

TRENDS IN THE EU AGRICULTURAL LAND WITHIN 2015-2030

In 2015 agricultural land is estimated to cover 42% of all EU land area. The arable land accounts for the largest share – 56%, followed by livestock grazing (25%), mixed crops (13.5%) and various permanent crops (5.5%). Within 2015-2030 the EU agricultural land is projected to shrink by 1.1%, chiefly driven by the decline in the two principal groups – arable land and livestock grazing – by 4.0% and 2.6% respectively. Mixed crops are expected to expand by 11%. In the group of permanent crops, olive trees are likely to grow at the expense of vineyards.

Drastic changes in agricultural land at national level are not forecast by 2030. The seven largest EU countries – France, Spain, Germany, Poland, Italy, Romania and the United Kingdom – account for about 70% of all Utilised Agricultural Area (UAA) both in 2015 and 2030. In relative terms, Denmark, Hungary and Ireland top the EU list with more than 60% of their surface being occupied by agricultural land both in 2015 and 2030.

The diversity of landscape and climatic conditions significantly affect the spatial patterns of agricultural production in the EU. Arable land dominates in the majority of countries, exceeding 70% in Cyprus, Hungary, Denmark and Slovakia. Within 2015-2030 it is expected to enlarge by more than 20% in Belgium, the Baltic States, Spain and Malta, while in Slovakia and Germany it will shrink. Livestock dominates in Luxembourg, the Netherlands, the United Kingdom and especially – in Ireland (>80%), but within 2015-2030 it will decline in all these countries, except for

Luxembourg, as well as in Austria, Latvia, Estonia, Sweden and Finland. Gains in livestock are likely (besides Luxembourg) in Portugal, Czech Republic and Slovenia. Mixed crops are particularly important for Croatia, Greece, Portugal, Finland and Slovenia.

Cutbacks are projected for Slovenia, Belgium, Spain and Latvia, while large growth is likely in Bulgaria, Denmark, France, Croatia, Ireland, Latvia and Sweden. Permanent crops are widely found in the Mediterranean countries. Vineyards will shrink the most, mainly in Cyprus and France, but Cyprus will see the largest relative growth in fruit trees in the EU.

Due to a set of landscape, climatic and socio-economic factors, large (more than 3 times) inter-regional variations in the share of agricultural land over total area are observed in Southern Europe – Italy, France, Spain, Portugal, Bulgaria, but also Austria and the United Kingdom. Central and Eastern Europe (the Baltic States, Poland, Czech Republic, Slovakia, Hungary, Romania) are peculiar with a more homogeneous and at the same time – elevated share of agricultural land. Within 2015-2030 noticeable (>15%) expansions of agricultural land are projected for a number of regions in Southern and South-Eastern Europe – Portugal, Spain, France, Italy, Croatia in particular (owing to the access to the CAP instruments and measures), Greece and Romania. Growth of similar magnitude, owing to the Climate Change, is also expected for Scotland in the United Kingdom, Sweden, Finland, Estonia and Latvia.

1. Context

Agricultural land covers almost 50% of the EU territory offering a high variety of economic activities and landscapes directly related to its physical, climate and soil characteristics. Of the whole Utilised Agricultural Area (UAA) in the EU by 2013 (European Commission, 2016a), 60% was used for arable crops, one third – for permanent grassland and meadows, and 6% - for permanent crops. In absolute values, France had the largest agricultural area – 28 million ha, equal to 16% of the total UAA in the EU, followed by Spain (23 million ha, 13% of UAA). More than 70

% of the total agricultural land was located in the elder¹ EU-15 Member States.

The distribution of the main agricultural production systems highly varied amongst countries. While arable crops covered almost 50% of the UAA in Denmark, Poland, Czech Republic, Slovakia and Hungary, in Ireland, the United Kingdom, the Netherlands and Luxembourg more than 50% (topping 80% in Ireland) of the UAA was used for permanent grassland and meadows. Permanent crops

¹ Accession before 2004

were more prevalent in the Mediterranean countries – Cyprus, Greece, Italy, Spain and Portugal.

Concerning the agricultural market and acreages, within 2008-2013 the EU area decreased by 8% (427,000 ha) and yields went down by 1%. The EU area with cereals reached 57.8 million ha and produced 301.5 million tonnes in 2013. Common wheat accounted for 45% of all cereals, followed by grain maize (21%) and barley (20%). Oilseeds covered 11.5 million ha, and harvest reached 29.8 million tonnes in 2013. The largest contributor was rapeseed (20.5 million tonnes), followed by sunflower (8.2 million t). Olive oil production, taking place mainly in Spain, Italy and Greece, reached 1.5 million tonnes in 2013, which was however down by 38% from the previous campaign². Rice area in the EU accounted for 467,000 ha in 2013, which was again down, but unlike olive oil – only slightly (2%) compared to the previous year, but yields were higher and the total EU rice production reached 1.89 million tonnes. Finally, the production of protein crops – 2.6 million tonnes in 2013 – remained considerably below the one in previous years (European Union, 2013).

2. Data and methods

The indicator for agricultural land provides the estimated share of land occupied by agriculture in 2015 and the expected evolution until 2030 at national and regional (NUTS 3) level for all EU Member States³, assuming that the production of:

- food and feed takes place on land allocated to arable farming, pastoral/livestock grazing, mix-crop systems, permanent crops and rice production;
- energy from agricultural land correspond to the bioenergy crops i.e. non-food crops, mainly perennial grasses (miscanthus or switchgrass) and short rotation coppice (willow or poplar) [see Perpiña et al., 2015].

The regional land demand for agricultural activities is specified according to the CAPRI 2016 Baseline projections⁴, thus being consistent with the EU Agricultural Outlook 2016-2026 (European Commission, 2016c). CAPRI is a partial equilibrium model that simulates market dynamics of agricultural

² Anyhow, olive oil production is peculiar with large variations from year to year, due to a set of agronomic and market factors.

³ As simulated in the Territorial Reference Scenario 2017 of the EC-JRC LUISA Territorial Modelling Platform (see Jacobs-Crisioni et al., 2017).

⁴ 2016 CAPRI baseline was provided by the EC-JRC Directorate Sustainable Resource, Economics of Agriculture Unit (JRC.D.04).

commodities for impact assessment of the Common Agricultural Policy (Britz and Witzke, 2012). The EU supply and market models of CAPRI are calibrated to the European Commission's medium-term prospects for EU Agricultural markets and income (European Commission, 2015), considering the following targets: supply, demand, production, yields and prices. CAPRI is also part of the model suite used to derive the EU energy, transport and GHG trends published in the EU Reference scenario 2016 (European Commission, 2016b). Among other outputs, CAPRI produces projections at regional (NUTS 1 and NUTS 2) level for all Member States on yields, production and land area to be allocated for specific crops. Regarding policy assumptions, the CAPRI 2016 Baseline incorporates agricultural and trade policies approved up to 2015, including some measures of the latest CAP 2014-2020 reform.

The spatial patterns of agricultural activities are simulated as agricultural production systems, which are specified following an aggregation of the individual crop projections provided by CAPRI (Table 1). Furthermore, the agricultural land abandonment is also simulated by specific classes – arable land, permanent crops and pasture/livestock grazing lands.

Table 1: Classification of the agricultural production system (based on Eurostat nomenclature) and the correspondence with LUISA base map classes (based on Corine Land Cover 2012).

LUISA base map ⁵	LUISA model classes	
	Model type classes	Aggregated classes
211 - Non-irrigated arable land 212 - Permanently irrigated land	Arable crop system	Arable farming systems
213 - Rice fields	Rice production	
231 - Pastures 244 - Agro-forestry	Livestock production	Livestock grazing systems
321 - Natural grassland	Extensive livestock grazing	
241 - Annual crops associated with permanent crops 242 - Complex cultivation patterns 243 - Land principally occupied with agriculture	Mixed crop-livestock systems	Mixed crop-livestock systems

⁵ The LUISA base map 2012 (Jacobs-Crisioni et al., 2017) that is used in the allocation mechanism, is an enriched version of CLC 2012, but with a significantly higher spatial and thematic resolution mainly owing to the integration of relevant land use/cover information from multiple compatible geodata sources (Copernicus "High Resolution Layers", Urban Atlas, European Settlement maps, etc.). Since LUISA is dependent on the base map 2012 (refined-CLC2012) as starting point of the simulation, it is worth mentioning the existing differences between CLC and other European data sources (LUCAS, Farm Structure Survey, etc.), not only due to the spatial interpretation, but also to the thematic classification (La Notte et al., 2017; Hiederer, R. 2016; Pointereau et al., 2008; European Environmental Agency, 2006).

221 - Vineyards	Vineyards	Permanent crop systems
222 - Fruit trees and berry plantations	Fruit production	
223 - Olive groves	Olive production	

3. Results

In 2015, the agricultural land area is estimated to reach 185.6 million ha, which would be equal to 42% of all EU land area. Arable land, with its 103.4 million ha, accounts for the largest share of UAA (56%), followed by livestock grazing with 47 million ha (25% of UAA) and mixed crops with 25 million ha (13.5% of UAA) and various permanent crops with 10.2 million ha (5.5% of UAA). By 2030, the largest increase of almost 11% is projected for mixed crops (Figure 1). The dynamics in permanent crops systems will be diverse – the areas with olive trees are expected to substantially expand, but largely at the expense of cutbacks in the areas with vineyards. Within 2015–2030 the two principal groups – arable land and livestock grazing – will be on decline by 4.0% and 2.6% respectively, which trend largely defines the overall downward trend of agricultural land of 1.1% over the same period of time, reaching 183.6 million ha in 2030. Bioenergy crops⁶ are likely to occupy a negligible area of 210 thousand ha, i.e. just 0.12% of the total agricultural land in 2030. The incremental abandoned agricultural land, which is not considered as a productive land, is expected to exceed 4 million ha within 2015–2030.

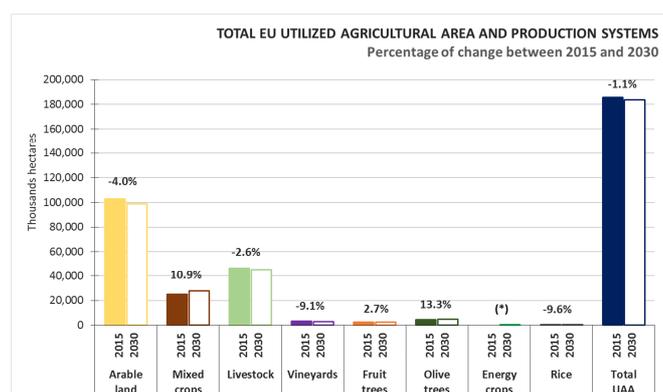


Figure 1: Agricultural land (thousand hectares) for production of food, feed and energy in the EU, changes between 2015 and 2030. The percentage values reflect the changes in land occupied by agricultural production systems and total UAA during the same simulation period. (*) – the land occupied by dedicated energy crops is considered (close to) null in 2015

Despite the relatively small changes that are projected for agricultural land within 2015–2030,

⁶ There are projections for bioenergy production from 2025 onwards only and these also heavily depend on each single Member State's projections.

important conversions among different types of agricultural production systems may also occur. The application of the land-use/cover flows⁷ method allows unveiling those conversions. Figure 2 clearly reveals that the internal conversion of agricultural land (i.e. between various types) is expected to be by far the largest transformation, accounting for more than 7.7 million ha (4.2% of the UAA), of which more than 2.3 million ha would be arable land into mixed crops. The loss of agricultural land (converting into abandoned land) is estimated to more than 4.8 million ha (more than 2.5% of UAA), partially because of negligible re-cultivation of once-abandoned land (evaluated at just around 0.1%). The transformation of agricultural land into build-up or forest & natural areas would be less significant, accounting altogether for less than 1.5% of all agricultural land.

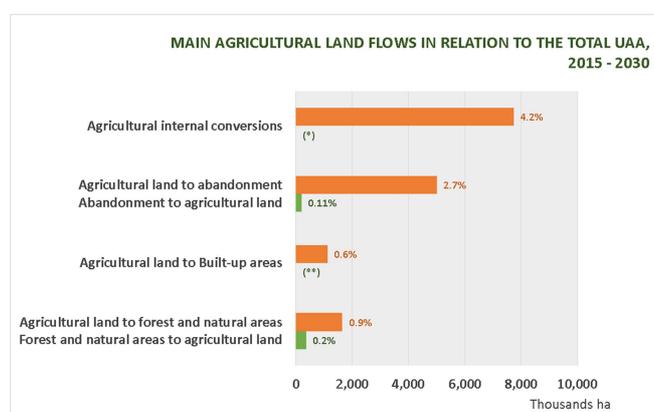


Figure 2: Main agricultural land-use/cover flows from agricultural to other land uses, including internal agricultural conversions. Net land conversions between flows are also included except the ones that either have the same amount of net land (*) or do not occur (**). The shares of flows are computed based to the total UAA in 2030.

Similarly to the overall EU picture, drastic changes in agricultural land are not forecast for EU Member States either (Figure 3). The seven largest EU countries – France, Spain, Germany, Poland, Italy, Romania and United Kingdom – account for about 70% of all UAA both in 2015 and 2030. Slight increases (<5%) are projected for France, Spain, Cyprus, Portugal, Greece, Malta, Croatia, and Latvia. In relative terms (agricultural land as share of total area), Denmark, Hungary and Ireland are the clear EU leaders, with more than 60% of their surface being occupied by agricultural land both in 2015 and 2030. Conversely, Sweden, Finland, Slovenia, Austria and

⁷ The approach of land-use/cover flows is based on the methodology presented by the European Environmental Agency for 'Land Accounts for Europe' (EEA, 2006). It was adapted to the LUISA framework and land-use classification scheme (for detailed description of the method, see Barbosa et al., 2015).

Estonia are the group of countries with the least land devoted to food, feed and energy production in the EU.

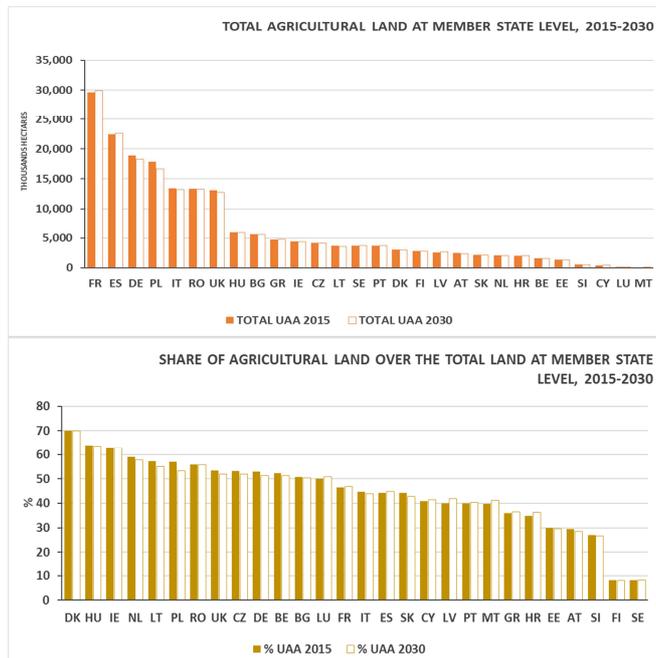


Figure 3: Absolute (top) and relative (bottom) agricultural land in 2015 and 2030 by EU Member State

The diversity of landscape and climatic conditions, and consequently, the spatial patterns of agricultural production vary considerably among EU Member States (Figure 4 and Figure 5). Arable crops, nevertheless, are the dominant agricultural land use in the majority of countries, exceeding 70% in Cyprus, Hungary, Denmark and Slovakia. Slovakia is, however, projected to be amongst the biggest relative losers of both arable and total agricultural land by 2030, together with Germany. Arable land is expected to enlarge more noticeably (by more than 20% within 2015-2030) in Belgium, the Baltic States, Spain and Malta (but from a very low basis for the last one). Livestock has more than 50% share of all agricultural land in Luxembourg (but similarly to Malta – negligible absolute figures EU-wide), the Netherlands, the United Kingdom and especially in Ireland (above 80%). Livestock is, nonetheless, expected to shrink in all those countries, except in Luxembourg. Other important (more than 20%) losers of livestock would be Austria, Latvia, Estonia, Sweden and Finland, while gains above 20% are likely (besides Luxembourg) in Portugal, Czech Republic and Slovenia. Mixed crops are particularly (above 30%) important for Croatia, Greece, Portugal, Finland and Slovenia. Cutbacks are projected for Slovenia, as well as for Belgium, Spain and Latvia, while large (above 40%) growth is likely in Bulgaria, Denmark, France, Croatia, Ireland, Latvia and

Sweden. Permanent crops (vineyards, fruit trees, olive trees) are widely found in the Mediterranean countries, topping around 20% in Greece and Spain. As already indicated, vineyards are projected to shrink the most, often at the expense of olive trees, especially in Cyprus and France. Cyprus will, in exchange, see the largest single relative growth in fruit trees of more than 30% in the EU by 2030. The share of rice and energy crops in total agricultural land is negligible but noticeable growth in energy crops⁸ cultivation is expected in the Netherlands, Finland and Romania.

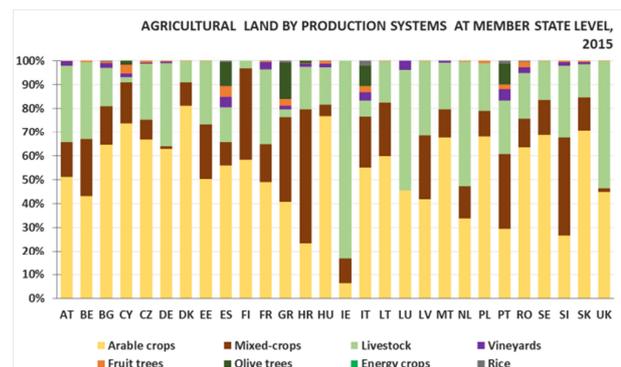


Figure 4: Breakdown of the agricultural production systems as percentage of total UAA at EU Member State level in 2015

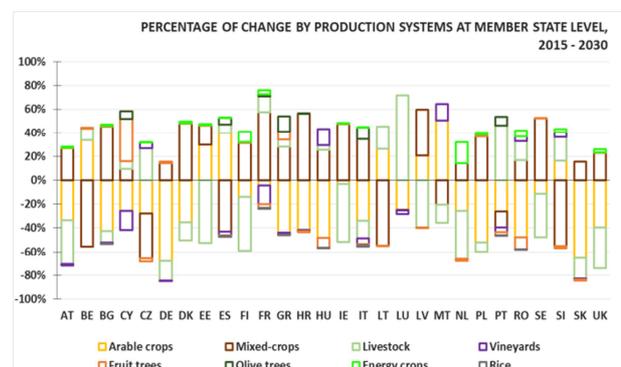


Figure 5: Percentage of change in the agricultural production systems at EU Member State level between 2015 and 2030

Figure 6 and Figure 7 provide an insight into the prevailing regional (NUTS 3) patterns and the likely future trends of agricultural land in the EU. The shares of agricultural land for the production of food, feed and energy over the total NUTS 3 surface vary considerably among and within Member States. Owing to a set of landscape, climatic and socio-economic factors, there are countries, mostly in Southern Europe e.g. Italy, France, Spain, Portugal, Bulgaria, but also Austria and the United Kingdom, with large (more than three times, i.e. from below

⁸ There is no energy crop production in Belgium, Cyprus, Germany, Greece, Croatia, Hungary, Italy, Lithuania, Latvia, Malta, Portugal, Sweden and Slovakia by 2030.

25% to above 75%) inter-regional variations in the share of agricultural land over total area. Other countries, predominantly in Central and Eastern Europe – the Baltic States, Poland, Czech Republic, Slovakia, Hungary, Romania – are peculiar with a more homogenous and at the same time – elevated share of agricultural land over total area. Romania, in particular, appears as the EU country with the widest area where more than 75% of total land is dedicated to agriculture. The significant inter-regional differences in Germany are mostly due to socio-economic factors – the big industrial centres and urban agglomerations leave little land to agriculture. The very low (below 5%) presence of agricultural land in the Central and Northern parts of Sweden and Finland is chiefly defined by the unfavourable climatic conditions for agriculture.

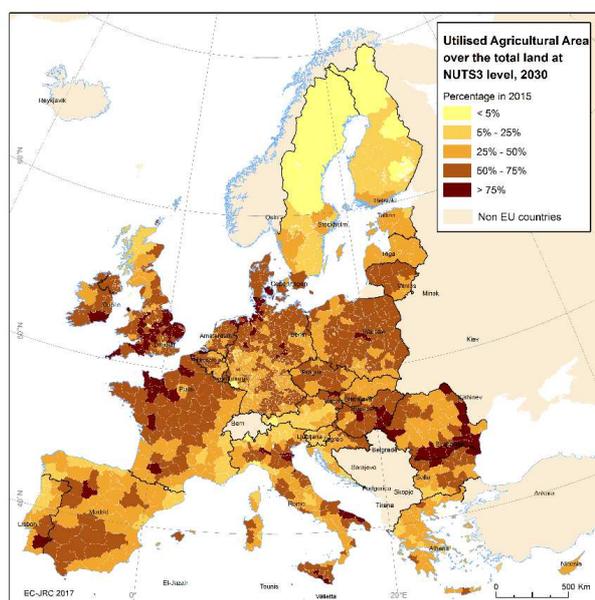


Figure 6: Share of agricultural land for the production of food, feed and energy land over the total land at NUTS3 level, 2015

Within 2015–2030 a noticeable (over 15%) expansion of agricultural land is projected for a number of regions in Southern and South-Eastern Europe – Portugal, Spain, France, Italy, Croatia in particular (owing to the access to the CAP measures), Greece, Romania, etc. Growth of similar magnitude (albeit, from a much lower basis), largely owing to the Climate Change, is also expected for the Northern strip of countries and regions that comprises Scotland in the United Kingdom, Sweden, Finland, Estonia and Latvia. Nonetheless, in line with the overall forecast trend of 1.1% shrinkage of EU agricultural land between 2015 and 2030, more than 75% of all NUTS 3 in the EU are likely to see a contraction of land for the production of food, feed and energy. The

reduction would be widespread in the regions of Central Europe – Lithuania, Poland, Czech Republic, Slovakia and Slovenia. It is worth noting that some of the deepest cuts in agricultural area would occur in Portugal, Spain, France, Sweden and Finland, pointing out on significant intra-regional (sometimes even neighbour) disparities at national level.

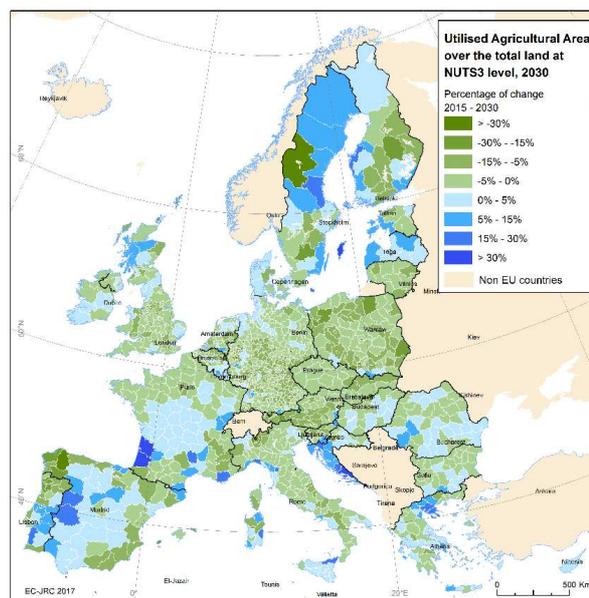


Figure 7: Percentage of changes of agricultural land for the production of food, feed and energy at NUTS3 level, between 2015 and 2030

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