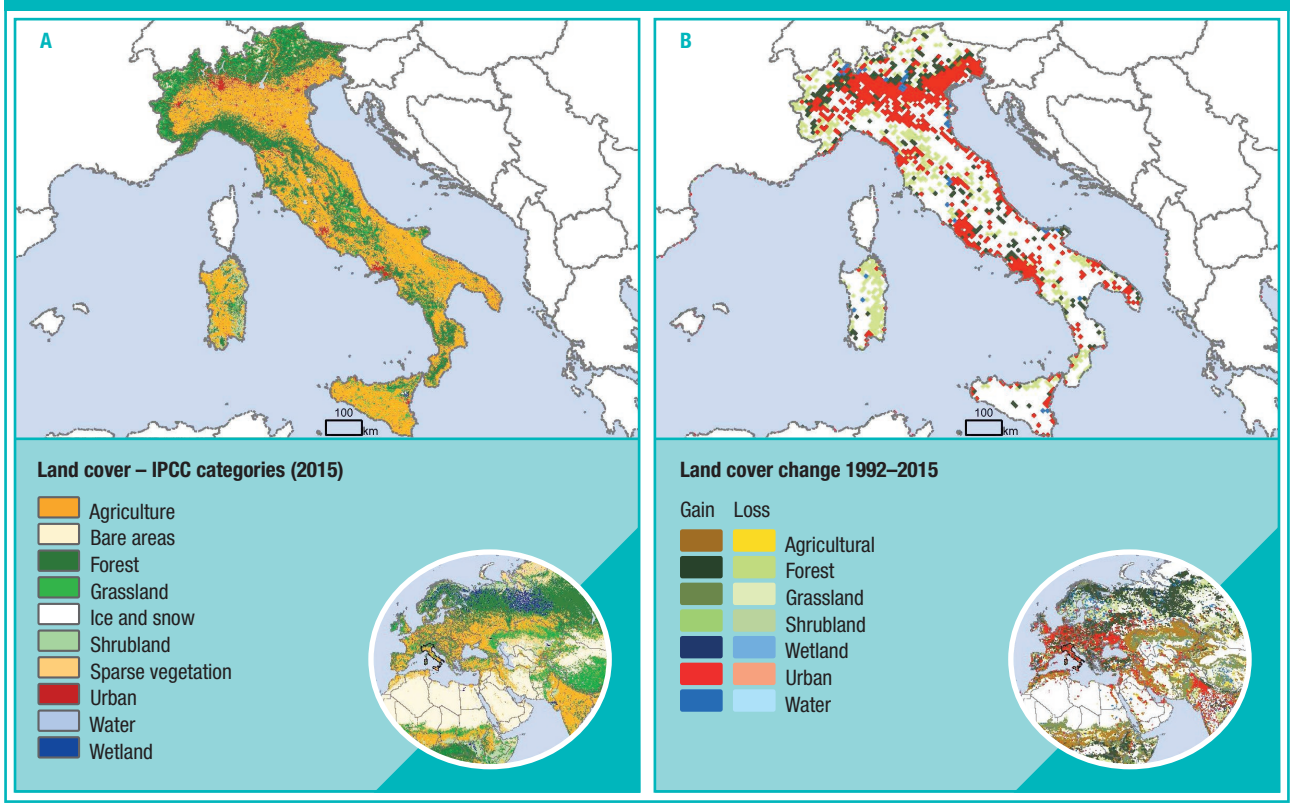
AGROBIODIVERSITY INDEX

Italy – Country profile

Context

- In Italy, agriculture occupies about 43% of the total land area (Figure 1A) and provides about 4% of employment. In 2017, this sector contributed to approximately 2% of the gross domestic product and in the same year, Italy's agricultural raw material exports accounted for 0.7% of export products.[i] Italy is an agroecological zone with a very dry climate, divided into three regions: the Alpine, the Continental and the Mediterranean.[ii] The country is one of the largest agricultural producers in the European Union, with northern Italy primarily producing grains, soybeans and dairy products, while the more hilly southern part specializes in fruits, vegetables, olive oil and wine.[iii]
- Italy has approximately 51,000 plant accessions stored *ex situ* in national and local genebanks.
- While undernutrition is not very prevalent in Italy, overweight and obesity have been increasing steadily. One out of three children and one out of two adults are overweight, which represents one of the highest rates in OECD countries. Mortality rate among adults attributable to inadequate diets is 108 per 100,000 population (in 2017).[iv] No data are available on diet diversity among young children.
- Important risks to agrobiodiversity include urbanization and progressive abandonment of rural areas[v] (Figure 1B), forest loss, and the replacement of local farmers' varieties with commercial modern varieties.[vi] The IUCN Red List estimates that, in 2015, around 280 plant and animal species across taxa were threatened in the country due to various reasons, including those directly or indirectly related to agriculture.

FIGURE 1 – Major land use (A) and changes in major land use (B)



Source: Adapted from: A) European Space Agency, 2017;[viii] B) Nowosad, et al., 2019.[ix]

Agrobiodiversity Index results

- Italy scores medium-high for the current **status** of agrobiodiversity (Figure 2A). Agrobiodiversity in genetic resource management for future options and agrobiodiversity in markets and consumption for healthy diets both add most strongly to the status score, followed by agrobiodiversity in production systems for sustainable agriculture. This trend indicates the high potential for continued commitment and management of genetic resources for sustainable production and consumption.
- The **progress** score is moderate-low (Figure 2B). Commitments to managing agrobiodiversity are more explicit in the context of genetic resource management, and less so for sustainable agriculture and healthy diets. The progress score indicates the need to strengthen actions to implement commitments and create an enabling environment, especially for sustainable agriculture and healthy diets.
- Compared to the 10-country average, Italy scores above average for the status score and below average for the progress score. There might be a risk that agrobiodiversity is taken for granted and therefore ends up being less well managed than it should be. At the same time, high levels of agrobiodiversity in Italy provide an opportunity for the country to strengthen agrobiodiversity management across the value chain, for future options, sustainable agriculture and healthy diets.

FIGURE 2 – Overview of Agrobiodiversity Index scores for Italy

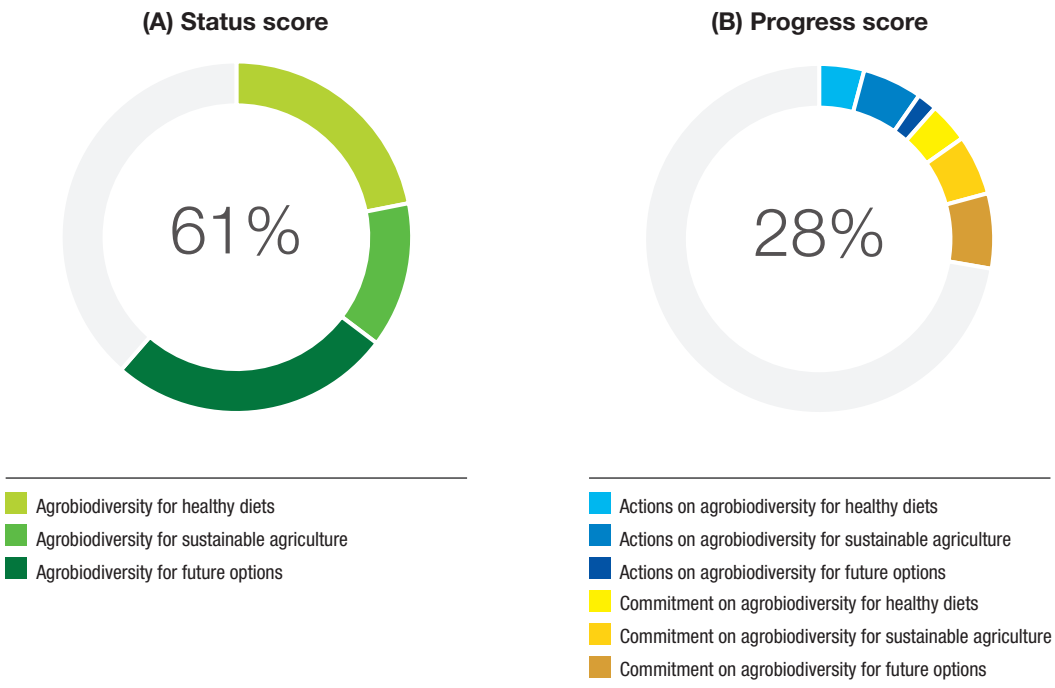


TABLE 1 – Overview of Agrobiodiversity Index results for Italy

		Pillar 1	Pillar 2	Pillar 3
		Agrobiodiversity in markets and consumption for healthy diets	**Agrobiodiversity in production for sustainable agriculture**	**Agrobiodiversity in genetic resource management for future options**
Commitment	Level of commitment to enhancing consumption and markets of agrobiodiversity for healthy diets	22		
	Level of commitment to enhancing production and maintenance of agrobiodiversity for sustainable agriculture		33	
	Level of commitment to enhancing genetic resource management of agrobiodiversity for current and future use options			42
Actions	Consumption and market management practices supporting agrobiodiversity	25		
	Production practices favouring agrobiodiversity		24	
	Production diversity-based practices		42	
	Genetic resource management practices supporting agrobiodiversity			11
Status	Species diversity	83	60	95
	Varietal diversity			99
	Functional diversity	47		
	Underutilized/local species	67		41
	Soil biodiversity		29	
	Pollinator biodiversity			
	Landscape complexity		32	

Note: All scores are scaled from 0–100. The colour scheme was changed on 1 August 2019 to reflect more accurately the scores

Leading practices

- ***In situ* and *ex situ* genetic resource conservation:** Italy scores high on *ex situ* and *in situ* measurements. In addition to the diversity of accessions available in genebanks, crop wild relatives and useful wild plants are highly present in natural or semi-natural areas. Italy has established voluntary regional repositories of indigenous genetic resources as well as 87 provincial genebanks for native animal and existing or new plant species to safeguard agrobiodiversity. These facilities are supported by the state through budget provision. The country also aims to reduce the number of threatened species to less than 1% of total species in each class, focusing on innovative land management for biodiversity conservation in the Mediterranean region and marine–coastal ecosystems.
- **Species diversity:** Species diversity in Italy is high across markets and consumption, production and genetic resource management. The diversity in vegetables, fruits, legumes and grains strongly adds to this diversity. Compared to other countries, species diversity in production is particularly high in northwestern Italy (Figure 5B).
- **Agrobiodiversity monitoring:** The Italian Ministry of Agricultural, Food and Forestry Policies has set up a national portal for agricultural and food biodiversity, made of interconnected databases of genetic resources. The tool allows for monitoring and optimizing interventions aimed at protection and management of agricultural and food diversity in the country.

Areas for improvement

- **Agrobiodiversity for healthy diets:** While species diversity is high in domestic supply, and a large diversity of vegetables, fruits and legumes are available, dietary intake of fruits, vegetables, legumes and whole grains are still below recommended values. Intake of processed meat, red meat, salt and sugar-sweetened beverages are consumed in excess.[x] Both trends contribute to the high overweight prevalence and an estimate of 2,121 disability-adjusted life years per 100,000 population. Food-based dietary guidelines are in place, but specific commitments and actions at national level to put those into practice lag behind, e.g. through institutional procurement that facilitates healthy sustainable diets.
- **International reporting on agrobiodiversity:** Italy systematically reports only on 16% of indicators to the World Information and Early Warning System (WIEWS) on Plant Genetic Resources for Food and Agriculture.
- **Natural vegetation in agricultural areas:** While Italy has an agroecology policy in place, only 37% of agricultural land has more than 10% of natural vegetation, and agroforestry is observed only on 2% of agricultural land. Managing natural vegetation and trees in agricultural landscapes, can increase long-term sustainability and resilience.

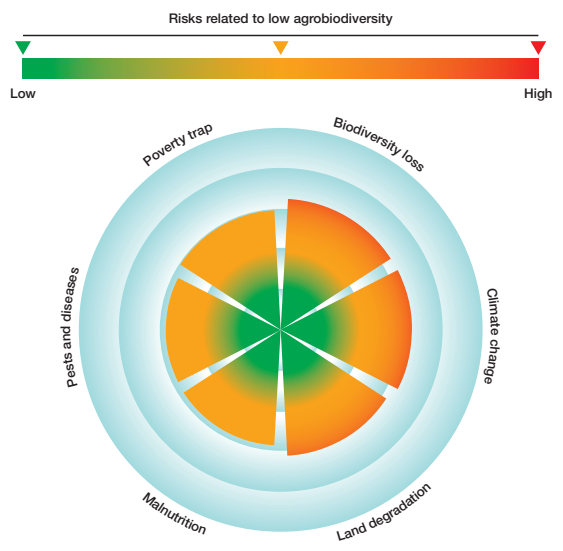
Notable findings

- **Crop–livestock integration:** about 83% of Italy's agricultural land integrates crop and livestock production. Such integrated systems can contribute to more closed and efficient nutrient cycles, soil fertility and diversified and resilient production systems.
- **High agrobiodiversity in markets but inadequate dietary intake:** While high agrobiodiversity can be observed in domestic food supply and markets, including many types of fruits, vegetables, legumes and whole grains, dietary intake does not follow recommendations, and contributes to high levels of overweight and obesity.[xi] Innovative approaches are recommended to use existing agrobiodiversity further to help address this challenge. The Milan Urban Food Policy Pact (2015), an international pact signed by 191 cities worldwide to develop sustainable food systems, can lead the way.
- **Benchmark:** Given its high status score, Italy sets a benchmark for other countries to manage agrobiodiversity across genetic resource management, production and markets. However, it is recommended that in the near future, the country also improves its commitments and actions to sustainably use and conserve its agrobiodiversity resources in order not to lose the benefits from these.

Risk assessment

Despite the high status scores, multiple risks related to low agrobiodiversity exist (Figure 3). This is partly explained by the limited evidence on actions and commitments to manage and use agrobiodiversity as a future adaptation option. The risks of climate change and land degradation stand out. Mismanagement of forestry and agriculture, abandonment of pastoral activities and rapid urbanization are among major contributors to these risks.

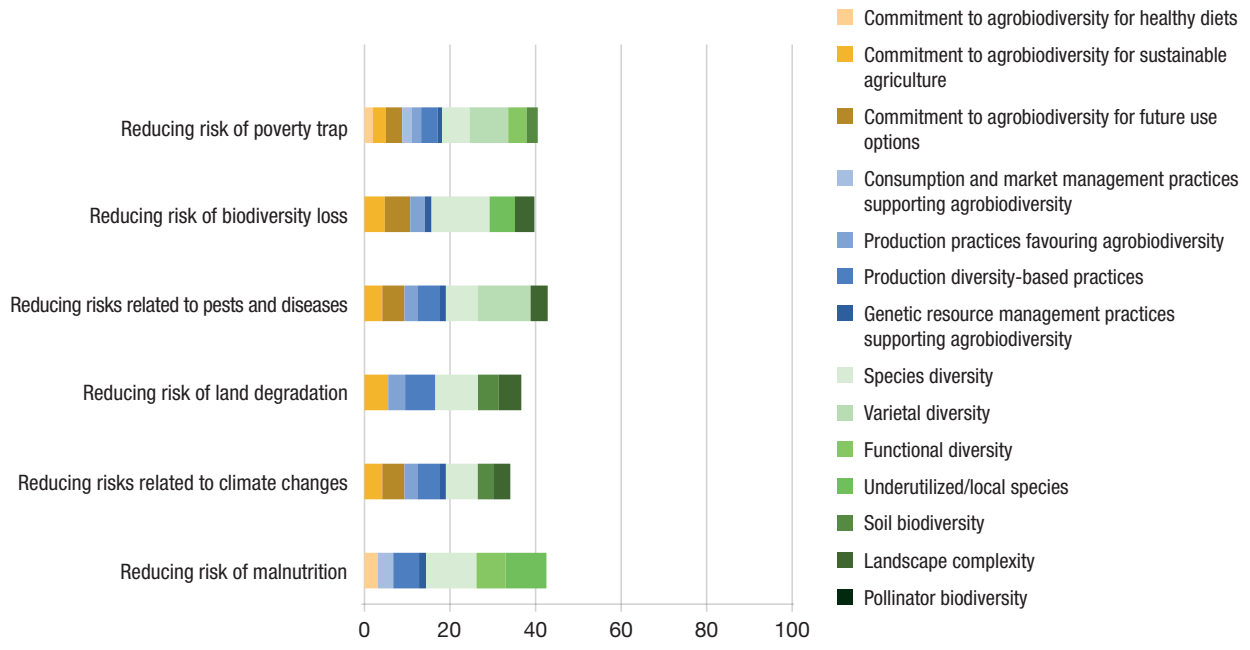
FIGURE 3 – Increased risks related to low agrobiodiversity levels in Italy



Resilience building

Reversing the risk assessment, the existing agrobiodiversity and related actions and commitment, help build resilience to various risks (Figure 4). Current agrobiodiversity management in Italy would contribute most significantly to managing malnutrition risks, through high species diversity, including high diversity in vegetables, fruits, legumes, whole grains, nuts and seeds. Actual dietary intake is however found to be inadequate,[xii] with too few vegetables, fruits, whole grains, nuts and seeds and too much processed meat, red meat, salt and sweetened beverages.

FIGURE 4 – Contributions of Agrobiodiversity Index indicators to resilience building in Italy



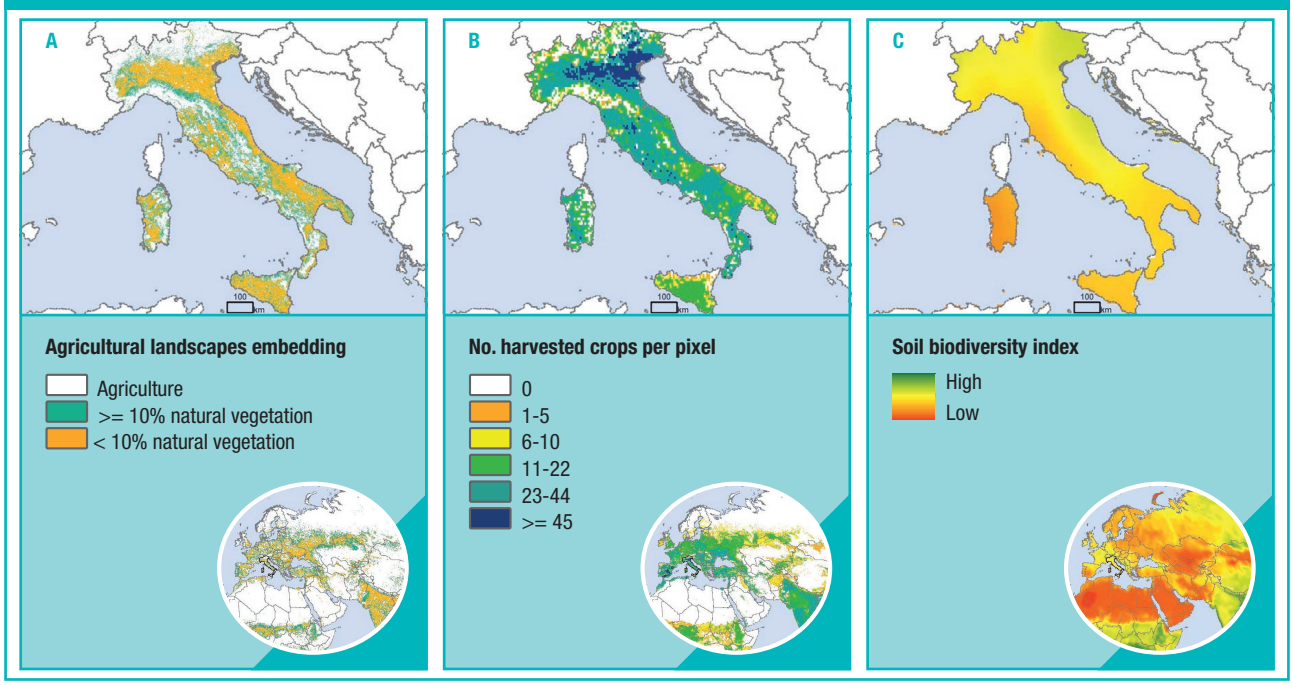
Note: All scores are scaled to a maximum of 100. Colours indicate relative scores of individual agrobiodiversity indicators that contribute to building resilience for that specific risk area. No data available for pollinator biodiversity.

Indicator trends

Spatial trends

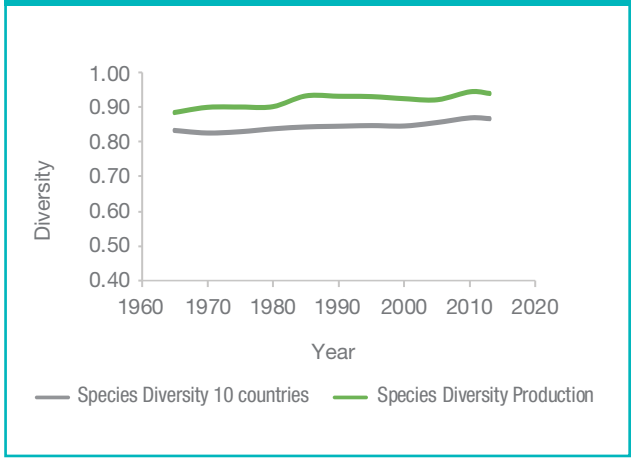
In Italy, 32% of agricultural land contains a minimum of 10% of natural or semi-natural vegetation (Figure 5A), suggesting that agriculture is moderately intertwined with the surrounding nature. Improving the management of this relationship between agriculture and natural vegetation is critical for agricultural and environmental sustainability. Diversified production systems (with more than 11 crop species harvested per land unit of 10x10km) dominate the country, with the most diversified systems concentrated in the Alpine region (Figure 5B). The soil biodiversity index (Figure 5C) is rather low across the country, indicating vulnerability of the agroecological systems to environmental shocks.

FIGURE 5 – Spatial trends in agrobiodiversity indicators for sustainable agriculture, including A) agricultural land with >10% natural or semi-natural vegetation; B) number of harvested crops per pixel, and C) soil biodiversity index



Source: Adapted from: A) European Space Agency, 2017; B) Monfreda et al., 2008;[xiii] C) European Soil Data Center, 2016.[xiv]

FIGURE 6 – Temporal trends in species diversity in production in Italy (Shannon diversity index)



Source: FAO, 2019[xv]

Temporal trends

Italy has a history of high species diversity in production systems and this has remained quite stable in the last 50 years, with some minor fluctuations (Figure 7). Notable to mention is that further analysis shows that diversity of export products from Italy has increased over time, with more species being exported and with more equal share of a wide range of species in the export.

References

[i] World Bank. (2019). Agricultural raw materials exports (% of merchandise exports). In: The World Bank [Online]. Available at: https://data.worldbank.org/indicator/TX.VAL.AGRI.ZS.UN

[ii] Hijbeek, R., Pronk, A. A., van Ittersum, M. K., Verhagen, A., Ruysschaert, G., Bijttebier, J., ... & ten Berge, H. F. M. (2019). Use of organic inputs by arable farmers in six agro-ecological zones across Europe: Drivers and barriers. Agriculture, Ecosystems & Environment, 275, 42-53

[iii] Export.gov. (2019). Italy country commercial guide. In: Export.gov [Online]. Available at: https://www.export.gov/article?id=Italy-Agricultural-Sector

[iv] Afshin, Ashkan & John Sur, Patrick & A. Fay, Kairsten & Cornaby, Leslie & Ferrara, Giannina & S Salama, Joseph & C Mullany, Erin & Abate, Kalkidan & Cristiana, Abbafati & Abebe, Zegeye & Afarideh, Mohsen & Aggarwal, Anju & Agrawal, Sutapa & Akinyemiju, Tomi & Alahdab, Fares & Bacha, Umar & F Bachman, Victoria & Badali, Hamid & Badawi, Alaa. (2019). Health effects of dietary risks in 195 countries, 1990–2017: a systematic analysis for the Global Burden of Disease Study 2017. The Lancet. 393. 1958-1972. 10.1016/S0140-6736(19)30041-8. Available at: https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(19)30041-8/fulltext

[v] Convention on Biological Diversity. (2019). Italy - Country profile [Online]. Available at: https://www.cbd.int/countries/profile/default.shtml?country=it#facts

[vi] PGR Secure. (2012). The Italian landrace conservation strategy. Availabl at: https://www.pgrsecure.bham.ac.uk/sites/default/files/documents/deliverables/D4.2_IT_landrace_conservation_strategy.pdf

[vii] IUCN. (2015). Red List. Threatened species in each country. Available at: http://cmsdocs.s3.amazonaws.com/summarystats/2015_2_Summary_Stats_Page_Documents/2015_2_RL_Stats_Table_5.pdf

[viii] European Space Agency (2017). European Space Agency Land Cover CCI Product User guide version 2.0. Technical report Year 2015. Available at: https://maps.elie.ucl.ac.be/CCI/viewer/download/ESACCI-LC-Ph2-PUGv2_2.0.pdf

[ix] Nowosad, J., Stepinski, T. F., Netzel, P. (2019). *Global assessment and mapping of changes in mesoscale landscapes: 1992–2015* in Science Direct, Volume 78, pp 332-340. Doi: https://doi.org/10.1016/j.jag.2018.09.013

[x] Global Nutrition Report. (2018). Italy Country nutrition profile [Online]. Available at: https://globalnutritionreport.org/nutrition-profiles/europe/southern-europe/italy/

[xi] Global Nutrition Report. (2018). Italy Country nutrition profile [Online]. Available at: https://globalnutritionreport.org/nutrition-profiles/europe/southern-europe/italy/

[xii] Global Nutrition Report. (2018). Italy Country nutrition profile [Online]. Available at: https://globalnutritionreport.org/nutrition-profiles/europe/southern-europe/italy/

[xiii] Monfreda, C., Ramankutty, N., Foley, J. A. (2008). Farming the planet: 2. Geographic distribution of crop areas, yields, physiological types, and net primary production in the year 2000. In: Global Biogeochemical Cycles, Volume 22, Issue 1. Doi: 10.1029/2007GB002947

[xiv] European Soil Data Center. (2016). "Global Soil Biodiversity Maps" associated with the Global Soil Biodiversity Atlas. Joint Research Centre of the European Commission. Available online at: https://esdac.jrc.ec.europa.eu/content/global-soil-biodiversity-maps-0

[xv] FAO. 2019. Food Balance Sheets. In: FAOSTAT [Online]. Available at: http://www.fao.org/faostat/en/#data/FBS