

EXPANDING FOOTPRINTS, GROWING CHALLENGES: BUILT-UP AREAS ARE OUTPACING POPULATION GROWTH WORLDWIDE

INTRODUCTION

The conversion of land to built-up area¹—the surface occupied by buildings and other roofed structures—has significant environmental implications and is relevant to several targets of the Sustainable Development Goals (SDGs), notably SDG 11.3 on sustainable urbanization and land-use efficiency in urban areas, SDG 12.2 on sustainable management and efficient use of natural resources, and SDGs 15.1 and 15.3 on the sustainable management and restoration of land.

The expansion of built-up areas in cities and towns to accommodate growing populations often results in the conversion of agricultural land, deforestation, habitat fragmentation, biodiversity loss and, in the long-term, changes in regional temperatures and precipitation patterns (Lwasa et al., 2022). These impacts operate through several channels (figure 1): sealing the soil surface with impervious materials reduces rainwater infiltration and groundwater recharge and raises flood risk; replacing vegetation with built surfaces increases local temperatures through the urban heat-island effect; fragmenting natural habitats disrupts ecosystems and accelerates biodiversity loss; and converting farmland erodes the productive land base on which food security depends.

In rural areas, built-up areas include large scale industrial farms, which tend to be more harmful to the environment and are a major source of emissions: global agrifood systems account for 32 per cent of global greenhouse gas (GHG) emissions, with roughly half originating from farming, and about 19 per cent from land-use change including deforestation and other processes associated with clearing land for agriculture (FAO, 2025a).

Data from the recently published *World Urbanization Prospects (WUP) 2025* (United Nations, 2025) make it possible to analyze changes in built-up areas and population

Key Messages

- » In many regions, built-up areas are expanding much faster than populations are growing across all settlement types, indicating potentially unsustainable conversion of land to built-up uses.
- » The disparity between built-up area expansion and population growth is most pronounced in rural areas, where built-up areas have expanded at roughly four times the rate of population growth,^a with residential^b built-up areas expanding faster than non-residential built-up areas.
- » Regional and temporal variations reveal complex dynamics: residential use has driven most built-up area expansion, but industrial and infrastructure uses have been catching up in several regions since 2000. These shifts vary by settlement type and country income group, underscoring that the balance between residential and non-residential growth is not uniform across space or time.
- » These findings call for integrated policy interventions that steer settlement growth towards compact, smart, and sustainable cities and towns, while promoting responsible land stewardship in rural areas through sustainable land management and agroecological farming practices—safeguarding food security and environmental sustainability for future generations.

^a Between 1980 and 2000, rural built-up area expanded by 45 per cent, while the population grew by 11 per cent; between 2000 and 2020, the rural built-up area expanded by 40 per cent while the population only grew by 9 per cent.

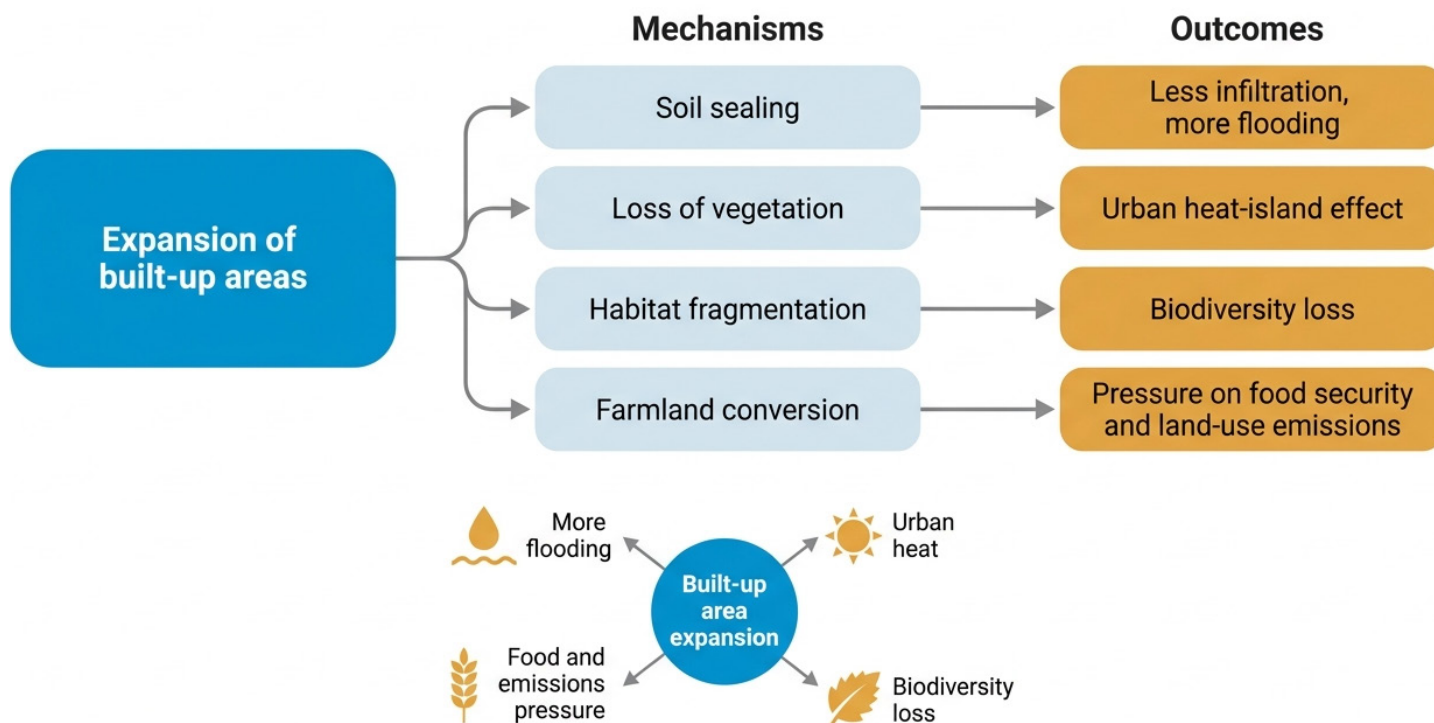
^b Non-residential area: area dedicated exclusively to non-residential use, such as industrial or commercial/retail units, confined animal feeding, indoor farming, hangars, data centres, transportation facilities (ports/airports), large government administration or office units, large sport or leisure indoor facilities, exclusively religious sites and similar; Residential area: built-up area not classified as non-residential.

size in cities, towns and rural areas.² Supplementary data (Carioli, Schiavina, and Melchiorri, 2026) were used to analyze residential and non-residential built-up areas, going beyond what was covered in WUP 2025. The observed patterns of built-up area expansion raise significant concerns regarding long-term sustainability. This brief draws on these data to document the divergence between built-up area expansion and population

¹ Throughout this brief, *built-up area* refers to the surface covered by buildings, as measured in the Global Human Settlement Layer (GHSL) built-up surface data; it excludes non-roofed artificial surfaces such as roads and paved open spaces. *Built-up area expansion* denotes the growth of this surface over time within each settlement class defined by the Degree of Urbanization for cities, towns and rural areas. The term *urban expansion* is reserved for the outward growth of cities and towns into surrounding territory and is not used interchangeably with built-up area expansion. *Land consumption* is used only in reference to SDG indicator 11.3.1, which relates the rate of land consumption to the rate of population growth within urban areas.

² We used the Degree of Urbanization classification, which defines cities as areas with a high density (at least 1,500 inhabitants per km²) and a large population (at least 50,000 inhabitants), towns as areas with a moderate density (at least 300 inhabitants per km²) and a population of at least 5,000 inhabitants, and rural areas as areas with a density below 300 inhabitants per km².

How built-up area expansion affects the environment



growth at the global level and across country income groups, to examine trends in agricultural land that help explain what is driving rural built-up area expansion, and to set out the implications for policy.

How built-up area is measured in this brief

Unlike analyses that track urban expansion within officially designated urban boundaries, this brief applies the Degree of Urbanization, which classifies the entire territory of each country into cities, towns and rural areas on the basis of the population size and density of 1-km² grid cells (see footnote 2). Built-up area is measured within all three classes. In rural areas, it comprises dispersed dwellings, farm and other agricultural buildings, industrial and infrastructure facilities, and small settlements below the population thresholds that define towns. Rural built-up area expansion therefore refers to growth of the building footprint within territory classified as rural; it does not capture the outward growth of cities and towns, which is reflected in those settlement classes. Because the classification is applied at each point in time, territory that urbanizes is reclassified from rural to town or city and is subsequently counted in its new class; the reported rural trends thus describe the rural domain as delineated in each period. This approach complements monitoring frameworks such as SDG indicator 11.3.1, for which land consumption is measured within urban areas.

BUILT-UP AREA EXPANSION IS OUTPACING POPULATION GROWTH AT THE GLOBAL LEVEL

At the global level, built-up areas have expanded faster than populations have grown, raising sustainability concerns about land-use efficiency and sustainable human settlement planning (SDG 11.3), as well as the sustainable use of land as a natural resource (SDG 12.2). This divergence has widened over time, meaning that the built-up footprint of human settlements is increasingly outpacing population growth.

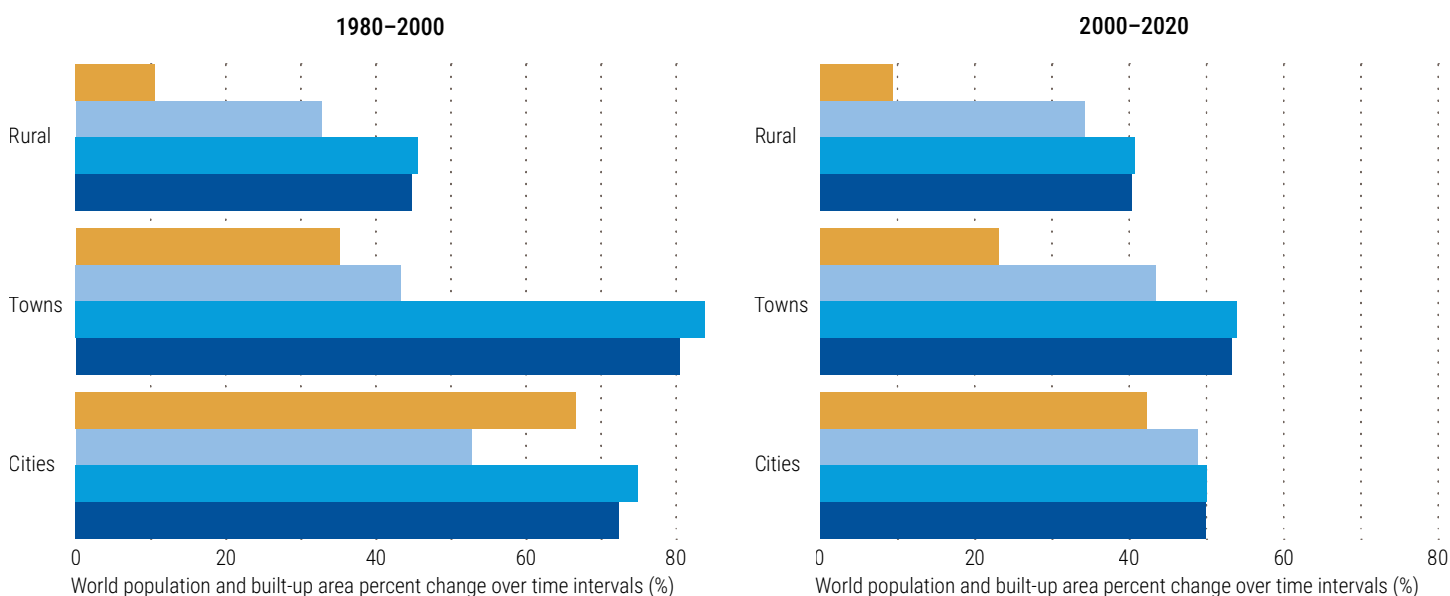
This gap between built-up area expansion and population growth is largest in rural areas, smaller in towns, and smallest in cities (figure 2). In practical terms, this means that built-up areas in rural areas are expanding much faster than their populations are growing, while in cities the rate of built-up area expansion is closer to that of population growth. Figure 2 also shows that this pattern has remained consistent over time (from 1980–2000 and 2000–2020), and applies to both residential and non-residential development, although residential areas tend to expand faster in all settlement types.

Figure 3 further illustrates that most built-up area is used for residential purposes. Across rural areas, towns and cities, roughly 90 per cent of built-up areas are residential, with only a small share used for non-residential activities such as industry or infrastructure. Rural areas have a slightly higher share of residential built-up area

Figure 2

Percentage change of population and built-up area (world)

Population Non-residential Residential Total built-up area



than towns and cities, reinforcing the idea that expansion in these areas is largely driven by housing rather than economic or service-related uses.

BUILT-UP AREA EXPANSION PATTERNS VARY ACROSS COUNTRY INCOME GROUPS

Analysis by World Bank country income classification largely mirrors global trends, with built-up areas expanding faster than population growth across most settlement types and income groups. The notable exception is cities in low-income countries, where more compact patterns of urban growth prevail: city populations grew faster than built-up areas expanded in both 1980–2000 and 2000–2020 (see figures 4.a and

4.b). Across the three settlement types, the discrepancy between population growth and built-up area expansion is greatest in rural areas and is especially pronounced in upper-middle-income countries (both time periods, but especially between 2000–2020).

Between 1980 and 2000, residential built-up areas expanded faster than non-residential ones across all settlement types and income groups. However, between 2000 and 2020, upper-middle-income countries exhibited a distinct pattern: non-residential built-up areas across all settlement types expanded faster than residential ones, likely reflecting rapid industrialization and commercial development, especially in China (the most populous upper-middle-income country), during this period.

Figure 3

Residential and non-residential built-up areas (world)

Non-residential Residential

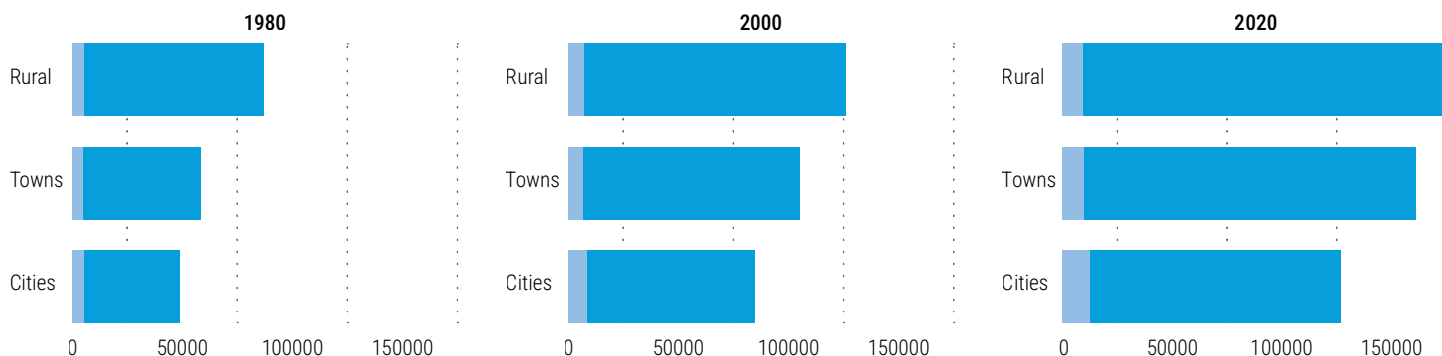
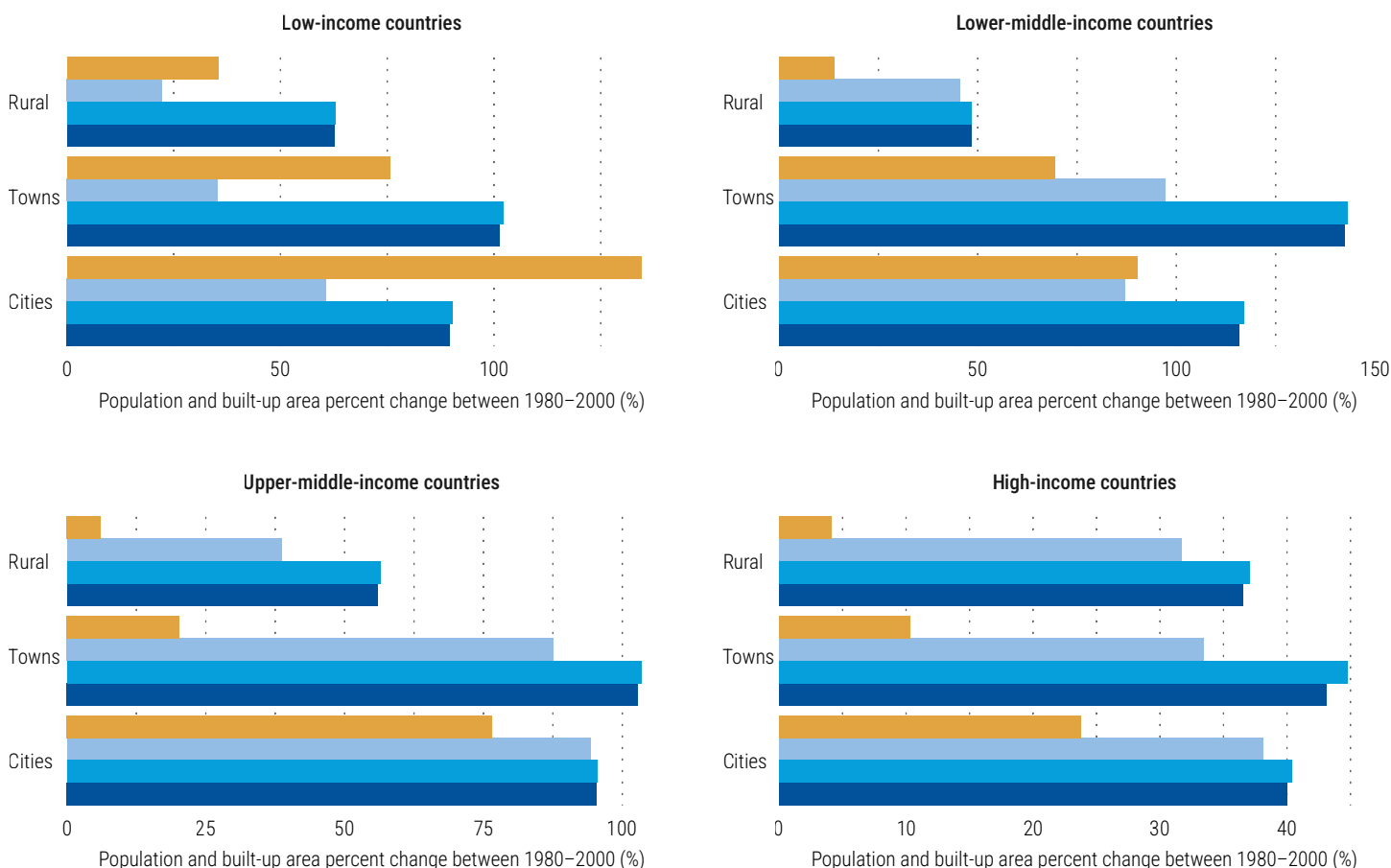


Figure 4.a.

Percentage change of population and built-up area by World Bank income groups (1980–2000)

Population Non-residential Residential Total built-up area



WHAT IS DRIVING RURAL BUILT-UP AREA EXPANSION?

To better understand these trends, especially in rural areas, we reviewed research on agricultural trends to assess whether the large expansion of residential built-up area in rural areas is driven by the rise of small farms. Because a rural dwelling is often associated with a farm, trends in the number and size of farms offer a useful lens on rural residential growth: a proliferation of small farm holdings would tend to add built-up area, whereas the consolidation of land into fewer, larger farms would point to other drivers, such as non-agricultural housing and larger residential lots.

Farmland consolidation is occurring in high- and upper-middle-income countries, while farms in low- and lower-middle-income countries are facing land fragmentation, with implications for sustainable agricultural land management (SDG 2.4) and the sustainable use and restoration of land resources (SDGs 15.1 and 15.3). In high-income and upper-middle-income countries (the income groups showing the greatest disparity in population growth and built-up area expansion in rural areas), farmland consolidation is occurring. Farm

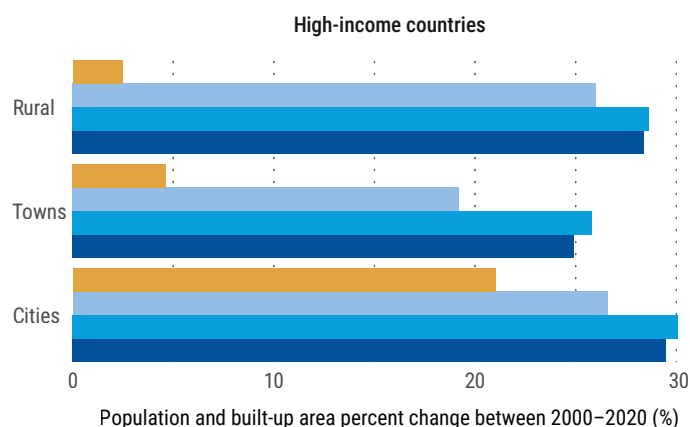
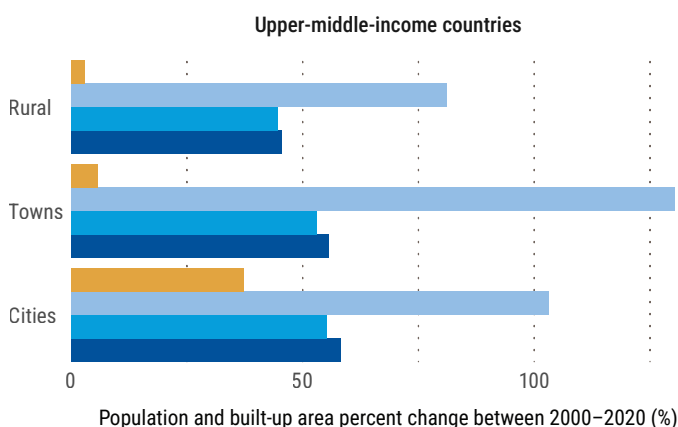
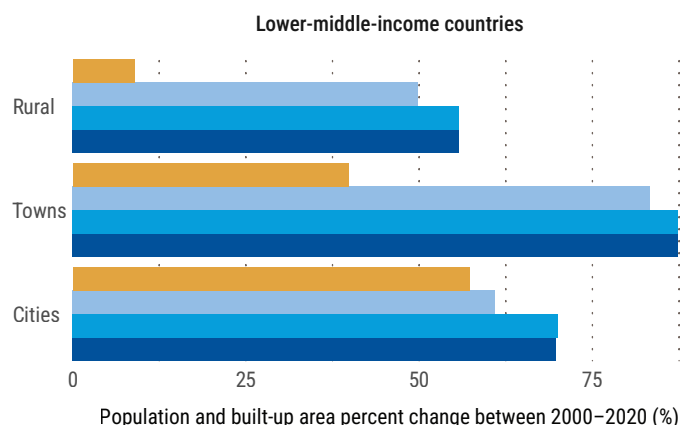
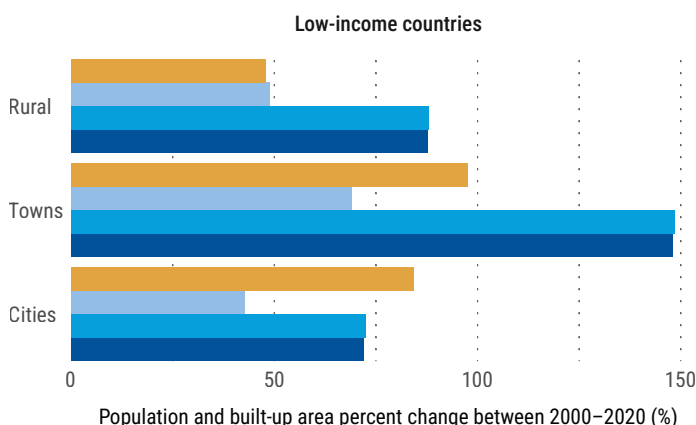
sizes are increasing while the total number of holdings is declining, a pattern consistent with capital-intensive, mechanized agriculture (FAO, 2024). In contrast, in low-income and lower-middle-income countries (where residential built-up area is not expanding as rapidly), small-holder farms are experiencing land fragmentation, with both mean and median farm sizes generally declining. This suggests that in these regions, the number of people attempting to derive a livelihood from increasingly smaller plots is often growing (FAO, 2025c).

These divergent trends have important implications for interpreting built-up area expansion (figure 5). The growth in rural residential built-up areas in wealthier countries cannot be attributed to more small farms; rather, it likely reflects low-density residential development, larger lot sizes, suburban sprawl and conversion of agricultural land to residential use, raising concerns related to sustainable urbanization (SDG 11.3), sustainable consumption of land resources (SDG 12.2), and pressures on productive agricultural land (SDG 2.4 and SDG 15.3). In lower-income countries, the more modest expansion of residential built-up areas occurs against a backdrop of increasing pressure on agricultural land from growing rural populations with declining farm

Figure 4.b.

Percentage change of population and built-up area by World Bank income groups (2000–2020)

Population Non-residential Residential Total built-up area



sizes. Both dynamics can have environmental and food-security consequences, including the loss of productive farmland, surface sealing, habitat fragmentation and associated emissions.

Further study, including at the subnational level, is needed to understand these trends. This policy brief is based on analysis of residential and non-residential built-up areas, as well as a review of the relevant literature. Further decomposition of built-up areas, beyond the residential and non-residential breakdown,³ would provide additional insight and help confirm our findings. We also note limitations on the interpretation of trends in cities and towns, where the data measure compactness and built-up density, but they do not distinguish the quality, safety, service provision or environmental performance of settlements. As a result, both well-served compact urban areas and dense informal settlements may appear similarly compact in the dataset. Trends in rural areas call for analogous care

³ For example, an analysis by UN Habitat on a sample of 110 cities found that the majority of new housing between 2010 and 2025 was low-rise single family housing, (UN-Habitat 2026).

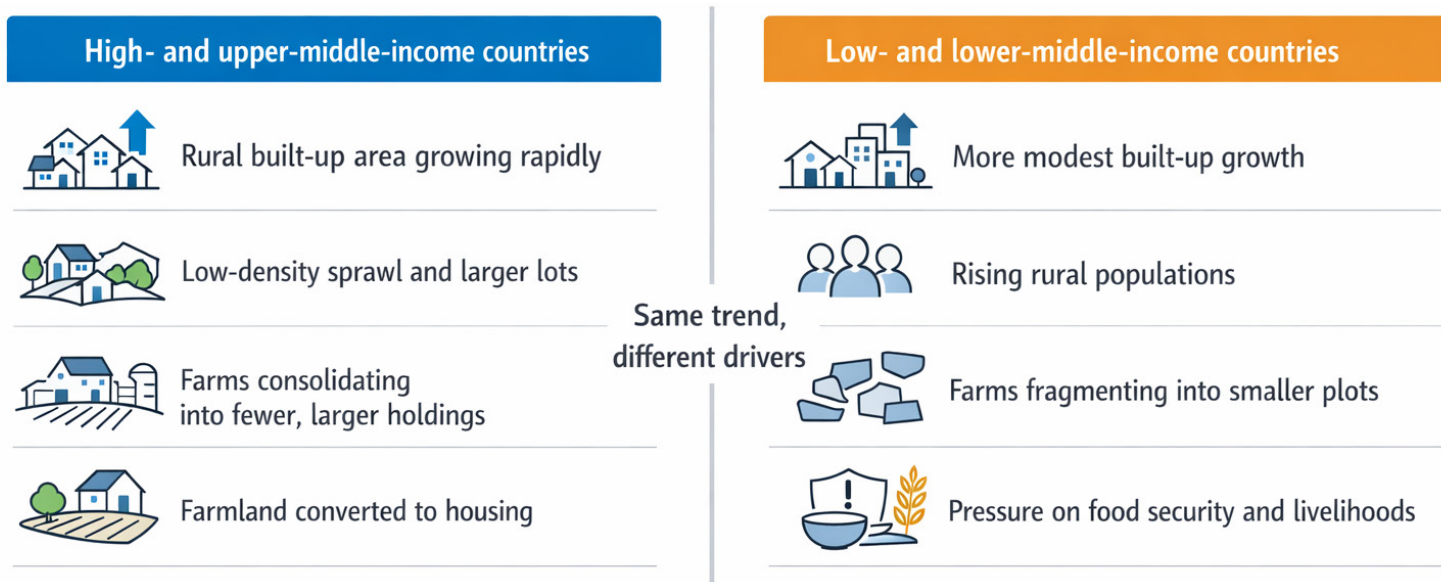
in interpretation: the measures capture growth of the building footprint across territory classified as rural at each point in time, rather than the encroachment of officially defined urban areas onto rural land, and they do not distinguish among housing, farm buildings and other structures beyond the residential/non-residential breakdown. Nevertheless, we can still draw important policy recommendations from the findings.

IMPLICATIONS FOR POLICY

Taken together, the analysis points to two distinct dynamics that the recommendations below are designed to address. In high-income countries, the rapid growth of rural built-up areas reflects low-density, land-intensive development—suburban sprawl, larger residential lots and the conversion of farmland to non-agricultural use—rather than agricultural expansion. In lower-income countries, the more modest expansion of built-up areas coincides with mounting pressure on a shrinking agricultural land base as rural populations rise and farms fragment. Both dynamics carry the environmental and local food-security consequences set out above—loss of productive farmland, surface sealing, habitat fragmentation

Figure 5

Two divergent dynamics: higher-income vs. lower-income countries



and associated emissions—and both call for steering settlement growth towards more efficient and sustainable patterns.

The findings have significant implications for sustainable development policy at local, national and international levels. The disproportionate expansion of built-up areas relative to population growth—particularly in residential areas and rural settings—underscores the need for integrated, multi-sectoral policy responses (see figure 6):

- **Promoting compact, sustainable urban development:** In cities and towns, policies should prioritize compact urban forms through effective land-use planning, mixed-use development, transit-oriented development and densification of existing built-up areas. Investment in sustainable infrastructure, including public transportation and green spaces, can support more efficient use of urban land while enhancing quality of life.
- **Supporting sustainable land management in rural areas:** Rural policies should support sustainable land management practices, agroecological farming and the protection of productive agricultural land from unnecessary conversion. In addition, policies should encourage restoring abandoned agricultural land for investment in biodiversity conservation rather than allowing it to fall into disrepair or be sold for development. Strengthening urban-rural linkages through improved transport, digital connectivity, and access to public service delivery can reduce pressure for land-intensive development while supporting rural livelihoods.
- **Safeguarding food security:** Globally, food production has more than kept pace with population growth since the 1960s, so the most pressing food-security risks from built-up area expansion arise at the local and regional levels rather than in aggregate global

supply. Since 1970, approximately 60 per cent of the land converted to urban use was previously productive farmland; protecting the remaining agricultural land is therefore essential for safeguarding local food systems, especially where communities rely on nearby farmland. Policies should balance the need for housing and infrastructure with the imperative to maintain sufficient agricultural capacity to feed growing populations. In addition, policies should protect small farms: depending on the practices used and the local context, they can support more environmentally sustainable land use, and are critical for local food security, particularly in low- and lower-middle-income countries, where they account for about 60 per cent of national food production (FAO, 2025b).

- **Strengthening monitoring and data systems:** Effective policy requires robust data. Regular censuses, integrated geospatial-statistical systems and harmonized methodologies such as the Degree of Urbanization are essential for monitoring land-use efficiency and tracking progress towards the SDGs.

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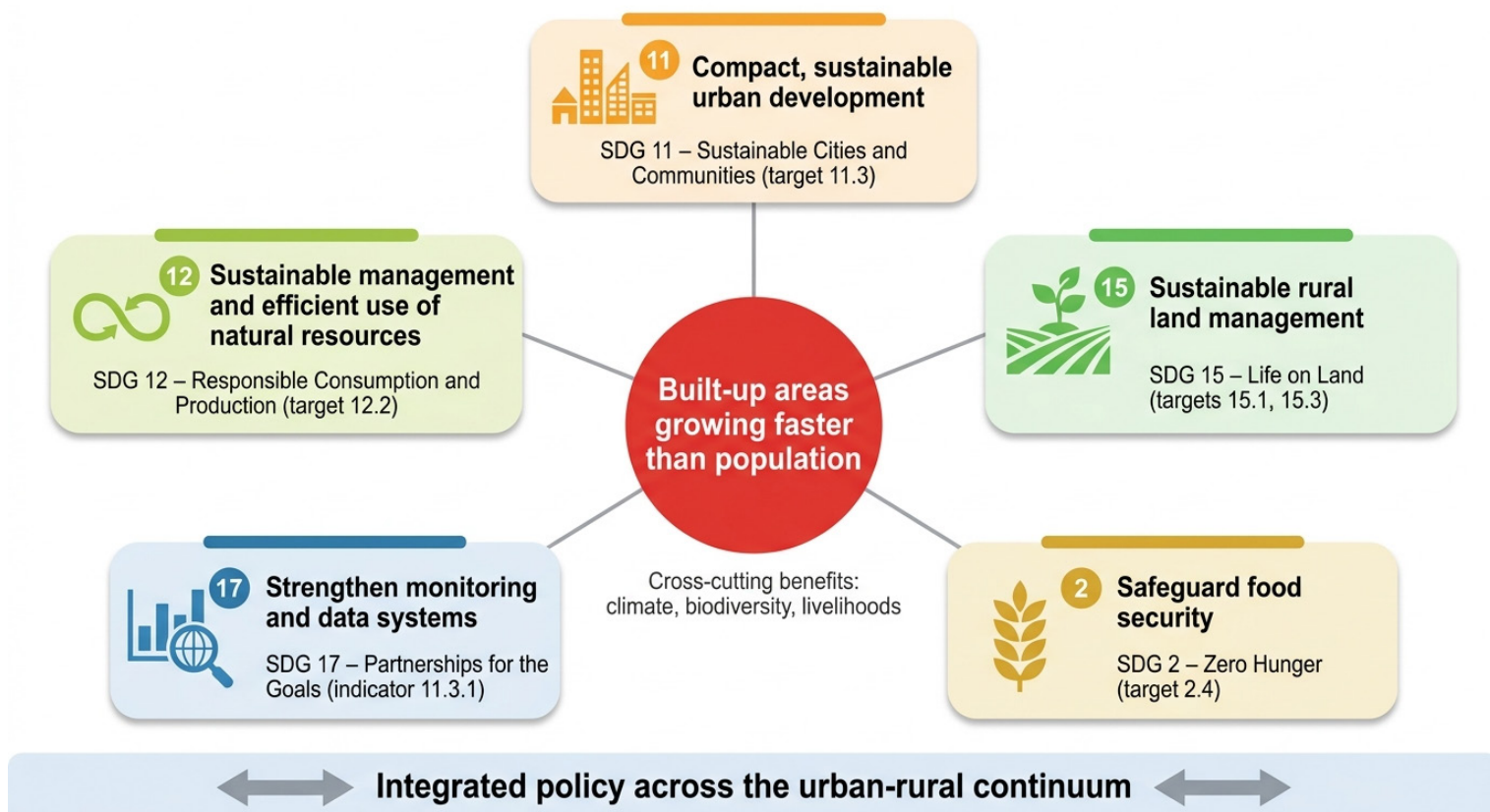
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Figure 6

Policy recommendations across Sustainable Development Goals



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