Irrigation Development: A Process of Land Degradation and Marginalisation of the Land Poor

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Firdaus Fatima Rizvi
Fellow at Indian Institute of Dalit Studies, New Delhi
firdausrizvi@gmail.com

Abstract

This article looks into the instances of growing waterlogging, which is a negative externality of the developmental process (canal irrigation) that has affected the marginalised sections to a greater extent, who mostly depend on land for livelihood and self-sustenance. Land-use pattern has undergone a tremendous transformation due to irrigation development in terms of increase in fallow and culturable waste lands. Fertility of the land has considerably been reduced: agricultural production has gone down, animals and trees have been diminished, livelihood and employment opportunities have declined, largely affecting the Other Backward Castes and Scheduled Castes living in its lower catchments that have sub-marginal landholdings and are historically marginalised, thus leading to higher incidence of migration among the local inhabitants of the basin.

The study recommends how integrated land and water development programmes at village level could improve land utilisation pattern. These changes would indirectly increase agricultural productivity, enhance livelihood of the farmers and the local communities by increasing employment and livelihood activities at village level. The employment scheme National Rural Employment Guarantee Scheme (NREGS) would be of crucial importance in managing water resources and enhancing land development simultaneously.

Keywords

Irrigation, waterlogging, land, agriculture, livestock, occupation, livelihood, migration, sustenance and marginalisation

Introduction

Given the existing stock of land resources, the issue of access to this resource is critical in determining the welfare of the farming community in India, where

about two-thirds of the total households are cultivators or agriculture labourers. Households that depend on agricultural wage-labour account for less than a third of all rural households, but make up almost half of those living below the poverty line. Many of these households own some land, but often holdings are so small or unproductive that their owners derive a greater share of their livelihood from their labour hired out than from the cultivation of their land.

Aside from its value as a productive factor, land ownership confers collateral in credit markets, security at times of natural hazards or life contingencies and social status. Often these landholdings turns into unproductive land due to wrong irrigation practices, waterlogging and salinity, change in land-utilisation patterns, etc., thus affecting the agriculture production, employment and livelihood of the households. It is, thus, important to study the relationship of farmers with land accessibility in terms of production, employment, earning and livelihood. Managing land is essential for long-term optimisation of economic as well as social welfare function. The surplus manpower in the agriculture sector needs to be diverted in National Rural Employment Guarantee Scheme (NREGS) and other activities for managing land and generating employment.

Objectives of the Study

The analysis primarily intends to study the land and water resource management in Phulpur block of Allahabad district. The objective is to study the landholding pattern and the land assets among different social groups, to study the effect of irrigation project on the livelihood of the marginalised and its plausible contribution to the process of marginalisation, the employment scenario of the local inhabitants for sustenance and livelihood and finally how NREGS will help in improving the land use and the condition of the local people.

This article attempts to look into the effect of irrigation development on land resources; the analysis incorporates land-utilisation patterns, access to land and land degradation characteristics in the study area. We look into the trend of land use, intensity of land use and major factors affecting the same. It focuses on the limited availability of land resources vis-à-vis the population who feeds from the land and also the population who are directly dependent on agriculture for their livelihood. Some challenges with respect to land-use planning are the issue of productive lands that are shifting out of agriculture to other uses, evaluation of any mechanism that may exist to arrest this shift and increase in the extent of degraded soils that are currently under agriculture. On the other hand, the study looks into the social conditions of the sample households, agriculture produce, livestock condition, their livelihood, employment, migration, credit and loan structure, etc. Further study suggests how to improve livelihood and employment of the local inhabitants through integrated land and water management.

Methodology

To make the study comprehensive and more effective, random sampling technique was used to collect the primary data from the field. Phulpur block from Allahabad was purposively selected for the case study. Some villages were randomly selected due to different reasons of waterlogging. In total, 300 households were selected for the study. The schedule raises questions related to landholding pattern, land-utilisation pattern, irrigation, extent and duration of waterlogging, agriculture production, employment and livelihood, loan, migration, status of National Rural Employment Guarantee Act (NREGA) etc.

Secondary data were collected from various rural and district development agencies as well as from departments working to facilitate the water supply in the area. It covers population structure, economic classification, operational landholding, land-use pattern, sources of irrigation, net sown area, cropping intensity, areas under different drainage and soil class etc.

About the Study Area under Different Sub-headings

Topographical Characteristics and Watershed of the Area

Topographically, the district Allahabad is divided into three distinct physical parts, the Trans Ganga (Gangapaar plain), the Doaba (Allahabad city) and the Trans Yamuna (Yamuna paar tract), which are formed by the river Ganga and its tributary Yamuna. The river Yamuna joins the river Ganga here and the confluence is known as Sangam. The rivers of the district belong to the main system of Ganga that comprises several subsystems of which the most important are the Yamuna and the Tons; others include the minor systems of Varuna and Sai. From agricultural point of view, the Trans Ganga and the Doaba are more fertile than the Trans Yamuna, which is poor.

The villages taken here for study are located in Phulpur block which are assumed to be one of the most fertile plains of the Ganges and lies in the Trans Ganga region at the north-west part of the district. It is situated 35 to 45 kilometres away from Allahabad district. The district is connected with the block by means of rail and road transportation. Every village of the block has been connected with a pucca road with the block.

The study area is physically lowland, very rich in water resources and has many lakes and ponds. It has one big lake called as Mailahan Lake, which is a source of river Varuna (the river follows its path through Allahabad, crosses district Bhadoi and later falls into the Ganges in Varanasi district). The river has been callously dumped and silted and flows below its normal capacity. Apart from these resources, there are other four more natural lakes adjacent to Mailahan Lake, namely, Dam-Dam, Mejora, Koshia and Kamasin. The water of all these

small lakes as well as of the minors of the Sharda Sahayak Canal falls into the Mailahan Lake.

The surplus water from canal, rainwater during monsoon, absence of effective drainage system and low capacity of the lakes and river Varuna all adds up to vast waterlogging in adjoining areas and agriculture fields. Other reasons like growth of weeds in *nallah*s, ponds and lakes, unlawful acquisition of public land and Kharanja road construction at higher heights hampers the natural watershed of the region that all aggravates the problem of waterlogging. Even the land given on lease by the Gram Sabha for agriculture and fisheries purposes are illegally occupied and constructed, thus hindering the natural flow of water. Thus, one of the most fertile plains of the Ganges is in grip of waterlogging from the early 1990s, since the coming of Sharda Sahayak Canal into the region.

Socio-economic Profile

Because the study area is lowland, General Castes possibly preferred less to settle on this land and Muslims preferred to settle near the *kasba* (tehsil or block headquarters) for the reason that they were mainly into non-farm activities. Hence, these villages are mostly dominated by 70–75 per cent of OBC population, followed by 15–20 per cent of SCs population, with a very low population of General Caste and Muslims.

Table 1 gives a brief picture of socio-economic configuration of the villages with total population, population below poverty line, number of agricultural labourers and number of educated unemployed. It also shows number of families below poverty line, marginal farmer's families and number of families interested in NREGS with respect to various Gram Panchayats. Gram Panchayats of Adampur and Mailahan show more than one-third of families and Baribhoj with more than half of the families below poverty line. About 96 per cent of the families are interested in NREGS in Gram Panchayat Atraura, with other families from all Gram Panchayats confirming the interest for the same.

Agriculture remains the main occupation of more than two-thirds of the population. According to Table 2, 60.52 per cent of working population are cultivators (mostly marginal and small farmers), 4.56 per cent are agriculture labourers and nearly 23 per cent are non-agriculture labourers. Remaining 12 per cent of the working population includes people in government (3.58 per cent) and private services (4.56 per cent), handicrafts (0.97 per cent), social services (0.16 per cent), business (1.95 per cent), politics (0.32 per cent) and law (0.48 per cent).

Landholding Pattern

About 10 per cent of SCs and 2.93 per cent of OBCs were found landless. The survey here reflects the trend of SC and OBC only because it constitutes 96 per cent of the total household surveyed. There were only seven households of the

Table 1. Socio-economic Profile of Sample Villages

	Population				Families				
Gram Panchayats	Total population	Population below poverty line (%)	Agricultural labourers (%)	No. of educated unemployed	Total number of families	BPL families (%)	Families affected by migration (%)	Marginal farmers families (%)	Families interested in NREGS (%)
Adampur (Adampur, Mahjil ka Purva)	4,025	40.49	13.66	5.71	890	26.96	3.93	28.0	31.46
Baribhoj (Baribhoj, Uttamnagar)	2,250	57.11	2.88	1.11	750	57.2	6.66	46.66	21.86
Kanjia (Kanjia, Pabnah)	5,110	8.55	10.76	0.97	1022	10.95	0.97	44.03	30.82
Atraura (Atraura, Kutubpur, Jalaaluddinpur)	4,257	20.24	–	17.03	941	39.85	2.65	42.50	96.38
Mailahan	2,860	35.66	3.21	30.41	496	34.27	13.10	23.18	17.33
Sawdih		NA	NA	NA	NA	NA	NA	NA	NA
Boodae (Nonaiya)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mehdipur urf Purainda	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sources: Work Plan in NREGA, Rozgar Sewak: District Allahabad, 2009 and Block Development Office Phulpur, Allahabad, 2009.
Note: Names of the villages under Gram Panchayats are given in parentheses.

Table 2. Percentage of Working Population

Villages	Cultivators	Agricultural labourer	Non-agriculture labourer	Handicrafts	Government service	Private service	Social service	Business	Law	Politics	Total
Kanjiya	30.13	27.39	35.61	0	0	1.36	0	5.47	0	0	100
Jalaaluddinpur	64.15	1.88	33.96	0	0	0	0	0	0	0	100
Kutubpur	51.76	1.17	40.0	0	2.35	2.35	0	2.35	0	0	100
Uttamnagar	68.75	0	0	0	9.37	21.87	0	0	0	0	100
Mailahan	69.56	2.17	10.86	2.17	4.34	6.52	2.17	2.17	0	0	100
Mahjilkapurva	83.33	0	0	0	0	0	0	16.66	0	0	100
Boodai	69.64	3.57	14.28	0	4.46	5.35	0	0.89	0	1.78	100
Mehdipur	65.30	0	6.12	2.08	12.24	12.24	0	0	2.08	0	100
Swedih	77.77	0	7.40	3.70	3.70	1.85	0	1.85	3.70	0	100
Bhogwara	88.88	0	0.0	11.11	0	0	0	0	0	0	100
Total	60.52	4.56	22.83	0.97	3.58	4.56	0.16	1.95	0.48	0.3	100

Source: Field survey, 2008.

General Caste and five households of the Muslims found in the random selection during the field survey, making it tough to predict anything from this small sample.

The operational landholding distribution (Table 3) shows that 76.04 per cent household have landholdings below 1 hectare (marginal) and 17.36 per cent having landholdings between one and two hectares (small). Just 6.25 per cent households have land between two and four hectares (semi-medium) and 0.35 per cent having 4–10 hectares (medium). None of the households had large landholdings to their credits. It means that 100 per cent landholdings were either marginal or small in the year 2008.

Table 3. Distribution of Operational Landholding across Social Groups (in per cent)

Type of landholding (hectare)	SC	OBC	General	Muslim	Total
Less than 0.5	59.09	43.10	42.86	80.0	46.18
0.5–1	20.45	32.33	28.57	0	29.86
Small (1–2)	18.18	17.67	0	20.0	17.36
Semi-medium (2–4)	2.27	6.47	28.57	0	6.25
Medium (4–10)	0	0.43	0.0	0	0.35
Total	100.0	100.0	100.0	100.0	100.0

Source: Field survey, 2008.

As far as tenancy is concerned, 19.3 per cent households have leased lands for agricultural purposes. About 6.33 per cent households have leased 0 to 0.2 hectare land, 10.33 per cent have leased 0.20 to 0.40 hectare land and remaining 2.66 per cent households have leased 0.40 to 1.20 hectare land. Regarding leasing out land, only 3.66 per cent households have leased out 0 to 2 hectare land for farming, 2.66 per cent have leased out 0 to 1 hectare of land and 1 per cent households have leased out 1 to 2 hectare of land

Under the land reforms during the last five years, government has only gone for consolidations of farm fields in some sample villages. The cost taken by the government from landowners was five *biswa* (0.0625 hectares) of land for consolidating five *bigah* (1.25 hectares) of fragmented land. The land taken by the government under consolidation scheme has been put under the Gram Sabha land.

Irrigation Development in the Area

As it is clear from the topography that the sample villages lie in the vicinity of lakes, ponds and river, these water resources remain the traditional and primary source of irrigation since earlier days. But during the late 1960s, Green Revolution was adopted by the government of India that emphasised adequate water as the key ingredient for agriculture development. During this phase, many major and medium irrigation projects were initiated in many parts of the country. In this period, only Trans Ganga area in Allahabad was the first to adopt new agriculture

strategies, with the advent of tubewells and canals for irrigation purposes (Shankar, 1981).

During 1980s, tubewells were the major source of irrigation in Phulpur block. A shift in irrigation from tubewells towards canal was seen in 1990s. Since then onwards, irrigation-induced externalities have emerged in the form of water-logging and soil salinity. Because of this, reverse shift was visible in 2000–01 (see Table 4) with users switching back from canals to tubewells again.

Table 4. Percentage of Area Irrigated by Different Sources in Phulpur Block

Year	Canal	Public tubewell	Private tubewell	Wells	Ponds	Others	Total
1980–81	6.56	80.28		3.51	9.65	0	100
1985–86	27.43	62.04		0.64	9.88	0	100
1990–91	41.19	6.68	46.57	0.17	5.36	0.02	100
1995–96	45.91	9.06	44.11	0	0.92	0.01	100
2000–01	24.85	12.30	61.14	0	1.70	0	100
2005–06	37.26	2.42	56.15	0	4.18	0	100
2007–08	36.80	3.44	57.21	0	2.55	0	100

Source: District Statistical Handbooks, Allahabad.

A brief background of Sharda Sahayak Irrigation Project

Sharda Sahayak Irrigation Project redirects water of the river Ghagra and Sharda to 14 districts in Uttar Pradesh (UP). This canal was taken off from the river Sharda at Banbasa near the foothills to command the area between the rivers Ganga and Ghagra (Figure 1). This project was launched in Phulpur block in 1976 to provide non-monsoon irrigation facility. The minors of the canal were gradually extended to many villages till the 1990s.

There is village-wise differentiation in use of sources of irrigation. Villages irrigated by canal are Kajiya, Uttamnagar, Boodai, Majhil ka purva, Mehdipur and Savdih and rest like Mailahan, Kutubpur, Jalaaluddinpur and Bhogwara are partially irrigated by canal and mostly served by lakes and ponds. Canal came into existence in Kajiya and Uttamnagar villages during 1940s–50s, in some sample villages during 1970s, but maximum villages were covered under it during 1980s–90s.

Irrigation Development and its Impact

This part of the article deals with the impact of irrigation development on land-utilisation pattern, on one hand, and livelihood pattern of the local inhabitants, on the other hand.

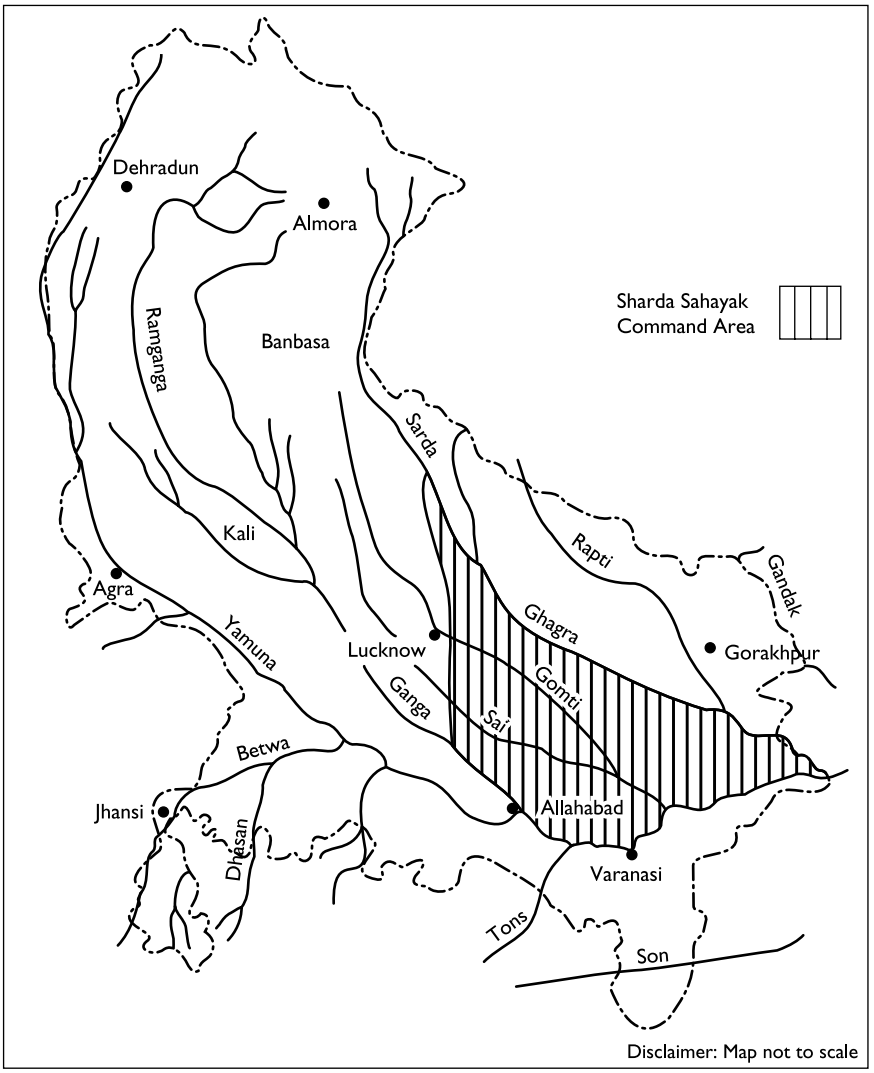

Figure 1. Sharda Sahayak Canal Command Area in UP

Irrigation Development: A Cause of Change in Land-utilisation Pattern

Extent, height and duration of waterlogging

In this section, extent, height and duration of waterlogging is analysed which is an important negative externality of irrigation development. The water remains in agriculture fields for four to eight months approximately. About 20.60 per cent, 23.61 per cent and 48.07 per cent commented that waterlogging occurs for 4–6, 6–8 and 8–10 months respectively. Sometimes farm fields become waterlogged

continuously for 10–12 months. The author has revisited the field after seven years and found the waterlogging scenario unchanged. Water rose on an average of four to eight feet in crop fields. It also rises to 8–10 feet at some places. About 60 per cent approved a minimum waterlogging of zero–two feet. The waterlogging starts with the advent of monsoon season, most likely remains in the months of August and September and goes on till November and December.

Area under different drainage class

Impact of waterlogging is easily visible on the natural drainage system of the study area. According to Soil Survey Office (Table 5), out of the total area in Phulpur block, about 3.0 per cent has been identified as the area under 'poor drainage class' which remains submerged during monsoon period, 74.6 per cent area has been recognised as 'imperfectly drained' and needed proper drainage system for sustained cultivation. Only 3.4 per cent is 'moderately well drained' and the remaining 9.5 per cent is 'well drained' area. It makes around just 12.9 per cent area in Phulpur block as 'well-drained' area, 5 per cent under miscellaneous use and the rest under imperfect/poor drained areas. The waterlogged area accounts for 600 hectares in Phulpur block that is approximately 2.66 per cent land of the block covering 19 revenue villages and affecting almost 20,000 people (Vikas khand Phulpur, 2003.

Table 5. Area under Different Drainage Classes

Drainage class	Percentage of area
Poorly drained	3.0
Imperfectly drained	74.6
Moderately well drained	3.4
Well drained	9.5
Total	90.5
Miscellaneous	9.5
Grand total	100.0

Source: Soil Survey Office (2008).

Land-utilisation pattern

During 1980s and 1990s, the land-utilisation pattern shows an increase in net sown area (refer Table 6). It is assumed that canal irrigation would be one factor behind the increase in net sown area, decrease in present fallow and other fallow land, barren and unculturable land and land put to non-agriculture use categories. The decrease in present fallow land and other fallow land during 1980s to 1990s automatically enhanced the land under agriculture use.

But subsequently, in the long run, since 2000 onwards, there was a sudden fall in net sown area which slipped to just 57 per cent in the year 2006–07. Simultaneously, there was an increase in present fallow land category from 0.85 per cent

Table 6. Land-utilisation Pattern in Phulpur Block

(Percentage of land)

Year	Forest	Barren culturable waste	Present fallow land	Other fallow land	Barren and unculturable land	Land put to non-agriculture use	Pasture land	Area under bush, forest and garden	Net sown area
1980–81	0	1.60	8.99	4.66	9.24	12.35	0.80	1.33	63.80
1985–86	0	2.32	4.10	2.46	5.82	10.83	0.78	1.25	72.51
1990–91	0	2.81	1.03	2.53	5.38	10.83	0.78	1.25	73.68
1995–96	0	2.81	0.92	2.44	5.82	10.83	0.78	1.25	75.16
2000–01	0	2.79	0.85	2.35	5.37	11.28	0.78	1.23	75.35
2005–06	0	2.70	16.85	2.33	3.90	12.70	0.78	0.94	59.81
2006–07	0	2.65	17.89	2.33	3.90	14.25	0.78	1.06	57.15

Source: District Statistical Handbooks, Allahabad.

in 2000–01 to almost 18 per cent in 2006–07. Land put to non-agriculture use has also expanded during this later period, showing an increase in culturable waste, an area which is supposed to be a part of agriculture use.

Assessing agricultural production: Before and after canal implementation

Before the implementation of new agriculture technologies and irrigation developments in the area, farmers were only sowing gram, peas, *jau*, bajra, *arhar*, etc. It is very much clear from Table 7 that crop produce was very low before canal came into existence. However, later on due to improved irrigation practices, cropping pattern has changed and farmers shifted towards the major crops like paddy, wheat and potato. Overall, the agriculture yields have increased since canal irrigation. Apart from change in irrigation practices, there would be other factors behind increased productivity like fertiliser, high yielding variety seeds and new technologies.

Table 7. Change in Average Crop Yield: Before and After Canal Implementation
(quintals/per hectare)

	Before Canal Irrigation	After Implementation of Canal	
Crops	Produce before canal	Produce in absence of waterlogging	Produce during waterlogging
Paddy	23.16	52.24	36.6
Wheat	13.24	26.6	22.44
Potato	123.56	305.0	264.0
Other (gram, peas, *jau*, etc.)	20.0	24.44	10.0

Source: Field survey, 2008.

There was a great jump in agriculture produce after canal implementation. Paddy production showed an increase of 225 per cent, wheat showed an increase of 200 per cent, potato increased with 247 per cent and other leguminous crops increased with 122 per cent after canal was introduced. Despite the fact that the yield has increased after irrigation development, there was a decrease in crop yield in the long run. There remains a vast difference between the crops produced during waterlogging and crops produced in absence of waterlogging. While analysing Table 7, it is clear that there was a high decline in productivity during occurrence of waterlogging. Paddy produced in waterlogged area is about 70 per cent of the total produced in absence of waterlogging. Similarly, wheat shows 84.36 per cent, potato shows 86.55 per cent and other crops shows 40.9 per cent of the total produced in waterlogged area with respect to non-waterlogged areas.

The crop yield is directly proportionate to level of waterlogging; if water in crop fields stands to an average height of more than three feet and remains in the field for 3–4 months then the crops are totally spoiled. If this condition is not satisfied then crop is saved. Kharif crops are sown in month of July/August, and when

it reaches some height, water from canal and rain comes concurrently leading to surplus water (more than critical water requirement) thus damaging the crops during August–September. If water in agriculture fields remains there till the month of November–December, farmers are unable to sow wheat also. They are unable to plant vegetables, leguminous plants and other cash crops also the whole year.

Crop diseases like *sarva*, worms, *muswa*, *charko*, *chuha lagna*, *geruva*, *peela rogh* and others are common during waterlogging. The loss of paddy, wheat, potato, vegetables, leguminous plants and other cash crops can be easily understood on the basis of average yield per year based on households' farm area under water as well as on 600 hectare waterlogged land.

Irrigation Development: A Cause of Change in Livelihood Pattern

This section of the article with deals how condition of the local inhabitants are getting marginalised in terms of loss of livestock, employment and occupation due to irrigation development in the region, as they are forced to migrate to other places for livelihood and employment and to go for loans.

Livestock condition

Cattle are affected with certain diseases because of consistent waterlogging. Animals have been affected with *galgotu*, *khurpaka muhpaka*, pneumonia, *muhpula*, loose motions, *sarra*, worms, *degnela* and others. Average spending of households on cattle was ₹1,000–1,500 per annum to cure diseases. Sometimes this amount ranges from ₹50 to ₹10,000. Households (who keep livestock) estimated around 450 animals died since last 10 years. Some respondents have viewed that around 14–15 animals per household have died so far. As a result, income from livestock has decreased making them more marginalised.

Employment under agriculture activities

On an average, 38 per cent of the households are employed for 60–90 man-days and about 26 per cent are employed for 90–150 man-days a year in agriculture. And for remaining 36 per cent of the households, the workdays are distributed unevenly from 15 man-days to any number of days per year in agriculture activities (see Table 8).

According to 57 per cent respondents, agriculture is not enough for livelihood. Relatively to this, 41 per cent respondents said that income has decreased since canal implementation. Nearly 36.7 per cent people are of the view that irrigation development has increased poverty for them. Only 27.3 people are satisfied with the canal project. More than 88 per cent people quoted that irrigation project has not enhanced employment opportunities for them.

Status of micro-credit/loan

Out of the total sample households surveyed, 19 per cent of the total households have taken loan. Of those who have taken loan, nearly 30 per cent households

Table 8. Days of Employment in Agriculture

No. of man-days in agriculture activities	No. of respondents	Percentage of respondents
No response	15	5.00
15–30	4	1.33
30–60	25	8.33
60–90	114	38.00
90–120	47	15.67
120–150	31	10.33
150–180	7	2.33
180–210	35	11.67
210–240	4	1.33
240–270	17	5.67
270–above	1	0.33
Total	300	100

Source: Field survey, 2008.

Table 9. Credit Scenario

Reasons for loan	Frequency	Percentage
Agriculture/farming/fertiliser	17	29.31
Disease/death	13	22.41
House construction	5	8.62
Marriage	15	25.86
Business	1	1.72
Other reasons (cattle, households work, etc.)	8	13.79

Source: Field survey, 2008.

have taken loan for agriculture/farming purposes, 26 per cent have taken loan to conduct marriage of their near ones and 22 per cent have taken loan at the time of disease/death of their kith and kin (Table 9). About 14 per cent have taken loan for buying cattle and for other household activities. Business and house construction remains the low concerned areas for taking loans.

The value of loan fluctuates from a minimum of ₹1,000 to a maximum of ₹124,000. Highest amount of loan were taken for the agriculture/farming/fertiliser/livestock purposes. Second highest sum of loans were taken mostly at the time of disease and death of any family member that ranged possibly from ₹30,000 to 40,000. Other smaller sums were borrowed for marriages (₹10,000 to ₹20,000), house construction and for other purposes. Mostly households have taken loan of ₹10,000. Maximum households are still dependent on private sources for credit purposes rather than relying on government sources. About 82 per cent of the respondents said that they still have not paid back their loans after a gap of many years.

Labour and out-migration for employment

As far as employment opportunity in agriculture sector is concerned, about half of the households don't get work at village level. To sustain their livelihood, around two-thirds of the respondents migrated to other places for employment. Of those who migrated, nearly 35 per cent respondents migrated for four months and an equal number of respondents migrated for six months, remaining 30 per cent migrated for more than eight months to other places in search of a job. The migration is of such a nature that they keep on coming to their villages and going back to workplace again and again after a gap of 15 days so as to keep the farm activities in process.

Of those who migrate, 6.25 per cent goes for a job to next village, 26 per cent and 31.25 per cent moves to tehsil and district level respectively, 3.64 per cent to other district at state level and largely 32.81 per cent to other states like Punjab, Gujarat (Surat), Mumbai (Bhiwandi) and Delhi. Regarding type of employment opportunities after migrating, 88 per cent of the households work in non-agriculture sector, working in looms, making sweaters, driving rickshaws, *rajgiri* (masons), casual labourers for house construction etc. Rest work as agriculture labour, in handicrafts, private services, self business and other activities for their sustenance.

Status of employment scheme at village level: NREGS

While only one-third respondents have job cards under NREGS, only 22 per cent have been able to get the work under this scheme. The number of days they worked under NREGS varied from one to 22 days. About 7.3 per cent respondents have got work for less than or equal to 10 days, 4 per cent have got work for less than 20 days and 1.6 per cent have got work for 20–22 days. Till the time of the survey, NREGS had already worked out for just 22 days and was stopped in midway because of rain and waterlogging by September 2008.

Conclusion

The irrigation development has certainly affected the land and livelihood of the people since its implementation, and one of the fertile plains of the Ganges is turning unproductive. Area under 'imperfectly drained category' has increased to more than three-fourths of the total land in Phulpur block. Land use has undergone a tremendous transformation due to canal irrigation in terms of increase in fallow and culturable waste lands. Fertility of the land has considerably been reduced, agriculture production has gone down and livestock have diminished. The livelihood and employment opportunities have largely declined affecting the OBC and the SC living in its lower catchments that have sub-marginal landholdings and are historically marginalised, thus leading to higher incidence of migration among the local inhabitants of the basin. Thus, irrigation development has degraded land, on one hand, and marginalised the poor, on the other hand, in terms of livelihood and sustenance.

Managing land resources will become meaningful only if the problem is viewed from the land users' perspective. According to the local communities and user groups, presently running government employment scheme NREGA would be of crucial significance in integrated water and land development programmes by managing water and land resources simultaneously.

Involvement of the local communities in NREGA activities by connecting each villages with *nallah* (effective drainage system), draining the river Varuna, draining lakes, making permanent (*pucci*) drains and minors, digging ponds and *nallah*s, etc., would thus improve the watershed of the area by negating water-logging, decreasing fallow land and improving land-utilisation pattern, increasing land under agriculture use; thus increasing agricultural productivity. These changes would indirectly enhance the livelihood of the farmers and the local communities by increasing employment and occupational activities at village level under NREGA.

Apart from all these activities mentioned earlier, draining of river should also be taken into consideration under NREGS. The Annexure 1 at the end of the article shows the estimated cost of draining the river Varuna with estimated number of man-days. The cost of draining the river Varuna was estimated by the engineers of Sharda Sahayak Canal in the 2001. The investment cost includes the cost of material and the labour cost in man-days. According to the District Development Officials, Allahabad, draining of river will be possible only if three administrative units of Allahabad, Bhadoi and Varanasi would come together for the cause. If this could be taken as an activity under NREGA, it could solve a larger problem of waterlogging, and hence improve land-use pattern and provide employment to large number of people.

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Annexure 1.

Estimated Investment Cost of Draining River Varuna for the Year 2001

Total Length of the River	Work for Removing Silt		Masonry Work			Ratio of Material and Labour	Total Estimated Cost (in lakh)	Total Estimated Man-days (in number)	Demand of Money for Year 2000–01 (in lakh)
	Length (in km)	Cost (in lakh)	Cost of Material (in lakh)	Labour Cost (in lakh)	Total (in lakh)				
196.0 to 189.0	7	22.61	1.6	0.71	2.31	10:90	24.92	16,500	24.92
189.0 to 178.0	11	24.24	0.48	0.26	0.74	40:60	24.98	20,000	24.88
178.0 to 169.0	9	22.73	0.65	0.45	1.1	40:60	23.83	20,000	23.83
169.0 to 165.0	4	20.34	–	–	–	40:60	20.34	1,500	20.34
165.0 to 162.0	3	19.2	–	–	–	40:60	19.2	1,400	19.2
162.0 to 160.5	1.5	13.6	–	–	–	40:60	13.6	1,000	13.6
160.5 to 158.0	2.5	24.6	–	–	–	40:60	24.6	1,700	19.49
158.0 to 155.5	2.5	24.78	–	–	–	40:60	24.78	1,800	24.78
155.5 to 153	2.5	24.73	–	–	–	40:60	24.73	1,750	24.73
196.0 to 153	**43**	**196.8**	**2.73**	**1.42**	**4.15**		**200.98**	**65,650**	**195.77**

Source: Sharda Sahayak Khand—39, Phulpur, 2002.