AGRICOLTURA SOSTENIBILE: UNA SFIDA DA VINCERE

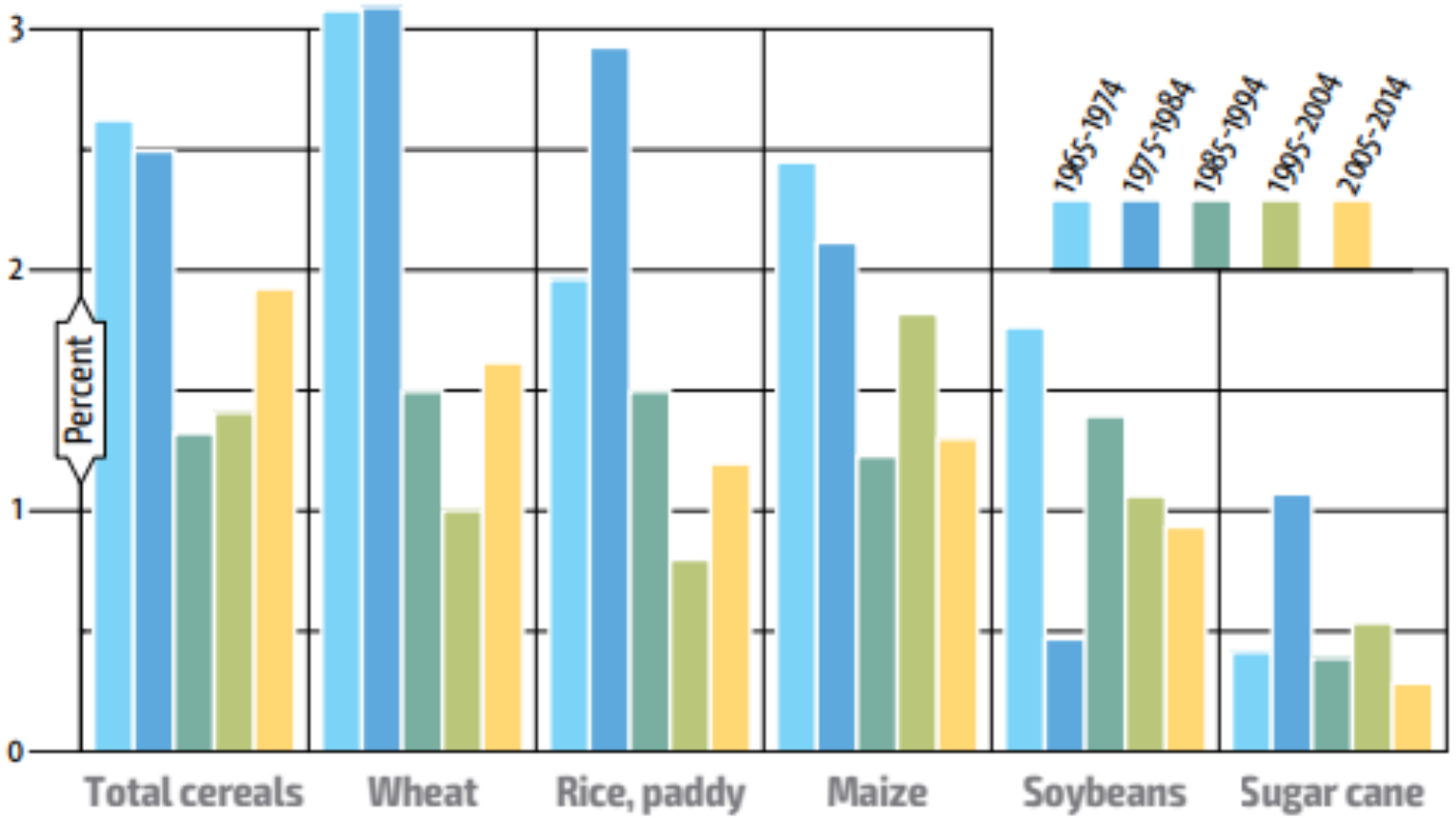
Le produzioni vegetali

Transizioni agroecologiche verso la sostenibilità

Stefano.Bocchi@unimi.it

CASA dell'AGRICOLTURA

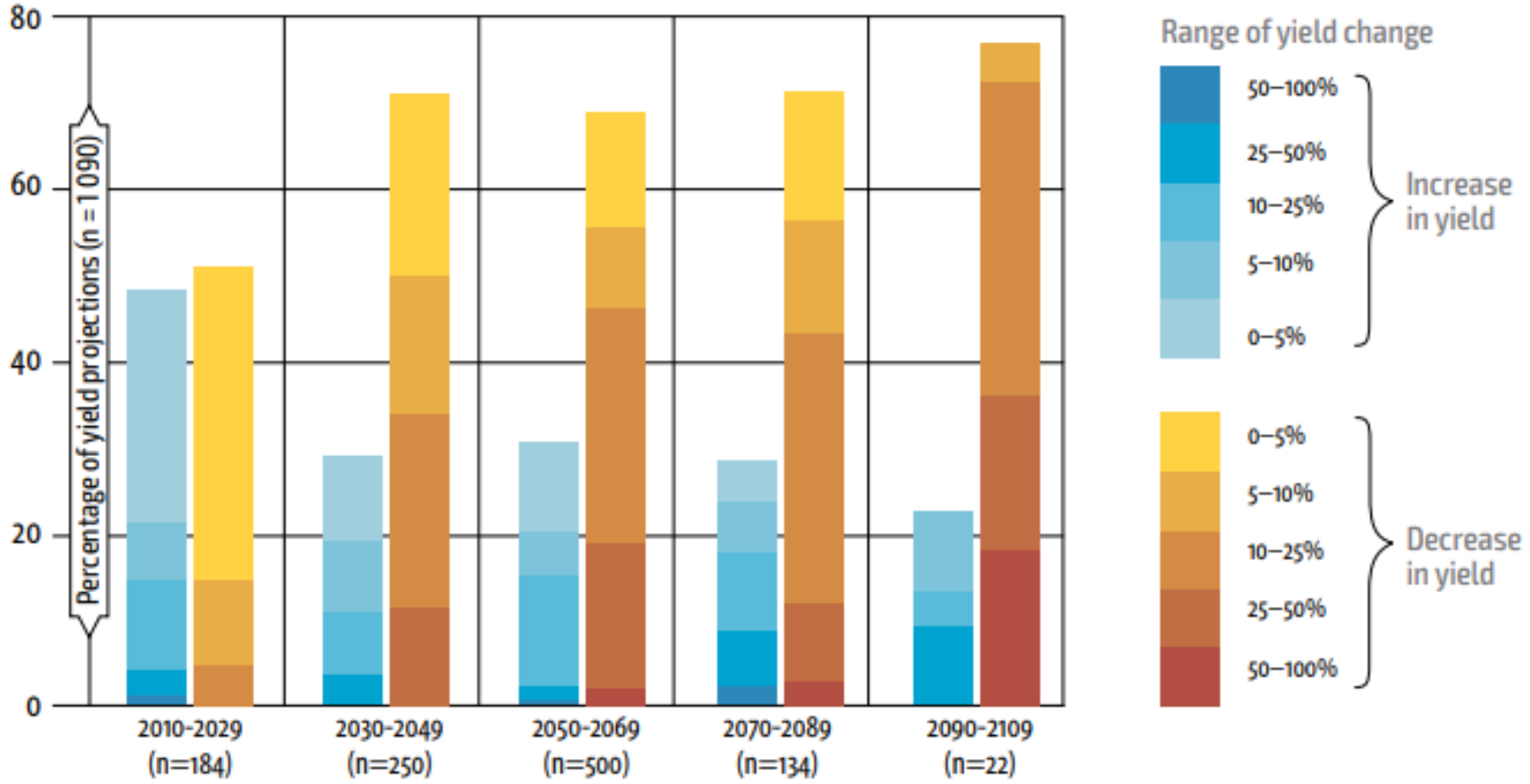
Figure 5.1 Average annual growth rates for selected crop yields



Note: Calculations based on FAOSTAT production statistics (downloaded on 20 September 2016). Growth rates estimated using the ordinary least squares (OLS) regression of the natural logarithm of crop yields on time and a constant term. The commodity group 'Cereals (total)' is from FAOSTAT and includes: wheat, rice (paddy), barley, maize, rye oats, millet, sorghum, buckwheat, quinoa, fonio, triticale, canary seed, as well as grains and mixed cereals not elsewhere specified.

Source: FAO, 2016b.

Figure 4.3 Projected changes in crop yields owing to climate change



Source: Porter *et al.*, 2014, p.504.

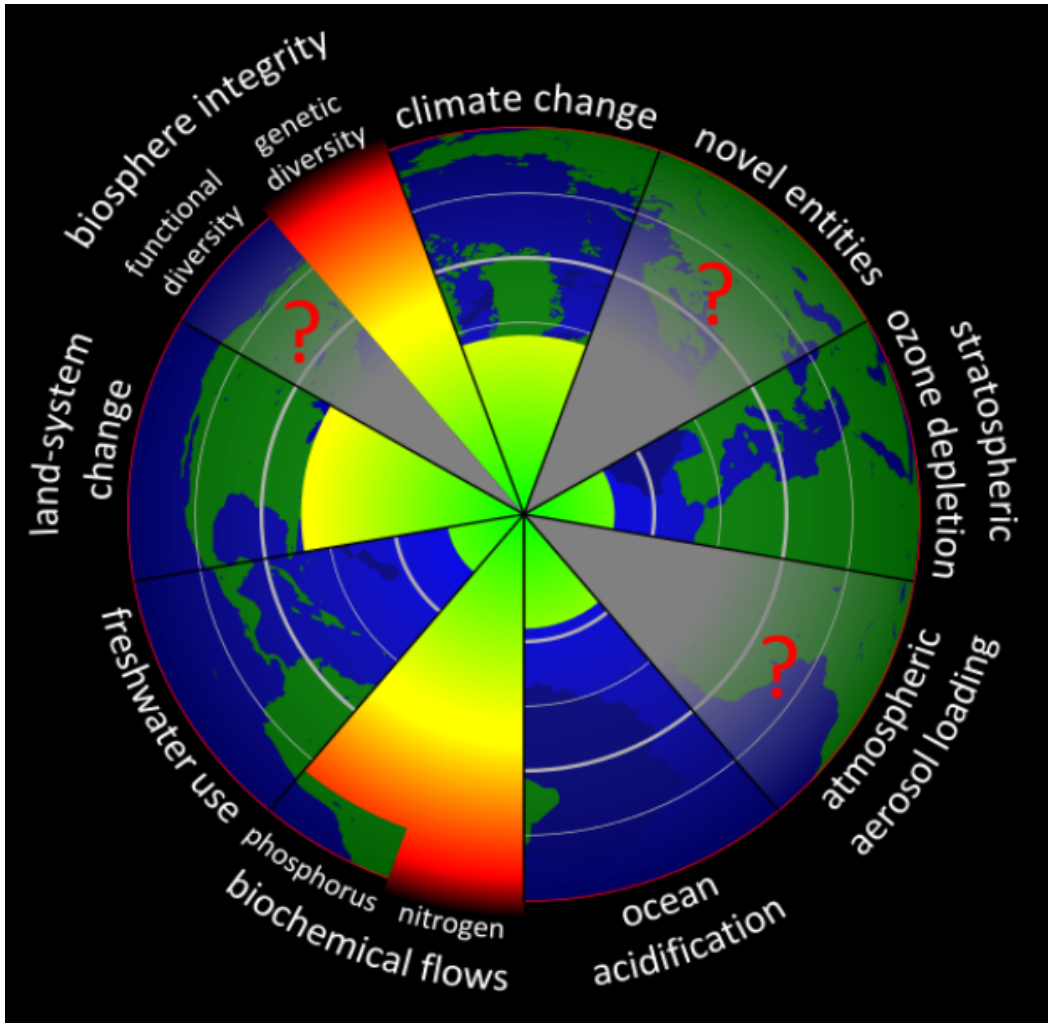
RESEARCH

RESEARCH ARTICLE SUMMARY

SUSTAINABILITY

Planetary boundaries: Guiding human development on a changing planet

Will Steffen,* Katherine Richardson, Johan Rockström, Sarah E. Cornell, Ingo Fetzer, Elena M. Bennett, Reinette Biggs, Stephen R. Carpenter, Wim de Vries, Cynthia A. de Wit, Carl Folke, Dieter Gerten, Jens Heinke, Georgina M. Mace, Linn M. Persson, Veerabhadran Ramanathan, Belinda Reyers, Sverker Sörlin



ARTICLE

https://doi.org/10.1038/s41586-018-0594-0

Options for keeping the food system within environmental limits

Marco Springmann[1,2*], Michael Clark[3], Daniel Mason-D'Croz[4,5], Keith Wiebe[4], Benjamin Leon Bodirsky[6], Luis Lassaletta[7], Wim de Vries[8], Sonja J. Vermeulen[9,10], Mario Herrero[5], Kimberly M. Carlson[11], Malin Jonell[12], Max Troell[12,13], Fabrice DeClerck[14,15], Line J. Gordon[12], Rami Zurayk[16], Peter Scarborough[2], Mike Rayner[2], Brent Loken[12,14], Jess Fanzo[17,18], H. Charles J. Godfray[1,19], David Tilman[20,21], Johan Rockström[6,12] & Walter Willett[22]

«The food system is the major driver of climante change, changes in land use, depletion of freshwater resources, and pollution of aquatic and terrestrial ecosystems through excessive nitrogen and phosphorus inputs»

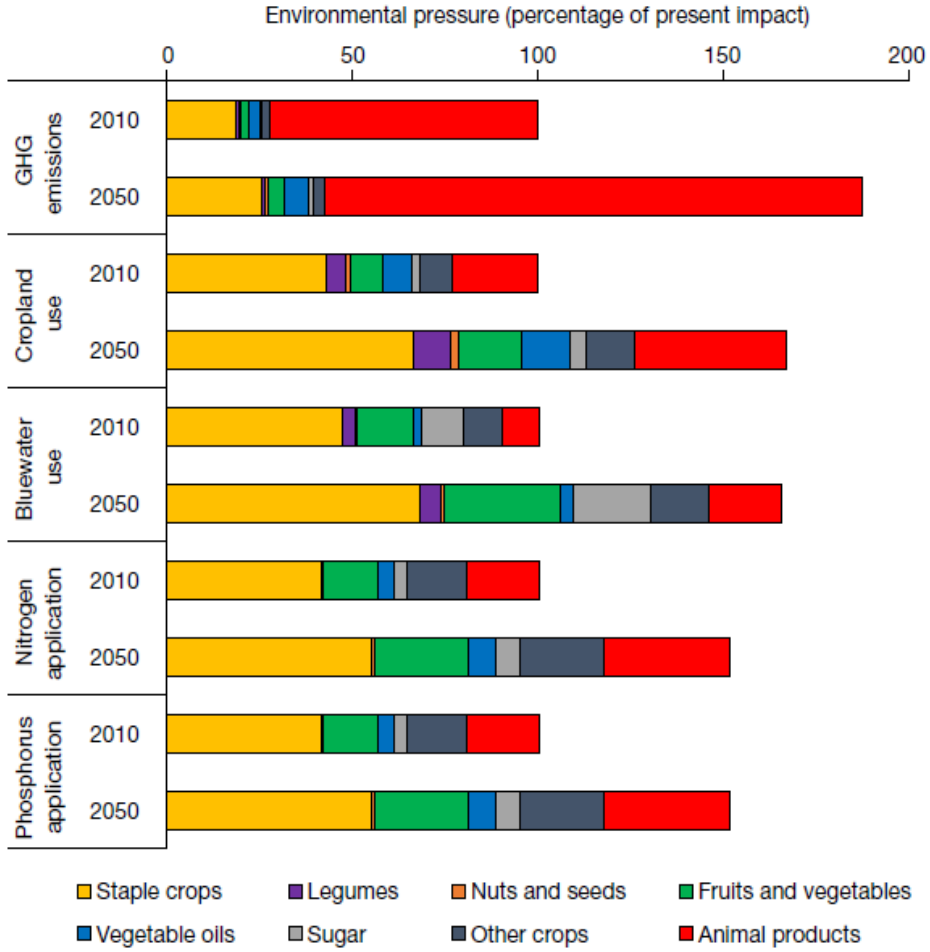


Fig. 1 | Present (2010) and projected (2050) environmental pressures on five environmental domains divided by food group. Environmental pressures are allocated to the final food product, accounting for the use and impacts of primary products in the production of vegetable oils and refined sugar, and for feed requirements in animal products. Impacts are shown as percentages of present impacts, given a baseline projection to 2050 without dedicated mitigation measures for a middle-of-the-road socioeconomic development pathway (SSP2). Absolute impacts for all socioeconomic pathways are provided in the main text and the data referred to in the 'Data availability' statement (see Methods).

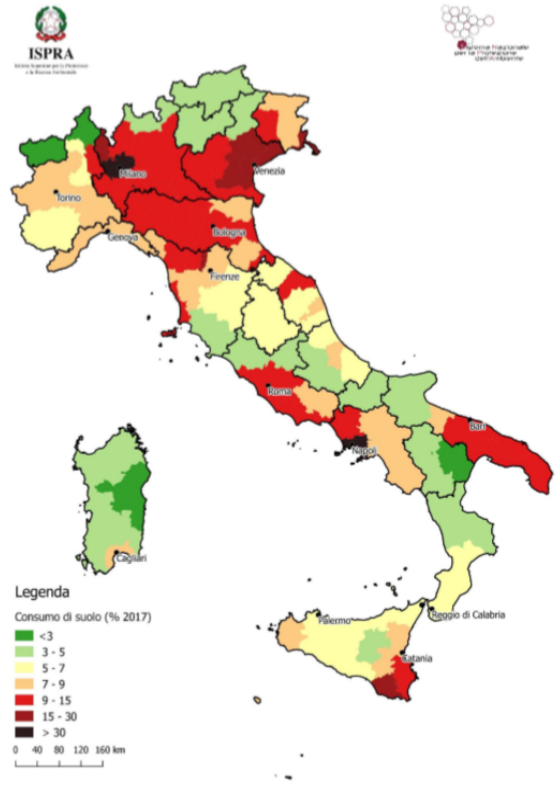


Figura 7 - Consumo di suolo a livello provinciale (% esclusi i corpi idrici - 2017). Fonte: elaborazioni ISPRA su cartografia SNPA.

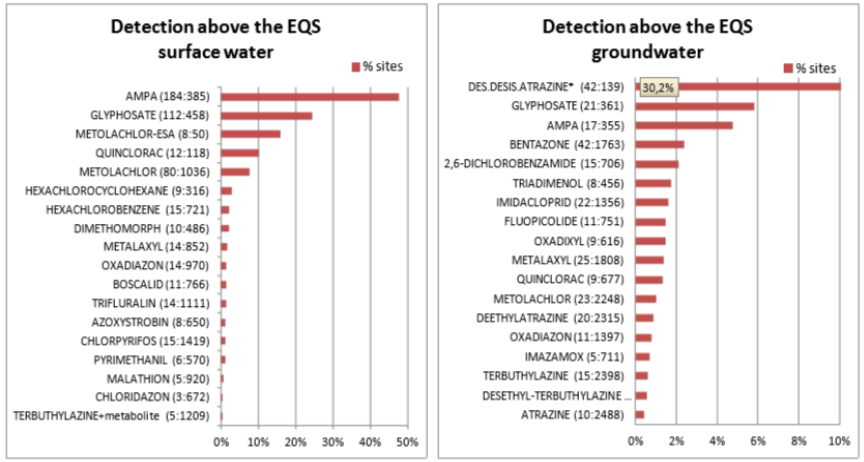


Fig. 6 - *Pesticides detected most frequently above the EQS in surface and ground water.*

Evolution of N and P budgets in the Po river watershed and comparison with the literature. NANI and NAPI are normalized for the watershed area and expressed in kg N km^{-2} yr^{-1} and kg P km^{-2} yr^{-1}. N and P budgets are normalized for agricultural land (AL) surface in the watershed and expressed in kg N ha^{-1} yr^{-1} and kg P ha^{-1} yr^{-1}.
References: (1) Billen et al., 2011, (2) Hong et al., 2013; (3) Lassaletta et al., 2012; (4) Goyette et al., 2016; (5) Hong et al., 2017; (6) Han et al., 2011; (7) Han et al. (2014); (8) Han et al. (2013); (9) Swaney et al. (2015); (10) Senthilkumar et al. (2012); (11) Hou et al. (2015); (12) Sobota et al. (2009); (13) Poisvert et al. (2017); (14) Vagstad et al. (2004); (15) Carmo et al. (2017); (16) Lassaletta et al. (2016).

	NANI	NAPI	N budget AL	P budget AL
Po river – before eutrophication (<1960) – this study	4930 ± 768	646 ± 76	27 ± 11	2.6 ± 1.2
Po river – maximum load (1980–1990) – this study	11021 ± 1077	1648 ± 115	78 ± 19	19.5 ± 1.6
Po river – recovery (>2010) – this study	8751 ± 634	1177 ± 101	60 ± 15	12.5 ± 1.8
Other watersheds				
European average, 2000 (1)	3700			
Lake Michigan Watershed, 1987–1997 (2)	3115			
Mississippi Watershed,1987–1997 (2)	2156			
Ebro Watershed, 2000 (3)	5118		50–200[a]	
St. Lawrence watershed (US and Canada), 1960–2010 (4)	436–866	87–116		
Danish straits, Baltic Sea watersheds, 2010 (5)	8779	1251		
Bothnian Bay, Baltic Sea watersheds, 2010 (5)	332	31		
Lake Erie watershed (US), 1964–2007 (6)		1092–463		
Mainland China 1981 (7, 8)	2630	190		
Mainland China 2009 (7, 8)	5013	465		
India average (9)	4016			
France average, 1999–2006 (10)				17.5–4.4
Hungary average, 1961–2010 (11)			12–93	
California watershed, 2000 (12)			<10–112[a]	
France average, <1960 (13)			16[a]	
France average, 1991 (13)			53[a]	
France average, 2010 (13)			34[a]	
Agricultural watershed in the Nordic and Baltic countries (14)			<10–75[a]	
Portugal average, 1950s (15)			~2	~4
Europe average, 1960s–2000s (16)			~50–80[a]	
North America average, 1960s–2000s (16)			~15–50[a]	

[a] Only crop harvest is considered as N output from the cropland.

AGRICOLTURA SOSTENIBILE: UNA SFIDA DA VINCERE

Le produzioni vegetali

Agricoltura industrializzata

Disconnessione dai cicli naturali

Settorializzazione

Dipendenza dal mercato (globale)

Da alimenti a *commodities*

Tecnologie (genetiche, chimiche, meccaniche)

Allargamento della scala come traiettoria dominante (riduzione di impiego e di posti di lavoro)

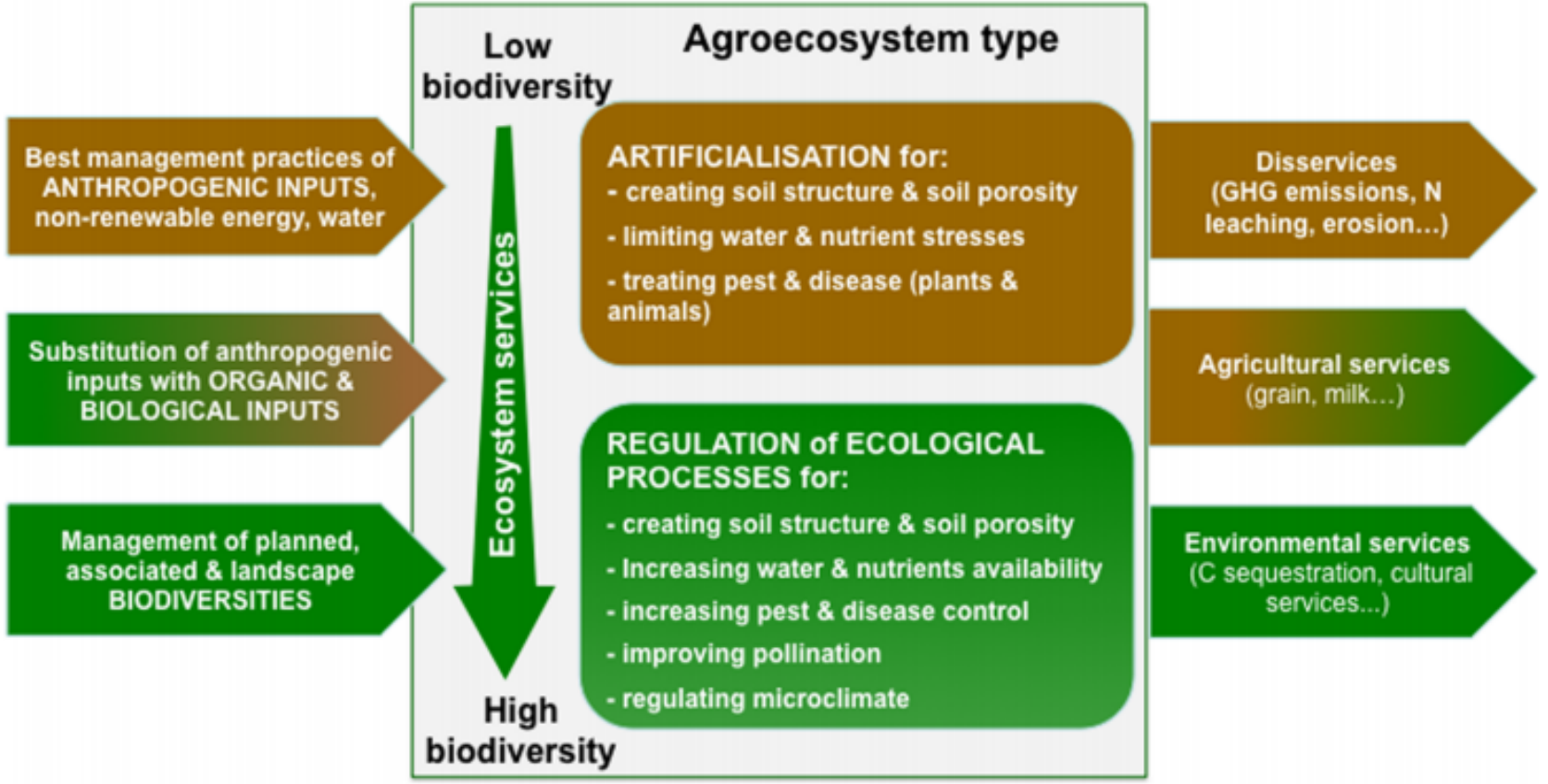
Intensificazione come funzione tecnologica

Specializzazione (ricerca, produzione, istituzioni ecc.)

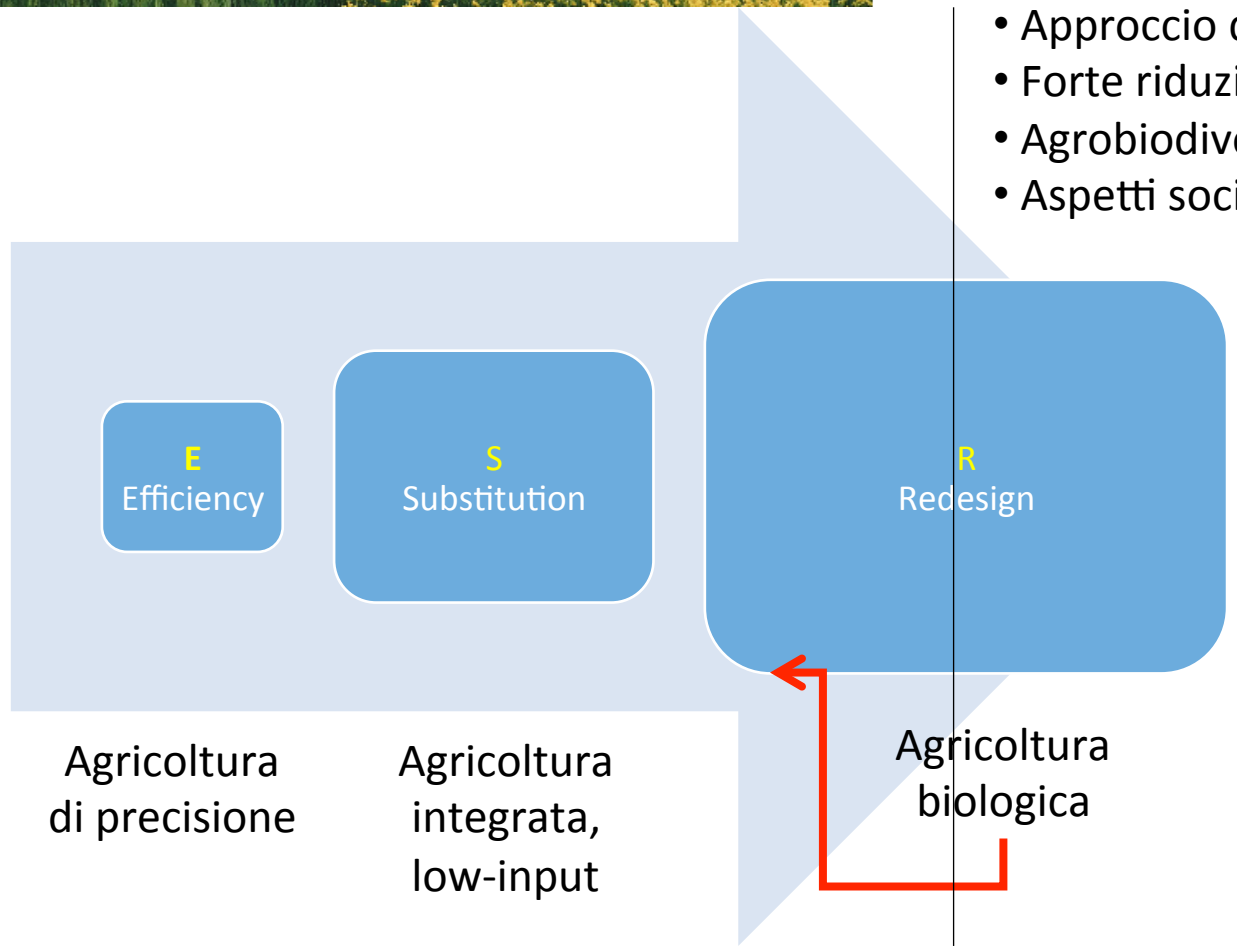
Rottura tra passato, presente e futuro

Ricerca esterna

Privatizzazione risorse



- Approccio di sistema
- Forte riduzione input esterni
- Agrobiodiversità
- Aspetti sociali

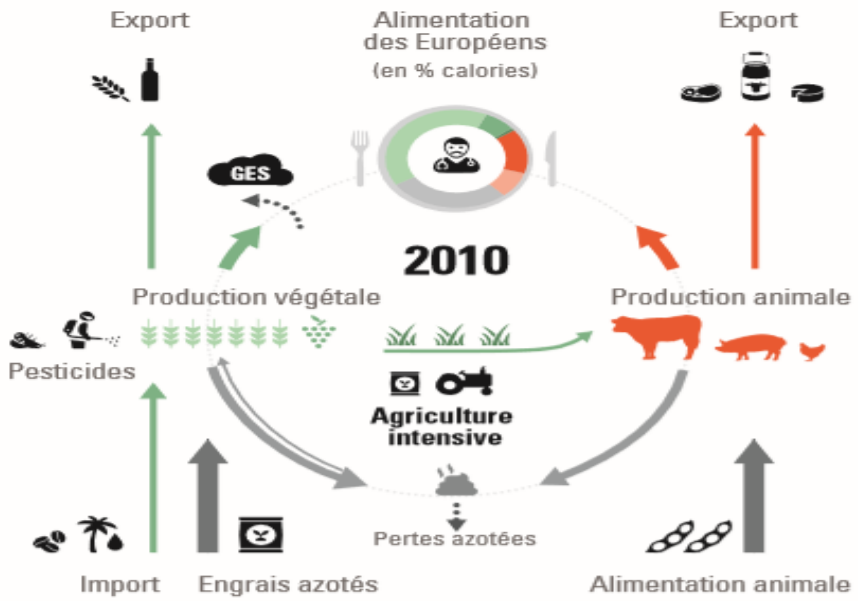


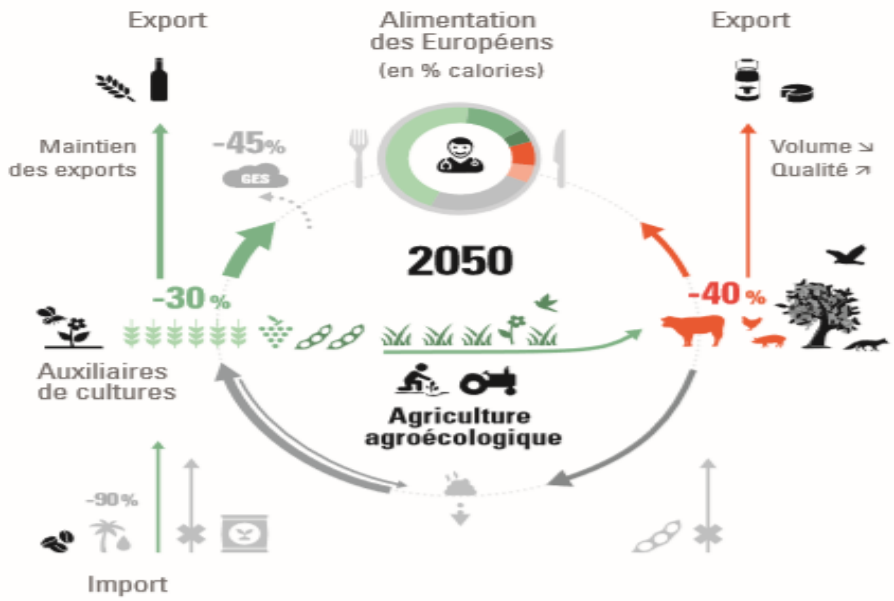
Trasformazione dei sistemi agro-alimentari

Hill & McRae (1995). J. Sust. Agr. 7, 81-87, adattato

AGRICOLTURA SOSTENIBILE: UNA SFIDA DA VINCERE

Le produzioni vegetali

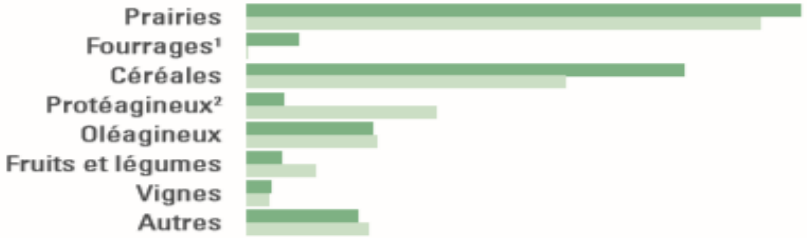




Productions

- Céréales et féculents
- Fruits et légumes
- Protéagineux (pois, lentilles…)
- Viandes, œufs et poissons
- Produits laitiers
- Autres

Usage des sols ● 2010 ● 2050



Prairies

1 : non protéinés ; 2 : grains et fourrage

DIVERSITY

Diversification is key to agroecological transitions to ensure food security and nutrition while conserving, protecting and enhancing natural resources.

CO-CREATION AND SHARING OF KNOWLEDGE

Agricultural innovations respond better to local challenges when they are co-created through participatory processes.

SYNERGIES

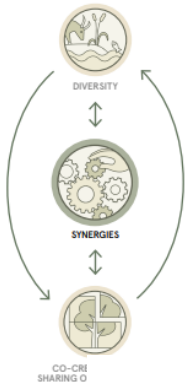
Building synergies enhances key functions across food systems, supporting production and multiple ecosystem services.

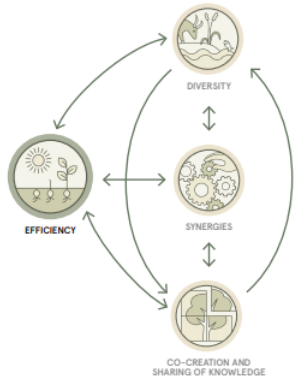
EFFICIENCY

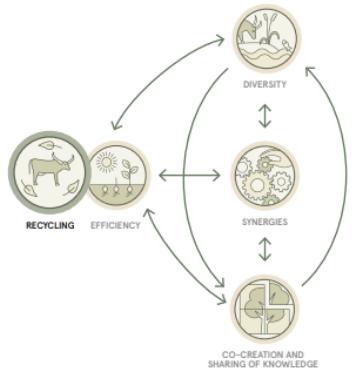
Innovative agroecological practices produce more using less external resources.

RECYCLING

More recycling means agricultural production with lower economic and environmental costs.

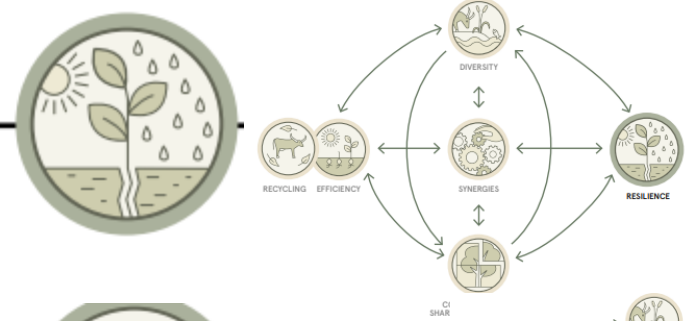






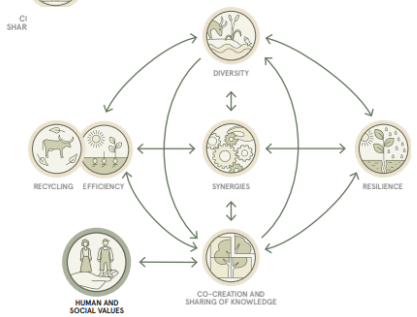
RESILIENCE

Enhanced resilience of people, communities and ecosystems is key to sustainable food and agricultural systems.



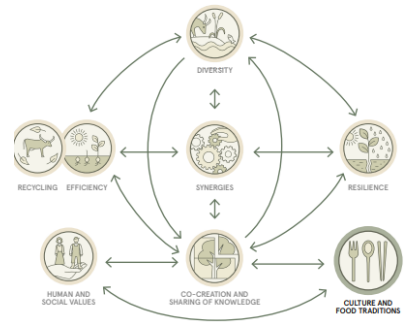
HUMAN AND SOCIAL VALUES

Protecting and improving rural livelihoods, equity and social well-being is essential for sustainable food and agricultural systems.



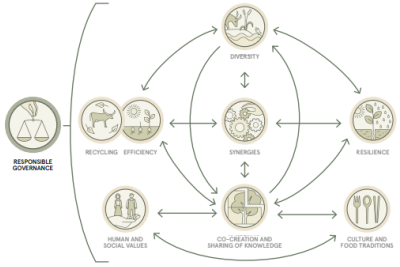
CULTURE AND FOOD TRADITIONS

By supporting healthy, diversified and culturally appropriate diets, agroecology contributes to food security and nutrition while maintaining the health of ecosystems.



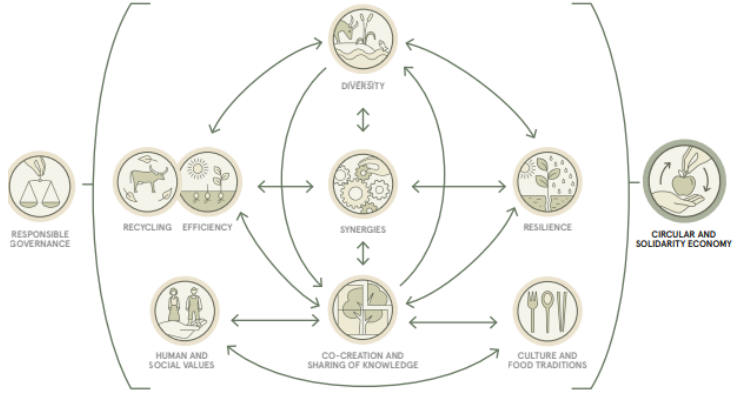
RESPONSIBLE GOVERNANCE

Sustainable food and agriculture requires responsible and effective governance mechanisms at different scales – from local to national to global.

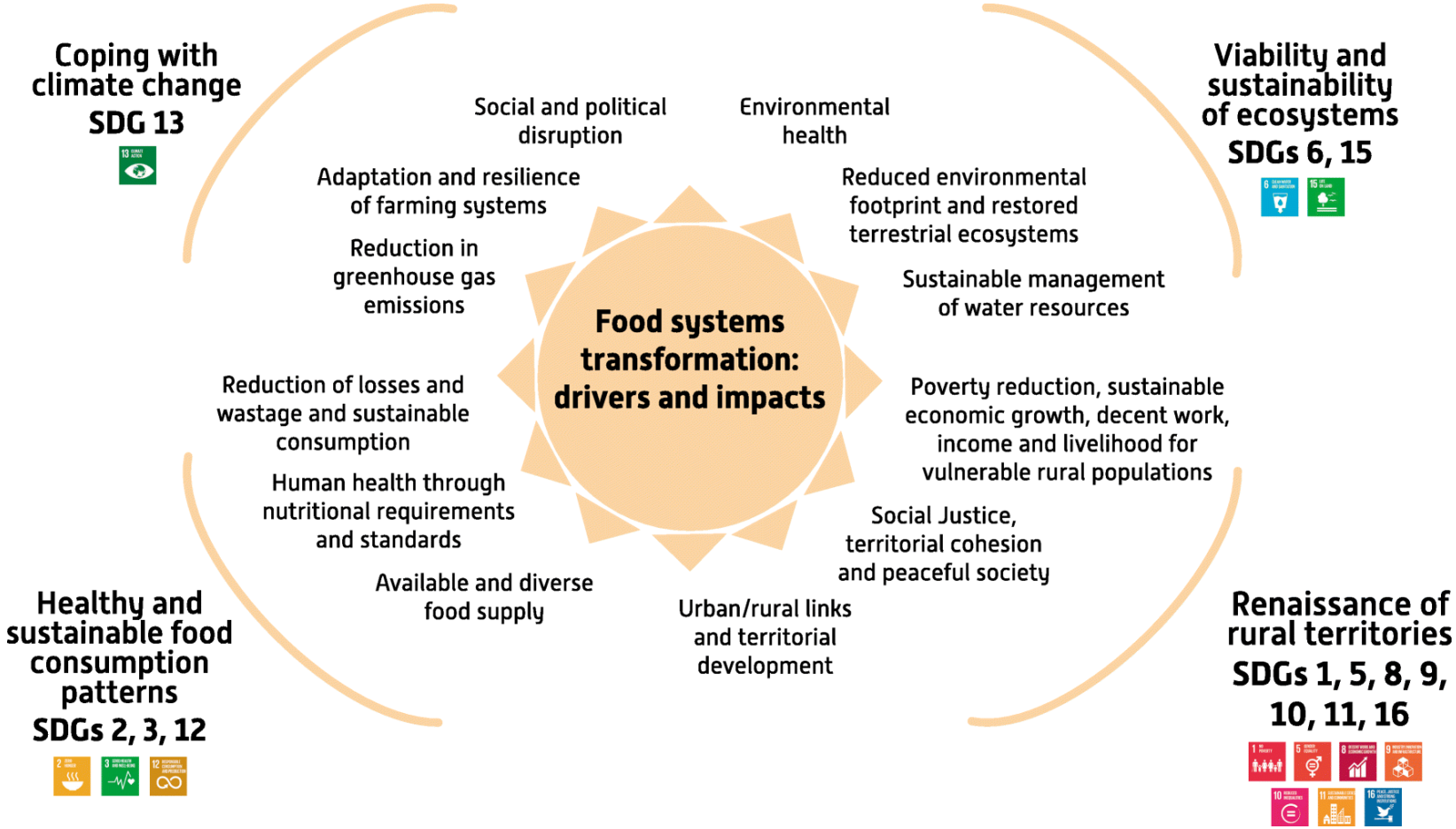


CIRCULAR AND SOLIDARITY ECONOMY

Circular and solidarity economies that reconnect producers and consumers provide innovative solutions for living within our planetary boundaries while ensuring the social foundation for inclusive and sustainable development.



Agricoltura industrializzata		***Strategia Agroecologia***
Disconnessione dai cicli naturali		Integrazione con cicli naturali, coevoluzione
Settorializzazione		Integrazione settori produttivi, insediativi, ricreativi
Dipendenza dal mercato (globale)		Ricerca di autonomia dai mercati degli input
Da alimenti a *commodities*		Differenziazione degli output (integrazione servizi ecosistemici)
Tecnologie (genetiche, chimiche, meccaniche)		Da commodity a prodotti contestualizzati
Allargamento della scala come traiettoria dominante (riduzione di impiego e di posti di lavoro)		Centralità delle tecnologie orientate alle competenze
Intensificazione come funzione tecnologica		Cooperazione, creazione di associazioni
Specializzazione (ricerca, produzione, istituzioni ecc.)		Intensificazione basata su quantità e qualità del lavoro, dei processi e dei prodotti
		Multifunzionalità all'interno di un modello cooperativo
Rottura tra passato, presente e futuro		Continuità fra passato, presente e futuro
Ricerca esterna		Interdisciplinarità e partecipazione
Privatizzazione risorse		Aumento della ricchezza sociale e territoriale



Fonte: Caron et al. Agronomy for Sustainable Development (2018) 38: 41 https://doi.org/10.1007/s13593-018-0519-1

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ACTUALITÉS ÉCONOMIE VIDÉOS OPINIONS CULTURE M LE MAG SERVICES

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Pour protéger la qualité de son eau potable, Paris tente de convertir les agriculteurs au bio

La capitale, qui s'approvisionne à la campagne, veut convaincre les agriculteurs d'avoir la main moins lourde sur les engrais et les pesticides.

Par Martine Valo • Publié le 18 avril 2019 à 01h55 - Mis à jour le 18 avril 2019 à 15h56

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