Asian Journal of Multidisciplinary Studies

ISSN: 2321-8819 (Online)
2348-7186 (Print)
Impact Factor: 0.92
Volume 3, Issue 5, May 2015

Role of Brick Industry in the Degradation of Land and Environment- A case study of Daluadashgir village in Coochbehar District.

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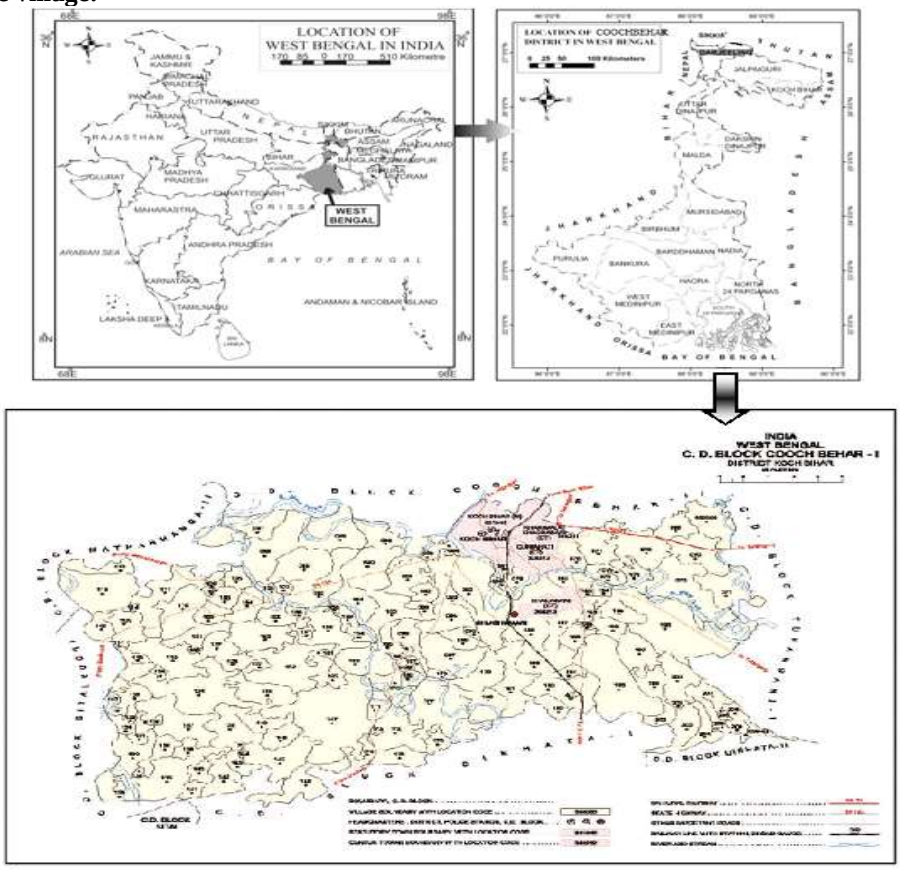
Abstract: The process of digging soil from agricultural field for Brick industry is frequently accompanied by severe soil erosion, and destruction of mixed vegetation cover and grazing lands. Further transportation of raw materials for brick industry that is soil leads to environmental pollution by mixing of dust particles in the atmosphere along with co_2 accumulation during burning of fresh bricks. The present study investigates on the role of brick industry in the degradation of land and environment at Daluadashgir in Cooch Behar District of west Bengal. Furthermore, this investigation shows the increasing of agricultural density due to the above mention process.

Keywords: agricultural density, environmental pollution, land degradation, Soil erosion.

Introduction: The impact of people upon the landscape has been so great, and is so rapidly increasing, that human must be regarded as the most effective geomorphic agents in many morphogenetic regions (M.J.Selby, 1985). The supply of land is limited. With population growth we have less and less land to support each person. Soil erosion is widespread throughout the world. Today, topsoil is eroding faster than it forms on about one-third of the world's Cropland, causing an estimated 85 percent of world's land degradation. The destructive practices are linked to rapid population growth, high human and livestock densities, poverty, and poor land management.

Location of the village:



Map 1: Location Map of the Study Area.

The study village i.e. Daluadashgir is located from $26^0$20'44" to $26^0$22'30" north latitude and from $89^0$33'32" to $89^0$34'46" east longitude under Dawaguri Gram Panchayet of Coochbehar Block – I. It is lie in the eastern corner of the district **Physiographic background of the Coochbehar district:** The districts Coochbehar geologically falls into Northern plain region. Numerous rivers like Tista, Jaldhaka, Torsha, Kaljani, Raidak, Gadadhar and their tributaries like Ghargharia, Naotora etc. Streams flowing over this region and deposited alluvial soil and sand. Although few of them are tiny channel in other season but during Monsoon these became violent and carries huge amount of sand and mud and deposited the same in the floodplains. These deposits are blessed for the farmers.

This area is about 30-40 metre high from the mean sea level with some local variations like surrounded by Tufanganj in the east, Gayergari village in the west, Coochbehar Block-II in the north and Talliguri village in the south (location map).

low lying areas lie in Dinhata area while most of the high lands appertain to Sitalkuchi area as like other riparian region. There is a general decrease of slope from North to South-East along which the main rivers of the district flowing. The area age annual temperature of January and July months are 17^0 and 28^0c respectively. The average annual rainfall varies from 200 to 250 cm.

Landuse pattern of the district: In one hand the supply is limited and, on the other, land has alternatives uses. The following table shows the landuse pattern in the district.

Table-1: Landuse pattern of Coochbehar District-2001. ('000 hectares)

Year	Reporting area	Forest area	Area under non-agricultural use	Barren and unculturable land	Permanent pastures & other grazing land	Land under misc. Trees groves not included in net area sown	Culturable waste land	Fallow land other than current falloff	Current falloff	Net area sown
2001	331.38 (100%)	3.15 (0.95 %)	50.33 (15.19%)	0.28 (0.08%)	0.03 (0.009 %)	6.09 (1.84 %)	0.75 (0.23%)	0.19 (0.06 %)	5.64 (1.70 %)	264.92 (79.94 %)

The above table shows that the net sown area accounting highest among all pattern of uses and is about 79.94%, followed by area under non-agricultural use (15.19%). Areas under forest cover and land under trees groves not included in net area sown together accounting 2.79%. The first one indicates the agrarian economy. The last one indicates the greenery of the district. It further indicates the potentiality of degradation of land and environment.

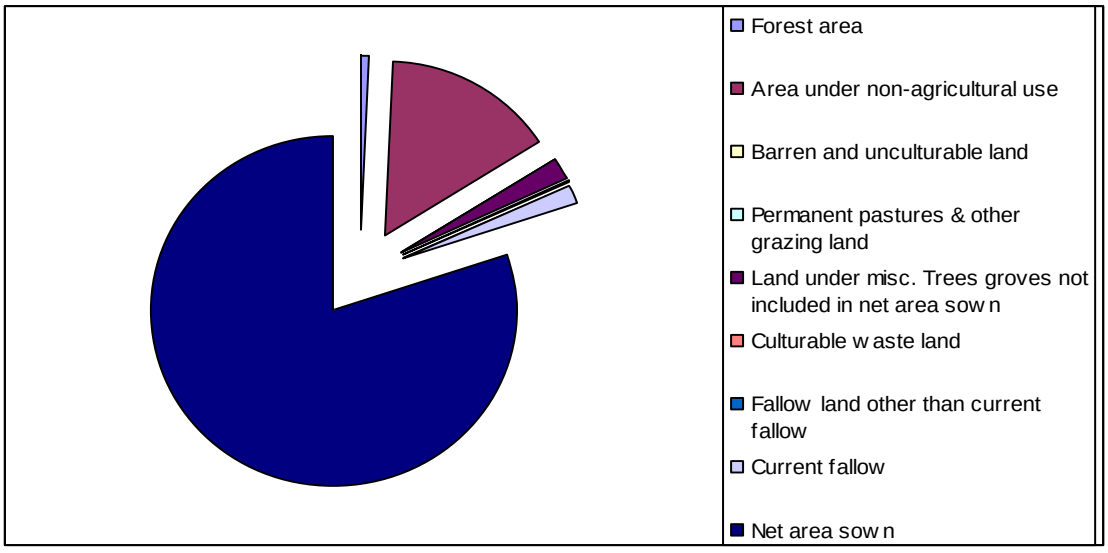


Figure-1: Landuse pattern of Coochbehar district-2001.

In Coochbehar Block-I out of total reporting area (28033 ha) the net sown area occupy a sizeable portion (95.89%). The villages under Coochbehar Block-I are basically an agrarian village. Therefore collection of soil from cultivable land for brick industry leads to soil erosion and crisis of agricultural plots.

Table-2: Landuse pattern of Coochbehar Block-I (2001). (hectares)

Year	Reporting area	Forest area	Area under non-agricultural use	Barren and unculturable land	Permanent pastures & other grazing land	Land under misc. Trees groves not included in net area sown	Culturable waste land	Fallow land other than current falloff	Current falloff	Net area sown
2001	28033 (100%)	____	_____	_____	_____	546 (1.95%)	291 (1.04%)	_____	315 (1.12 %)	26881 (95.89 %)

Sources: 1) Directorate of Agriculture (Evaluation). (2) B.L. & L.R.O., Coochbehar-I.

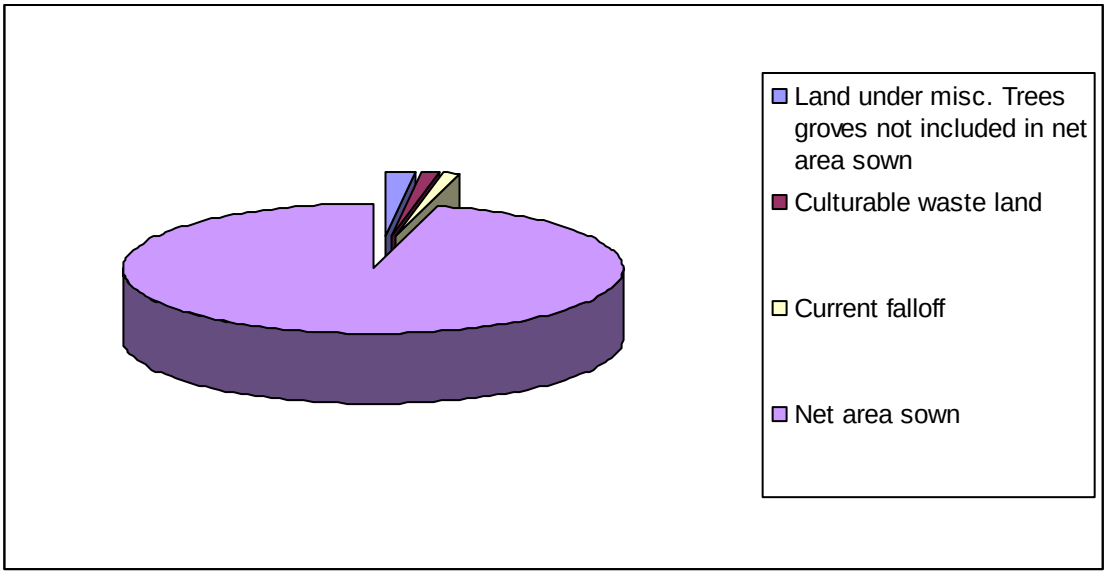


Figure-2: Landuse pattern in Coochbehar Block-I

Land degradation pattern: The common causes of land degradation are wind, surface run off and of course human activity and poor land management by low educated cultivators. It is a common fact in developing countries, especially in the rural areas of India that the poor people use soil from nearby agricultural plots, river banks, and pond's bank and also from low lying areas for flooring their houses- in an unscientific digging method, which causes degradation of land in addition to above mentioned natural processes. During monsoon these areas become victims of head ward erosion and a continuous process is going on for levelling the low lying areas. As a result the degradation process accelerates and causes increase in agricultural density. More over the man induced process leads in destruction of grazing land and barren land. Some of the results are soil erosion, landslides, desertification and deforestation. In arid and semi arid regions, desertification is a serious and burning problem because the cattle population are large and increasing. Desertification along with soil erosion are results in loss of land productivity; which further turns in more marginal land will have to be explored.

Land Degradation and Environmental pollution due to Brick Industry: The process of digging soil from agricultural field for Brick industry is frequently accompanied by severe soil erosion, and destruction of mixed vegetation cover and grazing lands. Further transportation of raw materials for brick industry that is soil leads to environmental pollution by mixing of dust particles in the atmosphere along with co_2 accumulation during burning of fresh bricks.

In Coochbehar at present 23 numbers of brick industry working with their full swing. Most concentration of such industries is found in the study village. The average daily production per chamber is about 37500 bricks in numbers. The soil

need for the same is about 10 trucks (120 m^3 of soil) per day. Besides soil, coal, fuel wood and wood dust are also need for burning of fresh bricks. These three types of fuels needed amounting 3120 kilograms. The peak season is from October to March, duration of six months. The source areas for soil is the nearby agricultural lands and river banks. Firstly because of transportation cost for bringing the chief raw material i.e. soil is a prime factor. In this regard it is worth mentioning that the possible waste land and fallow land for such soil needed is limited and is already exhausted. Secondly, that the quality of such soil for making bricks is not so good. Reason why mostly collected from cultivable plots. Thirdly as the income level of villagers are relatively low as compare to the suburban areas, in addition to per capita land for agricultural production is also low, the farmer earning more by selling soil. Despite some of them aware that such digging of soil for brick industry will hamper their amount of cultivable production, but there are no alternative income generation opportunities within a short span of time. Lastly, the agents between farmers and people for industry motivate the farmer by telling that these low lying areas will be converted for pisciculture. But the farmers did not know that the 1.5 to 2.5 metre deep digging areas will not sufficient for pisciculture for more than 3-4 months.

So far the degradation of land and specially soil erosion is concerned, every year in an average 180 days the process of digging soil is continued by affected about 3 hectares of land for one brick industry. In Daluadashgir, five such industries are working, so the soil collected for this from 15 hectares of land in each season. The following table shows the degradation pattern in Daluadashgir and entire district of Coochbehar.

Table-3: Soil erosion and land affected.

Village/District	No. Of Brick Industry	Soil needed per day in cubic metre	Soil collected from land in hectares
Coochbehar district	23	2760	69
Daluadashgir	5	600	15

Source: Primary data.

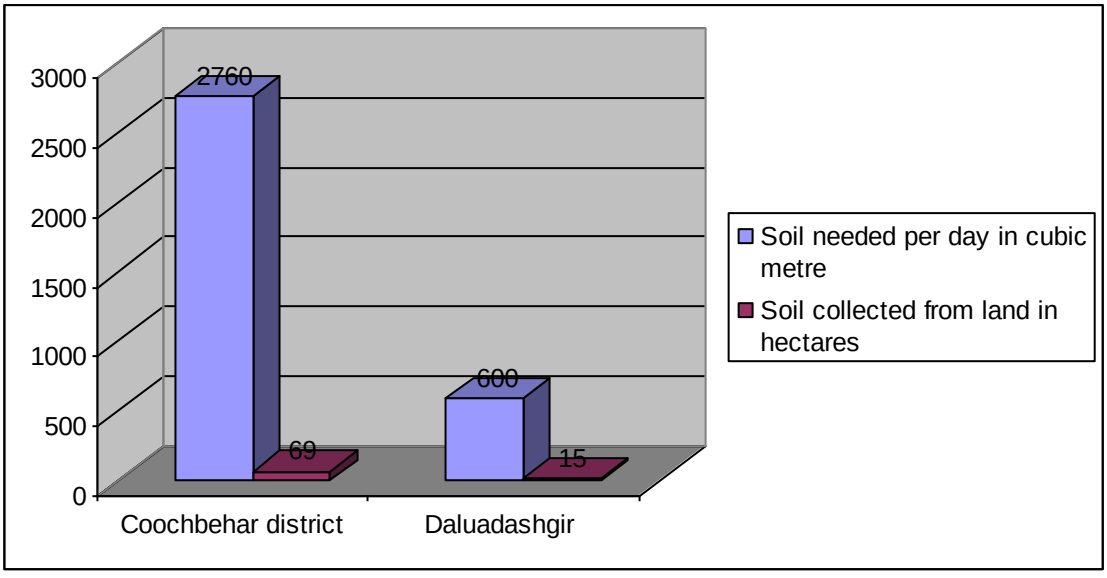


Figure-3: Bar diagram showing soil erosion and land affected due to brick industries in Coochbehar and Daluadashgir.

The rates of soil erosion in case of Coochbehar district and in Daluadashgir are about 496800 m^3 and 108000m^3 in each year respectively.

Impact of huge demand of brick on rural land and Environment: Urban people have no access of land for producing their agricultural and other commodities for subsistence. In order to cope up

with the demands for these commodities there is a tendency for intensive production in the nearby rural areas or in rural hinterlands (Deb, 2000). This implies overuse and abuse of land in rural areas at the highest cost of environment. Furthermore, the process of digging soil from agricultural field increasing agricultural density. This means pressure on land increases day by day in addition to population growth. According to 2001 census the agricultural density for the district is 209 persons/km^2 of cultivable land. If the present rate of land degradation will continue, it would be double in the next few years. Apart from this, blowing of sand and accumulation of co^2 to the environment due to burning of bricks will cause for respiratory disease. During dry season soil blowing cause an acute problem on roads, inhabited areas and farmlands. It hindered the natural growth of plants; shifting blowing soil has covered village roads, banked against houses, covered farm machinery, shrubs as fencing and formed troublesome fenced line drifts along roads. The human activities leading to accelerate the of soil erosion can be grouped into three categories namely, i) Landuse changes, (ii) Farm practice changes and (iii) Land use management factors.

Remedial measures: land degradation management involves reducing land erosion and restoring soil fertility. So it is important task to preserve soils for maintaining soil fertility, productivity, water table, vegetation cover, species of trees and soil moisture. Basic objectives of soil conservation measures are: (a) protection of surface from splash erosion, (b) increase in infiltration of rain water, (c) decrease in volume and velocity of surface and subsurface runoff, (d) modifying biological and mechanical measures to increase the resistance of soil erodibility. In India, the first law for prevention of soil deterioration was passed in 1904 in Punjab under the Land Protection Act. In 1953, Central Soil Conservation Board came into being at the behest of Central Government as a result of growing awareness of the problem of soil depletion and its reflection on the stability of the national economy. The following Biological and Mechanical measures can be taken for reducing land degradation.

Biological measures: (i) Trees can be planted surrounding the digging land in order to reduce headward erosion.

(ii) Crop rotation, improved crop management practices, tillage practices and mixed cropping practices can help in infiltration and will reduce surface runoff.

(iii) Alley cropping or agro-forestry, a form of inter-cropping in which several crops are planted together between trees and shrubs can reduce erosion.

Mechanical measures: (i) Mechanical barriers can be created surrounding digging land and across the direction of the flow of water and thus retard or retain run-off.

(ii) By dividing a long slope into several short ones so as to reduce the velocity of the run-off and thus prevent soil erosion.

Besides the above biological and mechanical practices, it is most important to reduce land degradation is that awareness should be made among farmers. Making of concrete brick will also help to reduce dependency on making of soil brick, so that degradation of land and environment can be controlled.

Plate-1: Digging of soil from agricultural field.

Plate-2: Showing the road condition due to transportation of soil.

Plate-3: Brick Industry in Daluadashgir.

Plate-4: Showing blowing sand cover in shrubs fencing and plants.

Conclusion: Brick industry, the growing and unorganized industry in India. Alluvium soil, the chief raw materials for this industry collected from agricultural plots, river banks, widening ponds causes degradation of land; because of unscientific methods for collecting such raw material. In the present time with the pace of change due to urbanization, huge demand of brick (i,e, soil) cause a great trouble for environment concern. Carrying of soil from above sources to the brick industries further assimilates dust particles in the atmosphere and vegetative cover in the surrounding areas. Growth of population in the rural areas increases pressure on land and resources. The supply of land is limited. With the population growth we have less and less land to support each person. In the Coochbehar District the area under agriculture use is about 49.67% and the population density is about 833 persons/ km^2, therefore the conservation of agricultural land and soil are very important. At present in the district 23 numbers of brick industry are found, of which most are located in the study village. Digging of soil from agricultural plots for brick industry is hampering the amount of agricultural production. The rate of soil erosion is about 108000 m^3 in each year. This implies overuse and abuse of land in rural areas at the highest cost of environment. If the present rate of land degradation will continue, it would be double in the next few years. Apart from this, blowing of sand (due to transportation of soil) and burning of bricks are responsible for atmospheric pollution and thus resulted in responsible for atmospheric pollution and thus resulted in respiratory disease. By discussing the above phenomenon and problem, it is very important to run awareness programs among cultivators, common people for such effect in the study area. It is also important task to preserve soils for maintaining soil fertility, productivity, water table, vegetation cover, species of trees and soil moisture.

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