European Commission

Science for Environment Policy

Mapping livestock water requirements to inform EU water policy

As part of the EU's Blueprint to Safeguard Europe's Waters[1], a new study from the Joint Research Centre has mapped the water requirements of livestock across Europe for 2005. The maps and data can help quantify total European water use but also inform sustainable management by making use of ecosystem services (ESSs).

Ecosystems provide a range of valuable services relevant to water. Lakes and rivers contribute to water supply, whilst forests and wetlands help protect against flooding and can also remove pollutants such as heavy metals and pesticides. The importance of ESSs is highlighted in the EU Biodiversity Strategy to 2020[2], while the Blueprint to Safeguard Europe's Water Resources aims to improve the quality and quantity of current water resources, potentially through harnessing ESSs.

To understand where and why the need for these water-based services is high, this study mapped the demand for livestock drinking water, which represents a significant use of water in Europe. Building on data from the Food and Agricultural Organisation, researchers created a series of nine maps of livestock density for sheep and goats, poultry, pigs, heifers, bulls, calves, high-yield dairy cows, low yield dairy cows and 'other cows'. The maps represented data at regional NUTS 2 levels (basic regions for the application of regional policies, see: Nomenclature of territorial units for statistics) for the EU-27, as well as Norway, Kosovo, Serbia, Bosnia and Herzegovina, Montenegro, Croatia (not part of the EU at the time of the study), Macedonia, Albania and Turkey.

The amount of water intake per head per day in different European regions was estimated from data on livestock category, (for example, dairy cows have the highest intake because they produce milk), and air temperature. Average daily temperature maps for 2005 were obtained from the European Floods Alert System[3]. The amount of dry feed eaten by the animals was also taken into account as this affects their water intake. Data on feed intake was provided by the CAPRI (Common Agricultural Policy Regionalised Impact) model.

For each of the nine livestock categories, daily water-use maps were produced for 2005. Water demand for livestock was high in Northern Europe throughout the year. For example, demand was 179 million m^3 of water in Denmark, which was 28% of the national total water use, similar to the amount of water used for the country's irrigation. Northern Ireland, Belgium, the Netherlands and northwest France also showed relatively high water use for livestock compared to other countries. Unsurprisingly, there was a significant increase in water use by livestock between winter and summer. Areas of Southern Europe showed a large increase in water demands for livestock in the summer, particularly Northern Italy and the Northeast of Spain. Demand in Northern Europe did not show such a large increase from winter to summer but still remained at a high level.

These maps can feed into specialised hydrological models such as LISFLOOD[4] to estimate overall water demands and contribute to the water accounting exercise for the EU's blueprint and also for the EU's Biodiversity Strategy. Since the data are represented at a regional level, they can also provide useful information for national and local water management to target areas where water demand by livestock is high. The model used by the study can also forecast water demand allowing decision-makers to evaluate policy scenarios to address future water issues.

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