

Brick kilns and their Impact on Land use/Land cover Change in Jaunpur district of Uttar Pradesh (India)

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Abstract

India is a developing nation. The pace of economic growth and status of Indian population favours use of bricks as one of the most important and easily available building material in India. In the wake of rapid urbanization and changing life style of villagers, brick-kilns have sprung up in rural areas of India. India ranks second, just after China in brick production. There are more than 10,000 operating units working in our country to maintain the balance of demand and supply of bricks and produce about 150 billion bricks in a year. The brick kilns in Jaunpur district are also playing vital roles in the economic development of the area. The availability of good quality alluvial soil is acting as a catalyst to increase the number of kilns in the area. The region is mainly populated by peasant class. These peasants are basically agriculturalists and their economy looms larger around agricultural practices and land produce. They are main donors of land or in other words we can say, their land is being used as local industry to produce bricks. Consequently brick-kilns have become one of the major driving forces in bringing about land use/ land cover changes around the rural areas of Jaunpur district. The paper aims to bring forward an anthropological view regarding the impact of brick kilns on the land use / land cover changes, factors which force peasantry to lease their land to brick kilns owners and also suggests a holistic approach to reduce the distress of peasantry which arises due to their land degradation.

Introduction and About Area of study

Bricks are the most important building material in housing development and are used as basic construction material in vogue of urbanization. Brick making is a dry reason activity that can be started as soon as the monsoon rain stops.

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The brick industry in Jaunpur is primarily an informal, traditional and unorganized sector. In some areas of the district, brick making is usually a clustered activity with several brick units existing in a single cluster. The cluster is characterized by access to easy availability of soil and proximity to urban centers.

The Jaunpur district comprises of 160.80 thousand rural population and this population structure is basically constituted by agro-based peasantry. The areas of Jaunpur which are covered under study are having many brick kilns in their vicinity.

Table 1:

<u>Region</u>	<u>No. of Brick kilns(Bhatthas)</u>	<u>No. of Respondents</u> (Both Peasants & Kiln Owners)
Baraipar	- 10 (Fix chimney)	41
Sujanganj	- 8 (Fix chimney)	38
Mugara Badshahpur	- 11(Fix chimney)	67
Macchli shahar	- 2 (Lohia /single chimney)	06
Sikarara	- 9 (Fix chimney)	58
TOTAL	40	210

Generally the brick kilns are categorized according to their stacks (chimneys) and the size of their trench. In the areas covered under study, the brick kilns earlier were mostly having stack of iron which are termed as 'Lohia' having single chimney or double chimney. But now most of the brick kilns have switched over to fix chimneys. Earlier the brick kilns which were single chimney or double chimney in Lohia(iron-stacked) were of circular structure called *Golua* and elongated structure called *Badami*. The capacity of the Bhattas depends on the size of trench width which varies between 8 feet to 10 feet. The height of chimneys varies from 60 feet to 100 feet.

Table 2: Details on categories of Brick kilns

Kilns category	Land Area needed for construction	Kilns capacity	Trench width	Annual Production in Normal operating kilns
Small	1 Beegha (=20 Biswa)	Up to 15,000 bricks/day	8 feet	Up to 15 lacs bricks
Medium	1.5 Beegha	20,000-22,000 bricks/day	Up to 9.5 feet	Up to 28 lacs bricks
Large	1.75-2.5 Beegha	30,000-35,000 bricks/day	Between 9.5 to 10.5 feet.	Up to 40 lacs bricks.

The capacity of a kiln is measured in terms of ‘*Raddas*’ (rows/layers) of bricks filled in the trenches. This varies between 15 raddas, 17 raddas, 19 raddas, 21 raddas and 23 raddas. The production depends on number of rounds of chimney in the kilns. A normal operating kiln completes from 5 to 10 rounds in a season and the production varies from 15 lakhs to 40 lakhs in a season.

Ethnography of the people

The people inhabiting the regions under study mostly belong to *peasantry* consisting of different caste groups. A peasant society is a small scale social organization in which peasants/farmers predominate. *Alfred Kroeber, Robert Redfield, Eric Wolf & Theodore Shanin* characterized peasants in their Anthropological studies as:

- i.** The family farm is the major economic unit among peasants around which production, labour and consumption are organized i.e. main source of livelihood is land and agriculture which fulfill almost all the requirements of life.
- ii.** Land husbandry is the main activity combined with minimal specialization and family training for tasks.
- iii.** Highly reverent attitude towards land.
- iv.** Acceptance of agriculture as the noblest, best and ideal job.

The peasants of the areas undertaken for study viz. *Baraipaar, Sujanganj, Mugra Badshahpur, Macchlishahar, Sikrara* are agriculturalists and their educational status is also not very sound. These rural people have very little opportunities of employment and

the peasants lament apathy of state governments for their miseries and economic backwardness.

Research Methodology

Five peasant-majority regions of Jaunpur district viz. Baraipar, Sikarara, Macchlishahar, Mugara Badshahpur, Sujanganj were selected on the basis of number kilns availability. In the beginning a pilot study was conducted to locate brick kilns. In the second phase, 200 peasants who leased their land to brick-kilns owners in last 20 years and 10 brick kiln owners were *interviewed* individually as well as *observation* and *photography* technique were applied to confirm the facts and views.

Land use by Peasantry

1. For agriculture and Staple crops.
2. Horticulture
3. Common Land, comprising of forest land and village pond, traditionally owned and administered by the village community, represented by panchayats, for collective needs including cattle grazing and bathing, firewood collection and space for drying cow dung cakes. These lands have decreased for some reasons. They are scattered throughout the area.
4. Vacant Land, comprising all unused land with no clear designation, though often it is in the middle of a process of conversion. This land area is mainly covered with bushes and grass, but it might also be completely barren. Many plots of vacant land are kept for speculative purposes and are therefore left vacant for extensive periods.

Driving Forces for Land use change

There are many driving forces compelling people in the area under study to over-exploit natural resources like land. The main forces are:-

A. Primary Forces-

1. Poverty with rapid population growth / *vicious circle of poverty*
2. Improper land use.
3. Absence of a land use policy.
4. Ineffective implementation of existing laws and guidelines.

B. Secondary Forces-

1. Unemployment
2. Lack of group consciousness.
3. Cravings for easy money returns
4. Desire to improve non-irrigable and unproductive land to productive one.
5. Unconsciousness.

Urban development is necessary for economic growth but the present process of urbanization in these areas of Jaunpur is accelerating the number of brick-kilns in the region and brick-kilns are becoming the major driving force and catalyst for the land degradation. They are invariably reducing the amount of good agricultural land. Unfortunately brick kilns are mostly situated on good agricultural land as brick manufacture needs silty clay loam to silty clay soils with good drainage conditions, which is turning good agricultural land to unproductive land. Bricks-kilns are degrading the top-soil which takes many years to regain fertility. Brick-kilns are never permanent, since they depend on the availability of loam. It is expensive to bring in this form a distant source. So when field with loam are no longer available, the kiln owner closes down the operation and move it to shift to another location. The brick kilns itself occupies about 2.5 beegha land and the extra space needed to pile-up bricks, for tube wells, for labour quarters and for other purposes adds many beeghas more. A small sized brick kiln generally excavates about 3 beegha land minimum in a season to meet the production targets. Every 2-3 years the kiln operator needs to lease fresh land. The area under study

includes 40 Bhatthas and in this way they are causing degradation of top soil in large encatchment area and hence converting many peasants from fertile land holders to unfertile land holders with no crop produce in next few years which throws them in *vicious circle of poverty, landlessness & indebtedness* and hence giving rise to various miseries, distress and *psycho-social frustrations*.

Findings and Discussion

Negative Effects of Brick-kilns on land use/ land cover change

- 1.** The first requirement of brick kilns is the availability of right kind of loam, which is raw material for bricks. The excavation of top soil is reducing the fertility of land and reducing the crop yield from last few years. Mushrooming bricks kilns in the district of Jaunpur are expanding rapidly the affected areas due to the increase in brick production. Loss of organic matter and nutrients in the burnt soils is a common feature due to the burning of the agricultural top soils. It is well known that soil organic matter is a reservoir for plant nutrients, enhances water holding capacity, protects soil structure against compaction and erosion, and thus determines soil productivity. All agriculture to large extent depends on the content of soil organic matter as well as the soil nutrients. Brick-burning is not only altering the physico-chemical properties and habitats of the nearby soil but also disturbing ecosystem.
- 2.** Soil excavation is accompanied by the erosion of adjacent areas and agro-fields. Soil excavation is disrupting the level grade of land and there by causes run-off of irrigation water, fertilizers-N, P, K and pesticides. Fertile top soils erode from fields leading to serious problems for the cultivator.
- 3.** Excavations are leading to splitting of field into smaller units which is a disadvantageous condition for agriculture and peasants of the area. This happens when a farmer leases out part of his land holding to the brick-kilns owner.
- 4.** Excavations are altering the local topography, which have negative consequences on access to tube well for irrigation. Higher fields adjacent to or nearby the

excavations get cut off from irrigation sources. Dirt roads being used for access to the kiln block the irrigation channels that run fields of a nearby farmer.

5. 52% peasants viewed that polluting brick-kilns are causing damage to crops like oilseeds mainly mustard crops, and coriander crops.
6. 82% peasants are of the view that smoke and dust coming out of brick kilns are destroying the fruit orchards basically Mango crop. Few are of the view that refuse of chimneys have affected the upper surfaces of most of the plant leaves. In some places flowering and fruiting is also being affected.
7. Excavations near roadsides are causing serious damage to roads during flood and raining season.
8. In most lease contracts, the brick-kiln owner has to ensure that the land is made level again when the lease period comes to an end. It requires considerable effort for the former to restore the land to its previous agricultural productivity. Generally local farmers have enough influence to demand compensation for damage to their land. But it is harder for small farmer who do not have much power to resolve these problems and this give rise to psycho-social frustrations. In certain cases it is also found that failure to convert land to its original form forces peasants to leave the land fallow for longer periods giving a chance to money lenders as well as *land alienation*
9. 35% peasants reported that due to excavation of top soil to the depth of many feets leaves a land depressed and low-lying and waterlogged which has even hampered the rice cultivation also as the depressed land lacks drainage of extra water.

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Positive Effects of Brick-kilns on land cover change/ land use

1. The mound areas or high-lands get leveled due to soil excavations and this helps to manage the irrigation channels and local water management system which was obstructed earlier due to its elevation. Hence helps in turning that waste land to productive one.

2. Excavation of soil turns those area into fertile farms which are left barren from long time due to bushes like ‘*Kusha*’
3. Easy employment.
4. Road development.

Conclusion

Interviewing the peasants and observing the areas under study, it appears that mushrooming brick kilns are the villains and creating an imbalance in peasant economic and socio-psychological life. Fertile, cultivable lands belonging to agro-based peasants are plundered by the brick-kilns owners. Many farmers have no option other than to sell their land and leave the village. The depredations are enormous- they use motors to suck water at large scale and hence disturbing water table of the area which is more challenging conditions for poor farmers who even fail to afford irrigation facilities.

Firewood is being used indiscriminately and hence reducing the forest covers in the area. The peasants who lease out their land get cash in hand which is too tempting but many can't afford to think of long term consequences due to low level of education. *The peasants who lease out their land are compensated by wheat or grain equal to lump-sum amount of a year produce of leased out land but what is not factored into the calculation is that in one year, the farmer will have lost feets of his priceless and irreplaceable top soil and reattaining fertility of soil is more or less irreversible process and takes long period.*

Conclusive Suggestions

1. Peasants should be made more conscious about their land use so that they should not be devoid of their precious land.
2. Land use policy must be properly implemented and laws enacted in this regards should be properly laid down.
3. Use of Vertical Shaft Brick Kiln (VSBK) technology, which is very compact and does not require large area of land, should be encouraged. They require less burning of fuel.
4. Brick-kilns must be constructed on barren land because excavation of its burning may help in turning form of top soil to a productive unit.

5. Pollution control norms must be strictly adhered.

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SUPPORTING VISUALS



Plate 1: CHANGING LAND COVER AND LAND FORMS



Plate 2: LAND COVER CHANGE, SOIL EROSION



Plate 3: BRICK KILN OF FIX CHIMNEY, GREEN TREES CHOPPED FOR FUEL



Plate 4: DESTROYED MANGO ORCHARD



Plate 5: CROPS DESTROYED DUE TO POLLUTION OF BRICK KILNS