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63
3

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Contents

SPECIAL ISSUE – *The role of traditional, transforming and new commons in landscapes*

POSEBNA IZDAJA – *Vloga tradicionalnega, preobraženega in novega skupnega v pokrajinah*

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Front cover photography: Common lands, like the pastures around Čadrg, reflect socio-economic change in the landscape. Their conservation and successful management are crucial for preserving local culture and biodiversity and supporting sustainable development (photograph: Jure Tičar).
Fotografija na naslovnici: Skupna zemljišča, kot so pašniki v okolici Čadrga, so odsev družbeno-gospodarskih sprememb v pokrajini. Njihovo vzdrževanje in uspešno upravljanje sta nujni za ohranjanje lokalne kulture ter biotske raznovrstnosti in zagotavljanje trajnostnega razvoja (fotografija: Jure Tičar).

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WILL FARMERS COOPERATE TO CONSERVE BIODIVERSITY? THE USE OF COLLECTIVE BONUS IN THE HIGH NATURE VALUE FARMLAND IN SLOVENIA

Tanja Šumrada, Emil Erjavec

ANA NOVAK

Traditional agricultural landscape in Slovenia.

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Will farmers cooperate to conserve biodiversity? The use of collective bonus in the High Nature Value farmland in Slovenia

ABSTRACT: Nature conservation in farmland is often based on the wide adoption of suitable farming practices, which are effectively coordinated at the landscape level. However, more advanced policy approaches to spatial coordination often require cooperation between farmers. We use quantitative analysis of 521 surveyed farmers and qualitative thematic analysis of 123 interviews in Natura 2000 sites Haloze and Kras in Slovenia to explore farmers' preferences towards a collective bonus, which could stimulate higher adoption of grassland conservation schemes. Abandonment of farming, low interest in agri-environmental schemes and changes in social relations (individualisation of farming and distrust among actors) were identified as critical barriers to farmer cooperation in the context of agri-environmental policy.

KEY WORDS: agri-environmental measures, collective bonus, spatial coordination, collaboration among farmers, grassland conservation, Common Agricultural Policy, Slovenia

Ali bodo kmetje sodelovali na področju ohranjanja biodiverzitete? Uporaba skupinskega bonusa v kmetijski krajini visoke naravne vrednosti v Sloveniji

POVZETEK: Varstvo narave v kmetijskih ekosistemih pogosto temelji na primernih kmetijskih praksah, ki se morajo izvajati na velikih površinah in morajo biti učinkovito usklajene na krajinski ravni. Naprednejši pristopi politik k prostorskemu usklajevanju zato pogosto zahtevajo sodelovanje med kmetijskimi gospodarstvi. S kvantitativno analizo 521 anket in kvalitativno tematsko analizo 123 intervjujev na območjih Natura 2000 v Halozah in na Krasu v Sloveniji smo raziskali preference kmetovalcev do skupinskega bonusa, ki bi lahko spodbudil večje vključevanje v ukrepe za ohranjanje travišč. Kot ključne ovire za sodelovanje med kmeti v okviru kmetijsko-okoljske politike smo prepoznali opuščanje kmetovanja, nizek interes za kmetijsko-okoljske ukrepe in spremembe družbenih odnosov, kot sta individualizacija kmetovanja in nezaupanje med akterji.

KLJUČNE BESEDE: kmetijsko-okoljski ukrepi, skupinski bonus, prostorska koordinacija, sodelovanje med kmetovalci, ohranjanje travišč, Skupna kmetijska politika, Slovenija

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1 Introduction

Voluntary agri-environmental schemes (hereinafter AES) have been established worldwide to pursue a wide range of environmental policy objectives, such as reducing erosion, protecting water resources and biodiversity conservation. Together with regulatory approaches, they remain a fundamental policy approach for tackling the negative environmental side-effects of food and fibre production (Organisation for Economic … 2015). In the European Union, AES are implemented as part of the Common Agricultural Policy (hereinafter CAP) and probably represent the biggest source of conservation funding, often matching or exceeding national budgets for implementing biodiversity policy (Batáry et al. 2015). However, the conservation and ecological effects of AES have proved to be limited (Kleijn et al. 2006; Gamero et al. 2017; Šumrada et al. 2021a).

One of the critical drawbacks is that AES are often unable to achieve satisfactory results on the level of landscapes because the enrolment of farmers might be too low and implementation is limited to several isolated plots (Franks and Emery 2013). Furthermore, most AES are based on individual contracts with farmers and thus lack incentives for coordinating their efforts (European Network … 2019). The landscape-level approach is critical for conserving populations of wildlife species because many require large and unfragmented areas of suitable habitat. In order to enable species' movement between such areas, agricultural landscapes also need to retain a network of well-connected ecological corridors (Donaldson et al. 2017). The latter is particularly relevant in intensively-managed farmland, where structural elements, such as landscape features, can considerably improve conditions for wildlife when implemented on scales, which correspond to different species' ecological needs (Kleijn et al. 2011).

Most farms, especially in the parts of Southern, Central and Eastern Europe, are too small to enable the ecological connectedness described above (Sutcliffe et al. 2015). Furthermore, their land can be highly fragmented and scattered around the local area due to the historical development of land policy (Jepsen et al. 2015). Both researchers and governments have thus come up with various modifications of the individual-based AES design to promote a landscape-level approach to biodiversity conservation (Šumrada and Erjavec 2020). In some cases, the managing authority can coordinate farmers' behaviour simply by providing enough information and advisory support to encourage sufficient uptake of schemes among the local farms (Franks and Emery 2013). The managing authority can also offer agglomeration or threshold (collective) bonuses to the individual payment, which incentivise farmers' efforts to achieve a common goal, e.g. sufficiently big and unfragmented patches of suitably-managed habitat (Nguyen et al. 2022). However, in many cases, the complexity of AES objectives requires the establishment of an institutional setting, which encourages collaborative management at the local level. Such a setting can involve providing support to groups of farmers who implement AES collectively via cooperatives or other types of farmer organisations. Alternatively, third-party organisations, such as conservation NGOs, can be recruited as intermediaries between farmers and policy-makers operating at the central level (Kuhfuss et al. 2019). Most of these approaches have been tested mainly in theoretical and experimental settings, whereas real-world applications remain relatively rare (European Network … 2019; Nguyen et al. 2022). To establish an effective AES design and supporting institutions, it is thus essential to understand if and under what conditions are farmers willing to participate in coordinated or collaborative efforts for biodiversity conservation.

Research on farmers' preferences shows that they generally prefer individual agri-environmental contracts over collective commitments (Mamine et al. 2020). However, their resistance to coordinating their activities with other farmers seems surmountable if an additional (bonus) payment is offered (Kuhfuss et al. 2016). In fact, a recent review shows that such incentives exhibit high potential for increasing farmer participation, spatial coordination and environmental effectiveness in the AES (Nguyen et al. 2022). These results suggest that if farmers recognise tangible benefits through monetary incentives or reduced transaction costs, coordinated management can indeed become a viable policy approach (Reed et al. 2014).

However, the success of cooperation efforts can be determined by a number of economic, social, cultural and institutional factors. These include the availability of external support in the form of advice or funding, the level of trust between actors and shared cultural values on collective working (Kuhfuss et al. 2019). Farmers' willingness to accept the AES can also be increased by social norms, e.g. if other farmers recommend the scheme (Villamayor-Tomas, Sagebiel and Olschewski 2019) or have high adoption rates (Chen et al. 2009). Finally, long-term political support and a stable institutional setting are typically needed to establish cooperation at the local level and to enable flexible management of the scheme (Organisation for Economic … 2013).

This research is a part of a broader study on farmers' decision-making process and preferences toward alternative designs of AES for grassland conservation in Slovenia (Šumrada et al. 2022). The study took place in two Natura 2000 sites in Haloze and Kras, which can be considered typical High Nature Value farmlands in Slovenia (European Environment Agency 2012). Specific geological, climatic and other factors in both sites contributed to the development of dry grasslands of high conservation value, which require extensive management with late mowing or grazing (Jogan et al. 2004). A targeted AES was introduced in 2009 to incentivise their conservation (Žvikart 2010). However, the uptake by farmers has been very modest (e.g. in 2019, only 12% of target grassland areas were enrolled in Haloze and 52% in Kras) and thus the scheme did not achieve its conservation objectives (Kirbiš et al. 2020). Therefore, this study aimed to determine whether a different design of AES can improve farmers' willingness to maintain extensive use of dry grasslands.

In this paper, we aim to explore farmers' preferences towards coordination incentives in the AES and what would be their most suitable design. Given the lack of experience with AES involving cooperation in Slovenia, a relatively simple economic incentive in the form of a collective bonus payment, which would be offered to farmers involved in the coordination efforts (Šumrada and Erjavec 2020), was selected as a suitable setting for our discussion with farmers. Furthermore, we explore the critical barriers to cooperation between farmers in the framework of AES.

2 Methods

2.1 Study sites

Natura 2000 sites in Haloze and Kras are located in the eastern and south-western parts of Slovenia, respectively (Figure 1). Both research areas are characterised by gradual abandonment of farming in recent decades, followed by changes in land use and overgrowing with shrubs and forests (Žiberna 2012;

Figure 1: Map of Natura 2000 sites Haloze and Kras in Slovenia, where the study took place.

Kaligarič and Ivajnšič 2014). Based on our own analysis of land use and agricultural policy data, in 2019, most of the study areas were covered by forest (Kras 61% and Haloze 56%) and a significant share was covered by agricultural land in various stages of overgrowth (Kras 14% and Haloze 9%). Permanent grassland occupied 19% of the area in Kras (11,830 ha) and 24% in Haloze (4,176 ha), whereas permanent crops (mostly vineyards and orchards) covered further 2% of Kras and 5% of Haloze. There were few arable fields in both areas (0.8% in Kras and 3% in Haloze). As such, both areas represent a typical structure of land use types in Slovenia with a relatively high coverage of forests (59% in 2019) and a predominant share of permanent grasslands among the agricultural land use types (17%). However, the share of agricultural land in various stages of overgrowth was considerably higher in both study areas than the Slovenian average (4%).

Similar to many other rural regions in the Central and Eastern Europe (Sutcliffe et al. 2015), structural changes have been relatively slow in both, Kras and Haloze. To this day, a highly fragmented land structure has been preserved and small farms predominate. In 2019, there were 1,045 farms in the Natura 2000 site Kras and 977 in the Natura 2000 sites in Haloze. More than half of the farms managed less than 5 ha of agricultural land (Kras 52% and Haloze 59%), and a quarter managed 5 to 10 ha (Kras 26% and Haloze 25%). Only 4% of farms in Kras can be considered large, since they manage more than 50 ha of agricultural land, whereas in Haloze such farms account for only 1%. This structure is similar to the overall farm size structure in Slovenia, where 59% of farms managed less than 5 ha of land, 23% from 5 to 10 ha and 17% more than 10 ha of land, according to the data on agriculture, forestry and fishery at the national Statistical Office (2020; https://pxweb.stat.si/SiStatDb/pxweb/sl/30_Okolje/). Statistical data show that in 2010, two-thirds (66%) of farms in Kras were producing predominately for their own consumption and almost three-quarters in Haloze (74%).

2.2 Data collection

Interviews with farmers took place in March and April 2019 with the help of six trained interviewers (Figure 2). The sampling population consisted of all registered farms that regularly submit applications for the CAP income support and manage at least 0.3 ha of grasslands. We focused on farmers who submit their annual CAP application in the local offices of the public agricultural advisory service in Ptuj and Slovenska Bistrica

TANJA ŠUMRADA

Figure 2: Face-to-face interviews with farmers during the data collection in the study areas.

(Haloze), and in Sežana (Kras). There were approximately 680 such farms in Haloze and 650 in Kras. All farmers, who met the above criteria, were invited to participate in a face-to-face interview. A total of 258 interviews (38%) were conducted in Haloze and 263 (41%) in Kras (Table 1).

Interviews followed a structured questionnaire, which consisted of three parts: (1) knowledge of and experience with agricultural policy measures and attitudes towards grassland conservation; (2) preferences regarding possible AES designs; (3) demographics and characteristics of the farm. During the interviews, we expanded the questionnaire with additional questions whenever possible. This provided us with in-depth answers and explanations from farmers, which were then the subject of qualitative analysis. Before the interview, we asked each farmer for permission to record the conversation, to which 347 farmers agreed (159 in Haloze and 188 in Kras). Before the data collection, we tested the questionnaire by surveying 22 farmers in both research areas.

2.3 Quantitative data analyses

The study of farmers' preferences towards coordination incentives was centred around two research objectives. In the quantitative analyses, we focused on farmers' preferences towards the bonus type. The collective bonus was defined as an additional (top-up) payment to each participating farmer if a targeted extent of grassland area is enrolled in the scheme in the particular Natura 2000 site. After presenting the concept of a collective bonus to farmers, we inquired what would be the most suitable conditions for the bonus activation. We offered two options that theoretically require different levels of direct communication between farmers: (1) a bonus, which would be paid to farmers when the target area is reached at the level of the whole Natura 2000 site (hereafter »Natura 2000« bonus), and (2) a bonus, which would be awarded to farms on a local level (e.g. in a couple of neighbouring villages) when a corresponding share of the Natura 2000 site target area would be reached. We aligned the target area for the »Natura 2000« bonus payment with conservation objectives determined for each site in the Natura 2000 management programme 2015–2020, i.e. 1,097 ha for Haloze (26% of registered permanent grasslands) and 2,280 ha (24%) for Kras (Vlada Republike Slovenije 2015). To determine the influence of the farmers' views on the feasibility of the »Natura 2000« bonus, we provided farmers with a visual presentation of the Natura 2000 site and asked them how likely the target would be reached in the study area.

Quantitative data analyses of farmers preferences towards different types of collective bonus and its feasibility, as well as the potential influence of different socio-economic factors were performed in the STATA (StataCorp, version 16.1). The homogeneity of the nominal variables was checked with the chi-square test to compare the samples between the two study areas, previous experience with AEM and farm characteristics. We used one-way analysis of variance (ANOVA) and the Bonferroni test to verify the averages of the numerical variables, describing the socio-economic factors and farm characteristics. The Kruskal-Wallis test was used as a non-parametric alternative. The latter was also used in the case of ordinal variables (Acock 2014).

2.4 Qualitative data analyses

The second research objective focused on eliciting the critical barriers to cooperation between farmers in the agri-environmental policy setting. After listening to all the interview recordings, we selected a total of 123 interview recordings (61 from Haloze and 62 from Kras), in which farmers gave the most in-depth additional answers and were, therefore, best suited for qualitative analysis (Table 1). Interviews lasted between 22 and 90 minutes. We read or listened to the recordings several times and encoded relevant segments, where farmers discussed cooperation, social relations, agri-environmental measures and agricultural and other development trends in the region. The codes were generated inductively while reading the interviews. After several stages of reviewing, the codes in this study were then grouped into topics connected to preferences towards the bonus type and various barriers to farmer cooperation, including individualisation of farming, trust between actors, interest of farmers to enrol in the scheme, farm abandonment, and land structure and fragmentation (Braun and Clarke 2006). Qualitative analysis was conducted in Atlas.ti (Cleverbridge, version 8.4).

Table 1: Interviewed farmers and their comparison to the whole farmer population in the study sites in Haloze and Kras in 2019 (AEM – currently enrolled in the agri-environmental measure, HAB – currently enrolled in the existing scheme for grassland conservation) (adapted from Integrated administration and control system (IACS) database of Slovenia and own research data).

	Farmer population (n = 2,022)				Survey sample (n = 521)				Qualitative sub-sample (n = 123)			
	%	Mean	SD	Range	%	Mean	SD	Range	%	Mean	SD	Range
Farm size [ha]		8.8	16.28	0.5–271.7		11.7	26.59	1.0–271.7		19.0	41.90	1.5–271.7
Grasslands [ha]		6.8	15.02	0.0–271.7		9.8	22.70	0.3–270.0		16.9	38.49	0.3–270.0
Livestock or mixed farms	63.2				64.5				70.6			
Age of farm holder [yrs]		59.5	14.44	20–98		59.5	13.74	20–95		59.3	13.76	27–94
Gender - male	67.4				67.4				72.3			
AEM	16.5				29.2				30.3			
HAB	8.0				15.2				11.8			

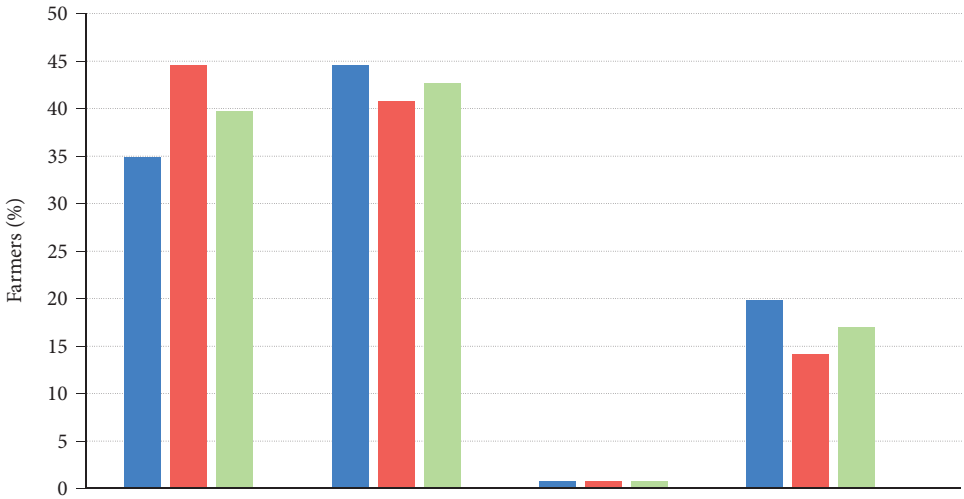
3 Results

3.1 Farmers' preferences towards the type of bonus

About 40% of respondents opted for the »Natura 2000« bonus, whereas slightly more farmers (43%) believed it would be better if the bonus was awarded to farms on a local level (Figure 3). Farmers in Kras were statistically more likely to opt for the »Natura 2000« bonus, whereas in Haloze respondents preferred the bonus, which would be awarded locally ($\chi^2(2) = 5.99$, $p = 0.05$). No other statistically significant differences between farmers, e.g. in relation to their farms' size (ANOVA, $p = 0.779$) or production orientation ($\chi^2(6) = 7.24$, $p = 0.300$), were detected. However, farmers who chose neither of the available options were, on average, somewhat older than other respondents (ANOVA, $p < 0.05$).

The reasons for the farmers' preference toward different types of bonuses could potentially be attributed to the disbelief in the feasibility of the biodiversity policy objectives. Therefore, we asked them how likely they think will the target area be reached at the level of the Natura 2000 sites. Interestingly, farmers who thought that the target was very likely to be reached more often chose the »Natura 2000« bonus option, whereas those who were less convinced were more likely to opt for the locally-awarded bonus option ($\chi^2(4) = 17.71$, $p < 0.01$).

A fifth (21%) of the respondents thought that the target was very likely to be reached and almost half believed that it was possible (47%) (Figure 4). There were no statistically significant differences between the study areas ($\chi^2(3) = 2.04$, $p = 0.564$). We also did not detect statistical differences in terms of farmers' knowledge of agricultural policy (K – W, $p = 0.565$), previous experience with agri-environmental measures



	If the target area is reached at the level of Natura 2000 site.	If several neighboring farms reach a local target.	I don't know.	Neither.
Haloze	34.9	44.6	0.8	19.8
Kras	44.5	40.7	0.8	14.1
Total	39.7	42.6	0.8	16.9

Figure 3: Possible collective bonus designs to incentivise coordination and higher participation rates in the AES (Haloze n = 258, Kras n = 253, Total n = 521).

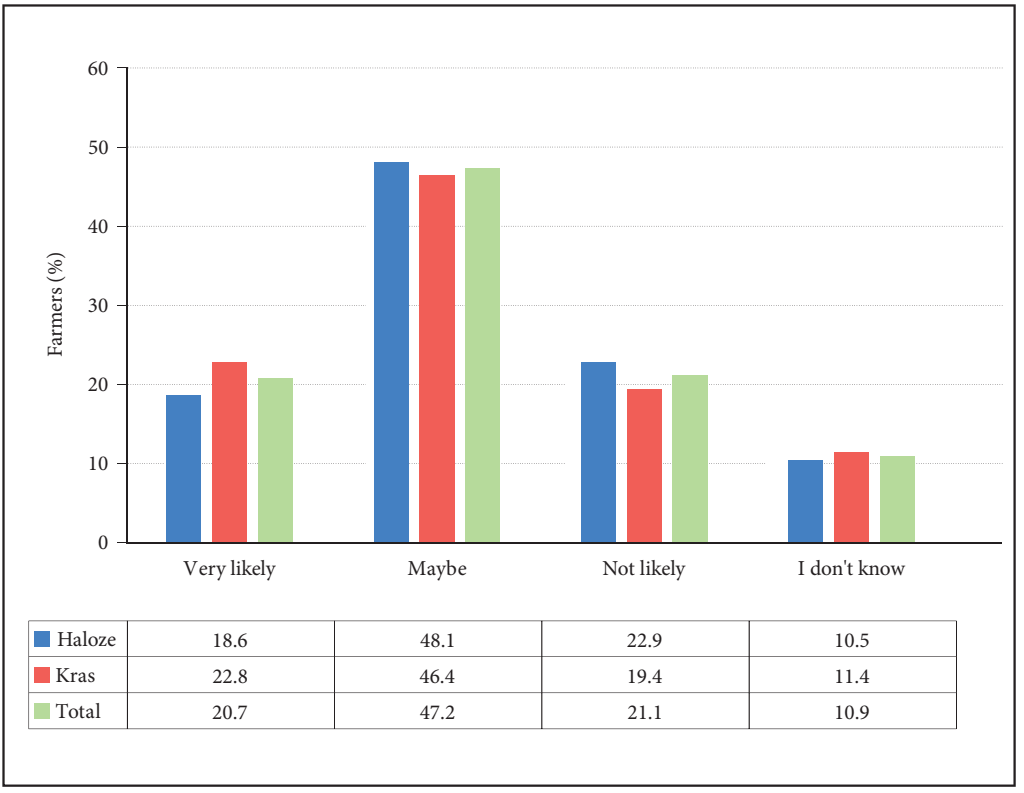
($\chi^2(6) = 6.29$, $p = 0.392$), farm size (ANOVA, $p = 0.262$) or production orientation ($\chi^2(9) = 4.84$, $p = 0.848$). Older farmers were more likely to state that the realisation of the target enrolment was unlikely, while younger farmers tended to be more optimistic (ANOVA, $p < 0.001$).

3.2 Critical barriers to farmer cooperation

In farmers' opinion, the key barriers to establishing cooperation with their peers in the AES are the abandonment of farming and rural depopulation (Table 2). In the study areas, both processes might indeed considerably influence the potential for coordinating activities because farmers pointed out that they have often become relatively isolated (e.g. the only farm left in the village). Furthermore, many farmers highlighted the ageing of the farmer population in this context, which might further limit the acceptance of new policy approaches.

The bonus payment (EUR 40/ha) was estimated as too low to overcome the reasons why existing farmers do not choose to enrol in the scheme, such as decreased fodder quality due to late mowing and administrative obligations. It is thus not surprising that when farmers were asked to rank five features of the scheme's design, the collective bonus was ranked the lowest (avg = 4.22, SD = 1.069), whereas the most important features were the technological conditions for receiving individual payment (avg = 2.25, SD = 1.332), such as the mowing and grazing regime, and the amount of payment (avg = 2.44, SD = 1.170) (Figure 5). This was followed by the advisory support (avg = 3.03, SD = 1.120) and the monitoring approach (3.06 place, SD = 1.388).

However, drawbacks to cooperation between farmers can also be traced to lifestyle changes in the agricultural community, where farming is becoming increasingly individualised, and other social factors, such



Haloze	18.6	48.1	22.9	10.5
Kras	22.8	46.4	19.4	11.4
Total	20.7	47.2	21.1	10.9

Figure 4: Farmers' assessment of the feasibility of reaching the conservation targets (i.e., extent of grasslands enrolled in the scheme) set for their Natura 2000 site in the Natura 2000 management programme (Haloze n = 258, Kras n = 253, Total n = 521).

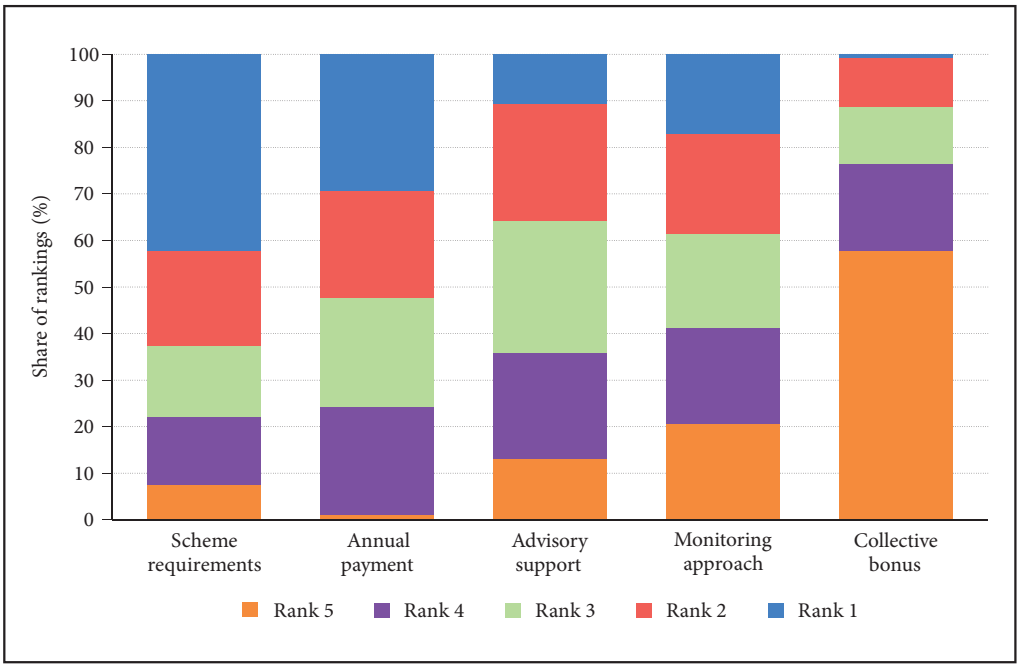


Figure 5: Share of farmers' rankings of the importance of different factors when they consider entering the AES for extensive use of grasslands (rank 1 – most important, rank 5 – least important) (n = 521).

Table 2: Barriers to cooperation between farmers in the framework of AES for extensive use of grasslands (Haloze n = 61, Kras n = 62).

Barrier to cooperation	No. of farmers	Example quotes
Farm abandonment and depopulation	37 (Haloze 14, Kras 23)	*In my village, for example, I have no neighbouring farm because I am the only one [left]. There's one [farm] more [in the vicinity], but whether they intend to enrol [in the AES] or not, I don't know.* (Kras, interview 119) *No one will opt for this [bonus] because there are simply no people left to do it. This is the worst thing that could happen. Even if someone wanted [to coordinate], he himself now mows [the meadows] when he has time and when there is suitable weather. /. . ./ When you get older, you can no longer enrol [in the AES] because you cannot oblige yourself. But there are no young people [to enrol] either.* (Haloze, interview 19)
Low interest in enrolling in the scheme	21 (Haloze 9, Kras 12)	*Everything depends on the presence of animals on the farm. Because most farms are now without animals and thus not tied to produce fodder, they can delay the mowing date a bit and [consequently] enter this measure. Now, if the feed quality is also important, then these [conditions of the scheme] are more difficult to reach. There are few animals in the Kras now. I can't estimate how many ... I have no idea. But a young farmer will probably find it easier to get involved than the old one. /.../ However, I don't think they will.* (Kras, interview 152)
Individualisation of farming	20 (Haloze 12, Kras 8)	*Yeah, it would be great if [the bonus payment] could be organised locally. It would be a tremendous success. But here [in my community], there are primarily winegrowers now. There are also those who came and moved here. You see them with cattle every now and then. [But] we don't really know each other.* (Kras, interview 159)
Distrust among farmers	20 (Haloze 4, Kras 16)	*This [bonus payment] doesn't seem likely to me at all. It ties you to someone else. Farmer should be bound only to himself. /.../ You can't force someone else to work . . . and then someone does something wrong and we're all in it. /.../ You can only rely on yourself, not on a neighbour or someone else, because sanctions would be on everyone if one does not adhere to conditions.* (Haloze, interview 22)
Land fragmentation and small size of farms	9 (Haloze 2, Kras 7)	*It's a little specific here [in Kras], because the plots are very small and fragmented. On average, they are only one thousand square meters in size. I don't even know how many parcels I needed to obtain to somehow reach [the current size of the farm].* (Kras, interview 131)

as mistrust between farmers with different production orientations and between »native« farmers and »newcomers«, who set up farms in the area in recent years (Table 2). When comparing the key barriers between the study areas, the farmers in Kras more often pointed out mistrust and the problems of farm abandonment and land fragmentation than in Haloze. By contrast, interviewees in Haloze seemed more often concerned with the individualisation of farming than in Kras (Table 2).

4 Discussion

In areas with highly fragmented farm structure and small farms struggling to respond to market pressures, farm economic resilience can be increased through cooperation, which can reduce production costs, improve market access and reduce transaction costs in obtaining agricultural policy funds (Valentinov 2007). In particular, if additional incentives are offered to reduce the transaction costs related to communication (Reed et al., 2014). However, research shows that the decision to cooperate goes beyond economic factors and is much more complex, because it is heavily influenced by social norms, the ability to develop a shared understanding and commitment, and contextual factors, such as past experience and governance structures (Ansell and Gash 2007).

Trust between the prospective collaborators has been consistently emphasised in the literature as a foundation for building cooperation among farmers (Kuhfuss et al. 2019). Trust develops by bridging conflicting perceptions of risk, which can create new opportunities for future collaboration (Slovenc and Erjavec 2021). In our study, farmers often highlighted the risk of free-riding, where incompliance with the rules of the AES by some farmers could potentially affect the whole group (Table 2). Farmers often justified their selection of the bonus, which would be awarded locally, by referring to this risk since they would have more control by working with the people they know. This shows a potential for establishing peer-based control, which is considered important for the success of the collective AES (Prager 2015).

The building of trust in the relationships typically develops over time, so past experience can significantly influence the success of cooperation attempts (Kuhfuss et al. 2019). In Slovenia, the collapse of the local agricultural cooperatives due to the loss of Yugoslav markets in the 1990s and further negative experience with attempts to re-establish them has importantly influenced farmers' perceptions. Furthermore, this negative cultural experience seems to have passed on to the next generation of young farmers as well (Slovenc and Erjavec 2021). Although some references were made to these past events, suggesting similar experiences in the study areas, farmers in our interviews rarely directly connected this legacy and to potential cooperation in the agri-environmental context. This is in line with the conclusion of Riley et al. (2018) that farmer-to-farmer relations are not universal and can differ between farming activities. However, it should be noted that a collective bonus is a relatively simple policy incentive, so the negative experience with cooperation, albeit from a different context, might still become relevant in the case of more complex policy designs, such as a collective AES (Prager 2015).

The development of agriculture in the past decades has significantly influenced farmers' decision-making in other ways as well. Dramatic technological, social and economic changes in rural areas after World War II significantly changed farmers' identities and how they cooperate. Agriculture has gradually changed from a common activity, in which all households in the village participated, to a sector where only a few (semi-)professional farmers operate. Farming has thus become an increasingly individual endeavour (Riley et al. 2018). Farmers in our study have highlighted the same process:

> »In our village, the abandonment of animal husbandry and farming began [in Yugoslavia] when [the police officers] started to punish [local farmers] for leading the cattle over the newly built regional road leading to the coast. /…/ At that time, about a third [of local inhabitants] abandoned farming. The next third went out of the business when the local dairy cooperatives disbanded [after Slovenia gained independence in the early 90s]. And the last third disengaged when it was no longer allowed to slaughter the animals at home [due to the new sanitary rules enforced before Slovenia joined the EU]. Now there is only a couple of farms left in the village« (interview 65, Kras).

This quotation shows that farmers experienced the sector's transformation in the last decades as a series of important structural breaks, which have been closely connected to the abandonment of farming. In the last decades, the agricultural policy may have further promoted individualisation in agriculture, including

by establishing the agri-environmental measure, where payments are based exclusively on individual contracts (Riley et al. 2018).

Consequently, farmers in the study areas now rarely communicate with each other, especially with peers that operate mainly in other agricultural sectors (e.g. winegrowers with cattle breeders) (Table 2). Furthermore, we noted that there is sometimes a tension between »native« farmers and newcomers, who immigrated to the area and have begun farming only recently, because these farmers often have different worldviews, including in the field of environmental protection. Similar tension has been highlighted between conventional and organic farmers in another Slovenian region Goričko (Slovenc 2019), which has some similar natural and structural characteristics to agriculture in Haloze, where organic farmers are often newcomers in the local farming community. Lack of communication, particularly on topics related to agri-environmental management, and social tensions, which inhibit the establishment of shared visions and trust, have been highlighted as important factors, which could potentially inhibit farmer cooperation (Riley et al. 2018). Therefore, some farmers in our study felt that a »Natura 2000« bonus payment would make more sense, because they believed it would be nearly impossible for them to come to an agreement with their peers at the local level.

Finally, a critical mass to establish cooperation between farms might be difficult to reach in the study areas due to the abandonment of farming (Table 2). In the interviews, farmers often pointed out that they were now the only or one of the few remaining farms in their village, so they did not believe there were enough peers to communicate with. This obstacle was highlighted more often by respondents from Kras (Figure 5), which could explain the difference in preferences towards the bonus type between the two areas in the quantitative part of the survey. This difference could stem from the fact that the farm abandonment process might be more advanced in the Kras (Kaligarič and Ivajnšič 2014), but this was not possible to confirm in this study.

However, we can conclude that farm abandonment can play a significant role in the potential for collaborative agri-environmental management. This problem has been rarely highlighted in the literature, which might be connected to the fact that the existing examples of collective action in the AES come almost exclusively from Western and Central Europe (Prager 2015), where this process might have been less intensive. By contrast, it has already been established that the lack of viable farms on the local level can inhibit economic cooperation between farmers in Slovenia (Slovenc and Erjavec 2021). As farm abandonment is a complex issue, involving several other factors and trends, including employment opportunities, population density, land structure and intensity of farming (Levers et al. 2018), the AEMs can probably serve only as one of the several complementary rural and regional development policy instruments (Šumrada et al. 2021b). Due to lack of research, it is currently not clear if collective or collaborative approaches to AES can be more effective than the schemes based on individual contracts in reaching agri-environmental objectives in these areas. However, it would be worth exploring if collective AES could also indirectly stimulate overall farming activity at the local level (Prager 2015).

5 Conclusion

The implementation of the agri-environmental policy often requires coordination of action at the landscape level because it is necessary to ensure a sufficient extent of contracted land to achieve the environmental objectives (Franks and Emery 2013). The design of such incentives may range from information measures to ensure a sufficient density of individual contracts to collective action, which enables groups of farmers to submit collective plans for managing a certain area (Šumrada and Erjavec 2020).

This contribution provides one of the first insights into farmers' preferences for cooperation in the field of agri-environment in Slovenian agriculture, where low willingness to cooperate among farmers has often been highlighted (Erjavec et al. 2018). However, the reasons for this, especially in the field of obtaining agricultural policy funds, are relatively poorly researched (Slovenc and Erjavec 2021). Furthermore, there has been limited experience in incentivising cooperation in the agri-environmental policy (European Network … 2019), although some schemes, e.g. mountain grazing, where the management has traditionally been common, do already allow enrolment of the groups of farmers (Uredba o ukrepih kmetijsko-okoljska-podnebna plačila, ekološko kmetovanje in plačila območjem z naravnimi ali drugimi posebnimi omejitvami iz Programa razvoja podeželja Republike Slovenije za obdobje 2014–2020, Uradni list RS 20/22).

Farmers in our study attributed relatively low importance to the collective bonus in their decision-making process, especially when compared with other aspects of the AES design. However, there was considerable heterogeneity in farmers' preferences regarding how the bonus should be awarded. These differences were mainly related to the optimism regarding the achievement of the conservation targets, perceived risk of free-riding, and individualisation in farm management. In both research areas, potential cooperation between farmers could also be considerably limited by the abandonment of farming, which has left only one or a few active farmers in some villages.

In the study areas and other regions with similar socio-economic contexts, spatial coordination and sufficient extent of contracted land to achieve conservation goals might thus be more feasible to achieve by working with farmers on the individual level (Franks and Emery 2013). To achieve this, third-party organisations, such as local advisory services, protected area management authorities and conservation NGOs, could be recruited to help with information-sharing and communication (Kuhfuss et al. 2019). In this sense, the introduction of the collective bonus might still be a useful incentive, because it could indirectly guide the operation of such institutions and help with the promotion of the scheme. However, other instruments, such as knowledge transfer and cooperation measures within the CAP, are probably more important and should be prioritised in pursuing this endeavour.

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