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# The impact of cement industries on the cropping systems of adjoining areas

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**ABSTRACT**

The present study on the impact of cement industries on cropping systems of adjoining areas was conducted in Darlaghat area of Solan district in Himachal Pradesh. The objectives of the study were to assess the changes in cropping systems in terms of cropped area under different crops and change in involvement level of community in farming sector so as to provide input for administrative decisions on the execution of developmental projects in hilly areas. The outcome of the study pointed out towards reduction in cropped area under different crops alongwith fall in the extent of community participation in different agricultural activities. The decline in crop production and shifting of people to other professions were also reported from the study area. It was recommended that planning in hills must be comprehensive in its scope and administrative input should be strategically apprehended.

**Key words:** Cement industry, cropping systems, cropped area, production.

## INTRODUCTION

After independence, lot of development took place in industrial sector in our country. It provided humanity with many material and social benefits as well as problems. One of the major problems is the environmental pollution as per the Stockholm Declaration of June 1972 (Pattnaik and Pattnaik 2000).

The government of Himachal Pradesh has evolved an ambitious industrial, tourism as well as other development plans to boost its economy for becoming self-reliant state. The establishment of big industrial houses like cement plants have contributed towards both positive and negative impacts on social and natural environment. In the rural areas the farming community is severely suffering due to the cement plants resulting in the change in their cropping systems and shift in their food security mechanism with rising vulnerability.

To protect the farming community from the expected impact of the industries, there is a need to conceptualise administrative practices, not in the routine sense of administration, but as dynamic interactional process that engulfs every sphere of societal activity as the administration plays a great role in the policy framework (Al-salem 1977).

Solan district with the population 5,00,557 is one of the major industrial centres of Himachal Pradesh. The total small and large industrial units in the district are 4,574 which is the highest in any district of the state (www.hp.nic.in). People from different parts of the country are turning to this district due to heavy industrialisation and easy accessibility to the major business centres. In the recent past it has been observed that environmental problems in the district have risen due to two basic reasons viz industrialisation and urbanisation. These have imposed the threat to agricultural practices being adopted by the farmers. The establishment of M/s Gujarat Ambuja Cements Ltd (GACL), Darlaghat (Kunihar), Solan , Himachal Pradesh has affected the farming activities at local region. In view of this impact the study related to the cropping pattern of the area as affected by the said Cement Plant was conducted in year 2003-04, with the following objectives :

- To study the impact of cement industry on cropping systems of the adjoining area
- To suggest suitable measures for averting impact of the industry on farming activities

## METHODOLOGY

The study was purposely planned to be undertaken in the surrounding areas of the Gujarat Ambuja Cement Limited, Darlaghat. For getting the true evidences from the affected hill farmers, a preliminary survey was carried out in the study area ie the Gram Panchayat, Darlaghat including some areas of Kashlog, Parnu, Giana and Mango Panchayats. It is worthwhile to mention here that while selecting the immediate surroundings of the study area, due attention was also paid to the directly affected population belonging to the nearby areas other than that of Darlaghat Panchayat, to get deeper and thorough understanding of the objectives of the study. Observations regarding the effects of mining and cement plant were assessed through visual observation and by holding discussions with the targeted respondents. Gender perspectives were carefully observed while understanding complexity of the research problem. Through random sampling, 84 respondents comprising of farmers, educated personnel, businessmen and professionals were interviewed (Table 1).

Personal interview method was applied for collecting data. Triangulation was also done to check cross-sectionally

Table 1. Classification of respondents selected for the study at Darlaghat, Solan.

| Category | No of respondents |
|---|---|
| Farmers | 32 |
| Educated personnel | 22 |
| Businessmen | 16 |
| Professionals | 14 |
| Total | 84 |

the reliability of data. Balanced weightage was also given to gender perspective whereby women were also encouraged to share their view points. The data thus collected were analysed by following simple tabular method and inferences were drawn accordingly.

## RESULTS

### *Change in average land holding and land use pattern*

The land ownership of the respondents and its use pattern are the most important components for the study of environmental sustainability.

The analysis of average land holdings and land use pattern of the sample households in rural areas is shown in Table 2. In general there was decrease in average land holdings in all the categories. The average land holdings in Darlaghat area was found to be 1.91 ha after the establishment of the cement plant showing thereby a decrease of 0.57 ha (22.98 %). In case of farmers category, the average land holdings was found to be 2.16 ha which was maximum in comparison to other categories of educated personnel, businessmen and professionals. Minimum landholding of 0.37 ha was found under the category of professionals. The cultivated land holdings showed maximum decrease for all the categories because of the fact that the cultivated land holdings were either acquired or destroyed by the GACL, as these were located in the vicinity of the plant area of the GACL. Similar type of results were observed in case of other land holdings which include fallow land, Ghasnis and other wastelands. Non-cultivated area under all the categories except professionals where no land was found uncultivable, exhibited increase which clearly shows the impact of industries and somewhat decline in the interest of people in cultivation.

***Change in cropping pattern***

The cropping pattern of sample respondents was also analysed and the results are shown in Table 3. The data show that wheat, maize, rice, vegetables and pulses occupied major share of the cropping pattern. Tomato dominated in vegetable production. The other miscellaneous crops like barley, arbi, ginger, turmeric, onion, garlic and other millets and root crops were also produced. The data show the existing cropping pattern as well as changes in acreage after the establishment of GACL. Wheat and maize dominated in terms of cropping pattern in all the categories. Pulses and other crops occupied marginal areas with rice which was grown by the categories of farmers and educated people in the study area.

The total acreage under all the categories showed declining trend and an overall difference was found to be 0.50 ha (26.32 %). The average acreage was found to be 1.26 ha. In case of wheat, there was a decrease of 0.31 ha (40.79 %). Rice showed a decrease of 0.12 ha (70.59 %). There was a slight upward change in pulses growing pattern which as a practice was

Table 2. Change in average land holdings and land use pattern of the respondents in Darlaghat area after establishment of cement plant

| Category | Average land holdings of people (ha) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Cultivated | | Non-cultivated | | Others | | Total | |
| | Before | After | Before | After | Before | After | Before | After |
| Farmers | 1.30 (38.35) | 0.64 (29.63) | 0.05 (1.47) | 0.12 (5.56) | 2.04 (60.18) | 1.40 (64.81) | 3.39 | 2.16 |
| Educated personnel | 1.16 (39.73) | 0.65 (26.86) | 0.05 (11.71) | 0.16 (6.61) | 1.71 (58.56) | 1.61 (66.53) | 2.92 | 2.42 |
| Businessmen | 0.96 (32.99) | 0.84 (31.10) | 0.05 (1.73) | 0.05 (1.87) | 1.90 (65.28) | 1.81 (67.03) | 2.91 | 2.70 |
| Professionals | 0.33 (48.53) | 0.23 (62.16) | 0.00 (0.00) | 0.00 (0.00) | 0.35 (51.47) | 0.14 (37.84) | 0.68 | 0.37 |
| Overall | 0.94 (37.90) | 0.59 (30.89) | 0.04 (1.61) | 0.08 (4.19) | 1.50 (60.49) | 1.24 (64.92) | 2.48 | 1.91 |

Figures in parentheses are per cent values

cultivated on marginal landholdings. This was due to the reason that pulses were grown as interacrop. No special efforts were observed to be made for this crop except in some cases. A significant increase in the cultivation of other crops was observed under all the categories. The interest in the production of other crops by the respondents was mainly to meet their own demands in general.

It was also concluded from the discussions made with the respondents that there was no change in cultivation of particular crops. A decrease was observed in respect of acreage which was attributed to GACL in Darlaghat area where the industry acquired the agricultural land including other land for its use. With the rising demand of residential accommodation, the buildings were also constructed on agricultural land, resulting decrease in cultivated area.

The area under cultivation also decreased owing to the sale and purchase of the land by migrated population for its residential or business purposes.

***Shift in community involvement in agriculture***

The people's involvement in cultivation of important crops such as wheat, maize, rice, vegetables, pulses and other crops showed a declining trend after the establishment of GACL (Table 4). There was 11.90 per cent change in case of wheat cultivation. Maximum change of 65.15 per cent was observed in case of pulses. The changes in people's involvement in cultivation practices were similar to that of decrease in acreage of land under various crops (Table 3). This could be due to the reason that most of the affected people who were paid for their land by the GACL became transporters for carrying of cement. Some of the beneficiaries also left agriculture as they got handsome of amount that upgraded their standard of living.

***Crop production and incidence of crop diseases***

The important outcome of the study was visible impact of industrial pollutants and resulting environmental degradation depicted through increased incidences of plant diseases and insect-pests and fall in the crop productivity. The results of the study are presented in the Table 5. Out of the total respondents, 66.67 per cent reported decrease in crop production as a consequence of industrialization in Darlaghat area, whereas, 33.33 per cent reported no change in it. Educated category and professionals reported maximum reduction in crop production of 81.82 per cent and 71.43 per cent, respectively. Significant increase in crop diseases was also observed. According to 23.81 per cent respondents, crop diseases and insect-pests had increased after the establishment of plant.

Table 3. : Crop-wise average cultivated area before and after the establishment of cement plant in Darlaghat area

| Category | Change in area under various crops grown by the respondents (ha) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Wheat | | Maize | | Rice | | Vegetables | | Pulses | | Others | | Total | |
| | Before | After | Before | After | Before | After | Before | After | Before | After | Before | After | Before | After |
| Farmers | 1.20 (45.03) | 0.56 (38.36) | 0.72 (27.02) | 0.40 (12.02) | 0.32 (12.02) | 0.12 (8.22) | 0.08 (3.00) | 0.06 (4.10) | 0.16 (10.96) | 0.16 (10.96) | 0.18 (6.93) | 0.16 (10.96) | 2.66 (100.00) | 1.46 (100.00) |
| Educated personnel | 0.96 (41.31) | 0.48 (34.29) | 0.72 (30.98) | 0.40 (28.57) | 0.16 (6.88) | 0.08 (5.71) | 0.12 (5.16) | 0.04 (2.86) | 0.14 (6.02) | 0.16 (11.43) | 0.22 (9.65) | 0.24 (17.14) | 2.32 (100.00) | 1.40 (100.00) |
| Businessmen | 0.64 (33.40) | 0.56 (33.02) | 0.56 (30.43) | 0.40 (23.58) | 0.00 (0.00) | 0.00 (0.00) | 0.09 (5.01) | 0.08 (4.65) | 0.14 (7.31) | 0.20 (11.63) | 0.20 (10.44) | 0.24 (13.95) | 1.92 (100.00) | 1.72 (100.00) |
| Professionals | 0.24 (36.19) | 0.15 (32.52) | 0.24 (21.38) | 0.07 (15.22) | 0.00 (0.00) | 0.00 (0.00) | 0.00 (0.00) | 0.07 (15.04) | 0.05 (7.72) | 0.00 (0.00) | 0.13 (19.90) | 0.12 (26.22) | 0.66 (100.00) | 1.70 (100.00) |
| Overall | 0.76 (40.21) | 0.45 (35.71) | 0.58 (30.69) | 0.37 (29.37) | 0.17 (9.00) | 0.05 (3.97) | 0.08 (4.23) | 0.06 (4.76) | 0.12 (6.35) | 0.14 (11.11) | 0.18 (9.52) | 0.19 (15.08) | 1.89 | 1.26 |

Figures in parenthesis are per cent values

Table 4. Change in people's involvement in cultivation of important crops after the establishment of cement plant

| Category | No of respondents associated with the cultivation of various crops | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Wheat | | Maize | | Rice | | Vegetable | | Pulses | | Others | |
| | Before | After | Before | After | Before | After | Before | After | Before | After | Before | After |
| Farmers | 32 (100.00) | 30 (93.75) | 32 (100.00) | 32 (100.00) | 16 (50.00) | 16 (50.00) | 12 (37.50) | 10 (31.25) | 21 (65.63) | 8 (25.00) | 23 (71.88) | 22 (68.75) |
| Educated personnel | 22 (100.00) | 19 (86.36) | 22 (100.00) | 19 (86.36) | 4 (18.18) | 2 (9.09) | 6 (27.27) | 4 (18.18) | 15 (68.18) | 8 (36.36) | 20 (90.91) | 20 (90.91) |
| Businessmen | 16 (100.00) | 14 (87.50) | 16 (100.00) | 14 (87.50) | 4 (25.00) | 0 (0.00) | 3 (18.75) | 2 (12.50) | 16 (100.00) | 7 (43.75) | 14 (87.50) | 8 (50.00) |
| Professionals | 14 (100.00) | 12 (85.71) | 14 (100.00) | 12 (85.71) | 0 (0.00) | 0 (0.00) | 0 (0.00) | 2 (14.29) | 14 (100.00) | 0 (0.00) | 14 (100.00) | 2 (14.29) |
| Overall | 84 (100.00) | 75 (89.28) | 84 (100.00) | 77 (91.67) | 24 (28.57) | 18 (21.43) | 21 (25.00) | 18 (21.43) | 66 (78.57) | 23 (27.38) | 71 (84.52) | 52 (61.90) |

Figures in parenthesis are per cent values

Table 5. Impact of industrialization on crop production and incidence of crop diseases in Darlaghat area

| Category | No of respondents reported change in crop production | | | No of respondents reported crop diseases and pests | | |
|---|---|---|---|---|---|---|
| | Decrease | Constant | Increase | Decrease | Constant | Increase |
| Farmers | 18 (56.25) | 14 (43.75) | 0 (0.00) | 0 (0.00) | 24 (75.00) | 8 (25.00) |
| Educated personnel | 18 (81.82) | 4 (18.18) | 0 (0.00) | 0 (0.00) | 16 (72.73) | 6 (27.27) |
| Businessmen | 10 (62.50) | 6 (37.50) | 0 (0.00) | 0 (0.00) | 12 (75.00) | 4 (25.00) |
| Professionals | 10 (71.43) | 4 (28.57) | 0 (0.00) | 0 (0.00) | 12 (85.71) | 2 (14.29) |
| Overall | 56 (66.67) | 28 (33.33) | 0 (0.00) | 0 (0.00) | 64 (76.19) | 20 (23.81) |

Figures in parentheses are per cent values

## CONCLUSION AND SUGGESTIONS

The cement industries have emerged as one of the major government managed developmental options. However, this has led to substantiated changes in the basic fabric of the farming community, which many a times have eroded the food and nutritional security of rural inhabitants. The present study at Darlaghat, Solan led to the findings that the cropping systems of adjoining areas changed in terms of total cropped area under different crops. The involvement of people in agriculture sector also declined as alternative livelihood avenues were available. The changed cropping pattern reflected rising vulnerability of food and nutritional security of rural inhabitants. It is, therefore, recommended to have comprehensive assessment of likely impact of cement industries before their execution. The process of social inclusion must be ensured whereby local people who are likely to be affected by the project activities are involved in project planning and its execution. The administrative input needs to be strategically incorporated for the maintenance of cropping systems in the adjoining areas.

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