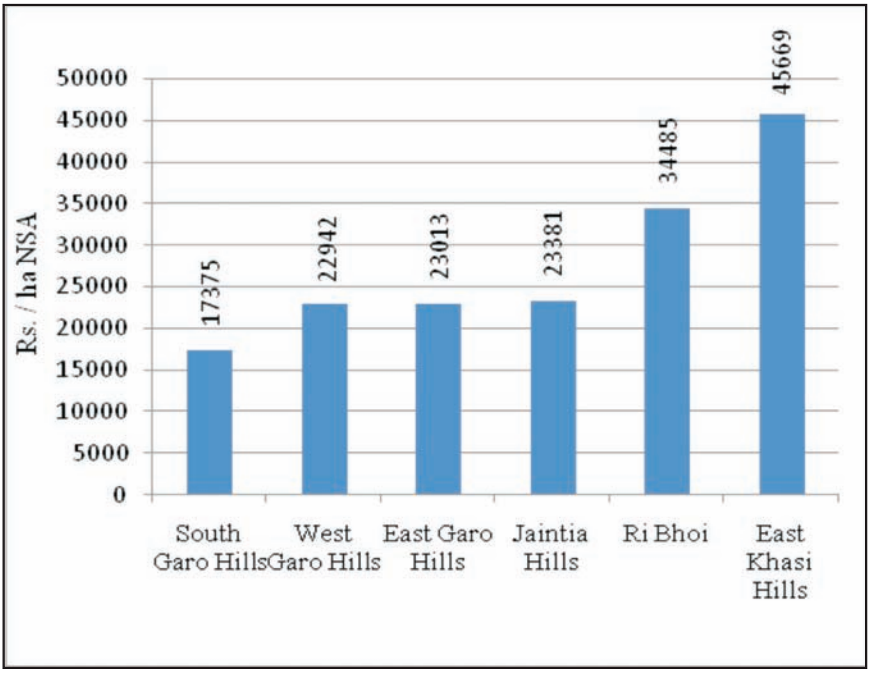
Figure 24: District-wise agricultural productivity in Arunachal Pradesh



Meghalaya

The per hecatre productivity in the six districts that comprise Meghalaya varies between Rs 17,000 and Rs 46,000. The highest productivity has been obtained in district East Hasi Hill, followed by Ri Bhoi district. South Garo Hills has come at the bottom of all districts in agricultural productivity.

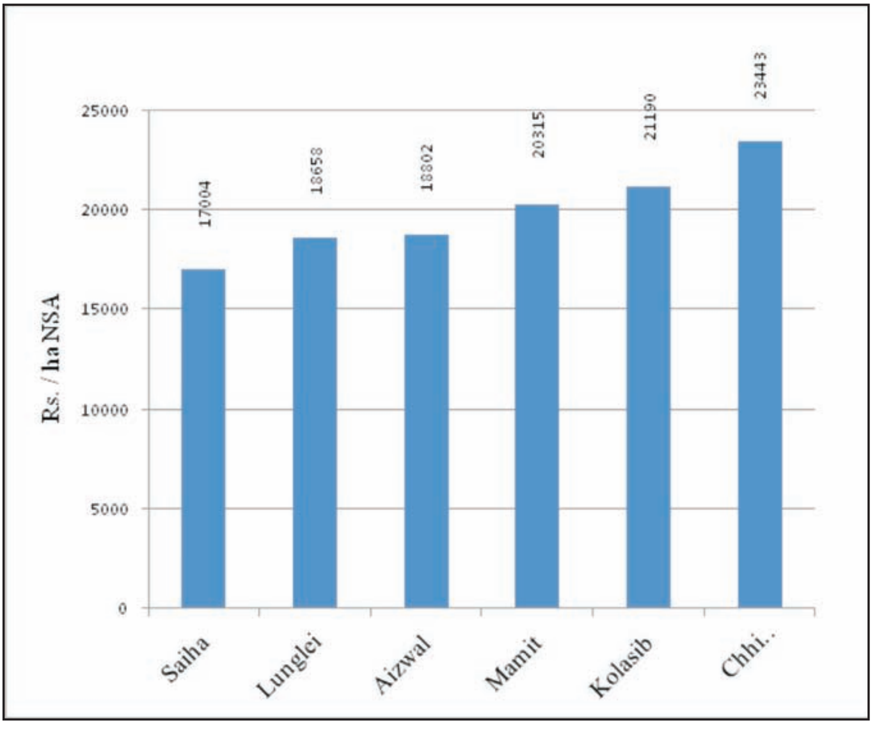
Figure 25 : District-wise agricultural productivity in Meghalaya



Mizoram

The productivity level across districts has shown minimum variation in Mizoram among all the North- East states. Per hectare productivity in the top ranked district was less than 50 per cent higher than the district at the bottom. Saiha turned out to have lowest productivity valued at Rs 17, 000/ha. Chimtuipui has come at the top with productivity level of Rs 23,443 per/ ha of NSA.

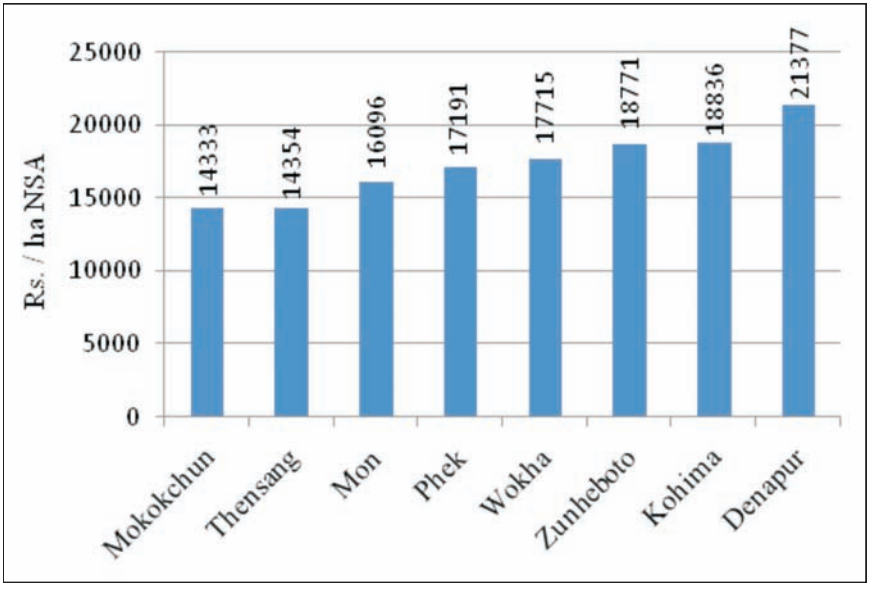
Figure 26: District-wise agricultural productivity in Mizoram



Nagaland

Like the state of Mizoram, per hectare productivity in Nagaland has also shown only a small variation. Denapur has comes at the top with productivity level of Rs. 21,377 ha of NSA, and lowest productivity has been recorded in Mokokchun where all crops taken together have been valued at Rs 14,333/ ha of NSA.

Figure 27: District-wise agricultural productivity in Nagaland



7

Conclusions and Policy Implications

The role of technology, institutions and policies in increasing agricultural and food production in the country is well known. However, adequate, clear and convincing evidence on impact of new crop technologies and policies followed during different periods since 1951 in reducing variations in production and resulting risk has been lacking. The issue of instability had attracted considerable attention of researchers in the early phase of adoption of green revolution technology and most of them have concluded that adoption of new technology had increased instability in foodgrains and agricultural production in India. This conclusion was based on the data for the period when improved technology had reached only a small area. This study has shown that when a longer period is taken into consideration, which witnessed the spread of improved technology to a large area, the inference on increase in agricultural instability due to adoption of new technology gets totally negated at the country level.

Yield variability in foodgrain as well as in non-foodgrain crops has been observed much lower in the first phase of green revolution, extending up to 1988 as compared to pre-green revolution period. Deviation in yield, away from the trend, has witnessed further decline during 1989-2007. Besides a larger spread of high -yielding varieties, expansion of irrigation, development of crop varieties resistant to insects and pests, and evolution of technologies to mitigate the effect of weather on yield have appeared as the other major factors in reducing yield variability in agriculture.

The productivity of crop sector has shown vast variations across districts both for the country as a whole and within the states. This clearly calls for a regionally differentiated strategy for future growth and development of the agriculture sector in the country. Cross classification of districts according to their productivity levels and other characteristics presented in this policy paper would help in understanding the link between agricultural productivity and other factors. The analysis has highlighted important features of those districts that have been stuck in low productivity. These include 191 districts where productivity is low and 66 districts where productivity is very low. In general, the districts having very low and low productivity have been characterized by low rainfall and low irrigated area which also results in a lesser amount of fertilizer use.

Area under fruits and vegetables in these districts is also generally low. Moreover, total livestock density and total bovine density have also been found low in such districts.

Production of non-foodgrains has shown an increase in the instability during the past two decades but production of foodgrains and total crop sector has been much more stable in the recent period compared to pre-green revolution phase and the first two decades of green revolution in the country. This indicates that Indian agriculture has developed resilience to absorb various shocks in supply caused by the climatic and other factors. Instability in yield of cereals and pulses has declined over time. However, opposite holds true for oilseeds. Oilseeds production has been found more risky than of cereals and pulses. The pattern in area, yield and production instabilities of food grains differs widely across states. Yield instability has been the major source of instability in foodgrain production in most of the states. Production has been recorded most stable in the state of Punjab, followed by Kerala. The states of Haryana, Uttar Pradesh and West Bengal have brought down instability in foodgrain production sharply. Foodgrains production is subject to high year-to-year fluctuations in the states of Maharashtra, Tamil Nadu, Orissa, Madhya Pradesh, Rajasthan and Gujarat. Foodgrain area under irrigation in all these states, except Tamil Nadu is less than 40 per cent as against national average of 44 per cent.

The disaggregate analysis for the state of Andhra Pradesh has shown that despite progress in irrigation and other infrastructural developments in agriculture, the instability in agricultural production has increased after early-1990s in the major crops. In contrast to this, farm harvest prices of groundnut have shown a decline in instability during 1995-2009, as compared to the period 1981-1995. The study has indicated that in a large state like Andhra Pradesh, the instability status perceived through the state-level data may be vastly different from that experienced at the disaggregate level. In some cases, the state level estimates may be completely misleading as seen in the case of instability in cotton production, which has shown an increase at the state level but a decrease in two-third districts. The effect of technology in stabilizing the yield has been found to vary across districts. Yield variability in cotton has declined in 78 per cent of the districts after 1995, despite increase in rainfall deviations. Among the crops selected for the study, groundnut has been observed to be the most risky crop in respect of production as well as gross returns.

The net effect of fluctuations in production and prices on farm income has depicted that instability in area, production, yield and prices do not negate each other. The instability has been found higher in farm income than area, production and prices in all the cases, and it has not changed over time.

District-level data for the whole country have revealed that poverty, fertilizer-use, irrigation and rainfall cause significant variations in productivity across districts. The highest effect has been of fertilizer-use. One per cent increase in fertilizer-use across districts has resulted in 0.32 per cent increase in agricultural productivity. Area under fruits and vegetables has come next with elasticity coefficient of 0.18. This implies that productivity increases by 0.18 per cent in response to one per cent increase in area under fruits and vegetables. Elasticities of productivity with respect to rainfall and irrigation across districts have been observed as 0.10 and 0.07 respectively. These results indicate the importance of fertilizer-use and need to manage rainfall water to raise productivity, particularly in the low productivity districts.

Another very interesting result from the cross section data of districts is that agricultural productivity is very powerful in reducing rural poverty. One per cent increase in land productivity reduces poverty by as much as 0.65 per cent. The effect of dependence of workers on agriculture has been found reverse. One per cent reduction in labourforce in agriculture results in 0.57 per cent decline in rural poverty. This highlights the need for reducing pressure on land by shifting labourforce from agriculture to non- farm activities for raising rural income and reducing poverty.

Most of the districts that are in very low or low productivity range offers immense opportunities for raising agricultural production in the country. The study has provided a snapshot view of productivity regimes across whole of the country which can be used effectively to delineate various districts for effective and specific interventions.

As the spread of improved technologies has been found to be associated with decline in variability in production, there is a need to pay special attention to production and distribution of seed of improved varieties to bring stability in agricultural production. Expansion of area under irrigation and development of watersheds are the other major factors for reducing variabilities in area, yield and production. There is also a need for large-scale promotion of stabilization measures like crop insurance to face the consequences of production fluctuations.

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Annexure 1

All-India area, production and yield of selected crops in different periods (Triennium Ending)

Crop	Area (million hectare)				Production (million tonnes)				Yield (kg/ha)			
	1953	1966	1988	2007	1953	1966	1988	2007	1953	1966	1988	2007
Foodgrains	98.79	116.88	124.97	121.77	54.00	80.78	144.74	208.08	547	691	1158.2	1708.8
Cereals	79.55	93.28	102.02	98.99	45.33	69.97	132.73	194.51	570	750	1301.0	1964.9
Pulses	19.24	23.59	22.95	22.78	8.67	10.81	12.01	13.57	451	458	523.3	595.8
Oilseeds	11.20	15.11	19.26	27.30	4.97	7.36	11.58	25.54	444	487	601.4	935.6
Paddy	30.20	35.91	40.37	43.09	21.59	35.63	60.42	88.66	715	991	1496	2057
Wheat	9.68	13.16	23.06	27.01	6.71	10.84	45.85	70.56	693	823	1988	2613
Jowar	16.35	18.04	16.02	8.76	6.31	8.82	10.53	7.37	385	489	657	858
Bajra	9.77	11.63	10.21	9.43	2.71	4.05	3.82	7.96	277	348	374	845
Maize	3.36	4.67	5.76	7.60	2.23	4.68	6.65	14.24	657	1003	1152	1876
Gram	7.22	8.75	6.85	7.09	3.75	4.83	4.65	5.68	519	553	673	802
Arhar	2.34	2.55	3.22	3.54	1.75	1.67	2.33	2.53	748	653	725	715
Groundnut	4.74	7.32	6.98	6.39	3.20	5.19	5.62	6.58	678	712	805	1022
R& Mustard	2.19	2.96	4.11	6.98	0.85	1.23	2.91	7.47	390	418	707	1071
Coconut	0.63	0.84	1.27	1.95	38.95	49.34	68.06	138.22	6131	5856	5368	7112

contd…

Crop	Area (million hectare)				Production (million tonnes)				Yield (kg/ha)			
	1953	1966	1988	2007	1953	1966	1988	2007	1953	1966	1988	2007
Cotton	6.27	8.18	6.98	8.87	3.22	5.54	7.34	18.66	87	115	178	357
Sugarcane	1.79	2.56	3.07	4.23	56.56	116.71	184.49	280.40	31568	45636	60113	66171
Potato	0.25	0.44	0.85	1.36	1.79	3.43	12.40	23.77	7192	7719	14518	17491
Tobacco	0.34	0.41	0.37	0.37	0.24	0.34	0.42	0.55	710	824	1151	1490

Source: 1. *Agriculture Statistics at a Glance* (various issues), Ministry of Agriculture, GoI, New Delhi.
2. *Indian Agriculture in Brief* (various issues), Ministry of Agriculture, GoI, New Delhi

Note: Coconut production in hundred million nuts and yield in nuts / hectare; Cotton production in million bales of 170 kg.

Annexure 2

State-wise area, production and yield of foodgrains in different periods in India (Triennium Ending)

State	Area (000 ha)			Production (000 tonne)			Yield (kg / ha)		
	1968	1988	2007	1968	1988	2007	1968	1988	2007
Andhra Pradesh	9284	7700	6901	7217	9812	15525	777	1274	2244
Assam	2268	2630	2520	2152	2839	3453	950	1079	1368
Bihar	9881	9386	8630	8099	10498	11820	820	1118	1363
Gujarat	4964	4410	4087	3324	2400	5969	666	534	1462
Haryana	3672	3785	4287	4108	7359	13623	1109	1949	3176
Himachal Pradesh	816	870	812	964	1082	1411	1183	1242	1737
Jammu & Kashmir	795	874	886	1065	1259	1475	1338	1442	1664
Karnataka	7477	7562	7580	5629	6613	11993	754	872	1582
Kerala	945	683	294	1330	1160	660	1407	1698	2249
Madhya Pradesh	16779	17892	17090	10050	14524	19197	599	811	1124
Maharashtra	13255	13970	12937	6553	9011	11760	494	647	908
Orissa	5672	6912	5380	5189	6049	7125	916	873	1324
Punjab	3799	5411	6323	6832	16858	25387	1797	3118	4015

contd…

State	Area (000 ha)			Production (000 tonne)			Yield (kg / ha)		
	1968	1988	2007	1968	1988	2007	1968	1988	2007
Rajasthan	11787	11572	12400	5865	6510	12604	488	559	1016
Tamil Nadu	5056	4163	3302	7209	7313	6131	1419	1761	1857
Uttar Pradesh	19485	20450	20677	17809	30119	41517	914	1472	2007
West Bengal	6041	6152	6440	7339	9681	15922	1215	1573	2473

Source: 1. *Agriculture Statistics at a Glance* (various issues), Ministry of Agriculture, GoI, New Delhi.
2. *Indian Agriculture in Brief* (various issues), Ministry of Agriculture, GoI, New Delhi

Annexure 3:

Per hectare productivity in various districts of India arranged in ascending order, alongwith other salient characteristics

District	State	Aver-agePro-ductivy/ ha	AveragePro-ductivy/ / worker	FERT_ NSA	NIA (%)	GIA (%)	FVA (%)	Crop inten-siy %	Work-er/ ha	Rain-fall (mm)	Net sown area (ha)	Rural poor (%)
Barmer	Rajasthan	2909	6386	3	7	10	0.0	106	0.46	265.7	1574	13.30
Jaisalmer	Rajasthan	3317	13403	9	12	19	0.0	109	0.25	185.5	472	3.30
Churu	Rajasthan	4770	8379	2	4	4	0.0	118	0.57	354.7	1160	13.60
Anuppur	Madhya Pradesh	6491	NA	1	2	2	0.5	120	NA	910	162	NA
Jodhpur	Rajasthan	6616	12975	17	11	15	1.1	106	0.51	313.7	1287	23.90
Umaria	Madhya Pradesh	7084	4569	21	18	14	0.7	130	1.55	1093	108	76.40
Ajmer	Rajasthan	7364	7510	23	16	16	1.1	115	0.98	601.8	419	7.40
Dindori	Madhya Pradesh	7701	5269	4	1	1	0.1	133	1.46	1481	205	72.00
Pali	Rajasthan	7965	11301	20	14	15	0.3	108	0.70	424.4	579	27.20
Shahdol	Madhya Pradesh	8046	2797	26	9	8	0.8	116	2.88	1335	176	64.40
Bikaner	Rajasthan	8075	28538	9	11	16	0.3	107	0.28	243	1437	35.40
Tirap	Arunachal Pradesh	8196	NA	NA	3	2	NA	133	NA	NA	14	NA
Gadag	Karnataka	8466	10050	41	19	15	6.0	129	0.84	612	380	6.40
Kargil	Jammu & Kashmir	8473	3021	19	100	100	5.6	110	2.80	100	9	NA

contd…

District	State	Productivity/ ha	Productivity/ Worker ha	FERT_ NSA ha	NIA (%)	GIA (%)	FVA (%)	Crop intensity (%)	Worker/ hectare	Rainfall: (mm)	Net sown area (ha)	Rural poor (%)
Panna	Madhya Pradesh	8556	7236	30	33	28	0.9	116	1.18	1186	248	49.60
Bijapur	Karnataka	8664	13280	45	21	20	2.6	116	0.65	578	780	20.00
Mandla	Madhya Pradesh	8801	4852	21	8	6	0.6	129	1.81	1425	218	73.70
Dantewara	Chhattisgarh	9017	7780	3	2	2	0.9	101	1.16	1283.3	290	88.20
Nagaur	Rajasthan	9085	14174	21	21	23	0.8	116	0.64	311.7	1273	31.80
Jalore	Rajasthan	9200	10768	24	30	28	0.3	121	0.85	370	659	13.40
Sidhi	Madhya Pradesh	9336	5368	24	17	13	0.9	136	1.74	1174	358	57.60
Rajsamand	Rajasthan	9338	4028	27	8	9	0.3	108	2.32	567.8	94	24.90
Osmanabad	Maharashtra	9391	8582	30	21	16	0.6	160	1.09	809	481	10.30
Jhabua	Madhya Pradesh	9769	5495	55	16	14	0.6	117	1.78	768	360	56.90
Beed	Maharashtra	9796	9791	64	27	30	1.9	113	1.00	685	762	55.00
Ahmednagar	Maharashtra	9921	8114	93	25	28	3.0	109	1.22	676	1103	10.30
West Siang	Arunachal Pradesh	9969	8687	NA	27	23	NA	120	1.15	NA	24	NA
Dharwad	Karnataka	10492	9408	73	12	9	9.9	152	1.12	772	328	9.70
Doda	Jammu & Kashmir	11034	3348	22	11	10	0.8	127	3.30	NA	66	NA

contd…

District	State	Productivity/ ha	Productivity/ Worker ha	FERT_ NSA ha	NIA (%)	GIA (%)	FVA (%)	Crop intensity (%)	Worker/ hectare	Rainfall: (mm)	Net sown area (ha)	Rural poor (%)
Raichur	Karnataka	11073	12071	161	26	27	1.9	112	0.92	616	581	59.20
Aurangabad	Maharashtra	11076	9935	106	22	24	0.4	116	1.11	786	692	46.50
Jashpur	Chhattisgarh	11108	7942	12	3	3	3.0	106	1.40	1447	250	35.00
Gulbarga	Karnataka	11183	14559	65	14	15	0.9	119	0.77	777	1183	39.40
Ramanathapuram	Tamil Nadu	11353	7134	61	38	38	0.4	100	1.59	821.2	191	36.70
Kawardha	Chhattisgarh	11358	8263	48	20	19	1.3	128	1.37	712.2	185	16.90
Ashok Nagar	Madhya Pradesh	11381	NA	18	30	25	0.2	122	NA	676	306	NA
Panch Mahals	Gujarat	11538	4185	123	16	17	1.8	108	2.76	690.6	276	38.30
Rewa	Madhya Pradesh	11718	6435	58	24	19	1.0	135	1.82	1079	371	43.10
Dangs	Gujarat	11759	8282	3	1	1	4.0	104	1.42	2262.6	56	88.40
Dhule	Maharashtra	11921	9633	108	12	14	1.9	105	1.24	738	435	38.20
Washim	Maharashtra	11950	11530	53	3	4	NA	112	1.04	NA	379	23.80
Bastar	Chhattisgarh	11970	7588	12	2	2	1.4	103	1.58	1358.5	351	80.60
Barwani	Madhya Pradesh	12001	6287	82	32	28	1.5	116	1.91	NA	232	6.30
Nandurbar	Maharashtra	12357	7274	86	20	23	NA	111	1.70	NA	296	49.40

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District	State	Productivity/ ha	Productivity/ Worker ha	FERT_ NSA ha	NIA (%)	GIA (%)	FVA (%)	Crop intensity (%)	Worker/ hectare	Rainfall: (mm)	Net sown area (ha)	Rural poor (%)
Buldhana	Maharashtra	12364	9949	88	6	7	0.8	107	1.24	901	676	31.00
Katni	Madhya Pradesh	12393	8762	73	30	26	1.9	133	1.41	1025	198	48.90
Kupwara	Jammu & Kashmir	12406	4202	88	44	43	21.9	105	2.95	NA	43	13.10
Jalna	Maharashtra	12661	12791	98	16	17	2.3	116	0.99	1472	579	35.80
Akola	Maharashtra	12661	12270	79	3	3	2.4	110	1.03	878	436	23.40
Satna	Madhya Pradesh	12701	9308	70	37	28	1.8	133	1.36	1138	360	19.80
Dungarpur	Rajasthan	12708	3875	59	29	21	0.1	143	3.28	728.9	124	25.20
Seoni	Madhya Pradesh	13062	10105	25	26	21	0.8	128	1.29	1447	366	60.00
Latur	Maharashtra	13139	10843	70	6	6	0.9	134	1.21	891	521	53.90
Raipur	Chhattisgarh	13247	9156	91	48	40	0.5	122	1.45	944.4	549	31.20
Mahasmund	Chhattisgarh	13277	10211	74	24	23	0.7	110	1.30	2226.2	267	21.40
Rajnandgaon	Chhattisgarh	13334	9246	53	18	16	1.6	125	1.44	1108.3	360	58.60
Gumla	Jharkhand	13442	5019	10	NA	NA	3.1	103	2.68	1100	215	68.60
Bidar	Karnataka	13494	14182	37	11	9	1.4	122	0.95	891	368	31.00
Tonk	Rajasthan	13538	17012	49	39	32	0.7	124	0.80	668.3	461	24.80
Yavatmal	Maharashtra	13601	12939	65	6	7	1.5	105	1.05	1133	849	42.10

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District	State	Productivity/ ha	Productivity/ Worker ha	FERT_ NSA ha	NIA (%)	GIA (%)	FVA (%)	Crop intensity (%)	Worker/ hectare	Rainfall: (mm)	Net sown area (ha)	Rural poor (%)
Gadchiroli	Maharashtra	13644	5500	73	28	31	1.0	113	2.48	1574	169	65.00
Guna	Madhya Pradesh	13659	8345	58	39	30	0.2	130	1.64	1222	326	16.60
Damoh	Madhya Pradesh	13707	15187	33	34	27	0.8	127	0.90	1218	310	49.00
Sirohi	Rajasthan	13718	11573	56	37	39	1.3	130	1.19	591.2	146	27.00
Lower Subansiri	Arunachal Pradesh	13767	NA	NA	17	13	NA	131	NA	NA	18	NA
Khandwa	Madhya Pradesh	13804	NA	112	35	28	2.2	125	NA	961	312	14.10
Betul	Madhya Pradesh	13898	11378	45	25	19	1.2	132	1.22	1129	401	53.70
Udaipur	Rajasthan	14091	4938	59	24	19	0.3	129	2.85	645	246	20.90
Sikar	Rajasthan	14157	12631	30	43	38	1.0	142	1.12	440.3	525	10.50
Raisen	Madhya Pradesh	14230	20768	62	42	36	0.4	117	0.69	1595	431	58.10
Surguja	Chhattisgarh	14244	8039	41	8	7	5.1	116	1.77	1391.6	483	49.70
Patan	Gujarat	14263	16186	50	27	30	1.5	109	0.88	393	387	42.40
Mokokchun	Nagaland	14333	5867	3	13	19	NA	128	2.44	NA	30	NA
Thensang	Nagaland	14354	4220		12	15	NA	116	3.40	NA	47	NA
Banswara	Rajasthan	14383	5538	117	34	26	0.1	140	2.60	950.3	235	50.10

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District	State	Productivity/ ha	Productivity/ Worker ha	FERT_ NSA ha	NIA (%)	GIA (%)	FVA (%)	Crop intensity (%)	Worker/ hectare	Rainfall: (mm)	Net sown area (ha)	Rural poor (%)
Upper Subansiri	Arunachal Pradesh	14431	7261	NA	19	16	NA	121	1.99	NA	8	NA
Sonbhadra	Uttar Pradesh	14575	6674	74	32	34	1.1	142	2.18	1134.1	181	24.80
Bhilwara	Rajasthan	14604	9464	63	33	27	0.4	134	1.54	683.2	390	18.50
Bagalkot	Karnataka	14628	13479	104	43	41	3.9	115	1.09	567	433	18.10
Solapur	Maharashtra	14677	13499	67	20	23	3.1	112	1.09	743	1027	11.00
Khargaon	Madhya Pradesh	14751	NA	114	42	36	0.9	116	NA	888	409	4.70
Balaghat	Madhya Pradesh	14817	6837	57	44	40	1.0	124	2.17	1474	263	53.50
Dahod	Gujarat	14933	4700	37	27	25	1.6	141	3.18	583.6	212	41.40
Chitrakut	Uttar Pradesh	14959	9243	44	29	28	0.4	112	1.62	940	173	81.50
Chhatarpur	Madhya Pradesh	15058	13265	66	54	43	1.6	126	1.14	1044	394	52.80
Koriya	Chhattisgarh	15071	7968	24	6	7	5.7	112	1.89	1377.8	106	49.70
Parbhani	Maharashtra	15125	14901	85	11	8	1.2	167	1.02	905	490	52.20
Mahoba	Uttar Pradesh	15218	15736	34	47	39	5.1	122	0.97	850.7	241	23.20
Koppal	Karnataka	15246	13412	132	31	31	2.4	129	1.14	577	356	3.70
Leh	Jammu & Kashmir	15367	6316	20	83	100	6.0	103	2.43	100	10	NA
East Kameng	Arunachal Pradesh	15396	6206	NA	19	12	NA	168	2.48		8	NA

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District	State	Productivity/ ha	Productivity/ Worker ha	FERT_ NSA ha	NIA (%)	GIA (%)	FVA (%)	Crop intensity (%)	Worker/ hectare	Rainfall: (mm)	Net sown area (ha)	Rural poor (%)
Sagar	Madhya Pradesh	15399	18790	39	39	29	1.3	135	0.82	1395	536	55.70
Janjgir-Champa	Chhattisgarh	15406	8411	138	52	49	2.7	117	1.83	1165.4	262	29.80
Banda	Uttar Pradesh	15431	11398	28	34	41	0.3	122	1.35	945.5	350	52.80
Vidisha	Madhya Pradesh	15478	24546	53	43	34	0.3	126	0.63	1331	534	51.30
Mahaboobnagar	Andhra Pradesh	15704	8342	87	18	22	4.8	108	1.88	604	708	11.80
Korba	Chhattisgarh	15900	7584	16	5	5	6.9	107	2.10	1465.2	133	22.70
West Kameng	Arunachal Pradesh	16008	5889	NA	8	5	NA	150	2.72	NA	5	NA
Bhind	Madhya Pradesh	16021	13846	80	33	31	0.6	108	1.16	1148	329	16.40
Jhunjhunu	Rajasthan	16027	12915	27	52	36	0.3	154	1.24	405.1	426	3.60
Simdega	Jharkhand	16061	NA		NA	NA	3.7	106	NA	NA	82	NA
Raigarh	Chhattisgarh	16094	9399	90	19	19	5.9	112	1.71	1259.7	281	23.60
Mon	Nagaland	16096	4326	1	8	17	NA	124	3.72	NA	31	NA
Upper Siang	Arunachal Pradesh	16159	8001	NA	58	33	NA	177	2.02	NA	6	NA
Hamirpur	Uttar Pradesh	16239	15556	38	36	32	2.7	117	1.04	850.7	302	44.10

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District	State	Productivity/ ha	Productivity/ Worker ha	FERT_ NSA ha	NIA (%)	GIA (%)	FVA (%)	Crop intensity (%)	Worker/ hectare	Rainfall: (mm)	Net sown area (ha)	Rural poor (%)
Kanker	Chhattisgarh	16349	11374	41	9	9	3.3	107	1.44	1335	207	53.10
Anantpur	Andhra Pradesh	16477	13914	56	11	13	4.3	105	1.18	553	1018	20.20
Pauri Garhwal	Uttrakhand	16751	7483	4	9	12	15.5	154	2.24	NA	83	31.80
Lakhisarai	Bihar	16776	4794	83	61	68	3.8	121	3.50	NA	64	38.60
Chand-rapur	Maharashtra	16986	12213	79	20	22	1.4	115	1.39	1474	451	30.10
Saiha	Mizoram	17004	8409		11	13	NA	100	2.02	NA	10	NA
Phek	Nagaland	17191	12615		35	37	NA	119	1.36	NA	39	NA
Datia	Madhya Pradesh	17263	13987	56	58	50	0.8	118	1.23	973	200	14.70
South Garo Hills	Meghalaya	17375	8760	0	9	9	NA	124	1.98	NA	18	NA
Araria	Bihar	17399	4258	76	38	38	4.3	156	4.09	1817	182	54.60
Kutch	Gujarat	17569	NA	52	26	31	4.8	107	NA	312.4	680	20.00
Jamui	Bihar	17640	2950	118	34	39	8.5	109	5.98	NA	78	46.30
Wokha	Nagaland	17715	16131		10	20	NA	126	1.10	NA	34	NA
Haveri	Karnataka	17878	12773	87	16	14	5.4	125	1.40	753	355	55.10
Hanuman-garh	Rajasthan	18127	29540	63	39	48	0.1	142	0.61	273.5	779	27.20

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District	State	Productivity/ ha	Productivity/ Worker ha	FERT_ NSA ha	NIA (%)	GIA (%)	FVA (%)	Crop intensity (%)	Worker/ hectare	Rainfall: (mm)	Net sown area (ha)	Rural poor (%)
Chitradurga	Karnataka	18205	14305	48	18	18	5.5	118	1.27	472	409	24.80
Madhubani	Bihar	18270	4019	31	45	44	7.4	141	4.55	1414	225	59.20
Shivpuri	Madhya Pradesh	18397	13775	46	47	36	0.5	132	1.34	1179	405	38.70
Thiruvarur	Tamil Nadu	18405	7019	214	96	73	0.5	145	2.62	1129.9	135	11.30
Jaipur	Rajasthan	18463	16032	71	48	41	2.0	147	1.15	563.8	666	12.50
Bellary	Karnataka	18510	13003	227	36	38	2.9	117	1.42	613	433	40.00
Rajgarh	Madhya Pradesh	18644	15321	58	40	28	0.6	141	1.22	1157	421	11.90
Lunglei	Mizoram	18658	4239	26	6	7	NA	100	4.40	NA	11	NA
Sawai Madhopur	Rajasthan	18686	15349	116	63	50	0.3	128	1.22	873.4	280	18.50
East Siang	Arunachal Pradesh	18702	24335	NA	57	59	NA	101	0.77	NA	25	NA
Zunheboto	Nagaland	18771	18027		10	16	NA	126	1.04	NA	28	NA
Aizwal	Mizoram	18802	4843	34	9	11	NA	100	3.88	NA	17	NA
Saraikela	Jharkhand	18805	NA		NA	NA	4.0	108	NA	NA	60	NA
Kohima	Nagaland	18836	8725	2	28	31	NA	117	2.16	NA	37	NA
Changlang	Arunachal Pradesh	18945	6566	NA	32	23	NA	141	2.89	NA	16	NA

contd…

District	State	Productivity/ ha	Productivity/ Worker ha	FERT_ NSA ha	NIA (%)	GIA (%)	FVA (%)	Crop intensity (%)	Worker/ hectare	Rainfall: (mm)	Net sown area (ha)	Rural poor (%)
Ahmedabad	Gujarat	19301	26903	96	34	38	3.8	110	0.72	621	509	11.30
Lalitpur	Uttar Pradesh	19342	15418	46	77	53	4.7	145	1.25	880.1	272	42.70
Udhampur	Jammu & Kashmir	19385	5773	40	8	6	0.3	161	3.36	NA	70	9.30
Nagapat-tinam	Tamil Nadu	19436	6992	202	81	62	1.2	159	2.78	1341.7	138	7.00
Adilabad	Andhra Pradesh	19436	15431	74	15	15	5.9	102	1.26	1157	546	26.10
Tumkur	Karnataka	19500	12201	52	22	22	2.9	106	1.60	541	574	20.60
Morigon	Assam	19645	9468	65	NA	NA	4.3	135	2.07	1165.8	92	21.50
Virudu-nagar	Tamil Nadu	19725	9715	90	39	41	4.9	104	2.03	829.6	139	22.90
Belgaum	Karnataka	19801	11940	118	43	38	4.5	128	1.66	835	781	12.00
Dhemaji	Assam	20099	6200	4	NA	NA	7.8	162	3.24	3471.7	63	0.00
Dhar	Madhya Pradesh	20151	15373	119	45	32	0.7	139	1.31	915	506	23.90
Shajapur	Madhya Pradesh	20239	17863	63	43	29	1.7	149	1.13	1117	452	29.00
Mamit	Mizoram	20315	10873		20	23	NA	100	1.87		11	
Gaya	Bihar	20364	3645	193	74	83	7.7	122	5.59	1095	179	37.50
Jabalpur	Madhya Pradesh	20541	17571	83	36	30	4.1	137	1.17	1447	275	33.30

contd…

District	State	Productivity/ha	Productivity/Worker ha	FERT_NSA ha	NIA (%)	GIA (%)	FVA (%)	Crop intensity (%)	Worker/hectare	Rainfall: (mm)	Net sown area (ha)	Rural poor (%)
Baramulla	Jammu & Kashmir	20562	16199	102	47	50	27.2	115	1.27	1270	82	6.00
Jhansi	Uttar Pradesh	20677	18088	70	64	49	6.0	131	1.14	879.1	344	19.80
Mirzapur	Uttar Pradesh	20768	9149	122	58	65	2.1	146	2.27	1134.1	200	28.60
Tikamgarh	Madhya Pradesh	20891	11546	73	73	56	2.0	153	1.81	1100	255	44.10
Amravati	Maharashtra	20903	19783	52	9	10	5.9	106	1.06	976	751	39.50
Buragarh	Orissa	20960	25594	129	39	NA	3.1	135	0.82	1527	320	61.70
S.Ravi Das Ngr	Uttar Pradesh	20978	8961	269	81	81	4.2	143	2.34	1052.3	68	30.60
Kolasib	Mizoram	21190	12478	22	36	40	NA	100	1.70	NA	13	NA
Chindwara	Madhya Pradesh	21210	17697	48	23	20	3.3	123	1.20	1094	484	30.90
Bhopal	Madhya Pradesh	21219	23943	94	51	36	1.6	142	0.89	1211	153	34.50
Siwan	Bihar	21261	6321	73	61	45	7.7	148	3.36	1154	163	30.20
Nanded	Maharashtra	21311	16464	86	11	13	1.6	113	1.29	915	705	42.80
Satara	Maharashtra	21327	12375	92	34	36	4.9	116	1.72	1119	539	4.90
Denapur	Nagaland	21377	39347	7	39	49	NA	124	0.54	NA	62	NA
Mandsaur	Madhya Pradesh	21412	16731	83	31	22	1.1	140	1.28	962	357	15.50
Bolangir	Orissa	21428	17874	30	9	NA	9.2	132	1.20	1443.5	334	66.30

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District	State	Productivity/ ha	Productivity/ Worker ha	FERT_ NSA ha	NIA (%)	GIA (%)	FVA (%)	Crop intensity (%)	Worker/ hectare	Rainfall: (mm)	Net sown area (ha)	Rural poor (%)
Surendranagar	Gujarat	21618	37711	78	16	18	2.3	105	0.57	470.6	702	20.50
Poonch	Jammu & Kashmir	21689	4229	54	13	14	0.1	167	5.13	NA	27	NA
Sivagangai	Tamil Nadu	21772	7683	72	67	67	5.0	100	2.83	876	117	13.10
Dausa	Rajasthan	21843	12034	103	73	48	0.5	155	1.82	561	220	19.60
Nawapara	Orissa	21892	18451	31	20	NA	10.7	148	1.19	1378.2	161	70.10
Durg	Chhattisgarh	22068	16190	76	36	30	4.0	142	1.36	1064.1	550	35.50
Tehri Garhwal	Uttrakhand	22097	7081	3	14	17	21.9	158	3.12	1706	60	61.20
Kurnool	Andhra Pradesh	22115	16183	149	17	19	5.3	109	1.37	670	873	24.60
Sundargarh	Orissa	22143	15565	24	18	NA	14.6	126	1.42	1647.6	309	69.90
Lakhimpur	Assam	22188	5913	17	NA	NA	7.7	172	3.75	1544.6	100	1.40
Shivasti	Uttar Pradesh	22391	7112	115	42	31	0.9	146	3.15	1147.8	130	56.10
Nawo-rangpur	Orissa	22396	11355	61	8	NA	13.1	144	1.97	1521.8	212	80.60
Jahanabad	Bihar	22617	3809	181	84	82	7.1	124	5.94	1095	63	54.20
Supaul	Bihar	22631	5201	48	60	54	3.9	173	4.35	NA	151	20.00
Ujjain	Madhya Pradesh	22654	21675	89	44	28	1.3	158	1.05	1088	489	28.90
Morena	Madhya Pradesh	22755	15009	113	62	51	0.5	124	1.52	927	266	20.80
Banka	Bihar	22787	6392	22	58	69	10.0	105	3.56	NA	153	59.80

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District	State	Productivity/ ha	Productivity/ Worker ha	FERT_ NSA ha	NIA (%)	GIA (%)	FVA (%)	Crop intensity (%)	Worker/ hectare	Rainfall: (mm)	Net sown area (ha)	Rural poor (%)
West Garo Hills	Meghalaya	22942	10220	2	10	10	NA	130	2.24	NA	68	NA
East Garo Hills	Meghalaya	23013	8169		19	27	NA	117	2.82	NA	32	NA
Sehore	Madhya Pradesh	23051	24004	73	57	37	0.4	157	0.96	1169	383	39.10
Cham-rajnagar	Karnataka	23067	11922	100	28	26	5.0	121	1.93	696	165	13.80
Karur	Tamil Nadu	23071	7389	73	41	42	8.3	102	3.12	742.2	94	10.20
Sangli	Maharashtra	23091	15873	118	20	20	2.6	121	1.45	571	596	17.50
Ganga-nagar	Rajasthan	23091	36590	100	71	78	0.7	132	0.63	226.4	693	22.80
Siddharth Ngr.	Uttar Pradesh	23122	8015	157	64	44	3.0	149	2.88	1264	236	66.30
Bhojpur	Bihar	23144	8733	207	65	82	8.6	112	2.65	1079	184	41.60
Sheopur Kala	Madhya Pradesh	23165	19445	93	67	57	0.5	123	1.19	730	157	37.60
Chittorgarh	Rajasthan	23232	13536	107	39	29	0.4	146	1.72	841.5	420	15.50
Darrang	Assam	23248	14343	87	NA	NA	10.2	143	1.62	1796.6	205	0.10
Jainta Hills	Meghalaya	23381	7583	15	20	30	NA	101	3.08	NA	31	NA
Chhim-tuipui	Mizoram	23443	6061	22	36	40	NA	100	3.87	NA	13	NA
Hassan	Karnataka	23471	14892	128	22	21	12.9	117	1.58	1247	384	5.10

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District	State	Productivity/ ha	Productivity/ Worker ha	FERT_ NSA ha	NIA (%)	GIA (%)	FVA (%)	Crop intensity (%)	Worker/ hectare	Rainfall: (mm)	Net sown area (ha)	Rural poor (%)
Kalahandi	Orissa	23493	17132	60	32	NA	8.8	149	1.37	1378.2	362	70.50
Bilaspur	Chhattisgarh	23524	13775	97	38	30	7.0	131	1.71	1089.6	368	34.80
Sabarka-ntha	Gujarat	23600	17788	151	32	33	5.3	119	1.33	567.6	447	20.20
G.Buddha-Ngr.	Uttar Pradesh	23613	21915	142	77	100	0.3	113	1.08	719.7	118	2.60
Buxar	Bihar	23632	10501	96	65	79	8.0	111	2.25	NA	139	54.20
Cham-paran (East)	Bihar	23708	6586	128	42	48	9.9	114	3.60	1253	294	20.10
Mayur-bhanj	Orissa	23774	13689	37	26	NA	12.0	122	1.74	1648.2	394	52.50
Wardha	Maharashtra	23779	22341	61	7	7	2.2	119	1.06	1144	365	20.90
Dholpur	Rajasthan	23796	14814	88	67	51	1.2	136	1.61	744	151	8.70
Nalbari	Assam	23830	18504	74	NA	NA	10.1	137	1.29	1904.4	154	15.00
Dhubri	Assam	23955	11983	118	NA	NA	7.7	153	2.00	3225.2	144	42.40
Arval	Bihar	23959	NA	NA	79	81	6.9	130	NA	NA	41	NA
Purnea	Bihar	24008	6232	191	43	56	8.5	137	3.85	1483	216	29.00
Medak	Andhra Pradesh	24232	11719	96	25	29	4.3	126	2.07	874	423	9.30
Harda	Madhya Pradesh	24288	24482	138	76	44	0.2	175	0.99	916	173	37.20
Amreli	Gujarat	24327	34780	80	19	21	3.0	105	0.70	479.4	547	0.50

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District	State	Productivity/ ha	Productivity/ Worker ha	FERT_ NSA ha	NIA (%)	GIA (%)	FVA (%)	Crop intensity (%)	Worker/ hectare	Rainfall: (mm)	Net sown area (ha)	Rural poor (%)
Ballia	Uttar Pradesh	24411	9567	169	77	69	3.6	162	2.55	1013.1	221	51.50
Karbi-Anglong	Assam	24433	12779	6	NA	NA	5.0	154	1.91	1121.5	126	26.50
West Singhbhum	Jharkhand	24460	6438	13	NA	NA	7.8	109	3.80	1314	176	53.80
Nagpur	Maharashtra	24590	22217	127	9	9	8.0	107	1.11	1242	547	39.30
Narsimpur	Madhya Pradesh	24634	24048	47	56	43	1.0	132	1.02	1690	302	36.60
Kaushambi	Uttar Pradesh	24838	8131	187	70	64	4.5	135	3.05	975.9	132	45.50
Bongaigaon	Assam	24856	14181	106	NA	NA	8.5	165	1.75	3219.4	95	33.00
Dibrugarh	Assam	24931	19667	55	NA	NA	9.1	129	1.27	2249.7	138	19.20
Aurangabad	Bihar	25023	9217	123	81	78	6.7	123	2.71	1153	197	55.40
Ratlam	Madhya Pradesh	25030	20192	93	33	23	0.7	144	1.24	1078	330	17.10
Champaran (West)	Bihar	25038	7232	158	35	48	8.6	134	3.46	1216	281	76.90
Bundi	Rajasthan	25055	19233	125	76	59	0.8	145	1.30	773.4	253	3.50
Sheikhpura	Bihar	25112	6174	177	82	75	8.5	129	4.07	NA	38	28.60
Allahabad	Uttar Pradesh	25144	9048	261	77	80	3.3	148	2.78	975.9	338	34.50
Kokrajhar	Assam	25176	9419	70	NA	NA	7.8	160	2.67	3767.7	85	35.70
Hoshangabad	Madhya Pradesh	25269	30582	164	85	51	1.2	167	0.83	1385	297	37.20

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District	State	Productivity/ ha	Productivity/ Worker ha	FERT_ NSA ha	NIA (%)	GIA (%)	FVA (%)	Crop intensity (%)	Worker/ hectare	Rainfall: (mm)	Net sown area (ha)	Rural poor (%)
Bharatpur	Rajasthan	25350	15762	88	75	54	0.7	143	1.61	663.9	394	16.60
Jhalawar	Rajasthan	25361	17747	92	58	39	1.5	154	1.43	844.3	315	18.20
Vadodara	Gujarat	25405	16217	132	41	44	7.6	110	1.57	686.2	516	5.60
Pratapgarh	Uttar Pradesh	25428	7480	191	87	88	3.3	148	3.40	977.9	214	65.20
Tawang	Arunachal Pradesh	25485	10605	NA	13	7	NA	177	2.40	NA	4	NA
Palamau	Jharkhand	25626	5091	43	NA	NA	8.9	120	5.03	1237	126	54.30
Kamrup	Assam	25674	16338	81	NA	NA	9.3	140	1.57	1428.6	180	22.30
Dewas	Madhya Pradesh	25753	22198	86	41	27	1.5	151	1.16	1079	385	17.70
Jharsugda	Orissa	25763	22437	89	16	NA	14.9	132	1.15	1527	77	58.70
Koraput	Orissa	25820	17454	25	29	NA	18.4	134	1.48	1521.8	282	74.20
Bhandara	Maharashtra	25893	23995	61	53	48	3.8	138	1.08	1349	362	51.20
Fatehpur	Uttar Pradesh	26024	11115	182	64	66	3.2	139	2.34	903.6	292	31.10
Karauli	Rajasthan	26091	14868	53	56	36	0.6	156	1.75	670.7	196	6.40
Rudrapryag	Uttrakhand	26151	6699	4	14	17	8.7	160	3.90	NA	20	8.70

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District	State	Productivity/ ha	Productivity/ Worker ha	FERT_ NSA ha	NIA (%)	GIA (%)	FVA (%)	Crop intensity (%)	Worker/ hectare	Rainfall: (mm)	Net sown area (ha)	Rural poor (%)
Gopalganj	Bihar	26178	7504	48	66	47	8.1	154	3.49	1187	150	27.40
Barpeta	Assam	26316	16148	93	NA	NA	11.3	154	1.63	1909.1	180	39.90
Sonitpur	Assam	26405	14776	29	NA	NA	9.4	147	1.79	1646.1	166	3.60
Mahesana	Gujarat	26424	23245	109	57	55	9.0	128	1.14	632.8	349	27.30
Bahraich	Uttar Pradesh	26451	12173	112	46	34	1.7	151	2.17	1145.5	327	43.70
Deogarh	Orissa	26474	17234	41	25	NA	14.2	156	1.54	1527	65	73.40
Jalaun	Uttar Pradesh	26499	23379	75	54	45	7.2	122	1.13	786.6	349	15.30
Rewari	Haryana	26501	17473	184	86	80	0.4	154	1.52	409	128	16.80
Goalpara	Assam	26513	13930	116	NA	NA	10.3	137	1.90	2458.7	79	33.90
Devanagrre	Karnataka	26574	18794	139	35	39	3.7	117	1.41	595	364	42.20
Dhamtari	Chhattisgarh	26627	12675	205	74	51	5.5	159	2.10	1223.6	134	38.50
Sibsagar	Assam	26683	19728	11	NA	NA	7.4	111	1.35	1900.8	138	20.30
Saran	Bihar	26790	8167	82	55	51	9.7	121	3.28	1168	193	55.90
Latehar	Jharkhand	26795	NA		NA	NA	8.7	121	NA	NA	60	NA
Nalgonda	Andhra Pradesh	26876	12317	206	32	38	12.1	116	2.18	751	495	5.40
Gorakhpur	Uttar Pradesh	26897	9039	241	82	61	3.2	152	2.98	1364.1	252	56.50
Varanasi	Uttar Pradesh	27091	9367	516	96	85	4.4	149	2.89	1056.4	106	33.10

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District	State	Productivity/ ha	Productivity/ Worker ha	FERT_ NSA ha	NIA (%)	GIA (%)	FVA (%)	Crop intensity (%)	Worker/ hectare	Rainfall: (mm)	Net sown area (ha)	Rural poor (%)
Nawadha	Bihar	27160	5104	97	73	85	10.6	122	5.32	NA	102	38.80
Jaunpur	Uttar Pradesh	27171	8488	175	87	81	4.1	160	3.20	997.9	277	27.90
Neemach	Madhya Pradesh	27190	19375	114	34	23	0.9	147	1.40	749	187	0.20
Ghazipur	Uttar Pradesh	27208	9961	219	84	84	3.7	163	2.73	1051.8	254	53.70
Deogarh	Jharkhand	27229	6081	119	NA	NA	10.3	104	4.48	1242	63	58.70
Garhwa	Jharkhand	27448	5152	50	NA	NA	8.1	136	5.33	NA	64	38.60
Rangareddy	Andhra Pradesh	27508	12087	411	21	26	11.6	110	2.28	781	253	10.90
Banas Kantha	Gujarat	27577	28275	94	48	46	4.8	139	0.98	462	744	26.00
Budgam	Jammu & Kashmir	27617	8443	193	56	60	7.4	109	3.27	585	52	2.90
Raebareli	Uttar Pradesh	27658	9340	171	87	85	2.8	155	2.96	927.6	270	54.40
Alwar	Rajasthan	27727	13540	84	88	62	1.9	161	2.05	657.3	506	9.90
Kanpur Dehat	Uttar Pradesh	27742	15372	159	74	67	2.2	143	1.80	801.5	221	35.60
Pakaur	Jharkhand	27766	7721	40	NA	NA	10.9	107	3.60	1355.0	58	75.60
Rajouri	Jammu & Kashmir	27782	9668	45	14	9	0.1	185	2.87	NA	53	NA
Azamgarh	Uttar Pradesh	27792	9539	152	91	84	2.7	168	2.91	1021.3	302	29.50
Tinsukia	Assam	27805	15765	54	NA	NA	13.8	142	1.76	2609.6	99	14.40
Chikmagalur	Karnataka	27846	30513	131	11	11	10.1	109	0.91	2061	282	2.00

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District	State	Productivity/ ha	Productivity/ Worker ha	FERT_ NSA ha	NIA (%)	GIA (%)	FVA (%)	Crop intensity (%)	Worker/ hectare	Rainfall: (mm)	Net sown area (ha)	Rural poor (%)
Jamtara	Jharkhand	27922	NA		NA	NA	9.3	105	NA	NA	55	NA
Sambalpur	Orissa	27985	22197	108	33	NA	12.9	144	1.26	1527	179	79.50
Bhavnagar	Gujarat	28001	37014	97	35	35	10.3	111	0.76	521.2	561	1.20
Cuddapah	Andhra Pradesh	28315	15199	117	31	34	9.8	115	1.86	700	397	5.40
Bhabhua	Bihar	28537	11948	78	75	82	5.8	128	2.39	NA	153	42.00
Mau	Uttar Pradesh	28610	9854	216	90	81	1.7	166	2.90	1021.3	126	39.50
Anantnagh	Jammu & Kashmir	28630	10524	199	59	71	13.0	128	2.72	NA	76	0.00
Champawat	Uttrakhand	28700	9258	23	12	12	26.3	166	3.10	NA	21	72.10
Srikakulam	Andhra Pradesh	28711	10550	136	59	47	4.8	137	2.72	1162	302	6.00
Balasore	Orissa	28711	15481		NA	NA	13.3	136	1.85	1568.4	234	28.30
Chandauli	Uttar Pradesh	28771	11444	259	94	87	0.7	177	2.51	1056.4	136	36.00
Prakasam	Andhra Pradesh	28885	15504	145	23	23	6.4	110	1.86	872	565	9.90
Pune	Maharashtra	28935	22069	101	25	27	8.4	114	1.31	715	946	6.70
Raigad	Maharashtra	28952	11917	69	6	7	4.7	103	2.43	2655	188	26.60
Karimganj	Assam	29037	16638	60	NA	NA	9.2	140	1.75	4559.9	69	40.90
Pithoragerh	Uttrakhand	29135	8582	9	10	9	15.8	184	3.39	2207	40	44.30
Jhajjer	Haryana	29143	19807	145	81	78	0.5	151	1.47	776.4	154	6.60

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District	State	Productivity/ ha	Productivity/ Worker ha	FERT_ NSA ha	NIA (%)	GIA (%)	FVA (%)	Crop intensity (%)	Worker/ hectare	Rainfall: (mm)	Net sown area (ha)	Rural poor (%)
Jammu	Jammu & Kashmir	29191	21370	119	52	51	0.6	179	1.37	NA	119	1.80
Kheda	Gujarat	29243	17006	193	65	63	8.5	130	1.72	668.4	310	42.40
Coimbatore	Tamil Nadu	29511	16516	150	49	49	6.9	106	1.79	694.4	322	12.40
Deoria	Uttar Pradesh	29589	10311	369	84	59	2.3	164	2.87	1145.1	198	41.90
Tiruvannmalai	Tamil Nadu	29616	8708	152	52	58	2.4	121	3.40	1046.6	227	43.20
Jorhat	Assam	29632	18585	59	NA	NA	12.6	143	1.59	1803.7	120	27.50
Dumka	Jharkhand	29643	6758	47	NA	NA	8.4	104	4.39	1391	145	55.40
Cachar	Assam	29728	21491	44	NA	NA	14.8	127	1.38	2366.1	115	33.50
Ranchi	Jharkhand	29817	11041	108	NA	NA	12.3	105	2.70	1530	253	23.20
Kathua	Jammu & Kashmir	29922	16415	47	34	34	0.2	196	1.82	1672	63	5.00
Sahibganj	Jharkhand	30103	4916	110	NA	NA	9.5	116	6.12	1316	41	63.70
Thane	Maharashtra	30163	10271	78	5	6	3.2	117	2.94	2617	245	40.30
Auraiya	Uttar Pradesh	30232	15126	135	NA	NA	2.1	162	2.00	752.4	144	28.80
Samastipur	Bihar	30554	6729	188	54	45	14.2	137	4.54	1173	185	52.30
Mahendra Garh	Haryana	30652	20125	156	79	53	0.3	173	1.52	310.9	152	8.40
Bageshwar	Uttrakhand	30924	7759	14	19	21	10.3	180	3.99		23	33.70
Bhagalpur	Bihar	30944	7520	173	40	46	13.7	121	4.11	1146	142	45.20

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District	State	Productivity/ ha	Productivity/ Worker ha	FERT_ NSA ha	NIA (%)	GIA (%)	FVA (%)	Crop intensity (%)	Worker/ hectare	Rainfall: (mm)	Net sown area (ha)	Rural poor (%)
Baran	Rajasthan	31054	29423	145	85	62	0.4	143	1.06	873.8	323	6.50
Godda	Jharkhand	31070	7027	142	NA	NA	8.8	107	4.42	1282	77	41.30
Paumpare	Arunachal Pradesh	31194	16540	NA	22	10	NA	218	1.89	NA	6	NA
Gonda	Uttar Pradesh	31215	11849	149	71	54	1.8	154	2.63	1147.6	298	39.00
Nagaon	Assam	31306	17289	109	NA	NA	9.3	151	1.81	1541.7	235	25.30
Hardoi	Uttar Pradesh	31498	15360	118	88	77	3.2	154	2.05	874.8	421	34.20
Rayagada	Orissa	31709	16104	46	20	NA	17.6	151	1.97	1521.8	152	67.10
Gandhinagar	Gujarat	31739	23406	113	59	57	10.2	122	1.36	541.8	164	5.20
Balrampur	Uttar Pradesh	31807	10912	96	39	35	1.7	144	2.91	1149.9	214	18.60
Valsad	Gujarat	31832	15108	106	28	29	30.7	111	2.11	1769.4	161	3.40
Vizianagarm	Andhra Pradesh	31851	12517	97	42	37	12.3	135	2.54	1131	315	4.70
Visakhapatnam	Andhra Pradesh	31855	11267	94	31	33	11.3	127	2.83	1202	302	18.90
Nayagarh	Orissa	31994	23614	41	24	NA	15.7	165	1.35	1449.1	133	47.00
Almora	Uttrakhand	32064	11676	5	6	7	16.7	160	2.75	1297	81	44.10
Perambalur	Tamil Nadu	32197	30463	64	27	29	14.8	109	1.06	949.6	208	34.40
Lohardaga	Jharkhand	32201	11382	139	NA	NA	12.3	112	2.83	1411	44	81.60
Jamnagar	Gujarat	32233	56677	84	20	22	2.4	113	0.57	589.6	609	0.00

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District	State	Productivity/ ha	Productivity/ Worker ha	FERT_ NSA ha	NIA (%)	GIA (%)	FVA (%)	Crop intensity (%)	Worker/ hectare	Rainfall: (mm)	Net sown area (ha)	Rural poor (%)
Basti	Uttar Pradesh	32321	11215	367	62	56	3.1	146	2.88	1264	209	23.20
Rohtas	Bihar	32321	14968	151	99	90	5.4	139	2.16	1142	254	34.60
Patna	Bihar	32367	8448	170	60	70	12.8	118	3.83	1110	206	44.70
Jajpur	Orissa	32404	19838	67	28	NA	12.6	173	1.63	1501.3	153	4.90
Uttarakannada	Karnataka	32732	15560	83	20	19	3.7	110	2.10	2836	108	47.60
Mathura	Uttar Pradesh	32772	20097	149	98	79	2.7	149	1.63	591.4	271	41.00
Chittoor	Andhra Pradesh	32794	10657	108	34	40	19.3	110	3.08	935	378	15.90
Broach	Gujarat	32827	34619	96	31	32	6.5	102	0.95	770.6	332	17.10
Unnao	Uttar Pradesh	32861	14061	160	88	76	6.0	155	2.34	840.8	300	24.10
Kota	Rajasthan	32925	39311	192	82	58	0.6	148	0.84	732.4	270	3.90
Bhiwani	Haryana	32936	33566	98	67	50	0.3	198	0.98	314.3	399	18.30
Sonepur	Orissa	33005	19473	47	61	NA	13.6	160	1.69	1443.5	108	51.30
Chamba	Himachal Pradesh	33030	8146	27	14	10	19.5	158	4.05	1637.46	42	20.70
Sant Kabir Ngr	Uttar Pradesh	33039	9809	175	84	51	4.0	173	3.37	1264	120	58.00
Sitamarhi	Bihar	33042	5717	111	45	38	12.0	144	5.78	1294	117	28.10
Indore	Madhya Pradesh	33077	30322	169	57	34	4.6	166	1.09	1054	259	21.80
Malkangiri	Orissa	33121	20981	32	28	NA	15.8	158	1.58	1521.8	131	67.90

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District	State	Productivity/ ha	Productivity/ Worker ha	FERT_ NSA ha	NIA (%)	GIA (%)	FVA (%)	Crop intensity (%)	Worker/ hectare	Rainfall: (mm)	Net sown area (ha)	Rural poor (%)
Sultanpur	Uttar Pradesh	33241	12276	157	82	83	7.4	153	2.71	1000.4	284	28.50
Nalanda	Bihar	33303	8560	166	63	84	15.2	124	3.89	1069	181	44.80
Badaun	Uttar Pradesh	33420	19342	188	92	69	4.3	168	1.73	821.2	416	28.80
East Singhbhum	Jharkhand	33423	8690	64	NA	NA	8.2	175	3.85	1300	83	58.40
Golaghat	Assam	33595	17444	31	NA	NA	14.2	128	1.93	2118.6	117	25.50
Darbhanga	Bihar	33639	7472	141	44	50	16.7	120	4.50	1258	172	42.20
Nasik	Maharashtra	33750	21206	130	21	24	10.1	108	1.59	591	877	48.00
Lohit	Arunachal Pradesh	33754	17489	NA	14	7	NA	190	1.93	NA	20	NA
Bhadrak	Orissa	33815	13184	125	44	NA	14.4	134	2.56	1568.4	175	22.90
Warangal	Andhra Pradesh	33895	14531	216	61	59	4.1	125	2.33	993	458	0.90
Thoothukudi	Tamil Nadu	34045	24266	61	23	23	10.1	102	1.40	655.7	170	33.20
Kolhapur	Maharashtra	34446	15068	202	24	29	2.1	102	2.29	1137	428	8.40
Ri Bhoi	Meghalaya	34485	11664	4	81	84	NA	111	2.96	NA	23	NA
Hailakandi	Assam	34515	17890	30	NA	NA	11.7	141	1.93	3094.2	46	7.00
Karimnagar	Andhra Pradesh	34577	12034	296	57	62	4.4	134	2.87	967	357	7.20
Porbander	Gujarat	34721	37862	37	16	17	4.4	112	0.92	431.8	119	0.00

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District	State	Productivity/ ha	Productivity/ Worker ha	FERT_ NSA ha	NIA (%)	GIA (%)	FVA (%)	Crop intensity (%)	Worker/ hectare	Rainfall: (mm)	Net sown area (ha)	Rural poor (%)
Purulia	West Bengal	34794	15380	131	39	NA	10.0	106	2.26	1361	335	31.20
Madurai	Tamil Nadu	34797	9321	254	51	53	10.6	104	3.73	840	123	18.60
Gajapatti	Orissa	35115	12640	54	30	NA	28.6	179	2.78	1295.6	78	61.40
Ganjam	Orissa	35128	16212	85	63	NA	17.8	171	2.17	1295.6	381	33.60
Pudukkottai	Tamil Nadu	35130	10831	334	63	63	7.4	101	3.24	921.5	147	18.60
Katihar	Bihar	35215	7678	62	46	48	11.4	164	4.59	1492	164	36.50
Rohtak	Haryana	35230	26338	237	78	82	0.7	155	1.34	454	142	6.00
Etah	Uttar Pradesh	35419	19688	171	95	78	6.2	161	1.80	694.9	327	30.80
Etawah	Uttar Pradesh	35477	31583	105	83	97	5.1	161	1.12	752.4	219	32.30
Mainpuri	Uttar Pradesh	35942	18535	244	99	91	6.3	166	1.94	720.2	177	22.90
Mysore	Karnataka	35957	18472	135	36	28	2.7	150	1.95	739	334	14.20
Khammam	Andhra Pradesh	36108	17335	172	38	40	10.7	109	2.08	1124	430	13.10
Sindhudurg	Maharashtra	36378	18770	47	18	20	32.2	115	1.94	2493	140	2.30
Monghyr	Bihar	36570	9022	63	66	62	12.5	139	4.05	956	47	35.60
Hamirpur	Himachal Pradesh	36719	8778	78	5	5	7.9	199	4.18	1242.42	35	6.30
Aligarh	Uttar Pradesh	37008	23252	189	99	82	4.2	167	1.59	662.8	302	19.80
Chatra	Jharkhand	37014	6740	73	NA	NA	16.3	111	5.49	NA	45	55.20

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Sitapur	Uttar Pradesh	37101	18145	192	84	75	3.9	149	2.04	974	436	27.60
Narmada	Gujarat	37723	20449	52	23	25	7.5	108	1.84	775	111	24.50
Agra	Uttar Pradesh	37879	27361	185	85	62	9.7	145	1.38	655.5	284	22.10
Nellore	Andhra Pradesh	37897	15379	240	73	72	14.8	110	2.46	1080	308	14.10
Faizabad	Uttar Pradesh	38005	8239	434	92	89	5.6	150	4.61	1008.9	135	25.00
Krishnagiri	Tamil Nadu	38181	NA	NA	22	22	23.6	110	NA	1298.1	180	NA
Pulwanna	Jammu & Kashmir	38220	18244	203	63	70	29.5	147	2.09	NA	56	0.00
Ambedkar Ngr.	Uttar Pradesh	38301	12309	274	94	94	4.8	168	3.11	1028.9	166	50.40
Rajkot	Gujarat	38607	66835	139	28	30	2.7	114	0.58	489.4	763	10.40
Kedrapara	Orissa	39031	20706	44	36	NA	12.6	176	1.88	1501.3	139	31.50
Shahjahanpur	Uttar Pradesh	39377	25709	315	94	90	1.7	165	1.53	1019.5	347	37.40
Gurgaon	Haryana	39511	26297	166	52	68	1.7	174	1.50	484.9	169	6.20
Maharaj Ganj	Uttar Pradesh	39709	11146	247	83	48	2.4	181	3.56	1364.1	202	53.40
Didugul	Tamil Nadu	39712	16151	93	33	34	18.9	103	2.46	831.6	247	10.30
Kancheepuram	Tamil Nadu	39781	11683	308	0	0	4.2	127	3.41	1252.1	125	20.20
Dehradun	Uttrakhand	39831	19643	75	43	44	35.9	156	2.03	2315	51	30.30
Khagaria	Bihar	39959	8921	329	85	64	10.4	157	4.48	1179	84	16.70

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Saharsa	Bihar	40025	8718	91	52	50	10.3	177	4.59	1525	108	21.10
Vellore	Tamil Nadu	40064	10989	219	42	44	10.3	122	3.65	917	177	26.20
Giridih	Jharkhand	40076	6407	49	NA	NA	14.6	120	6.25	1145	77	30.50
Una	Himachal Pradesh	40568	11807	165	23	21	8.6	192	3.44	1171.44	37	6.10
Villupuram	Tamil Nadu	40846	11079	216	57	59	5.7	120	3.69	1029.4	304	34.80
Burhanpur	Madhya Pradesh	40855	NA	27	31	35	15.9	113	NA	497	104	14.10
Cuttack	Orissa	41344	19857	73	57	NA	14.5	190	2.08	1501.3	165	14.00
Muzafarpur	Bihar	41428	10564	190	53	39	14.3	164	3.92	1250	207	65.30
Firozabad	Uttar Pradesh	41525	28390	226	94	71	13.4	156	1.46	655.5	181	26.50
Boudh	Orissa	41681	27019	45	44	NA	18.3	151	1.54	1597.1	87	70.50
Begusarai	Bihar	41743	9844	274	69	52	14.2	145	4.24	1118	117	56.70
Kushi Ngr.	Uttar Pradesh	41922	11342	222	72	75	2.2	154	3.70	1145.1	224	54.80
Angul	Orissa	41929	31616	36	21	NA	24.1	169	1.33	1421.1	199	53.00
Bareilly	Uttar Pradesh	41946	21308	271	92	89	2.6	168	1.97	1107.3	328	30.20
Nizamabad	Andhra Pradesh	42167	13208	371	58	61	4.0	150	3.19	1036	206	23.10
Uttarakashi	Uttrakhand	42286	11717	18	17	20	26.1	155	3.61		29	19.50
Thanjavur	Tamil Nadu	42398	13023	289	83	78	3.5	129	3.26	1053	173	7.50

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District	State	Productivity/ ha	Productivity/ Worker ha	FERT_ NSA ha	NIA (%)	GIA (%)	FVA (%)	Crop intensity (%)	Worker/ hectare	Rainfall: (mm)	Net sown area (ha)	Rural poor (%)
Dharmapuri	Tamil Nadu	42442	6724	78	26	26	21.8	111	6.31	855.9	158	40.30
Tiruchirapalli	Tamil Nadu	42680	12320	411	50	53	13.4	108	3.46	761.5	160	19.80
Dhenkanal	Orissa	42838	33529	31	23	NA	21.4	166	1.28	1421.1	167	57.10
Madhupura	Bihar	42908	9040	112	62	65	12.8	156	4.75	NA	129	7.70
Keonjhar	Orissa	42945	29109	37	24	NA	20.5	150	1.48	1534.5	292	46.10
Kanpur City	Uttar Pradesh	42990	17680	284	82	64	5.4	173	2.43	801.5	153	28.60
Kangra	Himachal Pradesh	43128	13464	77	31	30	17.4	188	3.20	1581.32	117	11.40
Salem	Tamil Nadu	43227	12272	239	37	37	19.1	114	3.52	898	197	37.40
N C Hills	Assam	43716	32482	2	NA	NA	30.2	127	1.35	1144.9	28	6.10
Chamoli	Uttrakhand	43958	14560	9	5	6	22.5	148	3.02	1233	35	35.70
Krishna	Andhra Pradesh	44069	17977	352	65	51	13.0	143	2.45	1034	445	2.80
Khurda	Orissa	44206	33938	52	31	NA	26.3	160	1.30	1449.1	134	27.80
Mandi	Himachal Pradesh	44401	11302	76	16	16	20.6	187	3.93	1290.36	86	10.00
Junagarh	Gujarat	44403	36946	133	33	32	7.5	128	1.20	720.6	534	0.00
Mandya	Karnataka	44446	16527	206	49	50	10.6	119	2.69	635	231	15.30
Shimoga	Karnataka	44492	21768	203	56	59	3.7	112	2.04	2694	217	7.80
Ropar	Punjab	44593	42256	391	86	82	2.7	180	1.06	890	123	2.40

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District	State	Productivity/ ha	Productivity/ Worker ha	FERT_ NSA ha	NIA (%)	GIA (%)	FVA (%)	Crop intensity (%)	Worker/ hectare	Rainfall: (mm)	Net sown area (ha)	Rural poor (%)
Pilibhit	Uttar Pradesh	44853	32211	311	97	94	0.7	172	1.39	1242	238	27.30
Gurdaspur	Punjab	45015	54078	276	74	83	1.2	172	0.83	1486	294	2.30
Barabanki	Uttar Pradesh	45443	16797	255	84	82	5.7	181	2.71	1002.7	288	14.20
East Khasi Hills	Meghalaya	45669	12969	175	33	31	NA	126	3.52	NA	22	NA
Hoshiarpur	Punjab	45722	43880	307	83	79	5.8	179	1.04	1315	201	1.70
Erode	Tamil Nadu	46276	15956	155	42	46	8.1	106	2.90	711.4	271	16.90
Kannur	Kerala	46336	61057	50	10	NA	32.6	129	0.76	3375	200	35.40
Ratnagiri	Maharashtra	46345	22017	32	1	1	32.8	121	2.10	3025	245	16.90
Rampur	Uttar Pradesh	46369	24899	262	88	94	2.1	188	1.86	944.3	194	31.70
Kheri	Uttar Pradesh	46379	28301	207	80	76	1.0	147	1.64	1068.7	486	21.50
Tirunelveli	Tamil Nadu	47243	13924	263	65	67	12.2	116	3.39	736.9	150	23.60
Udupi	Karnataka	47718	NA	59	32	27	10.8	123	NA	4167	100	0.00
Jalgaon	Maharashtra	47868	35601	157	17	19	5.9	108	1.34	841	851	22.80
Moradabad	Uttar Pradesh	48056	23394	305	98	84	3.7	176	2.05	944.3	317	17.10
Kannauj	Uttar Pradesh	48129	21245	252	92	74	19.9	158	2.27	795.4	143	25.40
Amritsar	Punjab	48385	50357	313	98	100	1.7	179	0.96	650	449	8.70
Thiruvallur	Tamil Nadu	48468	14065	300	89	79	8.8	139	3.45	1152.8	95	23.40

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Dhanbad	Jharkhand	48468	10554	10	NA	NA	22.1	114	4.59	1300	34	19.30
Bullandshahr	Uttar Pradesh	48865	23647	276	89	100	5.8	171	2.07	673.5	297	14.90
Udhamsigh Nagar	Uttrakhand	49185	33703	563	99	96	4.0	171	1.46	1256	149	45.70
Hissar	Haryana	49688	39581	237	83	84	0.8	198	1.26	269.8	313	15.20
Jind	Haryana	49691	35247	289	90	85	0.7	187	1.41	429.4	247	14.60
Alappuzha	Kerala	50147	36826	123	45	NA	20.8	135	1.36	3025	94	4.40
Hatharas	Uttar Pradesh	50460	32473	206	99	80	12.8	159	1.55	662.8	148	31.50
Anand	Gujarat	50857	21656	319	95	79	17.1	155	2.35	551.8	189	13.60
Panchkula	Haryana	51350	30118	NA	NA	NA	3.5	191	1.70	1282.7	24	NA
Nainital	Uttrakhand	51483	17542	171	59	50	36.3	169	2.93	1528	48	40.50
Midnapur (West)	West Bengal	51522	NA	147	75	NA	11.5	164	NA	1650	559	21.8
Jagatsingpur	Orissa	51722	28057	63	56	NA	16.1	188	1.84	1501.3	98	37.30
Puri	Orissa	52270	26663	94	61	NA	15.5	189	1.96	1449.1	138	27.00
Ernakulam	Kerala	52478	57651	157	27	NA	29.1	131	0.91	3250	162	12.50
Bangalore	Karnataka	52839	139034	121	4	4	22.2	104	0.38	735	387	6.60
Navsari	Gujarat	52950	25219	162	58	59	24.5	116	2.10	1715.4	147	6.50

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Vaishali	Bihar	53003	11751	160	51	42	21.7	153	4.51	1183	126	41.60
Faridabad	Haryana	53120	27457	326	78	80	2.3	185	1.93	534.4	145	37.60
Kolar	Karnataka	53122	24013	138	21	23	30.5	103	2.21	641	358	12.90
Kaithal	Haryana	53401	44852	392	99	100	0.5	193	1.19	455.3	197	12.40
Kasargod	Kerala	53476	114540	25	34	NA	27.1	115	0.47	3480	132	22.60
Phulbani (‘Kandhamal)	Orissa	53537	29593	5	12	NA	27.3	154	1.81	1597.1	118	76.60
Jalandhar	Punjab	53572	76468	399	99	98	5.7	175	0.70	1041	240	0.90
Lucknow	Uttar Pradesh	53651	21434	214	91	84	17.9	154	2.50	959.2	138	35.60
Sonepat	Haryana	53740	28374	490	100	92	1.6	190	1.89	503.5	147	24.50
Bilaspur	Himachal Pradesh	53740	13650	75	11	10	12.4	192	3.94	946.06	30	6.90
Cuddalore	Tamil Nadu	53872	17862	204	68	62	11.0	129	3.02	1235.8	214	14.00
Bankura	West Bengal	53966	19637	158	96	NA	15.1	131	2.75	1466	343	28.50
24 Parganas (South)	West Bengal	54009	21853	NA	NA	NA	13.5	140	2.47	1765	381	18.50
Ambala	Haryana	54168	74504	312	83	83	2.6	153	0.73	999.1	133	3.10
Namakkal	Tamil Nadu	54250	19794	47	28	30	17.9	127	2.74	776.5	164	18.50
Bokaro	Jharkhand	54310	3689	42	NA	NA	15.3	164	14.72	1250.0	15	52.40

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Sirsa	Haryana	54333	73530	255	82	86	0.8	176	0.74	172.5	394	9.40
Guntur	Andhra Pradesh	54937	22410	294	46	40	3.5	129	2.45	851	598	3.90
Sivhar	Bihar	55682	10194	13	50	33	21.3	161	5.46	NA	26	14.80
Farrukhabad	Uttar Pradesh	55906	27088	360	82	74	19.9	144	2.06	795.4	152	28.50
N.Shahar	Punjab	56807	62579	387	90	86	2.7	194	0.91	1041	95	1.20
Theni	Tamil Nadu	56960	18716	217	47	50	22.1	107	3.04	833.5	110	16.00
Bhatinda	Punjab	57613	67080	344	98	99	1.9	185	0.86	460	298	23.10
J.B.Phule Ngr.	Uttar Pradesh	58028	32562	317	85	84	5.8	153	1.78	944.3	171	4.70
Faridkot	Punjab	58046	56567	501	99	98	1.0	197	1.03	460	126	23.90
Kottayam	Kerala	58143	72827	147	8	NA	30.5	128	0.80	3047	169	6.90
Ferozpur	Punjab	58604	75742	351	100	98	1.9	191	0.77	537	475	17.90
Mansha	Punjab	58906	67457	354	97	100	0.5	191	0.87	460	190	16.60
Thrissur	Kerala	59129	51058	138	62	NA	21.0	142	1.16	3097	139	13.10
Burdwan	West Bengal	59664	25248	269	96	NA	10.4	184	2.36	1314	462	20.30
Palakkad	Kerala	60175	29938	137	35	NA	23.4	159	2.01	2363	201	11.20
Kozhikode	Kerala	60376	103231	102	3	NA	20.9	144	0.58	3185	159	25.30
Mukatsar	Punjab	60394	74386	352	97	100	1.8	198	0.81	779	224	28.30

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Haridwar	Uttrakhand	60561	40898	203	89	86	12.1	144	1.48	1182	120	44.40
Patiala	Punjab	60818	69065	399	96	97	2.5	194	0.88	870	303	2.60
Bijnor	Uttar Pradesh	61005	40489	185	88	86	1.7	132	1.51	1108.3	338	17.90
Kapurthala	Punjab	61381	88006	375	99	98	4.4	199	0.70	708	136	4.20
East Godavari	Andhra Pradesh	61517	21233	348	64	62	9.2	178	2.90	1218	417	3.30
Fatehbad	Haryana	61787	55524	311	98	96	0.6	186	1.11	254.9	220	13.20
Surat	Gujarat	62395	35780	210	57	59	13.1	109	1.74	1140.8	424	23.10
Moga	Punjab	62821	66742	414	100	99	1.8	195	0.94	779	200	25.20
Koderma	Jharkhand	62954	9918	108	NA	NA	28.9	122	6.35	1019.0	17	38.10
Dinajpur(South)	West Bengal	63143	29292	199	38	NA	14.7	162	2.16	2083	191	48.90
Saharanpur	Uttar Pradesh	63311	40605	270	91	90	8.3	155	1.56	949.3	275	14.60
Fatehgarh Sahib	Punjab	63515	92099	399	100	100	1.5	187	0.69	870	103	6.20
West Godavari	Andhra Pradesh	64600	23783	488	83	86	7.2	157	2.72	1152	429	4.40
Panipat	Haryana	64742	41533	616	93	95	1.8	199	1.56	411.9	93	22.70
Sangrur	Punjab	65002	74794	383	100	100	1.0	198	0.87	779	440	6.20
Yamuna Nagar	Haryana	65998	78592	436	90	86	2.2	163	0.84	908.6	125	7.60

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Malappuram	Kerala	66022	61116	60	12	NA	28.1	139	1.08	2560	197	19.30
Kanya Kumari	Tamil Nadu	67432	54104	170	35	41	27.4	114	1.25	1006	79	19.80
Birbhum	West Bengal	67497	31514	210	91	NA	15.0	166	2.14	1344	316	39.20
Karnal	Haryana	67825	57923	637	96	98	1.2	197	1.17	444.4	196	5.90
Ghaziabad	Uttar Pradesh	69057	44628	315	93	100	5.2	165	1.55	720.2	148	14.90
Ludhiana	Punjab	69145	93238	479	100	100	2.5	198	0.74	706	306	8.90
Kurkshetra	Haryana	69196	72274	454	100	95	2.9	182	0.96	461.2	150	2.40
Dakshinak-annada	Karnataka	69707	100778	107	55	47	9.0	122	0.69	3953	132	11.20
Cooch-Behar	West Bengal	69965	27610	265	28	NA	11.8	192	2.53	3244	255	11.20
Trivandrum	Kerala	70845	46042	57	2	NA	33.0	130	1.54	1955	140	3.70
Idukki	Kerala	71546	70277	84	7	NA	19.7	128	1.02	3946	231	3.40
Jalpaiguri	West Bengal	72160	49311	182	37	NA	19.3	164	1.46	3454	339	29.00
Kodagu(Coorg)	Karnataka	73239	352024				5.2	101	0.21	2840	150	NA
Midnapur (East)	West Bengal	73819	NA	278	36	NA	18.3	173	NA	1650	297	21.8
24 Parganas (North)	West Bengal	73991	68070	118	40	NA	17.1	157	1.09	1766	642	20.60

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Malda	West Bengal	75069	25045	234	53	NA	15.7	197	3.00	1594	230	46.00
Dinajur(North)	West Bengal	75599	31641	141	48	NA	18.0	191	2.39	2083	271	49.00
Hooghly	West Bengal	75915	23269	492	94	NA	19.4	235	3.26	1438	222	21.10
Srinagar	Jammu & Kashmir	75936	35836	121	74	76	25.2	127	2.12	NA	22	6.10
Muzaffarnagar	Uttar Pradesh	77353	36456	322	99	98	3.0	148	2.12	758.6	326	30.60
Pathanamthitta	Kerala	77809	57362	51	6	NA	43.1	129	1.36	3087	90	5.20
Bagpat	Uttar Pradesh	78106	38160	324	95	100	1.8	159	2.05	720.2	111	28.20
Sirmaur	Himachal Pradesh	78552	19108	68	34	34	26.0	183	4.11	1245.74	41	7.70
Kollam	Kerala	79182	62197	46	1	NA	36.5	135	1.27	2729	140	7.00
Darjeeling	West Bengal	81617	83317	246	18	NA	37.9	123	0.98	3088	143	14.70
Meerut	Uttar Pradesh	81855	48990	322	95	100	6.5	154	1.67	720.2	199	6.50
Wynad	Kerala	82604	65758	82	8	NA	31.4	177	1.26	3622	117	22.20
Murshidabad	West Bengal	87826	38160	148	57	NA	10.3	239	2.30	1366	404	55.90
Nadia	West Bengal	88997	38968	NA	NA	NA	9.3	260	2.28	1386	304	NA
Solan	Himachal Pradesh	95329	24710	93	25	29	19.2	164	3.86	852.4	39	4.70
Kinnaur	Himachal Pradesh	97104	22635	21	60	61	86.0	117	4.29	612.8	7	7.00
The Nilgiris	Tamil Nadu	98679	125222	NA	NA	NA	50.9	100	0.79	1695.7	79	NA
Kulu	Himachal Pradesh	102052	21721	89.0	8	NA	37.5	179	4.70	900.44	36	NA
Howrah	West Bengal	114815	45369	749	91	NA	25.4	217	2.53	1501	86	21.60

Annexure 4:

Per hectare productivity in various districts of India arranged in alphabetic orders of various states, alongwith other salient characteristics

State	District	Prod./ ha	Prod./ worker	FERT_ NSAN-PK /ha.	NIA %	GIA%	FVA %	Crop Inten-sity %	Work-er/ hect-are	Rain-fall: mm	Net sown area: 000ha	Rural poor %
Andhra Pradesh	Adilabad	19436	15431	74	15	15	5.9	102	1.26	1157	546	26.10
Andhra Pradesh	Anantpur	16477	13914	56	11	13	4.3	105	1.18	553	1018	20.20
Andhra Pradesh	Chittoor	32794	10657	108	34	40	19.3	110	3.08	935	378	15.90
Andhra Pradesh	Cuddapah	28315	15199	117	31	34	9.8	115	1.86	700	397	5.40
Andhra Pradesh	East Godavari	61517	21233	348	64	62	9.2	178	2.90	1218	417	3.30
Andhra Pradesh	Guntur	54937	22410	294	46	40	3.5	129	2.45	851	598	3.90
Andhra Pradesh	Karimnagar	34577	12034	296	57	62	4.4	134	2.87	967	357	7.20
Andhra Pradesh	Khammam	36108	17335	172	38	40	10.7	109	2.08	1124	430	13.10
Andhra Pradesh	Krishna	44069	17977	352	65	51	13.0	143	2.45	1034	445	2.80
Andhra Pradesh	Kurnool	22115	16183	149	17	19	5.3	109	1.37	670	873	24.60
Andhra Pradesh	Mahaboobnagar	15704	8342	87	18	22	4.8	108	1.88	604	708	11.80
Andhra Pradesh	Medak	24232	11719	96	25	29	4.3	126	2.07	874	423	9.30
Andhra Pradesh	Nalgonda	26876	12317	206	32	38	12.1	116	2.18	751	495	5.40
Andhra Pradesh	Nellore	37897	15379	240	73	72	14.8	110	2.46	1080	308	14.10
Andhra Pradesh	Nizamabad	42167	13208	371	58	61	4.0	150	3.19	1036	206	23.10

contd…

State	District	Prod./ ha	Prod./ worker	FERT_ NSAN-PK /ha.	NIA %	GIA%	FVA %	Crop Inten-sity %	Work-er/ hect-are	Rain-fall: mm	Net sown area: 000ha	Rural poor %
Andhra Pradesh	Prakasam	28885	15504	145	23	23	6.4	110	1.86	872	565	9.90
Andhra Pradesh	Rangareddy	27508	12087	411	21	26	11.6	110	2.28	781	253	10.90
Andhra Pradesh	Srikakulam	28711	10550	136	59	47	4.8	137	2.72	1162	302	6.00
Andhra Pradesh	Visakhapatnam	31855	11267	94	31	33	11.3	127	2.83	1202	302	18.90
Andhra Pradesh	Vizianagarm	31851	12517	97	42	37	12.3	135	2.54	1131	315	4.70
Andhra Pradesh	Warangal	33895	14531	216	61	59	4.1	125	2.33	993	458	0.90
Andhra Pradesh	West Godavari	64600	23783	488	83	86	7.2	157	2.72	1152	429	4.40
Arunachal Pradesh	Changlang	18945	6566	NA	32	23	NA	141	2.89	NA	16	NA
Arunachal Pradesh	East Kameng	15396	6206	NA	19	12	NA	168	2.48	NA	8	NA
Arunachal Pradesh	East Siang	18702	24335	NA	57	59	NA	101	0.77	NA	25	NA
Arunachal Pradesh	Lohit	33754	17489	NA	14	7	NA	190	1.93	NA	20	NA
Arunachal Pradesh	Lower Subansiri	13767	NA	NA	17	13	NA	131	NA	NA	18	NA
Arunachal Pradesh	Paumpare	31194	16540	NA	22	10	NA	218	1.89	NA	6	NA

contd…

State	District	Prod./ ha	Prod./ worker	FERT_ NSAN-PK /ha.	NIA %	GIA%	FVA %	Crop Inten-sity %	Work-er/ hect-are	Rain-fall: mm	Net sown area: 000ha	Rural poor %
Arunachal Pradesh	Tawang	25485	10605	NA	13	7	NA	177	2.40	NA	4	NA
Arunachal Pradesh	Tirap	8196	NA	NA	3	2	NA	133	NA	NA	14	NA
Arunachal Pradesh	Upper Siang	16159	8001	NA	58	33	NA	177	2.02	NA	6	NA
Arunachal Pradesh	Upper Subansiri	14431	7261	NA	19	16	NA	121	1.99	NA	8	NA
Arunachal Pradesh	West Kameng	16008	5889	NA	8	5	NA	150	2.72	NA	5	NA
Arunachal Pradesh	West Siang	9969	8687	NA	27	23	NA	120	1.15	NA	24	NA
Assam	Barpeta	26316	16148	93	NA	NA	11.3	154	1.63	1909.1	180	39.90
Assam	Bongaigaon	24856	14181	106	NA	NA	8.5	165	1.75	3219.4	95	33.00
Assam	Cachar	29728	21491	44	NA	NA	14.8	127	1.38	2366.1	115	33.50
Assam	Darrang	23248	14343	87	NA	NA	10.2	143	1.62	1796.6	205	0.10
Assam	Dhemaji	20099	6200	4	NA	NA	7.8	162	3.24	3471.7	63	0.00
Assam	Dhubri	23955	11983	118	NA	NA	7.7	153	2.00	3225.2	144	42.40
Assam	Dibrugarh	24931	19667	55	NA	NA	9.1	129	1.27	2249.7	138	19.20
Assam	Goalpara	26513	13930	116	NA	NA	10.3	137	1.90	2458.7	79	33.90

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State	District	Prod./ ha	Prod./ worker	FERT_ NSAN-PK /ha.	NIA %	GIA%	FVA %	Crop Inten-sity %	Work-er/ hect-are	Rain-fall: mm	Net sown area: 000ha	Rural poor %
Assam	Golaghat	33595	17444	31	NA	NA	14.2	128	1.93	2118.6	117	25.50
Assam	Hailakandi	34515	17890	30	NA	NA	11.7	141	1.93	3094.2	46	7.00
Assam	Jorhat	29632	18585	59	NA	NA	12.6	143	1.59	1803.7	120	27.50
Assam	Kamrup	25674	16338	81	NA	NA	9.3	140	1.57	1428.6	180	22.30
Assam	Karbi-Anglong	24433	12779	6	NA	NA	5.0	154	1.91	1121.5	126	26.50
Assam	Karimganj	29037	16638	60	NA	NA	9.2	140	1.75	4559.9	69	40.90
Assam	Kokrajhar	25176	9419	70	NA	NA	7.8	160	2.67	3767.7	85	35.70
Assam	Lakhimpur	22188	5913	17	NA	NA	7.7	172	3.75	1544.6	100	1.40
Assam	Morigon	19645	9468	65	NA	NA	4.3	135	2.07	1165.8	92	21.50
Assam	N C Hills	43716	32482	2	NA	NA	30.2	127	1.35	1144.9	28	6.10
Assam	Nagaon	31306	17289	109	NA	NA	9.3	151	1.81	1541.7	235	25.30
Assam	Nalbari	23830	18504	74	NA	NA	10.1	137	1.29	1904.4	154	15.00
Assam	Sibsagar	26683	19728	11	NA	NA	7.4	111	1.35	1900.8	138	20.30
Assam	Sonitpur	26405	14776	29	NA	NA	9.4	147	1.79	1646.1	166	3.60
Assam	Tinsukia	27805	15765	54	NA	NA	13.8	142	1.76	2609.6	99	14.40
Bihar	Araria	17399	4258	76	38	38	4.3	156	4.09	1817	182	54.60
Bihar	Arval	23959	NA	NA	79	81	6.9	130	NA	NA	41	NA

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State	District	Prod./ ha	Prod./ worker	FERT_ NSAN-PK /ha.	NIA %	GIA%	FVA %	Crop Inten-sity %	Work-er/ hect-are	Rain-fall: mm	Net sown area: 000ha	Rural poor %
Bihar	Aurangabad	25023	9217	123	81	78	6.7	123	2.71	1153	197	55.40
Bihar	Banka	22787	6392	22	58	69	10.0	105	3.56	NA	153	59.80
Bihar	Begusarai	41743	9844	274	69	52	14.2	145	4.24	1118	117	56.70
Bihar	Bhabhua	28537	11948	78	75	82	5.8	128	2.39	NA	153	42.00
Bihar	Bhagalpur	30944	7520	173	40	46	13.7	121	4.11	1146	142	45.20
Bihar	Bhojpur	23144	8733	207	65	82	8.6	112	2.65	1079	184	41.60
Bihar	Buxar	23632	10501	96	65	79	8.0	111	2.25	NA	139	54.20
Bihar	Champaran(East)	23708	6586	128	42	48	9.9	114	3.60	1253	294	20.10
Bihar	Champaran(West)	25038	7232	158	35	48	8.6	134	3.46	1216	281	76.90
Bihar	Darbhanga	33639	7472	141	44	50	16.7	120	4.50	1258	172	42.20
Bihar	Gaya	20364	3645	193	74	83	7.7	122	5.59	1095	179	37.50
Bihar	Gopalganj	26178	7504	48	66	47	8.1	154	3.49	1187	150	27.40
Bihar	Jahanabad	22617	3809	181	84	82	7.1	124	5.94	1095	63	54.20
Bihar	Jamui	17640	2950	118	34	39	8.5	109	5.98	NA	78	46.30
Bihar	Katihar	35215	7678	62	46	48	11.4	164	4.59	1492	164	36.50
Bihar	Khagaria	39959	8921	329	85	64	10.4	157	4.48	1179	84	16.70
Bihar	Kishanganj	24416	9063	18	23	26	6.7	149	2.69	2422	130	62.30

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State	District	Prod./ ha	Prod./ worker	FERT_ NSAN-PK /ha.	NIA %	GIA%	FVA %	Crop Inten-sity %	Work-er/ hect-are	Rain-fall: mm	Net sown area: 000ha	Rural poor %
Bihar	Lakhisarai	16776	4794	83	61	68	3.8	121	3.50	NA	64	38.60
Bihar	Madhubani	18270	4019	31	45	44	7.4	141	4.55	1414	225	59.20
Bihar	Madhupura	42908	9040	112	62	65	12.8	156	4.75	NA	129	7.70
Bihar	Monghyr	36570	9022	63	66	62	12.5	139	4.05	956	47	35.60
Bihar	Muzafarpur	41428	10564	190	53	39	14.3	164	3.92	1250	207	65.30
Bihar	Nalanda	33303	8560	166	63	84	15.2	124	3.89	1069	181	44.80
Bihar	Nawadha	27160	5104	97	73	85	10.6	122	5.32	NA	102	38.80
Bihar	Patna	32367	8448	170	60	70	12.8	118	3.83	1110	206	44.70
Bihar	Purnea	24008	6232	191	43	56	8.5	137	3.85	1483	216	29.00
Bihar	Rohtas	32321	14968	151	99	90	5.4	139	2.16	1142	254	34.60
Bihar	Saharsa	40025	8718	91	52	50	10.3	177	4.59	1525	108	21.10
Bihar	Samastipur	30554	6729	188	54	45	14.2	137	4.54	1173	185	52.30
Bihar	Saran	26790	8167	82	55	51	9.7	121	3.28	1168	193	55.90
Bihar	Sheikhpura	25112	6174	177	82	75	8.5	129	4.07	NA	38	28.60
Bihar	Sitamarhi	33042	5717	111	45	38	12.0	144	5.78	1294	117	28.10
Bihar	Sivhar	55682	10194	13	50	33	21.3	161	5.46	NA	26	14.80
Bihar	Siwan	21261	6321	73	61	45	7.7	148	3.36	1154	163	30.20

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State	District	Prod./ ha	Prod./ worker	FERT_ NSAN-PK /ha.	NIA %	GIA%	FVA %	Crop Intensity %	Worker/ hectare	Rainfall: mm	Net sown area: 000ha	Rural poor %
Bihar	Supaul	22631	5201	48	60	54	3.9	173	4.35	NA	151	20.00
Bihar	Vaishali	53003	11751	160	51	42	21.7	153	4.51	1183	126	41.60
Chhattisgarh	Bastar	11970	7588	12	2	2	1.4	103	1.58	1358.5	351	80.60
Chhattisgarh	Bilaspur	23524	13775	97	38	30	7.0	131	1.71	1089.6	368	34.80
Chhattisgarh	Dantewara	9017	7780	3	2	2	0.9	101	1.16	1283.3	290	88.20
Chhattisgarh	Dhamtari	26627	12675	205	74	51	5.5	159	2.10	1223.6	134	38.50
Chhattisgarh	Durg	22068	16190	76	36	30	4.0	142	1.36	1064.1	550	35.50
Chhattisgarh	Janjgir-Champa	15406	8411	138	52	49	2.7	117	1.83	1165.4	262	29.80
Chhattisgarh	Jashpur	11108	7942	12	3	3	3.0	106	1.40	1447	250	35.00
Chhattisgarh	Kanker	16349	11374	41	9	9	3.3	107	1.44	1335	207	53.10
Chhattisgarh	Kawardha	11358	8263	48	20	19	1.3	128	1.37	712.2	185	16.90
Chhattisgarh	Korba	15900	7584	16	5	5	6.9	107	2.10	1465.2	133	22.70
Chhattisgarh	Koriya	15071	7968	24	6	7	5.7	112	1.89	1377.8	106	49.70
Chhattisgarh	Mahasmund	13277	10211	74	24	23	0.7	110	1.30	2226.2	267	21.40
Chhattisgarh	Raigarh	16094	9399	90	19	19	5.9	112	1.71	1259.7	281	23.60
Chhattisgarh	Raipur	13247	9156	91	48	40	0.5	122	1.45	944.4	549	31.20
Chhattisgarh	Rajnandgaon	13334	9246	53	18	16	1.6	125	1.44	1108.3	360	58.60

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State	District	Prod./ ha	Prod./ worker	FERT_ NSAN-PK /ha.	NIA %	GIA%	FVA %	Crop Inten-sity %	Work-er/ hect-are	Rain-fall: mm	Net sown area: 000ha	Rural poor %
Chhattisgarh	Surguja	14244	8039	41	8	7	5.1	116	1.77	1391.6	483	49.70
Gujarat	Ahmedabad	19301	26903	96	34	38	3.8	110	0.72	621	509	11.30
Gujarat	Amreli	24327	34780	80	19	21	3.0	105	0.70	479.4	547	0.50
Gujarat	Anand	50857	21656	319	95	79	17.1	155	2.35	551.8	189	13.60
Gujarat	Banas Kantha	27577	28275	94	48	46	4.8	139	0.98	462	744	26.00
Gujarat	Bhavnagar	28001	37014	97	35	35	10.3	111	0.76	521.2	561	1.20
Gujarat	Broach	32827	34619	96	31	32	6.5	102	0.95	770.6	332	17.10
Gujarat	Dahod	14933	4700	37	27	25	1.6	141	3.18	583.6	212	41.40
Gujarat	Dangs	11759	8282	3	1	1	4.0	104	1.42	2262.6	56	88.40
Gujarat	Gandhinagar	31739	23406	113	59	57	10.2	122	1.36	541.8	164	5.20
Gujarat	Jamnagar	32233	56677	84	20	22	2.4	113	0.57	589.6	609	0.00
Gujarat	Junagarh	44403	36946	133	33	32	7.5	128	1.20	720.6	534	0.00
Gujarat	Kheda	29243	17006	193	65	63	8.5	130	1.72	668.4	310	42.40
Gujarat	Kutch	17569	NA	52	26	31	4.8	107	NA	312.4	680	20.00
Gujarat	Mahesana	26424	23245	109	57	55	9.0	128	1.14	632.8	349	27.30
Gujarat	Narmada	37723	20449	52	23	25	7.5	108	1.84	775	111	24.50
Gujarat	Navsari	52950	25219	162	58	59	24.5	116	2.10	1715.4	147	6.50

contd…

State	District	Prod./ ha	Prod./ worker	FERT_ NSAN-PK /ha.	NIA %	GIA%	FVA %	Crop Intensity %	Worker/ hectare	Rainfall: mm	Net sown area: 000ha	Rural poor %
Gujarat	Panch Mahals	11538	4185	123	16	17	1.8	108	2.76	690.6	276	38.30
Gujarat	Patan	14263	16186	50	27	30	1.5	109	0.88	393	387	42.40
Gujarat	Porbander	34721	37862	37	16	17	4.4	112	0.92	431.8	119	0.00
Gujarat	Rajkot	38607	66835	139	28	30	2.7	114	0.58	489.4	763	10.40
Gujarat	Sabarkantha	23600	17788	151	32	33	5.3	119	1.33	567.6	447	20.20
Gujarat	Surat	62395	35780	210	57	59	13.1	109	1.74	1140.8	424	23.10
Gujarat	Surendranagar	21618	37711	78	16	18	2.3	105	0.57	470.6	702	20.50
Gujarat	Vadodara	25405	16217	132	41	44	7.6	110	1.57	686.2	516	5.60
Gujarat	Valsad	31832	15108	106	28	29	30.7	111	2.11	1769.4	161	3.40
Haryana	Ambala	54168	74504	312	83	83	2.6	153	0.73	999.1	133	3.10
Haryana	Bhiwani	32936	33566	98	67	50	0.3	198	0.98	314.3	399	18.30
Haryana	Faridabad	53120	27457	326	78	80	2.3	185	1.93	534.4	145	37.60
Haryana	Fatehbad	61787	55524	311	98	96	0.6	186	1.11	254.9	220	13.20
Haryana	Gurgaon	39511	26297	166	52	68	1.7	174	1.50	484.9	169	6.20
Haryana	Hissar	49688	39581	237	83	84	0.8	198	1.26	269.8	313	15.20
Haryana	Jhajjer	29143	19807	145	81	78	0.5	151	1.47	776.4	154	6.60
Haryana	Jind	49691	35247	289	90	85	0.7	187	1.41	429.4	247	14.60

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State	District	Prod./ ha	Prod./ worker	FERT_ NSAN- PK /ha.	NIA %	GIA%	FVA %	Crop Inten- sity %	Work- er/ hect- are	Rain- fall: mm	Net sown area: 000ha	Rural poor %
Haryana	Kaithal	53401	44852	392	99	100	0.5	193	1.19	455.3	197	12.40
Haryana	Karnal	67825	57923	637	96	98	1.2	197	1.17	444.4	196	5.90
Haryana	Kurkshetra	69196	72274	454	100	95	2.9	182	0.96	461.2	150	2.40
Haryana	Mahendra Garh	30652	20125	156	79	53	0.3	173	1.52	310.9	152	8.40
Haryana	Panchkula	51350	30118	NA	NA	NA	3.5	191	1.70	1282.7	24	NA
Haryana	Panipat	64742	41533	616	93	95	1.8	199	1.56	411.9	93	22.70
Haryana	Rewari	26501	17473	184	86	80	0.4	154	1.52	409	128	16.80
Haryana	Rohtak	35230	26338	237	78	82	0.7	155	1.34	454	142	6.00
Haryana	Sirsa	54333	73530	255	82	86	0.8	176	0.74	172.5	394	9.40
Haryana	Sonepat	53740	28374	490	100	92	1.6	190	1.89	503.5	147	24.50
Haryana	Yamuna Nagar	65998	78592	436	90	86	2.2	163	0.84	908.6	125	7.60
Himachal Pradesh	Bilaspur	53740	13650	75	11	10	12.4	192	3.94	946.06	30	6.90
Himachal Pradesh	Chamba	33030	8146	27	14	10	19.5	158	4.05	1637.46	42	20.70
Himachal Pradesh	Hamirpur	36719	8778	78	5	5	7.9	199	4.18	1242.42	35	6.30
Himachal Pradesh	Kangra	43128	13464	77	31	30	17.4	188	3.20	1581.32	117	11.40

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State	District	Prod./ ha	Prod./ worker	FERT_ NSAN-PK /ha.	NIA %	GIA%	FVA %	Crop Intensity %	Worker/ hectare	Rainfall: mm	Net sown area: 000ha	Rural poor %
Himachal Pradesh	Kinnaur	97104	22635	21	60	61	86.0	117	4.29	612.8	7	7.00
Himachal Pradesh	Kulu	102052	21721	89.0	8	NA	37.5	179	4.70	900.44	36	NA
Himachal Pradesh	Lahaul & Spiti	150453	39684	91.0	91	NA	86.6	104	3.79	483.38	3	NA
Himachal Pradesh	Mandi	44401	11302	76	16	16	20.6	187	3.93	1290.36	86	10.00
Himachal Pradesh	Simla	135950	37116	123.0	31	NA	53.1	141	3.66	957.22	68	NA
Himachal Pradesh	Sirmaur	78552	19108	68	34	34	26.0	183	4.11	1245.74	41	7.70
Himachal Pradesh	Solan	95329	24710	93	25	29	19.2	164	3.86	852.4	39	4.70
Himachal Pradesh	Una	40568	11807	165	23	21	8.6	192	3.44	1171.44	37	6.10
Jammu & Kashmir	Anantnagh	28630	10524	199	59	71	13.0	128	2.72	NA	76	0.00
Jammu & Kashmir	Baramulla	20562	16199	102	47	50	27.2	115	1.27	1270	82	6.00

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State	District	Prod./ ha	Prod./ worker	FERT_ NSAN-PK /ha.	NIA %	GIA%	FVA %	Crop Inten-sity %	Work-er/ hect-are	Rain-fall: mm	Net sown area: 000ha	Rural poor %
Jammu & Kashmir	Budgam	27617	8443	193	56	60	7.4	109	3.27	585	52	2.90
Jammu & Kashmir	Doda	11034	3348	22	11	10	0.8	127	3.30	NA	66	NA
Jammu & Kashmir	Jammu	29191	21370	119	52	51	0.6	179	1.37	NA	119	1.80
Jammu & Kashmir	Kargil	8473	3021	19	100	100	5.6	110	2.80	100	9	NA
Jammu & Kashmir	Kathua	29922	16415	47	34	34	0.2	196	1.82	1672	63	5.00
Jammu & Kashmir	Kupwara	12406	4202	88	44	43	21.9	105	2.95	NA	43	13.10
Jammu & Kashmir	Leh	15367	6316	20	83	100	6.0	103	2.43	100	10	NA
Jammu & Kashmir	Poonch	21689	4229	54	13	14	0.1	167	5.13	NA	27	NA
Jammu & Kashmir	Pulwanna	38220	18244	203	63	70	29.5	147	2.09	NA	56	0.00
Jammu & Kashmir	Rajouri	27782	9668	45	14	9	0.1	185	2.87	NA	53	NA

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State	District	Prod./ ha	Prod./ worker	FERT_ NSAN-PK /ha.	NIA %	GIA%	FVA %	Crop Inten-sity %	Work-er/ hect-are	Rain-fall: mm	Net sown area: 000ha	Rural poor %
Jammu & Kashmir	Srinagar	75936	35836	121	74	76	25.2	127	2.12	NA	22	6.10
Jammu & Kashmir	Udhampur	19385	5773	40	8	6	0.3	161	3.36	NA	70	9.30
Jharkhand	Bokaro	54310	3689	42	NA	NA	15.3	164	14.72	1250.0	15	52.40
Jharkhand	West Singhbhum	24460	6438	13	NA	NA	7.8	109	3.80	1314	176	53.80
Jharkhand	Chatra	37014	6740	73	NA	NA	16.3	111	5.49	NA	45	55.20
Jharkhand	Deogarh	27229	6081	119	NA	NA	10.3	104	4.48	1242	63	58.70
Jharkhand	Dhanbad	48468	10554	10	NA	NA	22.1	114	4.59	1300	34	19.30
Jharkhand	Dumka	29643	6758	47	NA	NA	8.4	104	4.39	1391	145	55.40
Jharkhand	Garhwa	27448	5152	50	NA	NA	8.1	136	5.33	NA	64	38.60
Jharkhand	Giridih	40076	6407	49	NA	NA	14.6	120	6.25	1145	77	30.50
Jharkhand	Godda	31070	7027	142	NA	NA	8.8	107	4.42	1282	77	41.30
Jharkhand	Gumla	13442	5019	10	NA	NA	3.1	103	2.68	1100	215	68.60
Jharkhand	Hazaribagh	30972	6625	111	NA	NA	12.4	111	4.67	1319	104	28.30
Jharkhand	East Singhbhum	33423	8690	64	NA	NA	8.2	175	3.85	1300	83	58.40
Jharkhand	Jamtara	27922	NA		NA	NA	9.3	105	NA	NA	55	NA
Jharkhand	Koderma	62954	9918	108	NA	NA	28.9	122	6.35	1019.0	17	38.10

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State	District	Prod./ ha	Prod./ worker	FERT_ NSAN- PK /ha.	NIA %	GIA%	FVA %	Crop Inten- sity %	Work- er/ hect- are	Rain- fall: mm	Net sown area: 000ha	Rural poor %
Jharkhand	Latehar	26795	NA		NA	NA	8.7	121	NA	NA	60	NA
Jharkhand	Lohardaga	32201	11382	139	NA	NA	12.3	112	2.83	1411	44	81.60
Jharkhand	Pakaur	27766	7721	40	NA	NA	10.9	107	3.60	1355.0	58	75.60
Jharkhand	Palamau	25626	5091	43	NA	NA	8.9	120	5.03	1237	126	54.30
Jharkhand	Ranchi	29817	11041	108	NA	NA	12.3	105	2.70	1530	253	23.20
Jharkhand	Sahibganj	30103	4916	110	NA	NA	9.5	116	6.12	1316	41	63.70
Jharkhand	Saraikela	18805	NA		NA	NA	4.0	108	NA	NA	60	NA
Jharkhand	Simdega	16061	NA		NA	NA	3.7	106	NA	NA	82	NA
Karnataka	Bagalkot	14628	13479	104	43	41	3.9	115	1.09	567	433	18.10
Karnataka	Bangalore	52839	139034	121	4	4	22.2	104	0.38	735	387	6.60
Karnataka	Belgaum	19801	11940	118	43	38	4.5	128	1.66	835	781	12.00
Karnataka	Bellary	18510	13003	227	36	38	2.9	117	1.42	613	433	40.00
Karnataka	Bidar	13494	14182	37	11	9	1.4	122	0.95	891	368	31.00
Karnataka	Bijapur	8664	13280	45	21	20	2.6	116	0.65	578	780	20.00
Karnataka	Chamrajnagar	23067	11922	100	28	26	5.0	121	1.93	696	165	13.80
Karnataka	Chikmagalur	27846	30513	131	11	11	10.1	109	0.91	2061	282	2.00
Karnataka	Chitradurga	18205	14305	48	18	18	5.5	118	1.27	472	409	24.80
Karnataka	Dakshinakannada	69707	100778	107	55	47	9.0	122	0.69	3953	132	11.20

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State	District	Prod./ ha	Prod./ worker	FERT_ NSAN- PK /ha.	NIA %	GIA%	FVA %	Crop Inten- sity %	Work- er/ hect- are	Rain- fall: mm	Net sown area: 000ha	Rural poor %
Karnataka	Devanagrre	26574	18794	139	35	39	3.7	117	1.41	595	364	42.20
Karnataka	Dharwad	10492	9408	73	12	9	9.9	152	1.12	772	328	9.70
Karnataka	Gadag	8466	10050	41	19	15	6.0	129	0.84	612	380	6.40
Karnataka	Gulbarga	11183	14559	65	14	15	0.9	119	0.77	777	1183	39.40
Karnataka	Hassan	23471	14892	128	22	21	12.9	117	1.58	1247	384	5.10
Karnataka	Haveri	17878	12773	87	16	14	5.4	125	1.40	753	355	55.10
Karnataka	Kodagu(Coorg)	73239	352024				5.2	101	0.21	2840	150	NA
Karnataka	Kolar	53122	24013	138	21	23	30.5	103	2.21	641	358	12.90
Karnataka	Koppal	15246	13412	132	31	31	2.4	129	1.14	577	356	3.70
Karnataka	Mandya	44446	16527	206	49	50	10.6	119	2.69	635	231	15.30
Karnataka	Mysore	35957	18472	135	36	28	2.7	150	1.95	739	334	14.20
Karnataka	Raichur	11073	12071	161	26	27	1.9	112	0.92	616	581	59.20
Karnataka	Shimoga	44492	21768	203	56	59	3.7	112	2.04	2694	217	7.80
Karnataka	Tumkur	19500	12201	52	22	22	2.9	106	1.60	541	574	20.60
Karnataka	Udupi	47718	NA	59	32	27	10.8	123	NA	4167	100	0.00
Karnataka	Uttarakannada	32732	15560	83	20	19	3.7	110	2.10	2836	108	47.60
Kerala	Alappuzha	50147	36826	123	45	NA	20.8	135	1.36	3025	94	4.40
Kerala	Ernakulam	52478	57651	157	27	NA	29.1	131	0.91	3250	162	12.50

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State	District	Prod./ ha	Prod./ worker	FERT_ NSAN-PK /ha.	NIA %	GIA%	FVA %	Crop Inten-sity %	Work-er/ hect-are	Rain-fall: mm	Net sown area: 000ha	Rural poor %
Kerala	Idukki	71546	70277	84	7	NA	19.7	128	1.02	3946	231	3.40
Kerala	Kannur	46336	61057	50	10	NA	32.6	129	0.76	3375	200	35.40
Kerala	Kasargod	53476	114540	25	34	NA	27.1	115	0.47	3480	132	22.60
Kerala	Kollam	79182	62197	46	1	NA	36.5	135	1.27	2729	140	7.00
Kerala	Kottayam	58143	72827	147	8	NA	30.5	128	0.80	3047	169	6.90
Kerala	Kozhikode	60376	103231	102	3	NA	20.9	144	0.58	3185	159	25.30
Kerala	Malappuram	66022	61116	60	12	NA	28.1	139	1.08	2560	197	19.30
Kerala	Palakkad	60175	29938	137	35	NA	23.4	159	2.01	2363	201	11.20
Kerala	Pathanamthitta	77809	57362	51	6	NA	43.1	129	1.36	3087	90	5.20
Kerala	Thrissur	59129	51058	138	62	NA	21.0	142	1.16	3097	139	13.10
Kerala	Trivandrum	70845	46042	57	2	NA	33.0	130	1.54	1955	140	3.70
Kerala	Wynad	82604	65758	82	8	NA	31.4	177	1.26	3622	117	22.20
Madhya Pradesh	Anuppur	6491	NA	1	2	2	0.5	120	NA	910	162	NA
Madhya Pradesh	Ashok Nagar	11381	NA	18	30	25	0.2	122	NA	676	306	NA
Madhya Pradesh	Balaghat	14817	6837	57	44	40	1.0	124	2.17	1474	263	53.50
Madhya Pradesh	Barwani	12001	6287	82	32	28	1.5	116	1.91		232	6.30
Madhya Pradesh	Betul	13898	11378	45	25	19	1.2	132	1.22	1129	401	53.70

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State	District	Prod./ ha	Prod./ worker	FERT_ NSAN-PK /ha.	NIA %	GIA%	FVA %	Crop Inten-sity %	Work-er/ hect-are	Rain-fall: mm	Net sown area: 000ha	Rural poor %
Madhya Pradesh	Bhind	16021	13846	80	33	31	0.6	108	1.16	1148	329	16.40
Madhya Pradesh	Bhopal	21219	23943	94	51	36	1.6	142	0.89	1211	153	34.50
Madhya Pradesh	Burhanpur	40855	NA	27	31	35	15.9	113	NA	497	104	14.10
Madhya Pradesh	Chhatarpur	15058	13265	66	54	43	1.6	126	1.14	1044	394	52.80
Madhya Pradesh	Chindwara	21210	17697	48	23	20	3.3	123	1.20	1094	484	30.90
Madhya Pradesh	Damoh	13707	15187	33	34	27	0.8	127	0.90	1218	310	49.00
Madhya Pradesh	Datia	17263	13987	56	58	50	0.8	118	1.23	973	200	14.70
Madhya Pradesh	Dewas	25753	22198	86	41	27	1.5	151	1.16	1079	385	17.70
Madhya Pradesh	Dhar	20151	15373	119	45	32	0.7	139	1.31	915	506	23.90
Madhya Pradesh	Dindori	7701	5269	4	1	1	0.1	133	1.46	1481	205	72.00
Madhya Pradesh	Guna	13659	8345	58	39	30	0.2	130	1.64	1222	326	16.60
Madhya Pradesh	Gwalior	23092	22605	119	55	56	1.2	125	1.02	900	209	20.50
Madhya Pradesh	Harda	24288	24482	138	76	44	0.2	175	0.99	916	173	37.20
Madhya Pradesh	Hoshangabad	25269	30582	164	85	51	1.2	167	0.83	1385	297	37.20
Madhya Pradesh	Indore	33077	30322	169	57	34	4.6	166	1.09	1054	259	21.80
Madhya Pradesh	Jabalpur	20541	17571	83	36	30	4.1	137	1.17	1447	275	33.30
Madhya Pradesh	Jhabua	9769	5495	55	16	14	0.6	117	1.78	768	360	56.90
Madhya Pradesh	Katni	12393	8762	73	30	26	1.9	133	1.41	1025	198	48.90

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State	District	Prod./ ha	Prod./ worker	FERT_ NSAN-PK /ha.	NIA %	GIA%	FVA %	Crop Inten-sity %	Work-er/ hect-are	Rain-fall: mm	Net sown area: 000ha	Rural poor %
Madhya Pradesh	Khandwa	13804	NA	112	35	28	2.2	125	NA	961	312	14.10
Madhya Pradesh	Khargaon	14751	NA	114	42	36	0.9	116	NA	888	409	4.70
Madhya Pradesh	Mandla	8801	4852	21	8	6	0.6	129	1.81	1425	218	73.70
Madhya Pradesh	Mandsaur	21412	16731	83	31	22	1.1	140	1.28	962	357	15.50
Madhya Pradesh	Morena	22755	15009	113	62	51	0.5	124	1.52	927	266	20.80
Madhya Pradesh	Narsimpur	24634	24048	47	56	43	1.0	132	1.02	1690	302	36.60
Madhya Pradesh	Neemach	27190	19375	114	34	23	0.9	147	1.40	749	187	0.20
Madhya Pradesh	Panna	8556	7236	30	33	28	0.9	116	1.18	1186	248	49.60
Madhya Pradesh	Raisen	14230	20768	62	42	36	0.4	117	0.69	1595	431	58.10
Madhya Pradesh	Rajgarh	18644	15321	58	40	28	0.6	141	1.22	1157	421	11.90
Madhya Pradesh	Ratlam	25030	20192	93	33	23	0.7	144	1.24	1078	330	17.10
Madhya Pradesh	Rewa	11718	6435	58	24	19	1.0	135	1.82	1079	371	43.10
Madhya Pradesh	Sagar	15399	18790	39	39	29	1.3	135	0.82	1395	536	55.70
Madhya Pradesh	Satna	12701	9308	70	37	28	1.8	133	1.36	1138	360	19.80
Madhya Pradesh	Sehore	23051	24004	73	57	37	0.4	157	0.96	1169	383	39.10
Madhya Pradesh	Seoni	13062	10105	25	26	21	0.8	128	1.29	1447	366	60.00
Madhya Pradesh	Shahdol	8046	2797	26	9	8	0.8	116	2.88	1335	176	64.40
Madhya Pradesh	Shajapur	20239	17863	63	43	29	1.7	149	1.13	1117	452	29.00

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State	District	Prod./ ha	Prod./ worker	FERT_ NSAN-PK /ha.	NIA %	GIA%	FVA %	Crop Inten-sity %	Work-er/ hect-are	Rain-fall: mm	Net sown area: 000ha	Rural poor %
Madhya Pradesh	Sheopur Kala	23165	19445	93	67	57	0.5	123	1.19	730	157	37.60
Madhya Pradesh	Shivpuri	18397	13775	46	47	36	0.5	132	1.34	1179	405	38.70
Madhya Pradesh	Sidhi	9336	5368	24	17	13	0.9	136	1.74	1174	358	57.60
Madhya Pradesh	Tikamgarh	20891	11546	73	73	56	2.0	153	1.81	1100	255	44.10
Madhya Pradesh	Ujjain	22654	21675	89	44	28	1.3	158	1.05	1088	489	28.90
Madhya Pradesh	Umaria	7084	4569	21	18	14	0.7	130	1.55	1093	108	76.40
Madhya Pradesh	Vidisha	15478	24546	53	43	34	0.3	126	0.63	1331	534	51.30
Maharashtra	Ahmednagar	9921	8114	93	25	28	3.0	109	1.22	676	1103	10.30
Maharashtra	Akola	12661	12270	79	3	3	2.4	110	1.03	878	436	23.40
Maharashtra	Amravati	20903	19783	52	9	10	5.9	106	1.06	976	751	39.50
Maharashtra	Aurangabad	11076	9935	106	22	24	0.4	116	1.11	786	692	46.50
Maharashtra	Beed	9796	9791	64	27	30	1.9	113	1.00	685	762	55.00
Maharashtra	Bhandara	25893	23995	61	53	48	3.8	138	1.08	1349	362	51.20
Maharashtra	Buldhana	12364	9949	88	6	7	0.8	107	1.24	901	676	31.00
Maharashtra	Chandrapur	16986	12213	79	20	22	1.4	115	1.39	1474	451	30.10
Maharashtra	Dhule	11921	9633	108	12	14	1.9	105	1.24	738	435	38.20
Maharashtra	Gadchiroli	13644	5500	73	28	31	1.0	113	2.48	1574	169	65.00
Maharashtra	Jalgaon	47868	35601	157	17	19	5.9	108	1.34	841	851	22.80

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State	District	Prod./ ha	Prod./ worker	FERT_ NSAN-PK /ha.	NIA %	GIA%	FVA %	Crop Intensity %	Worker/ hectare	Rainfall: mm	Net sown area: 000ha	Rural poor %
Maharashtra	Jalna	12661	12791	98	16	17	2.3	116	0.99	1472	579	35.80
Maharashtra	Kolhapur	34446	15068	202	24	29	2.1	102	2.29	1137	428	8.40
Maharashtra	Latur	13139	10843	70	6	6	0.9	134	1.21	891	521	53.90
Maharashtra	Nandurbar	12357	7274	86	20	23	NA	111	1.70	NA	296	49.40
Maharashtra	Nagpur	24590	22217	127	9	9	8.0	107	1.11	1242	547	39.30
Maharashtra	Nanded	21311	16464	86	11	13	1.6	113	1.29	915	705	42.80
Maharashtra	Nasik	33750	21206	130	21	24	10.1	108	1.59	591	877	48.00
Maharashtra	Osmanabad	9391	8582	30	21	16	0.6	160	1.09	809	481	10.30
Maharashtra	Parbhani	15125	14901	85	11	8	1.2	167	1.02	905	490	52.20
Maharashtra	Pune	28935	22069	101	25	27	8.4	114	1.31	715	946	6.70
Maharashtra	Raigad	28952	11917	69	6	7	4.7	103	2.43	2655	188	26.60
Maharashtra	Ratnagiri	46345	22017	32	1	1	32.8	121	2.10	3025	245	16.90
Maharashtra	Sangli	23091	15873	118	20	20	2.6	121	1.45	571	596	17.50
Maharashtra	Satara	21327	12375	92	34	36	4.9	116	1.72	1119	539	4.90
Maharashtra	Sindhudurg	36378	18770	47	18	20	32.2	115	1.94	2493	140	2.30
Maharashtra	Solapur	14677	13499	67	20	23	3.1	112	1.09	743	1027	11.00
Maharashtra	Thane	30163	10271	78	5	6	3.2	117	2.94	2617	245	40.30
Maharashtra	Wardha	23779	22341	61	7	7	2.2	119	1.06	1144	365	20.90

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State	District	Prod./ ha	Prod./ worker	FERT_ NSAN-PK /ha.	NIA %	GIA%	FVA %	Crop Inten-sity %	Work-er/ hect-are	Rain-fall: mm	Net sown area: 000ha	Rural poor %
Maharashtra	Washim	11950	11530	53	3	4	NA	112	1.04		379	23.80
Maharashtra	Yavatmal	13601	12939	65	6	7	1.5	105	1.05	1133	849	42.10
Meghalaya	East Garo Hills	23013	8169		19	27	NA	117	2.82	NA	32	NA
Meghalaya	East Khasi Hills	45669	12969	175	33	31	NA	126	3.52	NA	22	NA
Meghalaya	Jainta Hills	23381	7583	15	20	30	NA	101	3.08	NA	31	NA
Meghalaya	Ri Bhoi	34485	11664	4	81	84	NA	111	2.96	NA	23	NA
Meghalaya	South Garo Hills	17375	8760	0	9	9	NA	124	1.98	NA	18	NA
Meghalaya	West Garo Hills	22942	10220	2	10	10	NA	130	2.24	NA	68	NA
Mizoram	Aizwal	18802	4843	34	9	11	NA	100	3.88	NA	17	NA
Mizoram	Chhimtuipui	23443	6061	22	36	40	NA	100	3.87	NA	13	NA
Mizoram	Kolasib	21190	12478	22	36	40	NA	100	1.70	NA	13	NA
Mizoram	Lunglei	18658	4239	26	6	7	NA	100	4.40	NA	11	NA
Mizoram	Mamit	20315	10873		20	23	NA	100	1.87	NA	11	NA

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State	District	Prod./ ha	Prod./ worker	FERT_ NSAN-PK /ha.	NIA %	GIA%	FVA %	Crop Inten-sity %	Work-er/ hect-are	Rain-fall: mm	Net sown area: 000ha	Rural poor %
Mizoram	Saiha	17004	8409		11	13	NA	100	2.02	NA	10	NA
Nagaland	Denapur	21377	39347	7	39	49	NA	124	0.54	NA	62	NA
Nagaland	Kohima	18836	8725	2	28	31	NA	117	2.16	NA	37	NA
Nagaland	Mokokchun	14333	5867	3	13	19	NA	128	2.44	NA	30	NA
Nagaland	Mon	16096	4326	1	8	17	NA	124	3.72	NA	31	NA
Nagaland	Phek	17191	12615	NA	35	37	NA	119	1.36	NA	39	NA
Nagaland	Thensang	14354	4220	NA	12	15	NA	116	3.40	NA	47	NA
Nagaland	Wokha	17715	16131	NA	10	20	NA	126	1.10	NA	34	NA
Nagaland	Zunheboto	18771	18027	NA	10	16	NA	126	1.04	NA	28	NA
Orissa	Angul	41929	31616	36	21	NA	24.1	169	1.33	1421.1	199	53.00
Orissa	Balasore	28711	15481	NA	NA	NA	13.3	136	1.85	1568.4	234	28.30
Orissa	Bhadrak	33815	13184	125	44	NA	14.4	134	2.56	1568.4	175	22.90
Orissa	Bolangir	21428	17874	30	9	NA	9.2	132	1.20	1443.5	334	66.30
Orissa	Boudh	41681	27019	45	44	NA	18.3	151	1.54	1597.1	87	70.50
Orissa	Buragarh	20960	25594	129	39	NA	3.1	135	0.82	1527	320	61.70
Orissa	Cuttack	41344	19857	73	57	NA	14.5	190	2.08	1501.3	165	14.00
Orissa	Deogarh	26474	17234	41	25	NA	14.2	156	1.54	1527	65	73.40
Orissa	Dhenkanal	42838	33529	31	23	NA	21.4	166	1.28	1421.1	167	57.10

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State	District	Prod./ ha	Prod./ worker	FERT_ NSAN-PK /ha.	NIA %	GIA%	FVA %	Crop Inten-sity %	Work-er/ hect-are	Rain-fall: mm	Net sown area: 000ha	Rural poor %
Orissa	Gajapatti	35115	12640	54	30	NA	28.6	179	2.78	1295.6	78	61.40
Orissa	Ganjam	35128	16212	85	63	NA	17.8	171	2.17	1295.6	381	33.60
Orissa	Jagatsingpur	51722	28057	63	56	NA	16.1	188	1.84	1501.3	98	37.30
Orissa	Jajpur	32404	19838	67	28	NA	12.6	173	1.63	1501.3	153	4.90
Orissa	Jharsugda	25763	22437	89	16	NA	14.9	132	1.15	1527	77	58.70
Orissa	Kalahandi	23493	17132	60	32	NA	8.8	149	1.37	1378.2	362	70.50
Orissa	Kedrapara	39031	20706	44	36	NA	12.6	176	1.88	1501.3	139	31.50
Orissa	Keonjhar	42945	29109	37	24	NA	20.5	150	1.48	1534.5	292	46.10
Orissa	Khurda	44206	33938	52	31	NA	26.3	160	1.30	1449.1	134	27.80
Orissa	Koraput	25820	17454	25	29	NA	18.4	134	1.48	1521.8	282	74.20
Orissa	Malkangiri	33121	20981	32	28	NA	15.8	158	1.58	1521.8	131	67.90
Orissa	Mayurbhanj	23774	13689	37	26	NA	12.0	122	1.74	1648.2	394	52.50
Orissa	Nawapara	21892	18451	31	20	NA	10.7	148	1.19	1378.2	161	70.10
Orissa	Naworangpur	22396	11355	61	8	NA	13.1	144	1.97	1521.8	212	80.60
Orissa	Nayagarh	31994	23614	41	24	NA	15.7	165	1.35	1449.1	133	47.00
Orissa	Phulbani ('Kandhamal)	53537	29593	5	12	NA	27.3	154	1.81	1597.1	118	76.60
Orissa	Puri	52270	26663	94	61	NA	15.5	189	1.96	1449.1	138	27.00

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Orissa	Rayagada	31709	16104	46	20	NA	17.6	151	1.97	1521.8	152	67.10
Orissa	Sambalpur	27985	22197	108	33	NA	12.9	144	1.26	1527	179	79.50
Orissa	Sonepur	33005	19473	47	61	NA	13.6	160	1.69	1443.5	108	51.30
Orissa	Sundargarh	22143	15565	24	18	NA	14.6	126	1.42	1647.6	309	69.90
Punjab	Amritsar	48385	50357	313	98	100	1.7	179	0.96	650	449	8.70
Punjab	Bhatinda	57613	67080	344	98	99	1.9	185	0.86	460	298	23.10
Punjab	Faridkot	58046	56567	501	99	98	1.0	197	1.03	460	126	23.90
Punjab	Fatehgarh Sahib	63515	92099	399	100	100	1.5	187	0.69	870	103	6.20
Punjab	Ferozpur	58604	75742	351	100	98	1.9	191	0.77	537	475	17.90
Punjab	Gurdaspur	45015	54078	276	74	83	1.2	172	0.83	1486	294	2.30
Punjab	Hoshiarpur	45722	43880	307	83	79	5.8	179	1.04	1315	201	1.70
Punjab	Jalandhar	53572	76468	399	99	98	5.7	175	0.70	1041	240	0.90
Punjab	Kapurthala	61381	88006	375	99	98	4.4	199	0.70	708	136	4.20
Punjab	Ludhiana	69145	93238	479	100	100	2.5	198	0.74	706	306	8.90
Punjab	Mansha	58906	67457	354	97	100	0.5	191	0.87	460	190	16.60
Punjab	Moga	62821	66742	414	100	99	1.8	195	0.94	779	200	25.20
Punjab	Mukatsar	60394	74386	352	97	100	1.8	198	0.81	779	224	28.30
Punjab	N.Shahar	56807	62579	387	90	86	2.7	194	0.91	1041	95	1.20

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Punjab	Patiala	60818	69065	399	96	97	2.5	194	0.88	870	303	2.60
Punjab	Ropar	44593	42256	391	86	82	2.7	180	1.06	890	123	2.40
Punjab	Sangrur	65002	74794	383	100	100	1.0	198	0.87	779	440	6.20
Rajasthan	Ajmer	7364	7510	23	16	16	1.1	115	0.98	601.8	419	7.40
Rajasthan	Alwar	27727	13540	84	88	62	1.9	161	2.05	657.3	506	9.90
Rajasthan	Banswara	14383	5538	117	34	26	0.1	140	2.60	950.3	235	50.10
Rajasthan	Baran	31054	29423	145	85	62	0.4	143	1.06	873.8	323	6.50
Rajasthan	Barmer	2909	6386	3	7	10	0.0	106	0.46	265.7	1574	13.30
Rajasthan	Bharatpur	25350	15762	88	75	54	0.7	143	1.61	663.9	394	16.60
Rajasthan	Bhilwara	14604	9464	63	33	27	0.4	134	1.54	683.2	390	18.50
Rajasthan	Bikaner	8075	28538	9	11	16	0.3	107	0.28	243	1437	35.40
Rajasthan	Bundi	25055	19233	125	76	59	0.8	145	1.30	773.4	253	3.50
Rajasthan	Chittorgarh	23232	13536	107	39	29	0.4	146	1.72	841.5	420	15.50
Rajasthan	Churu	4770	8379	2	4	4	0.0	118	0.57	354.7	1160	13.60
Rajasthan	Dausa	21843	12034	103	73	48	0.5	155	1.82	561	220	19.60
Rajasthan	Dholpur	23796	14814	88	67	51	1.2	136	1.61	744	151	8.70
Rajasthan	Dungarpur	12708	3875	59	29	21	0.1	143	3.28	728.9	124	25.20
Rajasthan	Ganganagar	23091	36590	100	71	78	0.7	132	0.63	226.4	693	22.80

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Rajasthan	Hanumangarh	18127	29540	63	39	48	0.1	142	0.61	273.5	779	27.20
Rajasthan	Jaipur	18463	16032	71	48	41	2.0	147	1.15	563.8	666	12.50
Rajasthan	Jaisalmer	3317	13403	9	12	19	0.0	109	0.25	185.5	472	3.30
Rajasthan	Jalore	9200	10768	24	30	28	0.3	121	0.85	370	659	13.40
Rajasthan	Jhalawar	25361	17747	92	58	39	1.5	154	1.43	844.3	315	18.20
Rajasthan	Jhunjhunu	16027	12915	27	52	36	0.3	154	1.24	405.1	426	3.60
Rajasthan	Jodhpur	6616	12975	17	11	15	1.1	106	0.51	313.7	1287	23.90
Rajasthan	Karauli	26091	14868	53	56	36	0.6	156	1.75	670.7	196	6.40
Rajasthan	Kota	32925	39311	192	82	58	0.6	148	0.84	732.4	270	3.90
Rajasthan	Nagaur	9085	14174	21	21	23	0.8	116	0.64	311.7	1273	31.80
Rajasthan	Pali	7965	11301	20	14	15	0.3	108	0.70	424.4	579	27.20
Rajasthan	Rajsamand	9338	4028	27	8	9	0.3	108	2.32	567.8	94	24.90
Rajasthan	Sawai Madhopur	18686	15349	116	63	50	0.3	128	1.22	873.4	280	18.50
Rajasthan	Sikar	14157	12631	30	43	38	1.0	142	1.12	440.3	525	10.50
Rajasthan	Sirohi	13718	11573	56	37	39	1.3	130	1.19	591.2	146	27.00
Rajasthan	Tonk	13538	17012	49	39	32	0.7	124	0.80	668.3	461	24.80
Rajasthan	Udaipur	14091	4938	59	24	19	0.3	129	2.85	645	246	20.90
Tamil Nadu	Coimbatore	29511	16516	150	49	49	6.9	106	1.79	694.4	322	12.40

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Tamil Nadu	Cuddalore	53872	17862	204	68	62	11.0	129	3.02	1235.8	214	14.00
Tamil Nadu	Dharmapuri	42442	6724	78	26	26	21.8	111	6.31	855.9	158	40.30
Tamil Nadu	Didugul	39712	16151	93	33	34	18.9	103	2.46	831.6	247	10.30
Tamil Nadu	Erode	46276	15956	155	42	46	8.1	106	2.90	711.4	271	16.90
Tamil Nadu	Kancheepuram	39781	11683	308	0	0	4.2	127	3.41	1252.1	125	20.20
Tamil Nadu	Kanya Kumari	67432	54104	170	35	41	27.4	114	1.25	1006	79	19.80
Tamil Nadu	Karur	23071	7389	73	41	42	8.3	102	3.12	742.2	94	10.20
Tamil Nadu	Krishnagiri	38181	NA	NA	22	22	23.6	110	NA	1298.1	180	
Tamil Nadu	Madurai	34797	9321	254	51	53	10.6	104	3.73	840	123	18.60
Tamil Nadu	Nagapattinam	19436	6992	202	81	62	1.2	159	2.78	1341.7	138	7.00
Tamil Nadu	Namakkal	54250	19794	47	28	30	17.9	127	2.74	776.5	164	18.50
Tamil Nadu	Perambalur	32197	30463	64	27	29	14.8	109	1.06	949.6	208	34.40
Tamil Nadu	Pudukkottai	35130	10831	334	63	63	7.4	101	3.24	921.5	147	18.60
Tamil Nadu	Ramanathapuram	11353	7134	61	38	38	0.4	100	1.59	821.2	191	36.70
Tamil Nadu	Salem	43227	12272	239	37	37	19.1	114	3.52	898	197	37.40
Tamil Nadu	Sivagangai	21772	7683	72	67	67	5.0	100	2.83	876	117	13.10
Tamil Nadu	Thanjavur	42398	13023	289	83	78	3.5	129	3.26	1053	173	7.50
Tamil Nadu	The Nilgiris	98679	125222	NA	NA	NA	50.9	100	0.79	1695.7	79	NA

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Tamil Nadu	Theni	56960	18716	217	47	50	22.1	107	3.04	833.5	110	16.00
Tamil Nadu	Thiruvallur	48468	14065	300	89	79	8.8	139	3.45	1152.8	95	23.40
Tamil Nadu	Thiruvarur	18405	7019	214	96	73	0.5	145	2.62	1129.9	135	11.30
Tamil Nadu	Thoothukudi	34045	24266	61	23	23	10.1	102	1.40	655.7	170	33.20
Tamil Nadu	Tiruchirapalli	42680	12320	411	50	53	13.4	108	3.46	761.5	160	19.80
Tamil Nadu	Tirunelveli	47243	13924	263	65	67	12.2	116	3.39	736.9	150	23.60
Tamil Nadu	Tiruvannmalai	29616	8708	152	52	58	2.4	121	3.40	1046.6	227	43.20
Tamil Nadu	Vellore	40064	10989	219	42	44	10.3	122	3.65	917	177	26.20
Tamil Nadu	Villupuram	40846	11079	216	57	59	5.7	120	3.69	1029.4	304	34.80
Tamil Nadu	Virudunagar	19725	9715	90	39	41	4.9	104	2.03	829.6	139	22.90
Uttar Pradesh	Agra	37879	27361	185	85	62	9.7	145	1.38	655.5	284	22.10
Uttar Pradesh	Aligarh	37008	23252	189	99	82	4.2	167	1.59	662.8	302	19.80
Uttar Pradesh	Allahabad	25144	9048	261	77	80	3.3	148	2.78	975.9	338	34.50
Uttar Pradesh	Ambedkar Ngr.	38301	12309	274	94	94	4.8	168	3.11	1028.9	166	50.40
Uttar Pradesh	Auraiya	30232	15126	135	NA	NA	2.1	162	2.00	752.4	144	28.80
Uttar Pradesh	Azamgarh	27792	9539	152	91	84	2.7	168	2.91	1021.3	302	29.50
Uttar Pradesh	Badaun	33420	19342	188	92	69	4.3	168	1.73	821.2	416	28.80
Uttar Pradesh	Bagpat	78106	38160	324	95	100	1.8	159	2.05	720.2	111	28.20

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Uttar Pradesh	Bahraich	26451	12173	112	46	34	1.7	151	2.17	1145.5	327	43.70
Uttar Pradesh	Ballia	24411	9567	169	77	69	3.6	162	2.55	1013.1	221	51.50
Uttar Pradesh	Balrampur	31807	10912	96	39	35	1.7	144	2.91	1149.9	214	18.60
Uttar Pradesh	Banda	15431	11398	28	34	41	0.3	122	1.35	945.5	350	52.80
Uttar Pradesh	Barabanki	45443	16797	255	84	82	5.7	181	2.71	1002.7	288	14.20
Uttar Pradesh	Bareilly	41946	21308	271	92	89	2.6	168	1.97	1107.3	328	30.20
Uttar Pradesh	Basti	32321	11215	367	62	56	3.1	146	2.88	1264	209	23.20
Uttar Pradesh	Bijnor	61005	40489	185	88	86	1.7	132	1.51	1108.3	338	17.90
Uttar Pradesh	Bullandshahr	48865	23647	276	89	100	5.8	171	2.07	673.5	297	14.90
Uttar Pradesh	Chandauli	28771	11444	259	94	87	0.7	177	2.51	1056.4	136	36.00
Uttar Pradesh	Chitrakut	14959	9243	44	29	28	0.4	112	1.62	940	173	81.50
Uttar Pradesh	Deoria	29589	10311	369	84	59	2.3	164	2.87	1145.1	198	41.90
Uttar Pradesh	Etah	35419	19688	171	95	78	6.2	161	1.80	694.9	327	30.80
Uttar Pradesh	Etawah	35477	31583	105	83	97	5.1	161	1.12	752.4	219	32.30
Uttar Pradesh	Faizabad	38005	8239	434	92	89	5.6	150	4.61	1008.9	135	25.00
Uttar Pradesh	Farrukhabad	55906	27088	360	82	74	19.9	144	2.06	795.4	152	28.50
Uttar Pradesh	Fatehpur	26024	11115	182	64	66	3.2	139	2.34	903.6	292	31.10
Uttar Pradesh	Firozabad	41525	28390	226	94	71	13.4	156	1.46	655.5	181	26.50

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Uttar Pradesh	G.Buddha Ngr.	23613	21915	142	77	100	0.3	113	1.08	719.7	118	2.60
Uttar Pradesh	Ghaziabad	69057	44628	315	93	100	5.2	165	1.55	720.2	148	14.90
Uttar Pradesh	Ghazipur	27208	9961	219	84	84	3.7	163	2.73	1051.8	254	53.70
Uttar Pradesh	Gonda	31215	11849	149	71	54	1.8	154	2.63	1147.6	298	39.00
Uttar Pradesh	Gorakhpur	26897	9039	241	82	61	3.2	152	2.98	1364.1	252	56.50
Uttar Pradesh	Hamirpur	16239	15556	38	36	32	2.7	117	1.04	850.7	302	44.10
Uttar Pradesh	Hardoi	31498	15360	118	88	77	3.2	154	2.05	874.8	421	34.20
Uttar Pradesh	Hatharas	50460	32473	206	99	80	12.8	159	1.55	662.8	148	31.50
Uttar Pradesh	J.B.Phule Ngr.	58028	32562	317	85	84	5.8	153	1.78	944.3	171	4.70
Uttar Pradesh	Jalaun	26499	23379	75	54	45	7.2	122	1.13	786.6	349	15.30
Uttar Pradesh	Jaunpur	27171	8488	175	87	81	4.1	160	3.20	997.9	277	27.90
Uttar Pradesh	Jhansi	20677	18088	70	64	49	6.0	131	1.14	879.1	344	19.80
Uttar Pradesh	Kannauj	48129	21245	252	92	74	19.9	158	2.27	795.4	143	25.40
Uttar Pradesh	Kanpur City	42990	17680	284	82	64	5.4	173	2.43	801.5	153	28.60
Uttar Pradesh	Kanpur Dehat	27742	15372	159	74	67	2.2	143	1.80	801.5	221	35.60
Uttar Pradesh	Kaushambi	24838	8131	187	70	64	4.5	135	3.05	975.9	132	45.50
Uttar Pradesh	Kheri	46379	28301	207	80	76	1.0	147	1.64	1068.7	486	21.50
Uttar Pradesh	Kushi Ngr.	41922	11342	222	72	75	2.2	154	3.70	1145.1	224	54.80

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Uttar Pradesh	Lalitpur	19342	15418	46	77	53	4.7	145	1.25	880.1	272	42.70
Uttar Pradesh	Lucknow	53651	21434	214	91	84	17.9	154	2.50	959.2	138	35.60
Uttar Pradesh	Maharaj Ganj	39709	11146	247	83	48	2.4	181	3.56	1364.1	202	53.40
Uttar Pradesh	Mahoba	15218	15736	34	47	39	5.1	122	0.97	850.7	241	23.20
Uttar Pradesh	Mainpuri	35942	18535	244	99	91	6.3	166	1.94	720.2	177	22.90
Uttar Pradesh	Mathura	32772	20097	149	98	79	2.7	149	1.63	591.4	271	41.00
Uttar Pradesh	Mau	28610	9854	216	90	81	1.7	166	2.90	1021.3	126	39.50
Uttar Pradesh	Meerut	81855	48990	322	95	100	6.5	154	1.67	720.2	199	6.50
Uttar Pradesh	Mirzapur	20768	9149	122	58	65	2.1	146	2.27	1134.1	200	28.60
Uttar Pradesh	Moradabad	48056	23394	305	98	84	3.7	176	2.05	944.3	317	17.10
Uttar Pradesh	Muzaffarnagar	77353	36456	322	99	98	3.0	148	2.12	758.6	326	30.60
Uttar Pradesh	Pilibhit	44853	32211	311	97	94	0.7	172	1.39	1242	238	27.30
Uttar Pradesh	Pratapgarh	25428	7480	191	87	88	3.3	148	3.40	977.9	214	65.20
Uttar Pradesh	Raebareli	27658	9340	171	87	85	2.8	155	2.96	927.6	270	54.40
Uttar Pradesh	Rampur	46369	24899	262	88	94	2.1	188	1.86	944.3	194	31.70
Uttar Pradesh	S.Ravi Das Ngr	20978	8961	269	81	81	4.2	143	2.34	1052.3	68	30.60
Uttar Pradesh	Saharanpur	63311	40605	270	91	90	8.3	155	1.56	949.3	275	14.60
Uttar Pradesh	Sant Kabir Ngr	33039	9809	175	84	51	4.0	173	3.37	1264	120	58.00

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Uttar Pradesh	Shahjahanpur	39377	25709	315	94	90	1.7	165	1.53	1019.5	347	37.40
Uttar Pradesh	Shivasti	22391	7112	115	42	31	0.9	146	3.15	1147.8	130	56.10
Uttar Pradesh	Siddharth Ngr.	23122	8015	157	64	44	3.0	149	2.88	1264	236	66.30
Uttar Pradesh	Sitapur	37101	18145	192	84	75	3.9	149	2.04	974	436	27.60
Uttar Pradesh	Sonbhadra	14575	6674	74	32	34	1.1	142	2.18	1134.1	181	24.80
Uttar Pradesh	Sultanpur	33241	12276	157	82	83	7.4	153	2.71	1000.4	284	28.50
Uttar Pradesh	Unnao	32861	14061	160	88	76	6.0	155	2.34	840.8	300	24.10
Uttar Pradesh	Varanasi	27091	9367	516	96	85	4.4	149	2.89	1056.4	106	33.10
Uttrakhand	Almora	32064	11676	5	6	7	16.7	160	2.75	1297	81	44.10
Uttrakhand	Bageshwar	30924	7759	14	19	21	10.3	180	3.99	NA	23	33.70
Uttrakhand	Chamoli	43958	14560	9	5	6	22.5	148	3.02	1233	35	35.70
Uttrakhand	Champawat	28700	9258	23	12	12	26.3	166	3.10	NA	21	72.10
Uttrakhand	Dehradun	39831	19643	75	43	44	35.9	156	2.03	2315	51	30.30
Uttrakhand	Haridwar	60561	40898	203	89	86	12.1	144	1.48	1182	120	44.40
Uttrakhand	Nainital	51483	17542	171	59	50	36.3	169	2.93	1528	48	40.50
Uttrakhand	Pauri Garhwal	16751	7483	4	9	12	15.5	154	2.24	NA	83	31.80
Uttrakhand	Pithoragerh	29135	8582	9	10	9	15.8	184	3.39	2207	40	44.30
Uttrakhand	Rudrapryag	26151	6699	4	14	17	8.7	160	3.90	NA	20	8.70

contd…

State	District	Prod./ ha	Prod./ worker	FERT_ NSAN-PK /ha.	NIA %	GIA%	FVA %	Crop Inten-sity %	Work-er/ hect-are	Rain-fall: mm	Net sown area: 000ha	Rural poor %
Uttrakhand	Tehri Garhwal	22097	7081	3	14	17	21.9	158	3.12	1706	60	61.20
Uttrakhand	Udhamsigh Nagar	49185	33703	563	99	96	4.0	171	1.46	1256	149	45.70
Uttrakhand	Uttarakashi	42286	11717	18	17	20	26.1	155	3.61	NA	29	19.50
West Bengal	24 Parganas (North)	73991	68070	118	40	NA	17.1	157	1.09	1766	642	20.60
West Bengal	24 Parganas (South)	54009	21853	NA	NA	NA	13.5	140	2.47	1765	381	18.50
West Bengal	Bankura	53966	19637	158	96	NA	15.1	131	2.75	1466	343	28.50
West Bengal	Birbhum	67497	31514	210	91	NA	15.0	166	2.14	1344	316	39.20
West Bengal	Burdwan	59664	25248	269	96	NA	10.4	184	2.36	1314	462	20.30
West Bengal	Cooch-Behar	69965	27610	265	28	NA	11.8	192	2.53	3244	255	11.20
West Bengal	Darjeeling	81617	83317	246	18	NA	37.9	123	0.98	3088	143	14.70
West Bengal	Dinajpur(South)	63143	29292	199	38	NA	14.7	162	2.16	2083	191	48.90
West Bengal	Dinajur(North)	75599	31641	141	48	NA	18.0	191	2.39	2083	271	49.00
West Bengal	Hooghly	75915	23269	492	94	NA	19.4	235	3.26	1438	222	21.10
West Bengal	Howrah	114815	45369	749	91	NA	25.4	217	2.53	1501	86	21.60
West Bengal	Jalpaiguri	72160	49311	182	37	NA	19.3	164	1.46	3454	339	29.00
West Bengal	Malda	75069	25045	234	53	NA	15.7	197	3.00	1594	230	46.00

contd…

State	District	Prod./ ha	Prod./ worker	FERT_ NSAN-PK /ha.	NIA %	GIA%	FVA %	Crop Inten-sity %	Work-er/ hect-are	Rain-fall: mm	Net sown area: 000ha	Rural poor %
West Bengal	Midnapur (East)	73819	NA	278	36	NA	18.3	173	NA	1650	297	21.8
West Bengal	Midnapur (West)	51522	NA	147	75	NA	11.5	164	NA	1650	559	21.8
West Bengal	Murshidabad	87826	38160	148	57	NA	10.3	239	2.30	1366	404	55.90
West Bengal	Nadia	88997	38968	NA	NA	NA	9.3	260	2.28	1386	304	NA
West Bengal	Purulia	34794	15380	131	39	NA	10.0	106	2.26	1361	335	31.20
Average country		28763										

Annexure 5

State-wise list of districts in different productivity categories

(A) List of districts falling under very low productivity/ha NSA Category:

State		Districts
Andhra Pradesh	:	Mahaboobnagar, Anantpur
Arunachal Pradesh	:	West Siang , Upper Subansiri , Lower Subansiri , Tirap , West Kameng, East Kanemg, Upper Siang
Bihar	:	Lakhisarai, Araria, Jamui
Chhattisgarh	:	Bastar , Jashpur , Raipur , Dantewara , Kawardha , Mahasmund , Rajnandgaon, Surguja, Koriya, Janjgir-Champa, Korba, Raigarh, Kanker
Gujarat	:	Panch Mahals , Dangs, Patan, Dahod, Kutch
Jammu & Kashmir	:	Doda, Kupwara , Kargil, Leh
Jharkhand	:	Gumla, Simdega
Karnataka	:	Bijapur , Gadag , Gulbarga , Raichur , Bidar, Dharwad, Bagalkot, Koppal, Haveri
Madhya Pradesh	:	Anuppur , Barwani , Guna , Jhabua , Panna , Satna , Shahdol , Ashok Nagar , Katni , Mandla , Rewa , Sidhi , Umaria , Dindori , Seoni, Damoh, Betul, Raisen, Khargaon, Balaghat, Chhatarpur, Sagar, Vidisha, Bhind, Datia
Maharashtra	:	Ahmednagar , Aurangabad , Buldhana , Gadchiroli , Latur , Washim , Akola , Beed , Jalna , Osmanabad , Yavatmal , Dhule , Nandurbar, Solapur, Parbhani, Chandrapur
Meghalaya	:	South Garo Hills
Mizoram	:	Saiha
Nagaland	:	Mokokchun, Thensang, Mon, Phek, Wokha
Rajasthan	:	Ajmer , Pali , Tonk , Barmer , Bikaner , Churu , Dungarpur , Jaisalmer , Rajsamand , Jalore , Jodhpur , Nagaur, Sirohi, Udaipur, Sikar, Banswara, Bhilwara, Jhunjhunu, Hanumangarh
Tamil Nadu	:	Ramanathapuram
Uttar Pradesh	:	Sonbhadra, Chitrakut, Mahoba, Banda, Hamirpur
Uttarakhand	:	Pauri Garhwal

(B) List of districts falling under low productivity / ha NSA category:

State		Districts
Andhra Pradesh	:	Adilabad, Medak, Kurnool, Nalgonda, Rangareddy
Arunachal Pradesh	:	Changlang , East Siang , Tawang
Assam	:	Darrang , Dibrugarh , Karbi-Anglong , Lakhimpur, Nalbari , Bongaigaon , Dhemaji , Goalpara , Morigon , Dhubri , Kamrup , Kokrajhar, Barpeta, Sonitpur, Sibsagar, Tinsukia
Bihar	:	Buxar, Gaya, Jahanabad, Siwan, Champaran(West), Aurangabad, Gopalganj, Madhubani, Supaul, Banka, Bhojpur, Champaran(East), Arval, Purnea, Kishanganj, Sheikhpura, Saran, Nawadha
Chhattisgarh	:	Dhamtari, Bilaspur, Durg,
Gujarat	:	Ahmedabad, Mahesana, Surendranagar, Amreli, Sabarkantha, Vadodara, Banas Kantha
Haryana	:	Rewari
Jammu & Kashmir	:	Poonch, Baramulla, Udhampur, Budgam, Rajouri
Jharkhand	:	Palamau, Deogarh, Saraikela, West Singhbhum, Latehar, Deogarh, Garwha, Pakaur, Jamatra
Karnataka	:	Belgaum, Chitradurga, Bellary, Chamrajnagar, Tumkur, Hassan, Devanagree, Chikmagalur
Madhya Pradesh	:	Bhopal , Chindwara , Dewas , Hoshangabad , Morena , Ratlam , Shivpuri , Ujjain , Dhar , Gwalior , Narsimpur , Sehore , Shajapur , Chhatarpur , Datia , Harda , Jabalpur , Mandsaur , Rajgarh , Sheopur Kala , Tikamgarh , Neemach
Maharashtra	:	Nagpur , Sangli , Nanded , Satara , Amravati , Bhandara , Wardha
Meghalaya	:	East Garo Hills , Jainta Hills , West Garo Hills
Mizoram	:	Aizwal , Chhimtuipui , Lunglei , Kolasib , Mamit
Nagaland	:	Denapur , Kohima , Zunheboto
Orissa	:	Buragarh , Mayurbhanj , Nawapara , Bolangir, Deogarh , Jharsugda , Koraput , Naworangpur , Kalahandi , Sundargarh
Rajasthan	:	Chittorgarh , Dholpur , Jaipur , Jhalawar , Karauli , Bharatpur , Bundi , Dausa , Sawai Madhopur , Ganganagar , Alwar
Tamil Nadu	:	Sivagangai , Karur , Nagapattinam , Thiruvarur , Virudunagar

State		Districts
Uttar Pradesh	:	Jhansi , Shivasti , Bahraich , Jalaun , Mirzapur, S.Ravi Das Ngr , Siddharth Ngr. , Allahabad , Ballia , G.Buddha Ngr. , Kaushambi , Lalitpur , Pratapgarh , Gorakhpur , Varanasi , Jaunpur , Ghazipur , Raebareli, Kanpur Dehat , Azamgarh
Uttarakhand	:	Rudrapryag , Tehri Garhwal

(C) List of districts falling under average productivity / ha NSA category:

State		Districts
Andhra Pradesh	:	Srikakulam , Warangal , Karimnagar , Prakasam , Visakhapatnam , Chittoor , Khammam , Vizianagarm , Cuddapah
Arunachal Pradesh	:	Lohit , Paumpare
Assam	:	Hailakandi , Jorhat , Karimganj , Cachar , Golaghat
Bihar	:	Patna , Bhagalpur , Darbhanga , Bhabhua , Nalanda , Rohtas , Sitamarhi , Samastipur , Katihar , Monghyr
Gujarat	:	Valsad , Broach , Gandhinagar , Bhavnagar , Jamnagar , Kheda , Porbander
Haryana	:	Jhajjer , Bhiwani , Rohtak , Mahendra Garh
Himachal Pradesh	:	Chamba , Hamirpur
Jammu & Kashmir	:	Anantnagh , Kathua , Jammu
Jharkhand	:	Sahibganj , Chatra , Dumka , Hazaribagh , Godda , Lohardaga , Ranchi , East Singhbhum
Karnataka	:	Uttarakannada , Mysore
Madhya Pradesh	:	Indore
Maharashtra	:	Pune , Raigad , Thane, Kolhapur , Sindhudurg, Nasik
Meghalaya	:	Ri Bhoi
Orissa	:	Gajapatti, Jajpur, Sambalpur, Bhadrak, Ganjam, Sonepur, Malkangiri, Rayagada, Balasore, Nayagarh
Rajasthan	:	Baran , Kota
Tamil Nadu	:	Pudukkottai , Coimbatore , Madurai , Tiruvannmalai , Perambalur , Thoothukudi
Uttar Pradesh	:	Balrampur , Badaun , Sant Kabir Ngr , Auraiya , Basti , Deoria , Mathura , Sultanpur , Chandauli ,

		Etah , Gonda , Hardoi , Mau , Sitapur , Unnao , Etawah , Mainpuri , Aligarh
Uttarakhand	:	Almora , Champawat , Bageshwar , Pithoragerh
West Bengal	:	Purulia

(D) List of districts falling under *high* productivity / ha NSA category:

State		Districts
Andhra Pradesh	:	Krishna , Nizamabad , Nellore
Assam	:	N C Hills
Bihar	:	Begusarai , Khagaria , Madhupura , Muzafarpur , Saharsa , Vaishali , Sivhar
Gujarat	:	Junagarh , Rajkot , Anand , Navsari
Haryana	:	Gurgaon , Jind , Hissar , Panchkula , Faridabad , Kaithal, Sonepat , Ambala , Sirsa
Himachal Pradesh	:	Kangra , Una , Mandi , Bilaspur
Jammu & Kashmir	:	Pulwanna
Jharkhand	:	Dhanbad , Giridih , Bokaro
Karnataka	:	Mandya , Shimoga , Udupi , Bangalore , Kolar
Kerala	:	Alappuzha , Kannur , Ernakulam , Kasargod
Madhya Pradesh	:	Burhanpur
Maharashtra	:	Ratnagiri , Jalgaon
Meghalaya	:	East Khasi Hills
Orissa	:	Angul , Cuttack , Khurda , Kedrapara , Boudh , Dhenkanal , Keonjhar , Jagatsingpur , Puri , Phulbani (Kandham)
Punjab	:	Amritsar , Hoshiarpur , Ropar , Gurdaspur , Jalandhar , N.Shahar
Tamil Nadu	:	Dharmapuri , Kancheepuram , Thiruvallur , Vellore , Didugul , Thanjavur , Villupuram , Erode , Tirunelveli , Cuddalore , Namakkal , Theni , Krishnagiri , Tiruchirapalli
Uttar Pradesh	:	Agra , Ambedkar Ngr. , Bareilly , Etawah , Kheri , Mainpuri , Bullandshahr , Faizabad , Kanpur City , Kushi Ngr. , Maharaj Ganj , Pilibhit , Rampur , Barabanki , Moradabad , Shahjahanpur , Firozabad , Kannauj , Hatharas , Lucknow , Farrukhabad
Uttarakhand	:	Nainital, Uttarakashi, Dehradun, Chamoli, Udhamsigh Nagar
West Bengal	:	Midnapur (West) , Bankura , 24 Parganas (South)

(E) List of districts falling under *very high* productivity / ha NSA category:

State		Districts
Andhra Pradesh	:	East Godavari, West Godavari
Gujarat	:	Surat
Haryana	:	Fatehbad, Karnal, Kurkshetra , Yamuna Nagar , Panipat
Himachal Pradesh	:	Sirmaur, Kinnaur, Solan, Kulu , Simla , Lahaul & Spiti
Jammu & Kashmir	:	Srinagar
Jharkhand	:	Koderma
Karnataka	:	Dakshinakannada, Kodagu (Coorg)
Kerala	:	Kottayam, Palakkad, Thrissur, Kozhikode, Pathanamthitta, Wynad, Idukki , Kollam , Malappuram , Trivandrum
Punjab	:	Fatehgarh Sahib , Ludhiana , Mukatsar , Bhatinda , Ferozpur , Mansha , Sangrur , Faridkot , Kapurthala , Moga , Patiala
Tamil Nadu	:	Kanya Kumari , The Nilgiris
Uttar Pradesh	:	Bagpat , Ghaziabad , Meerut , Muzaffarnagar , J.B.Phule Ngr. , Bijnor , Saharanpur
Uttarakhand	:	Haridwar
West Bengal	:	Cooch-Behar , Hooghly , Malda , 24 Parganas (North) , Burdwan , Darjeeling , Howrah , Murshidabad , Dinajur(North) , Dinajpur(South) , Birbhum , Midnapur (East) , Jalpaiguri , Nadia

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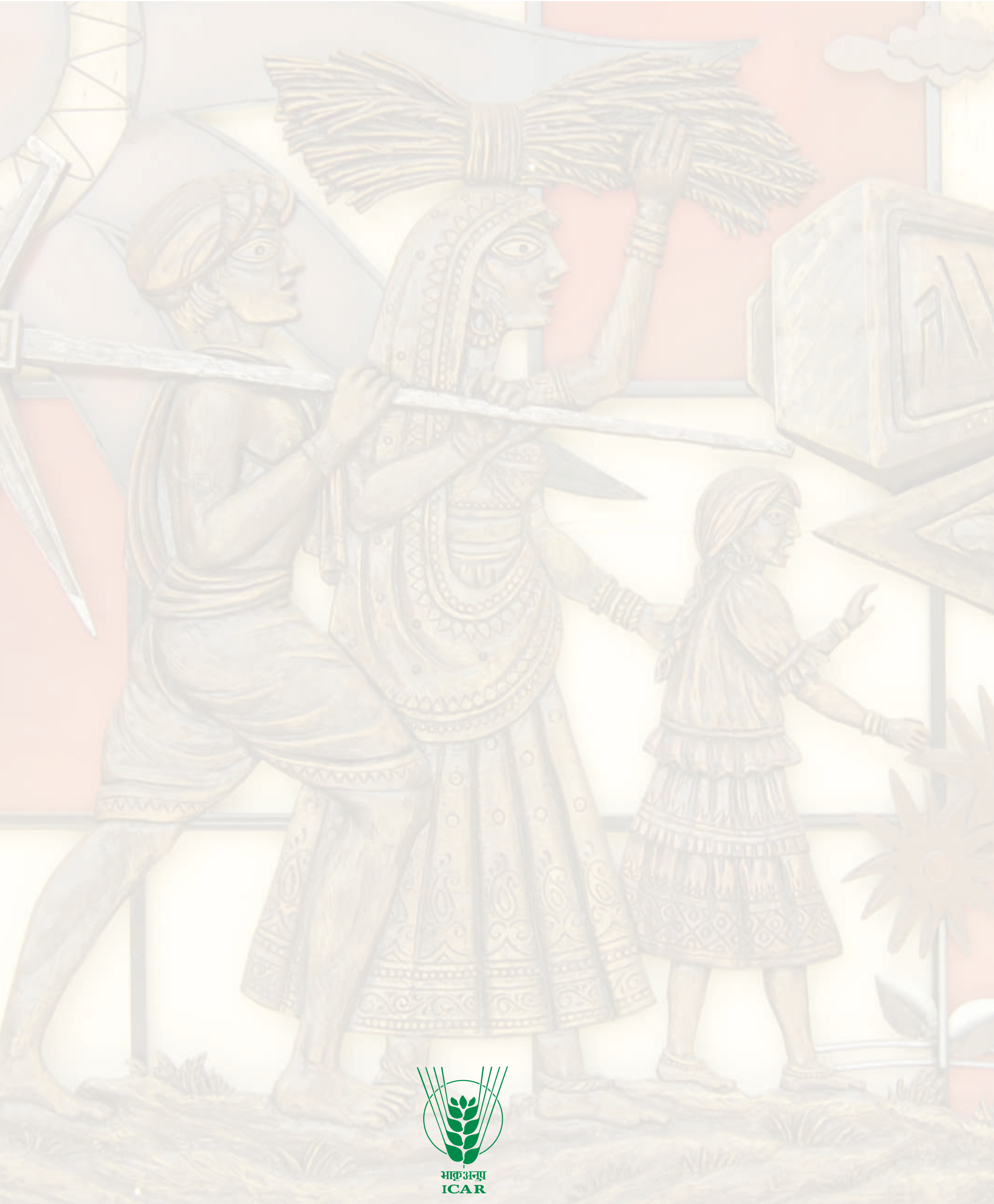

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