

CONSUMO DI SUOLO, DINAMICHE TERRITORIALI E SERVIZI ECOSISTEMICI. EDIZIONE 2022



Land Consumption, Land Cover Changes and ecosytem services

SUMMARY BY ISPRA

The full report is available at www.consumosuolo.isprambiente.it

Report di Sistema SNPA I **32** 2022 The 2022 edition of the Report on Land Consumption, territorial dynamics and ecosystem services, which is the ninth dedicated to these themes, provides an updated picture of our territory transformation processes that continue to cause loss of such an essential resource as soil along with its functions and the related ecosystem services. The Report analyzes Italy's territorial evolution and land consumption within a broader analysis framework of the dynamics of urban, agricultural and natural areas at different levels through useful indicators for evaluating characteristics and trends of land consumption, urban growth and landscape transformations, thus providing assessments on the impact of artificial land cover growth paying special attention to lost or threatened natural functions. The updated data, produced at the national, regional and local scale, are able to represent in extremely fine-grained details every single transformation detected thanks to the commitment of the Italian **National System for Environmental Protection** - SNPA (Sistema Nazionale per la Protezione dell'Ambiente) and the monitoring activities jointly carried out by the organizations of which it is composed, i.e. the Italian **Institute for Environmental Protection and Research, ISPRA** (Istituto Superiore per la Protezione e la Ricerca Ambientale), the **Territorial Environmental Protection Agencies** (ARPA/APPA) and the autonomous provinces of Trento and Bolzano.

This year's monitoring confirms the critical nature of land consumption in peri-urban and urban areas, where there is a continuous and significant increase in artificial surfaces, with an increase in the density of the built-up at the expense of agricultural and natural areas, together with the critical nature of areas around the infrastructure, which are more fragmented and subject to artificialisation interventions due to their greater accessibility and also due to the growing pressure due to the demand for ever larger spaces for logistics. The changes detected in the last year are concentrated in certain areas of the country, remaining particularly high in Lombardy, Veneto (although, in this region, with a slowing trend), Emilia-Romagna and Piedmont. The phenomenon remains most intense in lowland areas, along the coasts and in major metropolitan areas. The greatest density of change has been recorded this year within one kilometer of the sea and in the urban and peri-urban areas of major poles and belt municipalities, particularly where property values are higher and at the expense, primarily, of formerly agricultural and herbaceous vegetation soils, including in urban areas. The data confirm the advance of phenomena such as sprawl, dispersion, and urban decentralization on the one hand, and the densification of urban areas on the other, which causes the loss of natural surfaces within our cities, valuable surfaces for ensuring adaptation to ongoing climate change.

These processes mainly concern coastal and lowland areas while, at the same time, especially in marginal areas, we are witnessing land abandonment and the fragmentation of natural areas.

The assessment of land degradation, closely linked to the loss of ecosystem services that soil is able to offer, allows to have a more complete picture of the phenomena impacting soil functionality and limiting our capability "to combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world" (Land Degradation Neutrality - LDN)" and "to make cities more inclusive, safe, resilient and sustainable" by 2030, as envisaged by the Sustainable Development Goals of the UN Agenda for Sustainable Development.

Land consumption, land degradation, loss of ecosystem services and their consequences, analysed in depth in this report, continue at an unsustainable pace, and in the last year more than 2 square metres of agricultural and natural land per second have been replaced by buildings, infrastructure and other artificial surfaces. This phenomenon does not slow down in 2021, despite the interruption of activity during lockdown, and even this year almost 70 square kilometres are lost. This is also due to the absence of any effective normative interventions in most of the country or to the waiting for their implementation and for the definition of a homogeneous policy framework at national level. The consequences are economic too and "hidden costs", due to the last 15 years soil sealing expansion, reached 8 billion euro per year in Italy, that could influence negatively Next Generation E.U. resources.

LAND CONSUMPTION IN ITALY

Land consumption in Italy continues to transform the national territory at great speeds. Last year, the new artificial covers affected other **69.1 km**², i.e. an average of about **19 hectares per day** (Table 1). An increase that, unfortunately, in line with the recently detected data, despite moderate signs of slowing down, makes our country lose **almost 2.2 square metres of land per second**.

The speed of land consumption is still very far from the European targets envisaging to achieve "no net land take", i.e. a balance between land consumption and the increase in natural surfaces through demolition, de-sealing and renaturalization.

Data from the new SNPA map (Figure 3) show that the net values of last year's changes are equal to **69.1 km**², equivalent to **2.10 m**² **for each hectare** of the Italian territory. In addition, it must be considered that, last year, 11.9 km² changed from reversible consumed land to permanent consumed land, thus further increasing soil sealing in the country. Therefore, also considering the new permanent land consumption, soil sealing has increased by 24.4 km².

The relationship between land consumption and population dynamics confirms that there is not a direct link between demography and urbanization processes, and often an increase of land consumption does not correspond to population growth. Due to the population decrease, **consumed land per capita reaches 1.92 m²/p**, **from 359 to 369 m²/p**. In 2012 it was 349 m²/p (Figure 1).

Data from the new SNPA map of land consumption (Figure 3) show that, at national level, in 2021 artificial land cover, some types of which have been excluded (bridges, viaducts, forest roads in mountainous areas and other minor roads, artificial water bodies and greenhouses with unpaved floor), has reached 7.13% (6.95% in 2012 and 6.75% in 2016) rather than the U.E. average (4.2%). The percentage rises to 10.29% within the so-called useful land, i.e. that part of the territory theoretically available, or in any case more suitable, for different uses.

Between 2006 and 2021, 1,153 km² of natural or seminatural land was consumed in Italy due to urban expansion and its collateral transformations, with an average of 77 km² per year (Figure 2) (Net) Land consumption (or Land take) means the increase of artificial land cover areas, usually processed on an annual basis Consumed land means the total quantity of artificial land cover existing in the year considered

Table 1 Estimate of annual land consumption (new artificially covered surfaces), net annual land consumption (balance between new consumption and restored areas), consumption density (increase in square metres for each hectare of land) at national level. Source: SNPA map developed by ISPRA

	2020-2021
Land consumption (km ²)	69.1
Net land consumption (km ²)	63.3
Net land consumption (incr. %)	0.30
Density of net land consumption (m ² /ha)	2.10



Figure 1 Net land consumption's daily speed. Source: data processing by ISPRA on SNPA map



Figure 2 Consumed land (2006-2021) as a percentage at the national level. Source: data processing by ISPRA on SNPA map.



Figure 3 Localization of the main changes due to land consumption between 2020 and 2021. Source: SNPA map elaborated by ISPRA

LAND CONSUMPTION IN THE REGIONS

The changes detected in the last year are concentrated in some areas of the country, remaining particularly high in Lombardy, Veneto and the northern plains. The phenomenon seems to increase and accelerate along the coasts of Sicily and southern Apulia and in metropolitan area of Rome Milan, Naples, L'Aquila, while high rates of transformation persist along almost the entire Adriatic coast.

The higher changes density was registered, during the last year, in plain areas, in urban and periurban areas of the main cities, especially where real estate values are medium, at the expense of agricultural and natural soil. Higher percentage values of **consumed land** are in **Lombardy (12.12%)**, **Veneto (11.90%)** and **Campania (10.49%)** (Figure 4 and Table 2)

The largest increases, measured last year by net land consumption in hectares, occurred in **Lombardy**, which increase of **883 hectares** reaching **Veneto (+684 hec-tares)**, **Emilia-Romagna (+658)**, Piedmont (+629), Apulia (+498), Lazio (+407) and Aosta Valley is the lowest soil consumption region (only +11 hectares). The other regions that this year have had increases of less than 100 hectares are Liguria, Umbria, Molise, Friuli-Venezia Giulia, Trentino-South Tyrol, Basilicata e Calabria. ()

In terms of percentage increase (Table 4), compared with the artificial surface of the previous year, the highest values are detected in Abruzzo (+0.78%), Piedmont (+0.37%), Campania (+0.34%), Emilia-Romagna (+0.33%) (Figure 5, Table 2).

The density of net changes in 2021, i.e. land consumption in relation to the territorial surface area, makes clear the importance of **North-West** which consumes 2.70 square metres for each hectare of the Italian territory, of **North-East** (2.45 m²/ha) against a national average of 2.10 m²/ha. The highest density of land consumption among the regions is observed in Abruzzo (3.38 m²/ha) Veneto (3.73 m²/ha), Lombardy (3.70 m²/ha), and Campania (3.60 m²/ha) (Table 2).

In terms of **consumed land per capita**, the highest regional values are affected by the low housing density typical of some regions. Molise shows the highest value (592 m²/p), i.e. more than 200 m² compared with the national value (366 m²/p), followed by Basilicata (582 m²/p) and Aosta Valley (564 m²/p). Instead, Sicily, Lombardy, Campania and Lazio show the lowest values, below national value.

When considering only the annual growth, Abruzzo (3.27 m²/p), is the region with the highest values, while Liguria has the lowest value ($0.26 \text{ m}^2/\text{p}$;Figure 6).



Figure 4. Consumed land at regional level and for geographic distribution (% 2021). National percentage in red. Source: data processing by ISPRA on SNPA map

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Figure 5. Net land consumed at regional level. Percentage increase (in blue) and hectares (in green) between 2020 and 2021. Also the national percentage increase (in red) and geographic distribution are given. Source: data processing by ISPRA on SNPA map



Figure 6. Land consumed per capita in 2021 (square metres per person), with national value (in red) and geographic distribution. Source: data processing by ISPRA on SNPA map.



Figure 7. Regional annual net land consumption trend from 2006 to 2021. Source: data processing by ISPRA on SNPA map

Table 2 Total land consumed (2021) and net annual land consumption between 2020 and 2021 and between 2006 and 2021 at regional level. Source: data processing by ISPRA on SNPA map

Region	Consumed Land 2021 (ha)	Consumed Land 2021 (%)	Net land consumption 2020-2021 (ha)	Net land consumption 2020-2021 (%)	Net land consumption 2006-2021 (ha)	Density of Net land consumption 2020-2021 (m²/ha)	Density of Net land consumption 2006-2021 (m²/ha)
Piedmont	169,655	6.68	629.88	0.37	8,792	2.48	34.61
Aosta Valley	7,001	2.15	10.52	0.15	201	0.32	6.17
Lombardy	289,386	12.12	882.98	0.31	13,858	3.70	58.04
Liguria	39,299	7.25	39.3	0.10	824	0.73	15.20
North-West	505,341	8.72	1,562.68	0.31	23,675	2.70	40.85
Friuli-Venezia Giulia	63,375	8.00	98.44	0.16	2,722	1.24	34.37
Trentino-South Tyrol	41,624	3.06	87.78	0.21	1,835	0.65	13.49
Emilia-Roma- gna	200,320	8.90	658.16	0.33	10,351	2.92	46.00
Veneto	218,230	11.90	683.58	0.31	12,309	3.73	67.13
North-East	523,549	8.40	1,527.96	0.29	27,217	2.45	43.64
Umbria	44,543	5.27	111.97	0.25	2,636	1.32	31.18
Marche	64,751	6.94	137.95	0.21	3,755	1.48	40.27
Tuscany	141,827	6.17	293.75	0.21	4,238	1.28	18.44
Lazio	139,918	8.13	407.42	0.29	8,610	2.37	50.05
Centre	391,039	6.75	951.09	0.24	19,239	1.64	33.19
Basilicata	31,701	3.17	76.95	0.24	2,258	0.77	22.59
Molise	17,414	3.92	54.09	0.31	751	1.22	16.91
Abruzzo	54,210	5.02	418.69	0.78	3,428	3.88	31.75
Calabria	76,319	5.06	83.68	0.11	4,475	0.55	29.67
Apulia	158,695	8.20	498.6	0.32	13,752	2.58	71.05
Campania	142,625	10.49	490.04	0.34	6,984	3.60	51.36
South	480,963	6.56	1,622.05	0.34	31,648	2.21	43.20
Sardinia	80,029	3.32	180.49	0.23	3,591	0.75	14.89
Sicily	167,590	6.52	487.17	0.29	9,898	1.89	38.48
Islands	247,619	4.97	667.66	0.27	13,489	1.34	27.07
ITALY	2,148,512	7.13	6,331.44	0.30	115,268	2.10	38.24

LAND CONSUMPTION IN THE PROVINCES

With **307** hectares of new artificial land **Brescia** is the province where net **land consumption** grew the most in 2021, it is followed by **Rome (+216)** and **Naples (+204)**. Among those that have consumed less are the provinces of Trieste, Gorizia and Ancona, where even some actions to restore already consumed soil have helped to keep land consumption below 10 hectares.

Compared with 2020 (Table 3), the highest percentage values are those of Chieti (+1.05%), Pescara (+0.97%), Novara (+0.95%). In absolute terms, the metropolitan city of Rome is confirmed as the one with the largest area consumed as of 2021, with more than 70,100 hectares, thanks in part to an additional 216 hectares in the last year, more than 95 of which are in the capital's municipal area. The province of Rome is followed by Turin (about 58,075 hectares), with an increase of 162 hectares. Milan is approaching, in 2021, the threshold of 50,000 hectares (75 more in the last year) but is surpassed by Brescia with a slightly higher area consumed (50,022 hectares) thanks to 307 hectares of consumption in the last year. Verona (+184 hectares), Treviso (+119 hectares) and Naples (+204 hectares) have values between 40,000 and 42,000 hectares. More than a fifth (22 percent, more than 4,600 km2) of the artificial soil in Italy in 2021 is concentrated in the territory administered by the 14 metropolitan cities.

Monza and Brianza is confirmed as the province having the highest percentage of artificial-land, with about 41% of consumed land in relation to the provincial land area and a further increase of 10 hectares. Above 20% we find the provinces of Naples (35%), Milan (32%), Trieste (21%) and Varese (21%) and, just below, Padua (19%) and Treviso (17%). Among these, the greatest percentage increase occurred in Padua (+ 0.19%) and Treviso (+0.17%).

LAND CONSUMPTION IN THE MUNICIPALITIES

Also this year, with an increase of 95 hectares in artificial surface, **Rome** is confirmed as the Italian municipality that most transformed its territory (Table 3 and Figure 7).

The second largest municipality in terms of land consumption in 2021 is **Ravenna**, with 68 hectares of increase: the origin of this land consumption is to be found in the expansion of areas for construction sites and the construction of a methane pipeline.

Among the municipalities with the largest increase in land consumption in the past 12 months is **Vicenza**, where 42 hectares were lost due to the opening of several construction sites for the creation of a park in the north of the municipality. In both cases, the transformations have been classified as reversible processes, for which the situation will be verified in future monitoring in order to reassign natural status once restoration has taken place.

Closing the list of the top 10 municipalities that have achieved the most land consumption in the last year are Reggio nell'Emilia, Catania and Novara, with 35 hectares more. In Catania, the new consumption is mainly due to construction sites for the intermodal hub of the interport and the adjacent logistics hub; in Novara, the largest share of land transformation is due to the completion of a building with an estimated surface area of 10 hectares, destined for e-commerce, and another 17 hectares or so destined for construction sites for new infrastructure. In addition, among the top ten municipalities with the largest increase in the last 12 months we find three municipalities with populations under 30 thousand: Desenzano del Garda (almost 34 hectares), Palo del Colle (+32 hectares), Ghedi (+32 hectares) and Ostellato (+30 hectares). For Palo del Colle, the consumption is linked to a large photovoltaic plant, the extent of which will be explored in more detail in the dedicated chapter of this report; Ghedi, on the other hand, owes almost half of the new land consumed to the expansion of the military airport; finally, Desenzano del Garda owes its numbers to the construction sites for the high-speed train, adjacent to the highway in addition to punctual urban densification interventions

Among the regional capitals, in addition to Rome, already mentioned, we find Venice with significantly lower values than the first one in the ranking (+23), and 4 other cities that consume from 10 to 20 hectares: Milan (almost 19 hectares), Naples (almost 18), Perugia (13), L'Aquila (12).

In the municipalities of Polverigi and Osimo (Ancona province), on the other hand, we see a reduction of artificial land. These are all cases in which the negative balance results from renaturalization of building sites. Specifically, at the two municipalities, renaturalization has

referenced the construction site areas of a methane pipeline. On the other hand, the municipality where the most extensive restored areas are recorded is Trissino in the province of Vicenza, in which most of the land subjected to excavation for the construction of a lamination basin for the Agno-Guà River has been renaturalized. Finally, it is important to note the renaturalization of about 3 hectares in the municipality of Marano di Valpolicella (province of Verona), not particularly extensive in area, but due to the rehabilitation of quarried areas belonging to a former cement factory and now designated for a biodiversity park.

Table 3 Net annual land consumption in hectares (increase, 2020-2021) at municipal level (first 3 municipalities for each region). Source: data processing by ISPRA on SNPA map

Region	Municipality	Land consumption (ha)
Piedmont	Novara	34.58
	Trecate	28.30
	San Pietro Mosezzo	25.04
	Valtournenche	1.68
Aosta Valley	Courmayeur	1.02
	Ayas	0.84
	Desenzano del	33.77
Lombardy	Chodi	21.67
	Gileui Cividata al Diana	20.14
	Tronto	20.14
Trentino-South	Morano	4.07
Tyrol	Mori	1.43
	Viconzo	1.30
Vanata	Sommacampagna	42.20
veneto	Arzignano	29.93
	Morsono al Taglia	20.70
Friuli-Venezia	mento	11.73
Giulia	Rivignano Teor	11.24
	Cordovado	8.86
	La Spezia	7.67
Liguria	Genova	5.39
	Arcola	4.78
Emilia-Roma- gna	Ravenna	68.66
	Reggio nell'Emilia	35.44
	Ostellato	30.26
Tuscany	Bagno a Ripoli	26.44
	Badia Tedalda	26.31
	Grosseto	14.14
Umbria	Perugia	12.87

	Gualdo Tadino	11.08
	Spoleto	9.70
Marche	Matelica	25.90
	Fano	24.11
	Fermo	10.29
	Roma	95.05
Lazio	Fiumicino	23.77
	Fara in Sabina	17.22
	Lanciano	26.48
Abruzzo	Teramo	12.87
	Orsogna	12.30
	Larino	7.46
Molise	Campobasso	4.06
	Termoli	3.08
	Presenzano	22.94
Campania	Acerra	21.15
	Napoli	17.83
	Palo del Colle	32.37
Apulia	Nardò	19.26
	Foggia	17.82
	Melfi	13.61
Basilicata	Lauria	8.07
	Balvano	4.04
Calabria	Crotone	7.21
	Corigliano-Rossano	5.84
	Cassano all'Ionio	5.74
Sicily	Catania	34.62
	Modica	24.20
	Carini	19.93
	Olbia	10.74
Sardinia	Cagliari	9.26
	Sassari	8.64

Table 4 Percentage of consumed land (2021) at municipal level (first 3 municipalities per region). Source: data processing by ISPRA on SNPA map

Region	Municipality	Consumed land 2020 (%)
	Torino	65.0
Piedmont	Beinasco	57.9
	Grugliasco	55.4
	Aosta	29.2
Aosta Valley	Pont-Saint-Martin	17.7
	Verrès	14.6
Lombardy	Lissone	71.3
	Sesto San Gio- vanni	68.8
	Lallio	66.9
Trentino-South Tyrol	Lavis	27.2
	Bolzano	25.9
	Merano	22.8

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	Modugno	42.0
	Aradeo	28.5
	Potenza	10.7
Basilicata	Melfi	8.7
	Policoro	8.5
Calabria	Tropea	35.0
	Villa San Giovanni	27.9
	Soverato	27.3
Sicily	Isola delle Fem- mine	54.0
	Gravina di Catania	50.4
	Villabate	48.6
Sardinia	Monserrato	41.8
	Elmas	31.4
	Cagliari	24.7

Also this year, by investigating the first municipalities in terms of percentage of artificial surface with respect to their administrative boundaries, it can be observed that the small urban centres of Campania and Lombardy (more than 65%) stand out for their high or very high rate of consumed land. More specifically, Casavatore, Arzano, Melito of Naples, in Campania show a percentage of artificially covered areas exceeding 90% in the first municipality and 80% in the other two (Table 4 and Figure 8).

Turin (65%), Naples (63%), Milan (58%), Pescara (51%) stand out among the municipalities, which are also provincial capitals, having a percentage of artificially covered areas close to or greater than 50%.



Figure 8 Consumed land at municipal level (% 2021). Source: data processing by ISPRA on SNPA map

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Figure 9 Density of net annual land consumption (2020-2021) at municipal level. Source: data processing by ISPRA on SNPA map

DISTRIBUTION AND IMPACT OF LAND CONSUMPTION

Land consumption is more intense in already at-risk areas. In the most highly urbanized cities 27 square metres for each hectare of green areas have been lost in the last year alone.

This increase contributes to making our cities always warmer resulting in the Urban Heat Island (UHI) phenomenon and the difference in summer temperature between areas with dense or diffuse artificial coverage: compared with rural areas, this temperature difference often reaches values higher than 2°C in the largest cities.

But land consumption occurred also in the protected areas (+75 hectares last year, 10 hectares more than the last year), restricted areas for landscape protection (+1,037 hectares), areas within 10 km of coasts (+1,353), areas with medium hydraulic hazard (+992 hectares), landslide hazard areas (+371 hectares) and in seismic hazard areas (+2,396 hectares).

A clear impact of landscape transformations is given by fragmentation of the territory, i.e. the process that generates a progressive reduction in the surface of natural and semi-natural habitats and an increase in their isolation. In 2021 almost the 45% of the national territory is classified in highly or very high fragmented areas.

An assessment of the major ecosystem services, provided by soil but lost due to new artificial surfaces, is realized for agricultural production, lumber production, carbon storage, erosion control, insect pollination, microclimate regulation, removal of ozone and particulate matter, water purification and availability, and the regulation of hydrological cycle. Furthermore, to this list we must add habitat quality along with mapping and assessment of the status of ecosystems and their services in order to support making choices of planning and ecosystems protection.

The areas lost in Italy since 2012 would have ensured the total supply of 4 million and 150 thousand quintals of agricultural products and the infiltration of more than 360 million cubic meters of rainwater that now, flowing on the surface, are no longer available for groundwater recharge and aggravate the hydraulic hazard of our territories. Over the same period, the loss of the carbon storage capacity of these areas (more than three million tons) is equivalent, in terms of CO2 emissions, to what more than one million cars with an average mileage of 11,200 kilometers per year would emit between 2012 and 2020: a total of more than 90 billion kilometers driven, more than 2 million times the circumference of the earth.

This recent land consumption also produces potential economic damage in excess of 3.6 billion euros each year due to the loss of soil ecosystem services. The estimate rises to more than 8 billion euros per year when considering land consumption over the past 15 years (2006-2021).

New artificial cover is certainly one of the most acute forms of soil degradation, which in addition to changes in cover (not only from natural to artificial) takes place in the form of loss of productivity and organic carbon in the soil surface layer, but also through habitat loss, land fragmentation, 'erosion, etc.). The estimation of degraded areas to assess the distance that separates us from the Land Degradation Neutrality target set out in the 2030 Agenda for Sustainable Development was conducted through the methodologies proposed by UNCCD for the calculation of Sustainable Development Indicator 15.3.1; between 2000 and 2015 the degraded Italian territory stands at 20%, with higher values in Central Italy, while in the following four years of monitoring, in line with the periods agreed upon in the UNCCD, there is an additional portion of degradation of 5.9% of territory that reaches 11% considering the other indicators proposed by ISPRA. The total computation, in accordance with methodology 15.3.1 estimates at 17% the degraded territory as of 2019, net of improved areas (due to cover changes that have restored soil status or increased productivity beyond the thresholds considered). Considering the additional contributions that between 2016-2019 bring the portion of degraded land to about 33 thousand km² (Figure 10) and for the next two years (2020-2021) add another 7.6 thousand km², the Land Degradation neutrality still appears distant, especially considering the substantial contribution of the other causes of degradation.



Figure 10 Degraded areas between 2016 and 2019 due to one or more causes of degradation. Source: data processing by ISPRA on SNPA map

FUTURE SCENARIOS

An assessment of the scenarios of transformation of the Italian territory, in the event that the transformation speed was to be confirmed at the current rate in the coming years as well, leads to an estimate of new land consumption of 1,838 km² between 2021 and 2050 (Figure 12). On the other hand, if it were to return to the average rate recorded in the 2006-2012 period, it would exceed 3,000 km². In the case of implementing a gradual reduction in the transformation rate, assumed to be 15 percent every three years, there would be an increase in artificial areas of more than 800 km², before zeroing out by 2050.

These are all far from the sustainability goals of Agenda 2030, which, based on current population projections,

would impose a negative balance of land consumption. This means that, as of 2030, "sustainability" of development would require a net increase in natural areas of 269 km² or even 888 km², which would have to be recovered if this goal were to be brought forward starting immediately.

Considering the average annual costs due to the loss of ecosystem services, both for the flow-related component and for the stock-related component, it can be estimated, if the 2012-2021 average rate was confirmed even in the next 9 years and thus the growth in the economic values of lost ecosystem services, a total cumulative cost, between 2012 and 2030, of between 78.4 and 96.5 billion euros.



Figure 11 Scenarios of land consumption in Italy (km² of consumed land at national level by 2050). Source: data processing by ISPRA