

Growing cereals/pseudocereals in Italy and Europe

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Cereals and pseudocereals

- Cereals are grasses (monocot family *Poaceae*, aka *Gramineae*) cultivated for the edible components of their grain.
- Pseudocereals are broadleaf plants (non-grasses) that are used almost in the same way as true cereals, i.e. their seed can be ground into flour and used in food preparation as cereals.

Pseudocereals belong to various botanical families:

- *Poligonaceae*, e.g. Buckwheat (*Fagopyrum esculentum*)
- *Chenopodiaceae*, e.g. Quinoa (*Chenopodium quinoa*)
- *Amaranthaceae*, e.g. Amaranth (*Amaranthus* spp.)
- Minor cereals in food preparation include species addressing specific sectors as gluten free / celiac diet, etc.
 - Rye, millet, spelt, kamut and major cereals more frequently used in animal nutrition (maize, barley, oats and sorghum).



Statistical sources for cereals/pseudocereals diffusion and production



Food & Agriculture Organization
U.N.O., Rome



FAOSTAT

<http://faostat.fao.org/>



Eurostat

European Commission, Brussels

DATABASE

<http://epp.eurostat.ec.europa.eu/>



Istituto Nazionale di Statistica
Rome



AGRISTAT

<http://agri.istat.it>



Hectares at world level in the last 50 years

Crop \ Year	1962	1987	2012	
Buckwheat	5.8 M	3.5 M	2.5 M	-57%
Millet	43 M	34 M	31 M	-28%
Quinoa	55 K	61 K	103 K	+87%
Sorghum	47 M	46 M	38 M	-19%
Wheat (reference)	208 M	221 M	217 M	+4%



Yields (t/ha) at world level in the last 50 years

Crop \ Year	1962	1987	2012	
Buckwheat	0.456	1.004	0.899	+97%
Millet	0.562	0.739	0.820	+46%
Quinoa	0.671	0.561	0.803	+120%
Sorghum	0.943	1.419	1.535	+63%
Wheat (reference)	1.206	2.290	3.115	+158%



Hectares in France and Italy in the last 50 years

Crop \ Year		1962	1987	2012	
Rye	France Italy	243 K 56 K	81 K 11 K	32 K 3 K	-88%
Millet, buckwheat, other	France Italy	43 K 7 K	8 K 2 K	31 K 23 K	+8%
Sorghum	France Italy	10 K 8 K	78 K 26 K	42 K 37 K	+339%
Wheat	France Italy	4.6 M 4.6 M	5.0 M 2.9 M	5.7 M 1.9 M	-17%



Yields (t/ha) in France and Italy in the last 50 years

Crop \ Year		1962	1987	2012	
Rye	France	1.5	3.5	5.1	+145%
	Italy	1.6	2.6	2.5	
Millet, buckwheat, other	France	1.1	2.1	3.4	+89%
	Italy	2.4	3.5	3.2	
Sorghum	France	2.5	5.3	5.7	+113%
	Italy	2.2	5.4	4.3	
Wheat	France	3.1	5.8	6.6	+106%
	Italy	2.1	3.1	4.1	

Cereal/pseudocereals in the frame of the new Common Agricultural Policy (2014-2020)

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AGRICULTURE AND RURAL DEVELOPMENT

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The Common Agricultural Policy after 2013

Legal proposals for the CAP after 2013

The European Commission's proposals for a reform of the CAP after 2013 aim to strengthen the competitiveness and the sustainability of agriculture and maintain its presence in all regions, in order to guarantee European citizens healthy and quality food production, to preserve the environment and to help develop rural areas.

On 12 October 2011 the Commission presented a set of **legal proposals** designed to make the CAP a more effective policy for a more competitive and sustainable agriculture and vibrant rural areas.

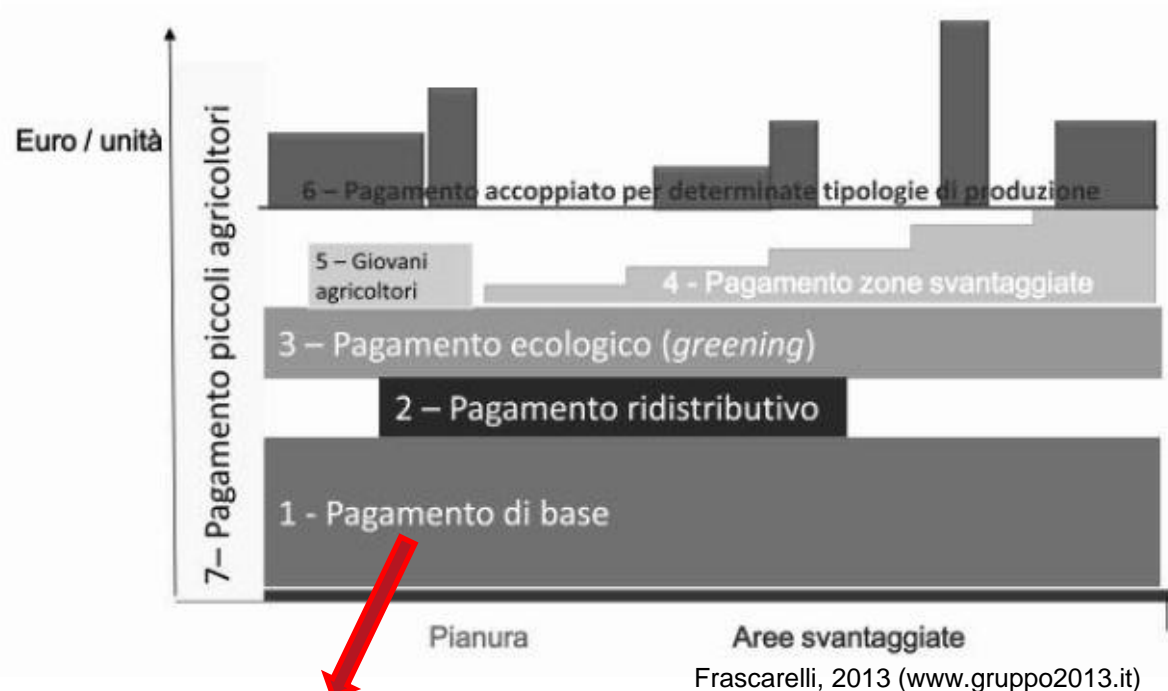
The legal proposals are accompanied by an **impact assessment** that evaluates alternative scenarios for the evolution of the policy on the basis of extensive quantitative and qualitative analysis.

IN THIS CHAPTER

- Introduction
- Political agreement
- Legal proposals**
- Consultation
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- Public debate
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- Speeches and press releases

<http://ec.europa.eu/agriculture/cap-post-2013/>

The new system of direct payments: seven components



Basic payment scheme (BPS)
= 70% of direct payments -
single area payment schemes;
SAPS = component 2, 4, 5, 6
and 7 in the graph.

Greening = Agricultural practices
beneficial for the climate and the
environment;

- 30% of direct payments;
- compulsory measure in the
new CAP (including penalties).

Farmers' duties in the frame of Greening

3 basic measures

- Maintaining permanent grassland
- Crop diversification
- Maintaining an “ecological focus area”

Crop diversification: ≤ 10 ha arable land, no need for diversification;
 $10 \div 30$ ha, at least 2 crops (main one, $\leq 75\%$);
 ≥ 30 ha, at least 3 crops (main two, $\leq 95\%$).

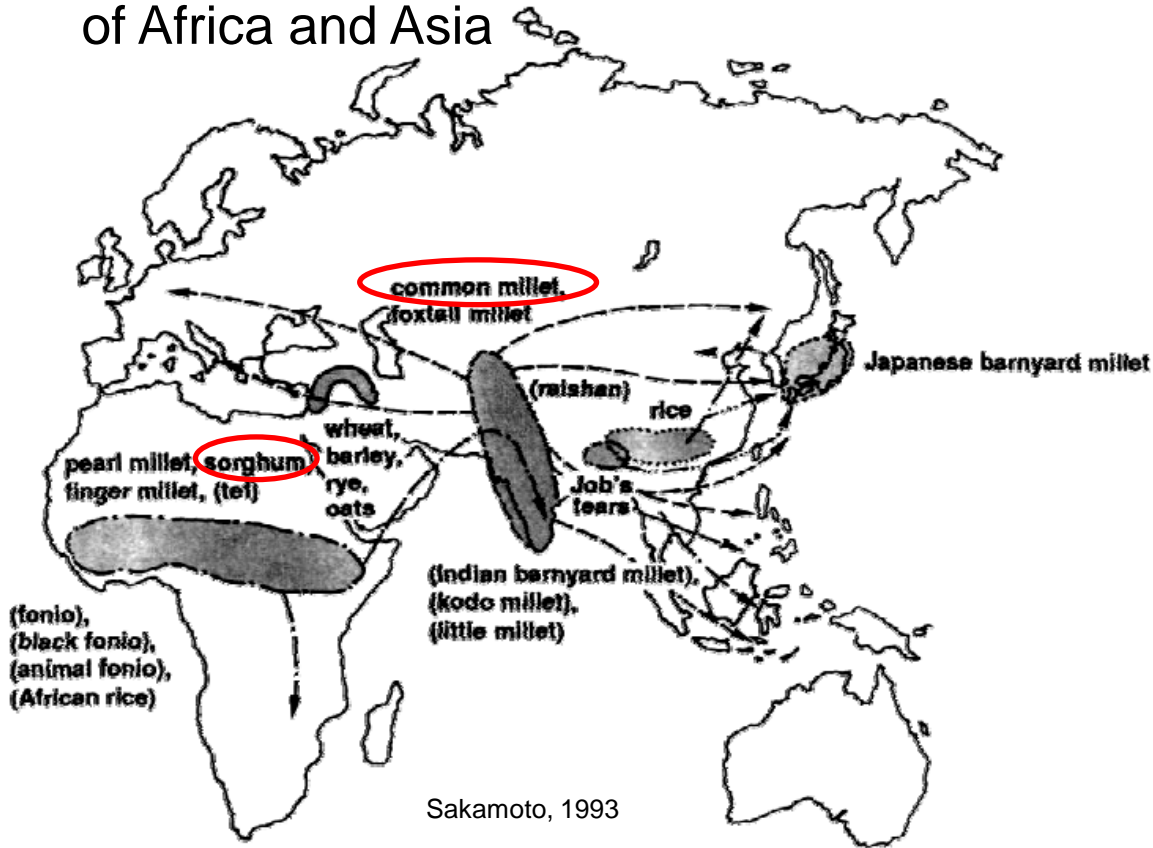
➡ No possibility of pursuing mono-cultures in many arable farms (> 10 ha) relying on the production of a single cash crop (e.g., maize).

➡ Need to introduce new crops in the rotation, e.g. minor cereals/pseudocereals.

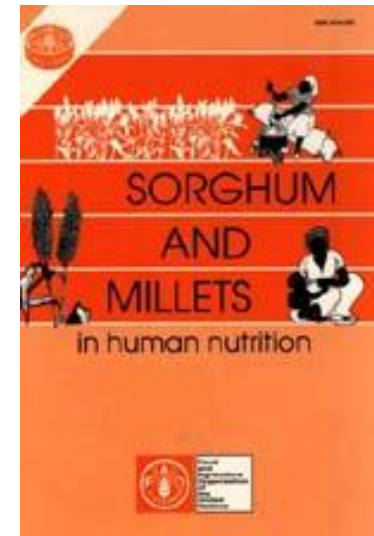
➡ Potential benefits from the introduction of new crops, e.g. easier weed, pest and disease control, better use of farm equipment, reduced risks from adversities, etc.

Sorghum and millets: their way in human nutrition

Their origins in warm(-temperate) areas of Africa and Asia



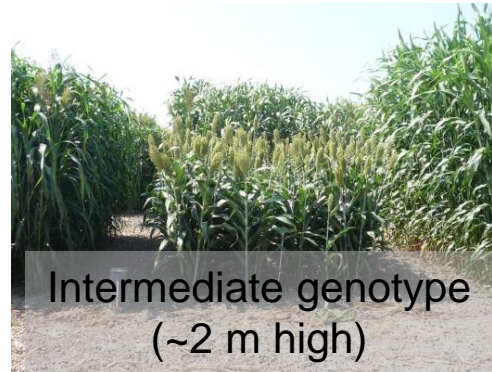
Their echo in the literature addressing human nutrition in developing countries



FAO, 1995

Sorghum (*Sorghum bicolor* (L.) Moench)

The species' heterogeneity



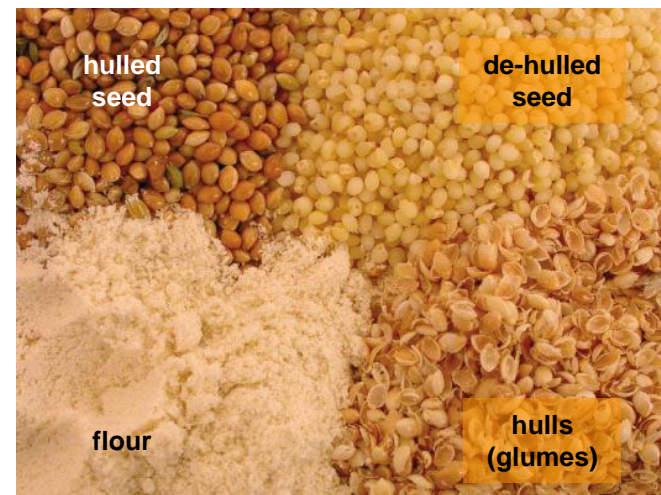
Sorghum vs. Maize (Northern Italy)

- shorter cycle (~120 vs. 150 days) 😊
- more thermophilic (later seeding) ☹️
- better dry-down at harvest 😊
- higher water use efficiency (less irrigation) 😊
- lower need of fertilizers (especially N) 😊
- cheaper hybrid seed 😊
- less herbicides available ☹️
- less sensitive to stem borers and *Diabrotica* 😊
- lower yield potential (in favourable conditions) ☹️



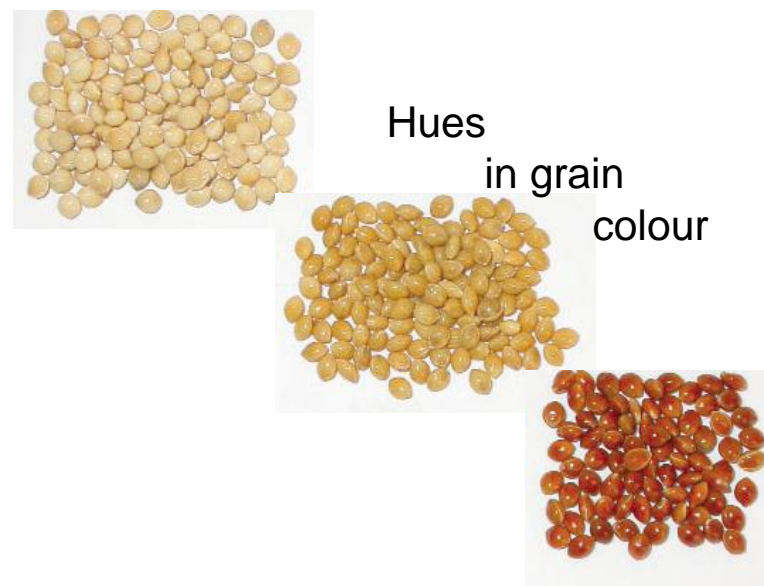
Common millet (*Panicum miliaceum* L.)

Crop in Cadriano (BO), 2012

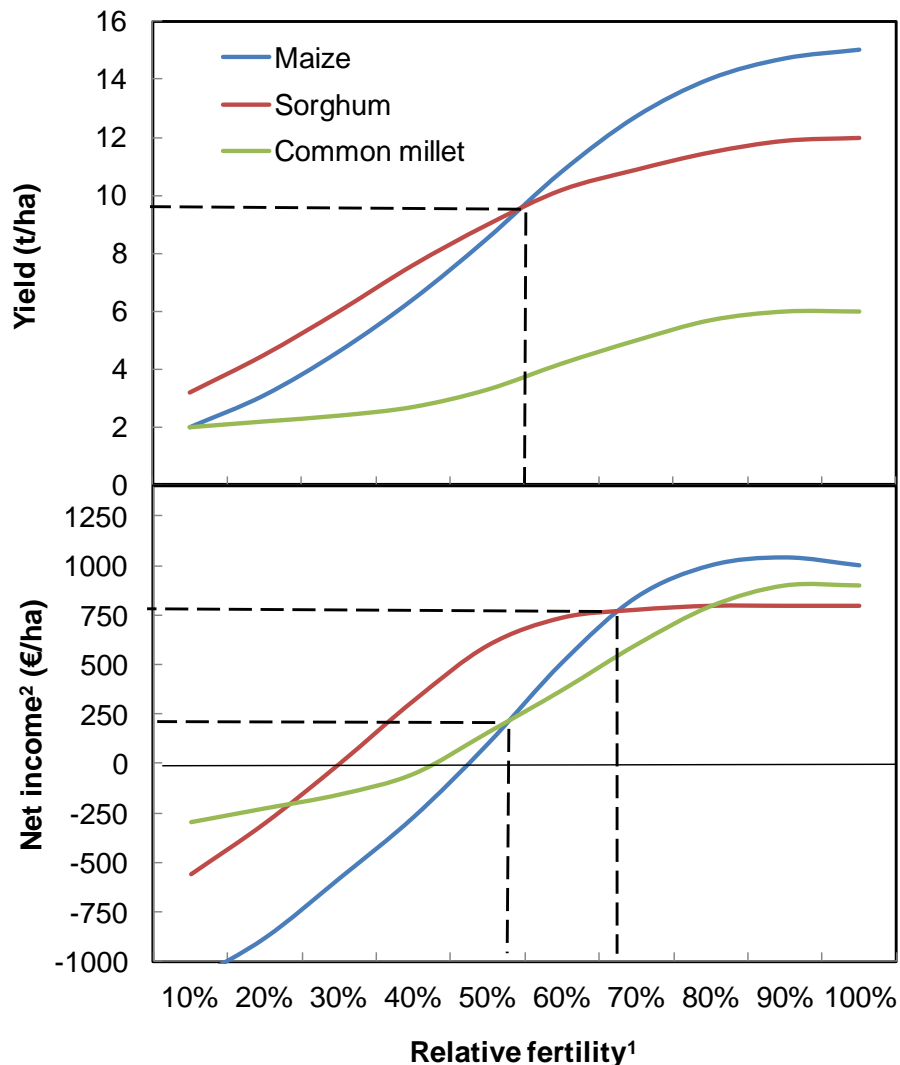


Millet vs. Maize (Northern Italy)

- much shorter cycle (~100 vs. 150 days) 😊
- more thermophilic (later seeding) ☹️
- lower need of fertilizers (especially N) 😊
- less sensitive to drought 😊
- cheaper seed (no hybrids) 😊
- only a few herbicides available ☹️
- less sensitive to pests (and diseases) 😊
- much lower yield potential ☹️
- delicate harvest (moisture vs. grain loss) ☹️



Yield and farmer's profit in maize, sorghum and millet at varying fertility: a tentative outline



Open issues in the results

- maize price volatility?
- subsidized seed?
- beneficial effects on maize?
- maize seeding restrictions (e.g., due to *Diabrotica*)?
- etc.

¹Ambient fertility + cultivation inputs.

²Before taxes, at the net of CAP contribution.

Conclusion

- Minor cereals and pseudocereals include species deserving more attention as they offer opportunities for fully mechanized niche crops produced by skilled farmers.
- The downward trend in their diffusion at world and European level implies a slower progress in crop technique with respect to major cereals.
- Sorghum is already well established in South European areas and can potentially be used for gluten-free products (pale, tannin-free hybrids).
- Common millet owns a lower yield potential in exchange for a shorter cycle and a good resilience to adversities (drought).
- However, millet demands a careful management of the crop, as it can count on few products for weed (and pest) control while its harvest window is quite narrow.
- The new CAP provides a favourable framework for the cultivation of minor cereals/pseudocereals as ingredients for specific food preparations as gluten-free products.

THANK YOU