

BETWEEN SMALLHOLDER TRADITIONS AND “ECOLOGICAL MODERNISATION” – AGRICULTURAL TRANSFORMATION, LANDSCAPE CHANGE AND THE CAP IN AUSTRIA 1995–2015

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Abstract: The paper explores transformations in agriculture during the period 1995–2015 and shows their impact on rural landscapes in the case of Austria. When Austria joined the European Union in 1995, this meant a minor gash in agricultural politics, from broad support of smallholder agriculture to a programme of modernisation and rationalisation. Austrian politicians defined this shift as a process of “ecological modernisation” (Fischler et al. 1994), incorporating agri-environmental schemes as instruments and modifying existing programmes of direct payments. The survey forms the groundwork for a discussion on landscape effects of the CAP as an “ecological” modernisation programme and possible impact of the CAP-reform 2020.

Key words: European Common Agricultural Policy, cultural landscape, agriculture, agri-environmental schemes, landscape policy

Zusammenfassung: Der Aufsatz untersucht die Effekte der GAP auf Agrarlandschaften am Beispiel Österreichs, das der EU 1995 beigetreten ist und seither umfangreiche Veränderungen innerhalb seiner Agrarstrukturen erfahren hat. Der österreichische Weg der Strukturanpassung wurde unter dem Titel der „ökologischen Modernisierung“ (Fischler et al. 1994) bekannt und ist durch die Einführung von Agrar-Umweltprogrammen gekennzeichnet. In der Untersuchung werden die Veränderungsprozesse innerhalb der österreichischen Landwirtschaft nachgezeichnet und deren Wirkungen auf die österreichischen Kulturlandschaften skizziert. Auf dieser Grundlage werden die Konzeption der GAP im Allgemeinen sowie mögliche Wirkungen der Reform GAP 2020 hinsichtlich ihrer Landschaftseffekte zur Diskussion gestellt.

Schlüsselwörter: Europäische Gemeinsame Agrarpolitik, Kulturlandschaft, Landwirtschaft, Agrarumweltmaßnahmen, Landschaftspolitik

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1. Introduction

Agriculture is an important factor shaping the European rural countryside. Consequently, agricultural policies function as a steering instrument for cultural landscape development, directly by supporting certain management practices, but even more deviously by affecting the structures and modes of agricultural production. Agricultural policies therefore, to a certain degree – obviously are *also* landscape policies. This is, by all means, the case with the European Union's Common Agricultural Policy (CAP), where landscape- and environmental issues take an outstanding place alongside economic and social subjects (European Commission 2013). Lefebvre et al. (2012) have observed for the bygone CAP period 2007–2013, that 40% of measures in agri-environmental programmes had been landscape-related, affecting an area of 40% of overall farmland in the European Union. Beyond, they have hinted at numerous non-targeted measures with potential influences on development of rural landscapes, above all the programme of direct payments (“single payment scheme”).

1.1 European agricultural policies and the programme of “ecological modernisation”

However, landscape issues are a rather young topic in European agricultural programmes. Their introduction goes hand in hand with a general change of course in policies that took place only a few decades ago. While the European Union had established a Common Agricultural Policy already back in the early 1960s², the conception of CAP in its current form has its origins in the early 1990s. This is when policies moved away from mainly subsidising agricultural production towards an integrated policy for rural areas and environmental issues found their way into European agricultural programmes (Hovorka 1998). Re-formation of agricultural policies at first glance was a reaction to ecological crisis that mainly resulted from agricultural modernisation and the industrialisation of agricultural production urged throughout the period after the Second World War (cf. Krausmann et al. 2003). Concretely, it was two occasions that (both in 1992) promoted something like a “paradigm shift” (Kuhn 1962):

- a) The United Nations Conference on Environment and Development, UNCED, in Rio de Janeiro set environmental issues globally on the political agenda.
- b) Yet at the same time, negotiations on the General Agreement on Tariffs and Trade (GATT – Uruguay Round) throughout 1992, by stipulating liberalisation and globalisation of agrarian markets and declaring product-based grants as a factor distorting competition. Agricultural subsidies from this point on had to link to environmental and/or regional development criteria to fit the free market standards of the World Trade Organisation WTO.

Based on EC-regulation 2078/92, this was the starting point for the design of agri-environmental programmes all over the European Union (Schuh 1999; Hovorka 1999). Farm payments were partly decoupled from production and maintenance of the rural countryside eventually become subject of subsidisation (ibid.). Therefore, agricultural policies redefined the role of farmers in rural development from being solely producers of agricultural products to also including overall management of the rural countryside (Buckwell et al. 1997). European countries established agri-environmental schemes as pivotal instruments for the linking of agricultural production, protection of rural environments and nature conservation targets, gaining increasing importance until the recently stated CAP-reform 2020.

Theoretical backbone of the CAP from 1993 onwards is rooted within the concept of “*ecological modernisation*” (EM), as elaborated by German theorists since the early 1980s (e.g. Huber 1982, 1984, 1985; Jänicke, 1985).³ EM is seen as a structural approach to transform economies in

² Ideas of forming a common European market for agrarian goods, financial solidarity between member states, and an improved competitiveness of the European agriculture shaped the original basis of CAP (Hofreither 1999; European Commission 2012).

³ The basic idea behind the EM-concept, formulated by Huber (1982), is founded on the belief that environmental problems caused by industrial production could be solved via “development and the application of more sophisticated technologies” (Murphy 2000: 2). Gouldson & Murphy (1996) have identified three projects that promote EM:

a more ecological direction. Starting points are localised in society and its institutions on all levels of scale, from individual behaviour to the national state (Murphy 2000). However, as Jänicke (1988) has reminded us, one central concern of EM is the restructuring of national economics. Referring to EM-theorists, it is the duty of the national state to encourage and support individuals, enterprises and institutions to fulfil the “*ecological switchover*” (Huber 1982): “*The state should explicitly intervene in the market in order to achieve economic growth and environmental protection*” (Murphy 2000: 4). This makes EM a pragmatic political programme that aims at bridging the gap between the goals of economic development and sustaining of natural environments. EM operates by the introduction of instruments, such as taxes, agreements, environmental impact assessment and the implementation of processes of governance (ibd.). The political relevance of EM for European policies is underlined by the fact, that it was introduced as a guiding principle into the EU’s Fourth Environmental Action Programme in 1993 (Pepper 1998). Subsequently, the concept found its way into several sectoral programmes, first of all European agricultural policies. This seems obvious, as the CAP not only had traditionally been a field of broad stately interventions, but also due to the fact, that agriculture is a sector being strongly linked to environmental issues (Schermer 2005). The theoretical framework of EM provides argument for policies promoting open agricultural market economies and yet supporting sustainable modes of production and the maintenance of ecosystem services.

To this day, “ecological modernisation” is well established as a general theoretical groundwork for European agricultural policies, defining the mainstream of ideas in questions of rural development and management of the countryside. There can be little doubt that the *political* landscape has fundamentally changed due to the “ecological shift”. But how have (in return) the *physical* landscapes in the European Union been developing under the influence of ecologically orientated CAP policies throughout the period of EM? Did modernisation processes in agriculture take a general turnaround, compared to the preceding decades? Is there evidence for changes in rural landscape patterns throughout this latest stage of “green” modernisation, indicating significant effects on their variety and diversity? And if so, how can these changes be related to policy frameworks?

1.2 Case example Austria

The following paper investigates those questions on the case example of Austria. Austria’s admission to the EU in 1995 and the negotiations in preparation took place under immediate influence of those processes of “ecological modernisation” in the European agrarian system. When joining the EU, Austria presented the most comprehensive, most complex and expensive agri-environmental scheme all over the European Union (Groier 1999). The Austrian Programme for Environmentally Responsible Agriculture (ÖPUL) consisted of 25 measures, aiming at an overall extensification in agricultural production and considerable landscape and environmental effects. The programme not only was an output of lengthy accession talks, but also the product of earlier developments and adaptations within the Austrian agrarian systems and agricultural policies since the late 1980s. Back in 1987, the term of an “*eco-social market economy*” (Riegler 1987) had occurred in Austrian agricultural policies and with it the ideas of a “*multifunctional agriculture*” (Renting et al. 2009) that provides various “*ecosystem services*” (Fischler 1994, cited in: Krammer & Rohmoser 2012). All these concepts have found their way into ÖPUL and made it the prototype for a modern, ecologically orientated agricultural programme with tight relationships to landscape issues (Groier 1999). Through that position, Austria at an early stage had retained the cutting edge of an environmentally orientated agricultural policy that later came to characterise the CAP-reforms from the 1990s onwards and eventually became mainstream within the CAP policies (Fischler et al. 1994). Several observers have been communicating the “*Austrian way*” of reforming agriculture and the agrarian system as a “success

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- Restructuring of production and consumption towards ecological goals. This involves the development and diffusion of clean production technologies and decoupling economic development from the relevant resource inputs, resource use and emissions;
 - ‘economising ecology’ by placing an economic value on nature and introducing structural tax reform;
 - Integration of environmental policy goals into other policy areas.

story” (Fischler 2015, Schultes 2015, Linsinger 2015), effectively linking environmental goals to economic development in agriculture. Besides, the strategy helped securing respectable amounts of subsidies for Austrian agriculture and helping modernising it. Coincidentally, modernisation processes had drawn the map of Austrian agriculture newly from scratch. New types of farming have appeared on the landscape, while others, particularly smallholder households and part-time farms – have gradually started disappearing from the scene. Processes of commercialisation have been characterising the development of the agricultural sector for the past two decades, including agricultural production as well as services for the maintenance of the rural landscape. And last but not least, as Krammer & Rohmoser (2012) have pointed out, that the decade of the 1990s was a period where over 60,000 (about a quarter of all) farm businesses were let down:

“The period of eco-social politics in combination with the joining of the European Union would instigate the worst decade for peasant farming, taking the number of abandoned farms as an indication” (Krammer & Rohmoser 2012: 147).

The paper traces these overall changes in agriculture throughout the period 1995–2015. It gives an outline of modernisation processes in agriculture, explores their impact on rural landscapes and discusses them in context to “*ecologically oriented*” agricultural policies of CAP. Through an aggregated and synoptic perspective, coincidences between dynamics of (diminishing) landscape diversity and of agricultural concentration processes can be discovered that characterise the era of “ecological modernisation” in Austria. With focus on two central programmes (ÖPUL, single farm payment), the inquiry asks for direct and implicit mechanisms through which CAP has been influencing agrarian structures, and in a further context contributing to the development of agricultural landscape diversity. Results from this case study form a groundwork for a brief discussion on possible landscape effects of the current CAP 2014–2020.

2. Material and methods

Research for this survey uses a “mixed methodology” (Kuckartz 2014), consulting empirical evidence from different sources and levels of scale. These include synoptic analysis of statistical data, a review of policy programmes and evidence from field study research. Modernisation processes in Austrian agriculture were investigated through selected statistical parameters, including inputs and outputs of agricultural production, ratio of land use and land cover and the structure of land tenure. Data material was provided by the Austrian Ministry of Agriculture – as published in annual reports (“Grüner Bericht”) – and by the national office for statistics (“Statistics Austria”). Those data, which are available at the level of provinces ($n = 9$) were obtained for 1955 to 2015 in 5-year steps, aggregated and organised in panel design, in order to outline long-term dynamics for the observed parameters. Inquiry loosely refers to a study published by Krausmann et al. (2003), where agricultural industrialisation processes and their impact on land use change in Austria 1950–1995 were analysed.⁴ To relate agricultural modernisation to landscape changes, we contrast our results to data collected within the recurring evaluations of the Farmland Bird Index (FBI). These data are available for Austria for the years between 1998 and 2014. FBI functions as an aggregated indicator to benchmark quality and diversity of agricultural landscapes (Teufelbauer 2012, 2015). Additionally to large-scale analysis, results from a regional case study on land use change and its impact on vegetation patterns are presented. This serves to illustrate effects of modernisation processes on landscape level, particularly setting the focus on a remote and mountainous area.

Policy programmes were analysed in a two-step procedure. First, they were investigated on their contents regarding landscape issues. In a second step, the focus was set on structural analysis of programme designs. This was complemented by a review of various evaluation studies. For investigation of these documents, we applied the methodological framework of interpretative content analysis, as described by Mayring (1994).

⁴ Krausmann et al. base their studies of agricultural systems on the concepts of “social metabolism” and “land use/land cover change” (LUCC) (see also: Krausmann 2004; Sieferle et al. 2006). We capture elements from these frameworks for our analysis of the succeeding period 1995–2015.

3. Austrian landscape and agriculture

Austria is located in the centre of Europe, stretching along the eastern Alps in an east-west direction. About two-thirds of the area is part of the Alps, while minor parts contain lower mountain ranges of the alpine foothills and the bohemian shield. Only the very eastern areas reach out into the Pannonian lowlands. Due to its geographical position and topographical conditions, Austria has a share in four climatic zones (Temperate-Atlantic, Pannonian, Illyrian and Alpine climates), and it participates in at least three cultural circles (Bavarian, Slavonic, Romanic culture). This forms the groundwork for a broad diversity of natural and cultural landscapes (Wrbka et al. 2005).

3.1 From smallholder heritage to “ecological modernisation”: Austrias’ path into EU and the CAP

Owing to its mountainous conditions, but also due to historical reasons, Austria’s agriculture has traditionally been characterised by low average farm sizes with high percentages of part-time farming, coupled to a rather “retarded process of modernisation” in the agrarian systems (Bruckmüller 1979; Sieferle et al. 2006). Many mountain regions saw mixed, self-support orientated agriculture as the prevalent type of farming until the 1960s. Considerable processes of concentration in agricultural production had not started before the late 1950s (Garstenauer et al. 2010a). This was also a result from post-war agricultural policies, supporting smallholder farmers particularly in mountainous and remote, less favoured areas in order to secure settlement, infrastructure and the open farmland countryside. Beyond that, developing tourist industries had recognised the cultural landscape as an important resource (Puwein 1993). Until the early 1980s, Austrian politicians understood agricultural policies essentially as social policies (Hanisch 2002). This found its expression in the mountain farmers’ programme (MFP), based on the mountain farm cadastre (1961). The MFP described a system of direct payments for farmers, iteratively staggered to individual difficulties (Salzer 2009). Although the post-war period saw strong promotion of mechanization, specialisation, intensification and the integration into commercial market structures (Komlosy 1988; Garstenauer et al. 2010b), on the eve of joining the European Union, Austrian agriculture was still characterised by the following features:

- a) farm sizes far beyond the European average,
- b) comparatively low productivity and high producer prices, compensated by
- c) oversized budgets for expensive market orders (Hovorka 1999).

Coincidentally, this system had contributed to the maintenance of numerous richly structured, varied and diversified, peasant cultivated landscapes with many persistent, so-called “traditional” elements (Fink et al. 1989).

Transformations in Austrian agricultural policies evolved during the 1980s, when agrarian politicians of the time introduced the concept of eco-social market economy. Josef Riegler, then Minister of Agriculture, based the manifesto for an eco-social agricultural policy (1987) on three pillars:

- 1) Partly decoupling of subsidies from production outputs
- 2) Reward of environmental achievements
- 3) Alignment towards an integrated policy for rural areas

The social-ecological market economy concept may be seen as a reaction on obvious crisis of the Austrian agrarian system, finding its expression in exploding cost for market regulations, increasing problems with over-production and upcoming evidence for ecological crisis in agriculture (Rammer 1999). The new agenda declared a programme of “ecological modernisation”, linking up to this point the conflicting issues of (neo-liberal) policies to environmental goals. In the words of Josef Riegler:

“Let us make the market protect the environment, let us make environmental protection an attractive product! This is the philosophy of social-ecological market economies, put straight to the point” (Riegler 1990, cited in: Salzer 2015: 81).

To specify this, agrarian politicians connected the social-ecological market economy to a strong landscape agenda (ibid.). Agricultural policy became landscape policy by defining “multifunctional” agriculture as a provider for numerous “ecosystem services” (Krammer & Rohrmoser 2012: 145).

3.2 Policy programmes according to CAP from the mid 1990s onwards

According to the framework design of CAP, Austrian policy programmes ground on the pillars “Direct payments and Market support” (1) and “Rural development” (2). Major effects on landscape issues result from the agri-environmental scheme ÖPUL and the EU-single farm payment.

The Austrian programme for environmentally responsible agriculture (ÖPUL)

Output of the EM-agenda and central instrument for its implementation was the agri-environmental scheme ÖPUL. ÖPUL represents a horizontal approach, aiming at an “overall extensification of agricultural production and comprehensive adaptation of Austrian agriculture to ecological standards” (Hovorka 1999:174). Further superior goals comprise expansion of organic farming practice, preservation of biodiversity and maintenance of traditional rural landscapes (ÖPUL, EC-Regulation 2078, 1995). Therefore, ÖPUL incorporates a pronounced focus on subjects of cultural landscape and nature conservation (Hovorka 1998) by supporting a number of measures that immediately or indirectly target on cultural landscape effects (see Fig. 1).

Type of measure	Description	Funding (in %)
Elementary support for environmentally compliant agriculture	Requirements: minimum area under cultivation of 2 ha, maximum intensity of 2 livestock units per ha, including grassland and arable land managed by farm holding	22
Measures supporting organic farming practice	cf. the guidelines on organic farming VO 2092/91	18
Specific measures supporting extensive, ecologically adapted production	<ul style="list-style-type: none"> • Waiver/reduction of yield-increasing supplies on grassland • Waiver/reduction of yield-increasing supplies on arable land • Waiver of fungicide • Waiver of herbicide • Transformation of arable land to grassland 	40
Measures supporting cultural landscape protection and nature conservation	<ul style="list-style-type: none"> • Maintenance of open landscapes in sloping sites • Introduction and maintenance of landscape elements • Preservation/management of nature protection areas • Cultivation of old varieties • Management of alpine pastures • Maintenance of orchard meadows 	20

Fig 1. Excerpt from the programme design of ÖPUL. Sources: Austrian Ministry of Agriculture and Environment 1995, 2015; Salzer 2009

The programme has been established in a number of versions, adapted to the framework conditions of the particular CAP programme periods. In 2011, 76 percent of the Austrian farm households, managing 89 percent of the farmland, took part in the ÖPUL. The average support was €4.773 per household and year. 20% of overall payments were tied to specific measures supporting landscape and nature protection goals (Source: Austrian ministry of Agriculture and Environment 2015).

From the Austrian mountain farmers programme to the EU-single farm payment

Another modification within the agrarian system concerned the mountain farmers programme (MFP). In its original version, the MFP had been a support for farmers working under difficult natural and/or spatial conditions to balance their disadvantages and to encourage them to keep up their businesses. Direct support of mountain farming reaches back to the 1930s and was refined until the 1970s, when a comprehensive programme package was introduced (Salzer

2009). MFP had based payments on a complex system, regarding several parameters such as topography, climate and soil as well as internal and external transport situation. On this groundwork, the MFP generated an individually tailored rating for each single farm. Difficulty was valued into four categories, but payments were also related to the income of the farm household so that farmers with lower incomes gained higher support. This made the MFP also a social concept that aimed at the balancing of income disparities between farmers in favoured areas and those who had to deal with difficulties in mountainous regions (ibid.).



Fig 2. Maintenance of alpine meadows, supported by ÖPUL funding. Source: Kurz 2011

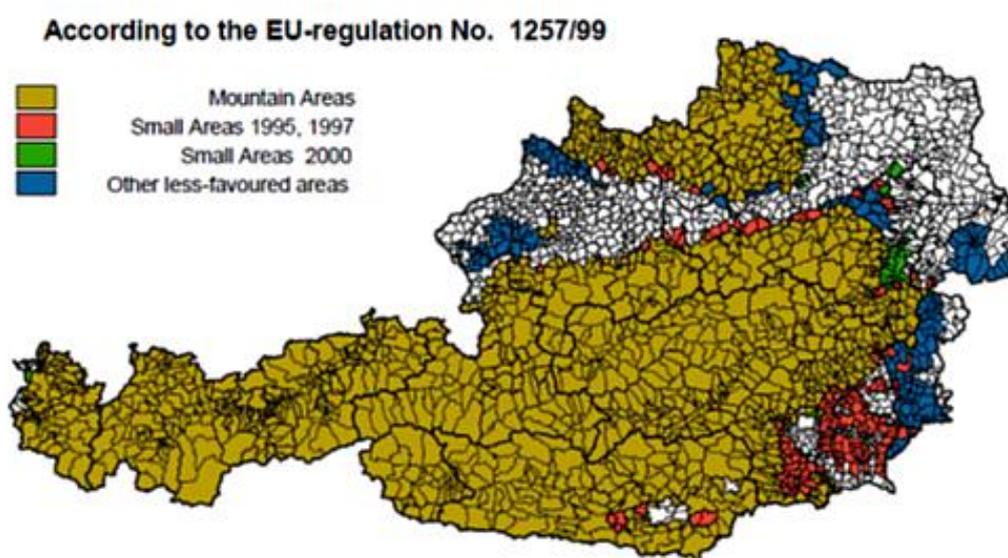


Fig 3. Mountain and other less-favoured areas in Austria, according to EU-regulation Nr. 1257/99. Source: Austrian Ministry of Agriculture and Environment)

The MFP was adapted to a simplified system that accords to European CAP criteria. The European Union urges a regionally based model for direct payments to farms in “*naturally less favoured areas*” (EU-Regulation 75/268/EWG). Payments have to be size-related and there is a minimum level of 3 hectares to achieve support (compared to the former MFP: 0.5 hectares with a cap of 10 ha). The “*new mountain farm cadastre*” (2001) sets the benchmark for the “*Ausgleichszulage*”, a single farm payment for farmers situated in less favoured areas. In contrast to the old version, the new programme contained a predefined spatial zoning concept including not only mountain areas, but also other areas affected by specific disadvantages. An essential difference to the old system is that each farm sharing in one of these zones is able to take part in the programme and get support in relation to its size (Salzer 2015).

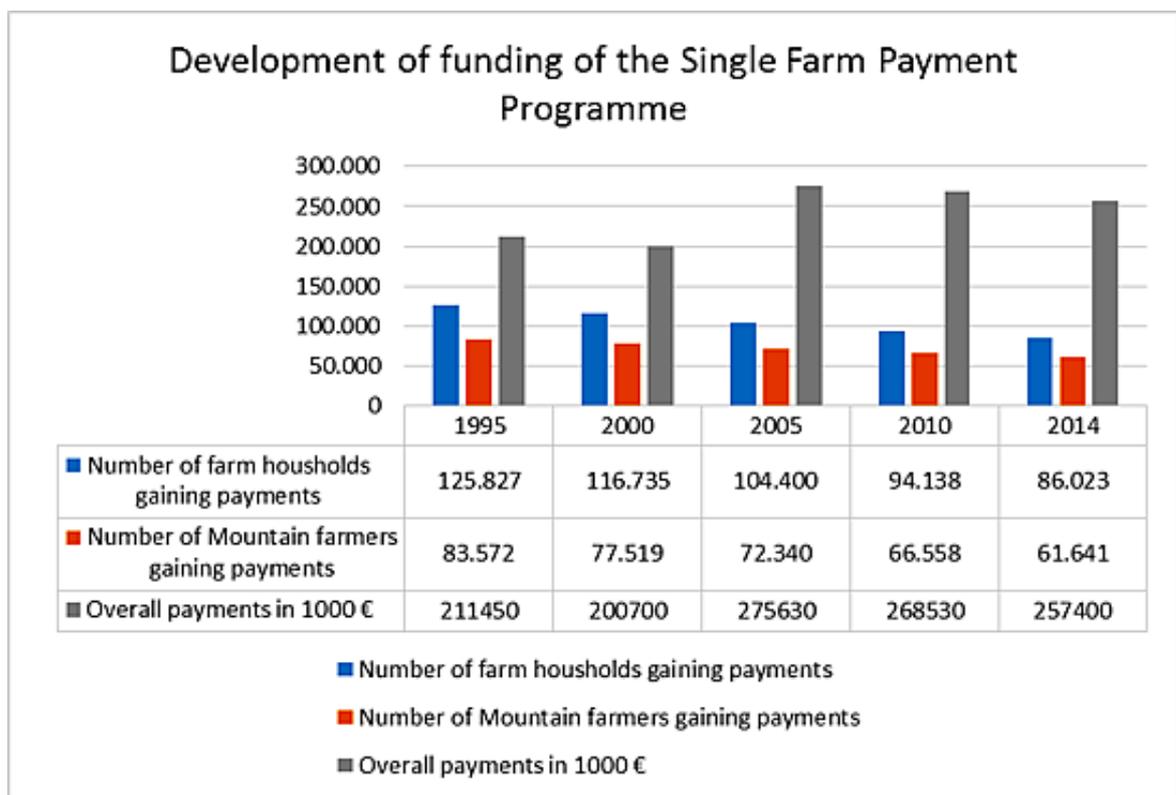


Fig 4. Development of funding in the Single Farm Payment Programme 1995–2014. Source: Austrian Ministry of Agriculture and Environment 2015

4. Changes in Austrian agriculture and rural landscapes 1995–2015: Synopsis

4.1 Developments in agricultural production

Despite pronounced differences between lowlands and mountain areas, Austrian agriculture ran through typical patterns of modernisation after the Second World War. Similar to most other European countries, these were principally driven by the industrialisation of production (cf. Sieferle et al. 2007). Krausmann et al (2003) have characterised agricultural industrialisation in Austria between 1950 and 1995, carving out the attributes:

- Accelerating rates of inputs and outputs in agricultural systems, causing an overall intensification of land use
- Specialisation and spatial segregation of different sectors, due to mechanisation and rationalisation in the techniques and organisation of production

- Spatial polarisation into areas of crop farming and livestock breeding, following disparate natural preconditions. (cf. Krausmann et al. 2003)⁵

In the following, we examine how those dynamics have been proceeding during the period of “ecological modernisation” 1995–2015, in search for continuities as well as possible breaks in developments.

a) Inputs and outputs in agricultural production

Developments in agricultural systems at a first level can be expressively earmark by data on the inputs in and outputs of production. Fig. 5 to Fig. 7 present trajectories of input parameters, containing: 1) amount of artificial fertilizers utilized, 2) the number of livestock bred for dairy production (representing the main branch of upland agriculture) and 3) human labour input in agricultural production. All these parameters show remarkable declines throughout the investigated period. Usage of artificial fertilizers (NPK) as a parameter for the overall intensity of agricultural land use, shows a decline of -30% by absolute numbers between 1995 and 2015. The number of milk-cows – representing the highly important dairy sector – has diminished from 750,000 to 530,000, equally showing a minus of 30%. Thirdly, the overall input of human manpower occupied within management of agricultural land has declined from 0.9 full-time equivalents/10ha in 1995 more than 50% to 0.43 in 2015.

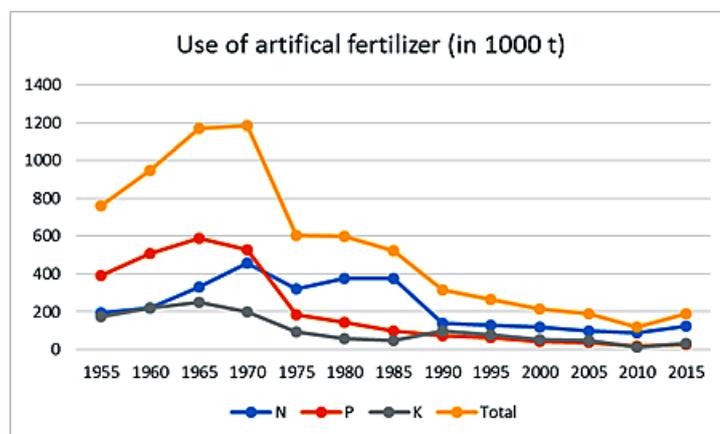


Fig 5. Use of artificial fertilizers in Austria 1955–2015.

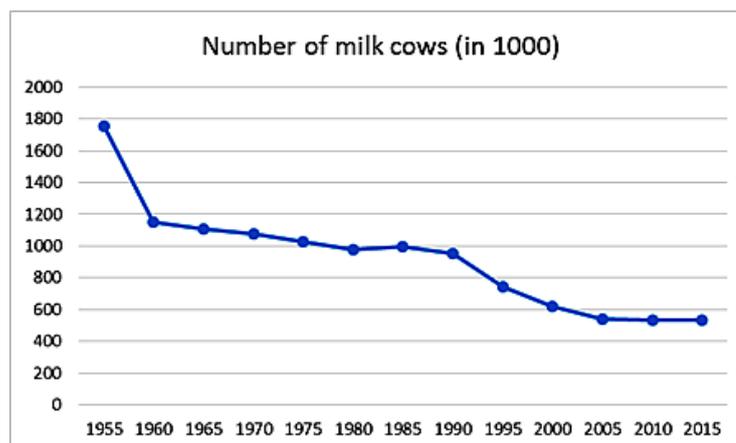


Fig 6. Number of milk cows 1955–2015.

⁵ As major driving forces for industrialisation, they identify processes of mechanisation, mainly advanced by the usage of increasing amounts of fossil fuels and other external energy sources. These have been promoting concentration and spatial segregation of production (Krausmann et al. 2003: 11f.).

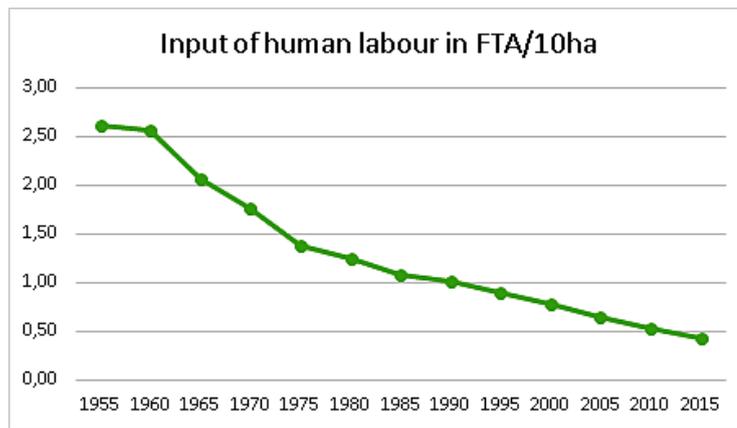


Fig 7. Full-time equivalents occupied in the management of agricultural land in Austria 1955–2015.

All these parameters on the input-side provide distinct evidence for processes of extensification in agricultural production systems throughout the past two decades, hinting to achievement of the politically defined goal of an overall extensification (Austrian Ministry of Agriculture and Environment 2015). However, considering developments from a long-term perspective, it also reveals that the observed tendencies had already set in long before the era of “ecological modernisation”: Inputs of artificial fertilizers had been continuously diminishing from the 1970s after a peak in the late 1960s – possibly as a result from general saturation of metabolic circles (cf. Krausmann et al. 2003). The number of milk cows saw a steady decline from the 1950s, as well as human labour input. Both parameters obviously indicate extensification by absolute numbers, but even more they hint to processes of rationalisation and mechanisation of agricultural production (cf. Krausmann et al. 2003; Kurz 2010). This is clearly the case with labour input, which progressively gets replaced by machines and though there are no reliable data available on this case by increasing input of energy from external sources (e.g. fossil fuels). Livestock, on the other hand, follows another logic that will be discussed further below.

Estimation of the extensification-effects becomes more conclusive when looking at the output side of agricultural production. In this area, virtually all of the goods show remarkable rates of growth. Fig. 8a/8b and Fig. 9a/9b compile data on the developments in yields of important cash crops and of cow’s milk. Incremental production of cash crops between +20% (cereals) and +30% (sugar beet) hints at ostensible processes of intensification. Data on the yield per hectare confirm this interpretation.

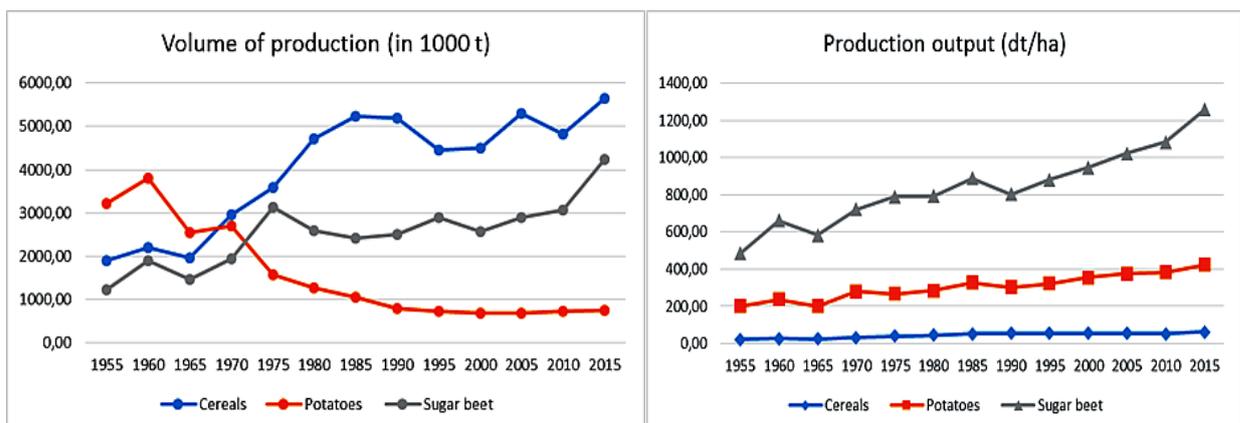


Fig 8a and 8b. Volumes of production and output of some important crops in Austria 1955–2015.

Comparatively low rates of growth provide the dairy sector: Milk production remained on a relatively steady level by absolute numbers (Fig. 9a). However, analysis also has to take into account the modes and framework conditions of cow-milk production. While nearly the same amount of milk was produced by 883,600 cows in 1990 (3.791 kg/cow/year), in 2014 the number

had decreased to 534,000 cows, which means 6.542 kg/cow/year. Dairy production has run through processes of (operational and spatial) concentration based on intensification in the field of cattle breeding. The number of farms producing cow milk has decreased from 99,000 in 1990 to 31,500 in 2014. Parts of the farmers have abandoned their businesses, while others, particularly in less favoured areas, have shifted to mother-cow farming. Dairy farming has gradually been concentrating in favoured areas, which again indicates a general phenomenon of spatial concentration and specialisation in agricultural production (Krausmann et al. 2003).

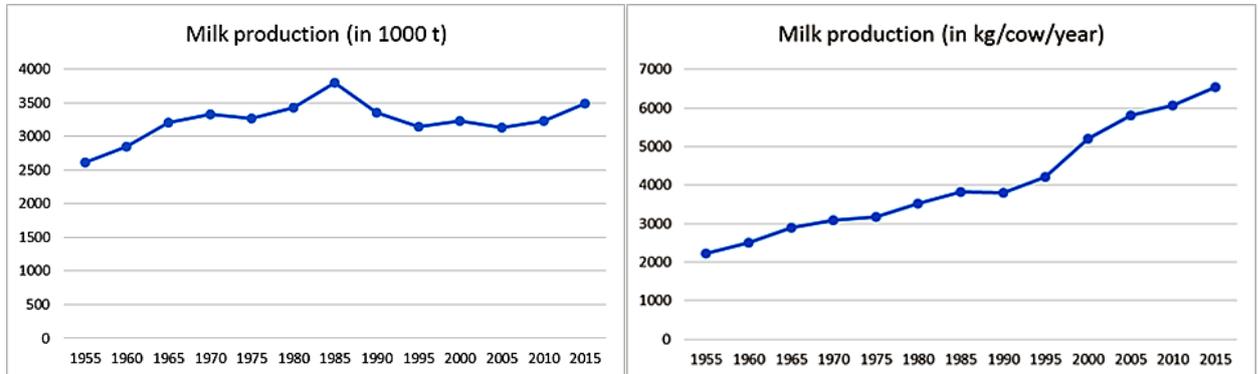


Fig 9a and 9b. Milk production in 1000 t and in kg/cow/year in Austria 1955–2015.

In mountain areas, where cattle farming takes the majority of agriculturally used land, a decline of livestock rates per hectare by absolute numbers can be observed. The more detailed perspective on developments in the sector brings to light processes of polarisation, where intensification in favoured parts of the countryside goes along with extensive use in less favoured parts of the landscape (cf. Buchgraber & Schaumberger 2006). As Buchgraber et al. (2010) had observed, we have to keep this in mind when discussing the landscape effects of agricultural production.

b) Land use and land cover dynamics

Reverse processes of intensification and extensification find spatial evidence in dynamics in agricultural land use patterns: Fig. 10a and 10b present statistics on land use/land cover. They attest decrease of arable land in an extent of 4% between 1991 and 2013, intensively used grassland area spans of 40%, while extensive grasslands declined of 30%. Dynamics mainly took place on behalf of extension of forestland. More detailed information held modifications in ratio throughout the years (Fig 10b).

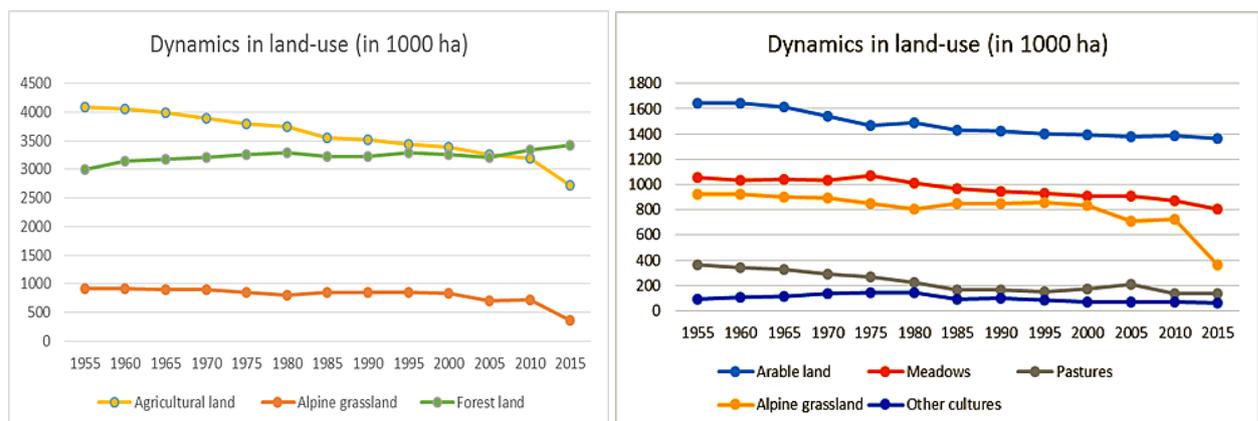


Fig 10a and 10b. Dynamics in agricultural land use 1991–2015 in ha. Source: Austrian Ministry of Agriculture and Environment 2015

While in 1991, 40% of the agricultural land had been covered by arable land, 27% by intensive grasslands, 30% by extensive grasslands and 3% by other cultures, in 2013, the ratio of arable

land had increased up to more than 50%, while intensive grasslands had taken only 21%, extensive grasslands 27% and other cultures 2% of the area. Extensification in terms of land use/land cover likewise appears as the dominating trend from an overall perspective. When setting the information in context to the data on production, interpretation hints to the phenomenon of ongoing polarisation and spatial fragmentation into intensively and extensively used parts within the rural landscape. Dynamics of a spatially uneven development can be observed since the 1950s. Krausmann et al. (2003) explained them as side effects of industrialisation.

c) Land tenure and organisation of land use

A third level of information relates to the social organisation of land use. Fig. 11a and 11b illustrate changes in land tenure and the structure of farm households that indicate dynamics in the management of farmland. The number of farm households has decreased from 281,910 in 1990 to 140,430 in 2015, which means a decline of more than 50 percent. Within the same period, average farm sizes have increased from 24 ha in 1990 to 44.8 ha in 2013 (+85 percent). Particularly, farms beyond the size of 10 ha, which had formed the majority of households and usually run in sideline, have been given up. Compared to the preceding decades, the period of EM is characterised by accelerating processes of land consolidation, driven by abandonment of smaller farm businesses to the benefit of growing units however.

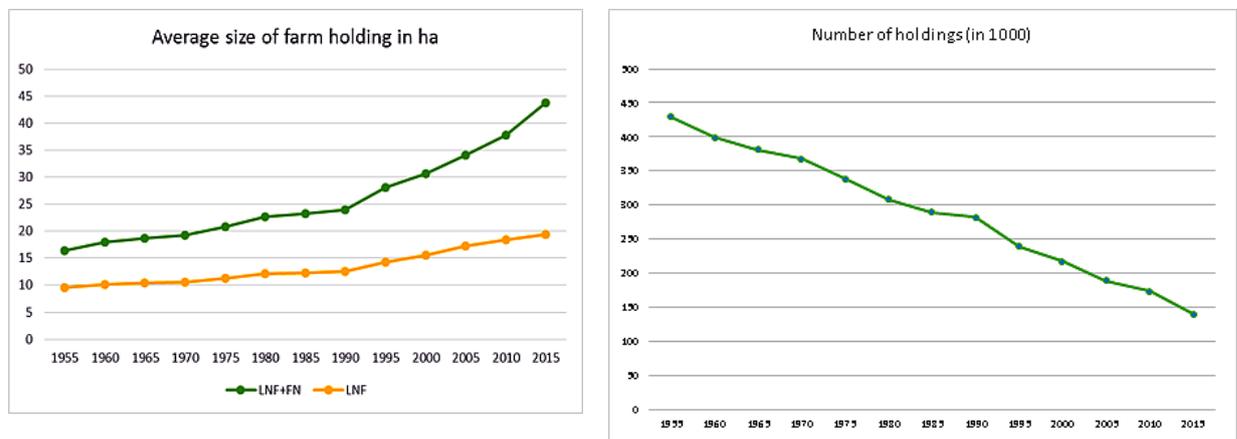


Fig 11a and 11b. Development of numbers and average sizes of farm holdings in Austria 1955–2015. Sources: Statistik Austria 2013; Austrian Ministry of Agriculture and Environment 2015

Allocation of farmland, augmented farm sizes and the decrease of full-time equivalents occupied in agriculture appear as outstanding features of the period of “ecological modernisation” so far. Although processes of consolidation characterise the whole period after the Second World War, the trend reached unusual pace from the 1990s up to present. There can be little doubt on the liberalisation of agrarian markets in the wake of GATT as a major driving force for these trends.

4.2 Landscape effects (1): The *Farmland Bird Index* (FBI)

Land consolidation and spatial polarisation suggest follow-up effects on landscape level. Still there is little aggregated data on the subject available for the observed time frame so far. An important, even though oblique source of information is the Farmland Bird Index (FBI). FBI is a monitoring system based on the observation of a set of bird species typical of agricultural farmland landscapes, providing a reliable and robust indication for the diversity of the agricultural landscape. Various living environments are mapped by the selected species (Teufelbauer 2015). The European Union takes FBI as a parameter for ecological state and developments in rural landscapes. In some of the member states, the first observations date back to the 1970s and the survey has become a trustworthy database. Austria started collection of data only after joining the European Union in the 1990s and has been maintaining the database since that time. Volunteers are monitoring 22 bird species all over the country within standardised settings. Since its first presentation in 1998, the Farmland Bird Index shows a more or less steady, linear decline

(Fig. 12a). Data from 2014 present an index of 57.7 percent in relation to the reference data from 1998, which means a decline in farmland bird population of more than 40 percent. This indicates poorer diversity in agricultural landscapes.

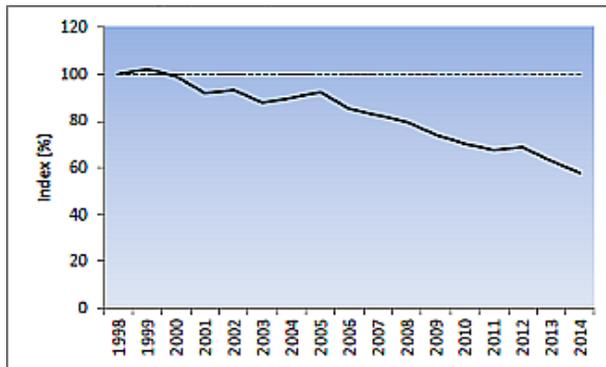


Fig 12a. Development of the Austrian Farmland Bird Index (FBI) 1998–2014. Source: Teufelbauer 2015

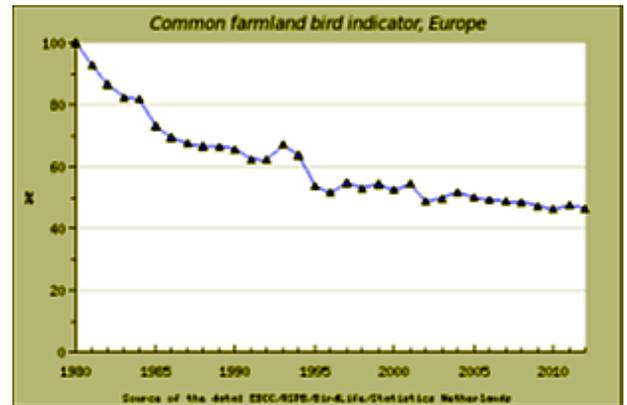


Fig 12b. Development of the European Farmland Bird Index 1980–2010. Source: Teufelbauer 2015

Comparing these data to the development of the European Farmland Bird Index, we can perceive remarkable differences (Fig. 12b). While European data show most significant rates of decline in the 1980ies, up to the early 1990s, Austrian data from the recent decades indicate loss that lie distinctly above the European average (ibid.: 4). This delay in the Austrian case might be related to initially retarded, and then accelerated processes of modernisation since joining the CAP in 1995. Particularly, the chronological coincidences between the described progressions of concentration and growth within agricultural units and the dynamics of the FBI seem evident. Teufelbauer (2015) suggested four possible reasons for ongoing declines of the FBI in Austrian cultural landscapes since the late 1990s:

- intensification in agricultural production,
- rationalisation of crop rotations,
- increasing plot sizes and
- loss of landscape elements and landscape structures (Teufelbauer 2015).

4.3 Landscape effects (2): Extensification and land abandonment in remote areas

While intensification is broadly acknowledged as a factor negatively influencing landscape diversity, effects of extensification only recently have been content of critical inquiries (Brady et al. 2009; Cooper et al. 2009, Reger et al. 2009). In Austria, where major parts of the rural countryside are part of mountainous and remote areas, marginalisation of agricultural production plays an important role as a driver for landscape change. In order to highlight changes related to extensification processes in marginalized mountain areas after joining the CAP, a small-scale study was conducted in a remote upland region in Upper Austria. Inquiry is based on a comparative analysis from the years 1996 to 2006, containing investigations on dynamics in farming practice, farming systems, land use and vegetation patterns. Land use in the studied area is characterised by mixed patterns of arable land and grassland. The traditional farming practice, as typical of many Austrian mountain regions, is the so-called „Egarten-Wirtschaft“. Egarten is a specific type of alternate husbandry connected to mixed farming systems. In traditional ley farming, 2–3 years of arable use would alternate, depending on the site conditions and intent of the farmer, with periods of grass that could last 7–8 years or longer. Alternate husbandry of Egarten contains a complex system of redistribution of manure and humus that aims on low-cost reproduction of soil fertility as well as high variability of labour- and resource input. This has its origins in the self-supply orientated, mixed peasant economies that had dominated the low-input land use until the late 1950s and early 1960s (Krausmann 2004, Kurz 2010). Since then, the traditional systems have been adapted to specialization on cattle farming by the use of

intensification and general rationalisation of cultivating methods. However, a high percentage of small and secondary income-orientated farms continued working on a rather low level of modernisation (Kurz 2009, 2010). This is why until the recent past, parts of the mountain land use and the landscape have been characterised by the typically geared and highly dynamic mosaic patterns of arable land (rye, oat, potatoes) and grasslands in different stages of development. The arable land, which had taken about a quarter to a third of the farmland area, was the basis for the mixed production farmsteads (cattle- and pig-farming, self-supply and forestry).

Results of our comparative mappings attest that only 40% of the area used in alternate husbandry in 1996 had remained arable land in 2006 (see Fig.13). Crop diversity had declined distinctly, focusing now on the production of barley and silage maize for cattle-feed. Farmers transformed major areas of former alternate husbandry into extensively managed grasslands (Kurz 2009a, 2010). Main development between 1996 and 2006 consist of:

- 1) Decline of crop fields and increase of grassland
- 2) Spatial consolidation of arable- and grassland and of intensively and extensively managed grassland types; decline of grassland of the “medium” spectrum
- 3) Extension of areas covered with fallow land

Reduction of crop variety, levelling of land use patterns and the homogenisation of the regional landscape mainly result from two dynamics:

- 1) The number of farms operating in the case study area has diminished within the 10 year period from 1996 to 2006 from 8 to 3, while farmland of the abandoned farms has been leased.
- 2) Farming practice has shifted from mixed farming with a focus on dairy production to dominance of extensive types of mother cow farming.

Local farmers attested in interviews, that ÖPUL contributed to these processes by the measures “*Extensification of arable- and grassland*” and “*Transformation from arable- to grassland*”. Both measures were implemented to assure overall extensification (Austrian Ministry of Agriculture and Environment 1995). Particularly, in (remote) areas with traditional alternate husbandry, a side effect is the overall levelling of once more diverse land use and vegetation patterns. As a result, areas of extensification are frequently not only are characterised by low input of resources (manure, plant protection products etc.), but also by minimised input of labour for their management and maintenance (Kurz 2009a, 2010, 2013). This underlines the findings described by Brady et al. (2009) and by Copper et al. (2009), who have showed the levelling impact on land use and landscape in marginal regions through decoupled payments. They argue that in remote areas, where farming income out of production is marginal, direct payments stimulate farmers to minimise inputs for management and maintenance of their land. Our observations also overlap with those reported by Reger et al. (2009), who found that decoupling transfer payments from production facilitated the expansion of grassland-dominated landscapes with rather “*low values of all habitat diversity indices*” (cited in: Lefebvre et al. 2012: 16).

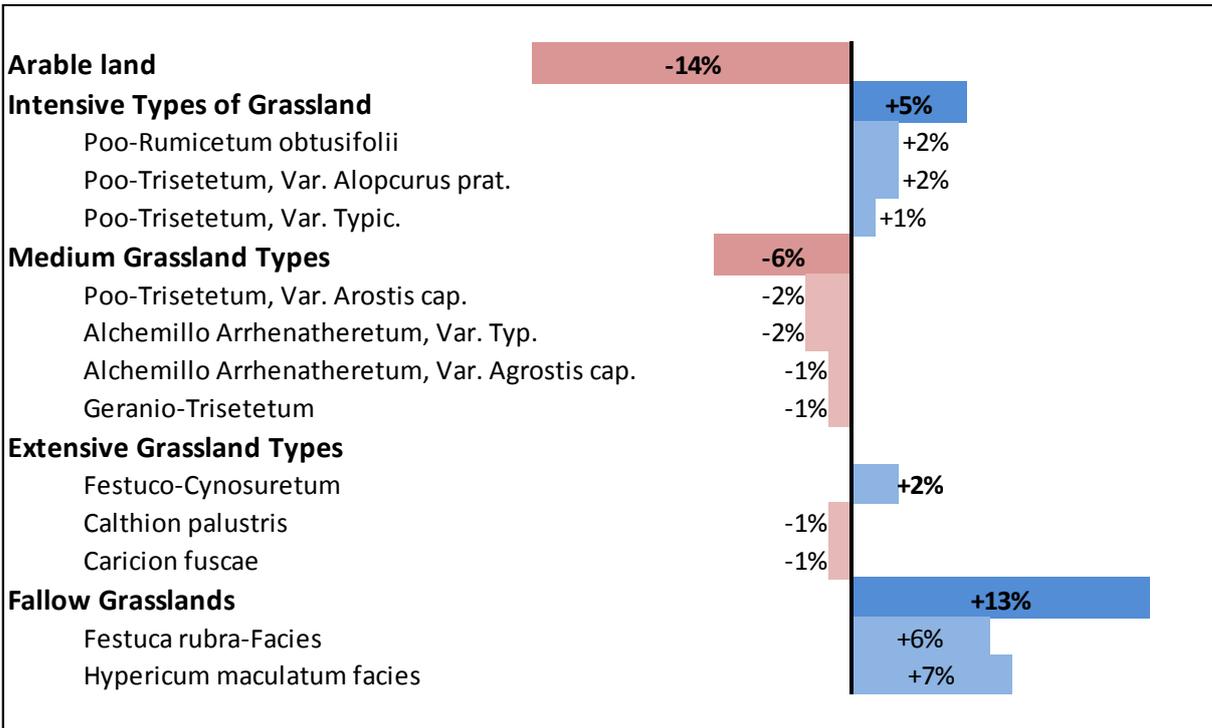
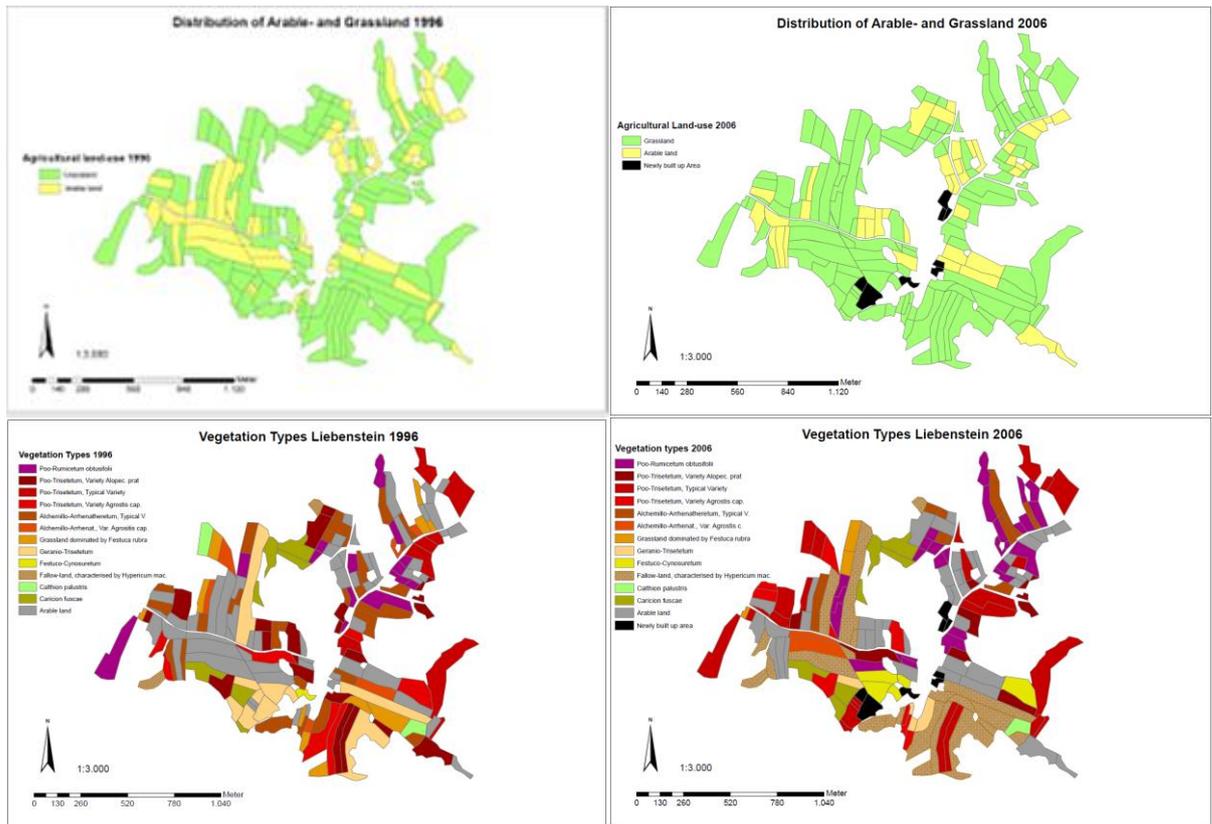


Fig 13. Changes in land use and vegetation patterns in the rural district of Liebenstein, Upper Austria 1996–2006 (Kurz 2010).



Fig 14. Levelling in landscape diversity due to transformation of the Alternate husbandry-system of the Egarten to extensively managed grassland (Kurz 2010).

5. Discussion

The model of “*ecological modernisation*” from the late 1980s onwards formed a framework for Austrian agricultural policies and later influenced the design of the European CAP. In Austria, where major parts of the rural countryside could be characterised by a “*retarded modernisation*”, the concept promoted comprehensive transformations in agrarian systems and rural landscapes. Retrospectively, the period of “*ecological modernisation*” in Austria can be characterised by five processes:

- 1) Overall extensification regarding the input of chemical resources and human labour
- 2) Intensification of production in absolute terms
- 3) Spatial concentration and polarisation into areas of intensive and extensive production
- 4) Comprehensive processes of land consolidation
- 5) Rationalisation of land management practice

Each of these processes follow long-term trends and can be traced back long before the era of CAP. This means that apart from a faster accelerating growth of farm units, there is no specific modernisation pattern that immediately relates to the CAP period 1995–2015. Regarding developments in cultural landscape during the observed period, we found evidence that indicates an overall decline in diversity on different levels of scale. Data from our inquiries support assumptions that land consolidation and rationalised management of agricultural land have been a major driving force responsible for advanced levelling of the cultural landscape.

CAP-policies and its downstream programmes have been influencing landscape qualities basically in two different ways. On the one hand, they support a number of measures directly impacting on maintenance and preservation of landscape diversity. Still, on the other hand, the designs of implemented programmes certainly also function as catalysts for modernisation processes that in the sequel equally advance structural landscape changes. Structural effects

steering landscape change could be seized with the agri-environmental scheme ÖPUL as well as with the CAP-adapted version of the single farm payment:

ÖPUL, for instance, provides positive effects on introduction and maintenance of landscape elements by encouraging and actively supporting farmers financially. Albeit, on the other hand, the structural effects of the nationwide standardised programme on locally adapted and diverse land use practice outweigh singular measures in maintaining landscape diversity. Overall extensification, as encouraged within ÖPUL, does not contribute to landscape diversity at any rate, owed to graduated land use patterns. Standardisation and rationalisation rather contribute to the levelling of land use practices, and as a consequence of landscape patterns instead. This is particularly the case in remote and marginalised areas. One crucial aspect with ÖPUL is that payments are site- and area-related. This means that the bigger the farm enterprise, the higher the subsidies earned. Bureaucracy for application and controlling – on the other hand – is unattached by the gained amount. Formal modes of funding go along with the fact that ÖPUL defines limits in livestock-rates as a measure to achieve comprehensive extensification goals. Consequently, as critics have recurrently pointed out, farmers are encouraged to increase their holdings. They are emboldened to lease additional land to be able to undercut those limits when raising their livestock (Groier 1999: 155ff.; Kurz 2009). In that, ÖPUL combines goals of an “*overall extensification*” with effects of general concentration of farmland and rationalisation of its management (ibid.).

The single farm payment – on the other hand – is an important pillar in sustaining Alpine agriculture and maintaining the cultural landscapes of mountain regions. In any case, despite augmented financial resources in the CAP-related programme, the old version of the MFP had certainly better targeted the needs of smallholder farmers in the Austrian mountain countryside. A subtle mechanism of policy programmes functions on the support of certain types of farming, while neglecting others. In Austria’s concept of the eco-social market economy, it has been the model of the “*modern, middle-sized multifunctional, market-orientated family farm enterprise*” (Austrian Ministry of Agriculture and Environment 1999) that has formed the guiding principle, whereas other types, particularly smallholder agriculture and side-line farming have been set in a disadvantage by practiced policies of “*ecological modernisation*”. This has an influence on farmers’ decisions that in further contexts generate effects on the shape of rural landscapes in their physical, but also in their social dimension. A result is not only a massive decrease in the number of farmsteads during the period of EM, coupled with growth of the remaining ones; it is also as Garstenauer et al. (2010a, b) have observed, a reduced variety in the “*styles of farming*” (Ploeg 1994, 2003, 2008; Langthaler et al. 2010) that operate on diversity of cultural landscapes at different levels of scale. We can agree with Cooper et al. (2009), who have pointed out, that the decoupled single-farm payments within CAP have been weakly targeted to the needs of “*economically vulnerable farms and those that deliver the most positive environmental public goods (including landscape)*” (cited in Lefebvre et al. 2012:16).

Within a broader context, the Austrian case provides example for the problematic structural double-sidedness of European Agricultural Policies, intending to link agriculture to globalised markets of industrially produced agricultural goods and to achieve environmental and preservation goals. The agenda of EM brought about a shift in discourses and paradigms, on the one hand focusing on the “greening” of production, on the other hand on its (technological) modernisation, aiming on improved competitiveness of farm enterprises. Swafford & Primdahl (2010), referring to M. Castells (2000), have pointed to the fact, that it is two contradictory global agendas functioning behind CAP: The global market agenda and the sustainable development agenda (or – as they also call it: a “*local landscape agenda*”). The key insight from this logic is that competitive struggles of “*growing or giving away*” within European agriculture will continue as long as policies operate on the solid foundation of a global market agenda (Swafford & Primdahl 2010). Rhetoric of “ecological modernisation” has been functioning as an efficient instrument for “masking” (Olwig 2002) those ambivalences. This strategy proved successful in communicating policy goals to the public, as well as in shaping farmers’ self-conceptions and their perception of farming. In retrospect, one can see this as a success on the level of political ideas (resp. ideology) that redefined the roles and societies’ understanding of agriculture and

landscape. Regarding empirical evidence in the physical landscape, results from the EM-agenda on the rural countryside certainly have to be recognized differently, at least.

6. The current CAP Reform 2014–2020: Some concluding remarks

CAP 2020 proceeds in developing the double strategy of improving competitiveness of European agriculture on the one hand and addressing environmental issues on the other (European Commission 2013). But CAP 2020 has set “green” goals such as the preservation of biodiversity and the maintenance of resilient, adaptable farming systems high on its agenda. With decreasing overall budgets, the goal is a better targeting of resources. The EU shall pursue the path “*from product support to producers support*”, reserving 94 percent of the budget for direct payments decoupled from production (ibid.). Removal of market restrictions, enhanced support of cooperation in agricultural production, processing and marketing aim at improved competitiveness. Direct payments are linked closer to “public environmental services (“Green Direct Payment” has to cover at least 30 percent) and member states achieve more flexibility in being allowed to transfer up to 15 percent of their budgets between pillars, fitting them to specific requirements. As a new subject, the EU introduced climate actions within CAP, aiming at adaptation to climate change and support of climate-friendly modes of production. By setting a focus on locally adapted, small-scale agriculture under impact of the “*resilience paradigm*”, the new programme might indicate a certain change of course in several details.

Maintenance of cultural landscapes and their (bio-) diversity still ranks among the superior goals of Austria’s agricultural policies after the CAP-reform 2020. Following the framing accounts from the reform, targets of the current Austrian agrarian programme have been adapted to the pestering societal challenges, primarily to climate change and provision of ecosystem services (Austrian Ministry of Agriculture and Environment 2016). The programme text says that “*traditional, regionally adapted modes and techniques of agricultural production shall be supported and remaining tiny structured land use patterns and landscape mosaics shall be maintained*” (ibid.). The “*resilience paradigm*” eventually brings small and medium sized farms as upholders of diverse rural landscapes back into the political discourse. Therefore, particularly two instruments are important:

1. The degression model for direct payments according to farm size (“capping”): farmers receive 100 percent of direct payments up to an area of 30 hectares of agricultural land, beyond payments decrease gradually, reaching a remuneration of zero percent beyond 70 hectares. This model shall help to redistribute financial resources to smaller units.
2. Support of small farmers on basis of a simplified subsidisation scheme for holdings with up to €1,250 direct payment. Small farmers shall be relieved from administrative burden in order to encourage them to apply for grants.

(Source: Austrian Ministry of Agriculture and Environment 2016).

Both measures may contribute to an improved support of smallholder farming as well as to the maintenance of richly structured cultural landscapes. Whether and to which extent these measures will form a viable counterpart to the global market agenda will be a worthwhile topic for subsequent research. We will have to judge them on the background of a general re-organisation of direct payments, recurring to a “regional model” and the adaptation of mountain farmers’ support in the new CAP. In any case, the question will also be, if policy offers will be attractive enough to steer development in the intended direction. One first effect from the CAP-reform 2020 hints into another course. Expiry of the milk quota as a measure to relieve market restrictions has stimulated another wave of smallholder farmers to abandon their non-competitive dairy businesses in Austria in 2015. One might anticipate that the economy and the “free market” this time again will be the stronger “landscaper” than the adopted subsidy schemes.

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