FACCE-MACSUR

Maps of grasslands in Europe

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1.0	First Release	2012-12-06
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Modelling of climate effects on agriculture and food security at the European scale requires a harmonized spatially, explicit database of European land use. It can be used for scaling results of point models to an area. A recent review of land cover maps focused on the global scale (Köchy, 2010). European land use as a subset of global land use is contained in the product GlobCover representing the year 2009 with a resolution of 0.3 km. A European product is the CORINE data set with a resolution of 100 m and a minimum mapping unit of 25 ha representing the year 2006 (version 16, European Environmental Agency, 2012).

	CORINE[1]	GlobCover 2009[2]	Global Land Survey[3]
Spatial resolution	100 m, min. 25 ha	300 m	30 m
Years	2006	2009	2008–2011
Agricultural land use classes	11 of 45, comprising Non-irrigated arable land Permanently irrigated land Rice fields Vineyards Fruit trees and berry plantations Olive groves Pastures Annual crops associated with permanent crops Complex cultivation patterns Land principally occupied by agriculture, with significant areas of natural vegetation Agro-forestry areas	7 of 22, comprising cultivated and managed areas/rainfed cropland post-flooding or irrigated cropland mosaic cropland (50-70%) mosaic vegetation including 20-50% cropland mosaic forest or shrubland including 20-50% grassland mosaic grassland (50-70%) closed to open (>15%) grassland	None (natural colour or greyscale)
Other relevant land use classes	Inland marshes Natural Grasslands		
Instrument	SPOT-4/5, IRS-P6	MERIS	Landsat 5/7, EO-1
Accuracy	varies by country, 50% areal coincidence with Germany's GIS registry of agricultural land use (estimated), greater accuracy at coarser resolution	73% (3000 sample points, weighted by class area, refers to previous version [2.2])	

[1] http://www.eea.europa.eu/data-and-maps/data/ds_resolveuid/ef13cef8-2ef5-49ae-9545-9042457ce4c6

[2] http://ionia1.esrin.esa.int/

[3] http://eros.usgs.gov/#/Find_Data/Products_and_Data_Available/GLS

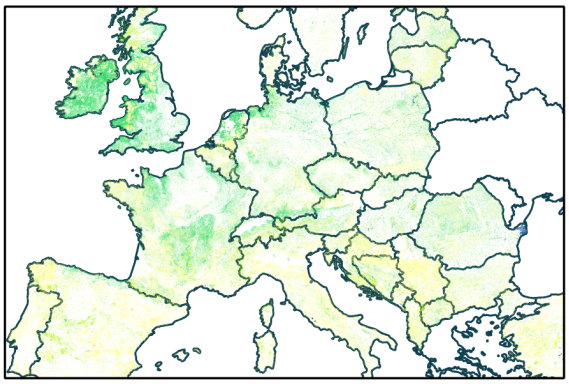

Fig. 1. CORINE Land cover 2006. Dark green: pastures, light green: natural grassland, blue green (eastern Romania): marshland.

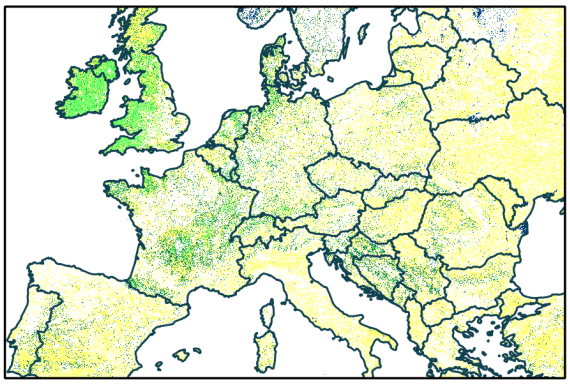

Fig. 2. GlobCover 2009. Dark green: Mosaic grassland (50-70%) / forest or shrubland (20-50%), light green: Closed to open (>15%) herbaceous vegetation (grassland, savannas or lichens/mosses), blue green [eastern Romania]: Closed to open (>15%) grassland or woody vegetation on regularly flooded or waterlogged soil - Fresh, brackish or saline water, yellow: admixed grassland.

Several authors tried to match the area and yield of agricultural land as interpreted from remote sensing to those of national censuses (Erb et al., 2007; Monfreda et al., 2008; Ramankutty et al., 2008). Their results for the year 2000 differ depending on, among others, the classification of the satellite data and spatial attribution and downscaling of census data (Fig. 3, 4).

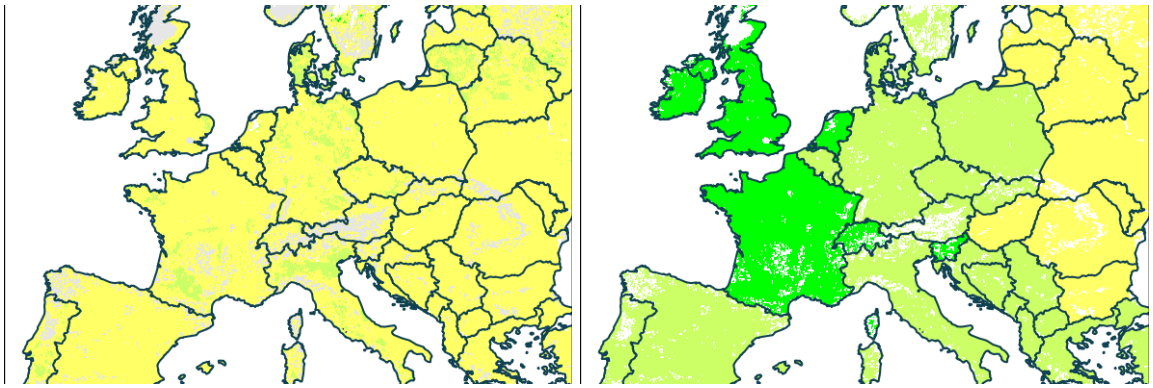

Fig. 3. a) Fraction of 5 arc minute pixels covered by forage crops and b) their yield per unit area in 2000 (Monfreda et al., 2008).

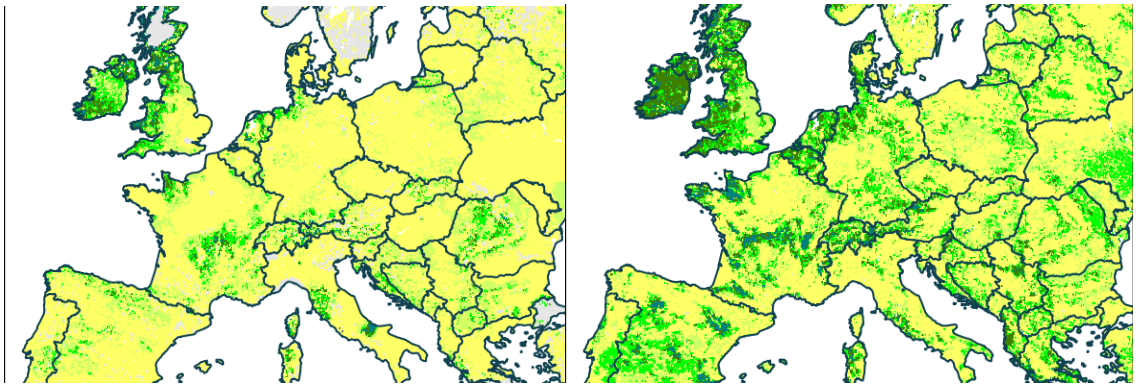

Fig. 4. a) Fraction per 5 arc minute pixels, derived from satellite data and adjusted to censuses of a) pasture cover (Ramankutty et al., 2008) and b) fraction of grazing land (Erb et al., 2007).

For scaling the results obtained for individual points to larger regions one needs fine-grained maps using the same categories as represented by the sample points. The CORINE map of pasture cover (Fig. 1) has the advantage of being very fine-grained and the classification being supervised. The visual differences to coarser maps of cover matched to census (Fig. 4), however, indicate, that none of the existing maps is reflecting reality perfectly. Since MACSUR will likely work with official national statistics it may be preferable to use one of the census-calibrated maps. For a better match, official EU spatial reporting schemes may be used at a grain that ensures data privacy of the land owners.

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