This article provides a fact sheet of the European Union (EU) agri-environmental indicator cropping patterns. It consists of an overview of data, complemented by information needed to interpret these data. This article on cropping patterns in the EU is part of a set of similar fact sheets, providing a comprehensive picture of the integration of environmental concerns into the Common Agricultural Policy (CAP).

**Analysis of cropping patterns at EU level**

**Cropping patterns in 2016: Arable land occupied the largest part of UAA**

The total utilised agricultural area (UAA) in the EU-28 covered just short of 173 million hectares in 2016. This was a slight decrease of -0.3% compared to 2005. Among the main types of land cover, arable land took up the largest part of the utilised agricultural area in the EU-28, covering just over 103 million hectares. This corresponds to 60% of the UAA in the EU-28 (Figure 1). Around a third of the UAA, 59 million hectares, was covered by permanent grassland and meadow, while permanent crops covered 11 million hectares (6%).
Trend in cropping patterns towards a decrease in arable land and an increase in permanent grassland

From 2005-2016, the area of all main types of land cover, except permanent grassland and meadow, decreased in the EU (values for the EU excluding Croatia are compared, as data are not available for 2005) (Table 1). Arable land decreased by 2.4 % and permanent crops by 4.0 %. The area covered by kitchen gardens decreased by 42.4 %, but represents only a very minor share; in 2016, kitchen gardens made up only 0.1 % of the UAA in the EU-28. In contrast, the area of permanent grassland and meadow increased by 4.5 % over the period.
Table 1: Utilised agricultural area by land cover types, 2005 and 2016 (thousand hectares)

Source: Eurostat (ef_lus_main)

Analysis of cropping patterns at country level

Largest shares of EU agricultural land are in France and Spain

In 2016, close to half of the UAA was located in just four Member States: France (16.1% of the EU-28 total), Spain (13.4%), Germany (9.7%) and the United Kingdom (9.4%) (Figure 2). Other countries with a high share of UAA were Poland (8.3%), Italy (7.3%) and Romania (7.2%). The remaining 21 Member States together managed 28.5% of the EU-28’s UAA, with each accounting for at most 2.8%.
The distribution of the main agricultural land cover types (arable land, permanent grassland, permanent crops and kitchen gardens) varied widely between Member States in 2016 (Figure 3). In seven Member States three-quarters or more of the UAA was occupied by arable land, with the highest values observed in Finland and Denmark (98.7 % and 90.3 % of the UAA respectively). The lowest share of arable land (9.4 % of the UAA) was observed in Ireland.

In contrast, several Member States with low shares of arable land reported high shares of permanent grasslands and meadow. By far the highest share was observed in Ireland, where most of the UAA was covered by permanent grasslands and meadow (90.6 %). Other countries where permanent grasslands and meadow covered more than half of the UAA included the United Kingdom (62.9 %), Slovenia (58.4 %), Portugal (51.5 %) and Luxembourg (51.4 %). The high shares in these countries may be associated with relatively high numbers of grazing animals; see AEI 10.2 - Livestock patterns for more on this. Less than 2 % of the UAA was occupied by permanent grassland and meadow in Malta, Finland and Cyprus.

As for the permanent crops, Mediterranean countries (Cyprus, Greece, Portugal, Spain and Italy) tended to have higher proportions (ranging from 17.5 % of UAA in Italy to 23.5 % in Cyprus) than the other Member States. In 22 Member States, the share of permanent crops in the UAA was less than 6 %.

With 6.7 %, Malta was the only country that reported a significant share of UAA devoted to kitchen gardens.

**Highest number of hectares of permanent grassland reported by the UK: 10 million ha**

Expressed in absolute figures, in 2016 there were 103 million hectares of arable land in the EU-28. The biggest areas of arable land were reported in France, Germany, Spain and Poland (from almost 11 million hectares in Poland to more than 18 million hectares in France). Permanent grassland and meadow covered over 59 million hectares in total, with the largest areas observed in the United Kingdom (10 million hectares), France (9 million hectares) and Spain (8 million hectares). Of the close to 11 million hectares occupied by permanent crops in the EU-28, more than 4 million hectares were reported in Spain and 2 million hectares in Italy, while the permanent crops covered close to 1 million hectares in France and Greece. Kitchen gardens covered only a relatively small area in all Member States. With 142 000 hectares of kitchen gardens, Romania stood out with the largest area; only Poland, Italy and Portugal also reported kitchen gardens covering more than ten thousand hectares (from 31 thousand in Poland to 16 thousand in Portugal).
In focus: arable land and fodder areas

Arable land - the main plant-based food producing areas

For the EU as a whole, the area covered by arable land decreased by 2.4 % from 2005 to 2016 (Figure 4). This corresponds to a decrease of around 2.5 million hectares. (This comparison does not include Croatia, as 2005 data for Croatia are not available.)

Among the EU Member States, there was a wide difference in how the size of the arable land developed from 2005 to 2016. In 11 countries, the arable land increased over this period, with Bulgaria seeing by far the largest increase (27.6 %, corresponding to an increase of almost 700 000 hectares). The arable land also grew considerably in the Baltic countries; Latvia (19.4 %), Estonia (17.5 %) and Lithuania (13.7 %). However, in the majority of countries, the arable land decreased over the period. Ireland stood out with a reduction in its arable land of 60.2 %. Despite this, the UAA of Ireland increased, as the increase in permanent grassland and meadow more than compensated the decrease in arable land. In absolute terms, the reduction of the arable land was most pronounced in Romania, with slightly more than a million hectares less arable land in 2016 than in 2005.
Figure 4: Change in arable land from 2005 to 2016 (%) Source: Eurostat (ef_lus_main)

Cereals occupied more than half of the arable land in the EU-28 in 2016. The other crop categories covered substantially smaller areas, with industrial crops and other crops together occupying around a quarter of the arable land and fodder crops almost a fifth.

Cereals were dominant in the arable land of 22 Member States, with shares exceeding 50 % in 20 countries (Figure 5). Malta did not report any area cultivated with cereals; fodder crops dominated with 62 % of its arable land. Fodder crops also dominated in Cyprus, the Netherlands, Sweden and Portugal, while in Luxembourg both cereals and fodder crops covered just short of 45 % of the arable land. On the opposite end of the scale, shares of fodder crops at 10 % or lower were reported in Bulgaria, Spain, Hungary, Poland and Romania. Industrial crops occupied a third of the arable land in Bulgaria; the next highest share of industrial crops (23.7 %) was reported by Hungary. In Croatia, Greece, Czechia, Romania and Slovakia, the share of industrial crops in the arable land was between 19 % and 20 % in 2016.
Fodder area - the basis for animal production

The share of fodder area (fodder crops, grass and permanent grassland and meadows) in UAA provides an indication of specialisation towards livestock farming. (For more specific information on this, see the agri-environmental indicators "Livestock patterns" and "Specialisation".) In 2016, the fodder area covered 45.7 % of the UAA in the EU-28.

Among the EU Member States, the highest shares of fodder area in UAA were found in Ireland (93.4 %), Luxembourg (72.6 %), the United Kingdom (71.4 %) and Slovenia (69.2 %). At the other end of the scale, the lowest shares of fodder area were registered in Hungary (22.2 %), Denmark (28.3 %), Bulgaria (28.6 %) and Poland (29.6 %).

Around one-eighth of the regions at NUTS 2 level had a share of fodder area higher than 80 % of UAA (Map 1). The NUTS 2 regions with particularly high shares of fodder area (more than 95 %) were mostly found in mountainous regions: Vorarlberg, Salzburg and Tirol in Austria; Valle d’Aosta in Italy; West Wales and The Valleys, Highlands and Islands and Northern Ireland in the United Kingdom; Border, Midland and Western in Ireland; Cantabria and Principado de Asturias in Spain; and the Região Autónoma dos Açores in Portugal. A fifth of the regions at NUTS 2 level had a share less than 25 %. Several of the regions with low shares of fodder area were found around capital cities (e.g. Paris, Bucharest, Copenhagen, Prague and Vienna). The regions with the lowest shares were the Spanish regions Melilla (0.0 %), Ceuta (0.1 %) and Región de Murcia (5.5 %), as well as the French region Île de France (5.4 %).
Map 1: Fodder area in utilised agricultural area by NUTS 2 regions, 2016 (%)Source: Eurostat (ef_lus_main)

Source data for tables and graphs
- Cropping patterns statistics

Data sources

Indicator definition

Cropping patterns are defined as trends in the share of the utilised agricultural area (UAA) occupied by the main agricultural land cover types (arable land, permanent grassland and land under permanent crops), and they are measured by the following indicators:

Main indicator
- Share (%) of main agricultural land cover types (arable land, permanent grassland and land under permanent crops) in total UAA.

Supporting indicator
- Areas (in hectares) occupied by arable crops, permanent grassland and permanent crops.
Links with other indicators

This indicator has links to a number of other AEI indicators that describe developments in some of the main contributory factors.

Data used

Cropping patterns are described on the basis of data from the Farm Structure Survey (FSS). The FSS is carried out by all EU Member States; it is conducted consistently throughout the EU with a common methodology at a regular base and therefore provides comparable and representative statistics on livestock and land use across countries and time, at regional levels (down to NUTS 3 level). Every three or four years the FSS is carried out as a sample survey, and once in ten years as a census. The unit underlying the FSS is the agricultural holding, a technical-economic unit under single management engaged in agricultural production. Until 2007, the FSS covered all agricultural holdings with a UAA of at least one hectare (ha) and those holdings with a UAA of less than one hectare if their market production exceeded certain natural thresholds. From 2008 onwards, the thresholds for agricultural holdings changed to cover a range of physical thresholds. This has an impact on the comparability of data across time. More information about the thresholds can be found in the background article Farm structure survey – survey coverage.

Data on agricultural land cover are also available from crop statistics. Crop statistics are collected annually, consistently throughout the EU with a common methodology. They provide comparable and representative statistics on land cover across countries and time, at national level. Data on land use from this data source might differ from data collected by FSS, due to differences in data collection methods and populations.

Methodology

The utilised agricultural area (UAA) is the total area taken up by arable land (including temporary grassland and fallow land), permanent grassland, permanent crops and kitchen gardens. It should be noted that common land is included in FSS in some countries. This has an impact on the comparability of data on land use. More information on this can be found in the background article on Farm Structure Survey – common land.

Arable land in agricultural statistics is land worked (ploughed or tilled) regularly, generally under a system of crop rotation.

Permanent grassland is land used permanently (for several consecutive years) to grow herbaceous forage crops and not included in the crop rotation scheme on the agricultural holding. Permanent grassland can be used for grazing by livestock or mown for hay, silage (stocking in a silo) or used for renewable energy production.

Permanent crops are ligneous crops, meaning trees or shrubs, not grown in rotation, but occupying the soil and yielding harvests for several (usually more than five) consecutive years. Permanent crops mainly consist of fruit and berry trees, bushes, vines and olive trees. Permanent crops are usually intended for human consumption and generally yield a higher added value per hectare than annual crops. They also play an important role in shaping the rural landscape (through orchards, vineyards and olive tree plantations) and helping to balance agriculture within the environment.

Fodder area includes arable fodder crops and grass: fodder roots and brassicas, forage plants (including temporary grass, green maize, leguminous plants) and permanent grassland and meadows. Grazing livestock mainly feed on fodder area.

Context

Cropping patterns provide insights into the relationship between the environment and farming systems and developments within a certain region/territory. In the EU, agricultural areas are mostly used for growing arable crops (such as cereals, fodder crops, industrial crops), permanent crops (like fruit and berry plantations, olive trees, vineyards), and permanent grasslands. The latter (when extensively managed) are generally considered as the most important agricultural area from a nature conservation perspective, providing habitats for many wild plants and animal species. From a climate change perspective, permanent grasslands are important to keep unploughed since they are significant carbon sinks.
Policy relevance

There are many non-agronomic drivers affecting cropping patterns such as sectoral policies, climate change, market prices, etc. The Common Agricultural Policy (CAP) is one of the main EU policies influencing cropping patterns, but regionally or nationally, energy and climate policies can have more influence on cropping patterns than the CAP.

CAP consists of different policy instruments with different influence on the cropping patterns. Support is available for the maintenance or introduction of practices that are beneficial for the environment and climate; some are mandatory and some voluntary. The so-called “Green Direct Payments” were introduced under CAP Pillar 1 from 2015 onwards as a compulsory requirement. They account for 30% of the national direct payments to farmers on the condition of respecting three obligatory agricultural practices:

- maintenance of permanent grassland;
- crop diversification (for farmers with over 10 ha of arable land);
- dedicating 5% of arable land to 'ecologically beneficial elements' called 'Ecological Focus Areas' (for farmers with over 15 ha of arable land).

These practices, also referred to as “greening”, cover most of the agricultural area in the EU but have in general had a limited impact on changing practices towards more environmentally/climate friendly farming. Ecological focus areas have increased the areas under nitrogen-fixing crops and land lying fallow since they are most frequently made up of nitrogen-fixing crops, catch crops or fallow land.

Other CAP instruments which directly target cropping patterns are voluntary agri-environmental climate measures, support to organic farming and to areas with natural constraints (ANC), funded under CAP Pillar 2 (rural development policy). Further CAP instruments, such as voluntary coupled support, may indirectly influence cropping patterns.

Among EU policies that could influence cropping patterns, the legislation on water protection such as the Water Framework Directive and the Nitrates Directive should be noted, laying down obligations to e.g. grow catch crops in specific areas at particular times of the year. Legislation underpinning the Natura 2000 network of protected areas (the Birds Directive and the Habitats Directive) limit human activities to ensure that the sites are managed in a sustainable manner, both ecologically and economically. Therefore agriculture can continue on these sites but with restrictions that are likely influencing cropping patterns.

Changes in cropping patterns also have an impact on greenhouse gas (GHG) emissions. The EU is a signatory to the Kyoto Protocol, setting targets for reducing GHG emissions.

In 2018 new legislation on the inclusion of GHG emissions and removals from land use, land use change and forestry (LULUCF) was adopted (Regulation (EU) 2018/841), in line with the Paris Agreement. This will lead to better estimates of the emissions.

**Agri-environmental context**

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2. Report from the Commission to the European Parliament and the Council COM(2017) 152 on the implementation of the ecological focus area obligation under the green direct payment scheme

3. These are practices, undertaken voluntarily by farmers, over a set period (see Agri-environmental indicator - commitments). Support may be provided through Rural Development programmes. The practices bring environmental benefits and/or help to mitigate and adapt to climate change.

4. These are areas where agricultural production is identified of facing natural constraints and challenges. These areas can be identified as "mountain areas", due to the presence of slopes or altitude, or areas where the so called "biophysical" constraints have been identified, or areas where agricultural production faces other types of specific constraints but the areas should be maintained for the reasons of environmental protection or improvement, maintenance of the countryside, preserving tourist potential or protection of the coastline.
Cropping patterns are strongly linked to the way natural resources (soil, water, air, biodiversity) are managed and impacted by management practices. Many of the current land cover/use patterns have developed over centuries and still shape agricultural landscapes today. The agricultural practices and specialisations differ depending on the local conditions such as water availability, temperature and soil quality, but also policies, traditions and economic situation of the farmers are factors influencing the choices in farming. Cropping patterns can be related to land use intensity, although with the present level of data detail available, the intensity is not well captured. A certain land use (e.g. fodder) or crop can have very different impacts on the environment depending on local characteristics and management intensity. Cereal crops, for example, are often managed very intensively, e.g. in the Paris basin or parts of the United Kingdom and Germany. On the other hand, cereals are also the key crop in one of the most important arable farming systems of High Nature Value in Europe, those of the cereal steppes in the Iberian Peninsula. Similarly, intensively managed pastures along the North Sea coast are very different in terms of habitat value from extensively grazed permanent grassland in the Scottish uplands or the alpine region. Therefore cropping patterns can give an indication of the changes in land use intensity, and therefore on the environmental impacts, when linked to farm management information.

In general, agriculture is more sustainable when dominance of one or a few crops (mono-cropping) is avoided, since this can be associated with a reduction of the supply of eco-system services. Mosaic landscapes often have high landscape and biodiversity values. Crop diversification can increase resilience of agricultural systems and support beneficial insects providing biological control, thus reducing the dependence on insecticides. Adopting crop rotations leads to positive environmental impacts and at the same time global improvement of soil productivity in the long term, which increases yields.

Permanent grassland has high recognition, due to the substantial role it plays in landscape and nature conservation. Semi-natural grasslands are among the areas with the richest biodiversity in the EU (e.g. wooded meadows of Estonia). However, in the most intensive permanent pastures farmers re-seed with selectively bred cultivars of grass and other fodder species, and may use mineral fertilisers and herbicides. This allows farmers to achieve high yields, but with little associated biodiversity value. There are negative impacts on climate change.

References:


of this type of intensive grassland, when compared to more extensive permanent grassland. The CAP has introduced a definition of permanent grasslands that are environmentally sensitive; Member States designated these areas, including permanent grassland in carbon-rich soils and wetlands, and farmers shall not convert or plough them.

Other articles
- Agri-environmental indicators - dashboard
- Agri-environmental indicators - background
- Livestock patterns - fact sheet
- Farm structure survey (FSS)

Tables
- Cross-cutting topics, see:

Agri-environmental indicators

Share of main land types in utilised agricultural area (UAA) by NUTS 2 regions (tai05)

Database
- Agriculture (agr), see:

Farm structure (ef)

- Farm land use by NUTS 2 regions (ef_landuse)
  - Main farm land use by NUTS 2 regions (ef_lus_main)
  - Arable crops farms by NUTS 2 regions (ef_lac)
    - Main crops by NUTS 2 regions (ef_lac_main)

- General and regional statistics

Regional statistics by NUTS classification (reg)

- Regional agriculture statistics (reg_agr)
  - Structure of agricultural holdings (reg_ef)
    - Structure of agricultural holdings 2010 (reg_ef_2010)
    - Farm land use - Permanent crops, other farmland, irrigation (reg_ef_po)
      - Land use: number of farms and areas of different crops by agricultural size of farm (UAA)
      - and NUTS 2 regions (ef_oluaareg)

Dedicated section
- Agri-Environmental Indicators
- Agriculture - Overview
Publications

- Agriculture, forestry and fishery statistics - 2018 edition

Methodology

- Structure of agricultural holdings (ef_esms)
- Data used: Agriculture (agr), see:
  
  Farm structure (ef)
  
  - Farm land use by NUTS 2 regions (ef_landuse)
  - Main farm land use by NUTS 2 regions (ef_lus_main)
  - Arable crops farms by NUTS 2 regions (ef_lac)
  - Main crops by NUTS 2 regions (ef_lac_main)

Legislation

- Commission Communication COM(2006)508 final - Development of agri-environmental indicators for monitoring the integration of environmental concerns into the common agricultural policy
- Commission Staff working document accompanying COM(2006)508 final

External links

- European Commission
  
  - DG Agriculture and Rural Development
    * CAP at a glance
    * CAP indicator dashboard
    * Agriculture and the environment
    * Rural development
    * High Nature Value farming