

AGRICULTURE AND TERRITORIAL COHESION IN PORTUGAL: AN ECOLOGICAL AND POLITICAL PERSPECTIVE

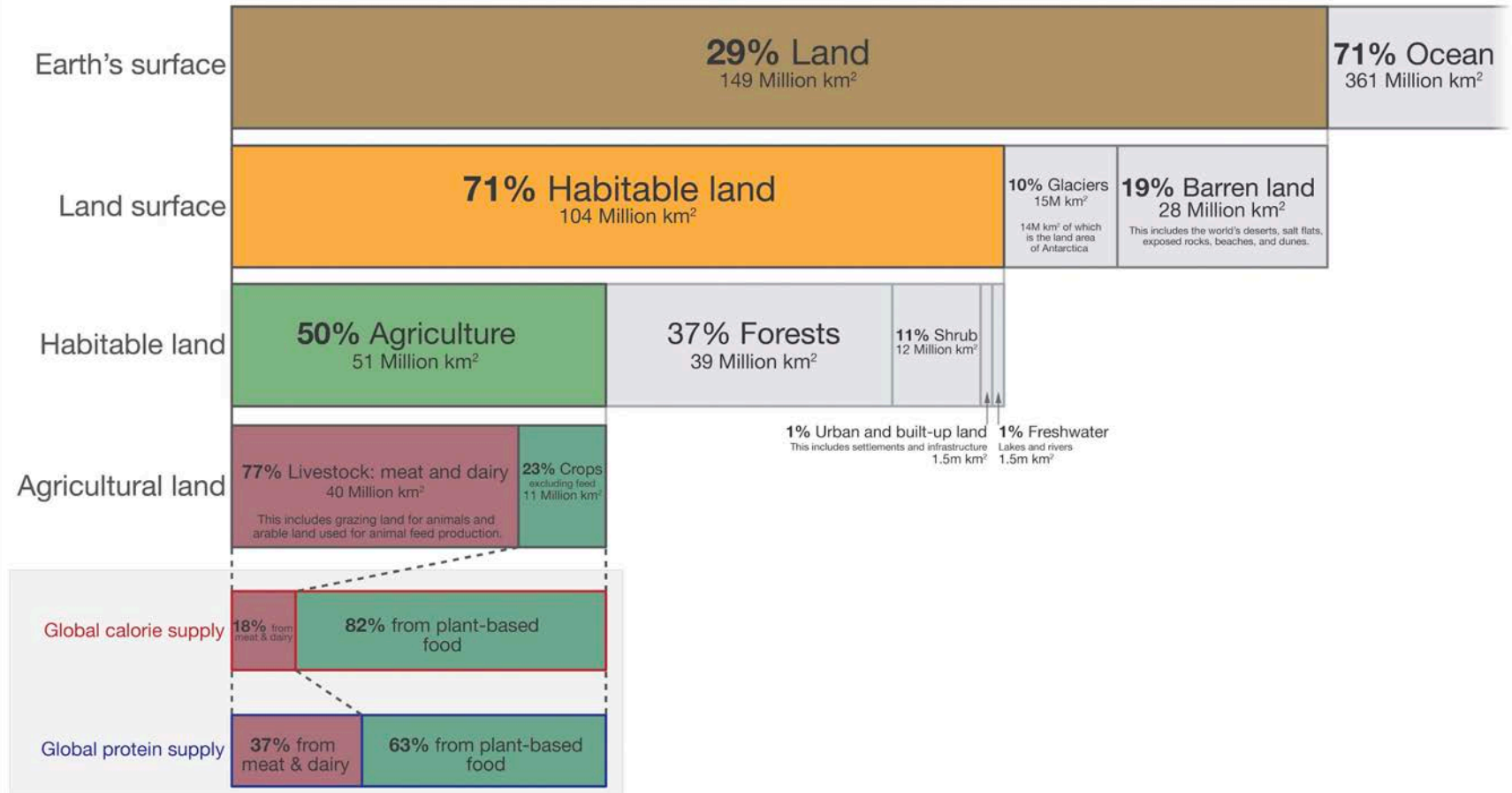
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Development

Évora, 11 April 2022

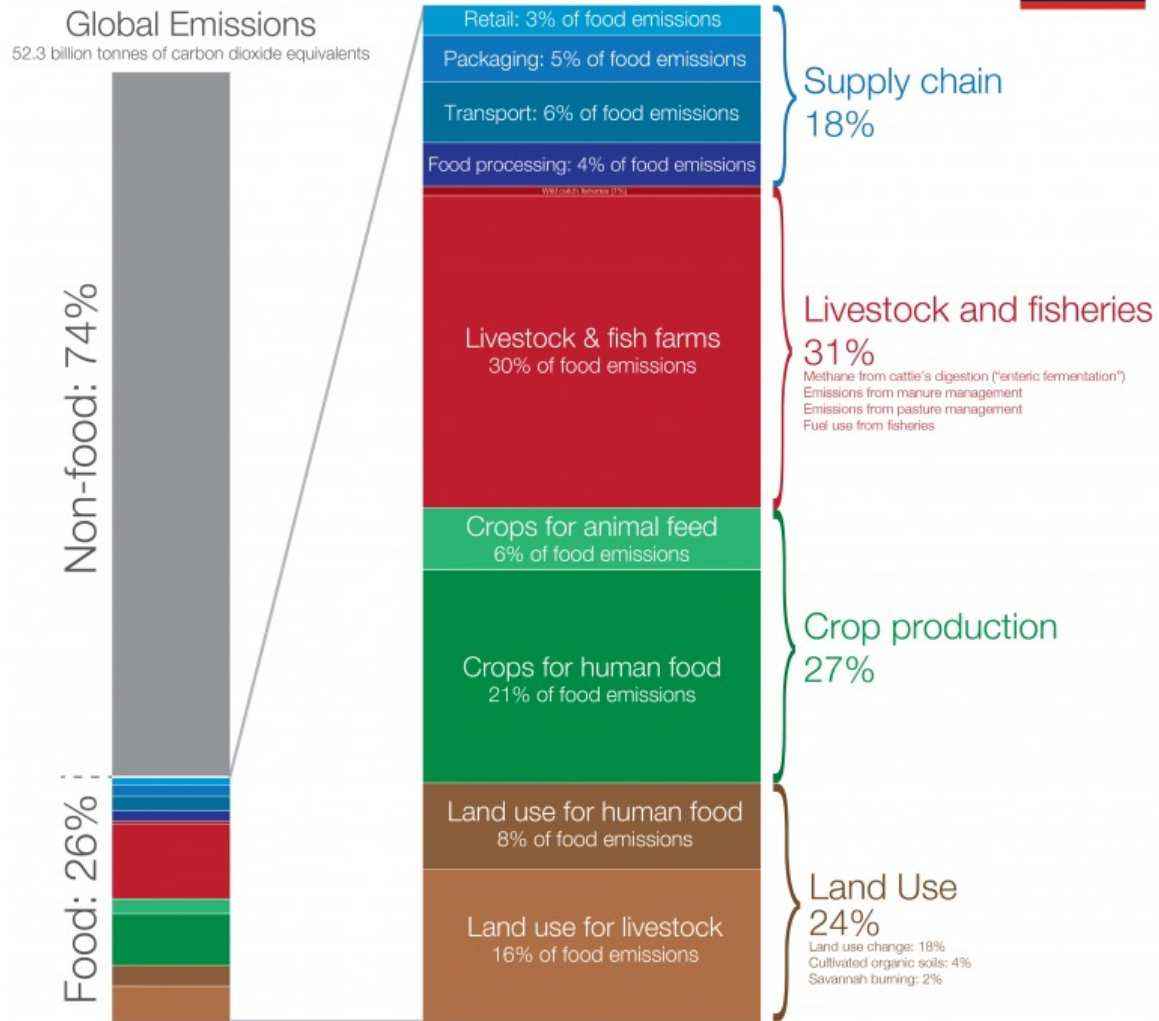
Global land use for food production



Data source: UN Food and Agriculture Organization (FAO)
 OurWorldinData.org – Research and data to make progress against the world's largest problems.

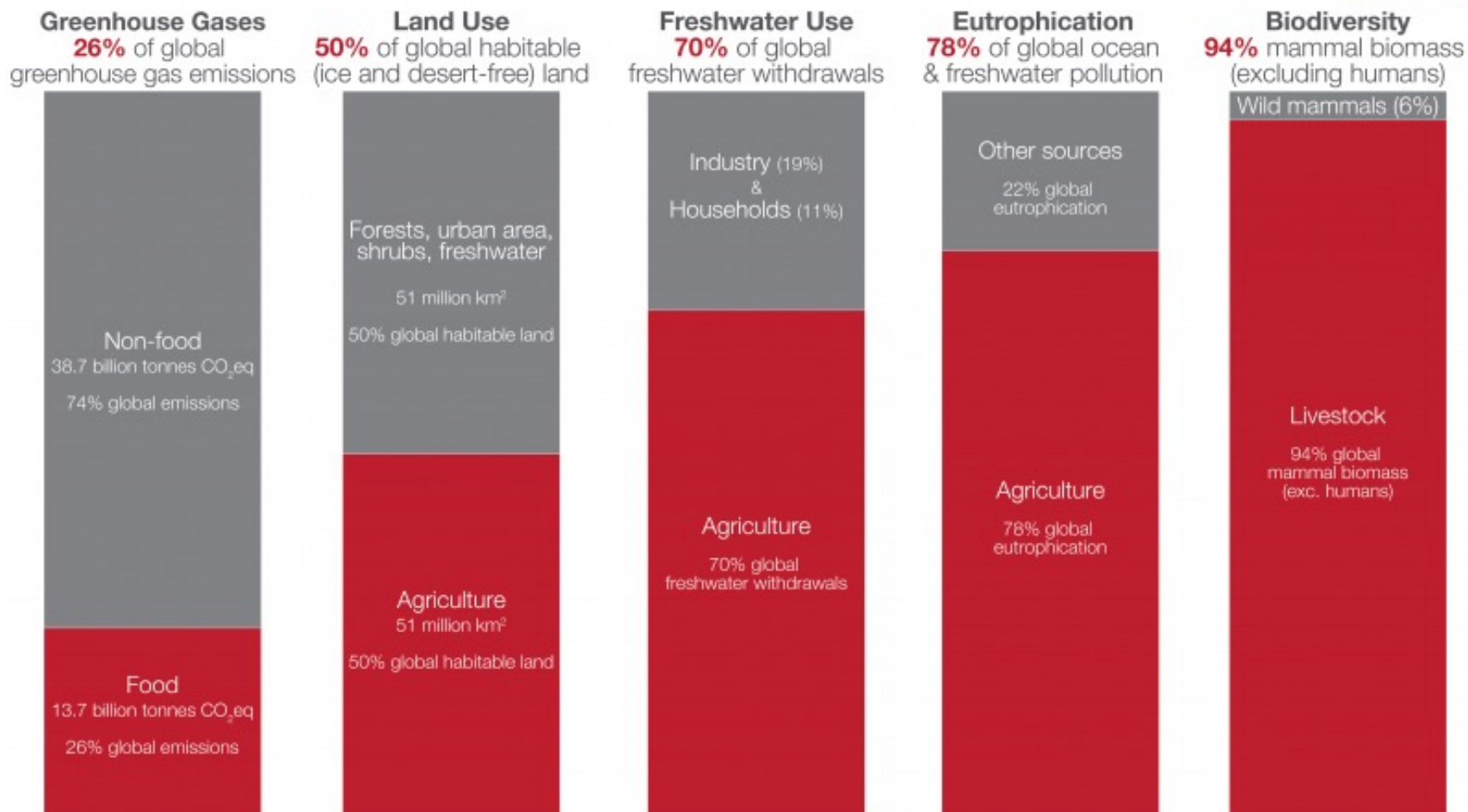
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Global greenhouse gas emissions from food production



Data source: Joseph Poore & Thomas Nemecek (2018). Reducing food's environmental impacts through producers and consumers. Published in Science. OurWorldinData.org - Research and data to make progress against the world's largest problems. Licensed under CC-BY by the author Hannah Ritchie.

What are the environmental impacts of food and agriculture?



Data sources: Poore & Nemecek (2018); UN FAO; UN AQUASTAT; Bar-On et al. (2018).
OurWorldinData.org - Research and data to make progress against the world's largest problems.

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GLOBAL CROPLAND CHANGE - 2000-2019

From 2003 to 2019, cropland area increased by 9% and cropland NPP by 25%, primarily due to agricultural expansion in Africa and South America. Global cropland expansion accelerated over the past two decades, with a near doubling of the annual expansion rate, most notably in Africa.

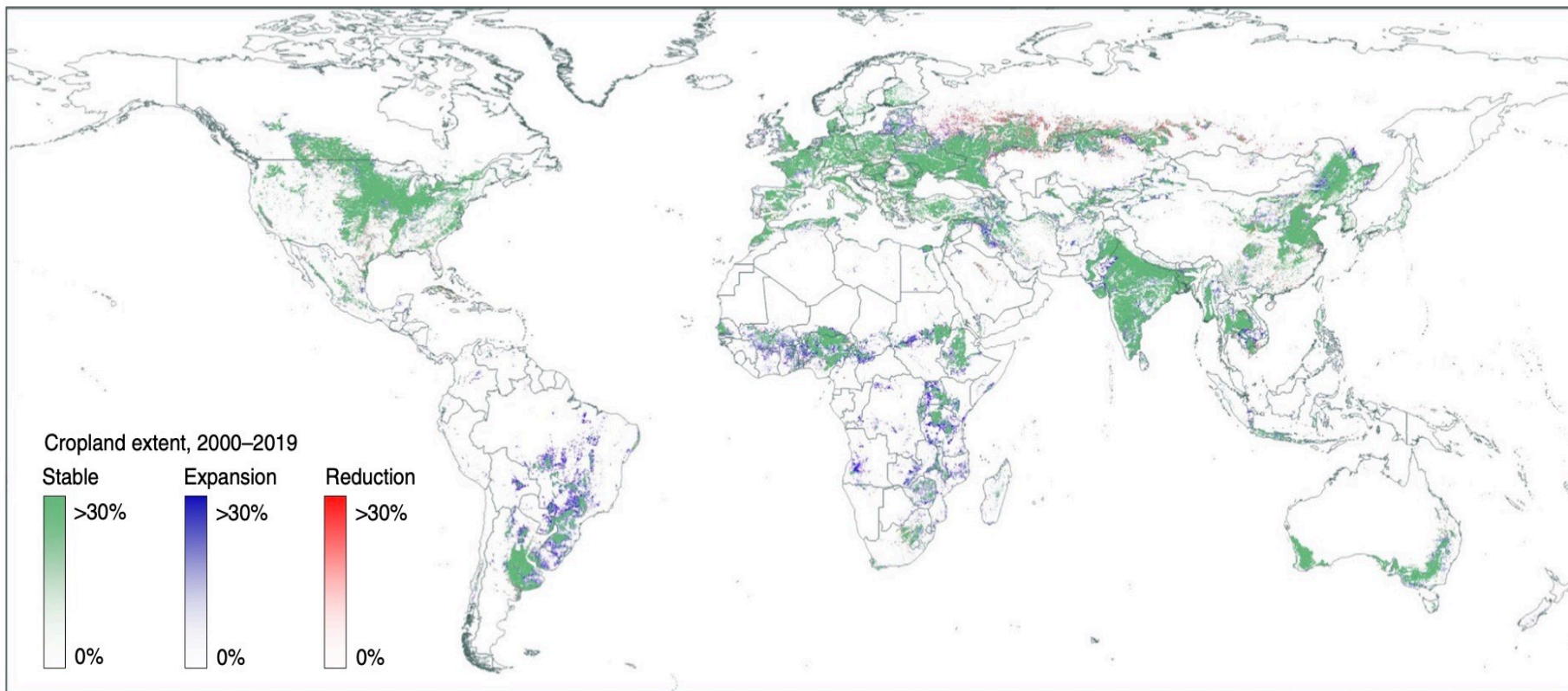


Fig. 3 | Global cropland extent and change, 2000–2019. The map shows the proportion of stable cropland, cropland expansion and cropland reduction within $0.025^\circ \times 0.025^\circ$ grid cells. The original cropland map time-series has a spatial resolution of 0.00025° per pixel, approximately 30 m at the Equator. Country boundaries are from GADM (<https://gadm.org>).

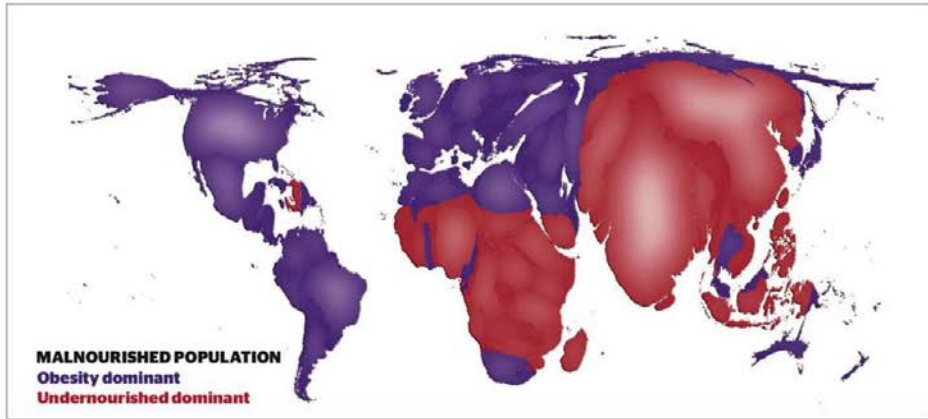
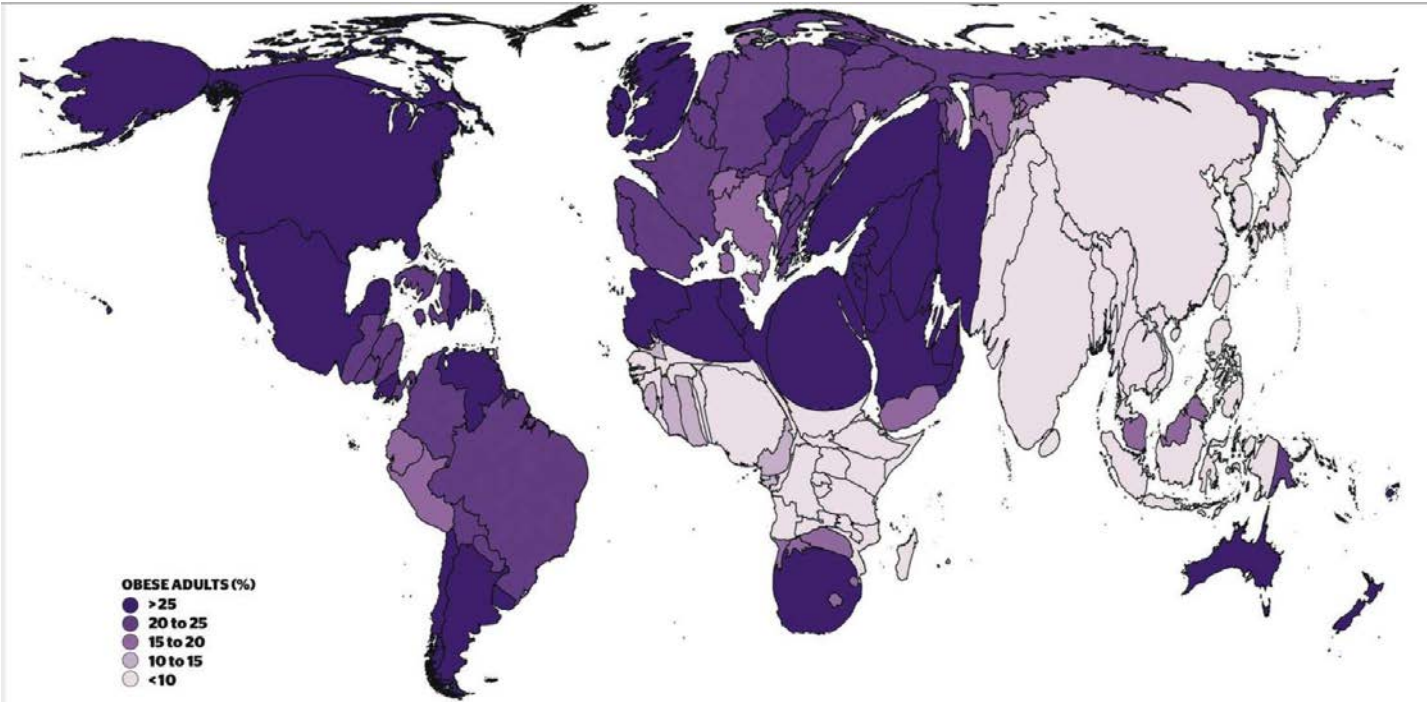
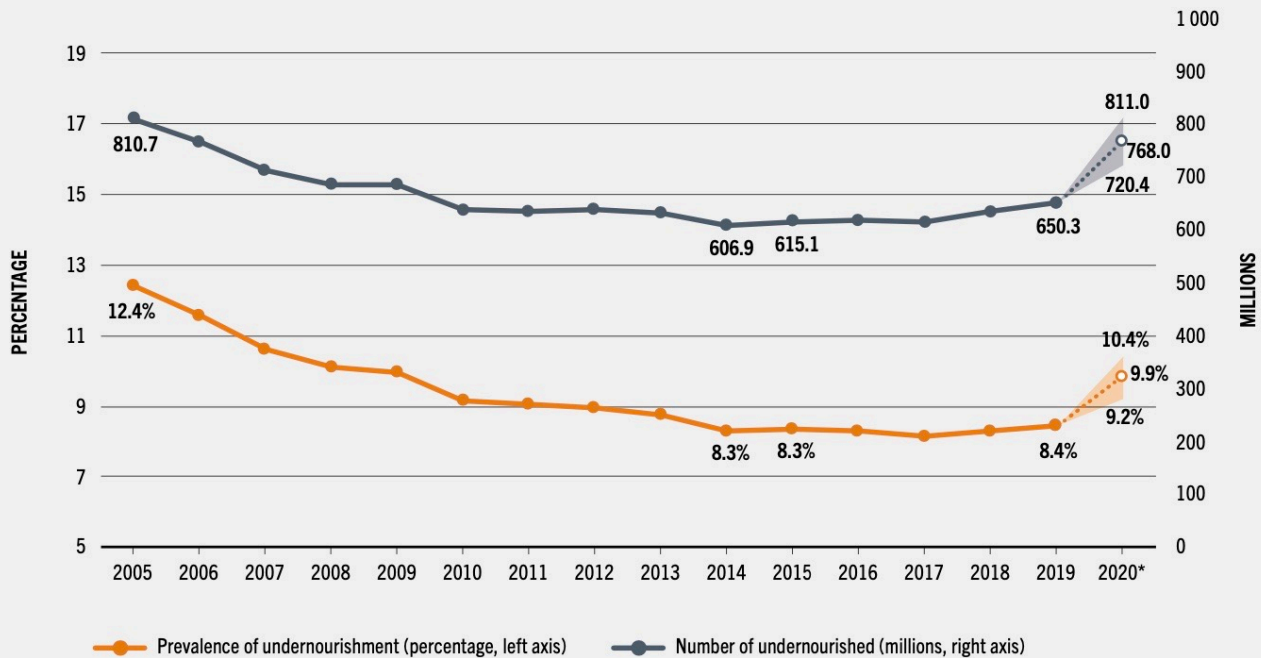


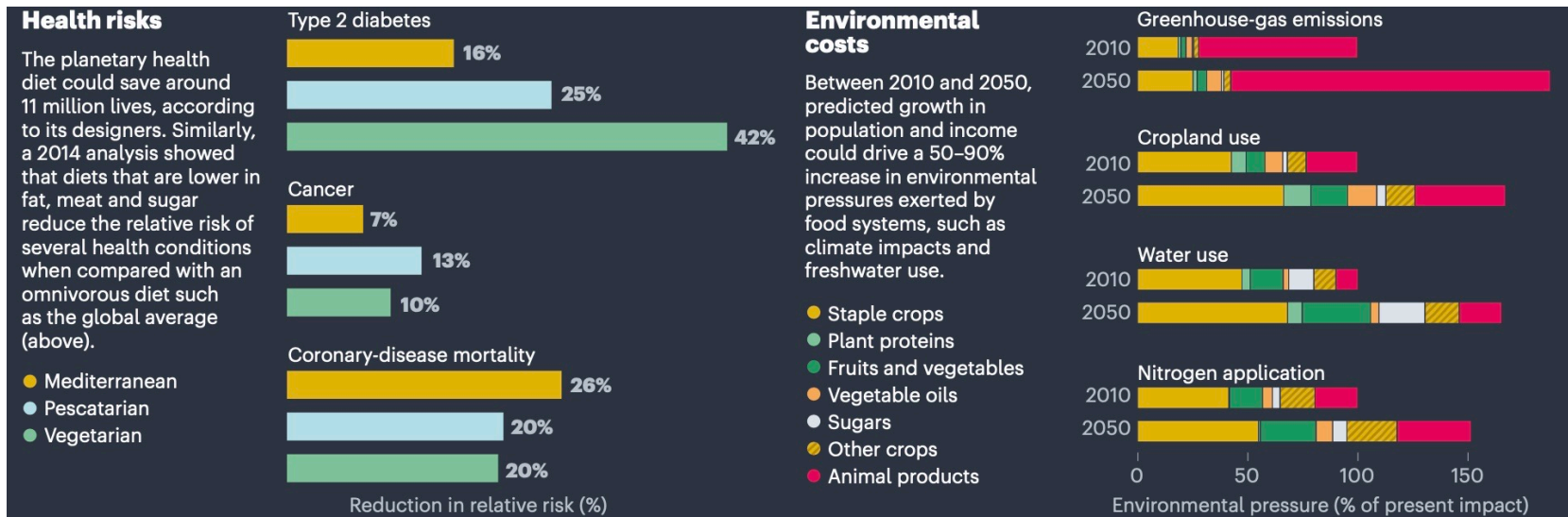
FIGURE 1 THE NUMBER OF UNDERNOURISHED PEOPLE IN THE WORLD CONTINUED TO RISE IN 2020. BETWEEN 720 AND 811 MILLION PEOPLE IN THE WORLD FACED HUNGER IN 2020. CONSIDERING THE MIDDLE OF THE PROJECTED RANGE (768 MILLION), 118 MILLION MORE PEOPLE WERE FACING HUNGER IN 2020 THAN IN 2019 – OR AS MANY AS 161 MILLION, CONSIDERING THE UPPER BOUND OF THE RANGE



NOTES: * Projected values for 2020 in the figure are illustrated by dotted lines. Shaded areas show lower and upper bounds of the estimated range.

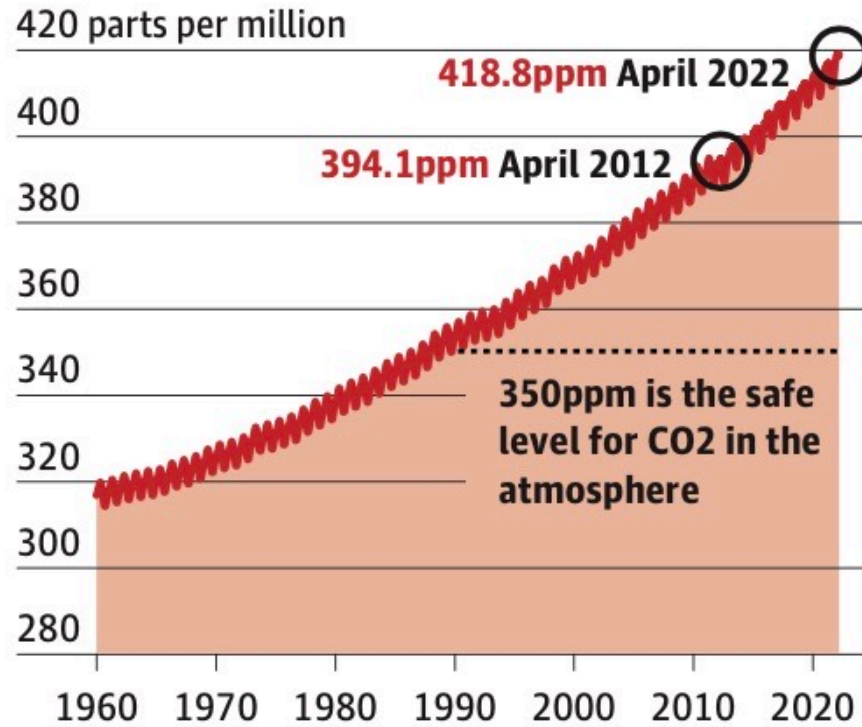
SOURCE: FAO.

Impact of the food system on global sustainability: one of the major causes of degradation of the environmental systems (including biodiversity, freshwater, oceans, land, and soils).



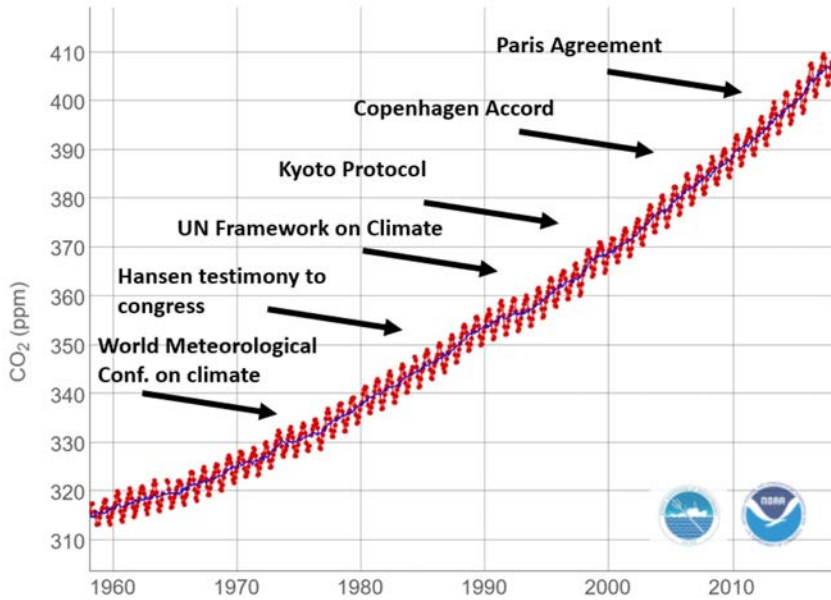
SOURCES: RISKS, REF. 6; ENVIRONMENTAL COSTS, M. SPRINGMANN *ET AL.* NATURE 562, 519-525 (2018)

Atmospheric CO₂ currently measures 418.8 parts per million



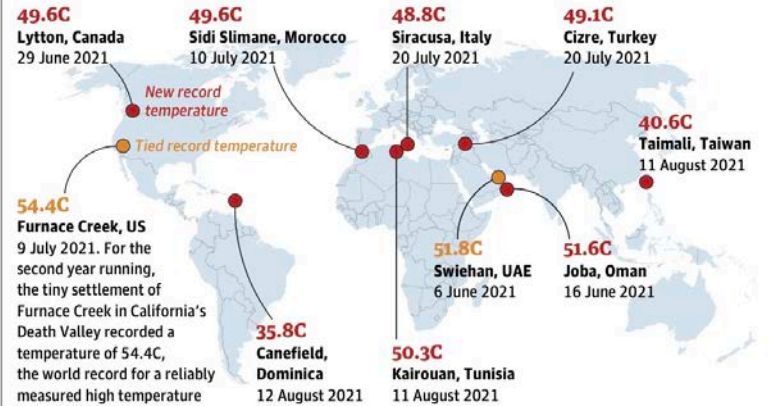
Source: NOAA, updated on 3 April 2022. Chart baseline is 280ppm - the preindustrial average

Mauna Loa Monthly Averages



10 national temperature records were broken or equalled in 2021

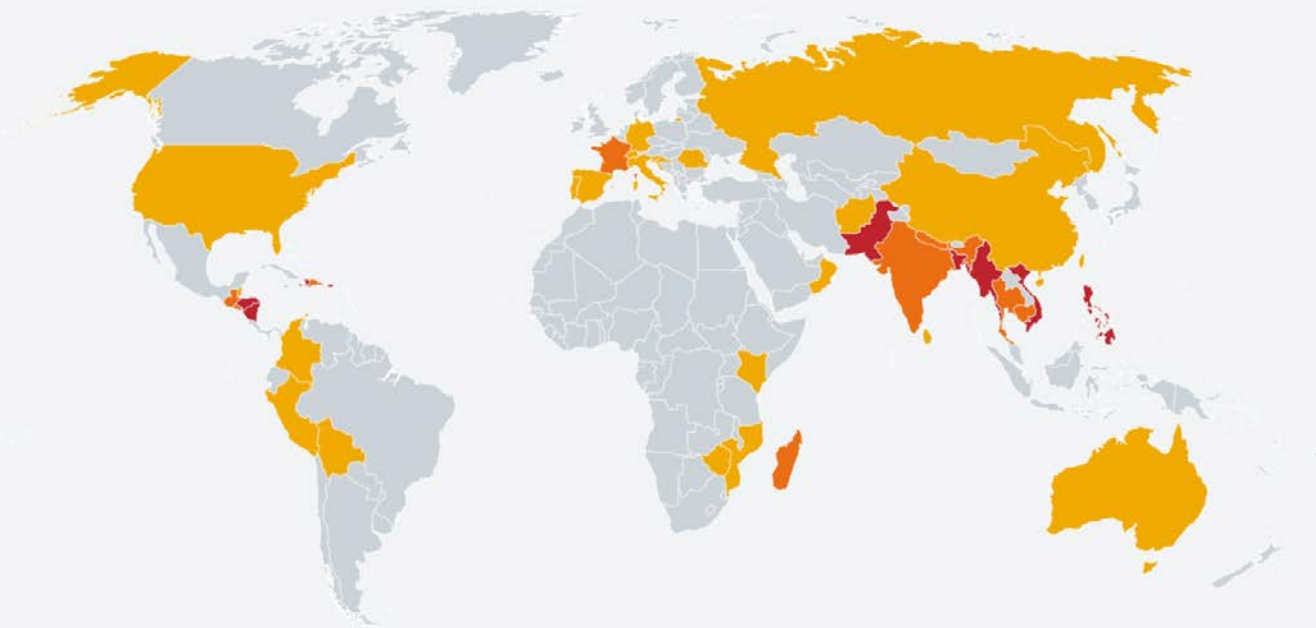
Including the highest ever reliably measured temperature on Earth



Source: Maximiliano Herrero

Where is the most extreme weather?

Most affected regions or countries (1998-2017)



■ Ranking 1-10 ■ 11-20 ■ 21-50

Climate change has already negatively affected the European agricultural sector and will continue to affect and may have some positive effects (longer growing seasons and more suitable growing conditions). The number of extreme events that negatively affect agriculture in Europe is expected to increase.

A cascade of climate change impacts outside Europe can affect the cost, quantity and quality of products and, consequently, trade standards, which in turn can affect agricultural income in Europe.

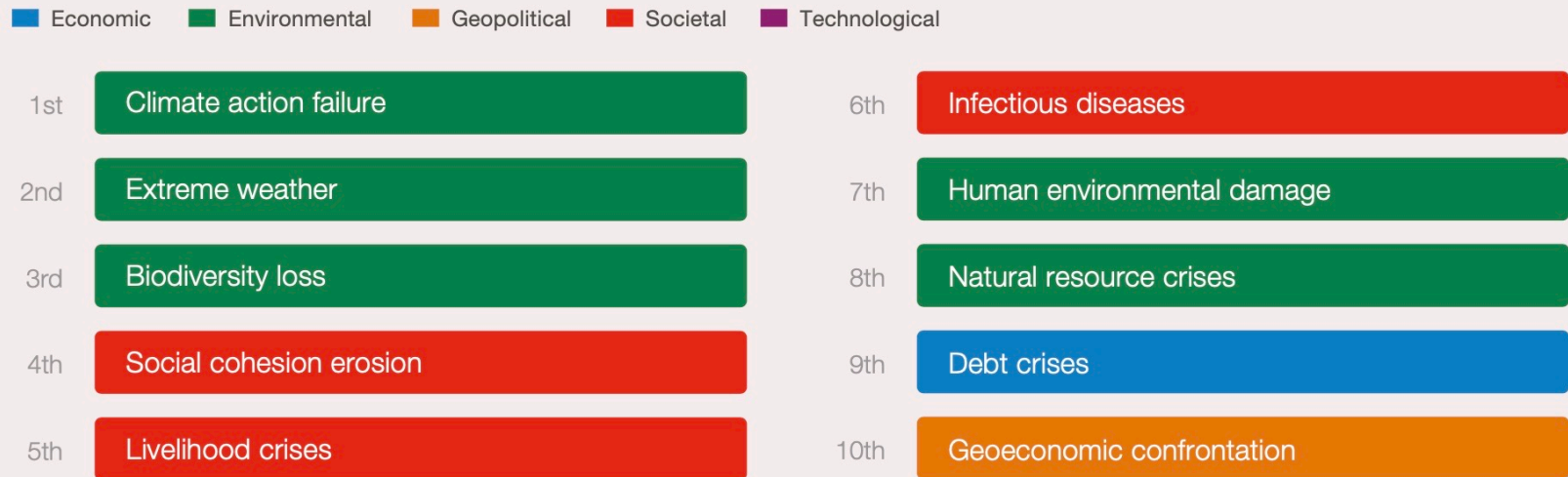
The common agricultural policy (2021-2027) has as its clear objective of adaptation to climate change. The agricultural sector is a priority in national strategies/national adaptation plans. The measures include practical measures to mitigate the impacts and risks of extreme weather events, risk-sharing strategies, and the development and implementation of infrastructure for irrigation and flood protection.

An opportunity to implement a wide range of existing property-level measures aimed at improving land and water management, which can benefit adaptation, mitigation, the environment and the economy.

Adaptation at the property level may not occur due to lack of investment resources, policy initiatives for adaptation, institutional capacity and access to knowledge.

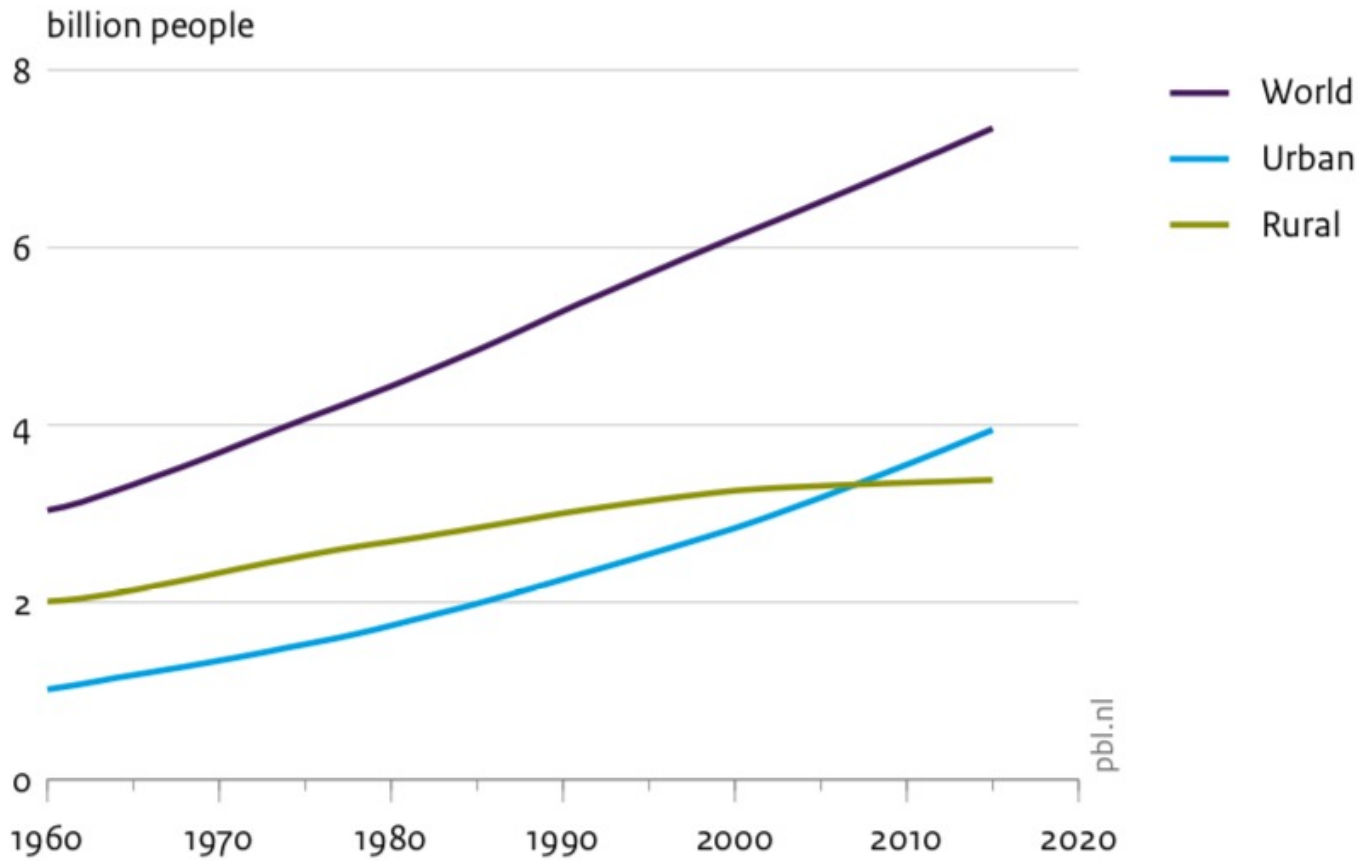
FIGURE 1.3

“Identify the most severe risks on a global scale over the next 10 years”



Source: World Economic Forum Global Risks Perception Survey 2021-2022

Global rural and urban population



Source: United Nations Urbanization Prospects 2017

Difficile transmission | PAR SERGUEI



THE FUTURE OF AGRICULTURE: WHAT TO EXPECT?

Agriculture will continue to be very diverse, very dependent on what might be access to land but desirably thought of in a logic of spatial planning (agro-ecological zone) that anticipates the effects of climate change as we currently predict, which allows for the best strategic decisions;

In this organisation, small-scale agriculture should be valued, and more disruptive production systems could be made to develop in an urban environment, and better production should be better organisation on medium and small farms for greater competitiveness within the marketing circuits;

The circular economy and the supply of short or larger chains where efficiency should be observed by the logistics and distribution of food stuff;

Science and technology are critical for agricultural/agri-food progress, seeking to solve current problems with solutions that are communicated in a clear and transparent way and that meet the values shared by consumers;

Technological progress lacks greater transparency so that knowledge is used effectively, generating greater resource efficiency, within which water and new energy sources play a central role. Access to databases relevant to agriculture should be free;

Sustainable agriculture will have an evolutionary process inseparable from natural capital, as it must seek and/or replicate "nature-based solutions" and define tangible and perceptible sustainability metrics by the most diverse audiences as it will be an increasingly scrutinized activity that has to update its narrative

“

Becoming the world's first climate-neutral continent is the greatest challenge and opportunity of our times. It involves taking decisive action now.

”

Ursula von der Leyen

CONTEXT AND CHALLENGES

MAJOR CHALLENGE

The European Union assumed the need to produce and consume food differently, as one of the great challenges of the upcoming years, and very well defined and exposed in the European Green Deal.

Provision of a unique approach to address the challenges referred in the European Green Deal, specifically, with the **Farm to Fork** agenda strategy:

50%

reduction on the
use of pesticides

20%

reduction on the
use of fertilizers

50%

reduction in sales
of antimicrobials

25%

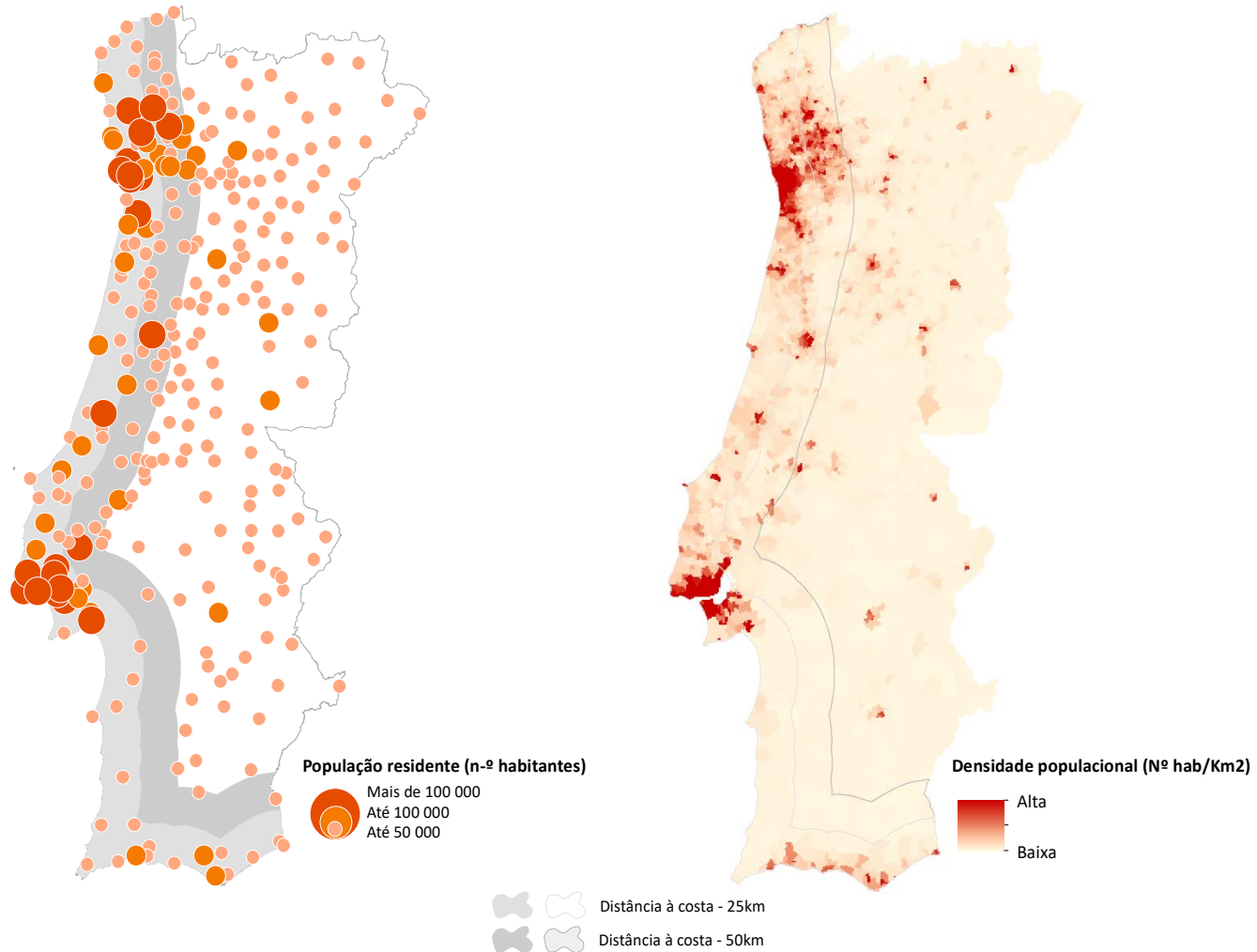
of agricultural land
under organic farming

The path to solve the identified problem lies on society, specifically on the incremental awareness regarding the impact of the food system in the environment, and the adoption of sustainable, rational and ecological practices on food consumption and production.



Montesinho, Bragança

The metropolitan regions of Lisbon (~2.8 million) and Porto (~1.8 million) concentrate about 45% of the total population living on the continent



CONTEXT AND EVOLUTION

The weakening of the primary sector as a vehicle for economic growth and the lack of employment opportunities have contributed to the abandonment and loss of competitiveness of the rural world;

An increasingly urbanised world still entrusts rural areas with the production of essential goods and services, such as food or environmental services;

The urgency to revitalise rural areas, which have lost much of their activity as a part of the transition to more competitive agriculture based on knowledge and innovation;

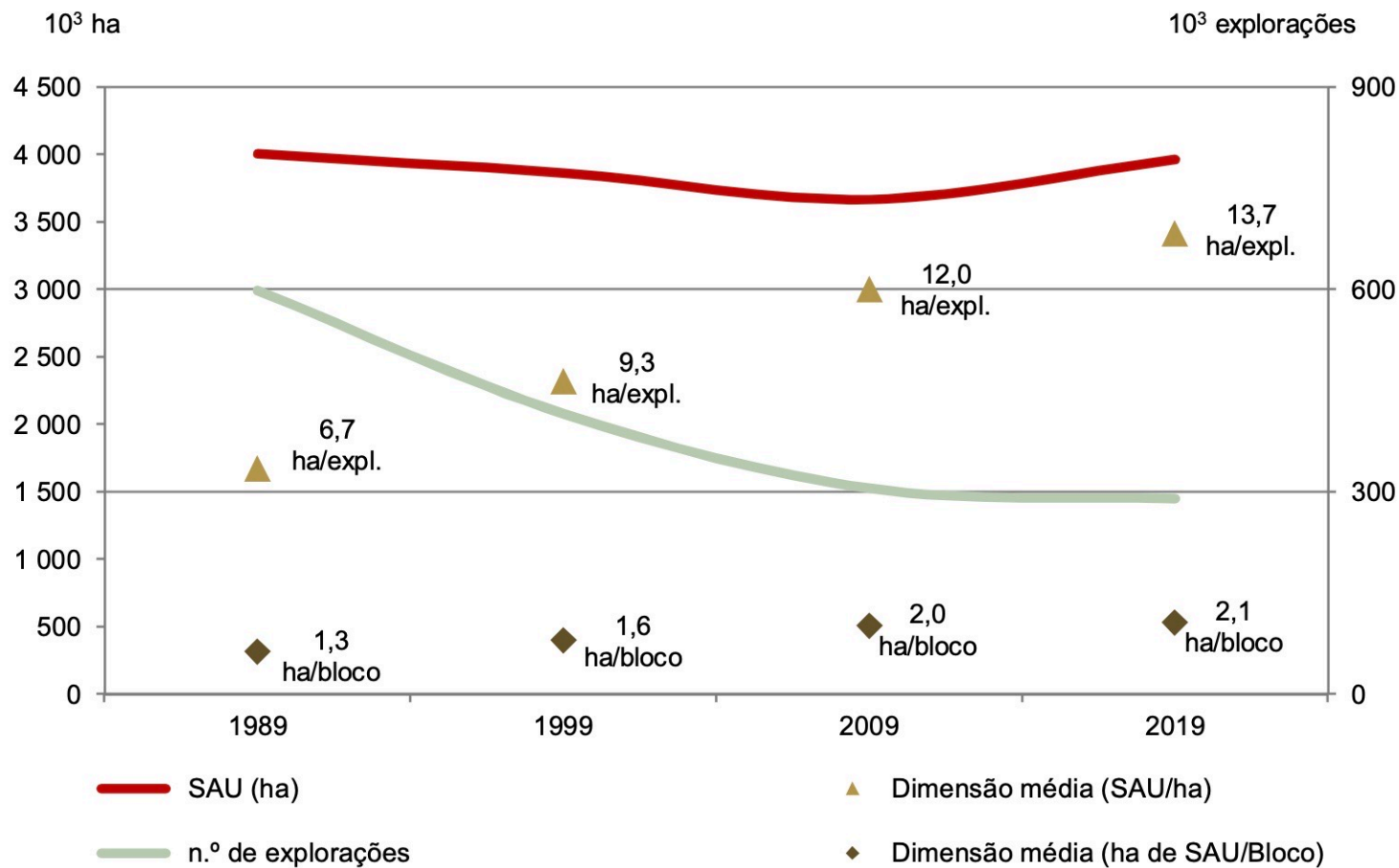
The agricultural activity in rural areas must count on the communities that persist in the territories, but also with the younger generations and with those who seek in knowledge the solutions for competitive agriculture in international markets;

Municipalities play a decisive role in valuing territories and promoting local resources, in harmony with resident communities, with a view to promoting their well-being;

Higher education institutions in the production and transfer of knowledge, innovation, and support for the development of solutions for the qualification of rural areas;

NUMBER OF FARMS (& Utilised Agricultural area)

Número de explorações e SAU (1989-2019)



Fonte: INE, I. P.

Número de explorações, SAU e dimensão média, por Região Agrária (variação 1999-2019)

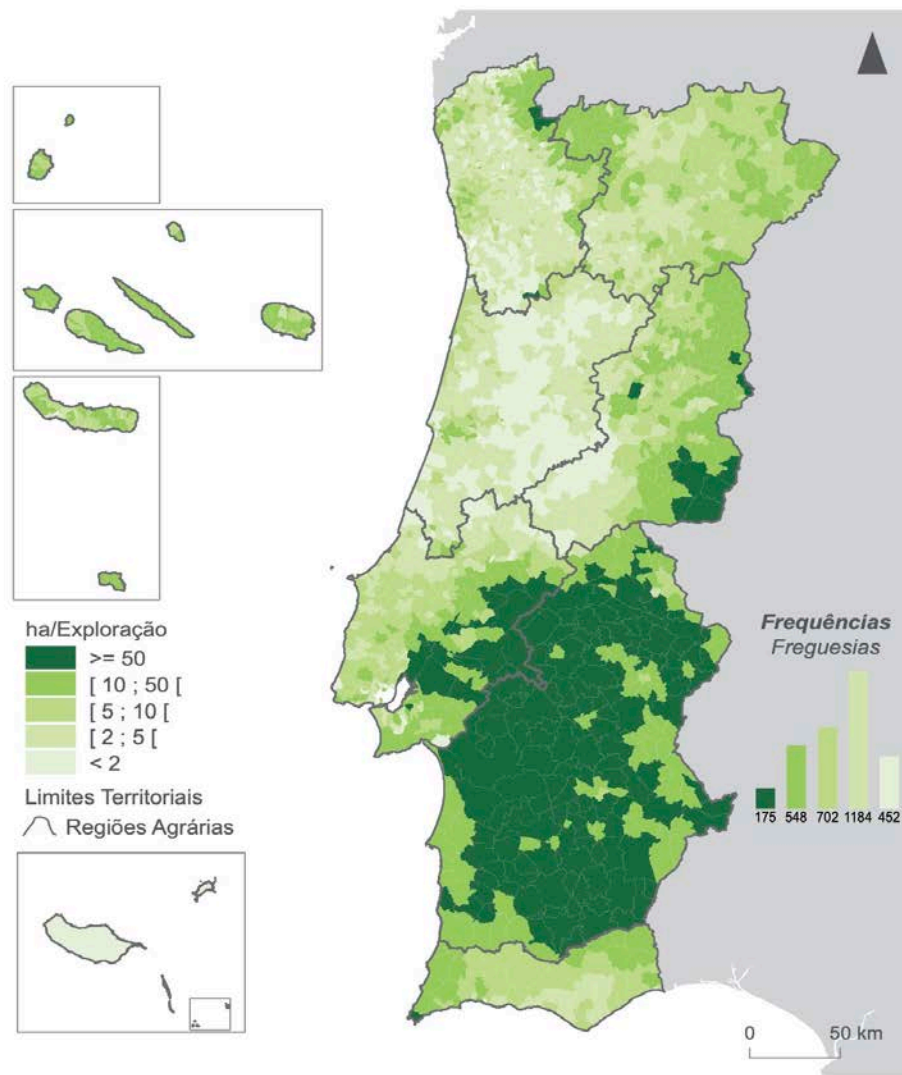
Região Agrária	Explorações		SAU		SAU média por exploração	Variação 1999-2019			Variação 1999-2009			Variação 2009-2019		
	(n.º)	(%)	(ha)	(%)	ha/expl.	n.º expl. (%)	SAU (%)	ha/expl. (%)	n.º expl. (%)	SAU (%)	ha/expl. (%)	n.º expl. (%)	SAU (%)	ha/expl. (%)
Portugal	290 229	100,0	3 963 945	100,0	13,7	-30,2	2,6	47,1	-26,6	-5,0	29,4	-4,9	8,1	13,7
Continente	266 039	91,7	3 838 708	96,8	14,4	-30,4	2,7	47,6	-27,2	-5	30,3	-4,3	8,4	13,3
EDM	44 560	15,4	212 639	5,4	4,8	-34,0	-1,4	49,5	-27,4	-2,1	34,9	-9,1	0,7	10,8
TM	65 211	22,5	450 701	11,4	6,9	-6,8	-1,6	5,7	-11,7	-5,5	7,1	5,5	4,1	-1,3
BL	44 245	15,2	129 848	3,3	2,9	-44,6	-23,5	37,9	-38,1	-26,1	19,3	-10,5	3,5	15,6
BI	33 617	11,6	391 754	9,9	11,7	-30,4	-6,5	34,4	-30,1	-19,6	15,1	-0,4	16,2	16,7
RO	34 486	11,9	409 095	10,3	11,9	-44,0	-8,7	63,2	-35,3	-12,7	34,9	-13,5	4,6	21,0
ALE	31 131	10,7	2 144 066	54,1	68,9	-13,3	11,4	28,5	-11,4	1,7	14,7	-2,2	9,6	12,0
ALG	12 789	4,4	100 605	2,5	7,9	-32,6	-1,3	46,4	-34,7	-13,4	32,7	3,3	13,9	10,3
Açores	10 656	3,7	120 632	3,0	11,3	-44,7	-0,6	79,9	-29,8	-0,7	41,3	-21,3	0,2	27,3
Madeira	13 534	4,7	4 604	0,1	0,3	-6,8	-18,4	-12,5	-6,3	-3,8	2,6	-0,6	-15,2	-14,7

Fonte: INE, I. P.

Figura atualizada em 2021-05-21

AVERAGE SIZE OF FARMS

Dimensão média das explorações (2019)



Natureza jurídica do produtor, por classes de SAU (variação 1999-2019)

Classes de SAU	2019						Variação 1999-2019			Variação 1999-2009			Variação 2009-2019		
	Produtor singular		Sociedade		Outras formas		Produtor singular	Sociedade	Outras formas	Produtor singular	Sociedade	Outras formas	Produtor singular	Sociedade	Outras formas
	(n.º)	(%)	(n.º)	(%)	(n.º)	(%)	(%)								
Total	274 248	94,5	14 604	5,0	1 377	0,5	-33,0	165,4	18,9	-27,3	23,1	-4,2	-7,8	115,5	24,2
S/ SAU	3 329	82,4	694	17,2	15	0,4	14,1	60,6	87,5	-63,8	-22,5	0,0	215,2	107,2	87,5
< 1 ha	54 561	98,4	785	1,4	129	0,2	-49,3	36,8	-15,1	-40,3	-55,6	-34,9	-15,1	207,8	30,3
1 a < 5 ha	150 524	98,1	2 655	1,7	307	0,2	-29,9	163,7	-5,8	-23,7	-23,1	-11,3	-8,1	243,0	6,2
5 a < 20 ha	47 724	92,7	3 519	6,8	225	0,4	-25,2	205,7	0,4	-20,8	24,6	-14,7	-5,5	145,4	17,8
20 a < 50 ha	10 632	80,9	2 329	17,7	185	1,4	-13,2	223,5	49,2	-14,4	57,1	1,6	1,5	105,9	46,8
50 a < 100 ha	3 946	71,2	1 458	26,3	142	2,6	9,2	246,3	56,0	-5,3	98,6	4,4	15,2	74,4	49,5
≥ 100 ha	3 532	50,0	3 164	44,8	374	5,3	-18,8	164,1	60,5	-12,8	67,9	29,2	-6,9	57,3	24,3

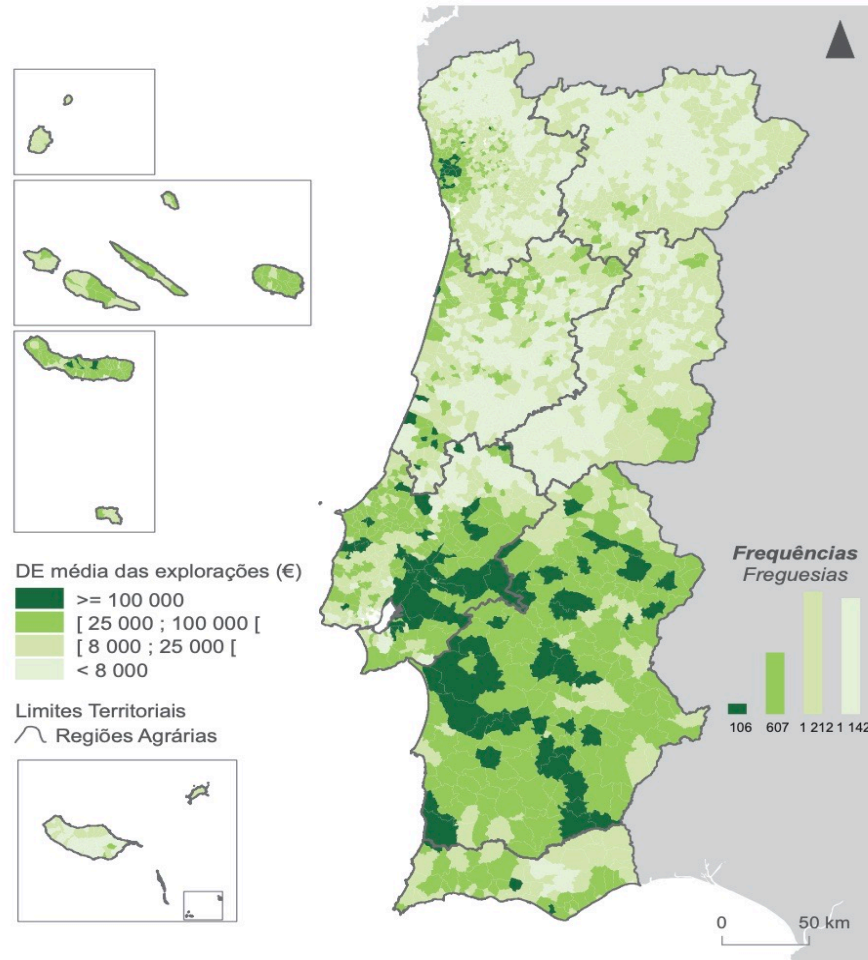
Fonte: INE, I. P.

Single agricultural producers in Portugal:

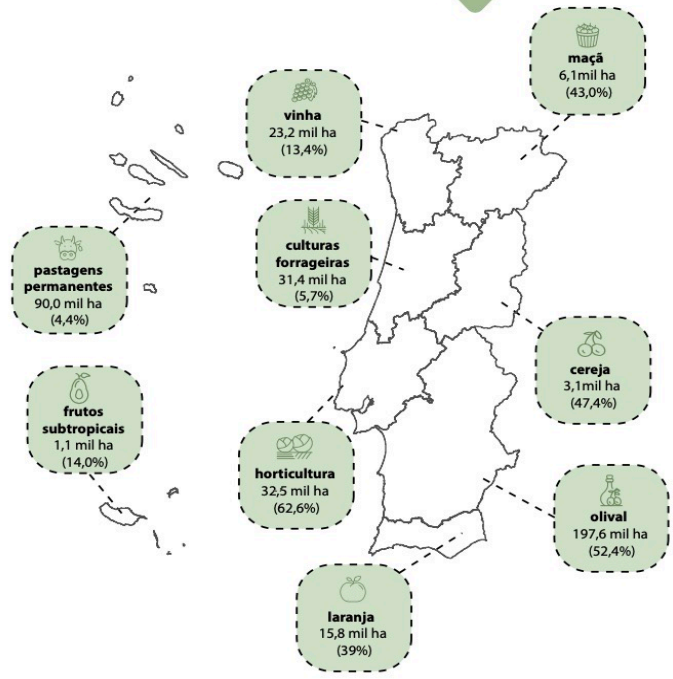
mostly men (67.1%), on average 64 years old, 46.3% have only completed the first level of basic education and 53.0% have exclusively practical agricultural training.

The producer's household consists of an average of 2.4 people, and 59.5% of these households have pension and pension benefits

DE média das explorações (2019)



Fonte: INE, I. P.



Family farming performs a set of very important and essential economic, environmental, social and demographic roles

The need for public policies that include:

Priority action at the level of the territory, covering all farms. Monetize the investments to be made in applied research, the engine of the technological transformation of family farming, as well as actions that make it possible to ensure, consistently, the sustainability of farms and, in this way, the spatial planning itself

R&D institutions offering new techniques and practices appropriate to the different types of holdings present in the territory, which induce productivity gains and increased and sustained appreciation of the products and services of the territories, as well as the improvement of the social conditions of production and well-being of farmers and their families

Institutions with scale and different models of organisation, including cooperatives and producer organisations, but also others, which can organise and promote the support and dissemination of technical knowledge, market orientation, the processing and valorisation of products and their competitive marketing

A stable and multiannual public funding system, regularly assessed according to the objectives and results obtained, both for research and development actions that meet the needs of family farming and its territories, and for institutions that carry out the technical framework and dissemination of knowledge to family farms

Measures to support public investment for farms and their framework organisations, with a view to valuing and promoting their products and services, appropriate to the diversity of their characteristics and facilitating the adoption of innovation and reducing context costs

Support measures for the organisation of the proximity market for products and services originating from family farming in those territories

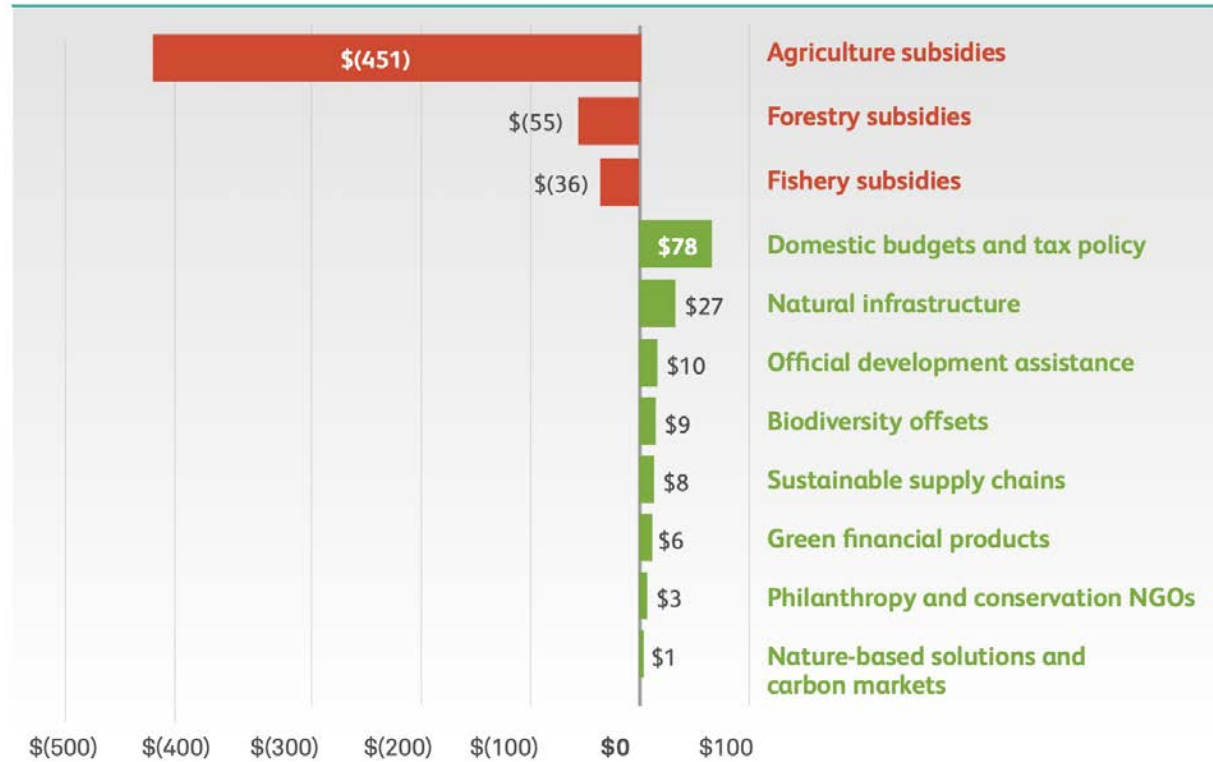
Model of organization and territorial governance, based on the principles of legitimacy, democracy and citizenship, which enables the convergence and mobilization of all local institutions and actors, public and private, for common objectives that maintain the viability of society, ensure its survival and long-term development

The expectation of European citizens on CAP: safe, high-quality, affordable, nutritious and diversified food, while safeguarding the impact on their health, the environment and climate.

CAP may have contributed to the modernization of agriculture in Portugal, but the allocation of direct payments to some productions distorted the market and made it difficult to reconvert the sector with a cultural, technological and productive conversion of the sector towards the international valorisation and competitiveness of endogenous resources

It is important to preserve soils with an aptitude for agriculture and increase national agricultural production, valuing the resources that make us more competitive. The country's dependence on energy and food imports remains a huge challenge for economic, social and environmental sustainability

FIGURE 2. Harmful subsidies and global financial flows towards biodiversity conservation.
(upper estimates, in 2019 US\$ billion per year)



Note: The estimates of agricultural, forestry, and fisheries harmful subsidies correspond to OECD's "potential biodiversity harmful" category of production subsidies. This graph excludes the estimated additional US\$ 395–478 billion in fossil fuel production subsidies.⁹

Figure 3 | Shifting agricultural subsidies to restore land can lead to many benefits

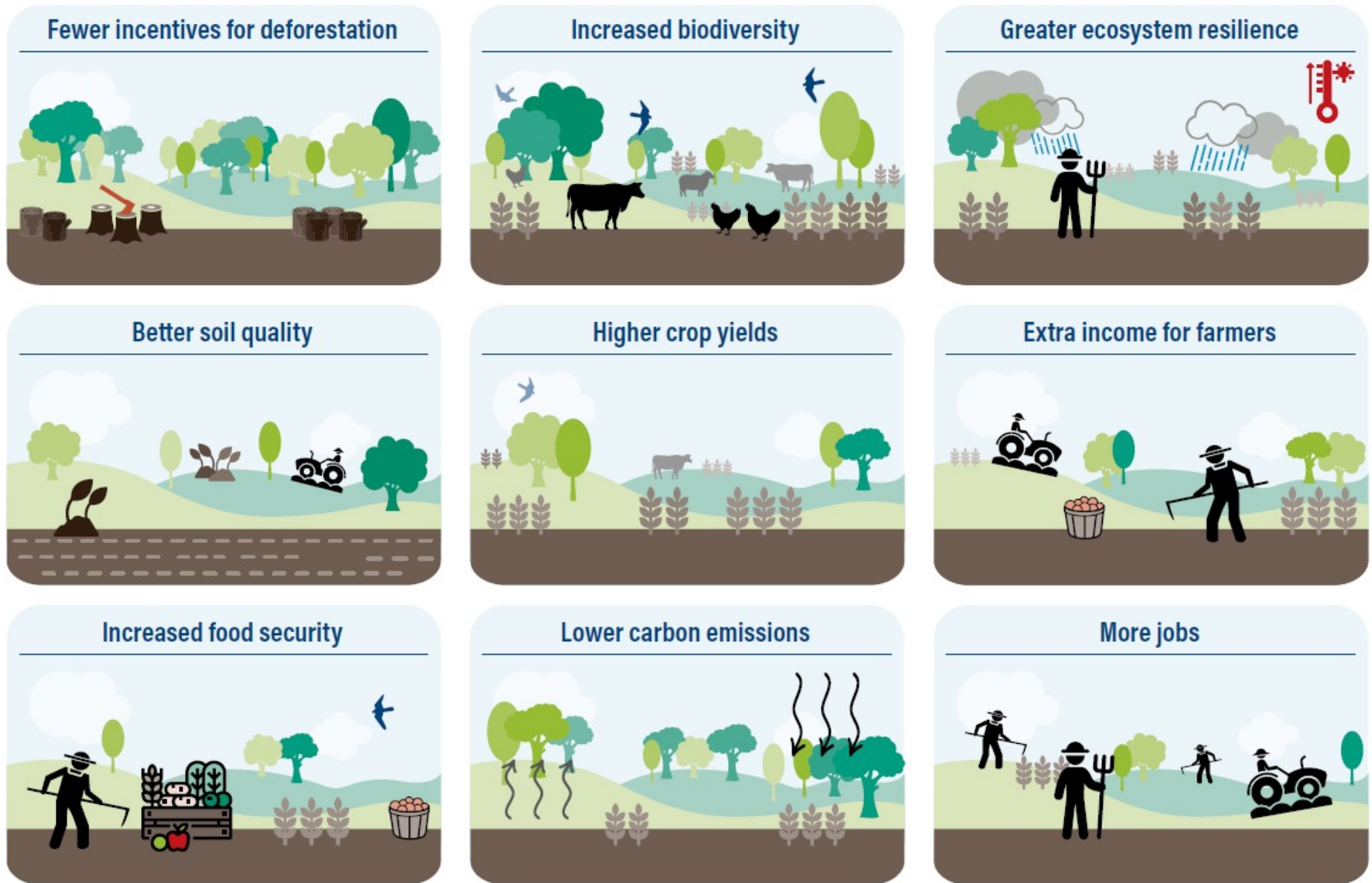


Table I. Agronomic principles and practices considered to be part of Regenerative Agriculture and their potential impacts on restoration of soil health and reversal of biodiversity loss.

Principles	Practices	Restoration of soil health	Reversal of biodiversity loss
Minimize tillage	Zero-till, reduced tillage, conservation agriculture, controlled traffic	***	—
Maintain soil cover	Mulch, cover crops, permaculture	***	*
Build soil C	Biochar, compost, green manures, animal manures	***	—
Sequester carbon	Agroforestry, silvopasture, tree crops	***	**
Relying more on biological nutrient cycles	Animal manures, compost, compost tea, green manures and cover crops, maintain living roots in soil, inoculation of soils and composts, reduce reliance on mineral fertilizers, organic agriculture, permaculture	***	—
Foster plant diversity	Diverse crop rotations, multi-species cover crops, agroforestry	**	***
Integrate livestock	Rotational grazing, holistic [Savory] grazing, pasture cropping, silvopasture	**	?
Avoid pesticides	Diverse crop rotations, multi-species cover crops, agroforestry	*	***
Encouraging water percolation	Biochar, compost, green manures, animal manures, holistic [Savory] grazing	***	—

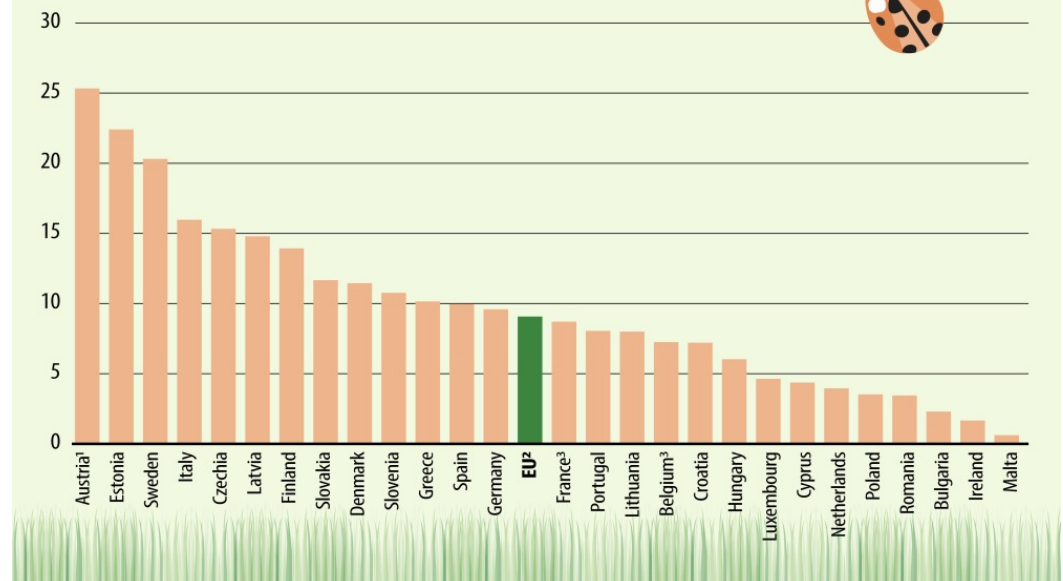
Based on McGuire (2018), Burgess et al. (2019) and Merfield (2019).

ORGANIC FARMING IN EUROPE

- The total area under organic farming in the EU continues to increase, and in 2020 covered 14.7 million hectares of agricultural land
- Organic area made up 9.1 % of total EU agricultural land in 2020
- In 2020, Sweden had the highest shares of organic cereals (7.1 %) and fresh vegetables (17.8 %) in its total production
- In 2020, Greece had the highest share of organic bovine animals (30.3 %) in its total production

Organic area

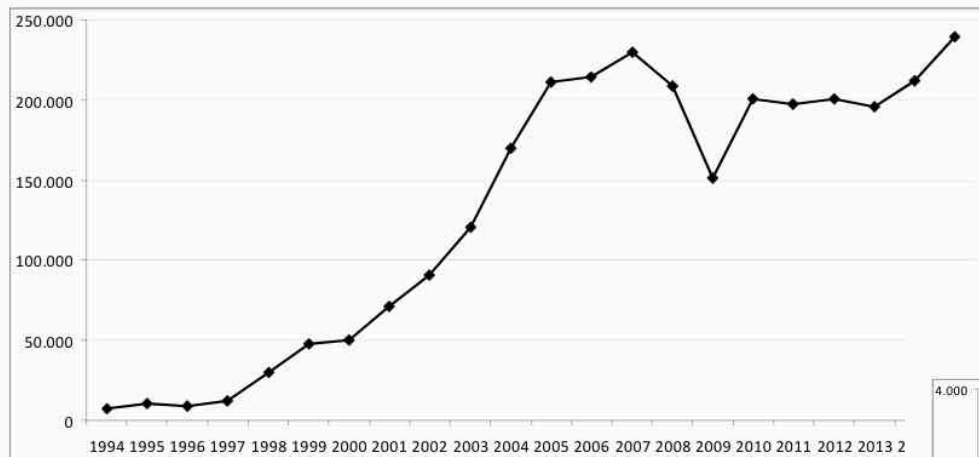
(% share of total utilised agricultural area, 2020)



1. 2019 data
2. Estimated
3. Provisional

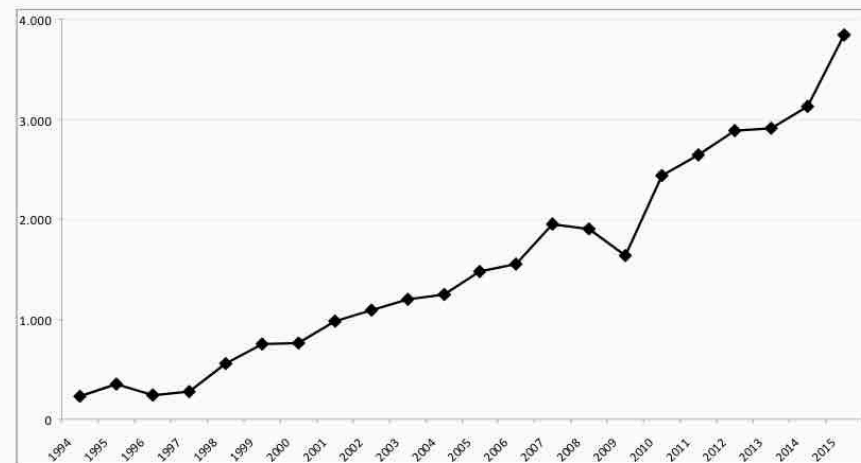
ORGANIC FARMING IN EUROPE

Figura n.º 2 — Evolução da superfície em agricultura biológica (ha) — Continente



Fonte: DGADR

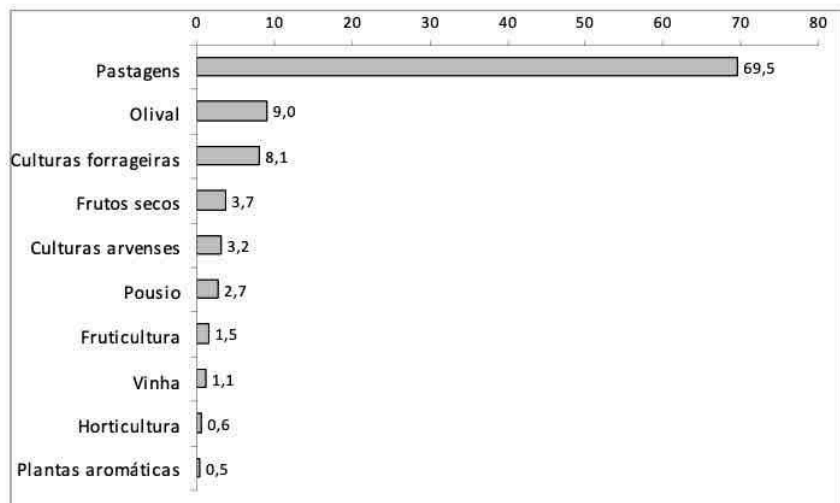
Figura n.º 3 — Agricultura Biológica — Total de Produtores (n.º) — Continente



Fonte: DGADR

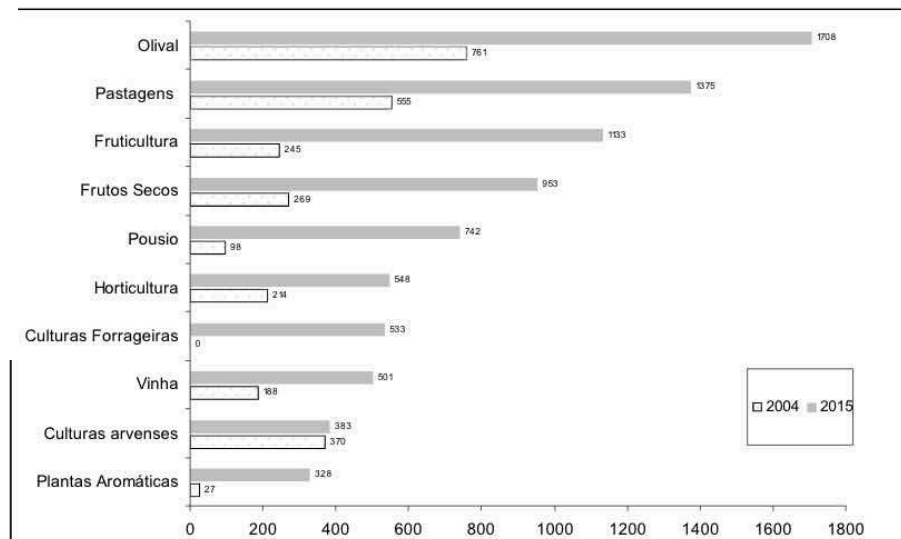
ORGANIC FARMING IN EUROPE

Figura n.º 1 — Ocupação cultural da superfície em agricultura biológica — Continente — 2015



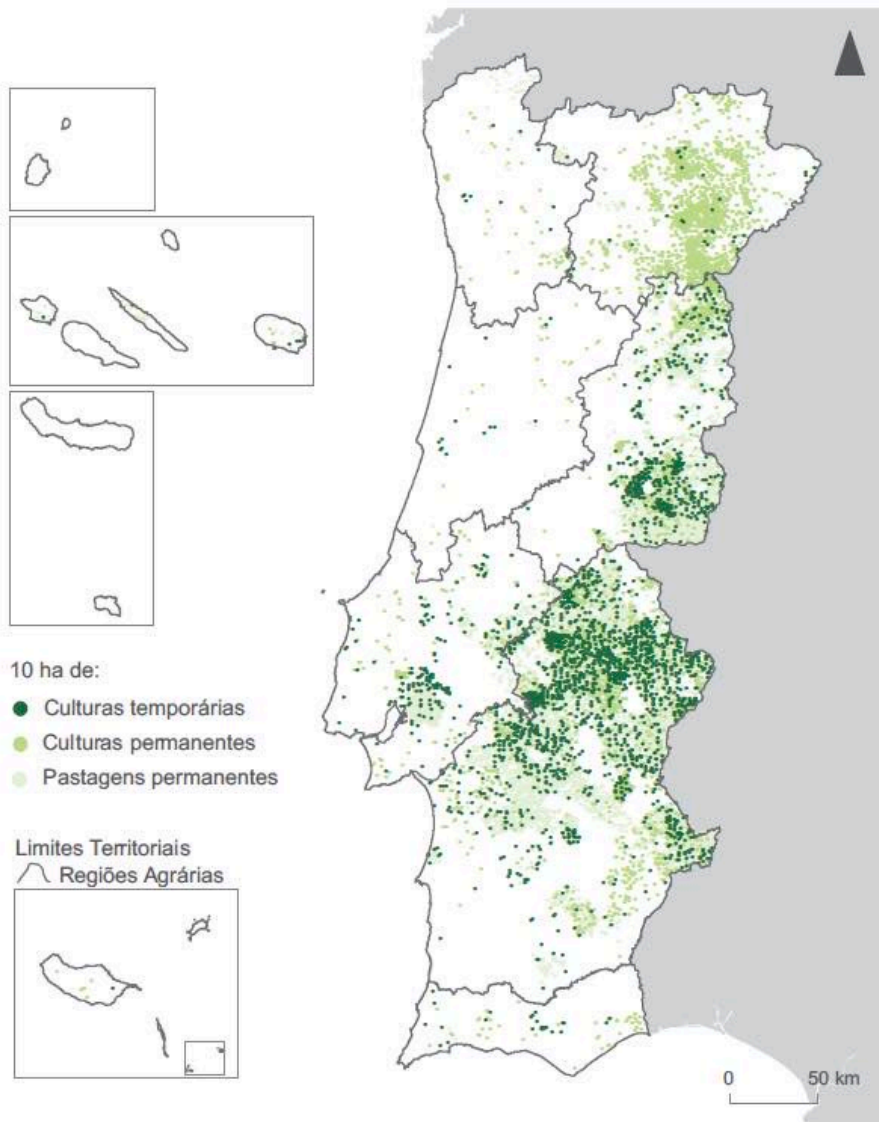
Fonte: DGADR

Figura n.º 4 — N.º de produtores por tipo de cultura, nos anos de 2004 e 2015 — Continente

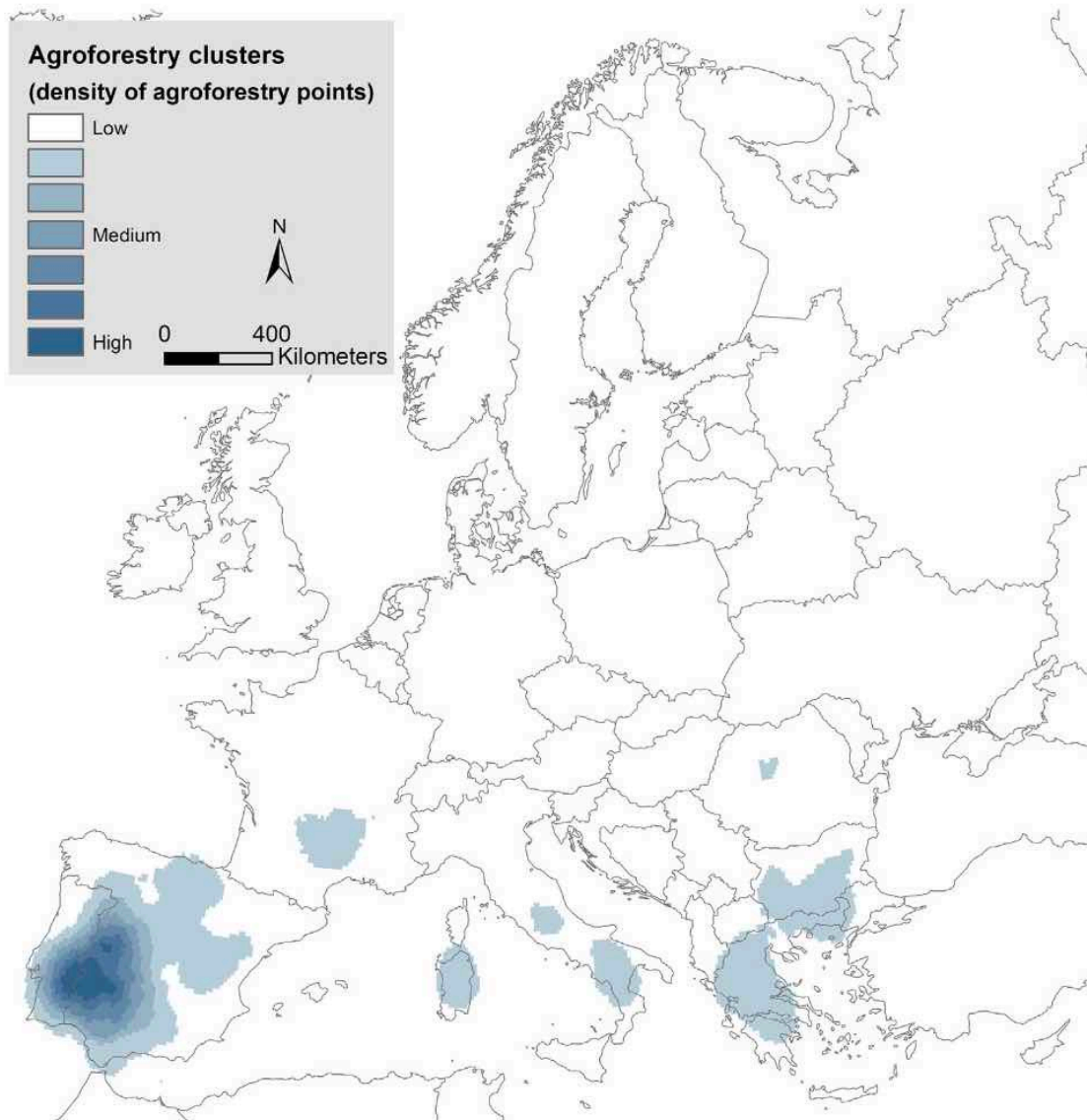


Fonte: DGADR

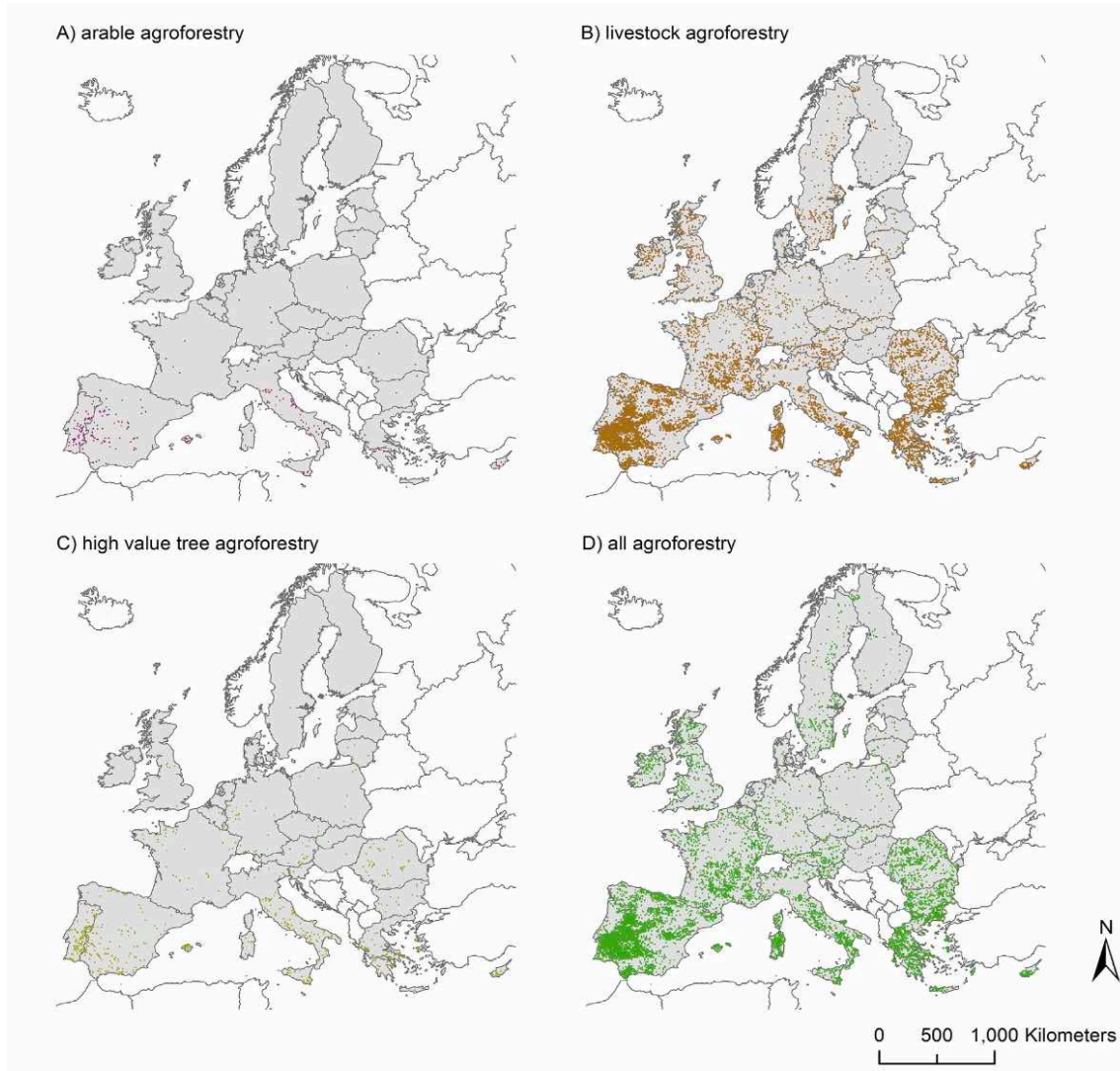
ORGANIC FARMING IN EUROPE



AGROFORESTRY DISTRIBUTION IN EUROPE



AGROFORESTRY DISTRIBUTION IN EUROPE



- **Arable agroforestry** - where crops are integrated with trees.
- **Livestock agroforestry** - where livestock production is integrated with trees
- **High value tree agroforestry** - where the primary land use is permanent woody crops such as fruit orchards, olive groves, or nut trees

*It should be noted that these categories are not mutually exclusive

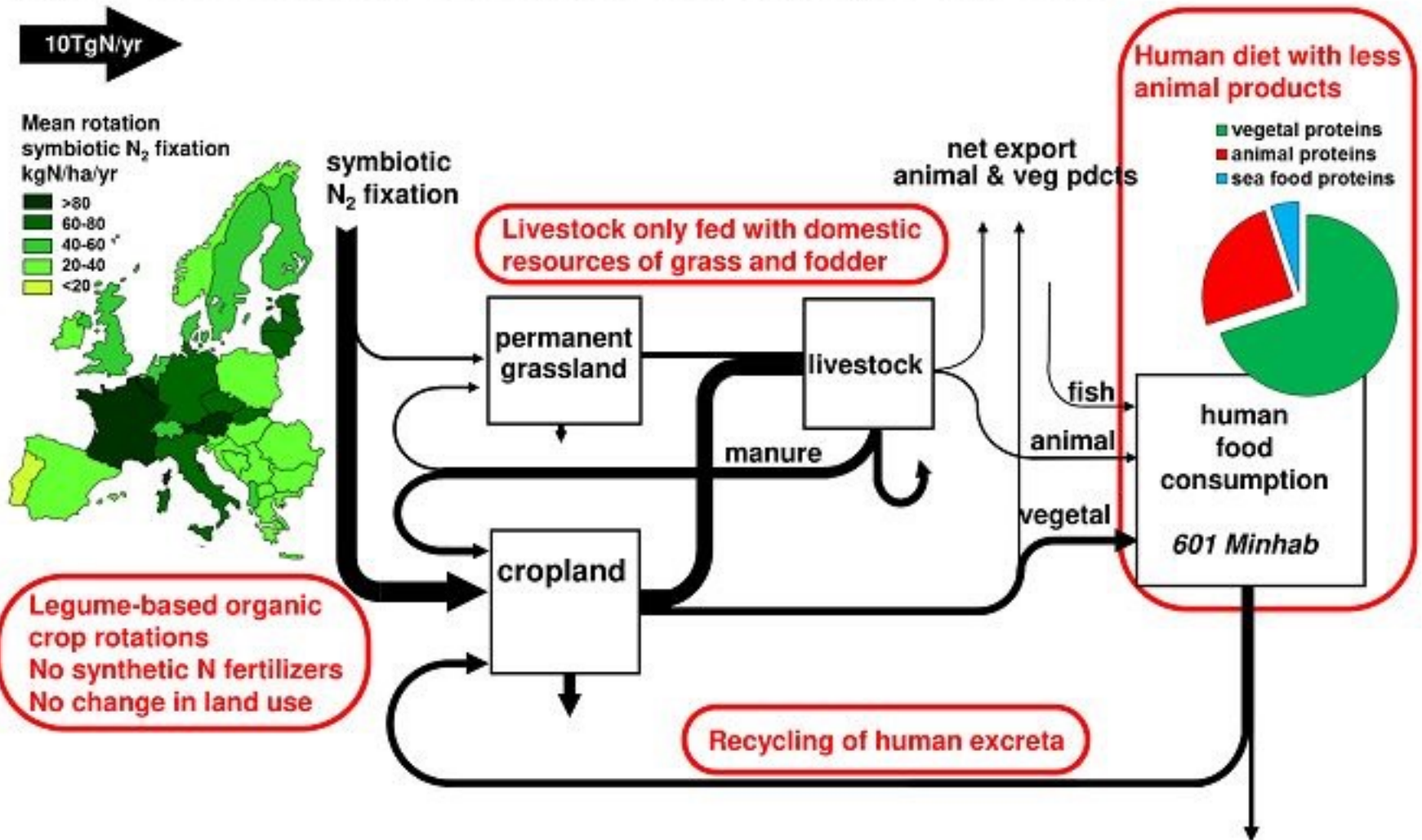
AGROFORESTRY DISTRIBUTION IN EUROPE

Table A2

Total extent of agroforestry (total area × 1000 ha) in Europe according to the literature study (den Herder et al., 2015a,b) and the LUCAS estimate.

Country	All agroforestry (literature estimate) 1000 ha	All agroforestry (LUCAS estimate) 1000 ha	Difference (LUCAS – literature) 1000 ha
Austria	48.6	160.8	112.3
Belgium	12.4	43.7	31.3
Bulgaria		869.9	869.9
Croatia	64.5		
Cyprus		47.5	47.5
Czech Republic	9.2	45.8	36.5
Denmark	3.2	16.2	12.9
Estonia		14.4	14.4
Finland	7.3	158.1	150.8
France	510.1	1562.2	1052.0
Germany	480.5	263.5	-217.0
Greece	2096.7	1616.4	-480.3
Hungary	22.8	38.1	15.3
Ireland		224.4	224.4
Italy	967.0	1403.9	436.9
Latvia		23.4	23.4
Lithuania		38.6	38.6
Luxembourg		7.2	7.2
Malta		0.4	0.4
Netherlands	3.0	27.8	24.8
Poland	200.0	100.4	-99.6
Portugal	1842.3	1168.3	-674.1
Romania	180.1	888.2	708.1
Slovakia	92.0	43.9	-48.1
Slovenia	185.0	56.3	-128.7
Spain	3839.9	5584.4	1744.5
Sweden	100.0	465.5	365.5
Switzerland	97.3		
United Kingdom	157.5	551.7	394.2
EU-27 total	10643	15421	4778

Agro-ecological scenario for Europe in 2050



SMARTER FOOD CHOICES ARE MULTI-LEVEL

Reducing the conflict between humanity's requirement for food and the negative impacts of food production on biodiversity and the environment, will not be achieved simply by identifying a single approach to biodiversity-friendly farming.

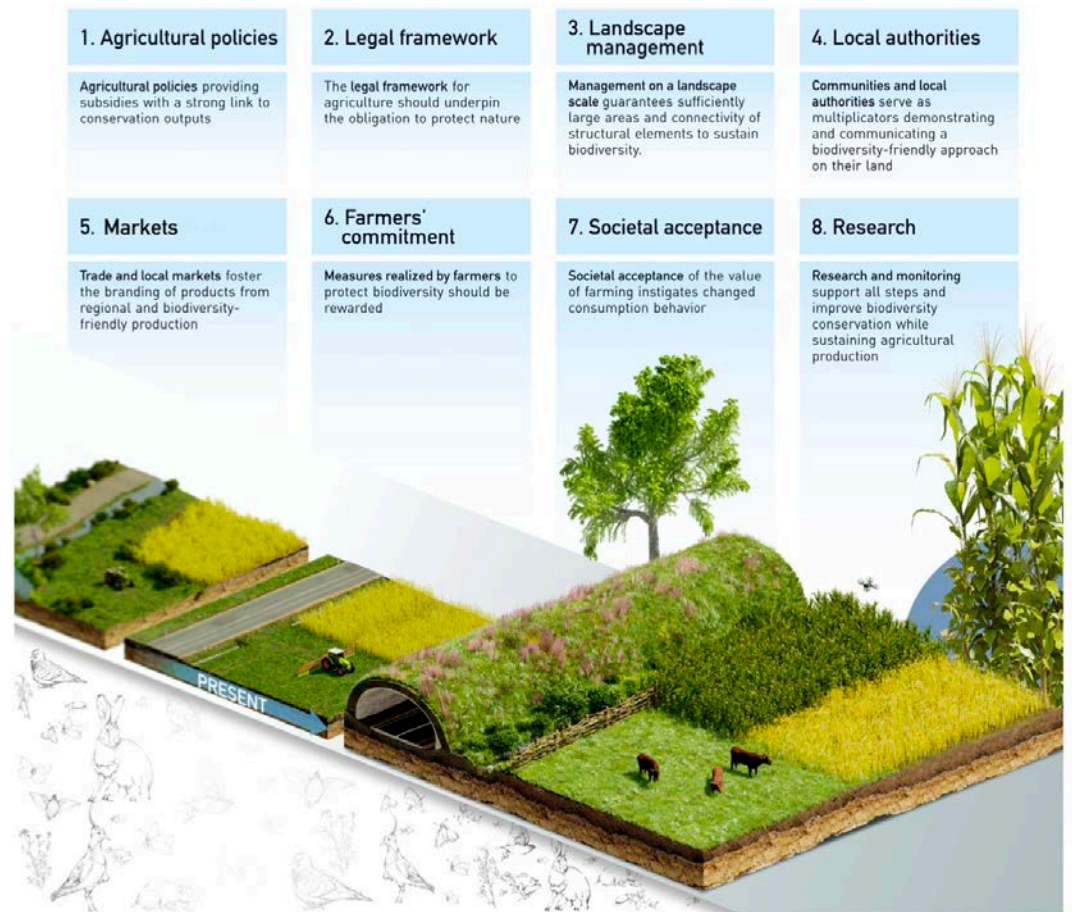


Figure 1. To sustain and increase biodiversity, the agricultural landscape needs to change. Here, we demonstrate a past, present, and future vision (from left to right) for a landscape supporting biodiversity with no net area loss to roads and small-scaled and diverse landscape structures with polycultures, such as corn-bean (blue semicircle). Modern technology will support this development, as exemplified by the drone.



UNE NOUVELLE RÉVOLUTION VERTE

AGRICULTURE AND TERRITORIAL COHESION IN PORTUGAL: AN ECOLOGICAL AND POLITICAL PERSPECTIVE

ABSTRACT

The Portuguese agri-food sector faces several threats, including climate change, globalization of goods and services and land use changes related to the abandonment of primary activities among the most worrying. Climate change scenarios for Portugal point to progressively more unfavourable conditions for agriculture, resulting from the reduction of precipitation and temperature increase, the worsening of the frequency and intensity of extreme weather events, the increased susceptibility to desertification and the favourable conditions for harmful biotic agents, evidencing the need to foster the resilience of territories through measures to **adapt to changing conditions**.

Agriculture will continue to be very diverse, highly dependent on what access to land may be but desirably thought of a land-use logic (agroecological zoning) that anticipates the effects of climate change. It is also essential to consider the specificity of the territories, providing public support to farms, and devoting resources to the development of the territory where family farming prevails, **recognizing the reality of the productive structure of these regions, namely the environmental and social importance of multi-income agriculture**.

The paradigm shift requires other policies, favouring territorial action, encompassing all explorations, and in harmony between these and the other sectors of activity. Only at this scale is it possible to make the necessary investments in applied research, with the support of the scientific and technological system, by **providing the technology, innovation and knowledge necessary for the transformation and sustainability of family farming**. The natural and progressive qualification of family farming will eventually drive other equally relevant areas, in particular the design of innovative cooperatives, the establishment of appropriate producer organizations, and proximity markets. **Placing family farming at the centre of the sector's public policies is a fundamental strategic movement for the cohesion and sustainability of the territory, for the wellbeing of the Portuguese, for the preservation of the environment and for the safeguarding of biodiversity**.