

Status of Small and Marginal Farming in **Eastern Uttar Pradesh**



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ABBREVIATIONS

ATMA	Agricultural Technology Management Agency
GEAG	Gorakhpur Environmental Action Group
CC	Climate Change
GSDP	Gross State Domestic Product
HHs	Households
BPL	Below Poverty Line
U.P	Uttar Pradesh
HDI	Human Development Index
MSP	Minimum Support Price
GoUP	Government of Uttar pradesh
SHG	Self Help Group
www	world wide web
HHI	Household industries
SC	Scheduled caste
ST	Scheduled Tribe
Ha	Hectare
RKVY	rastriya krishi vikas yojna
NFSM	National Food security mission
IRRI	International rice research institute
FIG	Farmer Interest Group
IPM	Integrated Pest Management
ASC	Agro Service Centre
SLD	Shared learning dialouge
API	Agriculture parity Index
NSS	National sample survey
KVK	Krishi Vigyan Kendra
GCA	Gross cultivated area
HYV	High Yield Verity
ICMR	India Council of Medical Research
GOI	Government of India
FFDA	Fish farming Development Agency
ZRS	Zonal research station
PRI	Panchayati Raj Institution
DASP	Diversified agriculture support projects
SRR	Seed replacement Rate
MNREGS	Mahatama Gandhi National Rural Employment Guarantee Scheme
NFSM	National Food Security Mission
SREP	Strategic research extension plan
CBOs	Community Based Organisations
IMD	Indian Meteorological Department
PACS	Primary Agriculture credit society
FGD	Focused Group discussion
NABARD	National bank of Agriculture and rural development
NGOs	Non-Governmental Organisations
SRI	System of Rice Intensification
JLG	Joint Liability Group
PLDB	Primary land development bank
CBB	Commercial bank branch
RRBB	Regional rural bank branch
CAC	Credit absorption capacity
LEISA	Low External Input Sustainable Agriculture
ITK	Indigenous Traditional Knowledge

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AGRICULTURE IN EASTERN UTTAR PRADESH

Uttar Pradesh occupies an important position in Indian agriculture not only because of its size but the diversity it has. It has been a major contributor in the national efforts for ensuring food security and achieving self reliance in terms of food. The state is among the largest producers of food-grains, wheat, rice, sugarcane, pulses and potato. Sectoral budgetary allocation for agriculture is continuously declining due to gradual decrease in public investment. Through several Five Year Plans, public investment in agriculture in the state has declined¹.

Since the locale of the study is Eastern UP it is worthwhile illustrating some of the key features that characterise this region, which is one of the most underdeveloped in the state even though it is well endowed with natural and human resources.

Composed of 27 districts in the eastern part of the state the general image of this area is - Poverty, backwardness, source of cheap labor in spite of its fertile soil, good potential for irrigation, good agro-climatic conditions, lots of natural resources for industrial development².

- A high population density of 849 per sq km (UP 689)
- Percentage literate of 45.2 (UP 57.36), Female literacy is 27.6 % (UP 42.93)
- Average size of land holding 0.63 hectare. (0.85 ha for small and 0.40 ha for marginal farmer in Uttar pradesh)
- Highest area under food grain production is 7497 (000 hectare) (UP 19288)
- Rice is the main crop but the area is not known for rice export.
- Ghazipur is the second highest producer of potato in UP but there is lack of storage facilities.
- Percent of BPL families 42.58 (UP 36.91). The largest numbers of BPL families
- are in Bahraich District - 56.91%.
- Sugarcane production suffers due to non support to sugar industry in the region.
- 14 of the 27 districts of Eastern UP are in the Low (0.50 to 0.54)³ to very low (below 0.50)⁴ category of Human development index(HDI)⁵ .
- Approximately 82% of total farmers are marginal and 12 % are small farmers
- Approximately 39% of the area is flood prone
- Out migration of men for wage work is a significant phenomenon in Maharajganj Kushinagar Sant kabir nagar, Gorakhpur, Basti, Siddharthnagar, Balia, Gazipur districts due to floods and water logging of the area⁶.

¹ 11 Plan document GoUP 2006-07, http://planing.commission.nic.in/stateplan/upsdr/vol-2/chapter_b1.pdf

² GCGA Sub National Study, U.P, 2007

³ Deoria, Azamgarh, Sultanpur, pratapgarh, Kausambhi, Kushinagar districts are in the low category(0.50 to 0.54) of HDI

⁴ Basti, Maharajganj Sant kabir nagar, Gonda, Siddharthnagar, Balrampur, Bahraich and Shrawasti districts are falling under very low category(below .50) of HDI index

⁵ Human development report of Uttar Pradesh, 2007, www.planning.up.nic.in/Annual%202010.../chapter-4prn.pdf

- The fall out of migration is the spread of HIV/Aids in the area
- Due to migration the no. of absentee landlords are very high and due to this the
- *Adhiya/Batai* (share cropping) is very common practice for Rabi and Jayad season crops.
- Gender discrimination is easily seen in wages as well as the other facilities related to the agrarian business. The entitlement of women to land is very rare, so women are hardly recognized as farmers
- Industrial Scenario of Eastern Uttar Pradesh is not very good.
- Three major electric power projects are situated in the region but shortage of
- power has broken the backbone of the sugar, loom and food storage industry.
- Carpet industries of Bhadohi & Mirzapur are suffering due to child labor issue
- Work participation – 46% are agricultural cultivators, 36 % are agricultural
- labour, 8% are HHI, 4% are in the public sector, 1 % are in private sector and 5% are in the organized sector.

Rural women continue to be denied rights to land so they are unable to access inputs like finances and other agricultural inputs (technical and non technical) to raise productivity of small holdings (poor SC/OBC), particularly where men migrate or when they are engaged in share cropping. Consequently, productivity is affected providing low yields through low inputs and inefficient practices making small scale marginal farming unviable being cost intensive. As a result women farmers who form the bulk of small and marginal sector in agriculture continue to face challenges, of breaking even and earning substantive profits from farming. Even agriculture extension and low cost /no cost technology and inputs are not available to them though the government extension network.

What is also becoming increasingly visible is the gap in rural - urban incomes. Agricultural wages have not increased at the pace of other wages or salaries⁷. If the majority of people are located in the agricultural/ rural sector inequalities are likely to rise further between rural urban income and expenditures. Here too women are affected because of low wages⁸, poor work opportunities and low bargaining power. They also face vulnerability due to climatic vagaries – floods/ drought that impact work availability in rural areas.

⁶ Amit Mitra, B.K Singh, 2011

⁷ Brajesh Jha

⁸ 11 plan document G oUP , 2007-2008

The Agrarian Crisis: Land Holdings, Land Distribution and Agricultural Production

Of the State's total geographical area of 24.2 million ha (mha), 16.8 mha (69.42 percent) is under cultivation (incomplete sentence) Agriculture contributes about 40 percent to the SGDP as against 25 percent at the national level. According to the 2001 census, 62.12 percent of the state's total workers are engaged in agriculture. UP contributes on an average 21 percent to the national production of foodgrains. With the average food grain production of about 42.7 million tons and per capita production of 234 kg per year, third highest among major states, UP is considered to be a food grain surplus state⁹.

UP's agriculture is characterized by very small size of land holdings; around 90 percent of the farmers in the state are small and marginal farmers. Some 73.8 percent of the total operational holdings in the state are marginal (below 1.0 ha) and another 15.5 percent holdings are small (between 1 and 2 ha)¹⁰. Due to the preponderance of the small holdings cropping pattern, UP agriculture is still largely subsistence oriented.

Landholdings in Uttar Pradesh are becoming more fragmented over the time. Thus between 1985-86 and 1995-96, while the total size of the holdings increased from 18.98 million to 21.53 million ha, the proportion of the area under medium and large holdings declined from 8.3 percent to 7.4 percent, and 3.22 percent to 2.5 percent and the share of the area under marginal holdings increased from 72.6 per cent to 75.4 per cent.

The average size of total land in UP is 0.65 hectares. The estimated average size of land with marginal farmers and small farmers are 0.4 hectares and 0.85 hectares respectively¹¹.

Declining Returns on Investment in Agriculture

Despite the rise in the cost of all inputs like seeds, power, fertilizers, pesticides and water, farmers are selling their outputs today at prices that are in reality half of those twenty years ago. Returns on investment are reducing further. Simultaneously, due to a whole range of factors, including reduced soil productivity, the dependency of farmers on external inputs is rising. All of these seem to make agriculture an unviable and unsustainable proposition, especially for the small and marginal farmers. In the case of UP for instance, the agricultural parity index (API) of prices received and paid by the farmers has declined from 91.3 in 1984-85 to 87.7 in 2003-04.

⁹ PHD Research Bureau, December 2011, <http://www.phdcci.in/admin/userfiles/file/Reserach-Bureau/Uttar-Pradesh.pdf>

¹⁰ Agriculture census 2005-06 (www.agcensus.nic.in), last access on 17.4.13

¹¹ Agriculture census 2005-06

This is evident from the data in table 1 :

Table 1: Agriculture parity Index of price received and paid in UP

Agricultural Year	Index of Prices Received by Farmers (a)	Index of Prices Paid by Farmers (b)	Agricultural Price Parity Index (a/b) %
1984-85	260.4	307.1	91.3
2003-4	1112.3	1268.7	87.7

The above calculations have been made for the farming sector as a whole, that is for all categories of farmers. The API, needless to say, would be worse for marginal and small farmers, given the problems they face in marketing their produce.

Rural Indebtedness

According to the National Sample Survey (NSS) data, in UP out of 22.12 million rural households, 17.16 million (77.46 percent) were farmer households and out of them, 6.92 million (40.3 percent) were reported to be indebted. As the following table 2 shows, nearly 89 percent of the indebted farmers belong to the small and marginal categories.

Table 2 : Percentage distribution of farmer and indebted households- -over size class of land possessed

Size of holdings (ha)	% of Farmer hhs	%of Indebted farmer hhs	Prevalence rate of indebtedness (%)
<1.00 (Marginal)	74.40	71.1	38.54
1.01-2.00 (Small)	16.50	17.4	42.54
2.01-4.00 (Semi Medium)	6.80	7.8	46.28
4.01-10.0 (Medium)	2.04	3.4	67.15
10+ (Large)	0.26	0.3	46.86
All	100.00	100.0	40.33

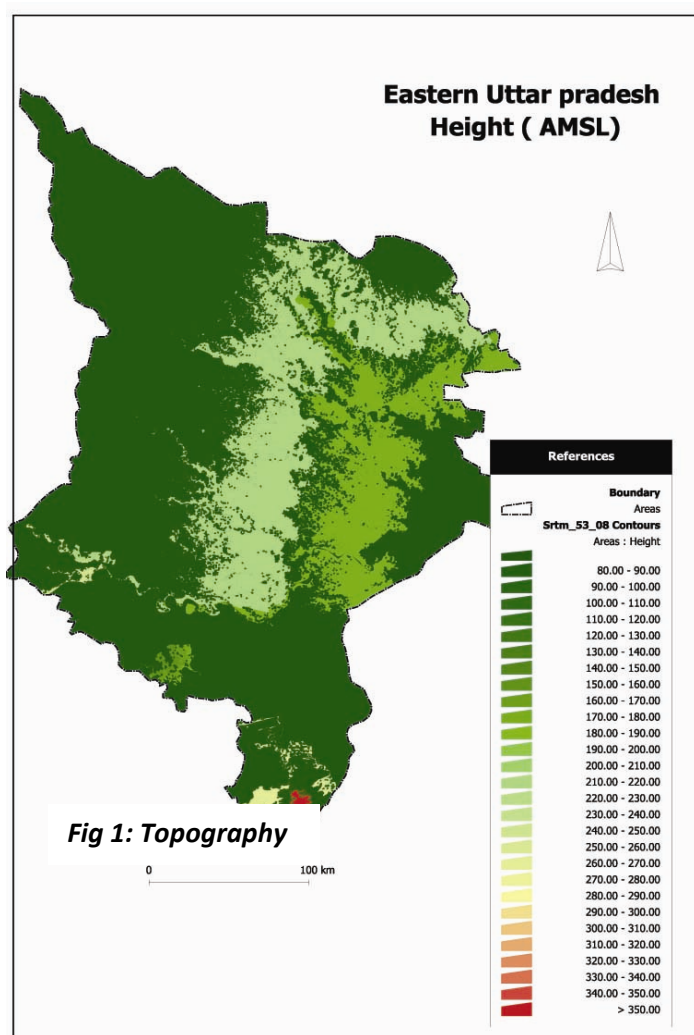
Eastern Uttar Pradesh

The region of Eastern Uttar Pradesh is located between 23⁰50` N to 28⁰25` N and 81⁰10` E to 84⁰40` E. and it covers an area of 85,803 sq/km. As it has mentioned that the region borders Nepal (international boundaries) in the north, Bihar and Jharkhand in the east, Chhatisgarh and Madhya Pradesh in the south and many districts of Uttar Pradesh in the west. Physiographically, the entire Eastern Uttar Pradesh may distinctly be grouped into three regions namely the tarai-bhabhar region- between the Himalayas and the Gangatic plain, the alluvial Gangatic plain and the southern Vindhayan hills and plateau. The Himalaya borders the region on the north but the alluvial plain that covers three fourth areas of the region are distinctly different from the mountain. It is a very deep and almost level land sloping gently from north-west to south- east. (Fig : 1)

On the basis of development of alluvial deposits, it can be divided between older alluvium (Banger) occupying relatively higher elevations and the new alluvium (khardar) occupying lower areas along the main rivers and their distributaries. The soils are deep, loamy and high in organic content. Broadly the soil of the region is termed as alluvial but it may be sub categorised into tarai soil, alluvial soil and vindiyan soil. Tarai soils are alluvial soils occurring as a narrow belt to the south of the Himalaya on the north.

These are grey to dark grey soils varying in texture from sand to clay loam and have high content of organic matter. Water table is high and the soils remain saturated or fairly moist during the major part of the year.

The alluvial soil is occupying the three-fourth areas of the region (Fig 2). They were excessively deep soils and have developed from the alluvium deposited by the two major rivers i.e the Ganga and the Yamuna and their tributaries, The alluvial material deposited by the Ganga and its tributaries is derived from the soft dolomitic rocks of Himalayas and that deposited by the Yamuna and its tributaries owes its origin to the basaltic rock of central Indian hills. The soil developed on Gangetic alluvium is neutral to moderately alkaline and calcareous especially at lower depth. Texturally, they vary from, coarse sands to fine clays, The alluvial soils developed from Yamuna alluvium are quite dissimilar to Gangetic alluvial soils. They are dark to very dark grey, fine textured, calcareous soils showing remarkable swelling and shrinking on wetting and drying. The alluvium laid down by the river Gandak and Ghaghra in north-eastern part of region is highly calcareous. As the general slope of the Gangetic plain being from north-west to south-east, the finer fraction increases from western to eastern parts of the region due to gravimetric assorting of soil particles during the course of their deposition. These soils are generally poor in Phosphorus (P) Nitrogen (N) and organic matter.



The vindhayan soil is lying south of the Ganga in the south-east corner of the region occupying nearly 5.1 per cent of the total area of the region. They have developed on Vindhyan rocks comprising of Vindyan and Kaimur sandstones, shales, mixed conglomerates, calcareous and haematitic slates schists, gneiss, carboniferous rocks and to some extent the lime-stones. In colour they vary from brown to dark brown and acidic in nature.

The entire region endowed with large surface water resources. A good numbers of rivers and their tributaries (river Ganga, Ghaghra, Rapti, Yamuna, Son and Gomti) traverse the region. Besides its, there are thousands of permanent water bodies of different size which serves as the major source of irrigation and recharging the ground water.

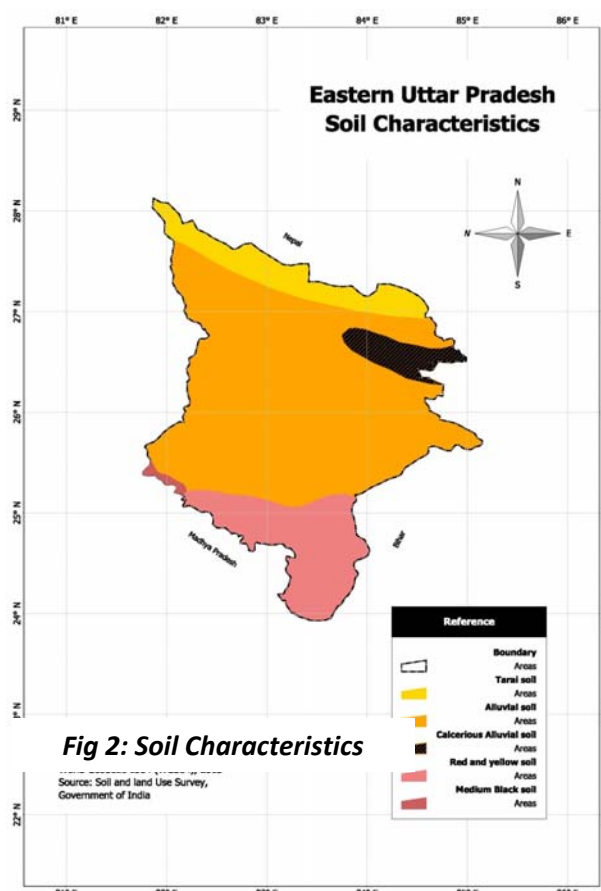


Fig 2: Soil Characteristics

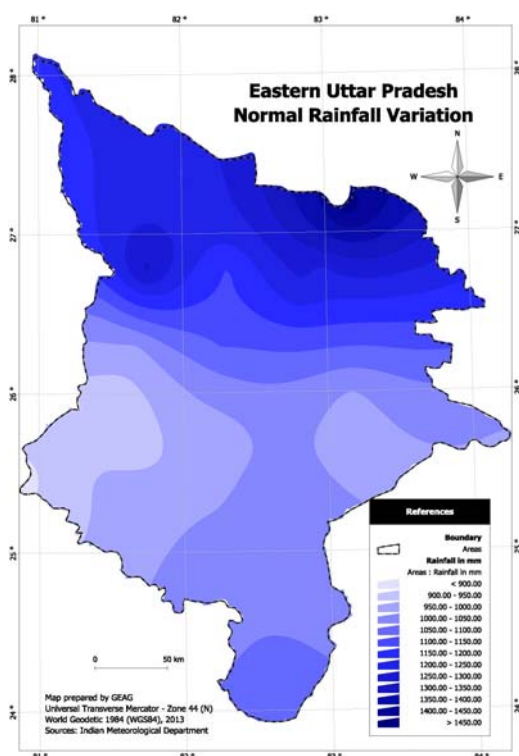


Fig 3: Normal Rainfall Variation

The region (eastern UP) has a climate which varies from semi arid to sub-humid and experience four seasons (Fig. 3). The winter in January and February is followed by summer between March and May and the monsoon season between June to September. The summers are very hot. The winters are cool and dry. The mean annual rainfall ranges from 80 cm in the south to 140 cm in the northern part. The south-west monsoon brings 80 percent of the rain here, although rain due to western disturbance and north east monsoon also contributes small quantity toward the overall precipitation of the region.

The land topography is of plain land, fairly levelled to very gently sloping with slopes ranging from 0-3 per cent. In most of the area in the region, the water table is high and hence

shallow tube wells, open wells and tank irrigation are common for supplemental irrigation. Canal irrigation is also common in some area. Agriculture is the main occupation of rural people.

Generally farmers take two crops during the year and in areas having facilities of summer irrigation, third crop is also taken in summers.

Out of nine agro climatic zones in Uttar Pradesh, eastern UP is spread in five of these zones (figure 4). These five agro-climatic zones along with the included districts and the key characteristics are as follows:

1. Central Plain: covered districts are Allahabad, Kaushambi and Pratapgarh. The soil is quite productive and varies from sandy loam to clay loam but low organic carbon, inadequate water management and efficiency of micro nutrients are major constraints.
2. Eastern Plain: the districts included in this zone are Varanasi, Chandauli, Ghazipur, Jaunpur, Faizabad, Ambedkar Nagar, Sultanpur, Azamgarh, Mau, Ballia and S. Ravi Das Ngr. The rain fall is adequate with a normal of 1,025 mm. the climate is dry sub humid to moist sub-humid. Over 70 per cent of the land is cultivated and more than 80 per cent of the land area is irrigated.
3. Vindhyan: There are only two districts in this agro climatic zone falling in mid-Gangetic plian, viz, Sonbhadra and Mirzapur. Rainfall is adequate at 1,134 mm and the region has a high forest cover of about 40 per cent of the land. Most of the land is undulating and rocky besides alluvial in plain area.
4. North Eastern Plain: this is the largest area comprising of 11 districts, viz, Gorakhpur, Maharajganj, Deoria, Kushi Nagar, Basti, Siddharth Nagar, Sant Kabir Nagar, Gonda, Balrampur, Bahraich, Shravasti. Soils are alluvial and calcareous. Rainfall is quite high at about 1,210 mm, the climate is moist sub humid to dry sub-humid. 73 per cent of the area is cultivated and about half o the cultivated land is irrigated. Floods and poor drainage and hence late sowing of wheat in wheat-paddy cycle are major constraints in the area.

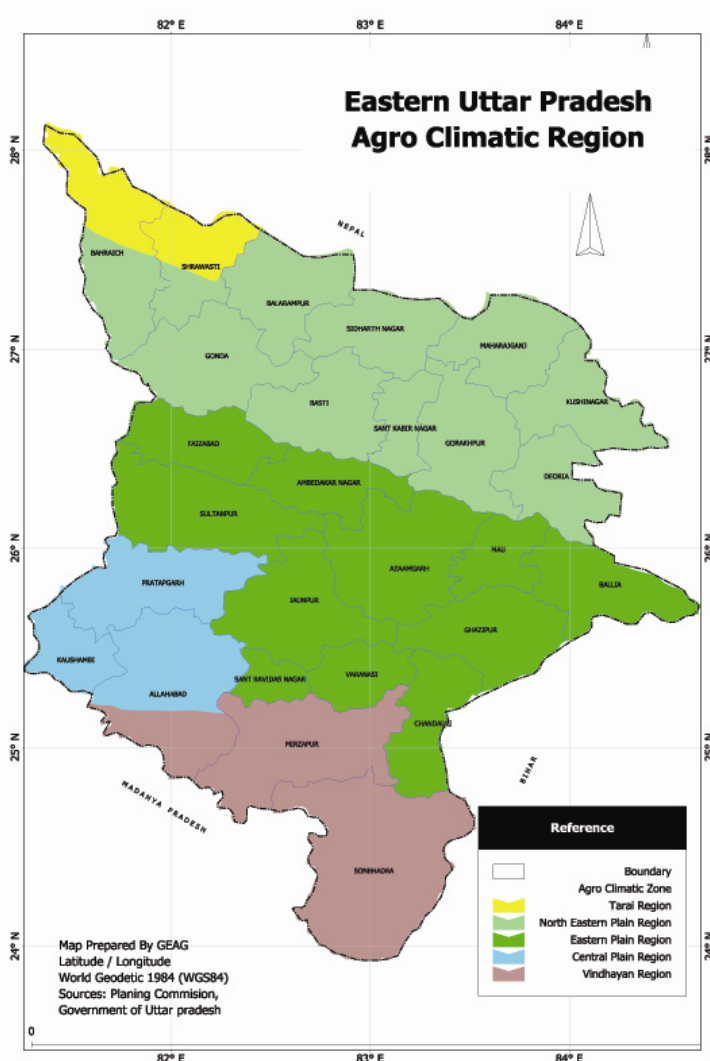


Fig 4 : Agro Climatic Zone

5. Terai and Bhabhar: Which comprises partially the districts of Bahraich (47 per cent) and Sharavasti (71 per cent). Terai soils are alluvial soils occurring as a narrow belt to the south of the Himalaya on the north. These are grey to dark grey soils varying in texture from sand to clay loam and have high content of organic matter. Water table is high and the soils remain saturated or fairly moist during the major part of the year. The average rain fall is highest in the region at 1400 mm.

Agriculture Profile and Trends

Looking at the agricultural profile, at a glance (Table 3), it is realized that the total reported agriculture area in eastern Uttar Pradesh is 65.80 lakh ha which is 26 per cent of the state of UP. The total forest in the region is, however, almost 47 per cent of the state- mainly due to forest areas of Vindhyan region and the northern terai. The gross cropped area in eastern UP is almost 33 per cent of the state which is due to better rain fall, overall good availability of surface and ground water (particularly in north eastern agro-climatic zone, which covers the largest area in eastern UP). The per cent of area sown of reporting area in eastern UP is 63.8 which is slightly less than the state average of 67.9. The area sown more than once is also higher in eastern UP compared to state averages and accounts almost 34 per cent of the state as a whole. However, looking at the area affected by floods it is realized that this is the major issue and more than 77 per cent of the area affected by floods in the state is constituted by eastern UP.

Eastern UP, largely inhabited by small-marginal and landless farmers, have subsistence farming as the main source of livelihoods. Working as agriculture labours also provide earning opportunities to marginal and landless farmers, besides significant population depending on shared/leased land cropping.

As mentioned earlier, eastern region of UP is flood prone and poverty is acute in this region. Therefore household food security is the primary concern of the farming households. To meet the household food security, as high as 91 per cent of all agriculture land is allocated to food grain crops. Rice and wheat shared 75 per cent of GCA (gross cropped area) and their production gone up during 1980s and 1990s due to increase in the yield. Rice yield, which was less than 1 t/ha in 1982-83, reached to 2.03 t/ha in 1999-2000. The corresponding increase in wheat yield was from 1.5 to 2.3 t/ha. These yields, however, are lower than the state averages. This region witnessed a late advent of green revolution effects as adoption of HYVs, chemical fertilisers and irrigation picked up during 1980s and continued during 90s. The yield has increased marginally in the years beyond 2000.

Chickpea and pigeon pea were the main pulses in the region. The area and production of these pulses have been declining. However, other pulses like lentil and green gram have been spreading in rice fallow areas. Amongst oil seeds, rapeseed and mustard and castor seeds have been the major crops in the area. Their areas rose largely due to expansion in its sown areas. These crops are grown in the areas which were earlier kept fallow. It could be due to availability of short duration varieties and irrigation¹².

¹² 11 Plan document , GoUP, 2007

Table 3 : Agriculture at a Glance : Eastern U.P.

S. No.	Item	Area of Eastern U.P (in Lac ha.)	Area of U.P (in Lac ha.)
1	Reported Area	65.80	241.70
2	Forest	7.80	16.57
3	Barren and unculturable land	1.40	5.07
4	Permanent Pastures	0.16	0.64
5	Culturable waste land	1.23	4.40
6	Fallow land-		
	(a) Old fallow	1.90	5.42
	(b) Current fallow	5.45	12.85
7	Net area Sown	55.00	165.73
8	Gross cropped area	85.30	254.15
9	Area Sown more than once	30.30	88.41
10	Cropping intensity	155.60	153.54
11	Net irrigated area	40.70	133.13
12	Gross irrigated area	58.17	192.18
13	Total problematic land	12.79	45.83
	(a) Flooded area/Submergenc	3.48/6.00	4.84/8.20
	(b) Sodic land	1.60	6.75

Sources : Government of Uttar Pradesh , Department of agriculture

The region had some distinct milestones in terms of agricultural development :

- Pre-1970s: Traditional crops, millets, largely dependent on rain irrigation, large areas unsown, flood impacts limited due better water holding capacity and lesser loss risks
- 1980s-90s: advent of green revolution but impacts are limited due to small land holding, lesser investment capacities, irrigation capacities enhanced, use of chemical fertilisers and pesticides increased significantly. Access to markets increased. Effects of floods and Water logging increased, sugar mills getting sick and hence frustration in sugar cane growing.
- Beyond 2000: Market driven cropping increased, uncertainty of floods and changing climate impacts more visible, several agriculture-horticulture related programmes launched.

The major crops and its productivity in eastern UP, vis a vis state averages can be summarized in as table 4 :

Table 4 : Crop Productivity in eastern Uttar Pradesh

Crop	Productivity Eastern UP (qt/ha)	Productivity UP (qt/ha)	No of Eastern UP districts below state average (out of 27)
Rice	19.9	20.3(23)	21
Wheat	26.0	28.6(29.0)	14
Sugarcane	481.6	565.4(700.20)	12
Rabi Maize	29.0	29.0(23.37)	Grown in 7 districts viz Ballia, Deoria, Kushinagar, Faizabad, Sultanpur, Bahraich, Gonda

Note : Value in bracket are the national average

Sources : www.agriculture up.nic :in

SMALL MARGINAL FARMERS IN EASTERN UTTAR PRADESH

Uttar Pradesh is predominantly a land of poor peasant surviving on marginal and uneconomical holding of less than 3 hectare. The bottom 70% of the rural household constituting mostly marginal and sub marginal cultivators, own less than 20% of the total land under cultivation. According to 37th round of national sample survey, the bottom 50% of rural household in U.P. operates only on 12.7% of the total available land.

Land holding size

Eastern Uttar Pradesh is predominantly characterised by a small landholding region with large regional variation in average farm size. Rapid population growth and division of families is directly correlated to fragmentation of holdings. Consequently, sizes of holdings are becoming more fragmented over the time. During last one decade average size of holding has come down 0.97 to 0.68 ha as a result number of marginal and small farmers are increasing every year. The average size of total land in eastern Uttar Pradesh is 0.68 hectares per farmer. The estimated average size of land with marginal farmers and small farmers are 0.35 hectares and 1.38 hectares respectively

The Table below shows the size and distribution of the operational land holdings under various categories of the farmers in the Eastern Uttar Pradesh. This is also known as the operational land distribution or land ownership pattern in the region. It provides the classification of land holding based on the size of the farm being cultivated or a family is operating on. From the analysis of the data it is manifested that About 84.09 percent land holding are less than 1 ha in which the proportion of land size below 0.50 ha is 63.75 percent and another 10.51 percent holdings are small (between 1 and 2 ha). Due to the preponderance of the small holdings cropping pattern, UP agriculture is still largely subsistence oriented.

Table 5 : Land holding size in Eastern Uttar Pradesh

Land holding	Number	Percentage	Operated Area (in hectare)	Percentage of operated area
Marginal	7802120	84.10%	2923552	48%
Small	974849	10.51%	1360345	23%
Semi medium	391358	4.22%	1051625	17%
medium	99916	1.08%	551237	9%
Large	8611	0.09%	143842	2%
Total	9276854	100.0	6030601	100.0

Source : District Statistical handbook, 2012

From the Table 5 it becomes clear that all those who are operating on less than one hectare of land come under the marginal farmers who alone form more than 84 % of the total land holdings but have access to only 48% of the cultivable land

in the region. Similarly all those who have operational holdings between one and two hectares are grouped under the small farmers' category. They form the next largest group of farmers (10.51%) and operating on 23 % of the cultivable land. However their average holding is below one hectare (0.68) indicating that within few years time they also will fall under the category of marginal farmers.

The next category namely the Semi-medium farmers have holdings between 2 to 4 hectares and their number is 4.22% of the total land holdings in the region and operate on nearly 17% of the cultivable land. At present their average land holding is around three hectars but under the present law of equal land inheritance eventually most of them will slide down to small farmers and then to marginal farmers' status.

The medium farmers having 4 to 10 hectares form 1.08 % of the total number of farm holdings operating on nearly 9% of the cultivated land though their average holding is 6.08 hectares. The large farmers who operate on more than 10 hectares are only 0.09% of the total number of the farm holdings. However they too control more than 2% of the cultivated land having an average size of 18.1 hectare. It is evident from the table that 71% of the cultivated land is under the control of marginal and small farmers.

Across the agro climatic zone the characteristic of number and area under different land holding has been shown in the table 6.

Table 6 : Land holding size in different agro climatic zone in Eastern Uttar Pradesh

Agro climatic zone	Marginal				Small		Semi medium		Medium		Large	
	<0.50		.50-1.0		1.0-2.0		2.0-4.0		4.0-10		10 ha	
	No	area	No	area	No	Area	No			area	No	area
Tarai-Bhabhar	55	20	21	20	14	27	6	22	4	10	0.06	1.28
North Eastern plain	63	26	21	25	10	23	4	16	1	7	0.04	1.06
Eastern plain	67	32	19	22	9	21	4	15	1	8	.04	.98
Vindhayan region	56	15	19	16	13	21	7	20	3	17	0.01	10.28
Central plain	67	27	18	21	19	21	4	19	1	10	0.04	0.97
Total	64	26	20	22	10	23	4	17	1	9	1	2

Source : District Statistical handbook, 2012

In marginal category north eastern plain and eastern plain have higher number and area as compared to the tarai and vindhayan region. In eastern plain 67 percent land holdings are below 0.5 ha. The condition of north eastern plain is near about same as what is seen in the eastern plain.

In Central plain number of small land holding (1-2 ha) is highest among the five zones. It accounts 19 per cent of land under this category.

One remarkable point noted in the vindhyan region- though the number of marginal and small land holding is high but the area under cultivation is very low. Here cultivated area under semi medium, medium and large is highest among all the five regions.

Socio-Economic profile of Small Farmers

The Small-Marginal and landless farmers are from all the castes. However, if it is observed closely it becomes clear that in most of the villages in eastern UP, the bigger farmers are generally from higher castes like Brahmin, Rajput and from backward castes like Bhumihar, Sainthwar, Ahir etc. The small and marginal farmers largely belong to backward and lower castes. In shared cropping also, the land owner is mostly from higher caste and the household taking the land for farming belongs to lower castes. Poverty is highest amongst the small, marginal and landless farmers. Hence, overall there are large overlaps amongst small-marginal land holding, lower castes and poverty. The quality of the land in a village is also caste-centric. The good and higher lands (in a flood affected area) generally belongs to higher caste farmers and the degraded and low lying lands are owned by small-marginal farmers. This has happened over a period of time due to social discrimination and power imbalance. Land consolidation has largely helped bigger, high caste, male farmers who in connivance with local leaders and government officials and prevailing corrupt system largely influenced consolidation process in their favour. In U.P., it is interesting to note that the distribution of rural households of different social groups by size class of population has changed in a way that :

- Landlessness amongst SC and ST has significantly gone down during 1993-94 to 2004-05, because of distribution of land amongst these groups.
- Almost 87 per cent of SC farmers have a land size of 0.01 to 1.00 ha and the farmers in this category of land holding are on a continuous increase, in 1993-94 the same data was 68.5 per cent.
- The SC and ST households having bigger than 1 ha land holding are decreasing.

(Source: GOI, NSSO, Report No 516, 61st round)

In Shared Learning dialogues conducted in few sample villages of eastern UP, it was revealed that amongst small-marginal land holding farmers the farmers having smallest land size belong mainly to SC population. In the village Chaumukha (distt Maharajganj) almost 55 per cent of the farmers had an average land holding of less than 3 bigha (1 acre= 3 bigha) and landless farmers were 5-10 per cent.

If one observes the caste wise distribution of agriculture and related activities, it can be summarized in Table 7 :

Table 7 : Caste wise engagement in different farming activity in Eastern Uttar Pradesh

Activity	Caste
Vegetable Growing	Kurmi, Kahar, Kewat
Cattle rearing (bigger animals)	Ahir, Kurmi, Harijan, Teli
Goat rearing	Nau, Dhobi, Muslim, Kumhar, Pasi, harijan
Polutry	Dhobi, Harijan, Nau, Muslim,
Sheep rearing	Gadaria
Piggery	Harijan(although government discourages piggery due to Japanese Encephalitis)
Fisheries	Kewat and Kahar

Source : Focus Group Discussion

The scheduled caste and tribe population of the region is predominantly rural with 88.8 percent of them residing in villages. In eastern Uttar Pradesh there are 11 castes which have been listed in the category of scheduled caste (Annexure 2). Among these 11, chamar have the highest number (10697094) constituting 56 percent of the total SC population of the region. They are widely distributed in the whole eastern Uttar Pradesh. Pasi is the second largest SC having a population of 2102015 followed by kori, dhobi and gond.

'Mushars' are low caste community and they are landless, traditionally known as rat catchers. Lands are being allocated to them for their settlement. The community is found in districts like Chandauli ,Deoria, Kushinagar etc. 'Tongya' workers are communities who live in forests of terai and they used to plant forest trees and use forest land for agriculture.

Out of five STs Tharu is the most populous tribe having population of 37391. They constitute about 77 percent of the total tribal population of the region. Bhotia is the second major tribe having a number of 732 followed by Jaunsari and Raji.

'At the individual tribe, Tharus' are primarily concentrated in Balrampur, Bhabhara and shrawasti district. Though they are also scattered in other district of eastern uttar Pradesh like Maharajganj, gonda in the forests of foothills of Nepal Himalaya. Their livelihood is based on shifting cultivation and they grow mainly mustard, corn and lentils. Bhotia have higher concentration in Sonbhadra followed by the districts of eastern agro climatic zone.

In Vindhyan region there are various generic tribal communities along with bhotia and basuka. They are mostly forest dwellers and also practice farming.

Shared Cropping : Means of Livelihood

Land reforms have not helped much in eastern UP. Laws such as the *Land Ceiling Act* that limits the amount of land that can be held by one individual, have only benefited small farmers in those areas where there are land holdings of more than 10-15 ha available for redistribution. Livelihoods in the area are largely dependent on land-based activities, and opportunities continue to shrink as population and land fragmentation increases. The adoption of high input

agriculture, including the use of hybrid seeds and agrochemicals, has led to increased costs and a reduction in crop diversity. This means that the economic margins in farming are becoming very small.

The shared learning dialogues with small and marginal farmers and also with the departmental personnel has inferred that in practical the markets and government purchase centres give priority to larger quantities of produce, which also disadvantages small producers both in terms of sale and price. As a result many small farmers often have no option but to migrate to the city. Increasing labour costs and decreasing gains have also created problems for larger farmers. Absentee landlords who live and work outside the region, large landowners and families with older or physically less able members are not able to manage their own farms. Nevertheless, they want their land to be used and if possible to receive some income or products - food, fodder or fuel - from their fields. At the same time, there are a large number of smaller and landless farmers who have agricultural skills, but no way of earning a livelihood. These two groups of people have developed a tradition of sharing their resources for mutual benefit. Where the resource base is shrinking this is a considerable help to resource-poor farmers. Share cropping has become a viable and acceptable mechanism for generating income for deprived communities.

Sharing resources

The history of present share cropping arrangements can be traced to the Zamindari abolition days in the 1950s. During this time, land titles and the right to transfer land was handed over to farmers. This changed the nature of negotiations as far as land use and payment of revenue was concerned. Previously, farmers (“*asami*”) paid the revenue to collectors (“*zamindari*”) for the use of land. Today, share cropping arrangements are agreed between farmers themselves. There has been no significant change in land ownership in the area since then, although hierarchical divisions (land being split between sons) and land consolidation (small plots belonging to one holder being brought together to create larger areas) have continued. Currently, approximately 30 percent of the agricultural land in the villages studied (Dudhai, Jodhpur, Pansharahi are the villages of Sardarnagar block, Gorakhpur where the study was conducted) was being worked under share cropping agreements. In this study it was deduced that some 45 percent of the smaller and resource poor farmers depend on share cropping for their livelihoods

There are three main kinds of share cropping systems :

Adhiya : Land is cultivated by resource-poor farmers who share inputs and outputs with the landowner on a 50-50 basis. In this system, the landowner provides land and one or more of inputs (oxen, labour, fertiliser, and seed). The produce is shared equally. This is the most common practise in the area and causes very little conflict. This arrangement is also common amongst farmers with equal status.

Honda : In this system, the land is hired on fixed terms by a resource poor farmer. The fixed terms include the type of crop to be grown and how much of the harvest should be used to pay for the land. The landowner only supplies the land. All other inputs are provided by the share cropper. In some cases, the land owner provides a loan in kind (fertilisers and seed) or cash. This loan has to be

repaid in addition to the share of the harvest agreed upon. At present, as share cropping becomes more common, landless people have started to compete for these arrangements. Under *Honda*, the element of exploitation is stronger, as the share cropper is responsible for any loss or damage caused by rainfall or other natural disasters. More conflicts occur under these arrangements.

Rehan : In this arrangement, land is leased at an agreed price for an average period of one to three years by a resource-poor farmer or group of farmers. The amount of cash involved in this system is relatively high and normally cash crops are grown on this type of land.

Other arrangements : In addition to crop-based sharing arrangements, resource poor farmers rear cattle - but more often pigs and goats - on a shared basis. The farmer cares for the animal(s) and also provides them with fodder. Offspring from these animals is shared on a 50-50 basis. Similar sharing arrangement also exists for fruit trees, where the resource poor farmer takes the tree at an agreed price, looks after it and harvests and sells the fruit. The income generated is shared between the owner and the farmer in accordance with the agreement between them.

In the prevailing situation of landlessness and a complete lack of alternative livelihood options in the villages, the shared farming system has brought land controlled by comparatively better-off farmers who are unable to farm it fully back into agricultural production. More importantly, although such arrangements can be exploitative, they provide a source of livelihood to significant numbers of people.

Small Landholding Agriculture: The Integrated Approach

The small holding agriculture has worked as a system. In such a farm system farmers' house, the farm and the livestock/cattle shed are three major and basic sub systems. Along with other components like fish pond, orchard etc the farm sub-systems are linked with flows from one system to other. The output of one sub system is used as input for another sub system and in this way the input needs of an integrated farm system is kept low. Need of external inputs are reduced due to the diversity, complexity and the recycling processes amongst various farm sub systems. The farm system is also linked to landscape or the ecosystem which comprises of common natural resources like village fish ponds, forests, open land, orchards etc. the inputs of the farm, like fodder, fuel, food and other agricultural inputs are derived from such natural resources thereby keeping the input costs low. However, the recent changes in farming system and the adopted policies and extension somehow disintegrated various farm sub system as the green revolution technology was based on chemical and external inputs, machines and oil and did not encourage the integration of farm sub systems. This approach helped the bigger farmers more who could afford high external inputs and practiced commercial cropping than the smaller farmers who practiced subsistence farming.

Livestock : Livestock has been an integral component of small farming. The small land holding farmers generally had some animals in their farming system which contributed to food, income as well as agricultural inputs like manure. The livestock (draft power) have been also used in ploughing, irrigation, extraction of

oil and cane juice, post harvest processes etc and the transportation. The livestock is also an asset with small-marginal farmers which is used as insurance and in cases of crop losses (floods, fires, pest attacks etc) and in situation of needs of cash (education, marriages, festivals etc) sale of livestock provides needed cash.

The preference of livestock also varies according to land holding and the bigger animals like buffalo, cows etc are reared by medium and smaller farmers who have bigger land size compared to marginal and landless farmers. The marginal and landless farmers have smaller animals like goat, pigs, poultry etc. Women of small land holding farmers are intensively engaged in livestock rearing.

In the flood affected area of eastern plain and Terai zones, animals rearing during floods is a problem as fodder becomes a serious problem. It is a common practice that the livestock are shifted to safer places of relatives in situations of flooding.

In general, it is observed that there is disintegration of livestock from the integrated farm system and generally the livestock rearing is practiced as stand alone and commercial activity. This has adversely affected both the farming system as well as livestock rearing, increasing the input costs in form of additional costs for fodder in livestock rearing and cost of manure/fertiliser/energy in farming system. Moreover, the number of smaller farmers rearing bigger animals has reduced. The small land holding farmers prefer to have smaller animals like goat and poultry.

The current situation of livestock in eastern UP can be summarized in following diagram which explains that so far as largest number of animals are concerned, buffalo is at the top their number being more than 26 million followed by cattle with approx 19 million as per the census of 2007.

Livestock Population in Eastern Uttar Pradesh

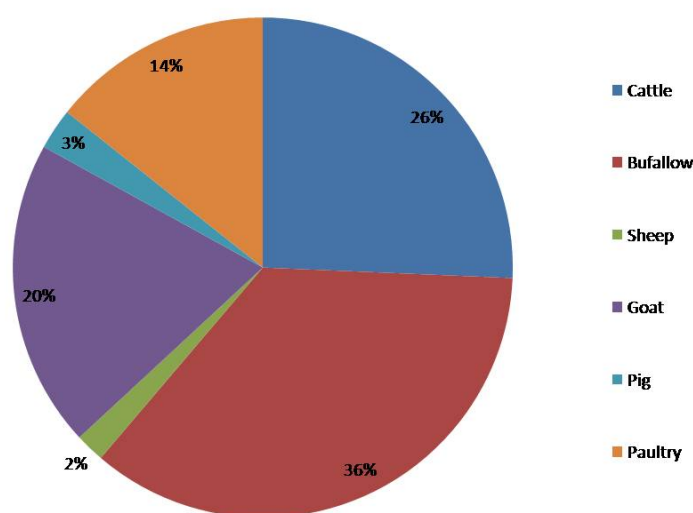


Fig 5 : Livestock Population
Source : Livestock Census 2007

Fisheries

As explained earlier, eastern UP has good availability of surface and ground water. There are large number of waterbodies in the area with some very big lakes and wetlands. These water bodies were constituted because of changing courses of rivers and the water bodies are the left over areas when the rivers changed the flow ways and hence these water bodies are termed 'chadans'. Low slope gradient specially in the terai and central region is also a reason of water stagnation and creation/recharge of water bodies. The water bodies have contributed to the livelihoods of people and large number population of castes like Mallah/Kewat and Nishad in the area, who traditionally depend on water related livelihoods, is due to availability of such water bodies.

In fact these water bodies have worked as a sub system of farming specially the small land holding farming. There are linkages of food, fodder and agricultural inputs amongst various farm sub systems. At the same time these water bodies have worked as village commons and ecosystems contributing to the water holding capacity of the villages, especially in the flood affected areas.

The density of such ponds are maximum in terai region (814/district), followed by north eastern plain (393/district) and central plain (385/district). Eastern plain region and Vindhyan region have minimum density of ponds (253 and 276/district respectively). The size of the ponds are also important and it was observed that the maximum number of smaller ponds of less than 0.5 ha and 0.5-2.5 ha is in north eastern plain zone constituting 43 and 33 per cent of the whole eastern UP, respectively. This zone is also having maximum number (more than 10 ha) of biggest ponds and it constitutes 43 per cent of all biggest ponds in UP. (Annexure 1) Vindhyan and eastern plain zones are having minimum number of ponds in all categories. Hence, the terai and north eastern plain region are best suited for aquaculture activities.

It is also a reality, however, that these water bodies have not been optimally utilized for the livelihood related activities. Most of the village ponds are under litigation and lying un-utilized being used merely for the disposal of waste water of the village. The non-utilization of these ponds also attracts encroachment due to increasing land pressure and land costs. The degeneration of the water bodies have directly (availability of food, fodder etc) and indirectly (ecosystem services) affected the small land holding farming adversely.

Most of these village ponds belong to Village Panchayat/Gaon sabha and these are leased to community for fisheries, according to Government directives. The prevailing regulations says that the first priority for such lease is 'Machua' community who belong to backward caste. If the 'machua' community is not residing in village then they should be looked for in another villages of the district. If they are still not located only then ponds can be leased to SC community. With such rules, many ponds are allocated to persons living far away from villages who sub let the ponds to others (which is legally not allowed but is a common practice). In the SLD conducted during this study in one village (Madinipur, district Maharajganj) out of five ponds located in the village three bigger ponds of 1-2 acre size are being used by higher caste big farmers and only two smaller ponds of 0.5 acre size are in possession of local community. In the prevailing situation majority of village ponds are not properly maintained and optimally utilized for fish production.

The average fish productivity in UP is low (3270 kg/ha). In Gorakhpur division, however, the productivity is better (3428 kg/ha). The ICMR norms says that for proper nutrition, consumption of fish should be 12 kg/person/year and in UP this figure averages at 3.58 kg/person/year. The officials of Fisheries Department, Govt of UP explain that the low productivity is due to :

- prevailing rules restricting allocation of ponds to specific community even if she/he belong to other parts of the district
- behaviour of community not taking fisheries as a commercial activity e.g. inadequate feeding and care (fisheries have been traditionally a zero input activity)
- Ponds under litigation
- Lesser investment capacities of community

It is interesting to note that Private hatcheries are flourishing so well in the region and the use of ponds for hatcheries is increasing. The seeds, for example, produced in Gorakhpur division are being exported to Nepal and Bihar.

There is no rule which prioritize small-marginal farmers in allocating these village ponds. The Fish farming Development Agency (FFDA) is a government scheme regularly operational since 1983 with provisions¹³ of pond creation, maintenance, training of fishermen etc. Most of the fisheries development work has been done under this scheme. Fisheries Department of GoUP is in process of developing district level Vision Documents for better planning and development of the sector.

Small Women Farmers: The Status

The woman farmer is the kingpin of agriculture and not just a secondary helper. They contribute significantly towards food security, economic development and growth of our country. Their hard work in fields is key to security of the nation right from household to the national level. Indian women in contemporary India do not enjoy an equal status with men. Many reforms have taken place in moving woman closer to equality but they are still far from giving full equality. Women in agriculture are a particular case of Indian patriarchy. They shared the general destiny of women in the society but also have specific role in the organization of agriculture.

Gender wage gap is prevalent in the rural sector with women's low bargaining power due to lack of other work opportunities. The differential wage rate continues to be prevalent in the unorganised sector. The work wages for different types of work for agricultural operations varies for males and females. This is evident in the table 8 :

¹³ Kushinagar, Basti, Sant kabir nagar, Deoria , Azamgarh, Mau and Sant rabi das nagar are the districts where this provision is not operative.

Table 8 : Differential wages in agriculture work¹⁴

Activity	Amount in Rs	
Sowing	F 45.29	M 51.12
Harvesting	F 47.43	M 52.03
Threshing	F 47.83	M 51.95
Others	F 45.47	M 60.48

When mechanization replaces manual labour, it is the women who get displaced, leaving them hardly any opportunity to find alternate jobs. Men often migrate to other areas in search of work, a possibility negligent in the case of women due to social and cultural factors as well as the necessities of reproductive work. Paradoxically more than 50 percent of the total work force comprises women but only 13 percent are seen as workers. They do not qualify as wage workers as much of the work- 87 percent is not economically valued as it entails reproductive work. However, in the urban areas, the proportion of women workers in secondary and tertiary sectors is roughly same as men. Work in the household industry and informal sector entails long working hours, hardly any social interactions and low monetary compensation. So, it is not surprising that women with low bargaining power are seen here in large numbers in the organised sector only 9 percent women were employed as against 91 percent males (1998-99). Women were most visible in the casual labour sector.

Table 9 : Percentage gender distribution in labour market

Work	Male	Female
Cultivators	41.0	20.0
Labourers	20.0	41.22
Household industry	4.35	8.24
Other work	33.51	12.0

Source : 11 Plan Document, GOUP, 2006 -07

According to the 2001 census, there are a total of 5 crore workers in U.P. out of which 76% are male and 24% are female. Out of 24% female workers 41% females are agricultural labourers and 34% are cultivators. On the contrary, out of 76% male workers, only 20% are agricultural labourers and 42% are cultivators. These figures show under-recognition of the role of women in farming and they are being denied their rights as farmers which is mainly due to lesser control over assets and decision making processes. The factual situations and grass root experiences have proved that the percentage of women involved in agricultural activities are far more than that of men and hence their contribution of this sector is more than their male counterparts. The census itself proves that despite women's significant contribution in agriculture, their identity is more of an agricultural labourers rather than of a farmer.

The small and marginal woman farmers of the state play a major role in serving the livelihood of the people and they constitute 89% of the total farming community. This particular section of farming community also comprises those hard working women who contribute to more than 80% of the agricultural activities. In each and every activity of agriculture, women contribute more than 50% of their labour. Maximum number, of women folks are also engaged in

¹⁴ 11 plan document , Go UP, 2006-07

working as agriculture labours and their livelihood is dependent on the meager daily wages that they earn.

Despite the key role of women in agricultural activities, their contribution has always been undermined and neglected. This feeling of neglect is deeply rooted at every dimension such as the society, political state, government schemes, research organization, etc. Statistics also show that although women are responsible for more than 70% of agricultural activities, their share in the agricultural production is only 12.9% despite the work participation rate of 18.4%. There are hardly any disaggregated data available in government records which can explain the actual status of women farmers. There are various surveys conducted by Gorakhpur Environmental Action Group and collaborating agencies, since 2006, which reveal the status of small-marginal women farmers in UP and particularly in eastern UP. This can be summarized in following bullets:

- Land Ownership: Women ownership on land is less than 6 per cent. More than 80 per cent of such women are widows or the only child of their parents. There are about 3 per cent land which is in joint ownership of both men and women.
- The ownership of women over agricultural tools and equipments like thresher, tractor, harvesters, winnowing fans, pumping sets etc is negligible
- In small-marginal farming community, women's right to take a decision on selection of crops is only 4 per cent although joint decisions by both men and women are taken in more than 40 per cent
- Women have been playing an important and significant role in agriculture. Their contribution to agriculture in terms of time spent is greater than men but they have no control on income-expenditure. ??control women have less than 8 per cent control over income-expenditure.
- Women are largely responsible (more than 60 per cent) for activities related cattle rearing, however, their decision on selling the animals or products is limited to 24 per cent
- Women are involved in almost all the agricultural activities except ploughing and their particular involvement are in activities like seed processing, Sowing, irrigation, weeding, harvesting, threshing, storage, transportation, application of manure and pesticides, paddy transplantation etc. Almost 90 per cent of women work in the agriculture field for approx 4-6 hours every day, besides their involvement in household chores.
- In spite of involvement of women in almost all the agricultural activities and responsibilities generally being more than men farmers, their representation on various agriculture related institutions and extension is negligible. Their representation on land management committee of the village is limited to less than 0.5 per cent. Less than 1 per cent of women farmers (compared to men farmers) attended training programmes organized by government in 2006. Women's representation as extension agents (e.g. kisan mitra, master trainers, farmers Club coordinators etc) is almost negligible. Although, the demands and pressures from civil society organizations have sensitized government departments and some directives are being issued for ensuring participation of women farmers in training and extension activities but the actual realization of such directives are yet to come.

Some of the key factors restricting the recognition of women as farmers and enhancing their access and control over resources and decision making may be summarized as follows:

- **Cultural Aspects:** women have dual responsibility contributing to both reproductive and productive roles. The work load and continued engagement hardly spares any time and space for social activities and skill building efforts. They are culturally treated as the 'helping hand' in agricultural and other production activities. The agriculture and extension in UP, and particularly eastern UP, is highly male and big farmers dominated. It is always convenient for the male government agents (working at local level) to relate with Male and Big land holding farmers.
- **Limited mobility:** Women have limited mobility due to various responsibilities and the cultural norms restricting their access to institutions and learning-exchange platforms. The problem becomes acute in stressed situations during floods.
- **Male Migration:** This is a common phenomenon in eastern UP and with the changing flood patters and impact of climate change the male migration is expected to rise. In such situations women farmers have no choice but to manage in a situation where she has no access and control over resources
- **Specified Activities:** "whereas operations performed by men were those that entailed the use of machinery and draught animals, thereby using animal, hydraulic, mechanical or electrical energy, women almost always relied on manual labour, using only their own energy." Rice transplantations, the most arduous and labour intensive task in rice cultivation, is carried out entirely by women without the help of any tools.
- **Food Security:** Women are food producers but their own food security is a serious problem consume. They are always the last persons in the family to eat the leftovers after the whole family has eaten up to their appetite. Hence, they often get inadequate food to eat. Women also become the targets for starvation during difficult times of food insecurity during the year especially during floods and droughts. The unavailability of nutritious food affects their ability to work and earn.
- **Legal factors:** Women make up a considerable portion of the agricultural labour force in Uttar Pradesh, as men often migrate from rural areas and/or are employed in non-agricultural occupations (a phenomenon referred to as "feminization of agriculture"). Agricultural labour rights are mainly determined by labour law, and particularly by two broad groups of norms:
 - Those concerning all workers, both male and female (minimum wage; safety and hygiene; trade union rights; etc.), and
 - Those specifically concerning women (non-discrimination; maternity leave; "protective" legislation; etc.).

The focus here is on the latter. While some labour-law issues are relatively uncontroversial (e.g. non-discrimination), others are debated. For instance, "protective" legislation prohibiting women from working in certain occupations or at night, enacted to protect women workers, limits women's freedom to choose their occupation and may hinder their access to employment. On the other hand, where the bargaining power between employer and employee is particularly unbalanced, allowing women to choose may leave them unprotected (e.g. on night work).

INFORMATION AND EXTENSION

Historically, farmers have invented and shared technologies and practices related to agriculture. This was largely informal and between farmer to farmer. With increasing state control over agricultural production and a cash based agricultural economy, markets have become ever more important. The advent of the green revolution has also made agriculture input intensive and externally dependent. In order to meet these demands, state controlled extension services were strengthened. These services, however, were, in general, chemical input intensive, natural resource exploiting and addressed larger and male farmers. As the needs and priorities of marginal, landless and women farmers – who constitute more than 90 percent of the farming segment – varies largely from those of big farmers, the majority of farmers got neglected in such extension support mechanisms and remained isolated from new technologies and agricultural methods. The major constraints of the public extension system in eastern U.P are listed below :

Not Need Based : The public extension services are not need based but supply driven. The top down planning rarely considers farmers' needs or involves them in the planning process. The programmes are set to achieve targets and do not develop the capacities of the farmers. The focus is on the supply of seeds, chemical fertilizers, pesticides and other agricultural inputs only and training and information are not imparted according to the crop cycle or before the cropping season. As a result, farmers remain uninformed about new techniques and advanced methods of farming of that particular cropping season. Moreover, the extension programs are not area-specific and do not suit the requirements, needs or problems of the area-specific farmers. For example, the farmers of the area need post flood recovery measures, sowing in sandy soils deposited during floods, inputs like oil cake (neem khali), flood resilient seeds, problems to specific farmers related to plant diseases etc

Lack of Participation of Women : Despite the fact that women perform more than 70% agriculture activities, the department of extension services has no clear strategy or practice on how to involve women. They were typically not recognised as farmers because they are not landowners (they are systematically denied land titles despite reforms in land laws, the reason being inheritance laws, gender disparities etc). Extension staff are men with almost no woman working at field level) , they receive little or no training on the specific constraints affecting women farmers and therefore, do not take into consideration, for example, the time and location women are able to participate in extension services. The distance of the venue of such meetings, late evening or early meetings, no crèche facilities during the training s are some of the reason for women not able to participate.

Low level of involvement of small and marginal farmers in technology development and dissemination processes : The public extension service is largely focused on high input and cereal crops, and is developed and demonstrated on large farms. As a result, small and marginal farmers perceive the extension system as irrelevant to their needs. It has been mentioned earlier that small farmers need low external input technologies, diversified agriculture and technologies which are non-chemical and bio intensive.

External technology : The extension service does not recognize farmer's knowledge nor does it provide space for their innovations. Good number of small marginal and women farmers have evolved bio intensive technologies such technologies are based on the farmers wisdom. These are needed to be recognized and respected. Provided these are scientifically valid.

Linkage of information-input : Extension services tend to neglect low external input agriculture. When it does provide information regarding this, the availability of the required inputs is not facilitated. Shops and outlets store and supply only those inputs, which are of high cost and chemically based. . The inputs like earthworms, neem oil cake, flood resilient seeds, millet seeds etc are not available at these shops

Solution Oriented : Most extension services are solution oriented and top down. rather than a problem solving approach. This means that the extension services are designed in a way that the solutions are suggested as per the guidelines coming from top rather making efforts to identify solution of specific problem of the farmer. Small farmers need specific suggestion to specific problem occurring in their farm but the suggestions are generic and part of the package designed elsewhere.

One of the key constraints felt by public functionaries working at different levels is lack of adequate staff. The vacancies are not filled in an environment where full time extension workers are highly understaffed. Further, their orientation is such that they have to fulfil the targets and work according to guidelines provided to them and they hardly have space to work with farmers and evolve participatory solutions in the local context.

The public research and extension played a vital role in spreading technologies of green revolution in western UP during 1960s and early 1970s which spilled over to eastern UP at later stage. There are 2 Agricultural universities and several agricultural colleges which are supposed to cater the diverse needs of eastern UP. Narendra Dev University of Agriculture and Technology at Kumarganj, Faizabad has been quite active in developing appropriate crop varieties for eastern UP. There are several examples of such evolved varieties suitable for local ecology. Narendra 97 (N97) is the early sowing short duration (90 days) paddy variety developed by NDUT which became quite popular in the flood affected areas. Allahabad Agriculture College (Deemed University) and

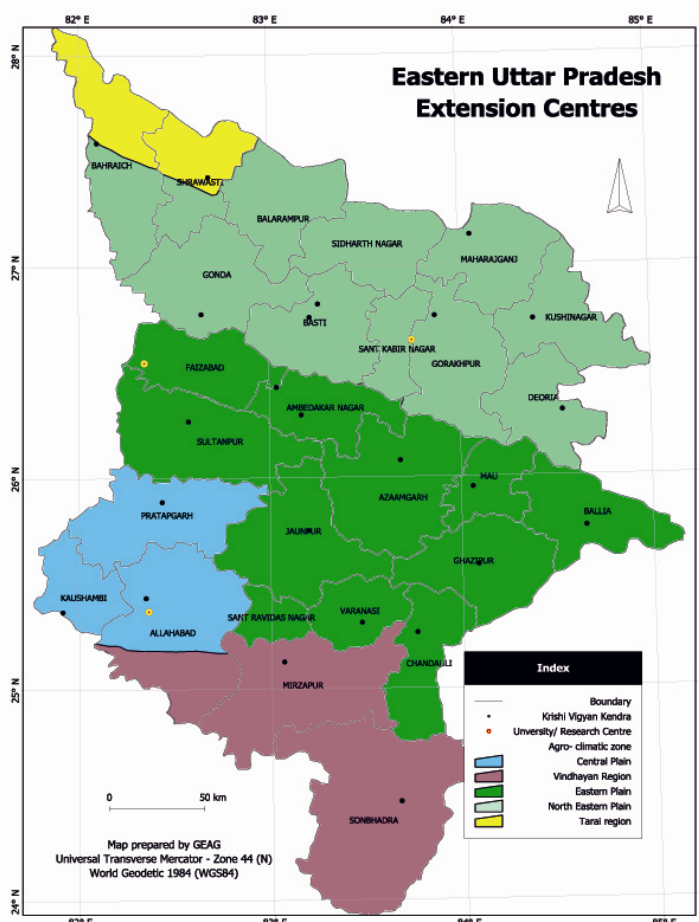


Fig 6 : Extension Centre

Agriculture Research set up at Banaras Hindu University in Varanasi are also a pioneering institute provided teaching and extension in the southern and vindhyan region of eastern UP. There are some central government research stations like Indian Vegetable Research Institute (Varanasi), Seed Research Institute (Mau), National Bureau of Agriculturally Important Microorganisms (Mau) Goat research centre (Padrauna), Sugar Cane Research Institute in Gorakhpur located in the region. There are 17 District soil testing laboratories and five Regional soil testing labs in eastern UP providing services to the farmers of this region. The figure 7 shows the location of these laboratories.

There are 27 Krishi Vigyan Kendra in eastern UP (Fig 6) and they are located in each of the eastern UP districts. KVKs are specially mandated for taking technology developed by Agriculture University to farmers. Hence demonstrations on institutional farms are one of the prime activity of KVK. Moreover, for the technical support to various schemes run by State Government, the KVKs are provided funds. Farmer-Scientist dialogue, Support to Farmers Clubs, organizing farmers, technique demonstration are some of the well known activities of KVKs. However, KVKs are not able to perform efficiently because of lack of staff (horticulture, fisheries and Animal Husbandry) and no fix timings when farmers can go to these centres and take their help. The distance of KVKs (being only one per district) also make it difficult for the small farmers to physically go to KVKs and take their help.

However, the whole research and extension mechanism has not performed satisfactorily for the development of agriculture in the region and especially in addressing the small-marginal and women farmers of the region. The mechanism of Zonal Research Stations (ZRS) and Krishi Vigyan Kendras (KVKs) meant to link location specific research with extension agents and farmers have not worked satisfactorily. There is severe lack of convergence of various departments catering to needs of small-marginal farmers (agriculture, horticulture, fisheries etc) and KVKs at district level with specific roles and ensuring inter-complimentarity. Most of the research is supply driven, the agenda for which is decided at the top level. A demand driven and bottom up approach would maximize the returns to investment in research.

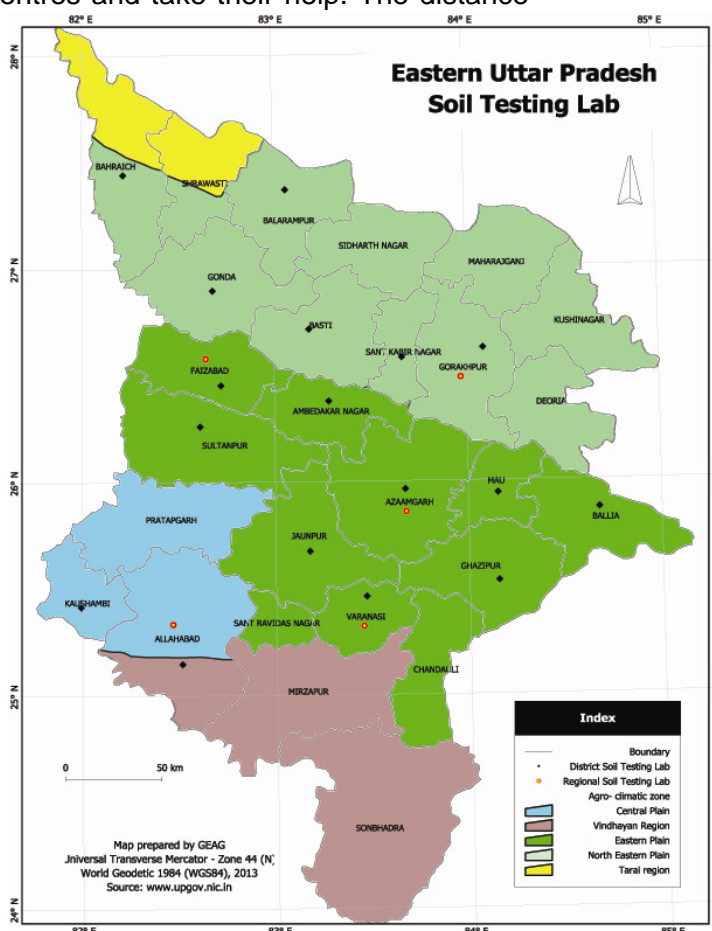


Fig 7 : Soil Testing Lab

The extension delivery mechanism found itself unable to respond to the changing demand of farming community. Innovative approaches are to be devised to meet more complex and challenging requirement in the era of globalization and liberalization to become more effective to meet the challenges of escalating input costs and reducing net gains, high value crops, adapt to the climate change impacts and resilience to floods and droughts, leading to conservation of natural resources and sustained agriculture growth. There is a cycle of sowing, production, harvesting, processing, PHT, marketing etc and small-marginal farmers need a system to guide and suggest them for the whole cycle. The departments are divided in compartments and the lack of convergence creates confusion to farmers as to for which problems whom to approach. For example, in an integrated farming the farmer needs guidance on a farming system which has components of horticulture, agriculture, livestock, fisheries etc and the inter-linkages amongst them. There is no single department/window which can guide on this integrated farm system. Sectoral solutions at the farm level is not helpful.

For any research and extension planning and management in eastern UP, the problems of small-marginal and women farmers are needed to be considered. In this context, major challenges encountered by farmers of Eastern U.P are illustrated below :

Lack of access to information, knowledge and recognition of work

Small and marginal farmers do not have access to quality and timely information and appropriate research support. Lack of resourcefulness is major detriment for them to optimize/maximise their productive abilities of farming. Weather advisories and forecasts, information about flood/drought resilient crop varieties, crop combinations for multi tier cropping, solutions in post flood season etc are a few examples in this regard.

Untimely supply of government services

Government services of fertilizers, seed and irrigation do not reach farmers on time and generally are received very late in season. Farmers are compelled to purchase seeds and other farm requirements from open markets, as time and season do not wait for anybody. Appropriate seeds, DAP, bio fertilizers and bio pesticides etc are few examples from eastern UP.

Excessive use of fertilizers and lack of appropriate soil testing facility

There is general lack of knowledge about use of fertilizers and required dosages of applications. First contact person who informs farmers is invariably the local pesticide retailer/dealer. Notion of high production often compels farmers to use more than recommended dose of fertilizers in their farms. Situation is further worsened due to lack of timely availability of soil testing report from department. Soil testing department are usually located some 30-40 kms from villages and not easily accessed by farmers.

Water management and irrigation

Irrigation is major constraint for majority of small-marginal farmers who do not have their own or public means to irrigate their farm. Problem of declining water table, untimely supply of water, frequent and long hours of power breakdown are other major challenges before farmers to overcome irrigation problem.

Limited outreach of farming extension services

- Villagers are usually unaware about role of 'KisanMitra, Master Trainers etc
- No appropriate mechanism exists in villages for dissemination of agriculture information and knowledge.
- Benefit of government schemes are largely enjoyed by big farmers who have access to Block development office, PACS etc.

Increasing input costs

The prevailing agricultural practices are based on the approach of high external inputs- largely being chemical fertilizers and pesticides and lesser respect of local ecology

Lack of organized market and storage facilities

Lack of post harvest processing and storage facilities and organized market does not allow farmers to get good return on their investments. Fruit of farmer's labour is actually enjoyed by large chain of trading communities.

Climate variability and vulnerability of farmers

Eastern U.P. has only 16.13 per cent of total irrigated area under canal irrigation. 63.6 per cent cultivable area is irrigated using private bore wells. Total irrigated area in Eastern U.P. constitutes 10.32 per cent total irrigated land of state. Most of the agriculture in this region is rain-fed and large proportion of small and marginal farmers depend on rain for agriculture. Increased climate variability adversely affects agriculture production; it impacts small and marginal farmers more severely. In recent years, climate change is characterised by more rains in less number of days. This phenomenon has adverse effect on ground water due to poor water recharge of aquifers. Phenomenon of climate change demands quick response of technology and also crop selection by farmers.

Strategic Research Extension Plans (SREPs) and Agriculture technology and Management Authority (ATMA) are the mechanisms through which agriculture development can be tuned according to local geo- climatic and agro-ecological situations with a bottom up approach addressing the needs and priorities of local farmers specially the small-marginal and women farmers. There are six departments at district level which are covered by ATMA, viz Animal Husbandry, Sugar Cane, Fisheries, Agriculture, Sericulture and Horticulture. While talking to small-marginal and women farmers and various government officials and NGOs in the region, following recommendations were identified so that the mandate of ATMA are more effective and meaningful. It is observed generally that SREPs are not well worked and functional document to provide effective guideline to extension workers. The document generally becomes a routine exercise incorporating change of data here and there. For example, identification of flood affected areas, water logged periods, degraded soil conditions, identification of needs and priorities of various farming groups, viz small, marginal, land less, women and other such locale specific issues will be needed to be captured and solutions evolved. Lack of staff, target oriented approaches and inadequate capacity with regard to bottom up and participatory planning are some of the issues pertinent in this regard :

1. Small-marginal and women farmers are needed to be recognised as economically viable units of farming and ways and mechanisms can be evolved to address them in capacity building and technological dissemination.

2. Small and marginal farming is not a controlled activity limited at the farm level. It is also significantly dependent on the nearby landscape, watershed and ecosystem. Hence, conservation and management of landscape and ecosystem will positively impact the small land holding farming. The village forests, grassland, orchards, water bodies etc are required to be managed. This also particularly important in developing resilience in the flood affected areas and in dealing with uncertainties of climate change impacts.
3. Attention is required at policy, research and programme formulation levels so that the farming is less cost intensive. Ecological agriculture and bio-intensive processes are helpful in this regard.
4. Agricultural inputs are required to be made available at village level. A quality input at appropriate time also enhances possibilities of recovery in flood/drought affected areas.
5. Community institutions are to be encouraged at village and block level for leading the processes of technology adoption, dissemination and linkages with appropriate resource institution.
6. Indigenous knowledge is valuable in cost effective farming and sustainability of production, in the local geo-climatic and agro-ecological context. Synergy of ITK and scientific know how is important at the ground level. It is particularly important in identifying tolerant and resilient varieties, methods etc.
7. Small-Marginal and women farmers are to be ensured at technology dissemination and skill building trainings. Monitoring of such participation is needed to be put in place, at district and state level.
8. The demonstration and field days activities largely ignore small land holding farmers. Ways and mechanisms are needed to be developed and formalized for such activities so that small land holding and women farmers are addressed and benefitted

ACCESS TO INPUTS : THE STATUS

Seeds

Emphasis of central on wheat and paddy has resulted in major efforts being concentrated on production and distribution of seeds of these two crops only. The green revolution was focussed on wheat and hence the areas covered and the technologies were largely focussing wheat. The thrust areas were mostly cereals and hence paddy was also included. At all India and UP level, during the period 1991-92 to 2005-06 of all the certified quality seeds distributed of these have always occupied the major share – more than 60 percent whereas very less increase observed in distribution of oilseeds and pulses in the state. The situation is same in eastern UP. State policy's statements on to increase diversification and self dependency on seed have almost been gone in vein. *Seed Village Program* was an innovative component under DASP but government has not yet shown her interest on it in terms of priority.

The Seed Replacement Rate (SRR) is quite low in eastern UP. In fact the SSR is low in whole of UP and similar situation is in all the agro climatic zones. The best SSSR is in case of Green Gram (more than 85) and Pearl Millet (more than 70), the reason being coverage of these crops in certain schemes where seed replacement was part of the programme. Also the area sown under these crops are much less compared to wheat and paddy and hence smaller interventions also change the percentage. However, in the main crops of eastern UP, the SSR is limited to approx 30 in case of wheat and paddy. Although no disaggregated data is available by which the SSR in small-marginal farmers can be assessed. In the discussions with small farmers they explained that their SSR is less than 20 per cent in various regions of eastern UP, The reasons being low priority for seed replacement, saving on costs and non availability of quality seeds.

In eastern UP, the maximum quantity of distributed seeds is of wheat which is approx 1.66 lakh tonnes (2010-11) and it is increasing every year by approx 9 per cent. Rice is the second crop having a seed distribution of 41 thousand tonnes almost one fourth of wheat. Maize is the third crop with a seed distribution of 2.5 thousand tonnes.

While talking to farmers they explained that the continuity of same seeds reduce the production and, for example, in case of wheat the production goes down to 10 per cent if the same seed is grown, 20 per cent if the seeds are continued for two years and 30 per cent reduction if the seed is not replaced consecutively for 3 years. In some varieties the generational loss is higher than these figures.

The small-marginal farmers of eastern UP largely depend on their own seeds. The seeds are generally developed by Terai beej Nigam and National Seed Corporation who procure quality seeds from farmers. These two companies are the main providers of seeds in the area. Small-marginal farmers get the seeds in from private shops, relatives, inert-exchange, Cooperative societies, UP Agro, KVK/Agriculture University, Development block, Research Stations (like Indian vegetable Research Institute), IFFCO, KRIBHCO and Govt Seed godowns. The easiest availability of seeds, so far as small-marginal farmers are concerned, is from shops. Farmers explain that 10-15 per cent of farmers access seeds from

PACS. Govt Seed Godowns are generally located at Tehsil level and these godowns also provide seeds and a subsidy is also available for farmers if they get seeds from such godowns. As explained earlier, the need of smaller farmers in small quantities, non availability of choice varieties, uncertainty of stocks and distance are the key reasons for not reaching to these government godowns. The rate of subsidy is Rs 500/q for seed varieties older than 15 years, Rs 700/q for varieties aged 10-15 years and Rs 900/q for varieties less than 10 years. Broadly, more than 90 per cent farmers avail seeds by informal/private set ups and only 10 per cent of small land holding farmers get the seeds from government agencies. This is true in both the cases of cereals and vegetables. The diagram below shows situation of one village of Maharajganj district as emerged in a FGD showing the distance of various centres of seed availability. The private shops being in the closest proximity becomes the first choice of small farmers.

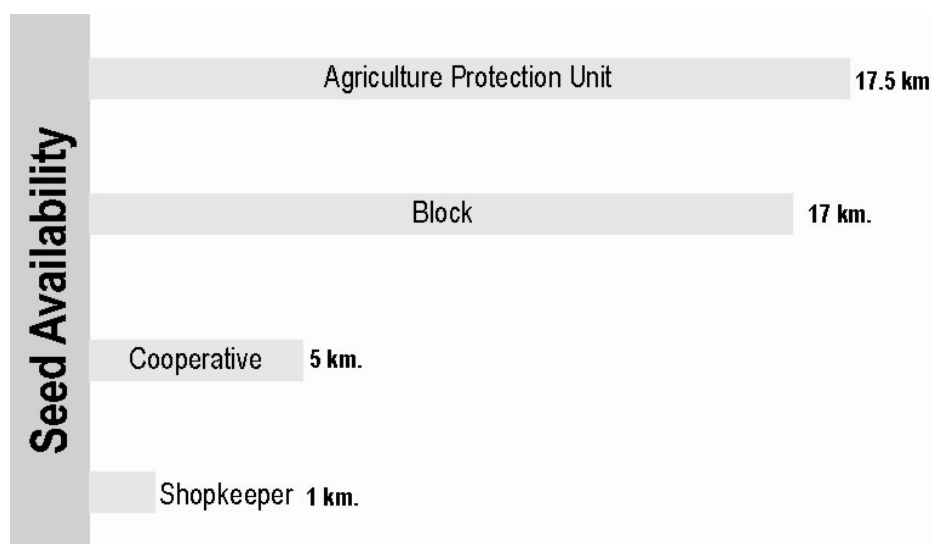


Diagram: FGD in village Chaumukha, Distt Maharajganj, 17th April 2013

Fertiliser and Pesticides

Eastern UP soil is deficient in specific nutrients in different agro climatic zones, as explained earlier. So far as primary nutrients are concerned, out of 27 districts in eastern UP 3 are classified as most deficient (very low category) in nitrogen, 11 in phosphorus. Situation of availability of Potash in soil is better in eastern UP. The data of status of sulphur and micronutrients in the region indicates sulphur deficiency in 4 districts. Zinc is deficient in 12 districts.

Insufficient use of organic manure and lesser adoption of green manures, imbalanced use of chemical fertilizers and inadequacy of beneficial micro flora are identified to be the main reasons of deteriorating soil health.

Distribution of N, P and K have been the major thrust of government out of which Nitrogen is at the top with a distribution figure of approx 12 lakh MT followed by Phosphorus at 5 lakh MT and Potassium 1.2 lakh MT (2010-11).

In FGDs with small-marginal farmers they explained that availability of fertilisers are from two main sources viz Licensed Private Shops and cooperative Societies. The cost of fertilisers charged by private shops are higher compared to cooperative societies as they sell these fertilisers illegally. The charge the amount as per the opportunity. Availability of DAP is a serious problem and it some times become a law and order problem. There are incidences where farmers demonstrations and agitations due to non availability of DAP caused lathi charge and police actions. There is no direct subsidy to farmers as the subsidies are provided to manufacturing companies directly to farmers on these fertilisers. Biofertilizers and Zinc etc are made available through Plant protection Units (Krishi Raksha Ikai). Such units caters to almost 25 per cent of the demands of small farmers.

Pesticides are generally availed from plant protection Units (where some subsidy is also available) and licensed private shops and they cater to almost 25 per cent of the needs of small-marginal farmers.

Farmers will have to be encouraged to produce bio-inputs like manure, pesticides etc. Technology transfer, micro production units etc are areas where subsidies are required. The suggestion is to encourage the farmers to develop such manures and bio-pesticides for which they generally have traditional knowledge. Government can also support to farmers in establishing micro production units of blue green algae, trichoderma etc and license requirements relaxed for local exchange and consumption. Subsidy has been already announced by the state on bio-inputs. Benefits of such subsidies should reach directly to the farmers instead of industries. Hence, enhanced budgetary allocation in this regard and proper mechanisms are required to be developed.

The availability of quality seeds and fertilisers at the appropriate time is a major problem in eastern UP. Government departments fully agree that they are not able to provide needed quantity of quality seeds. The concern is also to provide seeds at the village level as farmers are not able to buy seeds from distant shops. Mechanisms like Agro Service Centres (promoted by GEAG) helping farmers to buy purchase seeds from agriculture universities and share it locally has been quite successful. The needed money in this regard was linked to Self Help groups. Small farmers can not afford to reach University or any other authentic place where foundation and certified seeds are available in bulk. They have to depend on local shop keepers but the incidences of bad quality seeds are quite high and it is realized after the germination when the farmers have no option left. The experiences have been quite negative in case of vegetable seeds for which farmers pay good amount of money. Fertilisers are also sold to farmers at a higher price at a time when it is needed in the field. Government agencies try its best to control this situation but the shortage in supply causes such malpractices.

Irrigation

The gross irrigated area in eastern UP is 58.17 lakh ha against the reporting area of 65.8 lakh ha. The net irrigated area in the region is 40.70 lakh ha.

The main sources of irrigation in eastern UP are canals, tubewells and pumping sets. Out of these the most popular and convenient mode is private pumping sets with shallow boring which are diesel operated. The good availability of ground water in terai and north eastern plain attracts cheap and shallow boring for installation of private pumping sets. Small-marginal own such pumping sets and

majority get the irrigation water on rent. There are various government schemes providing subsidy to small land holding farmers on pumping sets. For example a subsidy of Rs 10,000 is given to small-marginal farmers for the engine and further pipe etc are also given free of cost. This has resulted in large number of shallow boring and coverage of this scheme. In the FGDs conducted in the north eastern plain, smaller farmers reported more than 80 per cent dependency on pumping set based irrigation. Govt tube wells are also effective but the number is quite low. Small farmers also do not prioritize such tubewells for reasons like without electricity these tubewells do not work and the electricity cuts go as high as 12-15 hours every day, the irrigation channels are damaged and dominance of bigger farmers on access to such tubewells. In Vindhya and eastern plain zones, the availability of ground water table is not so good and hence canals have been constructed for irrigation. These canals are being managed by irrigation department. The maximum canal density is in districts like Allahabad, Ghazipur, Jaunpur, Azamgarh etc.

Credit

Although NABARD has helped to boost agricultural credit flow in the whole country, the fact remains that eastern region of UP which account for 28 per cent of the cropped area, received only 10.13 per cent of agriculture credit in 2007-08, increasing marginally to 11.24 per cent by 2009-10. The share of agriculture credit for investment is much lower. The loan/credit taking ability is quite low in the region because farmers are small, cash crops are limited, lack of processing and marketing opportunities etc. This also reduces the CD ratio in the region. Bankers are interested in enhancing such investments as per the guidelines of NABARD but lack of govt infrastructure restricts such possibilities. Small farmers are not interested in enhancing their risks in terms of loan repayments. There is a dire need to make a concerted effort to finance investment that have a direct bearing on enhancing crop productivity in the region. This would also generate higher demands for crop loans which would also become more secure.

NABARD also needs to provide technical inputs on average unit cost, technical parameters and feasibility models to help bank branches, finance their investments in a large way. NABARD has set norms of unit costs in terms of loans for livestock, poultry etc but there is no norm/standards/unit costs for crop loans. This needs to be developed for facilitating better flow of credit.

Given the preponderance of small and marginal farmers in eastern UP, many of such investments would need to be financed through JLG (joint liability group) mode. The JLGs are promoted only by RRBs and the target for 2012-13 for all 27 districts of eastern UP was 36,265. However, the total achievement was only 9,881 which is 24 per cent of the target. The cooperative societies provide cash and kind inputs to farmers and has a membership based service. JLG is a local mechanism which can help marginal farmers to get loans easily. To boost agricultural credit in women farmers, SHG can be a good conduit to agriculture credit, as financial empowerment leads them to make more access and control over resources which ultimately boost their decision making capacity.

According to agriculture census 2005-06, main sources of credit available to small-marginal farmers are PACS, PLDB, CBB and RRBB. It was observed that the maximum credit availed by smaller farmers are from RRBB followed by, PACS, CBB and PLDB. In eastern UP, almost 43 per cent of all credit to marginal

farmers are provided by RRBB. In the present study efforts were made to analyze credit per ha taken by farmers in various agro climatic zones of eastern UP. In eastern UP, as a whole the credit availed by marginal farmers on an average was Rs 4,843 per ha in 2005-06. It was observed that in terai bhabhar zone, it was maximum at Rs 7738 per ha for marginal farmers whereas this figure for small farmers was Rs 9,233 per ha. In eastern plain zone, it was minimum, the average being Rs 3,332 per ha for marginal and Rs 5,243 for small farmers. Because of high land fragmentation the loan the credit absorption capacity (CAC) is quite low in eastern UP. The Credit:Deposit ratio of eastern Up is quite low and it ranges around 30-35, the highest being 45 in Gorakhpur RRB region. According to Gol norms, it should be more than 60. It is also worth mentioning that if the duration of the loan is compared (short, medium and long), it becomes clear that in various districts of UP, almost all loans availed by small farmers are short term.

Kisan Credit Cards (KCC) is also popular in small-marginal farmers. KCC was availed by 14,38,000 farmers in eastern UP during 2011-12 and it is estimated by bankers that small marginal farmers proportion is at par with their population in the region.

INNOVATIONS

There are several technological innovations in the agricultural activities for cropping system and varieties, plant protection, equipment and tools etc by farmers, government agencies and private sector. Such innovations are done in response to felt needs and local appropriateness. The innovations done by small farmers are generally based on local resources and in the context of local ecology. The innovations are generally done with a synergy of local wisdom (ITK) and the scientific know-how. Multi-tier system of farming, portable nursery, raised and floating nursery, climber vegetables are some of examples where farmers invented practices which can save them from the losses of floods and waterlogging. There are large number of such innovations in enhancing efficiency of manure, developing formula of bio-pesticides etc.

Research and Government agencies introduced several varieties in flood and drought affected areas. An early sowing paddy variety Narendra 97 introduced during last decade became very popular in the area. Under NFSM, IRRI introduced two paddy varieties viz Swarna Sub 1 and Shushk Samrat. Swarna Sub 1 is a water tolerant variety and can sustain water inundation of 18 days and hence makes it popular in flood and waterlogged affected areas of north eastern and terrain zones. The Shushk Samrat variety has the ability to sustain even if there is no rain fall for 15-20 days and this variety was very much liked by Small-Marginal farmers. The changing climate situation in the region has developed uncertainties of dry spells during monsoon months and the variety is very good as it can sustain the dry spell impacts.

Since the area is dominated by small land holding farmers the technology needs to cater their specific needs. Instead of tractors, power tillers were introduced by private agencies which suit a small land holding and became quite popular in the region. Such power tillers consume lesser fuel and can also be used for transportation cart, it also works as rotavator in rice fields. Similarly, the harvesters came to this region about 15 years back. However, such harvesters had no mechanism through which crop residue(used for fodder) could be collected and used. The new combined harvesters have this facility by which straw/residues can also be segregated and collected and used for fodder. There is one more major example of local technological innovation. The area being a paddy intensive region, rice mills are quite common. However, investments in such mills are huge and the number is limited and not dispersed causing problems for small farmers with a small amount of paddy. Now the mobile rice mills, mounted on tractor, have been introduced by private players which reaches at farmers door and the rice processed. The mobile mills are quite popular amongst small-marginal farmers and it was reported from surveyed villages that out of all farmers, the service availed by small-marginal farmers was almost 40 percent.

The following table shows some significant and popular innovations, as emerged in various FGDs conducted in various location of eastern UP. These are liked by small farmers and the benefits as enumerated by small-marginal farmers are being provided in the table 10.

Table 10 : Innovations and Technology adopted by farmers

Innovation Technology	Related Crops	Usage/Advantage	Seeded By
SRI	Paddy, wheat	- Less irrigation needs - Less seeds - More production	Research Institutions based on farmers practices
Zero Tillage	Wheat	- Late sowing is possible - Less seeds, fertiliser and ploughing needed	Research Institution
Laser Leveller	Any agriculture land	Land levelling	Research Institution
Drum seeder	Paddy	- Lesser seeds - Less sowing time (labor) - Better production	Research Institution
Potato Planter	Potato	- Line sowing - Time saving (labor)	Research Institution
Rotavator	Any agriculture field	- Less ploughing needs - Better Soil moisture	Research Institution
Seed drill	Wheat, Pulses	- Time saving - Lesser seeds - Easy harvesting - Better production - Lesser water needs	Research Institution
Paddy Transplanter	Paddy	- Lesser labor - Time saving	Research Institution
Power Tractor	Horticulture	- Field ploughing in banana and other vegetables - Lesser labor - Time saving	Research Institution

Source : FGD

GOVT SCHEMES AND SMALL AND MARGINAL FARMERS

National Food Security Mission (NFSM)

The National Food Security Mission is a centrally sponsored scheme which is funded by the Central Government. The objective of this scheme is to increase production and productivity of wheat, rice and pulses on a sustainable basis so as to ensure food security of the country. The approach is to bridge the yield gap in respect of these crops through dissemination of improved technologies and farm management practices. It is envisaged to focus on districts which have high potential but relatively low level of productivity performance at present.

Specific provisions made under NFSM for small and marginal farmers are:

- At least 33% allocation of the fund is to be made for small, marginal and women farmers. The allocation to SC/ST farmers will be made proportionate to their population in the district.
- The seed mini-kits will be distributed to the farmers free of cost. Preference will be given to progressive, small, marginal, women and SC/ST farmers. Only one kit of 5 kg will be given to a farmer.
- **Organising small and marginal farmers into interest groups:** The small and marginal farmers which form the majority in the total land holdings are often unable to get remunerative price for their produce due to small marketable surplus. Encouraging farmers to form producer associations and aggregating the produce of small and marginal farmers would go a long way in improving their bargaining power. The group action will confer on the small farmers the power of scale both at the production and postharvest phases.
- **Farm mechanization** is very crucial to ensure timeliness in farm operations, precision in metering of inputs, reduce drudgery and enhance input efficiency. The promotion of custom hiring of agriculture machinery will further improve access of farmers particularly the Marginal and Small ones on adopting mechanization.

In the FGDs conducted in various locations of eastern UP, it was realized that the best part of this scheme liked by small-marginal farmers are Demonstrations where farmers get seeds and input costs. The subsidy of Rs 10,000 on irrigation pumps/engines is also quite liked by small farmers under this scheme. 15-20 per cent of small-marginal farmers reported to have benefitted by the scheme.

However, according to the guidelines of the scheme demonstrations are meant for only those farmers who have land holding of 1-1.5 acres. Hence majority of smaller farmers are not able to take benefits of the scheme. Orchard demonstrations are normally availed by orchard owners who are largely bigger farmers.

Rashtriya Krishi Vikas Yojana (RKVY)

Rashtriya Krishi Vikas Yojana (RKVY) was designed to tackle the deceleration of growth rate in agriculture, at a time when post liberalisation, the rest of the economy was on a high growth rate trajectory. With the majority of the population

dependent on agriculture for their livelihood, slow growth of agriculture sector despite the immense potential available for higher agricultural productivity, was a matter of grave concern. RKVY targets the agriculture and allied sectors with schemes and programmes, which typically benefit individual farmers and farming community. The programme presents an excellent opportunity to the States to reorient their strategies to provide the much needed impetus to the growth of agriculture and allied sectors.

Specific provisions made under RKVY for small and marginal farmers are :

1. Under the RKVY 11th Five Year Plan (2007-12), an allocation of approximately 200 crores has been made for conducting various programmes for small and marginal farmers and women empowerment.
2. Efficiency of water use in canal irrigated areas need to be enhanced and dependence on groundwater needs to be reduced as this will benefit small and marginal farmers and also restrict the depletion of ground water resources.
3. The main thrust of dairy development in the State is to supplement the income of small and marginal farmers and landless labourers to bring about socio-economic transformation of the rural people through strengthening of cooperative structure and promoting private investment in the dairy sector.
4. New models having innovative ideas of cluster approach for organizing organic farmers will help small and marginal farmers in the long run. Group certification will help in reducing the cost of certification, added with traceability advantage their produce will become of international standards.
5. The small and marginal farmers suffer severely due to non-availability of irrigation water. This category of farmers does not have capital to construct tube well and it is uneconomic also to invest on tube well for small & fragmented land holding of this group. In order to increase the average yield of the state, it is essential that these small and marginal farmers are provided irrigation water by installing deep wells as public investment where there is scope to utilize the underground water.
6. To support nutritional kitchen garden as well as production of high value crops by small and marginal farmers, special emphasis is required to be given to provide high quality vegetable seeds to the farmers.
7. Mechanization of small and marginal farms at marginal rent will improve overall efficiency.
8. Promotion of protected cultivation of vegetable crops under low tunnels for early production of vegetables for the benefit of small and marginal farmers and woman farmers.
9. Promotion of vegetable cultivation especially for woman farmers.
10. Small poultry units need to be encouraged to help small and marginal farmers.

While talking to small-marginal farmers on the usability of provisions of the scheme, Demonstrations are most like activity. However, the availability of size of land restricts the benefits of the scheme to be availed by marginal land holding farmers. There is scope for devising appropriate mechanisms at district (ATMA) and GEAG and ATMA Gorakhpur implemented such demos on pooled land of marginal farmers making the land size suitable for the norms and at the same time helping marginal farmers to take the benefits.

Diversified Agriculture Support Project (DASP)

Diversified Agriculture Support Project (DASP) - commenced on September, 1998 with the objectives to accelerate the trends of diversification with the financial assistance from the World Bank to intensify agricultural activities through farmer's participation. Later it has been undertaken by Uttar Pradesh Government. Intensification and Diversification of Agricultural and Allied Activities through Farmer's Participation and Empowerment to create Self Reliance and Sustainable Processes and Structures. UPDASP was launched with the objective of introducing element of diversification in traditional Agriculture patterns; its coverage is continuously expanding, yet a vast area is still outside its approach.

DASP II: Deoria, Ballia, Ghazipur, Mau, Chandauli, Mirzapur, Sonbhadra, Azamgarh, Ambedkar Nagar, Faizabad, Balrampur. The specific benefits to small-marginal farmers from this scheme are group formation and FIG activities and the Demonstrations of varieties and techniques (like line sowing, zero tillage, SRI etc).

So far as effectiveness of the schemes are concerned, it will be worth mentioning here that there are good number of agriculture-horticulture related government schemes and financial resources are made available. However, the infrastructure to implement the schemes is quite inadequate. For example, lack of staff and vacant positions at various levels adversely affects the schemes and its benefits to farmers. Further, the lack of departmental and schemes convergence at district and block level creates confusion and duplication of resources.

National Horticulture Mission : A National Horticulture Mission has been launched as a Centrally Sponsored Scheme to promote holistic growth of the horticulture sector through an area based regionally differentiated strategies. The scheme is fully funded by the Government and different components proposed for implementation financially supported on the scales laid down.

Provisions for small and marginal farmers :

1. The assistance for bringing new areas under fruit crops will be limited to 75% of the cost, limited to a maximum of Rs. 22,500/ha for a maximum of 2 ha per beneficiary in the case of small and marginal farmers.
2. Hi-tech green houses will be promoted and the small and marginal farmers will be supported with 50% of the cost subject to a maximum of Rs.325/Sq.m for hitech and Rs.125/Sq.m for normal GH, limited to 1000 Sq.m./beneficiary
3. For the cultivation of cut flowers, small and marginal farmers will be supported with 50% of the cost @ Rs.35,000/ha limited to 2 ha. per beneficiary
4. For the cultivation of Bulbous flowers, small and marginal farmers will be supported with 50% of the cost @ Rs.45,000/ha limited to 2 ha. per beneficiary
5. For the cultivation of loose flowers, small and marginal farmers will be supported with 50% of the cost @ Rs.12,000/ha limited to 2 ha. per beneficiary.

Assessing the effectiveness of the scheme through the eyes of small-marginal farmers it was realized that Vegetable Demos are most liked activity. The selected farmers are provided with seeds, irrigation technology/ support etc.

EMERGING CHALLENGES

Drought, Floods

Communities in eastern UP have lived with floods since ages. However, the newer challenges in this regard are changing trends in floods where flood timings are becoming uncertain and increasing water logging. As explained earlier, the slope in the area is gentle and hence blockages in any form tends to increase situations of 'water-locking'. The low priority given to drainage in the developmental programmes has also increased water stagnation possibilities at micro /village level. The shrinking water bodies also reduces water holding capacity of the area. These factors result in increased area and duration of water logging. The losses which occur in flood season has been traditionally recovered in rabi season. However, increasing duration of water logging in post flood periods delays the Rabi sowing and hence reduction in productivity.

The over exploitation of underground water due to water demanding exotic and hybrid varieties, increasing crop intensities and cultivation of cash crops like mentha etc has increased pressure on ground water, thereby, enhancing grey zones in eastern plain and Vindhyan region. The changing trends of rain fall with increased intensity of rain fall, shrinking water bodies and lseer places for water recharge also adversely affect the ground water situation.

Changing Climate

There are various studies conducted in Rapti Rohin basin, conducted by GEAG and other resource agencies, indicating the changes in climate patterns and the trends to come. Changed timings of rain fall, increased rain intensities in monsoon and reduced rains in winter (even if the average annual rain fall remains the same), sudden increase in temperature during later months of winter, increasing humidity and other such factors are causing new problems of crop damage, pest attacks and diseases in animals.

Increasing Input costs

The cost of inputs are continuously increasing. Increase in price of fertilisers, pesticides, seeds (specially high costs of HYVs), wages, diesel etc ultimately make the agricultural inputs costlier. The mechanized, chemical and cost intensive agriculture promoted by green revolution technologies have reduced opportunities of input generation from the farm systems. The outputs and productivity growth is slowing down resulting into reducing net gains in small farming. The lack of processing, value addition and market opportunities in eastern UP reduces possibilities of good returns to farmers.

Disintegration of farm system

As explained earlier the small land holding farming worked as a system with the integration of various farm sub systems like livestock, poultry, fisheries etc. there has been flows amongst various farm sub systems which creates opportunities of recycling. This system, on one hand, makes the farm robust to deal with ecological stresses and at the same time reduces need of external/market inputs hence reducing input costs. However, the policies and conventional extension have largely neglected this integration thereby disintegration of the farm sub systems.

Ecological Degradation

The use of chemicals as agriculture inputs have adversely affected the soil flora and fauna thereby deteriorating the soil health. The natural systems in the village like water bodies, streams, ground water etc are also getting polluted. The increasing land pressure and prevailing policies have neglected maintenance and conservation of common natural resources like water bodies, forests, orchards etc. As explained earlier the farm of small land holding farmer is also dependent on common property resources and shrinkage of such resources are resulting in reducing water holding capacity in both floods and drought affected areas, drainage (by which flood water can be drained out so that the field is used for next crop), availability of fodder, fuel and food etc ultimately affecting the small and marginal farmers.

Disputes

Land is the primary asset for resource poor farmers. The corruption in land management procedures like chakbandi (land consolidation), increasing land fragmentation and reduction in land size, delayed legal procedures, ineffective redressal measures and other such factors are adding to land and asset disputes. Almost 90 per cent of the legal cases pending in courts of eastern UP are related to land disputes. The legal cases continue for generations in the small-marginal farming households, wasting the hard earned money.

Market/ Post Harvest opportunities

There are very limited opportunities and arrangements that suits the specific situation (low production volumes, needs of quick returns, perishable items etc) of small-marginal farming household. Post harvest and market opportunities are needed for the small-marginal farmers. There are two kinds of post harvest opportunities for small-marginal farmers.

Informal Sector: There are several mechanisms developed by private/informal sector by which small quantity of produce of small-marginal farmers are processed. Some of the common practices in this paddy – wheat growing area is making puffed rice (Chura), rice flour, roasted rice (bhujia), unpolished rice etc which are sold in the market. There are good number of rice mills in the area. However, the new technology where mobile rice mills mounted on tractors have been developed and are made available at the doorstep of small farmers. Such innovative mechanisms have been quite helpful. There are good number of sugar cane crushers developed in the area and the farmers frustrated with the efficiency and pending payments of sugar mills take the help of such crushers in making jiggery (gur).

Formal Sector: Sugar Mills have been existing in the area since long. However, the mills are becoming sick and non efficient due to low crushing capacity, pending payments to farmers etc.

There are only 231 cold storage in various agro climatic zones of eastern UP, the maximum storage capacity being in eastern plain region. Ghazipur is the district with maximum number (39) of cold storages.

The markets are completely in the hands of private sector and in informal sector. Farmers have choices of selling their surplus production to Minimum Support

Price outlets or in open market. The MSP centres are distantly located and for small-marginal farmers taking the small amount of produce to distant places is highly inconvenient. The practices like bag collection, moisture level measurements in the grains, uncertainty of closure of centres when the farmers reach etc makes the access complicated. However, there are still good number of small farmers who take the produce to MSP centres and as per communities perception approx 10-15 per cent of small farmers produce (cereals) are sold to these centres.

Farmers sell their produce to private petty buyers who reach at farmers door step in spite of lesser price paid to farmers.

There are good number of commodity specific sale centres for example cattle markets, spice and other products, owned by private people which are quite popular.

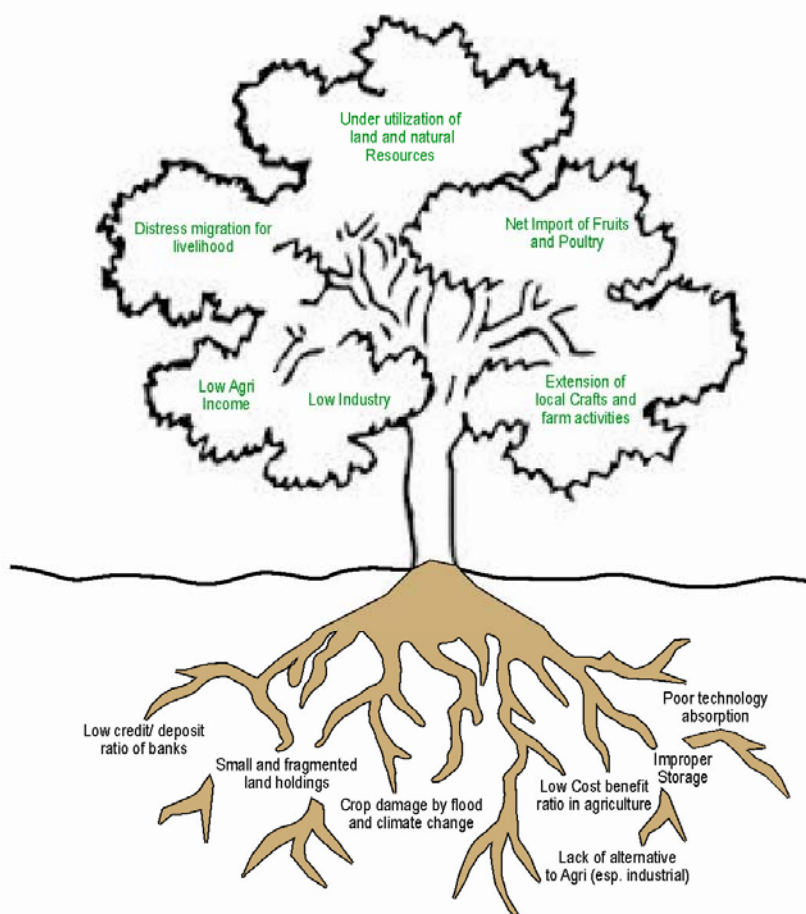
DASP and Fisheries Dept have made special efforts in developing markets for farmers by providing infrastructures. However, such opportunities are quite limited in number.

Research and extension

The extension and research programmes are not able to address the small-marginal-landless and women farmers. It is important that the extension plans are developed considering the following issues :

- Integration and intensification of farming system (livestock, aquaculture, farm, poultry)
- Synergy of ITK and Contemporary scientific knowledge
- Appropriate seeds (traditional and evolved)
- Linkage with relevant government programmes in improving farm (raising the land, nurseries) and landscape/ecosystem (drainage, conservation of water bodies, open land) especially MNREGA, ATMA, RKVY and Horticulture Mission.
- Appropriate extension system (problem solving, need based, availability of inputs, horizontal integration)
- Weather advisories/warning systems
- Special attention to gender disaggregated needs

The Problem Tree of East U.P. and its Analysis



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Appendix 1 : District wise size of pond and fish production in Eastern Uttar Pradesh

District	Size of pond (in ha)					Total	Total ponds	Production of Fish (in quintal)		
	0- .05	.50-2.50	2.50-5.0	5.0-10.0	> 10			Departmental	Private	Total
Baharaich	13.82%	18.10%	10.95%	8.38%	6.98%	1446	14.92%	475	465	940
Sravasti	4.71%	1.86%	1.01%	0.72%	1.13%	183	1.89%	62	1558	1620
Tarai region total	18.53%	19.96%	11.96%	9.10%	8.11%	1629	16.80%	537	2023	2560
Balrampur	0.00%	0.14%	1.80%	1.59%	1.24%	55	0.57%	8160	-	8160
Siddharthnagar	22.65%	7.26%	3.46%	3.61%	3.49%	749	7.73%	607	-	607
Maharajganj	1.08%	1.19%	1.22%	2.46%	1.69%	128	1.32%	150	381	531
Kushinagar	8.14%	10.95%	7.78%	5.78%	2.25%	876	9.04%	-	5311	5311
Gorakhpur	0.20%	3.03%	7.56%	14.16%	20.83%	563	5.81%	1005	13545	14550
Gonda	0.29%	1.12%	5.40%	8.24%	5.29%	246	2.54%	-	795	795
Basti	0.39%	0.75%	3.75%	6.50%	1.80%	160	1.65%	-	381	381
Sant kabir nagar	8.53%	5.17%	2.95%	2.75%	3.49%	473	4.88%	-	1020	1020
Deoria	2.06%	3.35%	2.81%	2.31%	3.04%	294	3.03%	-	2094	2094
North Eastern plain	43.33%	32.97%	36.74%	47.40%	43.13%	3544	36.56%	9922	23527	33449
Faizabad	0.00%	0.70%	1.01%	1.59%	3.04%	92	0.95%	104	2615	2719
Ambedkarnagar	8.24%	5.43%	3.60%	2.89%	5.63%	514	5.30%	45	10380	10425
Azamgarh	0.39%	1.56%	3.03%	5.06%	4.95%	214	2.21%	-	-	0
mau	2.55%	1.21%	1.44%	1.01%	2.03%	140	1.44%	-	2375	2375
Balia	0.00%	0.14%	1.80%	1.59%	1.24%	55	0.57%	136	4665	4801
gazipur	7.55%	9.90%	5.84%	2.17%	3.49%	769	7.93%	-	4525	4525
jaonpur	2.06%	2.75%	3.82%	3.76%	2.70%	281	2.90%	945	40320	41265
Sultanpur	6.76%	2.12%	1.15%	1.59%	0.34%	220	2.27%	25	991	1016
Varanasi	1.96%	1.93%	0.50%	0.29%	0.11%	140	1.44%	308	1222	1530
Chandauli	0.69%	1.51%	0.36%	0.00%	1.46%	111	1.15%	296	1763	2059
Eastern plain	30.20%	27.25%	22.55%	19.94%	25.00%	2536	26.16%	1859	68856	70715
Allahabad	0.29%	4.92%	16.28%	10.55%	6.76%	643	6.63%	601	8629	9230
Mirzapur	0.00%	0.23%	0.72%	1.30%	2.59%	55	0.57%	249	1003	1252
sonbhadra	0.20%	0.56%	2.02%	5.20%	3.72%	131	1.35%	2301	2344	4645
Vindyan region	0.49%	5.71%	19.02%	17.05%	13.06%	829	8.55%	3151	11976	15127
Pratapgarh	0.39%	0.63%	1.73%	3.32%	8.11%	159	1.64%	265	15127	15392
kausambhi	1.67%	7.20%	4.11%	1.01%	0.90%	500	5.16%	63	-	63
sant rabi das nagar	5.39%	6.27%	3.89%	2.17%	1.69%	497	5.13%	-	12518	12518
Central plain	7.45%	14.11%	9.73%	6.50%	10.70%	1156	11.92%	328	27645	27973
Grand total	100.00%	100.00%	100.00%	100.00%	100.00%	9694	100.00%	15797	134027	149824

District wise SC and ST population of eastern Uttar Pradesh

District	Schedule Tribes						Schedule caste										
	Tharus	Bhotia	Jansari	Generic tribes	Raji	Bakusa	Chamar	dusadh	Gond	pasi	kori	kol	dhobi	Khatik	Mushhar	Beldar	kharwar
Baharaich	8516	9	0	22	0	0	160679	0	0	62426	37979	0	0	0	0	0	0
Sravasti	4750		0	5	0	1	53996	0	0	89123	33958	0	0	0	0	0	0
Tarai region total	13266	9	0	27	0	1	214675	0	0	151549	71937	0	0	0	0	0	0
Balrampur	19304	33	0	0	0	0	30585	0	0	48552	92734	0	0	0	0	0	0
siddharthnagar	74	0	0	146	8	0	238032	0	0	43062	0	0	41445	0	0	0	0
maharajganj	2479	0	14	71	0	0	265168	0	0	57353	0	0	54072	0	0	0	0
kushinagar	52	0	0	231	0	85	283033	0	65886	0	0	0	51673	0	0	0	0
Gorakhpur	279	0	0	396	199	0	522742	0	0	110900	0	0	0	0	0	74237	0
Gonda	140	1	0	41	0	0	71931	0	0	68873	195711	0	0	0	0	0	0
Basti	0	0	0	235	0	0	344350	0	0	0	0	0	43044	23523	0	0	0
Sant kabir nagar	0	0	0	262	22	23	215913	0	0	0	0	0	29537	0	0	35387	0
Deoria	234	0	0	283	0	9	290458	0	82993	0	0	0	36687	0	0	0	0
North eastern plain total	22562	34	14	1665	229	117	2262212	0	148879	328740	288445	0	256458	23523	0	109624	0
faizabad	42	16	0	132	0	0	90143	0	0	175258	149274	0	0	0	0	0	0
Ambedkarnagar	0	0	0	133	10	0	438182	0	0	7809	0	0	29364	0	0	0	0
Azamgarh	0	63	0	458	90	0	829755	0	0	87872	0	0	34343	0	0	0	0
Mau	82	86	0	189	0	0	339913	0	14424	0	0	0	18995	0	0	0	0
Balia	0	30	0	243	0	0	304224	59649	33116	0	0	0	0	0	0	0	0
Gazipur	0	31	0	250	1	0	518794	23600	0	0	0	0	23712	0	0	0	0
Jounpur	15	96	0	254	0	0	636277	0	0	112804	0	0	36207	0	0	0	0
Sultanpur	137	0	44	262	0	0	304624	0	0	146026	196096	0	0	0	0	0	0

STATUS OF SMALL AND
MARGINAL FARMING IN

EASTERN UTTAR PRADESH

Varanasi	64	16	0	688	0	0	3081000	0	0	0	0	0	21206	31251	0	0	0
Chandauli	143	16	0	94	0	0	285302	21573	0	0	0	0	0	0	18752	0	0
Eastern plain total	483	354	44	2703	101	0	6828214	104822	47540	529769	345370	0	163827	31251	18752	0	0
Allahabad	870		57	3322	0	0	402347	0	0	412466	0	106164	0	0	0	0	0
Mirzapur	0		0	1242	10	50	285801	0	0	39515	0	123996	0	0	0	0	0
sonbhadra	73	306	0	61	0	0	179239	0	132946	0	0	0	0	0	0	0	64738
Vindyan region	943	306	57	4625	10	50	867387	0	132946	451981	0	230160	0	0	0	0	64738
Pratapgarh	57	28	0	63	0	0	244002	0	0	286572	0	0	29171	0	0	0	0
kausambhi	80		0	6	0	0	96207	0	0	283145	0	0	36537	0	0	0	0
sant rabi das nagar	0	1	0	217	0	6	184397	0	0	70259	0	0	11146	0	0	0	0
Central plain	137	29	0	286	0	6	524606	0	0	639976	0	0	76854	0	0	0	0
Grand total	37391	732	115	9306	340	174	10697094	104822	329365	2102015	705752	230160	497139	54774	18752	109624	64738

