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Impact of agricultural practices on environmental degradation: A case study of Hazaribagh district in Jharkhand

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Abstract
It is well known that about one third of the world's land surface is under agriculture. Environment has a direct influence on existence and sustainability of agriculture as it depends upon the use of natural resources. Undoubtedly, agriculture has a greater environmental impact on Earth than any other single human activity. Conventional agricultural farming practices will not provide the food and fibre needed by burgeoning population in the future. In general, the question arises, can we develop and adopt the agriculture farming practices that can produce the food needed to feed an increasing population and simultaneously sustain our environment on long term basis. Under most systems of agricultural production at this time, it is not a question of if, but rather when, virtually all of the natural habitat on the planet will become degraded to the point that it is no longer productive and then abandoned for future generations to find ways to rehabilitate and repair. Farmers are beginning to invent, adapt and adopt a wide range of new technologies and approaches but most of them are not environment friendly. Hence, this paper reviews the linkage between environment and agriculture and the resultant impact of agriculture on environmental degradation in hazaribagh district in Jharkhand.

Keywords: conventional agriculture, environment, natural resources and sustainability

Introduction

Growing demands on agricultural land for food, fibre, and fuel are predicted to rapidly increase in coming decades with continued population growth (Bommarco *et al.*, 2013) [3]. Agricultural land occupies 5 billion hectare of the land surface on earth and increases annually by 13 million hectare (FAO, 2002) [6]. Globally environment is changing day by day and now it has become a challenge to living forms due to the very ugly fact that every nation is trying to develop without taking into consideration the environmental impact of degradation and pollution of agricultural lands. People are using plastic bags, which are environmentally dangerous products, for their daily needs mainly for shopping purposes as a result of which, the environment and agricultural lands are thereby being polluted. However, both the business sector and the individual consumers have important roles to play in reducing the environmental and agricultural land pollutions. Over the years, while the business sector has strictly reduced its environmental and agricultural land pollution, such as, waste water and solid waste discharges and energy use, consumers have increased environmental and agricultural land pollution. However, the negative environmental impacts and agricultural land pollution have raised the concern of the global community and the caring media around the world.

Study Area

Fig 1: Geographical Location of Hazaribagh with respect to Jharkhand

Perched atop a plateau and surrounded by several mountains and valleys, Hazaribag, popularly known as city of thousand gardens," is the principal town and administrative headquarter of the district. Hazaribag city also serves as the Headquarter for the North Chotanagpur Division. The boundary of this district consists of Gaya and Koderma in the north, Giridih and Bokaro in the east, Ramgarh in the South and Palamu and Chatra in the west. The district of Hazaribag is endowed with rich mineral deposits. Coal can be found in abundance here, and there exists sufficient deposits of Limestone, Mica and Quartz. Explorations of these minerals have provided job opportunities to the inhabitants of this district. Hazaribag district ranks 7th in terms of population 1734495 and 12th in terms of area (4302sq km.) in the state of Jharkhand. The economy of the district mainly depends on agriculture and allied activities. More than 63% of the total workers are engaged in primary sector. This district consists of two subdivisions, namely, Hazaribagh Sadar and Barhi. There are 16 Blocks, 16 Revenue Anchals, and 257 Gram Panchayats in the district.

Literature Review

Land degradation definitions are very variable and dynamic due to the different spatial, temporal, economic, cultural and environmental complexities (Warren, 2002). Land degradation has been referred to as being a "loss in productivity of the land" (Muchena *et al.*, 2005, p23). This is especially important when one considers the negative effect of land degradation on a community that relies on natural resources for their livelihood. Land degradation is defined as a change in one or more of land's properties that results in a decline in land/soil quality (Wiebe, 2003). As soil is a fundamental component of land, soil degradation is a fundamental component of land degradation. Lindert (2000) however, defines soil degradation more specifically as any chemical, physical, or biological change in the soil's condition that lowers its agricultural productivity, which is defined as its contribution to the economic value of yields per unit of land area, holding other agricultural inputs the same. Douglas (1994) notes that land degradation has five main components namely; soil degradation, vegetation degradation, water degradation, climate deterioration, and losses to urban or industrial development. Soil erosion, the most visible and most widespread form of soil degradation, could have a serious negative effect on economic development in Ghana as the economy of this country depends heavily on land, forests, and water bodies for its agricultural growth and rural development (Diao & Sarpong, 2007). Generally, soil erosion involves a three-step process that begins with the detachment of soil particles, continues with the transport of these particles, which ends up at a new location. Myers (1993) reports that approximately 75 billion tons of fertile soil are lost from World Agricultural systems each year, with much less erosion taking place in natural systems. In the United States, it is estimated that the amount of soil lost to erosion is about 3 billion tons per annum (Carnell, 2011). The main forms of water-induced erosion include; sheet, gully and rill. Sheet erosion is the uniform removal of a thin film of soil from the land surface without the development of any recognizable water channels. This type of erosion is barely perceptible, but the loss of a single milli metre of soil depth from an acre of land, which can be easily lost during a single irrigation or rain event, works out to a total loss of up to 6.1 tons of soil (Pimentel, 2000).

Objectives of the Study

The specific objectives of the study however are as follows:

1. To study the relationship between environment and agriculture.
2. To explain the agriculture profile of Hazaribagh district
3. To Analysis the Agriculture's impacts on the environmental Degradation.

Research Methodology

For such a study as this, the required information is based on government publications issued by various departments in the state, particularly by the Directorate of census for both the state and for the districts as well. The other source of information includes the published books and articles from various authors and sources. But the primary information and data especially for the case study of rural areas has been collected through personal participation and observation.

Result and Discussion

Relationship between Environment and Agriculture

Environmental degradation is one of the major threats facing humanity in recent times. It includes deforestation, desertification, pollution, and climate change, all of which are issues of concern for the international community. Environmental degradation increases the vulnerability of many societies and contributes to the scarcity of resources. Fundamentally, the environment provides the resource base for the economic development of many nations.

The environment refers to the natural and physical surroundings and the relationship of people with it. It includes land, water, air, structures, living organisms, and the social, cultural and economic conditions. The continuity of human life is premised on how sustainably environmental resources are used. For instance land, as an agricultural resource is an important asset upon which the livelihoods of people especially the poor and vulnerable, largely depend. There is thus, the need to protect, conserve, and use environmental resources in a way that ensures sustainable economic growth and development in the long run. Environmental resources are also an essential part of the overall production process i.e. both marketed resources such as metals, minerals, and land, etc. and non-market resources (clean air, favourable weather conditions, biodiversity and ecosystem services, etc.). Environmental degradation has become a topical issue of intense discussion at diverse levels of decision-making in recent times. It is the deterioration of the natural environment through human activities and natural disasters (United Nations, 1997). UNDESA (2011) notes that environmental degradation and climate change contribute to the increasing occurrence of disasters which are linked to natural hazards". It is also one of the ten threats officially cautioned by the High Level Threat Panel of the United Nations.

Reduction defines environmental degradation as "the reduction of the capacity of the environment to meet social and ecological objectives, and needs". Some forms of environmental degradation may include; deforestation, pollution (air, water, and noise), soil erosion, etc. Developing means of farming and agriculture is the reason humans can live in the world today. It is a necessary means of survival, without which there would be famines all over the world. For thousands of years, agriculture was a natural process that did not harm the land it was done on.

In fact, farmers were able to pass down their land for many generations, and it would still be fertile as ever.

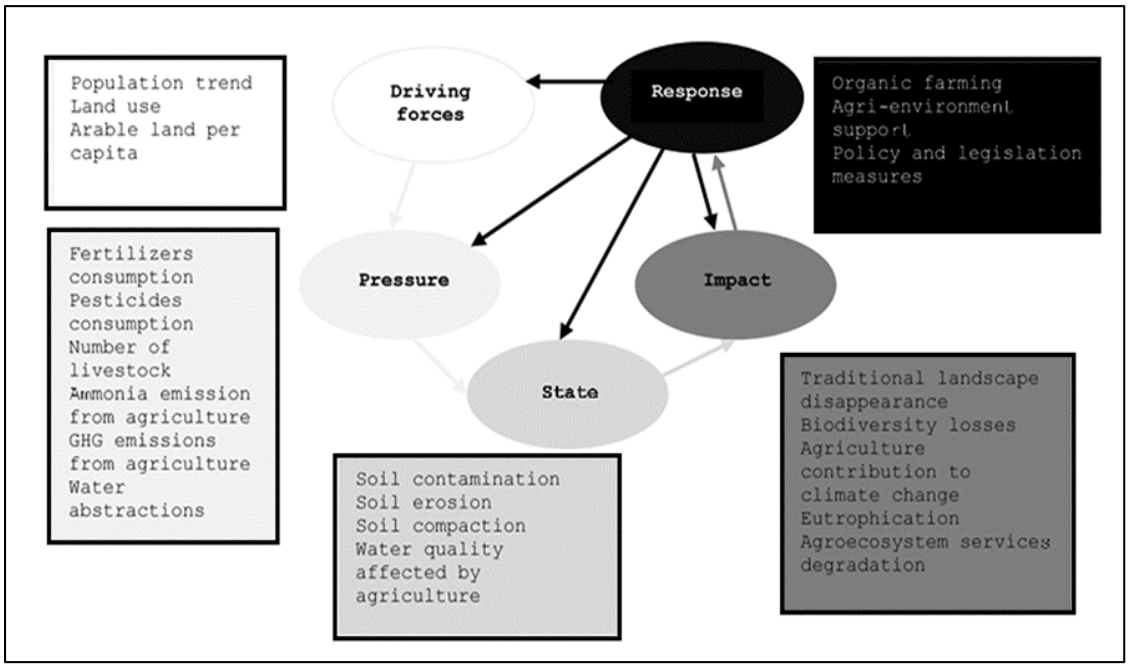
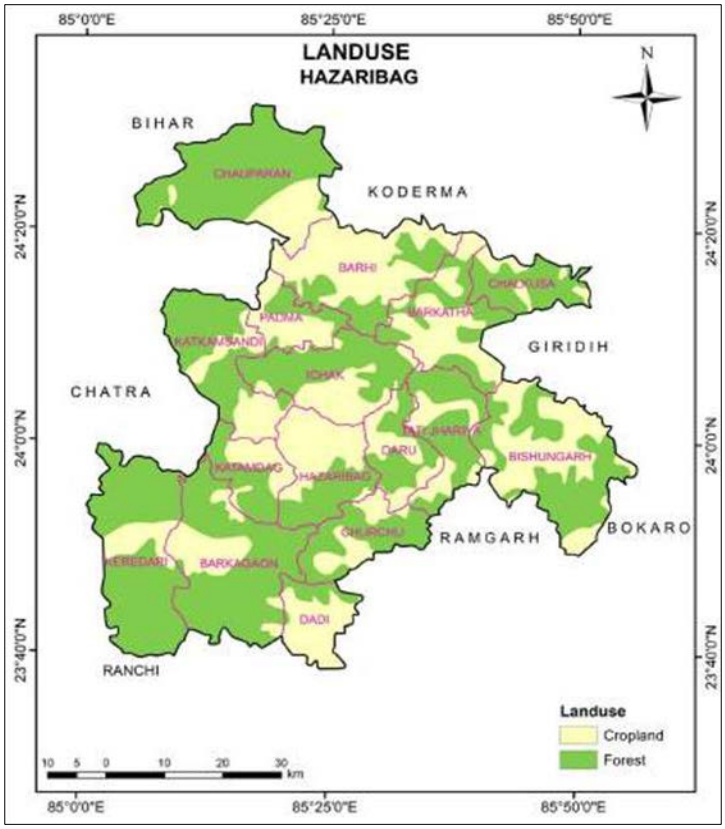


Fig2: Agriculture and its impact on land use, environment, and ecosystem services.

Agriculture Profile of Hazaribagh District

Hazaribag is a largely agricultural district, with many citizens engaging themselves in agriculture and allied activities. Most parts of the district are full of forests and stones. The cultivable land in the district can be divided into two parts namely - Upper land and Lower land. The lands situated on the banks of rivers are fertile and one can get good crop even after using lesser amount of fertilizers in these lands. But the upper land is barren and a huge amount of fertilizers and irrigation is required for cultivation in these lands. Rabi and Kharif crops are generally sown here.



Source: District Environment Plan for Hazaribagh District, 2020

Fig 3: Crop Land of Hazaribag district

Irrigation facility is not adequate in this district due to hilly terrain. However, there are small natural rivulets, which are generally used for irrigation and there is no other natural source of irrigation. Currently, percentage of irrigated area in the district stands at 18.25%, which is considerably below the national average. Wells, pump sets, and tanks are used for irrigation. Damodar Valley Project is also meant for irrigation in this area. The agriculture is predominantly rain-fed, and due to vagaries of monsoon, people face the problem of drinking water and irrigation during lean season.

Table1: Irrigated area of Hazaribag district

Irrigated Area	
Net Sown Area (ha)	125202
Net Irrigated area (ha)	22850
Percentage of irrigated area	18.25%
No. of Farmers(Ha)	1,63,541
Avg. Land Holding(Ha)	1.82 Acre

Source: District Environment Plan for Hazaribagh District, 2020

Table2: Food grain of the study area

Foodgrain	Target	Net Sown Area
Rice	84000	80976
Maize	12360	12380
Coarse Grain	2450	1353
Pulses	22000	19597
Oil Seeds	19500	16519

Source: District Environment Plan for Hazaribagh District, 2020

Agriculture's impacts on the environmental degradation

Agriculture can either sustain or degrade the environment (Millennium Ecosystem Assessment,
2005) has documented agriculture's main negative effects on land and freshwater, as well as the
Importance of agricultural landscapes in providing products for human sustenance, supporting biodiversity and maintaining ecosystem services. Negative impacts such as conversion of forests,
grasslands and other habitats for agricultural use, degradation of soil quality (20 per cent of soils are seriously degraded), pollution of soil and surface water, aquifers and coastal wetlands through excessive or inappropriate use of pesticides and fertilisers, significant loss of crop and livestock genetic diversity through the spread of industrial monocultures, reducing resilience in the face of climate and other changes. Many agricultural activities can have environmental impacts on land, water, and air. These environmental impacts will differ based on the farm location, farm type, and the specific farming and land management practices used as well as the timing of these practices (i.e., season of fertilizer application). For instance, nutrients and pesticides can run off agricultural fields into surface water bodies or leach into groundwater. The effects of climate change on agricultural production vary from one region to another depending on the prevailing climate of the region, hence affects agricultural productivity differently.

In this way Agriculture effects the environment because when people agriculture practice to need everything for their livelihood to fulfill their needs, on the other hand there is a pressure on natural resources. We always take from nature but never gave it back. So in the present study the researcher finds out that how agriculture degrades the environment. The researcher asked the respondents to mention that is there any impact of agriculture on environment and how it degrades the environment. The views and responses of the respondents have been shown in the following table:

Table3: Distribution of respondents according to their views regarding agriculture degrades the environment

Whether migration degrades the environment	Frequency	Percentage
Yes	300	75
No	100	25
Total	400	100.00

Source: Author Calculation

The table3 given above reveals that a vast majority of the respondents, i.e., 75 percent mentioned
Migration as a factor of environmental degradation. A very lesser proportion of the respondents, i.e., 25%mentioned "no" regarding agriculture as a factor of environmental degradation. Majority of the respondents mentioned "yes" this may be due to the fact that they had a lots of problems emerged in rural area.

Table 4: Further the responses of the respondents that how migration effects the environment is shown in the following table

Reasons	Frequency	Percentage
Cutting of Trees for Agriculture	92	27.60
Use of Pesticide and Fertilizers	73	21.9
Disposal of Agricultural waste in local bodies of water	66	19.8
Soil Erosion and Sedimentation due to inefficient farming practices	28	8.4
Poor Land Management	23	6.9
No response.	18	5.4
Total	300	100

Source: Author Calculation

The table4 given above shows that 27.60percent of the respondents mentioned cutting of trees for houses as a reason for environmental degradation. While 21.9percent and 19.8 percent of respondents gave the response as more use of Pesticide and Fertilizers and Disposal of agricultural waste in local bodies of water. 8.4 percent and 6.9 percent mentioned that with Soil erosion and sedimentation due to inefficient farming practices and Poor land management only 5.4 percent respondents had an not view.

Conclusion

India is a developing country, so, it should take more serious action related to environment andagriculture. Policies are needed, particularly, for improving agricultural infrastructure, strengthening research and development of new technologies. Establishment and implementation of new laws and regulations should be enhanced for the development and transfer of new technologies in the field of agriculture which are environment friendly.

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