

PTT työpapereita 155
PTT Working Papers 155

**CLASSIFICATION OF AGRICULTURAL
ECOSYSTEM GOODS AND SERVICES
IN FINLAND**

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Helsinki 2013

This paper is part of a synthesis study “Integrated and policy relevant valuation of forest, agro-, aquatic and peatland ecosystems services in Finland” – funded by Maj and Tor Nessling Foundation and carried out by University of Eastern Finland and Pellervo Economic Research PTT together with collaborators from academic and expert organizations in Finland.

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PTT työpapereita 155
ISBN 978-952-224-138-2 (pdf)
ISSN 1796-4784 (pdf)
Pellervon taloustutkimus PTT
Pellervo Economic Research PTT

Helsinki 2013

Arovuori, K. and Saastamoinen O. 2013. CLASSIFICATION OF AGRICULTURAL ECOSYSTEM GOODS AND SERVICES IN FINLAND. PTT Working Papers 155. 23 p. ISBN 978-952-224-138-2 (pdf), ISSN 1796-4784 (pdf).

Abstract: This study aims to define, at a general level, agricultural ecosystem goods and services in Finland based on the international classification of ecosystem services (CICES). The analysis is based on the fact that the role of agriculture is to produce food and fibre, defined as provisional ecosystem services. Via the production of these provisional services, agroecosystems produce some other services and disservices, but also impact on and utilise ecosystem services from other ecosystems. Ecosystem services from agriculture are tied to agricultural production practises, and local and regional agricultural conditions. Farm level land use decisions form a dominant factor for the provision of a particular agricultural ecosystem services.

Keywords: *Ecosystem services, agriculture, food production*

Arovuori, K. ja Saastamoinen O. 2013. MAATALOUDEN EKOSYSTEEMI-PALVELUIDEN LUOKITTELU SUOMESSA. PTT työpapereita 155. 23 s. ISBN 978-952-224-138-2 (pdf), ISSN 1796-4784 (pdf).

Tiivistelmä: Tässä työssä määritetään yleisellä tasolla suomalaisen maatalouden tuottamat ekosysteemipalvelut kansainvälisen luokitusjärjestelmän (CICES) mukaisesti. Tarkastelun lähtökohtana on, että maatalouden perustehtävä on tuottaa ruokaa ja kuitua. Maatalouden tuottamat ekosysteemipalvelut ovat suoraan sidoksissa maatalouden tuotantopäätöksiin ja ne vaihtelevat maan käyttömuodossa tapahtuvien muutosten seurauksena. Maataloustuotannossa hyödynnetään muiden ekosysteemien tuottamia ekosysteemipalveluita. Toisaalta maatalouden harjoittaminen heikentää joidenkin toisten ekosysteemien tuottamien palveluiden laatua ja vähentää niiden tarjottua määrää. Viime kädessä maatalouden tuottamat ekosysteemipalvelut määräytyvät tiloilla tehtävien tuotantopäätösten perusteella.

Avainsanat: *Ekosysteemipalvelut, maatalous, ruuan tuotanto*

YHTEENVETO

Ekosysteemipalvelut ja niiden merkitys yhteiskunnan kokonaisyhyvinvoinnille tiedostetaan aikaisempaa paremmin. Muiden ekosysteemien tapaan myös maatalouden ekosysteemit tuottavat ja hyödyntävät erilaisia tuotteita ja palveluita. Näistä palveluista tärkein on ravinnon tuottaminen. Ravinnon tuottamisen yhteydessä syntyy kuitenkin myös muita ekosysteemipalveluita. Muista ekosysteemipalveluista merkittävimpiä ovat maataloustuotannon ympäristövaikutukset.

Suomen maatalouden tuottamat ekosysteemipalvelut luokitellaan tässä raportissa kansainvälisen ekosysteemipalveluiden luokitusjärjestelmän mukaisesti kolmeen pääluokkaan. Maatalouden tuotantopalveluihin luetaan laajasti ruuan ja rehun tuotanto, maataloudessa tuotetut kuidut ja orgaaniset lannoitteet sekä kasvi- ja eläinpohjainen energia. Maatalousekosysteemien tuottamia säätely- ja ylläpitopalveluita ovat esimerkiksi ravinteiden kierrätys, eroosion torjunta sekä maaperän rakenteen ylläpito. Kulttuuripalveluita ovat etenkin erilaiset maatalousmaisemat sekä esimerkiksi maatiaisrotujen ylläpito.

Maatalousekosysteemien ja niiden tuottamien palveluiden luonne vaihtelee eri alueilla. Maataloudessa ekosysteemipalvelut ovat ennen kaikkea sidoksissa maataloustuotannon luonteeseen, rakenteeseen ja tuotantosuuntaan. Merkittävin yksittäinen tekijä on maankäytön muoto. Maatalouden tuottamat ekosysteemipalvelut eroavat merkittävästi riippuen siitä, tarkastellaanko niitä monokulttuurisen kasvinviljelyn alueella vai nurmi- ja laidunvaltaisella karjatalousalueella.

Maatalouden tuottamat tuotantopalvelut ovat markkinahyödykkeitä. Niillä käydään kauppaa ja niiden arvo määräytyy markkinoilla. Maatalouden tuottamat säätely- ja kulttuuripalvelut ovat pääosin suoraan sidoksissa tuotantopalveluiden tuotantoon. Maatalouden tuotannon ohjaus tulee ensi sijassa markkinoilta. Maataloustuotteiden suhteelliset hinnat ohjaavat näin ollen myös muiden ekosysteemipalveluiden tuotantoa. Markkinoiden lisäksi maatalouden ekosysteemipalveluiden tuotantoon vaikuttavat maatilan liikkeenjohdolliset päätökset, maatalouspolitiikan ohjauskeinot, viljelijöiden henkilökohtaiset ominaisuudet sekä maantieteelliset ja alueelliset tuotanto-olosuhteet.

Maatalousekosysteemit hyödyntävät muiden ekosysteemien tuottamia palveluita. Samalla maatalouden harjoittamisesta aiheutuu etenkin rinnakkais ekosysteemien

kannalta haitallisia vaikutuksia. Maatalous hyödyntää muiden ekosysteemien tuottamia palveluita esimerkiksi pölytyksessä, tuholaistorjunnassa ja ravinteiden kierrätyksessä. Esimerkkejä maatalouden aiheuttamista haitallisista vaikutuksista muille ekosysteemeille ovat maataloustuotannon lajien määrää vähentävät vaikutukset, ravinnehuuhtoumat ja -valumat sekä maataloudesta aiheutuvat kasvihuonekaasupäästöt.

Maatalouden ekosysteemipalveluiden yleinen luokittelu on hankalaa. Paikallisten ja alueellisten ominaispiirteiden liittäminen yleiseen kansainväliseen luokitteluun ei välttämättä ole tarkoituksenmukaista. Tämä on huomattu myös kansainvälisesti. Maatalous on jätetty esimerkiksi YK:n alaisen kokonaisvaltaista ekosysteemipalveluluokittelua tekevän työryhmän (TEEB) työn ulkopuolelle. Tässä raportissa hyödynnetty kansainvälinen CICES-luokittelussa sisältää myös maatalouden tuottamat ekosysteemipalvelut. Raportissa luokittelukehikkoa on hyödynnetty varsin yleisellä tasolla. Sitä voidaan kuitenkin käyttää esimerkkinä siitä, miten kansainvälistä ekosysteemipalveluiden kartoittamiseen kehitettyä rakennetta voidaan soveltaa kotimaiseen maatalouteen.

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1. INTRODUCTION

Ecosystem services are gaining increasing importance in the global discussion. Ecosystem services form a complex and comprehensive net of interlinks within and between different ecosystems. However, often only the provisioning services are widely recognised. This is due to the fact that they are usually traded and valued in markets. Non-market and/or non-tradable ecosystem services lack the market prices. However, they often have significant impact on the overall welfare on society via their essential functions within the ecosystems.

One of the defining characteristic of the nature of ecosystem services is linked to land use. In agriculture land use decision are relatively short and directly influenced by human decision. In forestry or in peatlands, the changes in land use occur in longer term and, even when influenced by human decisions, have very different characteristics compared to agriculture.

The different role of agroecosystems compared to other ecosystems is widely recognised. Agriculture and agroecosystems are not included on the extensive work conducted under The Economics of Ecosystems and Biodiversity (TEEB)¹. However, the important role of agriculture as a provider of provisioning services, such as food, fibre and energy is acknowledged. Via the production of these provisioning services, agroecosystems produce some other services and disservices, but also impact on and utilise ecosystem services from other ecosystems.

According to OECD (2001, 2003) the main role of agriculture is to produce food and fibre. However, besides these market commodities agriculture provides positive and negative externalities and public goods. In the current discussion these elements are conceptualised as ecosystem services or disservices. These externalities and public goods are an outcome of a joint-production process of the market commodities. Thus, they are not produced without agricultural markets and the production of the market commodities.

According to Nelson et al. (2011, 150), in agricultural production, ecological processes are combined with human labour and inputs such as fertilizer and irrigation to produce agricultural goods used for food, fodder, fiber and fuel. The ecosystem processes that

¹ <http://www.teebweb.org/>

influence agricultural production include soil retention, pest control, nutrient recycling in the soil, water capture, and animal pollination. By contributing to agricultural productivity, these processes become ecosystem services for agriculture.

Swift et al. (2004, 121) defines agroecosystems as natural ecosystems that have been deliberately simplified by people to purpose of the production of specific goods of value to humans. The simplification down to one or a few productive plant or animal species is implemented for greater ease of management and specialisation of product to suit market demands. This is especially the case in highly mechanised forms of agriculture. In ecological sense the system may be seen as one which is maintained by a high frequency of disturbance.

The services from agroecosystems are mainly market commodities which are valued, priced and traded via open market mechanisms. Agricultural markets may, however, be constrained by policies with multiple policy objectives. These policy objectives include, among others, those targeted to enhance the positive and reduce the negative environmental impacts from agricultural production. These policies have direct impact on ecosystem services provided in a particular agroecosystem.

The production processes in agriculture are highly influenced by human management. If price mechanisms for market commodities fail or would not exist, the other types of ecosystem services provided from a particular parcel of land would be very different or non-existent. Similarly to other ecosystems also agroecosystems form a spatial hierarchy of systems, where a block of field represent the lowest level, open fields and cultivated area the middle level and watershed and landscape areas the upper level (Helenius et al. 2004). In addition, agroecosystems are tied not only to climatic and soil conditions, but also to different sectors of production, production practises, structures, cultures and management. These conditions may differ between countries, regions and even field plots. Thus, the common classification of agroecosystem services is difficult to compile.

In this paper, the aim is to briefly discuss on the main characteristics of agroecosystems in general and some of its specific features in Finland. Based on this discussion, the CICES (Common International Classification of Ecosystem Services) based classification is applied to the agroecosystem services in Finland.

2. AGROECOSYSTEMS

Food is produced primarily in intensively managed agroecosystems, but apart from areas devoted to wildlife conservation or recreation, or areas used for other production systems. The ubiquitous of agricultural production also means that other ecosystems are frequently adjacent to food-producing land and processes and practises of agriculture may therefore have a broader impact. This may involve spray drifts of pesticides, nutrient pollution and barriers to the migration and dispersal of organisms among remaining patches of non-agricultural land (Barker et al. 2010, 20).

In general, economic incentives, including market prices, taxes, subsidies and other signals play a major role in influencing the use of agricultural land. These market signals do not necessarily take into account the value of ecosystem services. Moreover, some of them unintentionally have negative side effects on the overall natural capital. Reforming and redirecting environmentally harmful subsidies in such areas as fossil fuels, agriculture, fisheries, transport and water could provide significant benefits for nature as well as for government budgets (de Groot 2010).

In MEA (2005) the contributions of agroecosystems to other types of ecosystem services have been recognised. Agricultural processes within agricultural systems can provide services that support the provisioning services which, according to Power (2010, 365), include pollination, pest control, genetic diversity for future agricultural use, soil retention, regulation of soil fertility and nutrient recycling. Whether any particular agricultural system provides such services in support of provisioning depends on management, and management is influenced by the balance between short-term and long-term benefits.

Management practises also influence the potential for disservices from agriculture, including loss of inhabitant for conserving biodiversity, nutrient runoff, sedimentation of waterways, and pesticide poisoning (Power 2010). Since agricultural practises can harm biodiversity through multiple pathways, agriculture is often considered anathema to conservation. However, as noted by Power (2010), appropriate management can ameliorate many of the negative impacts of agriculture while largely maintaining provisioning services.

The diversification in agroecosystem services arise mainly from different use(s) of agricultural land. The nature of farming systems impacts on provided services. While

the provisioning services, at large, are provided basically in all agricultural systems, the roles of regulating and maintenance as well as cultural ecosystem services may differ significantly with respect to different uses of land. These vary a lot by countries and within countries, due to the geographical, socio-economic and cultural differences.

The forms of agroecosystems are based on production and farm management decisions. Regionally, agroecosystems are dependent on the existing agricultural structures. However, within these structures, the farm level decisions continuously form the agroecosystems. Land use and especially the changes in the land use define the agroecosystem services from agriculture for a given time period. Often this time period is same as the growing season.

The formation of the agroecosystem and its links to other ecosystems and ecosystem services are described in Figure 1. Given the existing agricultural structures and production line of a particular farm, the farmer makes land use decisions on what to produce usually on annual basis. The decision is guided by the markets, policies and farmer's individual preferences. Farm management decisions are affected by expected profitability of the farming operations, and farmer's individual preferences. Thus, production decision and farm management decisions define the land use structure and thus, the nature of agroecosystems.

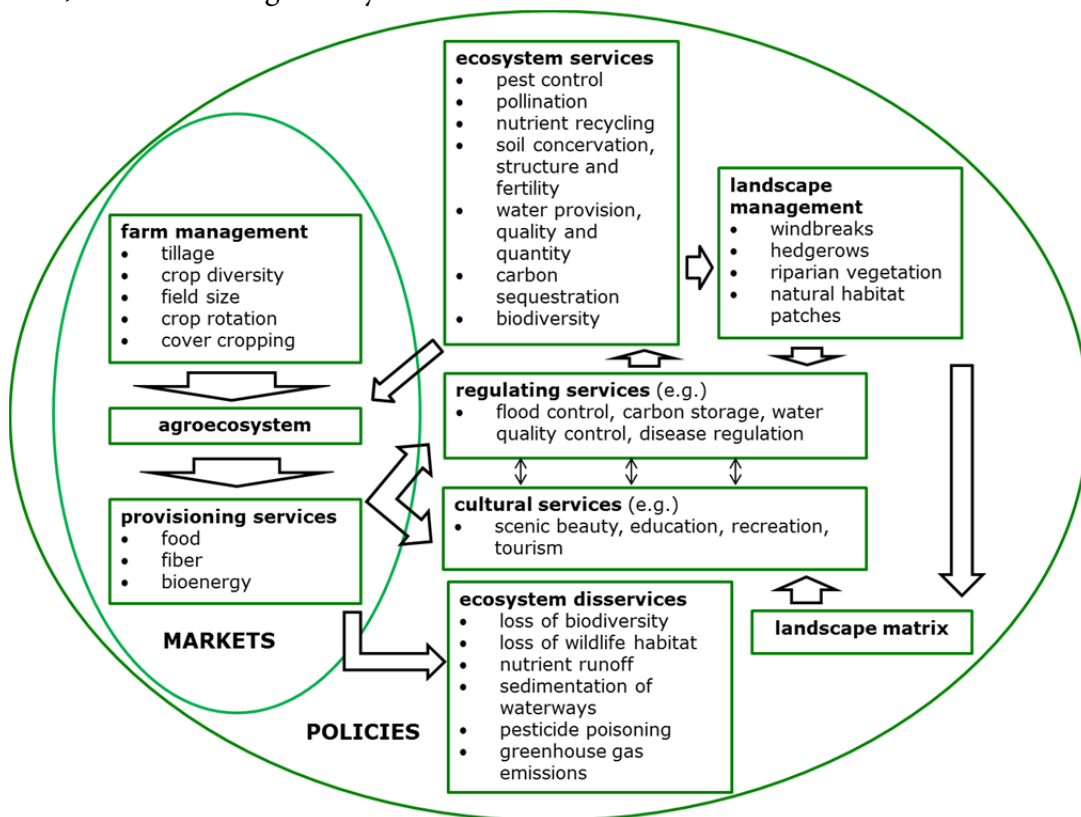


Figure 1. Impacts of farm management and landscape management on the flow of ecosystem services and disservices to and from agroecosystems (Source: modified from Power 2010, 2960).

In addition to production and farm management decisions, farmers also make landscape management decisions. These decisions are linked to production decisions, but also on the requirements and incentives set by society. Landscape management decisions are different depending whether farms operate near urban areas or at rural areas. In addition, landscape management decisions are directly tied to agricultural policy programs. In Finland, the agri-environmental support scheme covers more than 90 per cent of all utilised agricultural land (MTT 2013). Farmers are committed to utilise production practises and implement policy instruments that reduce environmentally harmful impacts or increase the positive impacts from agricultural production. The agri-environmental support scheme is a good example of a policy program that shapes the agroecosystem services and has direct impact on land use decisions, but also on the relation between agroecosystems and other ecosystems.

In addition to provisioning services and services in support of provisioning agroecosystems can provide a range of other regulation and cultural services to human communities. Regulating services from agriculture may include flood control, water quality control, carbon storage, and climate regulation through greenhouse gas emissions, disease regulation and waste management. Cultural services may include scenic beauty, education, recreation and tourism as well as traditional use. However, it is important to note that supporting services are different e.g. in monoculture crop production compared to livestock production. Pastures and meadowlands are very different agroecosystems compared to fields with barley or wheat. Thus, the structure of the agroecosystems and the provided services are related to the scope under which they are examined.

In maximizing the value of provisioning services, agricultural activities are likely to modify or diminish the ecological services provided by unmanaged terrestrial ecosystems. However, the appropriate management of key processes may improve the ability of agroecosystems to provide a broader range of ecosystem services (Power 2010, 2960). On-farm management practises can significantly enhance the ecosystem services provided by agriculture. Farmers routinely manage for greater provisioning of services by using inputs and practises to increase yields, but management practises can also enhance other ecosystem services (Power 2010).

3. MAIN CHARACTERISTICS OF AGRICULTURE IN FINLAND AND IMPLICATIONS TO AGROECOSYSTEM SERVICES

The share of agricultural land in Finland is approximately 2,3 million hectares covering around seven per cent of total area in Finland (Figure 2). The land use structure is very different in different parts of the country. In agriculture land use patterns have changed along the structural development. At highest level, the number of active farms was more than 300 000 during the early 1960s. In addition, most of the farms performed dairy husbandry in all parts of the country. The average farm size was very small, but farms were operating with multiple production functions including crop, grass, livestock and vegetable production.

The number of farms started declining more rapidly after 1995, when Finland joined the European Union. The EU membership meant open agricultural markets, lower agricultural product prices and less agricultural support and protection for Finnish agriculture. It forced Finnish agricultural sector to increase productivity and led to more specialised and professional production, but also to increasing number of part-time farming.

Despite of the rapid structural development, the level of agricultural production has, in general, remained at the 1995 levels. However, as measured by the number of farms, the production structure of Finnish agriculture has changed considerably. The share of livestock farms has fallen while the share of crop farms has increased. In 2012, crop farm presented 67 per cent and livestock farms 27 per cent of all active farms in Finland. In 1995, the shares were 39 and 52 per cent, respectively (MTT 2013, 16). The number of dairy farms fell from 22 200 farms in 1995 to around 9800 in 2012, while at the same time the total number of farms declined from 95 000 to approximately 58 000 (MTT 2013, 15).

The agricultural structures vary within the country. In Northern Finland farms specialized in crop production present 56 per cent of all farms, while the share of dairy farms is 28 per cent. In Central Finland, the shares are 66 and 17 per cent, in Eastern Finland 54 and 28 per cent and in Southern Finland 77 and 9 per cent, respectively. It is evident, that agricultural ecosystems are very different in different parts of the country.

Field and vegetation covers form a basic platform for agroecosystem goods and services. In the crop production areas, the dominant agricultural production practise is monoculture crop production with some annual variation of crops produced. In the areas with more livestock production, the land use structure varies in relative shares of crop covers, grass production, pastures and set-asides. Thus, production structures impact both on the production of ecosystem services, but also on the utilisation of ecosystem services provided by other ecosystems.

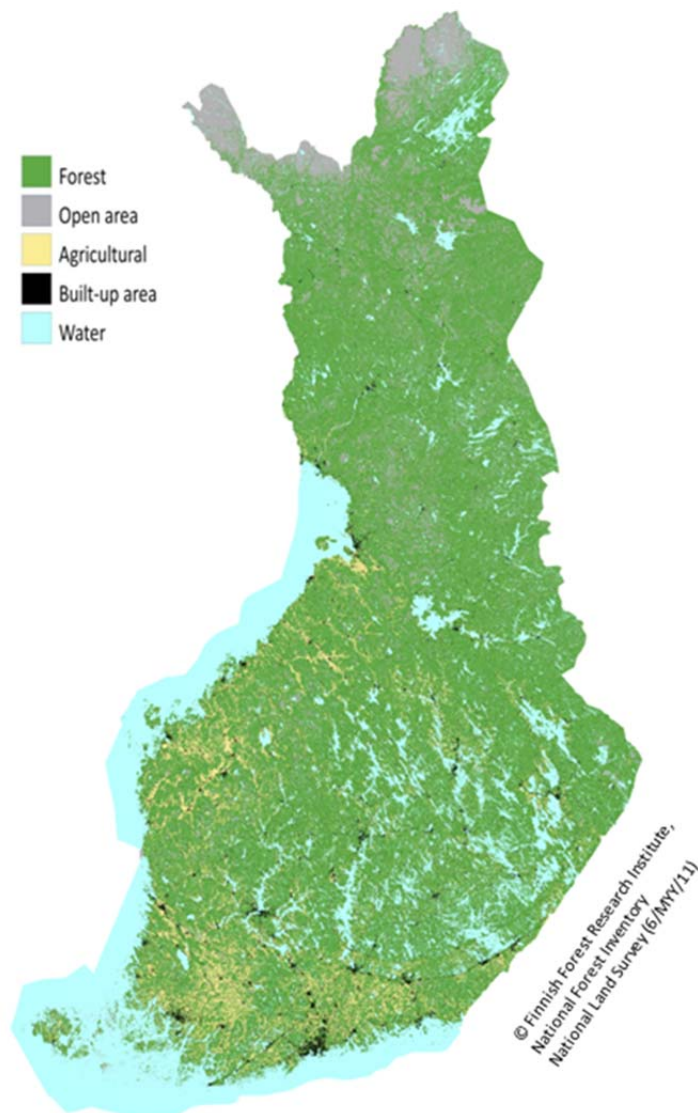


Figure 2. Main land cover categories in Finland (Source: Finnish Forest Research Institute, Saastamoinen et al. 2013)

4. CLASSIFICATION OF AGRICULTURAL ECOSYSTEM GOODS AND SERVICES IN FINLAND

The classification of agroecosystem services under a CICES classification is not straightforward. This is due to the fact that the classification aims to fit ecosystem services under universal categorisation. For agriculture this universal application is difficult to adopt. However, while emphasising the important role of provisioning services, Table 1 aims to compile a simplified and very general classification of some of the ecosystem services generalised to agriculture in Finland.

Provisioning services from agriculture are simply those produced for markets. In specialised production the provisioning service from a particular farm is directly linked to production line. In crop production these are different crops with some annual variation. In dairy husbandry, for example, milk is the main market commodity produced. However, specialised milk production has direct impact on land use in terms of pastures, grass production and feed use. In addition, while beef is as such a provisioning service produced in specialised farming, the majority of beef production in Finland is directly linked to milk production. Thus, meat is produced in a joint-production process with milk. In general, at the farm level, the ecosystem services provided may be totally different even in the neighbouring farms given the specialisation of a particular farm.

Ecosystems services on regulation and maintenance from agricultural ecosystems are often linked to field covers. Vegetative covers, e.g. crops, grass, pastures and meadows have important function e.g. in microclimate and water flow regulation. Vegetative covers reduce erosion, nutrient leaching, enhance nutrient recycling and filtrates impurities. Ecosystem specific impacts are linked to utilised production practises, including cultivation methods, crop selections, among others. Crop rotation and tillage have impacts on soil quality and soil structure. Most of these regulation and maintenance services are enhanced or controlled with targeted policy instruments.

Cultural services from agriculture interlink to historical heritage and the importance of agriculture in the rural areas. Typical form of agriculture has rapidly transformed from small-scale family farming to specialised agriculture. This has direct impact on agricultural landscapes, which are important cultural ecosystem services from agriculture. However, although the diversity of landscape has decreased along the more

specialised agriculture, it can be argued that both modern and historic agricultural landscapes and characters are valuable ecosystem services.

Development in production structures has also impact on the number of seeds and crops produced, as well as the number of breeds and animal species. Some species may have strong cultural influence and thus, the maintenance of these species is seen culturally important. A very good example is Finnish horse, which had very important role in agriculture and forestry in Finland prior to mechanisation. The number of horses started to decline as late as early 1960s, when tractors started to dominate.

The following CICES classification is a rare draft example on ecosystem services provided by agriculture in Finland. It could be further improved with more detailed analysis on the impacts of different agricultural production practises on soil structure, or on the theoretical possibilities of agricultural production in terms of biotic resources, among others. This application aims to mirror CICES classification on Finnish agriculture in a very practical manner. Thus, it should be noted that at the extreme, the level and amount of different ecosystem services from agriculture goes beyond the scope of the CICES classification in this paper.

Table 1. Draft CICES V4-based classification of agricultural ecosystem goods and services in Finland (Note: The numbering is not a part of CICES)

CICES Section 1 PROVISIONING GOODS AND SERVICES			
Division 11 Nutrition			
Group	Class	Class type	Sub-class type (Specification)
111 Terrestrial plants and animals for food	1111 Livestock and dairy animals	11111 Dairy cows 11112 Sucler cows 11113 Pigs 11114 Poultry 11115 Sheep	a) milk b) meat c) feed d) eggs
	1112 Crops	11121 Barley 11122 Wheat 11123 Oats 11124 Rye 11125 Caraway 11126 Buckwheat	a) animal feed b) flour c) flakes d) malt e) hulled grain f) seasoning
	1113 Vegetables etc.	11131 Roots 11131 Other	a) carrots, cabbage, yellow turnip, turnip, radish, beetroot b) tomato, cucumber, onion, lettuce, vegetable marrow

	1114 Oilseed, beans etc.	11141 Rape 11141 Turnip rape 11142 Horse bean	a) rapeseed oil b) protein feed
	1115 Beets, tubers etc.	11151 Sugar beet 11152 Potato	a) white sugar, molasses b) starch
	1116 Meadowgrasses	11161 Hay 11162 Clover	a) animal feed
Division 13 Materials			
131 Biotic materials	1311 Non-food vegetal fibre	13111 Linseed 13112 Hemp	a) linen, rope, straw
	1312 Non-food animal fibre	13121 Skin 13122 Wool	a) fur, skin, feather, down
	1313 Fertilizer	13131 Organic nitrogen fertilizers 13132 Nitrogen uptake by crops and forage	a) manure , legume crops, clover
	1314 Genetic resources	13141 Genetic diversity 13142 Transgenic crops 13143 Livestock breeds registered	a) number of plant varieties b) number of transgenic crops c) number of cattle, pigs etc.
	1315 Medicinal and cosmetic resources	13151 Oil- and medication plants	a) lubricants, lotions, fibres, medicines
Division 14 Energy			
141 Biomass based energy	1411 Vegetal based resources	14111 Biomass	a) fibre, straws, cereals
	1412 Animal based resources	14112 Gas based energy	a) biogases b) methane, ammonium
CICES Section 2 REGULATION AND MAINTENANCE			
Division 21 Regulation of bio-physical environment			
Group	Class	Class type	Sub-class type (Specification)
212 Dilution and sequestration	2121 Dilution, decomposition, remineralisation and recycling	21211 Nutrient recycling 21212 Nitrogen absorption 21213 Soil cultivation	a) soil phosphorus utilization, plant nitrogen absorption, soil spaciousness
	2122 Filtration	21221 Nutrient and impurities filtration	a) vegetative covers
	2123 Sequestration and absorption	21231 Rainwater and run-off absorption 21232 Floodwater absorption	a) vegetative covers, retentive soils

Division 22 Flow regulation			
221 Air flow re- gulation	2211 Rural microclimate regulation	22111 Vegetative covers 22112 Windbreaks	a) vegetative covers, set-aside, meadows and pastures
	2212 Urban microclimate regulation	22121 Vegetative covers	a) vegetative covers beside urban areas, meadowlands
222 Water flow regulation	2221 Attenuation of runoff and discharge rates	22221 Border strips	a) breaks for nutrient leaching, flood control
	2222 Water storage for flow regulation	22221 Vegetative covers	
	2223 Coastal protection	22231 Border strips 22232 Cover cropping 22221 Vegetative covers	
223 Mass flow regulation	2231 Erosion protection	22311 Pastures 22312 Vegetative covers 22313 Cover cropping 22314 Hedgerows	
Division 23 Regulation of physio-chemical environment			
231 Atmos- phere regulation	2311 Local and regional climate regulation	23111 Set-aside 23112 Vegetative covers 23113 Pastures 23114 Meadowlands	a) carbon storage
232 Water quality regulation	2321 Water purification and oxygenation	23211 Vegetative covers	a) crop rotation b) tillage, nutrients
233 Pedogenesis and soil quality regulation	2331 Maintenance of soil quality	23311 Production practices 23312 Soil growth ability	
	2332 Maintenance of soil structure	23321 Crop rotation 23322 Set-aside 23323 Production practices	
Division 24 Regulation of biotic environment			
241 Lifecycle maintenance and gene pool protection	2411 Pollination	24111 Cropping 24112 Pastures 24113 Meadows	
	2412 Seed dispersal	24123 Seed renewal	
	2413 Maintaining nursery populations	24131 Number of crops/plants	

	2414 Biological control mechanisms	24211 Species protection 24212 Nutrient recycling	
242 Pest and disease control (incl. invasive alien species)	2421 Seed purity	24211 Seed renewal 24212 Seed control	
	2422 Pest control	24211 Farming practices	
	2423 Invasive and alien species control	24232 Crop protection 24232 Competitive species	
CICES Section 3 Cultural services			
Division 31 Symbolic			
Group	Class	Class type	Sub-class type (Specification)
311 Aesthetic, Heritage	3111 Landscape character	31111 National 31112 Regional	a) historic, modern
	3112 Cultural landscapes	31111 Fields 31112 Villages	a) fields, pastures, meadows b) buildings, streets, lanes and alleys
312 Spiritual	3121 Charismatic or iconic wildlife or habitat	31211 Charismatic animal species 31212 Traditional biotopes	a) highland cattle, native rye, Finnish horse b) number of species, forest patches
Division 32 Intellectual and Experimental			
321 Recreation and community activities	3211 Charismatic or iconic wildlife or habitats	32111 Habitats for peacocks and pheasants, among others	a) bird watching b) conservation activities c) volunteering
	3212 Prey for hunting, fishing or collecting	32121 Recreation 32122 Hunting	a) angling b) shooting
	3213 Landscape character for recreational opportunities	32131 Rural tourism 32132 Horse riding 32133 Bird watching	
322 Information & knowledge	3221 Scientific	32211 Agricultural research	
	3222 Education	32222 Agricultural extension	

5. CONCLUSIONS

This paper briefly discusses on the main characteristic of agroecosystems and ecosystem services from agriculture in Finland. It opens the discussion, whether ecosystem services from agriculture fit to the categorization of ecosystem services in general. Further, it classifies agroecosystem services under a CICES-classification. Given that ecosystem services from agriculture are often discussed only based on the positive and negative impacts of agricultural production on biodiversity or on the environmental quality of land and water, no actual examples of this type of broader classification seem to exist. Moreover, given the role of agriculture as a provider of food and fibre, it can be concluded, that all ecosystem services from agriculture are related to food production function. Thus, the most essential human benefit from agroecosystem comes from the provisional services.

Structural development in agriculture and the changes in production practices have had significant impact on the level and number of ecosystem services from Finnish agriculture. In addition, these impacts have been very different at different regions. More concentrated and specialized farming has, to some extent, decreased the provision of the ecosystem services in certain regions. At the same time, the regional and local impacts of ecosystem disservices from agriculture have changed.

The role of agricultural policies is important. In agricultural policy reforms, policy programs have been shifted from production oriented policy instruments towards specialized instruments with targeted policy objectives. In Finland, the Agri-environmental support scheme aims to reduce the negative environmental impacts from agricultural production and enhance the positive impacts. Most of the ecosystem services under the regulation and maintenance in CICES classification are covered in the scheme. However, even more emphasis is put on the control of disservices from agriculture.

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