

Civil-Public-Private-Partnerships (cp³):
collaborative governance approaches for policy innovation
to enhance biodiversity and ecosystem services delivery in
agricultural landscapes



Inventory of agricultural production practices

Milestone M.05

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List of abbreviations

CAP = Common Agricultural Policy

cp³ = civil-public-private-partnerships

ES = Ecosystem services

EU = European Union

T = task

WP = work package

1. Introduction

This milestone (M.05) refers to work package 3 (WP3). The objective of M.05 is to present a first inventory of relevant agricultural production practices in the three core case studies of the project: the biosphere reserve Spreewald in Germany, the nature park Jauerling-Wachau in Austria, and the Berg en Dal region in the Netherlands. The information for compiling the inventory was retrieved from desk top research based on available data from agricultural reporting and statistics.

M.05 is structured as follows. In section 2 we define several key terms that we use in M.05. In section 3 we present in inventory on the agricultural production practices for the three case studies of the cp³-project. In section 4 we do a short cross-comparison of all cases.

2. Basic definitions

Land cover (LC): The main land cover types are arable land, grasslands, forests, water areas, settlements. We use the categories of Corine Landcover (CLC).

Land use (LU): The land use is related to the land cover categories. The focus is the agricultural land use including the farming systems, the crop concentration, the rotations and the production practices.

Farming systems: conventional vs. organic

Crop concentration: is derived from the share of cultivated main crops related to the total agricultural area in the region. The crop concentration is our basic information for the rotations and production practices (PP).

Rotations: defined by the crop succession and management sequence associated with each crop. Rotations are mostly relevant for arable production (e.g. to maintain crop health).

Production practices (PP): a sequence of actions needed for the effective management of agricultural land. Needed actions differ in dependency on the type of production (e.g. arable, grassland, vegetables, biomass). For instance, actions to maintain arable land include tillage, seed bed preparation, sowing, application of fertilizers and pesticides, mechanical weeding, and harvesting and the information regarding timing, kind of inputs, amount and frequency of applied inputs, and an exact description of the employed machinery. Actions also differ in time and space in dependency on the geographic location and actual site conditions, e.g. in terms of soil types, water availability, etc. Finally they differ in dependency on the technological standards and established conventions and restrictions defined through the socio-economic frame conditions (in a region, a state, a country). Altogether, the choice of actions is defined by the agronomic, environmental, and socio-economic constraints.

3.1 Biosphere reserve Spreewald, Germany

The biosphere reserve Spreewald, situated 100 km south-east of Berlin, covers an area of about 475 square kilometers. It was created in 1990 and was acknowledged the UNESCO status in 1991. Nested within the inland delta of the river Spree, it constitutes a unique landscape in Central Europe. More than 200 small navigable channels called 'Fließe' are crisscrossing the area. The natural floodplain provides habitat to a vast number of flora and fauna species, many of them endangered, storks, otters, amphibians and dragonflies among them. In terms of land use, about 30% are arable land, 30% are grassland, and another 30% are covered by forests. In some parts, land management is still done in a traditional fashion as many areas are only accessible by boat which makes it difficult to use modern machinery. Approximately 3% are water areas, so fisheries play also an important role.

Ecosystem service provision relates to provisioning services such as timber and food production (e.g. fish, vegetables), regulating services such as water retention, flood protection and nutrient regulation, as well as cultural services (e.g. recreation and tourism). About 50,000 people live in the biosphere reserve.

Descendants of the first settlers to the region, Sorbs and Wends, still live in the region and preserved their traditional language and customs to this day.

In terms of governance, many approaches overlay which includes command and control approaches (e.g. different regulations with respect to Natura 2000 areas, different types of protection areas), market-based approaches (e.g. agri-environmental programs specifically tailored to the area), as well as collaborative approaches, such as a citizen foundation founded in 2007.

Land cover in general

Forests, arable lands and grasslands each cover about one third of the area. The rest are water areas and settlements. While forests dominate the core zone, the maintenance zone is covered by forests and grasslands in combination, and the development and regeneration zone by a mix of grass- and arable lands. Residential areas are concentrated mostly in the development and regeneration zone.

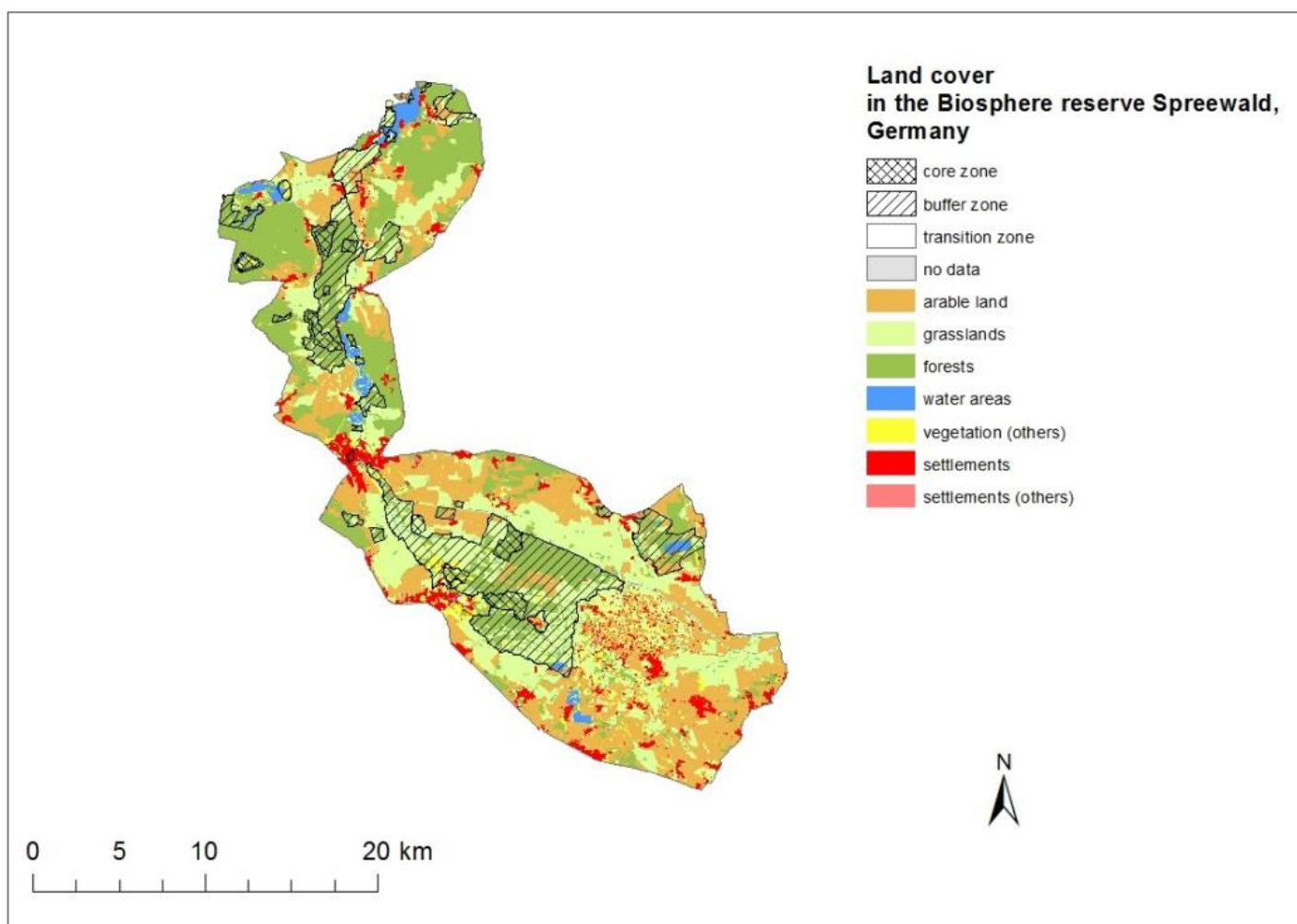


Figure 1: Land cover of the Biosphere reserve Spreewald, Germany.

Agricultural land use in specific

Agricultural production is defined by heterogeneous soils and accessibility of the plots highly dependents on site-specific water regulation. The average size of the farms is rather small scale with only about one fifth managing more than 200ha, which is below the Brandenburg average (238ha). The majority of land (80%) managed by the farmers is on lease. The share of organic farming with about 70% is the highest in all of Germany. Since 2004, the region has committed itself as a GMO (genetically modified organisms) free zone.

Arable crops include mostly rye, corn, winter rape, roughage such as clover-grass-mixtures, for livestock forage, and winter wheat. About 10km² are dedicated to vegetable production, thereof 6km² alone for the production of gherkins.

Livestock in the first place concerns grassland-bound rearing of suckler and dairy cows. The livestock density is 0.5 livestock units (LU) per ha and thus way below the Brandenburg average of about 1 LU per ha.

A number of farms are involved in biogas production.

Table 1: Site conditions for agricultural farming in the region of the Biosphere reserve Spreewald.

Site condition		Unit	
Climate	mean temperature	[°C]	8,5 – 9
	Sum of precipitation	[mm]	500 – 550
Soil	main soil types	[descr.]	gleyic soils, organic soils, mineral soils: e.g. cambisols, podzols, ranker

Table 2: Farm characteristics in the region of the Biosphere reserve Spreewald (statistical survey of county level, counties: Dahme-Spreewald, Oberspreewald-Lausitz, Spree-Neiße)

Farm characteristic	Parameter	Unit	Value
Farm size		[ha]	172 – 198

Table 3: Types of crops in the region of the Biosphere reserve Spreewald (statistical survey of county level, counties: Dahme-Spreewald, Oberspreewald-Lausitz, Spree-Neiße).

Main crops	Parameter	Unit	From - To
Arable land	Utilized arable land of main crops	[%]	winter rye 26 – 31
			maize 14 - 15
			clover-grass mixtures 6 – 13
			winter rape seed 7
			winter wheat 4 – 9
Grassland	Utilized farm land of grassland types	[%]	Pastureland 14
			Meadows 8
Special crops	Utilized farm land of special crops	[%]	Fruits 0.06

Table 4: Animal-livestock in the region of the Biosphere reserve Spreewald (statistical survey of county level, counties: Dahme-Spreewald, Oberspreewald-Lausitz, Spree-Neiße).

Main animal livestock	Parameter	Unit	Average
cattles	Number of animals of farmland	[animal/ha farmfield]	0.48
dairy cows	Number of animals of farmland	[animal/ha farmfield]	0.13
pigs	Number of animals of farmland	[animal/ha farmfield]	1.01
breeding sows	Number of animals of farmland	[animal/ha farmfield]	0.10
sheeps	Number of animals of farmland	[animal/ha farmfield]	0.04

3.2 Nature park Jauerling-Wachau, Austria

Naturpark Jauerling-Wachau along the Danube river in Lower Austria, was created in 1984 and covers about 11,500 ha. The park offers a rich biodiversity, providing habitats for rare orchids, butterflies, fish, birds, and other species. Agricultural production concerns mainly wine and fruit production, as well as some dairy farming. Farming is rather small scale, partly conventional and intensive, partly organic and extensive. Over the last years, the region has become Austria's most important producer of Christmas trees. ES delivery relates to provisioning services (wine, fruits, christmas trees) and cultural services (tourism), given the park's location in the wider Wachau region which is an important tourist region.

In Austria, nature parks are to fulfill four major functions (protection, recreation, education and regional development) in an equal way, leading to sustainable development where conservation, agriculture and tourism go hand in hand. This is in contrast to national parks and for instance the German case study, where the prior focus is on conservation.

In terms of governance, it is possible to identify command and control, market-based and collaborative approaches that are of relevance for the nature parks' management and the use of land and resources.

Land cover in general

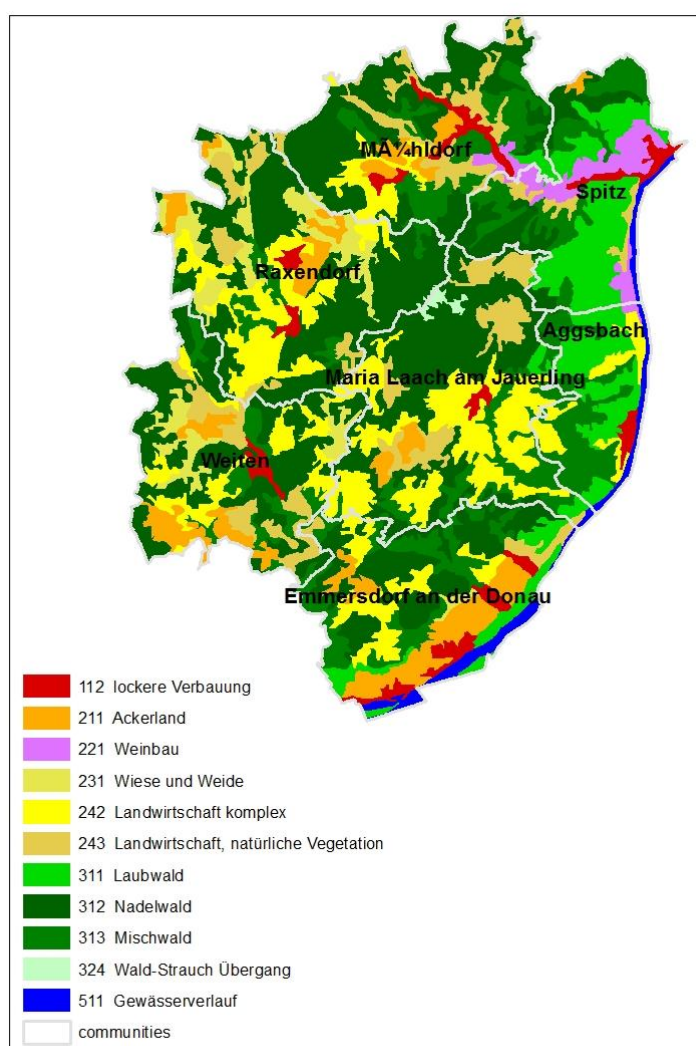


Figure 2: Land cover of the communities of the region Jauerling-Wachau, Austria.

Agricultural land use in specific

Agricultural production concerns mainly wine and fruit (apricot) production, as well as some dairy farming. Farming is rather small scale partly conventional and intensive, and partly organic and extensive. In the wider Wachau region, vineyards cover some 1400 ha of the area, and there are some 100000 apricot trees. Over the last years, the nature park Jauerling-Wachau has become Austria's most important producer of Christmas trees, with some 500 ha used for this purpose.

Table 5: Site conditions for agricultural farming in the region of the Nature park Jauerling-Wachau, Austria.

Site condition		Unit	
Climate	mean temperature	[°C]	nn
	Sum of precipitation	[mm]	nn
Soil	main soil types	[descr.]	nn

Table 6: Farm characteristics in the communities of the Nature park Jauerling-Wachau, Austria (statistical survey on community level, communities: Maria Laach, Emmersdorf, Aggsbach, Mühldorf, Spitz, Weiten, Raxendorf).

Farm characteristic	Parameter	Unit	Value
Farm size		[ha]	13 – 20

Table 7: Types of crops in the communities of the Nature park Jauerling-Wachau, Austria (statistical survey on community level, communities: Maria Laach, Emmersdorf, Aggsbach, Mühldorf, Spitz, Weiten, Raxendorf).

Main crops	Parameter	Unit	From - To
Arable land	Utilized arable of main crops	[%]	winter wheat 8 – 21
			triticale 3 - 22
			winter barley 9 – 14
			maize 5 – 16
			clover-grass mixtures 11 – 22
			temporary grass 4 – 15
Grassland	Utilized farm land of grassland types	[%]	Pastureland and Meadows 3 – 28
Special crops	Utilized farm land of special crops	[%]	Christmas trees 0.3 – 6.3

Table 8: Animal-livestock in the communities of the Nature park Jauerling-Wachau, Austria (statistical survey on community level, communities: Maria Laach, Emmersdorf, Aggsbach, Mühldorf, Spitz, Weiten, Raxendorf).

Main animal livestock	Parameter	Unit	average
cattles	Number of animals of farmland	[animal/ha farmfield]	0.43
horses and other solid-hoofed animals	Number of animals of farmland	[animal/ha farmfield]	0.01
pigs	Number of animals of farmland	[animal/ha farmfield]	0.06
sheeps	Number of animals of farmland	[animal/ha farmfield]	0.06
goats	Number of animals of farmland	[animal/ha farmfield]	0.02
chicken	Number of animals of farmland	[animal/ha farmfield]	0.23

3.3 Berg en Dal region, Netherlands

The municipality of Berg en Dal, situated between the Waal river, Nijmegen and the German border and with a population of 34,000 inhabitants, makes up an important part of the national landscape Gelderse Poort. The designation 'national landscape' signifies that the area is of agricultural, natural and historic value for the Netherlands. The area contains a varied cultural landscape with a variety of landscapes. The municipality can roughly be split into three zones: (1) the floodplains on the southern banks of the Rhine/Waal river (Ooijpolder and Duffelt), that harbor an important nature restoration area; (2) the forested ridges surrounding Nijmegen in the central western area; and (3) mixed agricultural lands south of the floodplains and surrounding the town of Groesbeek.

Berg en Dal has many different types of nature areas, including forests, open water, swamps, natural grasslands, shrublands and many small patches with special vegetation. The municipality harbors (parts of) three Natura 2000 areas: Gelderse Poort, De Bruuk and Sint Jansberg, together covering 6.7% of the area.

Different governance approaches are used for the municipality's management, including command and control approaches, market-based approaches and collaborative approaches.

Land cover in general

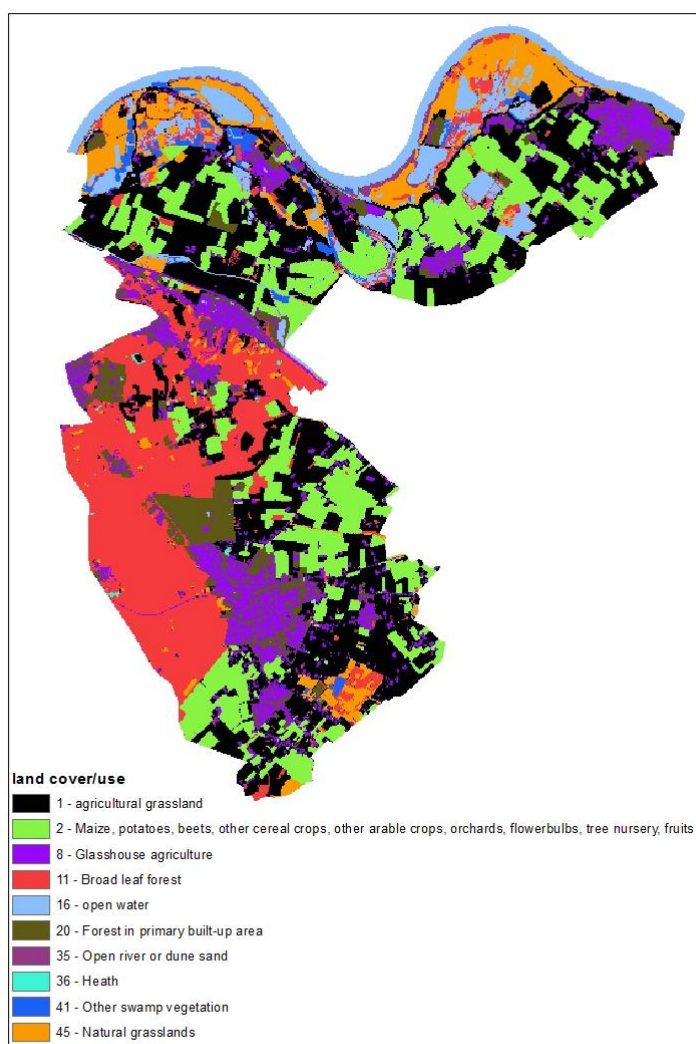


Figure 3: Land cover of the Berg en Dal region, Netherlands (landcover reclassified by Roy Remme 2016)

Agricultural land use in specific

Livestock production is the most dominant agricultural activity in Berg en Dal, with a focus on dairy cattle, but also sheep. The municipality has the largest extent of vineyards in the Netherlands, due to the combination of undulating terrain, a moderate groundwater table, and loess soil. Other agricultural activities include arable farming (34% of area), fruit production (1.3% of area) and horticulture (0.8% of area), all at relatively small scale. The main arable products are corn, sugar beets, wheat and potatoes.

Table 9: Site conditions for agricultural farming in Berg en Dal region, Netherlands.

Site condition		Unit	
Climate	mean temperature	[°C]	nn
	Sum of precipitation	[mm]	nn
Soil	main soil types	[descr.]	nn

Table 10: Farm characteristics in Berg en Dal region, Netherlands.

Farm characteristic	Parameter	Unit	Value
Farm size		[ha]	nn

Table 11: Types of crops in Berg en Dal region, Netherlands (statistical survey on community level: Berg en Dal is former Groesbeek, Millingen aan de Rijn, Ubbergen, data are related to the main community Groesbeek 2015).

Main crops	Parameter	Unit	Groesbeek
Arable land	Utilized arable of main crops	[%]	potatoes: 10.75 arable vegetables: 9.39 cereals: 55.56 grass seeds: 1.96 industrial plants: 3.55 legumes: 0.01 sugar beets: 17.67 other crops: 0.40 fallows: 0.64
Grassland	Utilized farm land of grassland types	[%]	grassland, total: 59,56 permanent pasture: 38.07 natural grassland: 3.24 temporary grass: 18.25
Special crops	Utilized farm land of special crops	[%]	green fodder: 16.38 horticulture open ground, total: 2,72

Table 12: Animal-livestock in Berg en Dal region, Netherlands (statistical survey on community level: Berg en Dal is former Groesbeek, Millingen aan de Rijn, Ubbergen, data are related to the main community Groesbeek 2015).

Main animal livestock	Parameter	Unit	Groesbeek
cattles	Number of animals of farmland	[animal/ha farmfield]	1.81
dairy cows	Number of animals of farmland	[animal/ha farmfield]	0.85
sheeps	Number of animals of farmland	[animal/ha farmfield]	0.62
goats	Number of animals of farmland	[animal/ha farmfield]	0.07
horses	Number of animals of farmland	[animal/ha farmfield]	0.12
pigs	Number of animals of farmland	[animal/ha farmfield]	4.35
breeding sows	Number of animals of farmland	[animal/ha farmfield]	0.41
chickens	Number of animals of farmland	[animal/ha farmfield]	57.85

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Impressum

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