

Pulses production in Italy: Trade, marketing and policy issues

Rino Ghelfi, Alessandro Palmieri

Department of Agricultural Sciences, Alma Mater Studiorum - University of Bologna, Italy

Abstract

Italian pulses production has sharply fallen since the middle of the last century and the role that pulses played has diminished at both the agricultural and food levels. This is the result of several factors that are analysed in this article, among which the most important can be identified in the low profitability compared to other crops, mainly cereals, the historic collapse of domestic consumption and a strong competition from foreign producers. Conversely, in recent years, different signals appear to delineate a possible framework for recovery for legumes: the first of these is represented by the recent reversal trend in domestic consumption, due to healthy reasons and a fall in meat consumption. The favourable trend of organic consumption can also be considered as a positive factor for pulses. However, the focus point for pulses future perspective is the recent development of the European policy (2014-2020) that planned several actions in support of them, such as coupled payments and the provisions of *greening* rules. These policies aim to support the training effort needed to bring home to producers the importance of legumes in a proper crop rotation that maintains soil fertility and therefore better yields and profitability. In light of this and based on the general crisis in cereals prices, it is possible to be reasonably optimistic regarding the future of the legumes sector in Italy.

Introduction

By establishing the International Year of Pulses, the FAO has

Correspondence: Alessandro Palmieri, Department of Agricultural Sciences, Alma Mater Studiorum – University of Bologna, viale G. Fanin 50, 40127 Bologna, Italy.
Tel. +39.051.209.61.26.
E-mail: alessandro.palmieri@unibo.it

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quite clearly signalled the renewed interest in these crops, which are recognised for their health benefits and high nutritional value, in addition to their important role in promoting rational, sustainable and environmentally friendly agriculture. By way of example, the FAO cites the water footprints of lentils and peas, which equal 50 litres of water per kilogram, in comparison with 4,325 litres per kilogram of chicken meat and 13,000 litres per kilogram of beef.

According to the FAO's classification, pulses include only those species belonging to the legume family and whose product is represented by dry grain to be used as it is. Thus, this classification excludes legumes for fresh consumption, particularly those that are grown principally for oil extraction (soybean and peanut), and grazing legumes.

Globally, pulses have played a historically important role and are the staple food in the diets of many countries (Sharma, 2014). Over the past two decades, according to FAO data, the pulse supply has increased at an average annual rate of 1.84%, which is slightly higher than that of cereals (at 1.82%).

Conversely, in Europe – and particularly in Italy – pulse production has fallen and the role that pulses have played since the middle of the last century has diminished at both the agricultural and food levels (see Legume future report 4.5, 2014 – Impacts of legume-related policy scenarios; Helming *et al.*, 2014). Pulse cultivation has gradually been abandoned in many parts of Europe and is currently relegated to a niche market, although Italy continues to play a significant role in the production of canned pulses.

This study attempts to frame Italy's productive role on the world stage and to reconstruct the dynamics of the cultivation and production of pulses over time. Based on botanical and agronomic similarities, the partial overlapping of final markets and the impact on international prices, many of the analysed parameters of this study were expanded beyond the limits of grain legumes (beans, peas, faba beans, chickpeas and lentils). In particular, this study included soybean because of the global presence of the species and the leading role that soybean plays in determining the prices for all feed legumes as well as of legumes for fresh consumption. Fresh legume use tends to be dissociated from that of pulses and more closely resembles fresh vegetable use, but sometimes-fresh legume and pulse usage can sometimes overlap in certain industrial preparations. In addition, fresh legumes share the same nutritional considerations with pulses. This study analyses the historical and present-day dynamics of pulse production and possible explanations for its decline in Italy. By analysing the data related to external trade and domestic consumption of pulses – including in relation to recent developments in European policy, which have been a historical driver of the legume supply chain – we will assess the likely future prospects of pulse production.

Materials and methods

Reconstructing the productive dynamics of the investigated legumes crops has been defined on the basis of the ISTAT statisti-

cal database for the Italian data and the FAOSTAT database for the short summary of pulse production at the world and European levels. Both data sources show the extent of cultivated areas, production and annual production, and the regional distribution of the same. Italian farms structural data have been collected through the last General Census of Agriculture.

The analysis of external trade was based on the elaboration of ISTAT source data streams regarding *foreign trade* and ISMEA.

The study of the economic and farm accounting aspects was conducted on the basis of ISMEA data, whereas the consumption analysis was performed on the basis of some ISMEA/Nielsen data.

The collected data have been properly integrated with the scientific and agricultural specialised literature and with several interviews of supply chain experts, which has allowed for expansion based on the available data as well as to better prepare the synthetic considerations regarding these data.

Results

A short review of world legume production and consumption: the role of the European Union and Italy

Globally, soybean is the most extensively cultivated legume, with a cultivated area of nearly 120 million hectares and production that exceeded 300 million tons in 2014. The increase in soybean cultivation over the last 15 years measured a 58% increase in cultivated area and a 91% increase in annual production.

Additionally, pulse production presents an interesting path of growth, although less significant than that of soybean: in particular, since 2000, the cultivated area of pulse production has increased by 32%, which currently stands at 85 million hectares, and pulse production has increased by 39%, which is currently estimated at 77 million tons.

The cultivated area and production of fresh legumes, however, remain marginal in the world context, amounting to just under 4 million hectares and 39 million tons, respectively. The spread of fresh legumes also, however, has increased considerably – by 30% in cultivated area and 73% in yearly production.

The production of pulses and soybeans in the world is highly concentrated and comes mostly from a few large producing countries. Just under 40% of the overall supply of pulses is produced in 5 countries: India, Canada, Myanmar, Brazil and China. Among these countries, India is by far the largest producer at 18-20 million tons, which are mainly consumed domestically (Inbasekar, 2014).

The European Union ranks behind the five largest world producers with a potential yield of 3-4 million tons. The countries of the EU, primarily France and the UK, together with Canada, the US and Myanmar, are the most active exporters of pulses, in contrast to the remaining major producing countries, whose production is largely intended for domestic consumption.

With regard to soybeans, the production concentration is even more pronounced, as 88% of the world's supply is produced by the following five countries: the US, Brazil, Argentina, Chile and India.

The role of Italy is marginal in the world context, as production is never higher than 1% of the global total, both in terms of cultivated area and output, for all the references considered: for pulses, in particular, Italy represents just 0.2% of world production. Italy's importance to Europe in this context is greater, as the Italian production of pulses represents 5% of the EU total and that of fresh legumes 15% of the EU total; regarding fresh legumes, Italy is the

second largest producer of beans and the sixth largest producer of peas. Finally, with regard to soybeans, Italy plays a starring role in Europe as its largest producer, with a share of almost one half of the total.

Pulses and other legumes in Italy: history and present

The cultivation of pulses in Italy has declined over the years, in contrast to the main agricultural crops of the country. Using index numbers, Figure 1 shows the changes in the cultivated areas for pulses from the 1920s through the present day and compares that area with the cultivated area for cereals. Figure 1 shows that, although cereal cultivated areas fell by one half, the cultivated area of pulses has been reduced to less than one tenth of its former area.

In particular, in the 1930s, the cultivated areas for pulses totalled just less than 1.5 million hectares, whereas at present only 70,000 to 75,000 hectares remain under cultivation. Detailing the main species, the most marked decline (in percentage terms) is that of the bean, with investment that now amounts to little more than 1% of that of the 1930s, whereas the cultivated area of pea cultivation has held up the best and continues to amount to 60% of that in the 1930s.

Although differences are evident among the various species of pulses, the stage in which the process of abandonment was most incisive occurred from the post-WW2 period up to the mid-70s; this trend continued through the mid-90s, when the situation stabilised.

Paralleling the decrease in cultivated areas, Italian production has also collapsed, declining from 800,000 to 1 million tons annually produced in the 1930s to the current 150,000-200,000 tons. The clearest evidence in this regard is the progressive increase in the average yields, which makes the loss of production less incisive than that of the cultivated area, even if not for all species. For example, pea production is even higher than that achieved in the 1930s, whereas faba beans, chickpeas and lentils current production amounts to 15% of that from the same period. Current bean constitutes only 6-7% of 1930s production.

Soybean cultivation began only in the 1980s as a result of European support policies; Soybean production peaked at 500,000 hectares of cultivated area and 1.8 million tons produced in the early 1990s. From this period, the cultivated area has gradually



Figure 1. Historical trend of area harvested of pulses and cereals in Italy (1921=100). Elaboration based on data from Istat (2016a).

contracted to just over 100,000 hectares due to the end of the support policies. Production remained at approximately 160,000 to 170,000 hectares until 2013, with a corresponding range of 500,000-600,000 tons of production volume.

Fresh legumes present a different trend than that of pulses, which is understandable in view of the fact that the production of fruits and vegetables as a final product has declined.

The cultivation trend for pulses was increasing until the 1970s, when the cultivated area was 120,000 hectares, on the whole, including faba beans, beans and peas for fresh consumption. Then, a downward parabola was initiated that shrunk the cultivated area until it reached its current level of 20,000-30,000 hectares. For fresh legumes, there are no evident effects of improvements in unitary yield, excluding the bean. Currently, the annual supply of fresh legumes is approximately 300,000 tons, which is approximately one-half of the production peak reached in the 1970s.

After analysing the historical trend, recent developments should also be examined: Figure 2 shows the cultivated area and production trends of pulses, soybean and fresh legumes over the past decade, *i.e.*, from 2006 to 2015. It is clear that the situation was broadly stable, with the exception of soybean, whose cultivation has increased sharply in the last three years, resulting in increases of 68% in cultivated area and 71% in production.

By contrast, pulses and fresh legumes have recorded little movement in the recent period and have, in fact, shown an average annual rate that is slightly negative for cultivated area when calculated over the entire past decade (-1.1% for pulses and -0.9% for fresh legumes). Only chickpeas and lentils (Figure 3) have deviated from the general trend, highlighting, on the contrary, a clear recovery in terms of cultivated area.

Limiting the observation to the last three years (2013-2015), however, it is possible to identify positive signs for most of the considered references: in particular, there has been an increase of 43% in the cultivated area for dry peas, 10% for beans, and 5% for feed peas and fresh peas.

Finally, it is important to remember the key role of organic farming in the legumes supply chain: according to Sinab data, in 2015, just under 30,000 hectares of pulses and soybean and approximately 8,700 hectares of fresh legumes were organically managed.

The regional distribution of pulses and fresh legumes production

At the same time that Italy registered a significant contraction in pulses and fresh legumes production, progressive concentration and regional specialisation developed, which led to a strong centralisation of the cultivated area and concentrated production of each species in only a few regions.

On the basis of the average production recorded over the last three years for all species considered, approximately three-quarters of the total domestic production is concentrated in the top 5 producing regions, and the top two produce, in most cases, 45-50% of the total supply (Figures 4 and 5). In summary, for chickpeas, lentils and faba beans, the main producing areas are located in the central southern regions of the country, whereas for beans and peas the top production areas are located in the central northern regions. Fresh legumes are mainly concentrated in three regions, Emilia-Romagna, Campania and Sicily, whereas soybeans are almost entirely concentrated in the northeastern part of the country, with the Veneto region producing slightly less than one-half of the national total.

In addition to the geographic concentration, the production of pulses has also gradually been concentrated at the farming level,

with the transition from small family farms to bigger specialised farms with the typical cropping systems of medium-sized and large enterprises. Of particular importance in this regard are the data from the last two General Census of Agriculture: in particular, the data from the 2010 Census show that only 30% of farms growing

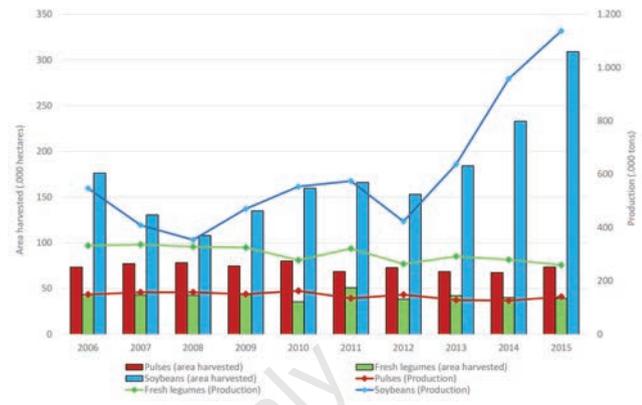


Figure 2. Last 10 years trend of area harvested and production of pulses, fresh legumes and soybeans in Italy. Elaboration based on data from Istat (2016b).

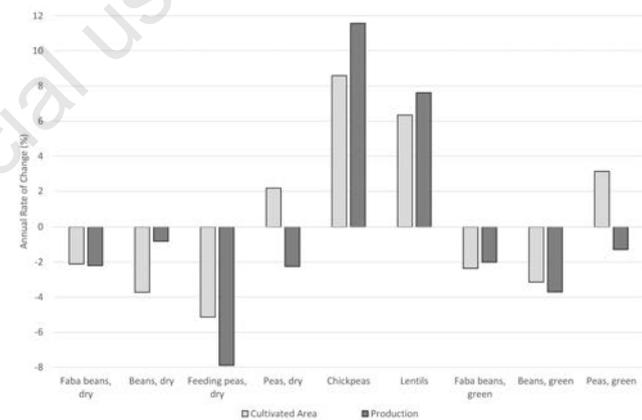


Figure 3. Annual rate of change of cultivated area and production of pulses and fresh legumes (years 2006-2015). Elaboration based on data from Istat (2016b).



Figure 4. Regional share of pulses production in Italy. Elaboration based on data from Istat (2016b).

pulses are smaller than 3 hectares, compared with nearly 70% in the 2000 Census. Larger farms, with more than 20 hectares of cultivated area, currently represent one-quarter of the total, compared with 6% in 2000, but they manage more than 70% of the total cultivated area, compared with 58% in 2000.

External trade

Italy has always been a large importer of pulses, and the relevant foreign trade data for the past three years, which presents a clear balance deficit (Table 1), fully confirms this situation: considering beans, peas, chickpeas and lentils, the trade balance is negative by approximately 250,000 tons, with a corresponding value of 200 million euro. The main responsibility for the deficit is beans, whose imports have a value of approximately 150 million euro per year, whereas the value of the imports for the other three species is significantly lower and rather similar, varying between 20 and 30 million euro per year.

Imports of pulses account for approximately 75% of Italian consumption, and 90% of these imports originate in non-EU countries, including China, Argentina, the US and Canada (Confagricoltura, 2016). Exports account, however, for 15% of national production, for a value that varies between 12 and 17 million euro.

Even for soybeans, the foreign dependency is clear, with imports of between 1 and 1.6 million tons and a value of 300-600 million euro, depending on the year, compared with exports varying between 15 and 50 million euro. The situation reflects the situation of the entire European Union, which is dependent on foreign countries for 97% of its soybean demand.

If the trade balance of pulses as such is clearly in deficit, the

situation is partially balanced when processed products, frozen and prepared/preserved, are included. Italy, in fact, has a traditional and important role in the production of canned legumes and therefore uses much of its imported product for industrial processing and subsequently re-exports the value-added product in processed formats. In addition to rebalancing, there is also an apparent gradual improvement in the trade balance because the passive amount has declined from over 100 million euro in 2006 to less than 50 million euro in 2015 (Figure 6) based on higher growth in exports (30%) than that of imports (15%).

Exports by value of legumes (including processed) are repre-



Figure 5. Regional share of soybeans and fresh legumes production in Italy. Elaboration based on data from Istat (2016b).

Table 1. Pulses, dry (excluding seed): external trade of Italy. Elaboration based on data from Istat (2016c).

		Beans			Peas			Chickpeas			Lentils			Total		
		2013	2014	2015	2013	2014	2015	2013	2014	2015	2013	2014	2015	2013	2014	2015
Volume (.000 tons)	Import	120.0	123.9	127.4	89.2	103.6	76.7	25.5	23.3	25.2	29.6	35.5	34.1	264.3	286.2	263.4
	Export	6.2	7.3	3.8	0.9	1.2	1.4	2.5	4.1	5.2	1.6	1.5	1.8	11.1	14.1	12.2
	Trade balance	-113.8	-116.6	-123.6	-88.3	-102.4	-75.3	-23.0	-19.1	-19.9	-28.0	-34.0	-32.3	-253.2	-272.1	-251.2
Value (million EUR)	Import	129.4	162.3	138.0	27.6	30.4	22.4	20.2	15.6	19.4	18.5	22.3	30.8	195.6	230.5	210.5
	Export	7.5	10.1	4.9	1.2	1.4	1.7	2.0	3.2	4.4	2.0	2.2	2.8	12.6	16.9	13.9
	Trade balance	-121.9	-152.2	-133.1	-26.4	-28.9	-20.7	-18.2	-12.4	-14.9	-16.5	-20.1	-28.0	-183.0	-213.6	-196.6

Table 2. External trade of beans and peas: detailed data (value). Elaboration based on data from Istat (2016c).

	Average 2013/15			Growth rate	Average 2013/15			Growth rate
	(.000 EUR)	%	2006-15		(.000 EUR)	%	2006-15	
Beans, import				Beans, export				
Dry	147.918	75.5	175.0	Shelled prepared/conserved		173.331	71.2	232.2
Fresh or chilled	21.606	11.0	8.4	Not shelled prepared/conserved		53.015	21.8	88.8
Frozen	13.113	6.7	46.5	Dry		9.169	3.8	43.1
Not shelled prepared/conserved	4.986	2.5	30.0	Fresh or chilled		3.657	1.5	3.0
Other	8.407	4.3	-45.5	Other		4.244	1.7	42.2
Total	196.029	100.0	95.6	Total		243.416	100.0	174.4
Peas, import				Peas, export				
Frozen	44.279	47.2	18.1	Prepared/conserved		22.100	68.3	79.9
Dry	31.796	33.9	-6.2	Fresh or chilled		4.581	14.2	66.5
Prepared/conserved	15.575	16.6	56.9	Dry		3.058	9.4	-5.6
Fresh or chilled	2.065	2.2	159.4	Frozen		2.624	8.1	61.3
Other	174	0.2	-	Other		4	0.0	-
Total	93.889	100.0	15.9	Total		32.367	100.0	62.9

sented in Figure 7; beans constitute the large majority of exports (260 million euro in 2015, 85% of the total) and at a great distance from peas, whereas the role of other species remains marginal. By contrast, imports are distributed more evenly among the various species (Figure 8), while remaining distinguished by a predominance of beans (50-55%). Table 2 presents the detailed data related to beans and peas by type of product traded.

Prices and profitability

Figure 9 shows the average producer prices recorded by ISMEA for the past three years for major grain legumes (Ismea, 2016). Figure 9 also shows that the price levels are different, with lowest prices for lentils, at less than € 0.40/kg for the entire three-year period, and the highest prices for chickpeas, which reached € 1.90/kg in 2015. Peas and beans are located on levels ranging from just over 0.80 and 1.20 €/kg, whereas the faba bean and soybean prices are substantially similar, at between 0.40 and 0.50 €/kg,

respectively: this feature is unsurprising because soybeans – by virtue of their role as the main feed legume in the world – can determine, by extension, the prices of other legumes. With regard to the trend of the most recent three years, only beans and chickpeas have shown continued growth, whereas peas and, above all, faba beans, soybeans and lentils, recorded lower prices in 2015 than in 2014, due to increased supply first in the international market and then in the domestic market. With a high sensitivity to what is produced worldwide for feed legumes and to domestic production for legumes for human consumption, supply is noticed for all legumes. The analysis of the agricultural profitability of the examined pulses (Figure 10) highlights a situation that is not particularly rosy: only peas and beans exceed 1,000 euro/ha of gross operating margin (the difference between revenue and variable costs), calculated on the basis of the most recent three years of yields and average prices. By contrast, the results for lentils show that there was a margin of only 150 euro/ha, which certainly portends a clear negative net farm income after the farm's fixed costs are added.

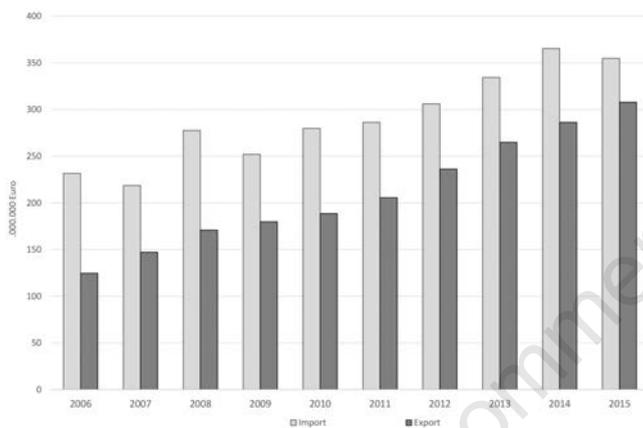


Figure 6. Italian external trade of pulses (including processed). Elaboration based on data from Istat (2016c).

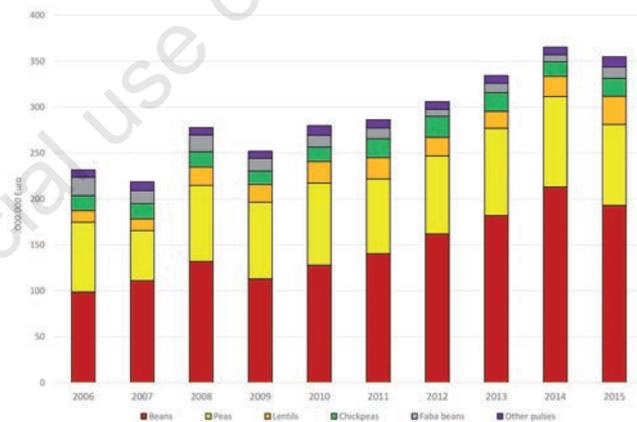


Figure 8. Italian import of pulses (including processed), detailed data. Elaboration based on data from Istat (2016c).

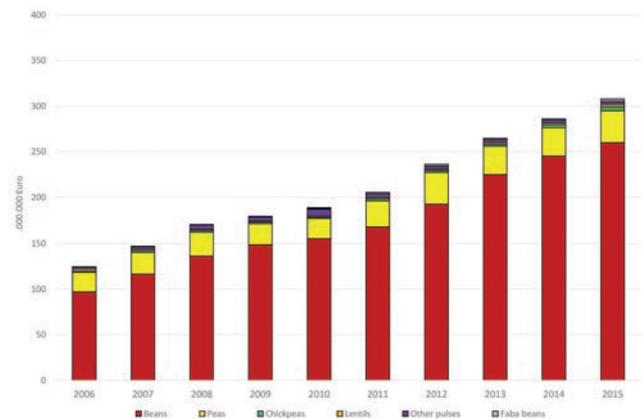


Figure 7. Italian export of pulses (including processed), detailed data. Elaboration based on data from Istat (2016c).

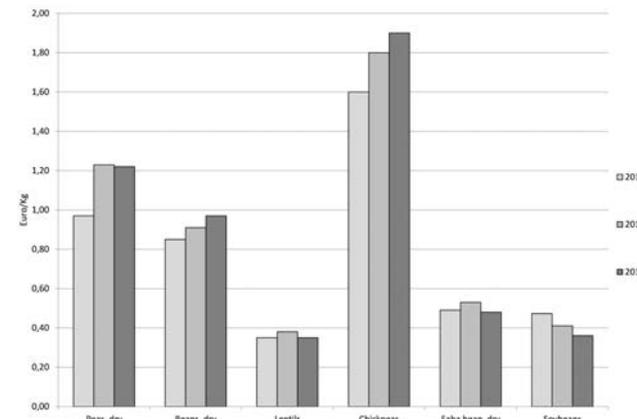


Figure 9. Last 3 years producer price of pulses and soybean in Italy. Elaboration based on data from Ismea (2016).

Consumption

The consumption of legumes has radically changed over time: in fact, until the end of the first half of the last century, legumes were the main and often only source of protein available, but since the end of World War II, the progressive advent of global economic well-being dramatically decreased the levels of pulse consumption in developed countries. Currently, in these countries, legumes account for 25% of the diet, whereas in the least developed countries, they continue to account for 75%.

Italy followed the typical dynamic of the industrialised countries and reduced its per-capita consumption of pulses by over 14 kg per year in the 1960s to its current 1.5 kg (Figure 11) level, increasing to 4.5 kg when the consumption of fresh legumes is included (Mipaaf, 2016a, 2016b). The consumption of meat, in parallel, has doubled from 42 to 80 kg per capita per year, and wheat consumption has also increased significantly, despite having shown a decrease in recent years.

If we focus only on the last few years, encouraging signs of recovery can nonetheless be seen: almost all categories of legumes in the last two years have positive balances in terms of domestic purchase. In terms of quantity, the increase can vary from 6% of dried legumes to 16% of cooked legumes. In terms of value, purchases over the past two years constantly show positive values for all categories of legumes, with the exception of frozen legumes in 2015. For details regarding household purchases by category and species see Table 3.

As with most agro-food references, including legumes, Italy boasts widely productive assets related to the various regions of origin, which has led to the activation of 7 registered PDO/PGI marks, of 28 total in Europe. However, certified production of pulses represents only 0.9% of the total production of vegetables, although it is following a growth trend. In 2014, the certified volume of legumes reached only 450 tons, representing 86% by *Lentil of Castelluccio di Norcia*, which is the only product that is successfully leveraging a recognised brand.

Finally, for many retailing experts the enrichment of convenience, in order to make the use of legumes more practical, will be crucial for the future (Tozzi, 2009).

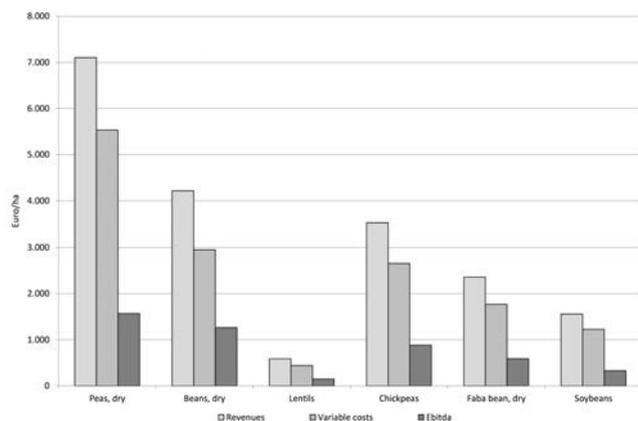


Figure 10. Farm account of pulses and soybean (last 3 years average). Elaboration based on data from Ismea (2016).

Discussion

The decrease in the production potential of legumes in Italy runs counter to the worldwide trend and also exceeds the on-going reduction in almost every Italian agricultural crop and is connected to the progressive loss of agricultural land occurred over time. The decrease of cultivated areas for legumes is far greater than that of other crops, such as cereals. Just the comparison with cereal crops is among the main reasons identified for this decrease, which is also related to legumes' lower yields, in addition to greater uncertainty of the results. By way of example, according to ISTAT data, the variance index of crop yields recorded in the last ten years has reached 0.14 for pea and 0.13 for soybean, compared with 0.06 for common wheat. Both of these differences are, *inter alia*, related to the delay with which the public and private research has dealt with legumes (initiated, in fact, only in the 1970s) compared to cereals and other extensive crops. Currently, except for peas, the productive average yields of major grain legumes are roughly the same as those registered in the 1950s.

Table 3. Household purchase of pulses in Italy. Elaboration based on data from Ismea (2016).

	Volume (%)	Value (%)
Category		
Canned	61	47
Frozen	25	32
Dry	13	19
Other	1	2
	Value, total (%)	Value, dry (%)
Type		
Peas	42	2
Beans	31	23
Lentils	11	40
Chickpeas	9	12
Faba beans	2	3
Mixed/Other	5	20

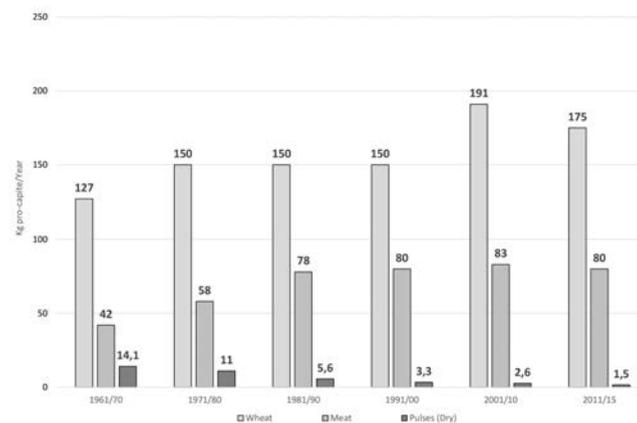


Figure 11. Per capita consumption of pulses, wheat and meat in Italy. Elaboration based on data from Mipaaf (2016a).

Legume's limits are not only of biological origin but also of an economic nature, due to low market prices that are unable to close the productivity gap with cereals, even as cereal crops are experiencing a period of extremely low prices.

These data also highlight the sharp decline in consumption as a result of substitution with other types of food. In addition, a clear contraction in livestock husbandry has occurred, with the consequent reduction in demand for feed pulses for livestock (Cargioli *et al.*, 2005).

In addition, the gradual disappearance of small farms affects this analysis, where most of the legume production was concentrated in the past, and the simultaneous drive towards crop specialisation.

Finally, the strong competition from foreign countries must also be considered when analysing pulses' collapse in Italy, and this competition is particularly stiff from the major non-European producers, who are the main global suppliers of pulses and soybeans, whether for people or for livestock. With regard to the product intended for industrial processing, it should be considered that the competitiveness of foreign product in this regard is borne out not only in competitive prices but also in the ability to offer large and highly homogeneous lots (Parisi and Campion, 2008).

Italian production is instead characterised by high fragmentation and a high degree of heterogeneity because of different soil and climatic characteristics of the origin area (as well as traditional legacies) and thus is less beneficial to the industrial logistics chain. For this reason, the industry's demand for domestic product was concentrated in a few highly specialised areas and product suppliers intended for high or medium-high quality production. In addition, the main causes of the drop in production of fresh legumes have an industrial cause: the freezing industries are now concentrated in a few areas of central and northern Italy. Moreover, because the supply area cannot exceed certain spatial limits, the areas in which fresh legumes are cultivated to be processed are consequently decreasing.

In addition to the drivers that have influenced the dynamics of the sector, a crucial role in the fate of legumes has been taken by the European Union's common policy since the 1980s and this effect lasts until today.

Since 1981, the European Union's CAP has provided an important support for the production of protein crops and had the effect of kick-starting the production of soybeans in the Community area to ensure an internal offer to accompany the almost exclusive imports of this product. The support was transformed into decoupled aid, per hectare, in 1992 and was thereafter suspended in 2006, leading to the progressive reduction of soybean cultivated areas, which were no longer economically competitive in comparison to cereal crops.

After a latency period, the European Union policy had an important turning point in favour of legumes with the recent CAP reform for the period 2014/2020, which introduced several tools to encourage the spread of pulse cultivation (Frascarelli, 2014). With the last CAP reform, the European Union has taken note of the historical role of legumes in encouraging proper soil management, their nutritional importance, and the strategic importance inherent in reducing dependence on supply from non-EU countries. The most direct of the tools put in place is to restore a coupled aid, although it is left to individual Member States to decide on the activation of this type of measure. Italy has taken advantage of this opportunity by contributing 97 €/ha for soybeans in the regions of northern Italy and 60 €/ha for oil and protein crops in central Italy (but only for protein crops in southern Italy): in both cases, pulses and annual crop grazing are included (Frascarelli, 2015).

However, the most important opportunity to spread the cultivation of legumes is probably that provided by the so-called *greening*, the set of ecological rules that every farm must respect to maintain the total amount of direct payments. The Greening measures are implemented, in particular, by means of two actions: first, a rotation with at least two or three crops is set for all farms larger than 10 hectares and in addition, the same companies must allocate a part of their arable land in areas of ecological interest that (among the various options) can be discharged through the cultivation of legumes.

Even the Regional Development Plans and the European Partnership for Innovation, finally, have provided for rules favourable to the spread of legumes, which are assigned important roles with different objectives such as reducing greenhouse gas emissions, encouraging biodiversity and maintaining fertile soil (see *Crop rotation and legumes cultivation*; Watson *et al.*, 2011).

Conclusions

As previously noted, pulses in Italy had a role of primary importance in the agri-food system, but now they have no more than a marginal role, as a result of several factors analysed in the previous chapter, among which the most important can certainly be attributed to low profitability, the historic collapse of consumption and competition from foreign producers. Simultaneously, production collapsed, and there was a concentration of cultivation in a few areas that have been able to specialise and integrate into special industrial districts.

However, in recent years, different signals appear to delineate a possible framework for recovery for legumes: the first of these is represented by the recent reversal trend in domestic consumption, which began to recover (although the level remains far from past volumes), in addition to the potential that could be reached if the consumption recommendations of nutritionists were observed.

Health reasons, which undermine the current consumption pattern of developed countries, have strongly focused on meat, which is certainly the first obstacle to legume consumption. In this regard, consumption of 100 g of legumes 3/4 times a week is considered optimal by nutritional experts and, if followed, would bring the national *per capita* consumption to values of 15/20 kg per year. Legumes are key to eating patterns proposed by vegetarian/vegan currents, but they also derive benefits from simply reducing animal protein; these vegetables are simply good for an individual's health, as indeed has been prescribed for centuries by the *Mediterranean diet*. Not least, some studies show an increase in legume consumption that is connected to the on-going situation of economic crisis (Marra *et al.*, 2015) and, finally, the possible use of legumes for bioenergy is expected (Voisin *et al.*, 2014).

At the agricultural level, the historic declining trend of pulse cultivation also seems to be in the process of making a slight recovery, particularly when the past decade is considered.

A decisive role regarding the future of legumes will be played by European Union policy: the 2014-2020 CAP reform has planned several actions in support of legumes. These are both direct actions related to the possibility of delivering coupled payments in certain ranges and indirect actions that can be achieved through the provisions of *greening*, the regional development plans and the European Partnership for Innovation.

These policies have, above all, the aim of supporting the training effort needed to bring home to producers the importance of

legumes in a proper crop rotation that maintains soil fertility and therefore better yields and profitability.

In this light and based on the general crisis in cereals prices, it is possible to have reasonable optimism regarding the future of the legumes sector in Italy.

The well-known issues that are facing European and – in particular – Italian *commodities* will remain, including, first, the difficult competition from much larger and organised producing countries. The only answer that can be made is linked to the valorisation of the product and increase in productive organisation.

Among the aspects related to valorisation, in addition to better efforts regarding territoriality (now used almost exclusively by the *Lentil of Castelluccio*), organic production certainly matters. The consumption of organic products is undergoing great expansion: from 2005 onwards, the overall share of organic products sold in the Italian large distribution chains has grown at annual rates of 5-10%, but in 2015 a growth of 20% over the previous year was registered. Organic cultivation techniques lend themselves excellently to legumes, due to the effect of the nitrogen-fixing ability of these plants and the reduced need for crop protection: the income gap with cereals and related crops grown organically is thus reduced considerably and may even be eliminated. Organic production also has a consumer trend clearly more favourable than the general average in the agri-food sector and could create useful synergies with a healthy image that pulses already benefit from.

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