

INVESTIGATION OF FARMING LAND UTILIZATION PATTERNS IN PUNJAB AND HARYANA.

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1. INTRODUCTION

Land use trends are important indicators of economic transformations. The more economically developed a region becomes, the more land is converted to nonagricultural land use. The impact of urbanization and industrialization is well known as it leads to deforestation and conversion of fertile land into concrete jungle with massive commercial structures and huge polluting chimneys replacing pleasant green spaces.

Land use means the utilization of land for different activities by humans. "Land carries ecosystems; land use is the application of human controls, in a relatively systematic manner, to the key elements within any ecosystem, in order to derive benefit from it (Vink, 1975)". "Land use is characterized by the arrangements, activities and inputs people undertake in a certain land cover type to produce, change or maintain it (Di Gregorio and Jansen, 1998)." Land-use denotes how humans use the biophysical or ecological properties of land. Land-use includes land-modification and/or management for agriculture, settlements, forestry and other uses including those that exclude people from land, as in the designation of conservation nature reserves (Ellis, 2013). Land use change essentially refers to the transfer of human use of a piece of land, from one objective to another.

The main categories of land use in Punjab and Haryana are: Area under Forests (actually forested area on the lands, classed or administered as forests), Land not available for Cultivation (includes absolutely barren and unculturable land, land cover by buildings, roads and railways and water or otherwise appropriated for nonagricultural purposes), Other Uncultivated Land excluding Fallow Land (includes culturable waste, permanent pastures and other grazing land and lands under miscellaneous tree crops), Fallow Lands (includes old fallow and current fallows) and Net Sown Area (is the net sown area under crops, the area sown more than once during the year being counted once only).

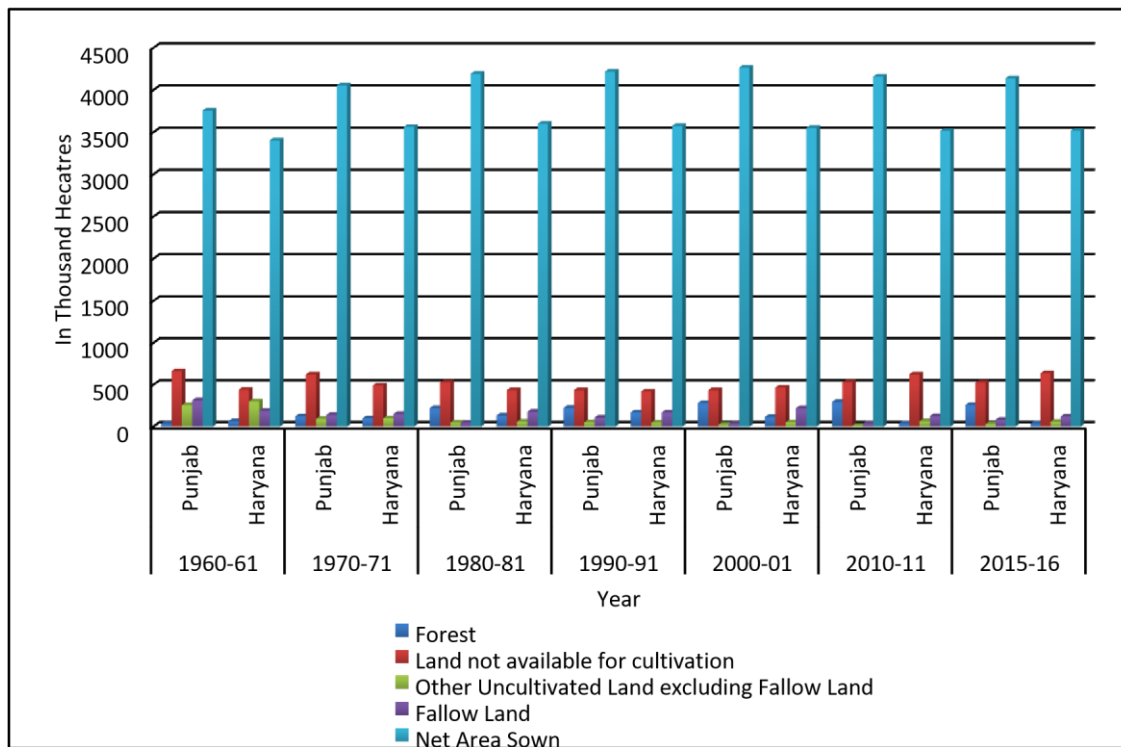
Land use pattern at any given time is determined by several factors including size of human and livestock population, the demand pattern, the technology in use, the cultural traditions, the location and capability of land, institutional factors like ownership pattern and rights and state regulation (Sinha et al., 2016).

2. Land Use in Punjab and Haryana

On analyzing the land use of Punjab and Haryana in 1960-61, we find that the forest land had occupied 0.70 per cent and 1.46 per cent area respectively. In 1966, after reorganization of Punjab it was left only with 1875 sq km of forests which was later on increased by conscious efforts of forest department. For the year of 1970-71, the share of forests was 2.44 per cent to total reported area for Punjab and 2.25 per cent to total reported area for Haryana. The state governments with the help of Indian Forest Act, 1937 and Land Preservation Act, 1950 brought private land under forests. In 1980-81, Punjab had 4.37 per cent share and Haryana had 3 per cent share of forest. This decade also witnessed increase in forest area due to efforts of government like increasing tree cover along roads, railways and canals. Same positive trends are reflected for both states for the decade of 1990-91. In 2000-01, Punjab continued the positive trend with 5.54 per cent share of forest land use whereas Haryana started a downward spiraling trend with a decline of 1.25 per cent as compared to 1990-91. In 2010-11, Punjab showed an increase of 0.30 per cent and Haryana showed a further decline of 1.72 per cent. Haryana especially in case of Panchkula witnessed a huge decline in forest land due to impact of urbanization. In 2015-16, both states reflected a declining trend due to human induced activities. The State of Forest Report, 2017 states that the recorded forest area for Punjab is 1837 sq km or 3.65 per cent of geographical area and for Haryana it is 1588 sq km or 3.59 per cent of geographical area. These figures depict the actual forest cover and do not include the tree cover as generally considered under forest land use. India had a 21.54 per cent of geographical area under forests which is below the 33 per cent share of forests expected at national level. Punjab has only 8 sq km area of very dense forest and overall 66 sq km area has increased under forests. Haryana has 28 sq km of very dense forest area and a net increase of 8 sq km in forest cover has occurred. The report attributes this increase (for both states) to growth of tree cover outside recorded forest area. Yet, Haryana has the lowest share of forest cover in India, ironically lower than even the desert state of Rajasthan. Earlier in 2015 report, Punjab used to have lowest share of forests in India.

Land not available for cultivation had a 13.18 per cent to total reported area share in Punjab and 9.98 per cent to total reported area share in Haryana during 1960-61. In 1970-71, it was 12.40 per cent in Punjab and 11.13 per cent in Haryana and the variation could be attributed mostly to the 1966 reorganization of these states. In 1980-81 as well as 1990-91, both states observed a declining trend. In 2000-01, Punjab showed same per cent share of this land use as observed in 1990-91 whereas Haryana showed a 1.02 per cent increase. In 2010-11, both states show a positive trend due to increasing impact of urbanization. In 2015-16, a slight decrease of 0.08 per cent was observed in Punjab and Haryana showcased an increase of 0.33 per cent.

Figure 1. Land Use Pattern (in Thousand Hectares) in Punjab-Haryana: 1960-61 to 2015-16



Source: S.A.P. 1961, 1971, 1981, 1991, 2001, 2011, 2016; and S.A.H. 1966-67, 71-72, 81-82, 9191, 2001-02, 2011-12, 2016-17

Other uncultivated land, excluding fallow land, was 5.08 per cent for Punjab and 6.81 per cent for Haryana in 1960-61. In 1970-71, this land use had 1.83 per cent share in Punjab and 2.23 per cent share in Haryana. The decline can be attributed to efforts by government to bring cultivable waste land under cultivation. The declining trend continued up to the year 1980-81. Again the reasons are government initiatives, and success of Green Revolution also encouraged farmers to bring more land under cultivation. In 1990-91, a slight increase of 0.06 per cent in case of Punjab and a further decline of 0.26 percent in Haryana was observed. Punjab had a further decline of 0.55 per cent in this land use category during 2000-01. For the same time span, Haryana showed an increase of 0.04 per cent of this land use category. In 2010-11, similar trends were observed that is the declining trend continued in Punjab and slight increasing trend in Haryana as can be seen from table 1.1. In 2015-16, the per cent share of this category in Punjab and Haryana is 0.60 per cent and 1.32 percent, respectively.

Fallow land had a 6.23 per cent to total reported area share in Punjab and 4.26 per cent share in Haryana in 1960-61. In 1970-71, there was a decline of per cent in Punjab and per cent in Haryana. The ushering of Green Revolution started encouraging farmers to bring old fallows under agriculture. In 1980-81, the fallow land further declined by 1.87 per cent in Punjab and Haryana observed an increase of 0.61 per cent. The big farmers were no longer tempted to keep old fallows, they wanted to cultivate every bit of land and also in few

districts government threatened to take away vacant patches of agricultural land if not used for growing crops. In 1990-91, the fallow lands share increased in case of Punjab and declined in Haryana. In 2000-01, the fallow land again declined in Punjab and increased in case of Haryana. These two decades' showcase see saw trends of fallow land in both states. More land under cultivation meant less fallow land and vice versa. In 2010-11 as compared to 2000-01, there was an increase of 0.05 per cent in Punjab's fallow land and a decline of 2.12 per cent in Haryana's fallow land. In 2015-16, an increase of 0.90 per cent occurred in fallow land of Punjab and a decline of 0.12 per cent occurred in case of Haryana. Overall, from 1960-61 to 2015-16, the fallow land has declined by three fold in case of Punjab and in case of Haryana decline has occurred in fallow land, but not as drastic as in case of Punjab.

The area under net sown area was 74.81 per cent for Punjab and 77.49 per cent for Haryana in 1960-61. In 1970-71, net sown area further increased and was 80.56 percent for Punjab and 80.98 per cent for Haryana. In 1980-81, the increasing trend continued for both states. This increase could be attributed to reclamation of culturable waste land and bringing old fallow under cultivation.

District	Forests	Land not available for cultivation	Other Uncultivated Land excluding Fallow Land	Fallow Land	Net Sown Area
Punjab					
Gurdaspur	21 (6.00)	36 (10.29)	4 (1.14)	32 (9.14)	257 (73.43)
Amritsar	3 (1.14)	42 (15.91)	0	@	219 (82.95)
Tarn Taran	5 (2.07)	19 (7.85)	0	@	218 (90.08)
Kapurthala	1 (0.60)	30 (18.07)	1 (0.60)	@	134 (80.72)
Jalandhar	6 (2.25)	0	10 (3.75)	0	251 (94.0)
S.B.S Nagar	16 (12.60)	10 (7.87)	0	6 (4.72)	95 (74.80)
Hoshiarpur	106 (31.18)	19 (5.59)	2 (0.58)	9 (2.65)	204 (60.0)
Rupnagar	31 (22.14)	24 (17.14)	3 (2.14)	1 (0.71)	81 (57.86)
S.A.S Nagar	16 (13.22)	25 (20.66)	2 (1.65)	1 (0.83)	77 (63.64)
Ludhiana	10 (2.72)	59 (16.03)	0	0	299 (81.25)
Firozpur	12 (2.26)	42 (7.98)	1 (0.19)	0	471 (89.54)
Faridkot	2 (1.36)	18 (12.24)	0	0	127 (86.39)
Muktsar	2 (0.76)	19 (7.20)	2 (0.76)	14 (5.30)	227 (85.98)
Moga	3 (1.34)	23 (10.27)	0	2 (0.89)	196 (87.50)
Bathinda	6 (1.78)	37 (10.98)	0	0	294 (87.24)
Mansa	2 (0.93)	11 (5.14)	0	12 (5.61)	189 (88.32)
Sangrur	1 (0.28)	46 (12.74)	0	2 (0.55)	312 (86.43)
Barnala	1 (0.71)	14 (10.00)	1 (0.71)	@	124 (88.57)
Patiala	12 (3.73)	43 (13.35)	4 (1.24)	2 (0.62)	261 (81.06)

Fatehgarh Sahib	1 (0.87)	12 (10.43)	0	0	102 (88.69)
Haryana					
Ambala	1 (0.64)	44 (28.39)	2 (1.29)	@	108 (69.68)
Panchkula	1 (1.82)	14 (25.45)	8 (14.54)	13 (23.64)	19 (34.55)
Yamunanagar	14 (8.14)	32 (18.60)	2 (1.16)	@	124 (72.09)
Kurukshetra	1 (0.61)	18 (10.91)	1 (0.61)	@	145 (87.88)
Kaithal	3 (1.31)	23 (10.04)	@	0	203 (88.65)
Karnal	1 (0.41)	31 (12.60)	11 (4.47)	9 (3.66)	194 (78.86)
Panipat	1 (0.77)	20 (15.38)	6 (4.62)	9 (6.92)	94 (72.31)
Sonipat	1 (0.49)	55 (25.82)	5 (2.35)	0	152 (71.36)
Rohtak	@	22 (13.25)	3 (1.81)	4 (2.41)	137 (82.53)
Jhajjar	0	19 (9.95)	7 (3.66)	26 (13.61)	139 (72.77)
Faridabad	@	42 (58.33)	0	1 (1.39)	29 (40.28)
Palwal	3 (2.22)	17 (12.59)	1 (0.74)	10 (7.41)	104 (77.04)
Gurugram	3 (2.54)	36 (30.51)	1 (0.85)	@	78 (66.10)
Nuh	0	35 (23.81)	1 (0.68)	@	111 (75.51)
Rewari	2 (1.32)	19 (12.50)	4 (2.63)	1 (0.66)	126 (82.89)
Mahendragarh	2 (1.02)	37 (18.88)	1 (0.51)	3 (1.53)	153 (78.06)
Bhiwani	2 (0.43)	48 (10.32)	4 (0.86)	12 (2.58)	399 (85.81)
Jind	1 (0.36)	29 (10.54)	1 (0.36)	0	244 (88.73)
Hisar	1 (0.25)	49 (12.10)	0	22 (5.43)	333(82.22)
Fatehabad	@	27 (10.38)	0	3 (1.15)	230 (88.46)
Sirsa	1 (0.23)	22 (5.15)	0	7 (1.64)	397 (92.97)

* Figures in parenthesis show the Land use category Percentage to Total Reporting Area of that year.

@ Area less than 500 hectares

Source: S.A.P. 2016, and S.A.H. 2016-17

Table: 1 - Land Use Pattern (in Thousand Hectares) in Punjab-Haryana: 2015-16

3. Overall Changes in Land Use

Land use change is a process of transformation of the landscape of a given region by humans to achieve certain benefits. But land utilization has important ecological implications too. Many land use changes have detrimental effects on the natural environment that is, conversion of pastures into agricultural land, setting up of industries in prime agricultural area, increase in urbanization, etc.

Table 2 Percentage Change in Overall Land Use Patterns in Punjab and Haryana from 1960-61 to 2015-16

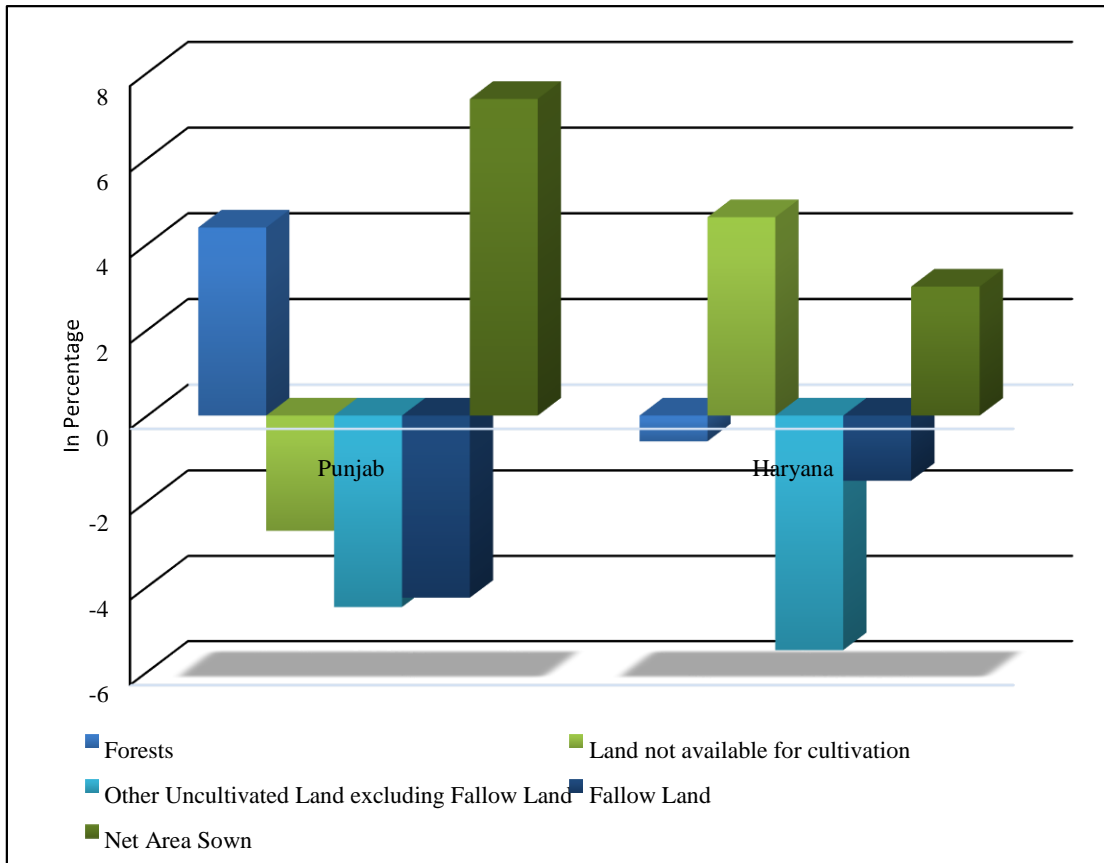
State	Forest (%)	Land Not Available for Cultivation (%)	Other Uncultivated Land Excluding Fallow Land (%)	Fallow Land (%)	Net Sown Area (%)
Punjab	4.39	-2.69	-4.48	-4.26	7.39
Haryana	-0.60	4.63	-5.49	-1.52	3.01

Source: S.A.P.1961, 2016; and S.A.H. 1966-67, 2016-17

Decade-wise, we can observe that in Punjab area under forest land increased till 2010-11 and then decreased in 2015-16 due to human induced activities. In case of Haryana, from 1960-61 till 1990-91 the forest area increased and since then it has shown a declining trend. The State of Forest, 2017 report mentions that Haryana followed by Punjab have the lowest forest cover in the country. The state governments have launched various forestry schemes to rectify this. Sadly, we only wake up when the damage has been done. In 2015-16, maximum forest area lies in district Hoshiarpur (1.06 lakh ha) followed by Rupnagar (0.31 lakh ha), Gurdaspur (0.21 lakh ha), S.B.S Nagar (0.16 lakh ha), S.A.S Nagar (0.16 lakh ha) and Yamunanagar (0.14 lakh ha).

The land not available for cultivation kept on declining till the decade of 1990-91. The economic liberalization and urban expansion increased the demand for non agricultural land use. Thus in the decades of 2000-01 and 2010-11, this land use saw an increase in its per cent share. Overall, from 1960-61 to 2015-16 this land use share declined by 2.69 per cent in Punjab and increased by 4.63 per cent (2,01,000 hectares) in Haryana. The increase is more in Haryana because some of its districts are part of National Capital Region (NCR).

Figure 2. Percentage Change in Land Use Pattern in Punjab-Haryana: 1960-61 to 2015-16



Source: S.A.P. 1961, 2016; and S.A.H. 1966-67, 2016-17

The other uncultivated land excluding fallow land has significantly reduced since 1960-61. It was 5.08 per cent for Punjab and 6.81 per cent for Haryana in 1960-61 and in 2015-16 it is only 0.60 per cent in case of Punjab and 1.32 per cent for Haryana. The reason is that all the agricultural potential land lying under this category has been brought under cultivation.

The fallow land has also declined in Punjab by 231 thousand hectares and in Haryana by 67 thousand hectares from 1960-61 to 2015-16. The old fallow or sometimes referred to as fallow land other than current fallow is negligible and is only 6 thousand ha in Punjab and 27 thousand ha in Haryana in 2015-16.

Net sown area in 1960-61 was about 75 per cent in Punjab and 78 per cent in Haryana. It is 83 per cent in Punjab and 81 per cent in Haryana in 2010-11. It can be clearly seen that net sown area in Punjab has been increased at a steady pace from 37.57 lakh ha in 1960-61 to 40.53 lakh ha in 1970-71 and 41.91 lakh ha in 1980-81 respectively. The net sown area was highest in 2000-01 (42.64 lakh ha). A decline of 106,000 ha was observed in 2010-11. A further decline of 21000 ha occurred in 201516. Similarly net sown area has increased steadily in Haryana from 34 lakh ha in 1960-61 to 35.65 lakh ha in 1970-71, and 36.02 lakh ha in 1980-81. After the decade of 1980-81, there has been a decline in net sown area and it is 35.19 lakh ha in 201516. The

reason is the increasing share of non-agricultural land use especially in districts who are part of NCR. District wise land use pattern data of years 2015-16 indicates that maximum area under cultivation is in districts of Jalandhar (94 per cent), Sirsa (92.97) and Tarn Taran (90.08 per cent). The lowest area under net sown area was in district of Panchkula (34.55 per cent), and is followed by Faridabad (40.28 per cent).

Thus, maximum area of these states is under agriculture out of which some part has been utilized in developing canal and drainage irrigation system. This is predictable as agriculture is important contributor to economic growth of these states. Also, it should be noted that the cultivable waste land (agricultural potential land) is not much left and there is no scope of further increase in net sown area due to the fixed limitation of land available for agriculture. Also with increasing urbanization and industrialization, the net sown area category will start to decrease to fulfill requirement of built up area, factories and transport network and this is already visible in industrialized districts of Punjab and Haryana states.

4. CONCLUSION

Land is one of the most important natural resource and the magnitude of agricultural activities largely depends upon the quantity and quality of land resources. Forest cover of Punjab and Haryana is less than even desert states like Rajasthan. The government has started initiatives to increase tree cover along roads. But some of these plans can have negative impact too. Encouraging eucalyptus plantation under social forestry schemes is going to have a huge negative effect on our already dwindling ground water resources. Karnataka government has banned its plantation after severe decline in ground water table.

Land not available for cultivation, especially under built up area, is increasing due to real estate boom which led to conversion of fertile agriculture land into residential complexes, educational institutes and other urban and industrial structures. Other uncultivated land excluding fallow land has been reduced because of reclamation of culturable waste land and encroachment of grazing lands.

Fallow land is decreasing as chemical intensive agriculture increases input costs and the farmers are pushed to grow more than two crops to earn more profit. Net sown area has been maximized in these two states and no further horizontal expansion is possible. So the conclusions drawn here clearly points to the hypothesis that states that changes in the land use have impact on intensity of agriculture.

In future, the pressure on land will further increase as the population numbers go on increasing. Also, intensification of agriculture has led to expansion of land under agriculture and not land sparing in the study area. Further this chapter also fulfills the hypothesis that the agricultural intensification brings about changes in the cultivated area.

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