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Cropping Pattern Change Due to Urbanisation in Haryana Metropolitan City

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ABSTRACT
There are few studies analyzing the cause-and-effect relationship of this phenomenon, despite the fact that the cropping pattern in emerging nations has been significantly changing from cereals to noncereal cash crops.
The current study's goals were to examine how main food items are consumed and how this affects cropping patterns in India overall and in the Delhi National Capital Territory (NCT) specifically. The analysis shows that between 2000 and 2020, the nation's intake of cereals decreased by 11.6% per person per day, whereas consumption of eggs, vegetables, and fruits climbed by 80.41%, 41.58%, and 39.13%, respectively. An increase in the areas planted to fruits (14.4%), vegetables (15.37%), spices (16.9%), and plantation crops (13.16%) demonstrated the effect of shifting consumption patterns on agriculture practices. A similar trend was observed in the case of NCT of Delhi. Information collected from 896 farming households revealed that vegetables (28.38%), potatoes (25.32%) and cereals (23.9%) were the prime crops in the study area. Increasing demand of non-cereal crops in the city markets, ($p<0.000$), in the local market, and in commercial establishments ($p<0.05$) were determined the cropping pattern. With changing consumption pattern, more and more agricultural land may be devoted to non-grain crops. Integrated planning for land allocation between grain and non-grain crops is needed for sustainable agriculture development.

KEYWORDS: shifting , consumption , patterns , agriculture

I. INTRODUCTION

Urbanisation has increasingly become a transformative force, particularly in agrarian states like Haryana, where land use dynamics are rapidly evolving. This research paper examines the change in cropping patterns due to urbanisation in Haryana's metropolitan regions, focusing primarily on cities such as Gurugram, Faridabad, and Panchkula. Using geospatial techniques, secondary agricultural data, and satellite imagery, the study identifies key drivers of cropping pattern changes and quantifies the loss of cultivable land. Results show a significant decline in cereal crops like wheat and rice, with a parallel rise in fallow land and non-agricultural usage. The paper concludes with policy recommendations to balance urban expansion and food security.

Urbanisation in India has brought about significant economic growth, yet it poses substantial challenges to agriculture, particularly through land-use change. In Haryana, one of India's most agriculturally productive states, metropolitan expansion is leading to the decline of agricultural lands and a shift in cropping patterns.

Many studies show that the nation's food consumption patterns are shifting away from food grains and toward non-grain crops and animal products (Gupta & Misra 2014; Ramesh & Pradhan 2006; Kumar, 1998; Kumar and Mathur, 1997; Huang and David, 1993; Radhakrishna and Ravi, 1992). Thus, it is anticipated that as the nation becomes more urbanized, the consumption of cereal will tend to decline while the consumption of non-cereal and animal goods is likely to rise. The percentage of calories from grain, non-grain, and animal products is predicted to rise from 63%, 29%, and 8% in 2000 to 55%, 33%, and 12% by 2025 and 48%, 36%, and 16% by 2050, respectively, according to a research report (Amarasinghe et al., 2007).The global food supply, ecological balance, biodiversity, and the quality of land and water resources will all suffer as a result of the significant changes in how agricultural demands are satisfied and what is produced where and how brought about by shifting consumption patterns.

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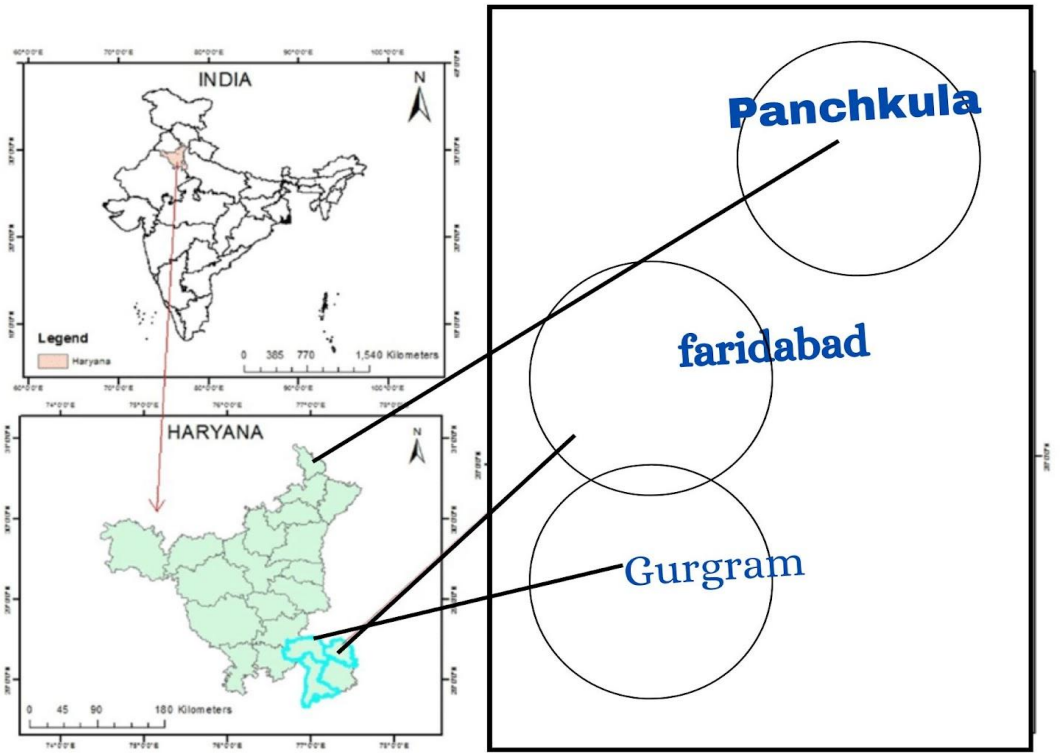
Thus, it is crucial to examine the nation's shifting cropping patterns, paying special attention to people's dietary preferences. It was postulated that urbanization causes a shift in people's consumption patterns, which in turn influences cropping patterns both at the macro and local levels.

II. STUDY AREA

This study focuses on three metropolitan areas of Haryana:

- Gurugram: Rapid IT and real estate development zone.
- Faridabad: A major industrial hub close to Delhi.
- Panchkula: A planned city with expanding urban fringes.

These cities represent the changing interface between agriculture and urbanisation in Haryana.



III. OBECTIVES

- Understand the extent of urban encroachment on agricultural lands.
- Assess how cropping patterns have changed in metropolitan cities.
- Identify the socio-economic and policy drivers of these changes.

IV. DATA AND METHODOLOGY

Data Sources

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- Satellite Images (Landsat and Sentinel-2) for 2000, 2010, and 2020.
- Agricultural Statistics from Haryana Agriculture Department.
- Census and Land Use Records from the Directorate of Town & Country Planning, Haryana.
- Field Surveys and Interviews with local farmers and urban planners.

Methodology

- Remote Sensing and GIS were used to map land use changes.
- NDVI (Normalized Difference Vegetation Index)** helped identify cropping intensity.
- Statistical Trend Analysis was applied to compare cropping data over 20 years.

V. RESULTS AND DISCUSSION (Land Use Change)

Urban area increased significantly in all three cities:

- Gurugram: Urban area grew by 155% from 2000–2020.
- Faridabad: Urban area grew by 98%.
- Panchkula: Urban spread increased by 75%.

Decline in Cultivable Land

- Gurugram: Cultivable land declined from 54% to 28%.
- Faridabad: From 62% to 41%
- Panchkula: From 68% to 45%.

Cropping Pattern Shift

Crop Type	2000 (%)	2020 (%)	Change (%)
Wheat	35	21	-14
Rice	30	18	-12
Vegetables	10	8	-2
Fallow Land	8	19	+11
Urban/Other	17	34	+17

Driving Factors

- Real Estate Development: High land prices led farmers to sell.
- Infrastructure Projects: Roads, metro lines, and airports took over farmlands.
- Policy Push: Industrial corridors and Smart City projects furthered land conversion.

IMPACT :

- Food Security Risk**: Reduction in staple food production.
- Employment Shift**: Labour migration from agriculture to construction and services.
- Environmental Effects**: Loss of green cover, heat islands, and water table decline.

POLICY AND RECOMONDATION :

1. Zoning Regulations: Enforce green belts around urban peripheries.
2. Urban Agriculture Promotion: Encourage rooftop and peri-urban farming.
3. Incentives to Farmers: Provide subsidies to retain agricultural land use.
4. Sustainable Urban Planning: Integrate agricultural land preservation in master plans.

VI. CONCLUSION

The current study demonstrates a strong correlation between urbanization, human consumption patterns, and its effects on cropping patterns both at the macro and micro-levels. Currently, the majority of the effects of shifting consumption patterns on agricultural activities occur in and around metropolitan regions, and this trend is predicted to continue as urbanization increases in the near future. According to the 2011 census, 108.29 million people live in more than 35 million Indian cities. A significant amount of agricultural land will be needed for non-grain and fodder crops if current consumption patterns continue. This will result in food insecurity, the depletion of land and water resources, and social, economic, environmental, and political imbalances on a global scale. Therefore, in order to estimate future food

demand, it may be necessary to take into account the effects of urbanization by taking into account the structural alterations in consumption patterns that may aid in the development of appropriate agricultural land use regulations.

The transformation of agricultural landscapes in Haryana's metropolitan cities due to urbanisation is stark and accelerating. Cropping patterns have shifted, fallow land has increased, and urban infrastructure now dominates once-fertile plains. There is an urgent need for balanced policies that promote both urban development and agricultural sustainability.

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