

## REGIONAL DIMENSIONS OF CRISIS OF AGRICULTURE: EXPERIENCES FROM FARMER LEVEL SURVEY IN UTTAR PRADESH

*Rakesh Raman<sup>1</sup> & Khursheed Ahmad Khan<sup>2</sup>*

*Among a vast sea of problems that the Indian economy is enwrapped in and that are sapping its vigour and much talked about potential to emerge as an economic power, a very pertinent one is decay of agriculture and despair and desperation at the countryside (Gupta, 2005). The faulty leap-frog strategy (Konana et.al 2004) together with the withdrawing neo-liberal state has frazzled the agricultural sector (Posani, 2009). The sector has festered and has plunged into a crisis making life difficult and ornery for farmers bringing them to the brink of committing suicide. Though Indian agriculture has never been fortune's favoured offspring, what is really worrisome is that the phenomenon that was initially restricted to some selected states, is acquiring an all India character. Further, the present crisis is very complicated as it has brought into focus the agriculture versus agriculturists debate (Assadi, 2006) and unlike the crisis of 1960s has in it a regional dimension with nature & features, intensity and complexities varying in different states and even within regions of larger states like Maharashtra, Uttar Pradesh, Bihar etc. It is crucial for us to understand how the crisis of agriculture varies among different regions of a state, among farmer groups e.g. marginal, small etc. and also among social groups e.g. caste, religion etc. so as to evolve a rather decentralised policy mix that addresses the specific problems of particular region, farmer groups etc. and is ultimately able to revive agriculture and rebuild the economy of farmers. It is precisely this that the present write-up does. It attempts to identify the regional dimensions of crisis of agriculture for the state of Uttar Pradesh.*

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### INTRODUCTION

Uttar Pradesh, an archetype of backwardness and a miniature of the nation in terms of all features of under-development, remains agricultural from the perspective of dependence of population. With growth of manufacturing restricted to a very small region located close to the national capital, agriculture is important to the livelihood of about 60% people of the state and major factor determining their fortune and survival. There are three very prominent issues related to UP agriculture. First, like elsewhere in the nation, agriculture in the state has decomposed. There has been deceleration in growth of production and productivity (Verma, Gulati & Hussain, 2017), significant fall in return to agriculture or rather increase in its unviability, steep rise in indebtedness of farmers, surge in risk and uncertainty caused by rather frequent crop failures etc. The declining capacity of the agriculture to absorb the growing manpower in rural economy and falling availability of food grains per capita have further aggravated the situation. A general aura of gloom and desolation has descended among those dependent on it. It is being increasingly felt that there exists a crisis like situation in agriculture. There is some debate as to how to conceptualise this crisis- as crisis of the agricultural sector or crisis of the farming community. The conceptualisation seems relevant as often the interests of the two are on a discord. Second, Uttar Pradesh being a huge state, finds it different agricultural zones or economic regions varying significantly (Diwakar, 2009) among one-another in terms of level of development of agriculture, existence of mode of production- capitalist or feudal, size and distribution of agricultural holding,

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<sup>1</sup> Professor, Department of Economics, Banaras Hindu University, Varanasi-221005, email-rraman88@gmail.com

<sup>2</sup> Assistant Professor, Department of Economics, Samastipur College, Smastipur, L. N. Mithila University, Darbhanga, Bihar, email khursheedak47@gmail.com

climate and fertility of soil, kind of crop grown, problems faced by farmers etc. The state boasts of its Western (& Central) region, lying close to the NCR and the states of Haryana and Punjab as torch bearer of green revolution. Agriculture in the region is highly developed as compared to other two regions in terms of technology used, irrigation facilities available, infrastructure, access to agricultural credit, marketing network etc. The region is in complete contrast to the Bundelkhand region which is backward in most respect; with low irrigation & cropping intensity, low fertiliser use, low productivity, high risk and frequent crop failures. The third major region is the Eastern region. The region has highly fertile landscape but is a clarion case of over dependence of population on agriculture, small farm size and subsistence farming. Though agriculture in all three regions face problem, yet the nature of the same varies significantly and any sweeping generalisation could be disastrous. Third, a very peculiar feature of agriculture in the state is that the problem with the sector has social orientation. Although in a given region all farmers operate within the same macro-economic environment and encounter common hindrances, there exist significant variations of crisis of agriculture across farmer groups in the state. Thus whether we take size of land or caste of the farmer as criteria, the intensity of crisis varies across farmer groups, making generalisation and development of common policy within a given region impractical.

These three features of Uttar Pradesh call for a more disaggregated treatment of crisis of agriculture in the state. It seems relevant to first develop a common set of indicators to identify and measure crisis in the state and then attempt to capture crisis of agriculture in different regions and for different farmer categories. It is expected that such an analysis would help us understand the problem of agriculture and agriculturists in all dimensions and then develop a policy mix that can handle the problem at the disaggregated level effectively. It is however, not possible to take up all the issues in one single write up so we chose to analyse only the regional dimension of crisis here. The choice is justified as it has been amply emphasised (Raman & Kumari, 2012) that disparity in terms of agriculture exist in UP and that it is serious cause of concern. The paper is structured in four sections. Section-I conceptualises the Crisis of Agriculture briefly discussing the major debates Section-II identifies indicators of the crisis of agriculture and mentions the methodology adopted in the work to capture the same at the disaggregated level. Section-III explains the crisis of agriculture based for the chosen districts of the three regions of Uttar Pradesh and analyses the same. Section-IV comes up with concluding remark.

### **CONCEPTUAL FRAMEWORK**

For a country like India huge in size and full of diversities of different kinds and for a sector like agriculture that continues to be a way of life, developing a common understanding about the problems of the sector and those dependent on it and evolving a common meaning to crisis of the sector is no mean a task. There are two opposite view as regards crisis of agriculture (Khan & Raman, 2014). The first approach looks at the crisis of agriculture as the sectoral crisis known as agricultural crisis. This is an official statement and presents a comparative study of the present scenario of agriculture with the era of the green revolution. Poor agricultural performance i.e., low, stagnant and even falling production and productivity of food grains together with high incidences of crop failures and farmer indebtedness have been accepted as the main indicators of crisis (Chand et al 2007, Sidhu 2002, Chand and Parappurathu 2011, Pillai 2007, Reddy and Mishra 2007, Barah & Sirohi 2011, Deshpande 2002, Galab et. all 2009 etc.). The approach

attempts to locate the reasons in multiple issues such as the incessant floods, manipulation of prices by traders, supply of spurious pesticides and seeds, decline in prices of agricultural produce, increase in the cost of agricultural inputs, successive drought in recent years, and of course, the neglect of farmers by the previous state governments. Over a period of time excess use of fertilizers and pesticides has caused technological fatigue, resulting in decline in land fertility and increase in input cost. The second approach attempts to locate the crisis to the negative growth of agrarian economy in the neo-liberal era as argued by Shiva (2006) and a host of authors towing the Leftist line. This is the Marxist critique spearheaded by Patnaik (2004: Web), and others. It locates crisis in the larger context of ambiguous path of capitalist development in India manifested in the neo-liberal policy or imperialist globalization that linked the poor unprotected peasantry with the global market. It is also due to the way the government has continuously withdrawn in the neo-liberal era and global capitalism has brought in or introduced new methodology to expose the autonomous farmers or the social categories with the vagaries of global market and led to pauperization of the peasantry (Kalamkar and Narayanamoorthy 2003, Deshpande and Arora 2010, Sainath, 2010). The push to capital intensive high cost agriculture, commercial planning coupled with the policy of deliberate price deflation that the monopoly capitalism has induced has made agriculture an unviable occupation.

The second view relates agrarian crisis also to reduced food absorption by all, a shift from food to cash crops even in the face of the adverse terms of trade shift; rapid and significant increase in indebtedness of farmers, squeezing of agricultural land in peri-urban areas because of expanse of urban centres and marginalisation of farmers and fall in private investment in agriculture (Patnaik, 2003). The approach sees the crisis in agriculture as a crisis afflicting the peasantry, which in turn is a part of the crisis of petty production that capitalism has an inbuilt tendency to destroy. The leftist thinkers claim that the neglect of the interest of farming community or rather the pro-big farmer policy of the government in the pre 1990 era and adoption of neo-liberal policy in the post 1990 period have badly distorted the agrarian structure. Despite much hype created by different governments as regards their commitment to institutional reforms, the political will and commitment to the cause has been missing resulting in rather tardy progress on this front. The agrarian structure today stands badly distorted thereby complicating the situation of farmers. The land distribution and the usage pattern of land have caused a significant change in the structure of the agrarian organization. The approach thus gives credence to profitability/viability of agriculture, farmers' indebtedness, net availability of food grains etc.

Negating the influences of 'isms' and approaching the issue from a rather open frame of mind helps one to believe that it is not a case of either- or in case of the present problem of agriculture. The present crisis is neither only crisis of the agricultural sector (first belief) nor only that of peasantry (second belief); it is rather a combination of the two. Though there is no denial of the fact that the agricultural policies in the nation over the years have created a conflict between agriculture and farmers especially the small and marginal ones and made agriculture an unviable occupation for bulk of them, yet it would be wrong to say that just by addressing the concern of small and marginal farmers the present crisis can be effectively handled and the agricultural sector can be put back on track. Similarly, it cannot be said that just by adopting policies that provides crutches to the sector, problem of agriculture sector can be solved. The crisis is a mix of factors that have affected both the agricultural sector and the farmers depending on it. It is actually crisis

of agriculture and as such while making any attempt to measure it one need to include variables that affect both the agricultural sector (e.g. falling production, productivity etc.) and farmers (e.g. falling profitability, rising indebtedness etc.). It is precisely this that is being attempted here.

### METHODOLOGICAL FRAMEWORK

The present researchers have made an attempt to club the indicators suggested by the two approaches i.e. the one that views the present crisis as crisis of a sector and the other that regards it as agrarian crisis in order to develop a comprehensive picture of crisis of agriculture. Thus attempt has been made to compute crisis of agriculture index based on primary survey of farmers using the following indicators. In cases where a particular indicator has been split into sub-indicators, after normalisation the average value of all the sub-indicators has been taken as the value of the particular indicator.

Table 1  
**List of Indicators for Computation of Crisis of Agriculture Index**

S.N	Indicators	Unit
<b>VAR-1 Land Use</b>		
1.1	Cropping intensity	Ratio
<b>VAR-2 Unviability of Agriculture</b>		
2.1	Profitability of Cultivation	Rs./Hect
2.2	Percentage of Expenditure Covered by Income from Agricultural Activities	%
<b>VAR-3 Yield of Major Crops</b>		
3.1	Yield of Major Food Grain	Q./Hect.
3.2	Yield of Major Commercial Crop	Q./Hect.
<b>VAR-4 Indebtedness of Farmers</b>		
4.1	Per Hect. Outstanding loan	Rs
4.2	Debt Asset Ratio	Ratio
4.3	Debt Income Ratio	Ratio
<b>VAR-5 Net Availability of Food Grain per capita</b>		
		Kg/Year
<b>VAR-6 Use of Modern Technology</b>		
6.1	Access to Modern Technology	Qualitative
6.2	Quality of Technology Used	Qualitative
<b>VAR-7 Migration (Dwindling Opportunities of Livelihood)</b>		
7.1	Percentage of small and marginal farmers migrated in search of livelihood	Number

*Source:* Developed by the Researchers on the basis of Extensive Literature Survey

#### ***Sampling Design & Methodology for Computation of Crisis Index:-***

The present work is based on the household level survey of farmers of chosen districts of Uttar Pradesh. Multistage sampling has been adopted. One district each has been selected from three different economic regions i.e., Eastern, Bundelkhand and Western of Uttar Pradesh in the first stage sampling. The availability of resources has prevented us from selecting the Central region. However, neglect of Central region is not expected to cause any problem as its features overlap with adjoining regions which have been included. Since the primary aim was to measure the extent of agriculture crisis in UP, we first computed district level crisis of agriculture index (based on some indicators) and have chosen from each region, the district that has been affected most by the crisis. For this we developed crisis index in two time period- first in triennium ending (TE) 2004

and second TE 2011. Triennium data was taken in order to neutralise the impact of sudden fluctuation that is so common in agriculture. After ranking different districts in two time periods in different regions, we have chosen one district from each of the three major regions. District with maximum deterioration in terms of crisis between the two time periods have been chosen so that we are able to capture crisis in full manifestation.

The second stage sampling was associated with the selection process of blocks of the district. Three blocks from each districts chosen in Stage-I were selected after preparing block level agricultural development index. The indicators used for computation of index were percentage of net irrigated area to net area sown, cropping intensity, fertilizers consumed by per hectare of gross area sown (kg), number of primary agricultural cooperative societies, advance agri. instrument (tractor) used etc. After ranking all the blocks in a district the most advanced, most backward block and block lying in the middle were chosen. Level of agricultural development was taken as a criterion to see whether crisis of agriculture has got anything to do with agricultural development of the region. Finally in the last stage, one village was chosen from each block on random basis. Table-2 gives the list of chosen districts, blocks and villages.

**Table 2**  
**List of Selected Districts, Blocks & Villages**

Region	Chosen District	Chosen Block		Village
Western	Meerut	Advanced	Mawana Kalan	Mawana Khurd
		Average	Rajpura	Masuri
		Backward	Sarurpur Khurd	Dabathuwa
Bundelkhand	Jalaun	Advanced	Jalaun	Bhitara
		Average	Dakore	Aet
		Backward	Kadoura	Atta
Eastern	Kushinagar	Advanced	Hata	Tharuadih
		Average	Tamkuhi	Gauri Abraham
		Backward	Dudahi	Rakwa Dulma Patti

*Source:* Selected by the Authors on the basis of methodology discussed

The selection of household was done after doing proper household listing. As the statistically computed sample size was much beyond the reach of the researchers, it was decided to use rule of thumb and take 60 households from each of the 3 villages in a particular district making it 180 HHs from one district. Household listing was first done and then proportionate stratified random sampling method was used to choose marginal, small, semi-medium, medium and large farmers based on their presence in the village chosen. Thus a total of 540 HHs were chosen for the purpose of primary survey from the three districts of Uttar Pradesh. Semi-structured questionnaire was used to collect data. Data for different indicators were first normalised and then Principal Component Analysis (PCA) was used to compute the Factor Loading and Weights of these indicators. Finally the crisis index was computed at farmers' level, village, block and district level.

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### Results

The present work on the basis of indicators mentioned in Table-1 and sampling design discussed, has computed crisis of agriculture index for the chosen districts on the basis of primary survey of farmers. Table-3 given below shows the factor loadings of crisis index of agriculture.

Table 3  
Factor Loading for Crisis Related Indicators

Variables	Rotated Component Matrix			Eigen Values			Weight
	Component 1	Component 2	Component 3	1	2	3	
				<b>2.998</b>	<b>1.843</b>	<b>1.113</b>	
<b>VAR-1</b>	0.717	0.364	-0.389	2.15	0.671	0.433	3.253
<b>VAR-2</b>	0.838	-0.204	0.365	2.512	0.376	0.406	3.295
<b>VAR-3</b>	0.951	0.167	-0.204	2.851	0.308	0.227	3.386
<b>VAR-4</b>	0	-0.875	-0.206	0	1.613	0.229	1.842
<b>VAR-5</b>	0.054	0.789	-0.314	0.162	1.454	0.349	1.966
<b>VAR-6</b>	0.907	-0.058	0.267	2.719	0.107	0.297	3.123
<b>VAR-7</b>	0.084	-0.007	0.932	0.252	0.013	1.037	1.302
Rotation Method: Varimax with Kaiser Normalization.							18.17

Source: Computed By the Present Researchers from Primary Survey Data

After initiating factor analysis by using statistical software (SPSS), the weights of each indicator was computed. During this process, the absolute values (irrespective of sign). Having computed the weights of each indicator, the next step was to calculate crisis index. This is depicted in the Table-4 given below.

Table 4  
Crisis Index by Districts & Blocks

Weight	3.253	3.295	3.386	1.842	1.966	3.123	1.302	18.167	Rank
Blocks	W <sub>1</sub> *	W <sub>2</sub>	W <sub>3</sub>	W <sub>4</sub>	W <sub>5</sub>	W <sub>6</sub>	W <sub>7</sub>	Crisis index	
<b>Jalaun</b>								<b>0.515</b>	1**
Jalaun	0.556	0.591	0.494	0.018	0.674	0.306	0.714	<b>0.477</b>	3
Dakore	0.414	0.607	0.619	0.020	0.757	0.331	0.600	<b>0.483</b>	2
Kadaura	0.707	0.707	0.722	0.031	0.730	0.384	0.667	<b>0.585</b>	1
<b>Kushinagar</b>								<b>0.418</b>	2
Hata	0.078	0.762	0.499	0.030	0.656	0.350	0.933	<b>0.446</b>	4
Tamkuhi	0.210	0.543	0.376	0.023	0.744	0.308	0.921	<b>0.408</b>	5
Dudahi	0.092	0.561	0.416	0.021	0.702	0.335	0.967	<b>0.401</b>	6
<b>Meerut</b>								<b>0.370</b>	3
Mawana Kalan	0.098	0.553	0.424	0.057	0.672	0.317	0.800	<b>0.387</b>	7
Rajpura	0.244	0.565	0.442	0.039	0.692	0.309	0.333	<b>0.384</b>	8
Sarurpur Khurd	0.107	0.494	0.376	0.022	0.723	0.289	0.429	<b>0.340</b>	9

Source- Computed by the Present Researchers on the basis of Primary Survey

\* W<sub>1</sub> = Geometric mean of 1st indicator

\*\* Ranks given in front of districts and blocks reflect rank among the districts and blocks respectively

Table-4 presents some very important results pertaining to crisis of agriculture- first, it shows that agriculture is not in a very comfortable position in the state of Uttar Pradesh and there exists crisis of agriculture of at least low intensity in almost all parts of the state. Second, it reflects that there exists wide inter-region variation in crisis with relatively high crisis in Jalaun (Bundelkhand region) and low crisis in Meerut (Western region). The Eastern region (Kushinagar) has moderate crisis. Third, if we attempt block-wise analysis, we find that although by and large incidence of crisis is high in all blocks of Jalaun and low in all blocks of Meerut but even within a particular district inter-block variation exists. Table-5 that attempts to classify the blocks on the basis of crisis of agriculture index makes this variation clear. It shows that while all the blocks of Jalaun lie

in the high crisis zone, Meerut that has the lowest crisis index overall finds two of its blocks (Mawana Kalan, Rajpura) appearing in medium crisis zone. The moderate crisis district Kushinagar has one block (surprisingly its agriculturally advanced block Hata) in high crisis zone and other blocks in medium zone. Thus even in the better performing district there are acute problem related to agriculture.

Table 5

<b>Classification of Bocks on The Basis of Index Score</b>			
<b>S.N</b>	<b>Index Scores</b>	<b>Classification of Data</b>	<b>Blocks</b>
1	0.436 and Above	<b>High</b>	Kadaura, Dakore, Jalaun, Hata
2	0.353 – 0.435	<b>Medium</b>	Tamkuhi, Dudahi, Mawana Kalan, Rajpura
3	Below – 0.352	<b>Low</b>	Sarurpur Khurd

*Source-* Computed by the Present Researchers on the basis of Primary Survey

These interesting results need to be further explored and analysed. The presence or otherwise of crisis can be analysed from the perspective of region, level of development, farm size i.e. from the perspective type of farmers- marginal, small and the like, social factors i.e. caste of the farmers etc. however, as already mentioned, we , in this paper concentrate on regional dimension of the problem. We start by giving a very brief introduction of the three regions and then pick up some factors that explain crisis of agriculture and compare the three regions and district chosen on these counts.

#### ***Understanding the Regions & Variations***

Among the three regions of Uttar Pradesh, Western region, because of its close proximity with leading agricultural states of Haryana and Punjab, better infrastructure including irrigation facilities (Roy & Ahmad, 2015) and stronger political muscle, has always been rated high and has always performed better. The region spreads over four agro-climatic zones of UP, has alluvial soil and is perfectly suited for production of paddy, wheat and sugarcane among other crops. The district chosen Meerut is in Western Plain zone. The agro-climatic condition of the district is suitable for floriculture, apiculture and mushroom cultivation (District Planning Committee, 2014). Paddy (rice), wheat, maize, sugarcane, potato, oilseeds and pulses are the main crops. The proximity of the district from the NCR has enabled the district to attract resources from centre and developed infrastructure here has influenced the market size. Despite having small and medium land holdings, the farming community of Meerut properly utilize its land using modern technology and HYV seeds and maintain high level of productivity and cropping intensity.

Eastern region of the state falls in Central plain and North Eastern Plain. The region has alluvial plain with tropical climate and average humidity. The climate and soil is specially suited for Rabi and Kharif crops. Although as compared to the Western region the region lags in terms of irrigation facility yet, the fertility of the soil makes up for it. The district chosen from the region, Kushinagar is situated in the area of the river Gandak. Despite highly fertile land and favourable climatic condition, it is backward in terms of a number of socio-economic indicators. Absence of industries in the region and subsidiary occupation has caused over dependence of population on agriculture, resulting in fragmentation and subdivision of agricultural holding. Small and medium farmers constitute significant proportion of total farmers and they live in a situation of abject poverty. The fragmentation of land holdings coupled with high cost of cultivation and low profitability of agriculture has resulted in low income to the farmers.

The third region chosen is Bundelkhand, obviously the most backward region of the state. The quality of land is not very suitable for agriculture; rainfall is erratic in the region and irrigation facility sparse. The region hardly has any industry so there is excessive dependence on agriculture. Farmers of the region are very poor and most of them do not have sufficient resources to carry out cultivation using even modest technology. They face high cost of cultivation and frequent crop failure and most of them for want of resources are forced to sow the land only once in a year or even leave significant portion of the land as fallow land. The district chosen from the region Jalaun is a clarion case of agricultural backwardness in the state. It is a drought prone area where frequent crop failures have left farmers in deep debt forcing many of them to commit suicide.

### ***Variations across Regions***

As we attempt to delve in deep trying to understand the regional variation in crisis, we compare the regions on different parameters such as availability of infrastructure related to agriculture, land condition & cropping intensity, productivity of food grains and commercial crops, profitability of farmers, economic condition of farmers etc. and see how the regions stand and what explain the variation in crisis of agriculture.

The first factor chosen is the availability of infrastructure. For a considerable period of time centrality of infrastructure for agricultural health has been emphasised. The general perception in relation to UP is that the Western region is rich in agricultural infrastructure and the backward regions of Bundelkhand and Eastern UP are backward. The contention however is only partially true. While in general districts of the Western region are well-off in terms of agricultural infrastructure, yet there are some exceptions. Prakash & Raman (2018) in their study using variables like number of agricultural production societies per lakh hectare of net area sown, number of cold storages per thousand square kms, number of primary agricultural loan cooperative societies etc. have found the agricultural index value of different districts of Uttar Pradesh. On a scale of 0 to 1, they have obtained index scores of Meerut, Kushinagar and Jalaun to be 0.233, 0.196 and 0.326, respectively. Thus while Jalaun was occupying 11th rank among districts of UP in terms of agricultural infrastructure, for Meerut and Kushinagar the rank was 22 and 38 respectively. The finding entails that despite having rich infrastructure, performance of agriculture and condition of farmers in Jalaun is not good. The finding corroborates the one of Kumari & Raman (2012) who have, using crisis indices of agricultural development and overall infrastructure found that while in general districts ranked high on infrastructure are also high on agricultural development, yet there are some exceptions like Kanpur Nagar, Jalaun, Jhansi & Sonbhadra who are high on infrastructure but low in agricultural development. The reason for this obviously is the extent of use of infrastructure. If one compares the availability dimensions of agricultural infrastructure with use dimensions e.g. contrasts number of primary agricultural loan cooperative societies with loan distribution of primary field per person or percentage of electrified villages in total inhabited villages with percentage of electricity consumed in agriculture division in total electricity consumption, one clearly finds that the intensity of utilisation of available infrastructure is very low in Jalaun and in fact whole of Bundelkhand and is very high in Western region of UP. Prakash & Raman (ibid) have computed infrastructure utilisation index and have obtained a very low score for Jalaun. Hence, poor utilisation rather than poor infrastructure explains the variation in performance. There are several factors in Jalaun that keep utilisation low. We can count some of these- First, Rainfall in Bundelkhand region is sparse and has declined over

a period of time. This has made crop failure very frequent and drained-off already scarce resources of the farmers. Obviously intensity of infrastructure use is low. Second, the land rights in the region are not very clear. Land shown in the name of small farmers are being captured and tilled by big farmers. Small farmers cultivate a plot only to be told later that it is not their land. Third, farmers of this region face very high risk/uncertainty and many of them lack resources to do more than on crop in a year.

The second factor taken up is average size of land and variation in utilization of land (as measured in terms of cropping intensity) across chosen districts. Average size of landholding is a very crucial factor reflecting status of average farmers, productivity (Chand et.al, 2011, Helfand and Taylor 2017) and health of agriculture. While large farm size facilitates mechanization of agriculture, small size results in more intensive cultivation of land and is often associated with high per hectare productivity. Primary survey conducted by the researchers of 540 households reveals that there is significant difference in average size of holding across regions. Jalaun (Bundelkhand) has the highest (2.87 hectare) and Kushinagar (0.8 hectare) the lowest. Not only this the average size of parcel land that shows consolidation of land area and affects the cost of production through the economies of scale was also found to be the highest in Jalaun (1.37 hectare), followed by Meerut (0.717 hectare). Kushinagar (Eastern UP) is at the bottom with only 0.248 hectare. High fertility of land along with absence of subsidiary occupation in Eastern UP has resulted in high dependence of population on agriculture causing subdivision and fragmentation of landholdings while the very fact that a significant portion of land in Jalaun lacks irrigation facility and is not culturable explains relatively high size of holding there. The net effect of this is that in Kushinagar mechanization is discouraged because of uneconomic land size; in Jalaun it is a far cry given the poor economic condition and high risk of farming in face of frequent crop failure. Thus the Western region of the state has shifted to modern agriculture and has naturally been benefitted also by the green revolution, while reverse is the case for Jalaun and Kushinagar.

A factor related to land size is cropping intensity that indicates raising number of crops from the same field during a year. *Ceteris paribus* high cropping intensity reflects better agricultural and farmer health. Only when return to cultivation is high and farmers have resources to grow multiple crops cropping intensity would be high. The primary survey revealed that cropping intensity for Kushinagar was the highest i.e. 187.24, followed closely by Meerut with 185.05. Jalaun was lagging far behind with only 144.04. In fact within a particular district while the agriculturally advanced blocks have marginally high cropping intensity, no significant difference was discernible between the average and backward blocks. This reflects that it is not presence or otherwise of infrastructural facilities (that causes variation in ranking of blocks) that explains variation in land use, but the return on cultivation and farmers economic health. Low return on cultivation (see table on profitability given below), low income (see table on farmers' economic health) uncertainty and relatively high cost of cultivation are major deterrent for Jalaun (Bundelkhand). Unavailability of reliable all weather source of irrigation facility is another factor depressing cropping intensity in Jalaun. Survey results show that about 11% of cultivated land in Jalaun did not have a definite source of irrigation, one fourth of total land relied on Canal irrigation with canals drying in seasons when they are needed the most.

The third factor chosen for comparing the three regions and explain differences in intensity of crisis across them is productivity and profitability. The present researchers in their farmer survey

computed physical productivity for three major food grains and major commercial crop for the three regions. Inter-district comparison for food grains is possible only with respect to wheat as paddy, jawar & maize which are other important crops in Meerut and Kushinagar, are not grown in Jalaun. Thus in order to have an overall picture of productivity, we have measured productivity per hectare in Rupee terms also. The result is shown in Table-6 given below.

Table 6

Block/ District	Productivity (Q./Hect.)			Food grain productivity (Rs./ H.)	Commercial Crop productivity (Rs./ H.)	Profitability (Rs./H)
	Wheat	Rice	Sugarcane			
Mawana Kalan	40.16	38.37	523.10	60099.59	128313.7	37367.9
Rajpura	39.40	33.42	586.12	57195.51	131013.8	43017.08
Sarurpur Khurd	40.29	-	546.05	57718.26	137211.2	51475.52
<b>Meerut</b>	<b>39.95</b>	<b>35.90</b>	<b>551.76</b>	<b>58337.79</b>	<b>132084.6</b>	<b>43953.5</b>
Jalaun	39.77	N.A	N.A	56576.15	48977.74	23277.56
Dakore	34.33	N.A	N.A	48637.72	42216.78	22072.12
Kadaura	28.71	N.A	N.A	38943.55	29612.97	13991.48
<b>Jalaun</b>	<b>34.27</b>	<b>N.A</b>	<b>N.A</b>	<b>48052.47</b>	<b>41977.43</b>	<b>19780.39</b>
Hata	26.25	33.84	540.00	38154.94	144914.3	22284.23
Tamkuhi	31.06	38.92	673.07	44671.35	179148.2	72747.57
Dudahi	35.72	38.64	567.81	53265.63	147633.0	50989.35
<b>Kushinagar</b>	<b>31.01</b>	<b>37.13</b>	<b>593.63</b>	<b>45363.97</b>	<b>160377.9</b>	<b>48673.71</b>

Source- Computed by the Present Researchers on the basis of Primary Survey

The result is very interesting- first, Meerut has the highest productivity per hectare in physical terms for wheat (compared to both Kushinagar and Jalaun), paddy and sugarcane (in relation to Kushinagar) with highest figure being returned by the agriculturally advanced blocks. Similarly Kushinagar has advantage in terms of paddy and sugarcane. The surprising factor is that Jalaun has higher productivity per Kg of wheat as compared to Kushinagar that boasts of having highly fertile land. In fact large scale cultivation of wheat is a relatively recent occurrence in Jalaun, caused by increase in use of groundwater irrigation and some increase in surface irrigation. The subsidies given by the government for water and power, as well as improved availability of high yielding varieties have contributed to higher productivity in the district. The second finding is that for all the crops in Kushinagar district and Sugarcane in Meerut, the advanced block in terms of agricultural infrastructure have lower per hectare productivity as compared to the average or backward blocks. This reaffirms the findings of Kumari & Raman (2012) that no one to one relationship between availability of infrastructure and productivity can be drawn. The utilization of infrastructure is a crucial factor and that depends on a host of factor. Third, the situation of productivity is dramatically different for cash crop. While for both Meerut and Kushinagar the important cash crop is sugarcane, for Jalaun it is green pea and peppermint. Per hectare productivity of sugarcane is far higher than these.

The ranking of the district (region) changes dramatically as we shift the basis of comparison from productivity to profitability per hectare. We have subtracted the cost of production from gross value of output to compute profitability. The norms of CACP (Commission for agricultural Costs and Prices) for the calculation of profitability and different component of costs have been used. As

we compare the profitability, the ranking of district changes. While Kushinagar because of relatively higher productivity of commercial crop (Sugarcane) attains the first position, Western UP (Meerut) comes a close second. Bundelkhand (Jalaun) that was second in ranking of productivity of wheat becomes a distant third. As a matter of fact all three blocks of Jalaun district have per hectare profitability lower than even the most backward blocks of Meerut and Kushinagar. This contrast of high productivity but low profitability in Bundelkhand is explained by three factors- first, relatively high productivity of wheat in Jalaun is more than offset by a very low productivity of green pea and peppermint. Second, the cost of production in Jalaun is fairly high as compared to other two regions. Third, the market price of output/crops in Jalaun is slightly low. The Comprehensive District Agriculture Plan of Jalaun also accepts the shortage of adequate marketing infrastructure and network in Jalaun that works as a major deterrent for farmers, preventing them from getting remunerative prices. Relatively high market price of sugarcane and low cost (of transportation) also explains higher per hectare profitability of Kushinagar. Transportation cost of sugar cane is considerably high. Since there are a number of sugar mill located in Kushinagar district farmers do not have to spend much on transportation. Further, the demand for sugarcane is high so they are able to get remunerative price in timely fashion there.

Table 7

**Financial Health of Farmers**

District	Per Hect. Outstanding loan (in Rs)	Debt Asset Ratio	% of HHs Expenditure Covered by Agricultural Activity	Per Capita Food Grain Availability (Kg/Year)
Meerut	89697.62	0.378	50.58	276.67
Jalaun	24754.22	0.561	41.21	255.34
Kushinagar	54432.57	0.414	31.15	272.69

Source- Computed by the Present Researchers on the basis of Primary Survey

The fourth factor that explains variation in crisis index across regions of UP and at the same time highlights the need to follow a farmer centric policy in the state is poor financial health of the farmers. We have chosen to explain the same on the basis of comparing their indebtedness, availability of per capita food grain with them and percentage of their total expenditure being covered by the agricultural income. The findings are presented in Table-7 given below. The table shows very high per hectare outstanding loans in the chosen districts. Meerut tops the list with Rs.89,697/-. The figures however are bit misleading. Low per hectare loan in Jalaun creates a false impression of better financial health of the farmers here. The conclusion is not valid because the quantity of fallow land is very high and cropping intensity low in Jalaun. Hence, significant portion of land remains unused or is cropped only once here.

We have computed per hectare loan by dividing total loan by the total quantity of land possessed by the farmer and not total quantity of land actually sown the particular year (as the quantity of land sown varies from year to year), something that depresses the per hectare loan figure. In fact in Jalaun high amount of loan is one of the factors that depress cropping intensity. Debt to asset ratio is a better indicator of financial health of farmers. We have computed this by dividing outstanding loan by the value of all assets of the farmers (excluding land). Quite naturally in Jalaun as the farmers are worst off as the quantity of debt with them is high and equipments/assets is low. Farmers here, because of their poor economic condition either do not use big machines or else hire

them. Farmers in Meerut are relatively well-off (have strong asset base) and since production process is mechanized and they own lot of agricultural equipments, their debt-asset ratio is low.

Another indicator that we have used is percentage of expenditure covered by income from agricultural activity. The result given above shows that since agriculture in Meerut is a remunerative profession, farmers use it as their main source of income (for 81% farmers in the district agriculture is the main source of income). In Jalaun as droughts and crop failures are little common and profitability per hectare is considerably low, it is not possible for farmers to rely exclusively on agriculture (Agriculture is the principal source only for 56.7%). They look for wage work and adopt other occupation like street vending to supplement their income. The situation with Kushinagar is different. Although per hectare profitability here is high, the farm size is very low (83.3% of total farmers are marginal). Absence of industries and remunerative occupation has forced subdivision of land holdings and for most farmers the available land size is not large enough to support the entire needs of their families. This forces them to go for doing menial jobs.

We have used net per capita food grain availability as another indicator of farmers' health (Patnaik, 2003, 2004, 2006). Using this indicator too our conclusion that farmers of Meerut district are well-off and those in Jalaun are in trouble gets validated.

### **CONCLUDING REMARKS**

Crisis in the Agrarian Economy has emerged as a big problem for the state and region. During the last few years a number of steps have been taken to tackle the problem but with very little impact. There are precisely two reasons for this- first, the efforts made relate mostly to the agricultural sector and only partially address the issues affecting different categories of farmers and second, in most cases common policy for the entire state have been adopted completely disregarding regional variations. The need is to adopt farmer centric and region specific policies. An exhaustive treatment of the same is not possible here for want of space so; we provide only brief treatment of the same-

**Adoption of Farmer Centric Policies-**The present crisis to a greater extent is the result of farmers concern and the solution lies in adoption of peasant centric policies. The principal component of the same would be ensuring sufficient return to farmers from farming activity. There are two important interventions required from this angle. First, provision of remunerative prices to farmers and checking price deflation is a crucial thing. This calls for developing agro-marketing network with very effective involvement of government agencies and fixation of prices that are farmer friendly. State should intervene to resolve the problem of sale of agricultural products. Minimum Support Price for key crops is not regularly revised and upward revision is generally not sufficient enough. A system of determination of MSP at district level be developed and revision of MSP be based on rate of inflation in the economy and cost of production with inputs from farmer groups. The poor farmers should be protected from vagaries of international market. Hence, during years of shortages of agricultural commodities farmers should be allowed to reap reasonable benefits and prices should not be deliberately depressed by pushing up imports. The decision is definitely going to be tough as it results into a clash of interest of farmers and consumers (who prefer cheap imports) but government should attempt to strike a balance. Second important step would be reducing cost of production which in turn depends on provision of extension services (which can insure timely supply of inputs at low cost and smooth transfer of cost reducing technology),

increasing public investment in rural development and mitigating risks associated with farming by offering dependable insurance against crop failure. For minimizing input cost, the high quality of agricultural inputs should be made available at the appropriate time on affordable price. The arrangement of agricultural inputs should be made by farmer's cooperatives and such cooperatives should be member based and free from bureaucratic intervention and controls. Government should provide subsidies especially for marginal farmers by the case transfer scheme.

**Adoption of Region Specific Policies-**The analysis of regional dimension of crisis of agriculture clearly shows that the Western region of U.P has some advantage in terms of agricultural development and has recorded low crisis intensity, whereas the situation of Jalaun and Kushinagar looks difficult. Of late farmers' suicide is becoming little regular in Bundelkhand giving a serious warning signal to the government. Since, the problem of Bundelkhand is different from that in Kushinagar we have given some region specific suggestions for these two regions.

There are certain issues that are very crucial for Jalaun in particular and Bundelkhand Region in general. First of course is irrigation, an important hurdle for the whole of Bundelkhand region. Lack of reliable source of irrigation and frequent crop-failure in case of rain dependent agriculture is keeping cropping intensity low and making income uncertain in Bundelkhand. Government should enhance irrigation facilities and improve irrigation systems. There is need to replenish groundwater through water harvesting. Since underground water is the primary source of irrigation in the district, government should promote tube-well irrigation and lay public tube-wells. Arrangement of underground pipeline for water conveyance should be promoted so as to reduce water loss in conveyance. Government should also give emphasis on micro-irrigation system and precision farming. Second issue is developing agro-marketing centres. Farmers are caught in the clutches of local dealers. There is a need to offer proper marketing infrastructure so that farmers can market their produce at optimum rates. Procurement by government agencies should be increased and market centres with adequate infrastructure at the block level should be established. Third crucial factor is dissemination of technology. Indebtedness and lack of information together have forced farmers in the region to use backward technology. Government should emphasize on technology dissemination by opening customized farmer training centres where the farmers can be trained and demonstrated the latest technologies in all components of farming i.e. crop husbandry, dairy, animal breeding, poultry, fisheries and other ventures. The comprehensive district level agriculture planning has suggested establishment of agricultural knowledge and market information centre at the block level but still no headway has been made in this regard. There is a need to have extension facilities for diversification to more lucrative cash crops like green pea and peppermint. Government should provide basic facilities regarding these commercial crops. Fourth, important intervention is required in the field of crop insurance in the district.

Kushinagar district, and the Eastern Region in general, has different type of problems. So obviously the intervention required is different. First, the principal problem of the district is marginalization of land holdings. The government should launch special programmes for these farmers. Creating subsidiary occupation in the non farm sector could well reduce the subdivision of holdings and make size of farms economic. Second, there is need to spread the networking of rural banks and cooperative societies and reinforce close coordination between the district and block development authorities and banking institutions operating in the district. There is need to ensure that agriculture loan is used for productive purpose by lenders through systematic

monitoring. Third, the availability of agricultural machineries per acre in Kushinagar is very low. Therefore the machinery cost per acre is very high. It is essential to reduce this cost for which it is suggested that micro level cooperatives should be strengthened and assisted to stock tractors and other high cost farm implements/machinery, which are needed for a few days in a year. This will reduce farmers' fixed costs and will especially help the small and marginal farmers.

We can conclude by saying that there exists significant regional variation in problem of agriculture in Uttar Pradesh. The severe livelihood crisis in rural areas in Uttar Pradesh is complicating problems in rural areas. If the state government moves in a planned manner and gives proper emphasis on non-farm sector especially rural manufacturing, it would on the one hand reduce dependence on agriculture and revert the trend of sub-division of land holding and on the other provide surplus income that can be pooled back and invested in agriculture. What is needed is a comprehensive district and region level planning as piecemeal efforts are not going to give desired results. It is high time that serious consideration is given to the problem of farmers else crisis of agriculture would intensify in the state and would have very serious repercussions for the state and bulk of its population.

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# GROWTH AND DEVELOPMENT IN INDIA REGIONAL DIMENSIONS



Centre for Regional Development and Planning, Department of Economics, University of Burdwan