



Research Article

Volume-03|Issue-05|2023

TRANSFORMING AGRICULTURAL LANDSCAPES: A DECADE OF CHANGE IN HIMACHAL PRADESH (2010-11 TO 2019-20)

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Article History

Received: 30.09.2023

Accepted: 07.10.2023

Published: 13.10.2023

Citation

Kumar, A., Lal, M. (2023). Transforming Agricultural Landscapes: A Decade of Change in Himachal Pradesh (2010-11 To 2019-20). *Indiana Journal of Agriculture and Life Sciences*, 3(5), 13-17.

Abstract: This study comprehensively analyzes agricultural land use changes in Himachal Pradesh from 2010-11 to 2019-20. It reveals significant shifts in land allocation for various agricultural purposes during this period. Notably, there were positive growth rates in non-agricultural land use (3.91%), Miscellaneous tree crops and Groves (7.40%), and fallow lands, with other fallows growing by 5.66% and Current Fallows by an astonishing 38.43%. These trends signify evolving agricultural practices in Himachal Pradesh. Conversely, some agricultural land use categories experienced negative growth rates, indicating their declining presence in the region. The study also highlights changing shares of agricultural land dedicated to specific patterns. Land for non-agricultural uses, Miscellaneous tree crops and Groves, other fallows, and Current Fallows increased from 7.71%, 1.42%, 0.46%, and 1.26% in 2010-11 to 8.01%, 1.52%, 0.49%, and 1.74% in 2019-20, respectively. This underscores their growing importance in Himachal Pradesh's agricultural landscape. In contrast, other agricultural land use categories saw a decrease in their share, indicating a diminishing presence. This study offers valuable insights for informed policy decisions and sustainable land management strategies in Himachal Pradesh, reflecting the region's evolving agricultural land use patterns.

Keywords: Agricultural land, Current fallow, Other Fallows, Non- non-agricultural uses.

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INTRODUCTION

Himachal Pradesh, nestled in the lap of the Himalayas, boasts not only breathtaking landscapes but also a complex and ever-evolving tapestry of land use. Over the past decade, this picturesque region has undergone significant transformations in its land utilization, presenting a dynamic interplay of growth and decline across various categories. These changes hold profound implications for the state's agriculture, environment, and its overarching goal of sustainable development. This study delves into the intricacies of the evolving land use patterns within Himachal Pradesh, aiming to uncover the multifaceted consequences they bring about. These shifts, ranging from the expansion of non-agricultural sectors to the diminishing net area sown, vividly highlight the impacts of urbanization, economic diversification, and efforts towards environmental conservation. The comprehension of these transformations and the ability to respond to them effectively represent crucial steps in the journey toward shaping a sustainable future for the region.

The agricultural sector plays a pivotal role in the economic development of countries, both developed and developing (Lekhi and Singh, 2014). Its contribution to economic prosperity is well-established. Agriculture is not merely a sector but a cornerstone of overall economic progress, demanding due attention. It is crucial to acknowledge the interdependence between agriculture and non-agricultural sectors. The synergy between them is mutually beneficial, fostering development. The

demand for non-agricultural inputs originating from industry stimulates industrial activity, creating a ripple effect. Industrial growth, in turn, fuels the demand for wage goods and materials, bolstering agricultural employment and income. Increased farm income creates a market for industrial consumer goods, driving further industrialization and market expansion. This interplay underscores the dependence of industrial development on agricultural progress (Tyagi, 2015). Several studies have delved into land use patterns and their implications in various regions. In Himachal Pradesh's Bilaspur district, land use has been systematically classified into four categories: land not available for cultivation, barren land, cultivable land, and forest, with a significant portion (43.30%) designated as unirrigated land (Chandel, 2013). Across India, a comprehensive examination of land use from 1950-51 to 1999-2000 shows marginal changes in most categories. However, the forest area expanded from 14.2% to 22.52%, and the net sown area increased from 41.77% to 46.07% during this period (Rani, 2020). In Haryana, changes in land use patterns from 1995-98 to 2002-05 revealed minor variations in most categories except for a significant increase in forested areas. The ratio of net sown area to total area decreased during this period, while non-agricultural land use expanded (Malik, 2012). Studies also highlight the shifting dynamics of land use in Punjab, where significant imbalances persist among land use categories (Singh, 2015). Another study focusing on fallow land across 17 major states from 1984-85 to 2011-12 in India found negligible changes in cultivable land

and fallow land over the years (Pandey and Ranganathan, 2018). In Bihar, the conversion of common land into fallow land was attributed to non-agricultural use, particularly in districts like Gaya, Patna, Purnia, and Mangar (Ahmed *et al.*, 2017). In Haryana's Bhindawas wetland, agricultural land dominates land use in the catchment area, followed by grasslands, with forest areas converted into water bodies and grasslands within the wetland area (Singh and Kumar, 2014). A study in Himachal Pradesh's Solan district from 1993-94 to 2007-08 revealed significant variations in permanent pastures and net sown areas, while other land categories remained relatively stable (Kumar & Sanjay *et al.*, 2012).

THE OBJECTIVES OF THE STUDY

The study objectives are as follows:

1. Assess and analyze changes in land use patterns in Himachal Pradesh over the past decade.

2. Identify implications of changing land use on agriculture, the environment, and sustainable development.
3. Recommend sustainable land management practices, afforestation, and land reclamation.
4. Provide policy recommendations for balanced and sustainable land use in Himachal Pradesh.

DATA AND METHODOLOGY OF THE STUDY

The present study is based only on secondary data published in the various census publications of Himachal Pradesh such as the statistical abstract of Himachal Pradesh, a statistical outline of Himachal Pradesh, the Economic Survey of Himachal Pradesh, and Directorate of Land Records of Himachal Pradesh. To look into the variations in the land use pattern of Himachal Pradesh, the index numbers have been calculated by applying the formula:

$$\text{Annual compound Growth Rate} = \frac{\text{Area of the current year} - \text{Area of the base year}}{\text{Area of the base year}} \times 100$$

RESULTS AND DISCUSSION

Land utilization in Himachal Pradesh encompasses a diverse range of activities and purposes. The state's land is primarily utilized for agriculture, including the cultivation of crops like wheat, maize, and apples, which are vital to its economy. Additionally, Himachal Pradesh's picturesque landscapes and natural beauty make it a popular destination for tourism, contributing significantly to land utilization for recreational and

hospitality purposes. The region also allocates land for industrial development, infrastructure projects, and residential areas to support its growing population. Conservation efforts are evident in the allocation of land for wildlife sanctuaries and protected areas, ensuring the preservation of its unique biodiversity. Effective land utilization practices are essential to strike a balance between economic growth, environmental conservation, and the well-being of its residents.

Table-1: The Growth Rate of Area under Agricultural Land Use of Himachal Pradesh

Agricultural Land categories/Years	Area Under Agricultural Land '000' Hectare		Annual Compound Growth Rate 2019-20/2010-11
	2010-11	2019-20	
1. Forests	1125.7	1123.9	- 0.16
2. Barren and Unculturable land	778.5	766.8	- 1.50
3. land put to non-agricultural uses	352.7	366.5	3.91
4. Permanent pastures and other Grazing lands	1507.5	1499.9	- 0.51
5. Land under Miscellaneous tree crops and Groves	64.9	69.7	7.40
6. Culturable Waste Land	124.1	118.4	- 4.59
7. Other fallows	21.2	22.4	5.66
8. Current Fallows	57.5	79.6	38.4
9. Net Area Sown	543.4	530.4	- 2.39
Total Agricultural land use Area	4575.5	4577.6	0.05

Sources: 1. Statistical Abstract of Himachal Pradesh for various Years.

2. Statistical Outline of Himachal Pradesh for various Years.

3. Directorate of Land Records of Himachal Pradesh for various Years.

Table 1 provides an overview of the annual compound growth rates of different agricultural land use categories during the period from 2010-11 to 2019-20. Notably, the overall agricultural land use area exhibited

a modest growth rate of 0.05% over this period. It's evident that various land categories experienced diverse growth patterns compared to the broader agricultural land. Among them, the category with the highest annual

compound growth rate was current fallows, showing a remarkable increase of 38.43%. Following closely was the land under miscellaneous tree crops and groves, which grew at a rate of 7.40%. Other fallows and land allocated for non-agricultural purposes also showed positive growth rates of 5.66% and 3.91%, respectively.

Conversely, several land categories, including forests, barren and unculturable land, permanent pastures, other grazing lands, culturable wasteland, and net area sown, witnessed negative annual compound growth rates. The decline in the growth rate of the net

sown area can be attributed to the expansion of non-agricultural activities, such as industrial development, urban and rural construction, and the expansion of transportation infrastructure like roads and railways.

Furthermore, the increase in land dedicated to miscellaneous trees and groves contributed to a reduction in barren and unculturable land. The notable growth rate of current fallows may be linked to unauthorized encroachments by farmers into forested and cultivable areas. These findings shed light on the changing dynamics of land use and the factors driving these shifts.

Table –2: Percentage share of area under different Agricultural Land Use as a Total Agricultural land use Area of Himachal Pradesh

Agricultural Land use categories/Years	2010 -11	2019 -20
1 Forests	24.60	24.55
2 Barren and Unculturable land	17.01	16.75
3 Land put to non-agricultural uses	7.71	8.01
4 Permanent pastures and other Grazing lands	32.95	32.77
5 Land under Miscellaneous tree crops and Groves	1.42	1.52
6 Cultural Waste Land	2.71	2.59
7 Other fallows	0.46	0.49
8 Current Fallows	1.26	1.74
9 Net Area Sown	11.88	11.59
Total Agricultural land use Area	100.00	100.00

Sources: 1. Statistical Abstract of Himachal Pradesh for various Years.

2. Statistical Outline of Himachal Pradesh for various Years.

3. Directorate of Land Records of Himachal Pradesh for various Years.

The data presented in Table 2 signifies significant changes in the agricultural land use patterns in Himachal Pradesh over the course of the study period (2010-11 to 2019-20). Let's delve into a detailed explanation of these findings:

Decline in Certain Land Categories: Forests: The proportion of land designated as forests saw a marginal decrease from 24.60% in 2010-11 to 24.55% in 2019-20. This could indicate factors such as deforestation, urbanization, or changes in forest management practices.

Barren and Uncultivated Land: The percentage of barren and uncultivated land decreased slightly from 17.01% to 16.75%. This may be due to efforts to bring such land into productive use or reclamation projects.

Permanent Pastures and Other Grazing Land: This category saw a small decline from 32.95% to 32.77%. Changes in livestock management or land conversion might contribute to this trend.

Culturable Wasteland: The proportion of culturable wasteland reduced from 2.71% to 2.59%, potentially indicating efforts to reclaim and cultivate previously unused land.

Net Area Sown: The decline in net area sown from 11.88% to 11.59% suggests a reduction in the total area

dedicated to crop cultivation, which could be influenced by non-agricultural land use expansion.

Rise in Other Land Categories:

Non-Agricultural Purposes: The allocation of land for non-agricultural purposes increased slightly from 7.71% to 8.01%. This could be due to urbanization, industrialization, or infrastructure development.

Miscellaneous Tree Crops and Groves: The proportion of land used for miscellaneous tree crops and groves grew from 1.42% to 1.52%, possibly indicating afforestation efforts or changes in horticultural practices.

Current Fallows: This category experienced a notable increase from 0.46% to 0.49%, potentially reflecting changes in agricultural practices or land being temporarily left uncultivated.

Net Area Sown: While net area sown declined as mentioned earlier, the proportion of land in this category increased from 1.26% to 1.74%. This could be due to shifts in cropping patterns or intensification of cultivation in smaller areas.

These findings collectively suggest a complex interplay of factors influencing land use in Himachal Pradesh. While some categories, such as forests and barren land, have experienced minor reductions, others,

like non-agricultural uses and tree cultivation, have expanded. These changes may be linked to urbanization, industrial growth, evolving agricultural practices, and environmental considerations. Understanding these shifts in land use patterns is crucial for policymakers to make informed decisions regarding sustainable land management, rural development, and agricultural policies. Additionally, it highlights the need for balancing agricultural and non-agricultural land uses to ensure the economic and environmental sustainability of the region.

Table 3 presents a comprehensive analysis of changes in land use within Himachal Pradesh over the span of a decade, from 2010-11 to 2019-20. This analysis focuses on several key categories of land use, shedding light on significant trends and shifts during this period.

Current Fallows, Miscellaneous Tree Crops and Groves, Other Fallows: These categories reflect the types of land that are temporarily or partially unused for agricultural purposes.

Table -3: Percentage Share of the Area under Different Agricultural Land Use as a Cultivable Land Area of Himachal Pradesh

Agricultural Land use categories/Years	2010 -11	2019 -20	Annual compound growth rate
Land under Miscellaneous tree crops and Groves	8.00	8.49	6.13
Cultural Waste Land	15.30	14.43	- 5.69
Other fallows	2.61	2.73	4.60
Current Fallows	7.09	9.70	36.81
Net Area Sown	67.00	64.64	- 3.52
Cultivable land	100.00	100.00	-
Cropping Intensity	172.73	168.16	- 2.65

Sources: 1. Statistical Abstract of Himachal Pradesh for various Years.
 2. Statistical Outline of Himachal Pradesh for various Years.
 3. Directorate of Land Records of Himachal Pradesh for various Years.

Data reveals an overall increase in these categories, with current fallows experiencing the most substantial growth at an annual compound growth rate of 36.81%. This suggests that more land was left uncultivated temporarily during this decade. Additionally, miscellaneous tree crops and groves saw a growth rate of 6.13%, while other fallows increased at a more moderate rate of 4.6%.

Culturable Wasteland: This category represents land that is no longer suitable for cultivation, possibly due to degradation or other factors. The concerning trend here is that culturable wasteland experienced a negative annual compound growth rate of -5.69%, indicating a decline in the amount of land available for agriculture. This could have adverse implications for future agricultural productivity.

Net Area Sown: This metric reflects the total land area actively used for cultivation. The data shows a decrease in net area sown, with a negative growth rate of -3.52%. This suggests that over the years, there has been a reduction in the amount of land being utilized for agricultural purposes, which could be attributed to factors such as urbanization or changing land-use practices.

Cropping Intensity: Cropping intensity is a measure of land utilization efficiency and indicates how intensively the available land is used for cultivation. The decline in

cropping intensity from 172.73% in 2010-11 to 168.16% in 2019-20, with a negative annual compound growth rate of -2.65%, suggests a decrease in the efficiency of land utilization for agricultural activities.

Finally, the data in Table 3 highlights significant shifts in land usage patterns within Himachal Pradesh over the specified decade. While some categories, like current fallows and miscellaneous tree crops, have seen growth, others, particularly culturable wasteland and net area sown, have experienced declines. The reduction in cropping intensity further underscores changes in land utilization efficiency. These trends may have important implications for agricultural productivity and land management in the region, warranting further investigation and policy considerations.

CONCLUSION AND SUGGESTIONS

The data presented in Tables 1, 2, and 3 reveal complex and dynamic changes in land use patterns within Himachal Pradesh over the past decade. These shifts have significant implications for agriculture, environment, and sustainable development in the region. Himachal Pradesh has witnessed diverse growth patterns in land use. While some categories, such as current fallows and miscellaneous tree crops, experienced significant growth, others, like forests and net area sown, showed declines. The expansion of land allocated for non-agricultural purposes and the reduction in net area

sown indicate the influence of urbanization and non-agricultural development in the region. The decline in forested land and an increase in land dedicated to tree crops and groves may reflect efforts to balance agricultural expansion with environmental conservation. The decline in cropping intensity suggests challenges in land utilization efficiency, which could be addressed through better farming practices and crop diversification.

Promote sustainable land management practices, afforestation, and reclamation of degraded lands to ensure long-term agricultural productivity and environmental conservation. Encourage balanced development by regulating non-agricultural land use expansion and preserving agricultural land to ensure food security. Engage local communities and stakeholders in land use planning to align policies with local needs and priorities. Implement effective monitoring and regulation to address issues like unauthorized encroachments and unsustainable land practices, as seen in the case of current fallows. Encourage crop diversification and the adoption of efficient farming techniques to improve land utilization efficiency. Focus on preserving forests and natural habitats to maintain biodiversity and environmental sustainability. Develop long-term regional plans that consider the effects of climate change, population growth, and the sustainable utilization of land resources. Finally, understanding and addressing the changing land use dynamics in Himachal Pradesh is crucial for the region's sustainable development. Balancing agricultural and non-agricultural land use, promoting environmental conservation, and engaging local communities are key steps toward achieving this goal. Policymakers should take these findings into account when formulating land management and development policies for the region.

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