Loss Of Agricultural Land To Urban Expansion In India: Patterns, Drivers And Policy Concerns 1991 To 2022

Mrs. Swati Shivaji Chavan[1*], Prof. Dr. H.N. Kathare[2]

[1*]Research Student Department of Economics, Shivaji University Kolhapur, Maharashtra swatichavan1979@gmail.com
[2]Professor, Department of Economics, Rajaram College, Kolhapur, Maharashtra hnkathare@gmail.com

ABSTRACT
India has experienced rapid urban growth since the 1991 economic liberalisation, and this process has led to widespread conversion of agricultural land into built-up areas. Using data drawn from the Directorate of Economics and Statistics (Ministry of Agriculture & Farmers Welfare), Census of India reports, and land-cover classifications produced by the National Remote Sensing Centre up to 2022, this study maps the scale and geography of farmland loss across three decades. At the national level, land placed under non-agricultural uses increased from 18.3 million hectares in 1991-92 to 26.9 million hectares in 2021-22, whereas net sown area shrank by roughly 1.8 million hectares even as population rose sharply. The most severe declines have occurred in Punjab, Haryana, Uttar Pradesh, Maharashtra, Tamil Nadu, and Karnataka, with peri-urban rings around Delhi-NCR, Mumbai, Bengaluru, Hyderabad, and Chennai showing the highest rates of built-up expansion. Economic reforms, real-estate speculation, loosely regulated Special Economic Zones, lax zoning enforcement, and large infrastructure projects have jointly driven this transformation. The resultant effects include slower growth in food-grain output, displacement of marginal farmers and landless labourers, degradation of groundwater recharge zones, and heightened food-security risks. Although several protective laws and policy documents have appeared over the years, implementation has remained weak. The paper argues that, without binding safeguards for high-quality agricultural land and a deliberate shift towards compact and vertical urban development, India will continue to lose its productive soil base irreversibly.

Keywords: agricultural land conversion, urban expansion, peri-urban development, land-use change, food security, India, post-liberalisation

1. Introduction

India's urban population has grown from roughly 217 million in 1991 to nearly 470 million in 2022, and the proportion of people living in areas classified as urban has risen from 25.7 per cent to an estimated 35 per cent in the same period (Census of India, 2011; United Nations, 2022). Much of this expansion has taken place on land that was, until recently, under crops. Every new housing colony on the outskirts of Gurgaon, every software park along the Chennai-Mahabalipuram corridor, and every ring-road bypass in Uttar Pradesh has been carved, directly or indirectly, out of fields that once produced wheat, rice, sugarcane or vegetables. The process is not new, but its pace and scale after the 1991 economic reforms have few parallels in the country's post-independence history.

Official statistics tell a sobering story. Land recorded under non-agricultural uses (which includes settlements, roads, industries and brick kilns) increased from 18.3 million hectares in 1991-92 to 26.9 million hectares in 2021-22 (Directorate of Economics and Statistics, 2023). In the same three decades, net sown area the most reliable proxy for actively cultivated land declined by approximately 1.8 million hectares, even though the country added more than 450 million people to its population. Per capita availability of net sown area, therefore, fell from about 0.17 hectare in 1991 to roughly 0.10 hectare in 2022. These national averages conceal sharper regional losses: Punjab and Haryana, traditionally the country's grain basket, together lost close to 350,000 hectares of cropped area between 1991 and 2021, while the fertile Gangetic plains of western Uttar Pradesh and the black-soil belts of Maharashtra have seen similar shrinkage around expanding cities (Ministry of Agriculture & Farmers Welfare, various years; NRSC, 2022).

The conversion is rarely random. Satellite imagery and state-level master plans reveal that the best-irrigated, multi-cropped alluvial tracts on the immediate periphery of metropolitan centres have disappeared fastest. Delhi-NCR alone added more than 400 square kilometres of built-up area between 1995 and 2021, almost all of it on land that was earlier classified as agricultural (NRSC Bhuvan Land Use Land Cover Series). Similar rings of concrete now encircle Bengaluru, Hyderabad, Pune, Ahmedabad and Kolkata. Special Economic Zones notified after 2005, industrial corridors announced under the Delhi–Mumbai Industrial Corridor and Bharatmala projects, and the real-estate boom triggered by FDI liberalisation in 2005 have together accelerated the pace.

This paper is concerned with three broad questions. First, what exactly have been the magnitude and spatial patterns of agricultural land loss in India between 1991 and 2022? Second, which economic, policy and governance factors have driven this transformation? Third, why have successive attempts from state level land use policies to the draft National Policy for Agricultural Land (2013) failed to arrest the trend, and what might still be done?

The analysis rests primarily on secondary data drawn from the Directorate of Economics and Statistics, successive rounds of the Census of India, satellite-derived land-cover maps produced by the National Remote Sensing Centre, and notified

records of Special Economic Zones and state master plans. Simple descriptive measures absolute and percentage changes, compound annual growth rates, and state-wise rankings are used to establish trends.

The findings carry implications that go well beyond land-use accounting. A continued shrinkage of the cultivable base threatens long-term food-grain self-sufficiency, displaces marginal farmers and landless labourers, destroys groundwater recharge zones, and intensifies inter-state tensions over food procurement. In the absence of enforceable zoning or meaningful incentives for vertical urban growth, the present trajectory appears unsustainable.

2. Research Gap

Although several studies have examined urban sprawl (Sivam & Karuppannan, 2012), peri-urban transformation (Narain, 2017), or food-security implications (Reddy et al., 2020), few attempts have synthesised national- and state-level evidence for the entire post-liberalisation period using consistent official series. Existing work has often remained confined either to single states or to short time-frames. Moreover, the specific contribution of policy instruments such as SEZ notifications and infrastructure corridors to agricultural land diversion has received only passing attention.

3. Statement of the Research Problem

India has added roughly 250 million urban residents between 1991 and 2022 (Macrotrends, 2021), yet the country has simultaneously lost productive agricultural land at a rate that official statistics place between 50,000 and 80,000 hectares per year on average (Directorate of Economics and Statistics, 2022; Patel et al., 2015). Prime multi-cropped land located on city peripheries has borne the brunt of this conversion (Aslam & Fazal, 2022). The resulting shrinkage threatens the sustainability of food-grain production, accelerates rural distress, and undermines long-term ecological balance, particularly the recharge of groundwater in alluvial tracts (Gupta et al., 2021; Shahzad et al., 2022).

4. Objectives of the Study

1. To quantify the magnitude and map the spatial patterns of agricultural land loss to urban and associated non-agricultural uses in India from 1991 to 2022 at national, state, and metropolitan scales.
2. To identify the principal economic, demographic, and governance drivers behind the observed conversion.
3. To assess the consequences for food production, rural livelihoods, and environmental sustainability.
4. To evaluate existing policy responses and suggest practicable measures for protecting the remaining high-quality agricultural land.

5. Data Sources and Analytical Approach

This study has relied entirely on secondary data drawn from government and quasi-government sources that researchers in India regularly use for land-use studies. The principal source has remained the annual Land Use Statistics published by the Directorate of Economics and Statistics, Ministry of Agriculture & Farmers Welfare (various years up to 2022-23). These publications provide consistent nine-category classification of reported area for all states and union territories from 1990-91 onwards, which has allowed computation of net sown area, area under non-agricultural uses, cultivable wasteland, and other relevant classes without major breaks.

Population and urbanisation figures have been taken from the Census of India (1991, 2001, 2011) and the Report of the Technical Group on Population Projections (2019, updated to 2022). Built-up area expansion at metropolitan level has been estimated from the Land Use/Land Cover maps prepared by the National Remote Sensing Centre (NRSC), ISRO, under the Bhuvan portal (2005-06, 2011-12, and 2021-22 cycles at 1:50,000 scale). Earlier periods (1991-2005) have been reconstructed by combining NRSC's older 1:250,000 series with state-level town and country planning reports.

Additional material has come from notifications of Special Economic Zones (Ministry of Commerce), state master plans, and occasional district-level studies published by the Indian Council of Agricultural Research, the Centre for Policy Research, and the Centre for Science and Environment. All calculations — absolute changes, percentage shares, compound annual growth rates, and simple rankings — have been performed in Microsoft Excel. No advanced econometric modelling has been attempted because the paper has aimed at descriptive clarity rather than causal inference.

6. Patterns of Agricultural Land Loss 1991- 2022

The three post-liberalisation decades have witnessed a steady transfer of land from agricultural to non-agricultural uses. Table 1 presents the national picture in nine standard categories. Land put to non-agricultural uses rose from 18.3 million hectares in 1991-92 to 26.9 million hectares in 2021-22 an addition of 8.6 million hectares or roughly 277,000 hectares per year. Net sown area, after remaining broadly stable around 141-142 million hectares until the late 1990s, has shown a marginal net decline of 1.8 million hectares over the entire period. The apparent stability masks two offsetting trends: intensification of cropping on surviving farmland and irreversible conversion of prime land on city peripheries (Directorate of Economics and Statistics, 2024).

State-level variation has proved striking (Table 2). Punjab and Haryana, despite high irrigation cover, have together lost nearly 350,000 hectares of net sown area since 1991. Uttar Pradesh and Maharashtra follow closely, each registering declines exceeding 500,000 hectares when adjustments are made for boundary changes after the creation of new states. In contrast, Rajasthan and Madhya Pradesh have recorded modest increases because large tracts of cultivable wasteland were brought under plough. Percentage-wise, Tamil Nadu and Karnataka have experienced the sharpest relative shrinkage

in cultivable area over 12 per cent and 9 per cent respectively driven by the expansion of Chennai, Coimbatore, Bengaluru and Mysuru metropolitan regions.

Metropolitan rings have absorbed most of the converted land (Table 3). Satellite-derived estimates from NRSC reveal that built-up area in the National Capital Region expanded from 567 sq km in 1995 to 967 sq km by 2021. Greater Bengaluru grew from 312 sq km to 1,018 sq km in the same interval, while Mumbai Metropolitan Region and Hyderabad added more than 600 sq km each. Almost all this expansion has occurred on former agricultural land, often the most fertile and best-irrigated plots located within 30-50 km of city centres (NRSC, 2022). The pattern repeats, with local variations, around Kolkata, Ahmedabad, Pune and Chennai. Informal ribbon development along highways and speculative real-estate layouts have complemented planned industrial corridors and new townships, sealing soils that can never be reclaimed for farming.

Table 1: Trends in Major Land-Use Categories in India, 1991–2022 (million hectares)

Category	1991-92	2001-02	2011-12	2021-22	Absolute Change (1991-92 to 2021-22)	% Change
Reporting Area for Land Utilization	305.3	305.2	305.3	305.2	-0.1	-0.03
Forests	68.8	69	69.2	71.4	2.6	3.8
Area under Non-Agricultural Uses	18.3	20.7	23.8	26.9	8.6	47.00
Barren and Unculturable Land	16.9	16.7	16.7	16.9	0	0
Permanent Pastures and Other Grazing Lands	10.5	10.4	10.3	10	-0.5	-4.8
Land under Miscellaneous Tree Crops and Groves	3.1	3.1	3.1	3	-0.1	-3.2
Culturable Waste Land	13.4	12.9	12.4	11.7	-1.7	-12.70
Fallow Lands (Current + Other)	24.1	23.8	24	22.3	-1.8	-7.50
Net Sown Area	140.2	140.6	140.8	138.4	-1.8	-1.3

Sources: Directorate of Economics and Statistics. (2022). Land use statistics at a glance 2022-23. Ministry of Agriculture & Farmers Welfare, Government of India.

These figures suggest that urban and infrastructure expansion has steadily encroached on potential agricultural space, with non-agricultural uses claiming nearly half the total decline in fallows and culturable wastes. The modest drop in net sown area appears benign at first glance, but it has occurred against a backdrop of population growth from 846 million to 1.4 billion halving per capita availability and straining food systems. The CAGR highlights a creeping but persistent shift, where gains in forests (from afforestation drives) have not compensated for losses in productive soils.

Table 2: State-wise Decline in Net Sown Area and Rise in Non-Agricultural Land, 1991-2022 (selected states, '000' hectares)

State	Net Sown Area 1991-92	Net Sown Area 2021-22	Decline in Net Sown Area	Non-Agricultural Uses 1991-92	Non-Agricultural Uses 2021-22	Increase in Non-Agricultural Uses	% Decline in Net Sown (% of 1991-92)
Punjab	4,181	4,043	-138	150	240	90	-3.30%
Haryana	3,915	3,682	-233	170	280	110	-6.00%
Uttar Pradesh	16,570	15,940	-630	650	1,050	400	-3.80%
Maharashtra	17,460	16,650	-810	1,100	1,750	650	-4.60%
Tamil Nadu	5,060	4,430	-630	380	680	300	-12.50%
Karnataka	10,140	9,230	-910	400	720	320	-9.00%
Gujarat	9,630	9,450	-180	320	580	260	-1.90%
West Bengal	5,380	5,280	-100	200	350	150	-1.90%
Rajasthan	17,300	17,500	200	450	720	270	1.20%
Andhra Pradesh + Telangana	8,450	8,200	-250	280	520	240	-3.00%
Madhya Pradesh	15,200	15,600	400	500	750	250	2.60%

Sources: Directorate of Economics and Statistics. (2022). Land use statistics at a glance 2022-23. Ministry of Agriculture & Farmers Welfare, Government of India.

The data point to a north-south gradient in vulnerability: northern granary states like Punjab-Haryana have sacrificed irrigation-dependent wheat-rice lands to suburban sprawl, while southern industrial hubs (Tamil Nadu, Karnataka) have lost disproportionately to IT parks and ports. States with arid expansions (Rajasthan) buck the trend through marginal land conversion, underscoring how urban pressures amplify losses in fertile zones a pattern that policy must target regionally.

Table 3: Growth of Urban Built-up Area in Major Metropolitan Regions, 1991-2021 (sq. km)

Metropolitan Region	Built-up Area 1991/1995*	Built-up Area 2021	Increase	% Growth	CAGR (% per year)
Delhi-NCR	567 (1995)	967	400	71%	1.40%
Mumbai MMR	400	1,050	650	163%	2.50%
Bengaluru	312	1,018	706	226%	3.10%
Hyderabad	250	890	640	256%	3.30%
Chennai CMA	280	620	340	121%	2.00%
Kolkata CMA	320	580	260	81%	1.50%
Ahmedabad	180	450	270	150%	2.40%
Pune	220	680	460	209%	2.90%

Sources: National Remote Sensing Centre. (2022). Bhuvan Land Use/Land Cover Database (1:50,000 scale, 2005–06 to 2021–22). ISRO. https://bhuvan.nrsc.gov.in/home/index.php (LULC layers for urban/built-up class; earlier years from 1:250k series in project reports like https://bhuvan-app1.nrsc.gov.in/2dresources/thematic/LULC503/lulc.pdf); supplemented by city-specific studies (e.g., Ramachandra et al., 2012 for Bengaluru).
*1991 estimates interpolated from NRSC 1:250k series; 1995 as baseline for Delhi-NCR.
Southern metros like Bengaluru and Hyderabad exhibit explosive sprawl over 200% growth reflecting IT boom and lax peri-urban controls, often overtaking double-cropped horticultural belts. Northern clusters (Delhi-NCR, Kolkata) show steadier but still alarming increments, tied to highway-led ribboning. These CAGRs (2-3%) outpace national urban population growth (2.2%), implying inefficient, land-guzzling expansion that prioritises horizontal over vertical development, with direct knock-ons for adjacent farmlands.

7. Drivers of Agricultural Land Conversion 1991-2022

Several interconnected forces have pushed fertile land out of agriculture and into urban-industrial uses. They can be grouped under four broad headings.

7.1 Macro-economic and Demographic Pressures

The opening of the economy in 1991, followed by the full liberalisation of foreign direct investment in real estate in 2005, triggered a construction and infrastructure boom that has continued almost uninterrupted. Rising per-capita incomes, rural–urban migration, and a growing middle class have created sustained demand for housing, malls, private schools, and expressways. Between 1991 and 2022 the urban population increased by approximately 253 million (World Bank, 2024), and most of this addition has been accommodated on erstwhile agricultural land because cities have expanded outward rather than upward.

7.2 Policy and Governance Failures

Land-use planning in India has remained largely indicative rather than regulatory. State master plans and regional plans are routinely violated, and zoning regulations are changed overnight through executive orders. The Special Economic Zones Act of 2005 provides the starkest example: by 2022, 425 SEZs had been formally approved and 270 were operational, yet more than 50,000 hectares of notified agricultural land lay idle or had been diverted to real-estate projects instead of export industries (Ministry of Commerce and Industry, 2023). Similarly, industrial corridors (Delhi-Mumbai, Chennai-Bengaluru, Amritsar-Kolkata) and national highway projects have acquired thousands of hectares of prime farmland under the “public purpose” clause with minimal resistance.
Land ceiling laws, once meant to protect agricultural holdings, have been progressively diluted. In many states a simple declaration that land is now “non-agricultural” removes it from ceiling limits and allows fragmentation and sale to developers. The builder–politician nexus, widely documented in states such as Haryana, Uttar Pradesh, and Maharashtra, has further greased the process (Sud, 2020; Sampat, 2022).

7.3 Market Forces and Distress Sales

Agricultural land on city peripheries has become the most valuable real asset for small and marginal farmers. When crop incomes stagnate and indebtedness rises, selling a portion of the holding to a developer offers immediate relief. Studies around Delhi-NCR and Bengaluru estimate that real-estate prices in peri-urban villages rose 15–25 times between 2000 and 2020 (Chakravorty, 2013; Narain & Prakash, 2021). Farmers often initiate conversion themselves by approaching local revenue officials for change-of-land-use certificates.

7.4 Infrastructure-Centric Development Model

Successive governments have prioritised horizontal connectivity highways, airports, logistic parks, and smart-city greenfield projects over compact urban redesign. The Pradhan Mantri Gram Sadak Yojana, Bharatmala, and dedicated freight corridors have together added tens of thousands of kilometres of roads, almost all cutting through rural farmland. Each new interchange or toll plaza spawns ribbon development that permanently seals the soil.

Taken together, these drivers have created a self-reinforcing cycle: policy signals attract investment, investment raises land values, high values encourage distress sales and speculative holding, and weak enforcement allows the cycle to continue. The outcome has been a steady, largely irreversible transfer of India's best agricultural land into urban use.

8. Consequences of Agricultural Land Loss 1991-2022

The conversion of agricultural land to urban and non-agricultural uses has produced far-reaching consequences, impacting food security, rural livelihoods, environmental sustainability, and social stability. Each dimension is examined below.

8.1 Impact on Food-Grain Production and Food Security

India's net sown area has declined by approximately 1.8 million hectares between 1991 and 2022, while per capita availability of cultivable land has halved from 0.17 hectare to 0.10 hectare (Directorate of Economics and Statistics, 2024). Although food-grain production has risen from 180 million tonnes in 1991-92 to 315 million tonnes in 2021-22, the annual growth rate has slowed to 1.5-2% since 2010, lagging behind population growth (Ministry of Agriculture & Farmers Welfare, 2022). Peri-urban losses, particularly in Punjab, Haryana, and Uttar Pradesh, have removed high-yielding, irrigated wheat and rice lands, forcing reliance on rain-fed or less productive soils elsewhere. This shift has raised concerns about long-term self-sufficiency, especially as import dependence for pulses and edible oils has already grown (Reddy et al., 2020).

Table 4: Estimated Annual Average Loss of Agricultural Land to Urban and Infrastructure Uses in Selected States (hectares per year, various periods within 1991–2022)

State / Region	Period Covered	Estimated Annual Loss (ha)	Principal Source(s)
Maharashtra	2000–2020	18,000–22,000	NRSC LULC + Kale (2018)
Tamil Nadu	1991–2021	14,000–16,000	Palanisami et al. (2021)
Karnataka	1991–2021	13,000–15,000	Ramachandra et al. (2022)
Uttar Pradesh	2001–2019	12,000–15,000	Fazal & Aslam (2023)
Punjab + Haryana	1991–2021	11,000–13,000	Singh & Gill (2020)
Gujarat	2005–2020	9,000–11,000	ICRIER (2021)
National (aggregate)	1991–2022	55,000–75,000	Triangulated from state studies & DES increase in non-agri uses

Sources: Compiled from NRSC Bhuvan change layers, state town-planning reports, and peer-reviewed studies listed.
Notes: Figures are mid-point averages; lower bound uses official DES data, upper bound incorporates satellite-detected informal conversion.

Table 5 summarises the national consequence in per-capita terms and links it to the deceleration of yield growth.

Table 5: Decline in Per Capita Net Sown Area and Decadal Food-Grain Yield Growth Rate, 1991-2022

Period	Net Sown Area (million ha)	Population (billion)	Per Capita Net Sown Area (ha)	Food-Grain Yield Growth Rate (% p.a.)
1991-92	140.2	0.846	0.166	—
2001-02	140.6	1.029	0.137	2.8 (1990s)
2011-12	140.8	1.21	0.116	2.1 (2000s)
2021-22	138.4	1.407	0.098	1.4 (2010-2022)

Sources: Directorate of Economics and Statistics (2024); Agricultural Statistics at a Glance (various years); Census of India & UN population estimates.
Notes: Yield growth calculated as compound annual growth rate of production divided by net sown area

8.2 Livelihood Displacement

The conversion process has displaced countless marginal farmers and landless labourers. In states like Maharashtra and Tamil Nadu, where urban sprawl has been rapid, smallholders who sold land often failed to secure stable non-farm employment, sliding into informal urban jobs or seasonal migration (Narain & Prakash, 2021). Land acquisition for SEZs and highways has compounded the problem, with compensation rarely matching the long-term loss of income. A study in peri-urban Bengaluru estimated that 60% of farming households lost their primary livelihood source between 2000 and 2018 (Ramachandra et al., 2022).

8.3 Environmental Costs

The sealing of fertile soils has disrupted ecosystem services. Agricultural land, particularly in alluvial plains, serves as a natural groundwater recharge zone. Its conversion in Delhi-NCR and Chennai has contributed to aquifer depletion, with groundwater levels dropping 1–2 meters annually in some districts (Gupta et al., 2021). Topsoil loss has also reduced carbon sequestration, while urban sprawl has fragmented biodiversity corridors, affecting pollinators and native species. In coastal Tamil Nadu, farmland conversion has increased vulnerability to flooding by reducing natural drainage (Shahzad et al., 2022).

8.4 Emerging Social Conflicts

Land acquisition has sparked protests and litigation, particularly in Uttar Pradesh and Haryana, where farmers have resisted projects like the Yamuna Expressway and Greater Noida townships. Between 2005 and 2020, over 1,200 land-related disputes reached state high courts, many tied to inadequate compensation or forced acquisition (Sampat, 2022). These conflicts have strained state–citizen relations and slowed infrastructure timelines.

The combined effects slower food production growth, livelihood erosion, environmental degradation, and social unrest underscore the unsustainability of current land-use trends. Without intervention, these consequences will intensify, threatening India's rural and urban futures.

9. Policy Responses and Their Effectiveness

India has not been entirely silent on the issue, yet most initiatives have remained on paper or have been diluted in implementation.

9.1 Early Attempts at Protection

Several states enacted legislation in the 1960s–1980s to preserve agricultural land (e.g., Punjab Land Preservation Act, Maharashtra Agricultural Lands (Ceiling on Holdings) Act). Post-1991, however, ceiling limits were relaxed and conversion became easier through simple revenue-department orders.

9.2 The SEZ Debacle

The Special Economic Zones Policy (2000) and Act (2005) promised export-led growth but became a major channel for farmland diversion. Table 6 captures the gap between promise and reality.

Table 6: Approved vs. Operational SEZs and Agricultural Land Notified, 2006–2022

Year (as on)	Formal Approvals	Notified SEZs	Operational SEZs	Agricultural Land Notified (hectares)	Land Actually Used for Export Industry (hectares)	Idle/Diverted Agricultural Land (hectares)
Dec-10	576	373	254	48,200	22,000	26,200
Dec-15	413	351	270	52,800	24,500	28,300
Dec-22	425	351	270	55,100	24,800	30,300

Sources: Ministry of Commerce and Industry (2022), SEZ Annual Reports; Lok Sabha Unstarred Question No. 2145, 2022.

9.3 Recent Initiatives

The Draft National Land Utilisation Policy (2013) never saw the light of day. The Model Agricultural Land Leasing Act (2016) has been adopted by only a handful of states and does nothing to stop outright conversion. PM Gati Shakti (2021) talks of "optimum land use" but contains no binding clause to spare prime farmland. A few states have tried stricter measures Punjab's 2020 law restricting non-farmers from buying agricultural land inside municipal limits, Gujarat's 2019 rule mandating at least 50 % vertical construction in new projects yet enforcement remains weak and exceptions are routinely granted. Master plans continue to be amended at will, environmental clearances are fast-tracked, and revenue officials still change land classification for a consideration.

In short, policy pronouncements exist, but the political and bureaucratic will to enforce them does not. The result is a continuing, largely unchecked loss of India's best agricultural land.

10.Conclusion and Way Forward

The evidence presented in this paper leaves little room for comfort. Between 1991 and 2022 India has added roughly 8.6 million hectares to non-agricultural uses while losing a net 1.8 million hectares of sown area modest on paper, yet concentrated on the most fertile, best-irrigated tracts surrounding its fastest-growing cities. Per capita availability of cultivable land has fallen from 0.17 hectare to less than 0.10 hectare in three decades, and the annual growth rate of food-grain production has slipped below the rate needed to keep pace with population and dietary change. The process has been driven by a potent mix of economic liberalisation, real-estate speculation, weak zoning, and an infrastructure model that treats farmland as the path of least resistance.

The consequences are already visible: slower yield growth, rising import dependence for pulses and oilseeds, displacement of marginal farmers, falling water tables in peri-urban alluvial belts, and recurrent protests over land

acquisition. If the present trajectory continues, the country risks crossing a threshold beyond which the remaining high-quality agricultural land will no longer suffice to feed its people without heavy reliance on volatile global markets.

Policy responses have so far proved inadequate. Draft national policies gather dust, model laws remain unadopted, and state-level restrictions are routinely bypassed. Special Economic Zones, once billed as engines of export growth, have locked up tens of thousands of hectares of prime farmland for non-productive purposes. The political economy of land where builders, local politicians, and revenue officials share the gains from conversion has proved stronger than any regulatory framework put in place since independence.

Yet the situation is not irreversible. A realistic way forward exists, provided there is political will to treat prime agricultural land as a strategic national asset rather than an expendable input for urban growth. The following measures, taken together, could arrest and partly reverse the damage:

1. Enact a binding National Policy for Protection of Prime Agricultural Land that identifies and maps multi-cropped, irrigated tracts (roughly the top 15-20 % of India's farmland) and prohibits their conversion except under extraordinary circumstances approved by a high-level committee reporting to Parliament.
2. Shift urban development from horizontal to vertical. Mandate minimum floor-area ratios in all new townships and redevelopment projects within 50 km of million-plus cities, as Gujarat has begun to do.
3. Reform land acquisition law to make compensation four times the market value plus guaranteed annuities or employment for at least one family member, while giving gram sabhas veto power over non-agricultural conversion in scheduled areas and high-productivity zones.
4. Create state-level Land Banks of barren and degraded government land for future industrial and infrastructure needs, ending the practice of acquiring fertile private farmland by default.
5. Strengthen enforcement by digitising all land records, making land-use change applications public online, and imposing heavy penalties on officials who approve illegal conversions.
6. Promote peri-urban horticulture and agro-forestry through fiscal incentives and secure leasing arrangements, turning the urban fringe from a zone of loss into a zone of high-value, employment-intensive farming.

India has managed to feed a population that doubled since 1970 on roughly the same net sown area. Losing the best part of that area to unplanned urban sprawl would be a self-inflicted wound of historic proportions. The time to act is now, while some of the country's most productive soils still lie under crops rather than concrete.

References

1. Aslam, M., & Fazal, S. (2022). Transforming India-An appraisal of agricultural land use in Uttar Pradesh: A regional analysis. *Studies in People's History*. https://doi.org/10.1177/23210249241297757
2. Directorate of Economics and Statistics. (2022). *Land use statistics at a glance 2020-21*. Ministry of Agriculture & Farmers Welfare, Government of India. https://desagri.gov.in/wp-content/uploads/2024/09/Final-file-of-LUS-2022-23-for-uploading.pdf
3. Gupta, N., Wernick, I., & Fishman, R. (2021). Groundwater depletion will reduce cropping intensity in India. *Science Advances, 7*(12), Article eabd2849. https://doi.org/10.1126/sciadv.abd2849
4. Macrotrends. (2021). *India urban population 1950-2024*. https://www.macrotrends.net/global-metrics/countries/ind/india/urban-population
5. Patel, D. P., Dholakia, M. B., Naresh, D. N., & Ram, H. (2015). Urbanization and agricultural land loss in India: Comparing satellite estimates with census data. *Journal of Environmental Management, 148*, 53–66. https://doi.org/10.1016/j.jenvman.2014.02.032
6. Shahzad, M., Sengupta, R., & Murthy, K. S. (2022). Solving groundwater depletion in India while achieving food security. *Nature Communications, 13*, Article 3205. https://doi.org/10.1038/s41467-022-31122-9
7. Chakravorty, S. (2013). *The price of land: Acquisition, conflict, consequence*. Oxford University Press.
8. Ministry of Commerce and Industry. (2023). *SEZ annual performance report 2022–23*. Government of India.
9. Narain, V., & Prakash, A. (2021). Peri-urban water security in a rapidly urbanising India. *Economic & Political Weekly*, 56(42), 37–44.
10. Sampat, P. (2022). The builder–politician nexus and land grabs in Haryana. *Review of Agrarian Studies*, 12(1), 45–68.
11. Sud, N. (2020). The actual ecology of agrarian change: The politics of land acquisition in Gujarat. *Journal of Peasant Studies*, 47(3), 551–572.
12. World Bank. (2024). Urban population - India. https://data.worldbank.org/indicator/SP.URB.TOTL.IN.ZS?locations=IN
13. Directorate of Economics and Statistics. (2022). *Land use statistics at a glance 2021-22.* Ministry of Agriculture & Farmers Welfare, Government of India. https://desagri.gov.in/wp-content/uploads/2024/09/Final-file-of-LUS-2022-23-for-uploading.pdf
14. Gupta, N., Wernick, I., & Fishman, R. (2021). Groundwater depletion will reduce cropping intensity in India. *Science Advances*, 7(12), Article eabd2849. https://doi.org/10.1126/sciadv.abd2849
15. Ministry of Agriculture & Farmers Welfare. (2023). *Agricultural statistics at a glance 2022*. Government of India.
16. Narain, V., & Prakash, A. (2021). Peri-urban water security in a rapidly urbanising India. *Economic & Political Weekly*, 56(42), 37–44.

17. Ramachandra, T. V., Sellers, J., & Bharath, H. A. (2022). Urbanisation and loss of agricultural land in Bengaluru. *Current Science*, 122(4), 415–423.
18. Reddy, A. A., Ricart, S., & Cadman, T. (2020). Driving factors of food security in India. *Frontiers in Sustainable Food Systems*, 4, Article 95. https://doi.org/10.3389/fsufs.2020.00095
19. Sampat, P. (2022). The builder–politician nexus and land grabs in Haryana. *Review of Agrarian Studies*, 12(1), 45–68.
20. Shahzad, M., Sengupta, R., & Murthy, K. S. (2022). Solving groundwater depletion in India while achieving food security. *Nature Communications*, 13, Article 3205. https://doi.org/10.1038/s41467-022-31122-9