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Contribution of agricultural policy measures to maintain grassland areas (the case of Radensko Polje Landscape Park)

Dubravka ŽGAVEC¹, Klemen ELER², Andrej UDOVČ², Franc BATIČ²

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ABSTRACT

Within this research paper, the enforcement of agricultural policy measures for farms that have their agricultural lands within the Radensko Polje Landscape Park (RPLP) were studied. The purpose of the study was to evaluate the effectiveness of the additional payment for the extensive rearing of female bovine animals (ERB) and agri-environmental measures (AE measures) in terms of maintaining extensive agricultural systems or transitions from intensive systems to sustainable ones. This is especially desirable in the protected areas that also include landscape parks. The results of the survey of farmers of RPLP showed that both the ERB and AE measures are inefficient and fail to encourage farmers to implement more extensive farming. The main reasons for the poor enforcement of claims for ERB are intensive livestock production (milk production or bovine animals fattening), and the lack of information about the possibility of claim enforcement for ERB. Regarding AE measures, the main reasons for the failure are burdensome conditions and low financial compensation. Inventories of the composition of plant species on sample grasslands showed that the conditions of the habitats are still relatively good, because a relatively large number of species of high conservation value is present.

Key words: agricultural policy, grasslands, landscape parks, sustainable development, nature conservation/subvention

IZVLEČEK

PRISPEVEK UKREPOV KMETIJSKE POLITIKE K OHRANJANJU TRAVIŠČ (PRIMER KRAJINSKEGA PARKA RADENSKO POLJE)

V raziskavi smo na območju Krajinskega parka Radensko polje (KPRP) proučevali uveljavljanje ukrepov kmetijske politike za kmetije, ki imajo kmetijska zemljišča znotraj parka. Namen naloge je bil ugotoviti učinkovitost dodatnega plačila za ekstenzivno rejo ženskih govedi (ERG) in ukrepov kmetijsko okoljskega programa (KOP) v smislu ohranjanja ekstenzivnih kmetijskih sistemov oziroma prehodov iz intenzivnih sistemov v trajnostno naravnane. To je še posebej zaželeno na zavarovanih območjih, med katere sodijo tudi krajinski parki. Rezultati ankete pri kmetovalcih so pokazali, da so tako ukrep ERG kot ukrepi KOP na območju KPRP neučinkoviti in ne stimulirajo kmetovalcev k izvajanju bolj ekstenzivnega kmetijstva. Glavni razlogi za slabo uveljavljanje zahtevkov za ukrep ERG so v usmerjenosti v bolj intenzivno živinorejo (prireja mleka oziroma reja pitancev) in v premajhni informiranosti o možnosti uveljavljanja tega ukrepa. Pri ukrepih KOP so glavni razlogi za neuveljavljanje prezahtevni pogoji in premajhna finančna nadomestila. S popisi vegetacije vzorčnih travišč na območju parka smo ugotovili, da je kljub neuveljavljanju zahtevkov stanje habitatov še zmeraj relativno dobro, saj je še prisotno relativno veliko število naravovarstveno pomembnih vrst.

Ključne besede: kmetijska politika/travišča/krajinski parki/trajnostni razvoj/varstvo narave/subvencije

Prispevek je del magistrskega dela: Prispevek ukrepov kmetijske politike k ohranjanju travišč (primer Krajinskega parka Radensko polje), mentor: prof.dr. Franc Batič.

This paper is a part of the master's thesis: *Contribution of agricultural policy measures to maintain grasslands (the case of Radensko Polje Landscape park)*, mentor: Prof. Franc Batič, Ph.D.

¹ Agencija Republike Slovenije za kmetijske trge in razvoj podeželja, Dunajska 160, 1000 Ljubljana, mag.

² Univerza v Ljubljani, Biotehniška fakulteta, Oddelek za agronomijo, Jamnikarjeva 101, 1000 Ljubljana, dr., prof.dr.

1 INTRODUCTION

Grasslands comprise a great part of agricultural land and are an important part of the environment; therefore, their sustainable management is important. They cover 52.5 million km² (i.e. 40.5% of the Earth's land surface), excluding Greenland and Antarctica (Suttie et al., 2005). Grasslands are also significant in Slovenia, comprising 58% of all agricultural land. (Pomembnejši podatki popisa kmetijstva ..., 2010). Grasslands in Slovenia are endangered similarly as in other parts of the world, specifically by the change in land use as a consequence of urbanisation, the building of infrastructure and changes in the soil water regime, the intensification of agriculture (ploughing of meadows, increased use of mineral fertilisers and seeds of cultivated grassland species) and the abandonment of agricultural use (Pregled stanja ..., 2001).

Of all economic activities, agriculture has influenced nature for the longest period of time (Batič et al., 2002). It has changed natural ecosystems and reduced their cover; at the same time, agriculture has made new habitats and increased overall landscape biodiversity. In the 1990s, the concept of agricultural areas with high natural value was developed as a consequence of the recognition that the conservation of biodiversity and cultural landscapes in Europe depends on the existence of low intensity agricultural systems (Beaufoy et al., 1994; Bignal in McCracken, 1996). At the same time, the Common Agricultural Policy (CAP) of the EU changed and started to move from market-oriented production support towards environment-protection support in order to promote efficient and sustainable agriculture. Among other direct payments, an extensification payment scheme emerged in order to conserve and promote extensive livestock farming, which should support biodiversity in the rural agricultural landscape. These payments were carried out also in Slovenia from 2003 to 2006. In 2007, these payments were halted with CAP reform, but on the basis of 69th article of the European Community Council Act (No. 1782, 2003) a new measure, called ERB (extra payments for extensive rearing of female bovine cattle) was introduced, as part of a set of specific supports, which also supports extensive agricultural practices.

AE measures of the Agri-environmental Programme are designed to implement environmentally friendly farming practices. They reflect the multi-functionality of agricultural production, expressed in the public services of maintenance of landscape, biotic diversity and the rural population, by taking into account ecological, social and site dependent aspects of rural areas (Program razvoja podeželja ..., 2007). For the conservation of grasslands, the measures of the second pillar of the Slovenian Rural Development Programme are of great importance. These are devoted either to the conservation of nature, biotic diversity, soil fertility or the maintenance of the traditional cultural landscape (Group II measures), or the conservation of protected areas (Group III measures).

In this research, it was our intention to determine to what extent the ERB and AE measures are implemented in the Radensko Polje Landscape Park (RPLP) from 2007 onward. Additionally, we analysed reasons for the rejection of the ERB measure by farmers during that time, and estimated the potential number of farmers who could apply for this measure. In the second part of our research, we investigated the effectiveness of the ERB measure, i.e. the extent to which it contributed to the conservation of grasslands in the RPLP. Critically, we evaluated the definition of extensive farming and the use of the term "extensive", and compared how many criteria of extensive farming are covered by the obligations of the ERB measure. Using these analyses, we estimated the intensity of agricultural systems on the RPLP area, which may serve as a good contribution to the search for new, more suitable and more efficient measures for achieving RPLP objectives. On the basis of an overview of national and foreign studies, we can assume the validity of the generally accepted thesis that less intensive agricultural systems have positive effects on the conservation of permanent grasslands and their ecosystem services (Kramberger, 1994; Nösberger and Rodriguez; 1996; Nösberger et al., 1994; Bignal et McCracken, 1996; Nielsen in Debosz, 1994; Zechmeister et al., 2002; Miles, 1981; Brak et al., 2004; Critchley et al., 2007; Hayes et al., 2007; Dunn et al., 2007; Gulliver et al., 2007;

Buckingham and Peach, 2007, Marriot et al., 2009, Ketiš, 2010).

2 MATERIAL AND METHODS

The research was carried out on the RPLP, on which there are two protection zones (Uredba o Krajinskem parku Radensko Polje, 2011). The first zone covers the areas of the most valuable habitats for nature conservation and is primarily devoted for protection and conservation of natural values and the favourable conservation status of specific plant and animal species and their habitats. The second zone is primarily devoted to the protection and conservation of natural values and biodiversity of a landscape. Areas of the park outside of both zones (delimited as a third zone) are dedicated for the protection of the landscape diversity and for the promotion of sustainable development. According to habitat-type mapping, the RPLP is divided into four main subareas: part of Grosupeljsko Polje west of the village Veliko Mlačevo, and the northern, central and southern parts of Radensko Polje (Inventarizacija flore in favne na Radenskem polju, 2000). Considering habitat types, the most preserved and valuable part is the central part of the park where the continuous mosaic pattern of wetland plant communities, mostly wet meadows, prevails. Among the meadows, *Molinia caerulea* (*Molinietum caeruleae* W. Koch 26) or *Deschampsia cespitosa* (grasslands from the *Deschampsion littoralis* Oberd. et Dierss in Dierss. 75 alliance) prevail. Regarding the flora of these grasslands and other wetland areas, the following plant species relevant for nature conservation thrive here: *Carex pulicaris* L., *Fritillaria meleagris* L., *Gentiana pneumonanthe* L., *Gratiola officinalis* L., *Iris sibirica* L., *Ludwigia palustris* (L.) Elliot, *Menyanthes trifoliata* L., *Pedicularis palustris* L., *Potentilla palustris* (L.) Scop., *Schoenoplectus mucronatus* (L.) Palla, *Teucrium scordium* L. and *Utricularia australis* R.Br. (Inventarizacija flore in favne na Radenskem polju, 2000).

The research was divided into three sections. In the first section, we performed an analysis of measures of agricultural policy in the study area, which was based on data obtained from the Agency of the Republic of Slovenia for Agricultural Markets and Rural Development (ARSKTRP), the Geodetic Institute of the Republic of Slovenia (GURS), the

Register of Agricultural Holdings (RKG), the Surveying and Mapping Authority of the Republic of Slovenia (SMA) and the Institute of RS for Nature Conservation (ZRSVN). For the analyses of the ERB measure and AE measures for the period from 2007 to 2011, the necessary data were obtained via special enquiry submitted to ARSKTRP. The administrative borders of the Grosuplje municipality were derived from GURS. The official borders of the Radensko Polje Landscape Park, protected areas and subareas were obtained from ZRSVN. The spatial data (land use and graphical units of agricultural use, Natura 2000 areas) needed for the analyses in the investigated area were obtained by special request from Ministry of Agriculture and the Environment (MKO).

In the second section, socio-economic analyses were carried out with an inquiry among 15 farmers in which the socio-economic and production characteristics of farms were obtained (property and size of farms, types and history of land use, grassland management practices, use of agricultural mechanisation), attitudes of farmers towards the formation of RPLP (acquaintance with reasons for park formation and mode of providing this information, knowledge of Natura 2000 areas) and reasons for not applying for the ERB and AE measures. Farms used in the sampling inquiry were selected randomly from all the farms with land within the RPLP. In all, 25 farms were chosen but only 15 of them expressed a willingness to participate in the inquiry. Fourteen selected farms out of the 75 that had land within the first conservation zone in 2011 comprised 54.66 ha of the park area, which represents 47.2% of agricultural land of the first conservation zone of the RPLP. One of the farms had agricultural land only in the second and the third conservation zones, representing 8.65 ha.

In the botanical section of the research, the vegetation composition of 12 grasslands scattered in all three conservation zones of RPLP was assessed. Seven of these grasslands were in agricultural use in 2011, belonging to seven

different farms. The owners of one of these farms did not want to participate in the inquiry. Five of the grasslands in agricultural use extended to all three conservation zones; two grasslands extended only to either the second and third conservation zone. Vegetation composition was assessed twice in 2011; first, shortly before the first mowing in the April-May period; second, in September. To estimate the cover and abundance of plant species, the modified method of Braun-Blanquet (1964) was used in vegetation surveys.

Spatial analysis was carried out using the GIS software ArcGIS 9.3. The majority of inquiry data was processed using MS Excel. Data were analysed by means of descriptive statistics and were presented in tables and figures. The similarity of grasslands, based on plant species composition was determined using correspondence analysis with a removed trend (DCA).

3 RESULTS AND DISCUSSION

Implementation of ERB of AE measures in the areas of RPLP

ERB should promote extensive bovine rearing and in this way contribute to grassland conservation. From the measures promoting rural development, some of the AE measures were analysed (measures important for conservation of grassland habitats included in the Natura 2000 site, important for the conservation of birds and butterflies on extensive wet meadows).

In the analysis of how many of indicators of low intensity systems (after Beaufoy et al. (1994)) are included in requirements to apply for the ERB measure, we can conclude that only two are included: stocking rates and cattle breeds. The breeds are not restricted to being native to the area

but must be adapted to low-intensity use. Limited fodder use is regulated indirectly by the livestock unit (LU) load, which is calculated as LU/ha with the condition that permanent grasslands have to account for 50% of all fodder areas. The input of fertilisers could be partly controlled by the control of the cross compliance of measures. We can conclude that the essential elements of extensive bovine rearing are included in the ERB measure; the remaining problem is that too much LU has been permitted. One potential solution in this area is the requirement for the farmers to have at least 30% of permanent grasslands from all lands in agricultural land use from 2010 onward, which means better contribution for the conservation of grasslands than the former requirement of 50% of permanent grasslands from all fodder areas.

Table 1: Number of claims for ERB by areas and years (ARSKTRP..., 2012)

Preglednica 1: Število zahtevkov za ERG po območjih in letih (ARSKTRP ..., 2012)

Območje Area	2007		2008		2009	
	Št. kmetij Number of farms	Št. živali Number of animals	Št. kmetij Number of farms	Št. živali Number of animals	Št. kmetij Number of farms	Št. živali Number of animals
RS	16146	48531	14927	44971	14981	45672
KPRP RPLP	28	82	24	73	24	72
Prvo in drugo VO* KPRP First and second PA* RPLP	22	70	20	66	19	63

VO*=Varstveno območje

PA*= Protection area

From 2007 to 2009, 15,351 farms applied for the ERB measure for 46,391 animals throughout the Republic of Slovenia. On the RPLP, 25 farms applied for the ERB with 76 animals in the first conservation zone, and 20 farms with 66 animals in the second conservation zone. A decrease in the application for the ERB measure was observed in Slovenia from 2007 to 2008 regarding the number of farms and animals. A slight increase was observed in 2009, but number of application did not reach the 2007 levels. The overall steady decrease of applications for ERB measure has been observed in the RPLP. In 2007, the ERB measure was applied by 29% of farms of RPLP, and only 24% in 2008 and 2009.

Analysis of mistakes in the application for the ERB measure in the Republic of Slovenia in the period of 2007–2010 showed that the proportion of mistakes is decreasing, indicating better familiarity of farmers with the requirements for the measure. The remaining problems, related to the extensive agriculture, are the following: proportion of permanent grasslands, stocking rate of fodder areas, and affiliation of the cattle in the area to the herds of calves breeding for meat production. This problem also occurs in the RPLP. Exceeding the

permitted LU/ha is even greater in the RPLP than in Slovenia as a whole.

The average proportion of permanent grasslands regarding the fodder areas in farms that applied for the ERB measure was bigger in Slovenia as a whole than in the RPLP. The proportion of permanent grasslands in the Republic of Slovenia is around 94%, and this share was stable during the 2007–2009 period. On the first and second conservation zones of the RPLP, these proportions are 7 to 10 percentage points smaller and are fluctuating over time. The average LU in the the first and second conservation zone of the RPLP during the 2007–2009 period was 1.22 LU/ha, which is slightly higher than at the country level (1.14 LU/ha).

Using the data obtained by ARSKTRP, it was calculated that ERB measure could be applied by nine additional farms for 16 cows within the whole RPLP, and seven 7 farms for 14 cows within the first and second conservation zones. This indicates that some farmers are still not sufficiently familiar with possibilities of applying for agricultural subsidies or that the procedure to obtain these subsidies is overly complicated.

Table 2: Number and percentage of farms involved in AE measures, which have land in the first and second PA RPLP in the 2007–2011 period (ARSKTRP..., 2012)

Preglednica 2: Število in delež kmetij, vključenih v ukrepe KOP, ki imajo zemljišča na območju prvega in drugega VO KPRP v obdobju od leta 2007 do 2011 (ARSKTRP ..., 2012)

Leto Year	Skupno število kmetij Total number of farms	Število kmetij KOP Number of AE farms	Delež (%) Share (%)
2007	96	24	25.0
2008	98	23	23.5
2009	98	19	19.4
2010	97	12	12.4
2011	96	11	11.5

Regarding the farms with agricultural land within the first and second conservation zones of the RPLP, the proportion of farms applying for the AE measures is small. From 2007, when it accounted 25% of farms, it decreased to 11.5% in 2011. Only three such farms applied for specific measures intended for Natura 2000. That is very little,

having in mind that entire first and second conservation zones of RPLP are within Natura 2000.

Data on the application of the ERB measure and AE measures of RPLP farms show little interest among farmers for these measures. Using our

inquiry information, we determined that the majority of farms do not implement the ERB measure simply because they do not breed cows (53%). A total of 33% of farms claim that they do not fulfil the requirements, either due to milk production (4 farms) or exceeding LU (1 farm). As a main reason for not applying for the AE measures, farmers mention overly demanding requirements making their farming economically unprofitable under these conditions. Similar findings were also reported by other investigators (Udovč and Čemažar 2002, Pust Vučajnk and Udovč 2008, Žvikart 2010).

Analysis of agriculture in the RPLP and attitude of farmers towards the formation of the landscape park

The majority of the studied farms are oriented towards animal husbandry, mostly cattle breeding, and horse breeding to a lesser degree. Breeding of Black-White, Brown and Simmental cattle breeds prevail; in horse breeding, the Cold-blooded Slovenian horse (*Slovenski hladnokrvni konj*) prevails. The average LU for all RPLP farms was 0.75 LU/ha in 2010, meaning that the intensity of animal husbandry within the park area is not very high. In accordance with the requirements of cross-compliance, the annual input of nitrogen should not exceed 170 kg/ha of the agricultural land in use on the farm level. Regarding data of the ARSKTRP, the average annual input of nitrogen on farms having land within the first and the second conservation zones of RPLP accounted 50.5 kg N/ha/year in 2010, and no farm exceeded the allowed yearly input. In most cases, fertilization was carried several times during the vegetation period (67% of farms within the first and second conservation zone of RPLP, 73% of farms in the third conservation zone of the park and 75% of farms outside the park). Fertilizer is applied in February, March, April, June and October. This is in accordance with the regulation claiming that slurry application is prohibited in areas without green cover from 15th of November to 15th of February and on lands with green cover from 1st of December to 15th of January.

The attitude of farmers towards the establishment of the RPLP is not very encouraging. The study showed that 53% of the studied farmers stated that park formation brought a limitation to the

agricultural development to the RPLP area. The results of the inquiry are much worse than those obtained by the park management authorities in 2008 in which 94% of inquired farmers were in agreement with formation of the park. The reason for this discrepancy might be the smaller number of people included in our investigation or a shift of attitude in recent years.

Analysis of the grasslands management in the RPLP.

Results of vegetation mapping and evaluation of habitats on the RPLP showed (Inventarizacija flore in favne na Radenskem polju, 2000) that approximately 40% of the park was rated as the highest nature conservation grade (4, 5) (IUCN, 2012). The majority of this area is wet meadows and lowland pedunculate oak-hornbeam forests. A roughly equal area is covered by cultivated meadows, which are not of high value from a nature conservation point of view. On the RPLP, 450 vascular plant species were registered, of which 44 are endangered and 18 protected (Strokovne podlage za zavarovanje Radenskega polja, 2008).

The largest part of permanent grasslands was assessed by the inquiry within the first and the second conservation zones of the RPLP (87% of farms declared that their grasslands are within the first and second conservation zones). The average height of the grassland turf before the first mowing was 37 cm in the first and second conservation zones of RPLP, 44 cm in the third zone, and 46 cm outside of the RPLP, indicating smaller yields of the grassland in first and second conservation zones. For the areas of Natura 2000, the first mowing is recommended after the first of August, and at least one mowing and harvesting per year. During field work, we noticed that the first mowing had already been performed in the middle of May. We also observed areas where mowing was abandoned. In spite of a relatively earlier vegetation period in 2011, such an early mowing time is not suitable for nature conservation, even more so when taking into account the modern harvesting technology (wrapping mowed plants into plastic bales which does not enable natural seeding of meadow plants). All analysed farms in the RPLP, regardless the conservation zones, perform only mowing. The majority of the farms

perform three cuts per year, and the proportion of three-cut meadows increases with the distance from the first and second conservation zones of the park. Only one cut per year is the most common in the first and second conservation zones of the RPLP due to low quality of the fodder and poor regeneration after the first cut. Two cuts per year are performed on 31% of farms within the park and on 21% of farms outside the park.

With multivariate processing of data (Fig. 1.), it was determined that there was no distinct group of grasslands according to plant surveys, but plant species could be linked with the gradient of soil

moisture and nitrogen content of the soils. For the entire area investigated, wet meadows are characteristic, sorted by analysis into moist, moderately fertilised meadows with fritillary, extensive wet meadows with purple moor-grass, extensive wet meadows with purple moor-grass in the first stage of heather encroachment, and grasslands belonging to alliance *Magnocaricion elatae* W. Koch 26. Altogether, we found evidence of 211 plant species, of which 21 are important for nature conservation, and 17 of which are in the red list of vascular plants of Slovenia (Wraber and Skoberne, 1989).

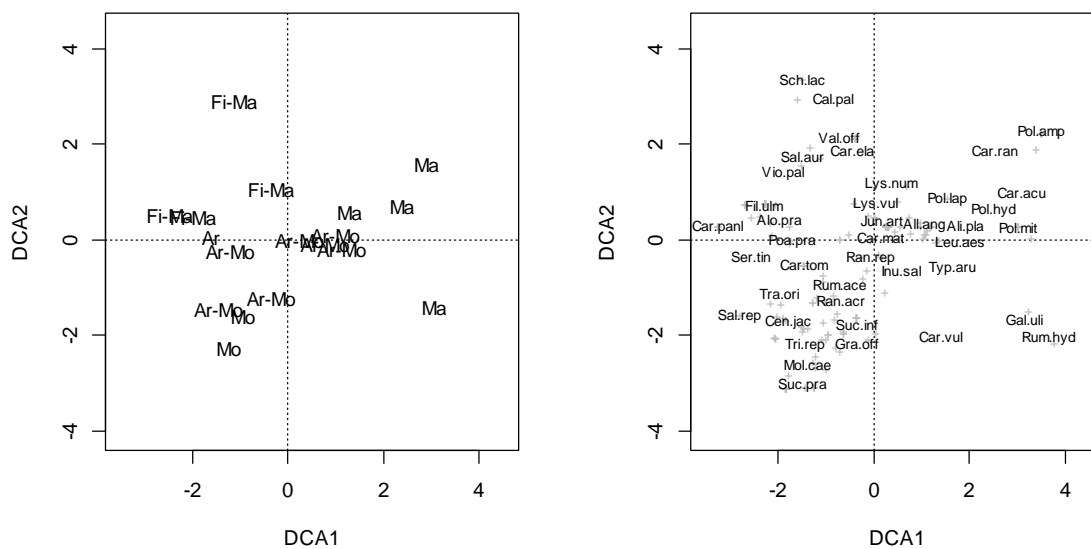


Figure 1: Ordination of vegetation relevés and characteristic plant species of the Radensko polje Landscape Park according to detrended correspondence analysis. Relevés are labeled by their affiliation to main grassland alliances or their transitions (Ar: *Arrhenatherion*, Ar-Mo: *Arrhenatherion-Molinion*, Ma: *Magnocaricion*, Mo: *Molinion*, Fi-Ma: *Filipendulion-Magnocaricion*).

Slika 1: Ordinacija popisov vegetacije in značilnih rastlin po korespondečni analizi z odstranjenim trendom na Krajinskem parku Radensko polje. Popisi so označeni glede na njihovo pripadnost glavnim zvezam združb na traviščih ali prehodov med njimi (Ar: *Arrhenatherion*, Ar-Mo: *Arrhenatherion-Molinion*, Ma: *Magnocaricion*, Mo: *Molinion*, Fi-Ma: *Filipendulion-Magnocaricion*).

4 DISCUSSIONS

Analysis of application of the ERB measure and AE measures on the RPLP area enabled us to estimate the effectiveness of payments devoted for the conservation of extensive agricultural systems, or for the transition from intensive systems to more sustainable ones.

The majority of farms in the RPLP are oriented to animal husbandry, mainly cattle breeding and to a lesser degree to horse breeding. The average LU for the first and second conservation zones of the RPLP was 0.75 LU/ha for agricultural lands in use in 2010. Farmers do not use exceedingly high amounts of mineral fertilisers. Within the first and

second conservation zones, lower use of stable manure is also observed in comparison to the areas that the same farmers cultivate outside the park. Data on annual input of nitrogen in the RPLP show that the Nitrate Directive is respected (Poročilo Slovenije na podlagi 10. člena Direktive sveta 91/676/EEC..., 1991). Cumulatively, these results show that on average the intensity of agriculture in the area is low presently.

Surveys of plant species indicate relatively good state of habitats in the RPLP, proved by the relatively high number of species important for nature conservation.

On the basis of the data gathered regarding the implementation of the ERB and AE measures on the RPLP (analysis of the requirement for the ERB measure, state of implementation of the ERB and AE measures, analysis of mistakes in the implementation of ERB measure, average proportion of permanent grassland to all fodder areas at the implementation of the ERB, reasons for not applying for the measures), we confirmed the assumption that current measures of the agricultural policy do not stimulate farmers to perform more extensive agriculture and are inefficient for the conservation of favourable status of grassland habitats. Park management has done much to inform the farmers about the formation of the RPLP and about the changes the formation would bring to inhabitants. In spite of this, the majority of farmers (53% according to the inquiry)

still share the opinion that the park limits the agricultural development in the area.

For the future conservation of the grasslands in the RPLP, further intensification of agriculture should be prevented. More attention should be paid to late mowing and to the encouragement of farmers to recultivate the abandoned areas in an extensive way. For implementation of these plans for the transition from intensively cultivated meadows to more extensive ones, new agri-environmental measures should be considered, being more adapted to the specifics of this area, simpler to implement, and (above all else) providing additional financial means.

Considering the biodiversity of the RPLP, we can conclude that the conservation of habitats in the area is more supported by the traditional use of grasslands (only mowing) than the ERP and AE measures, but the establishment of the landscape park also helped to keep the traditional land use. Too short a time has elapsed since the establishment of the RPLP and start of the implementation of agro-environmental measures to detect significant changes or effects on grasslands. Certain signs of intensification (overly early moving, use of stable manure) represent threats to the existing good condition of the protected habitats and species; therefore, the started measures should continue and should be improved in both sides, e.g. to keep the existing biodiversity and enable farmers sustainable management of their land.

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