

Financial support measures for endangered local (autochthonous) livestock breeds in Slovenia

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Abstract

In Slovenia, 14 local, 14 traditional and 27 foreign breeds are monitored, with particular emphasis placed on the preservation of local (autochthonous) Slovenian breeds. Local (autochthonous) breeds are breeds that originated in the territory of the Republic of Slovenia, whereas traditional breeds are those that have adapted to the climatic and other conditions of a specific geographical area and have been subject to continuous breeding for at least 30 years, or at least 50 years in the case of horses and cattle. All other breeds are referred to as foreign breeds.

Around the turn of the millennium, several populations of local (autochthonous) breeds in Slovenia faced the threat of extinction. Through targeted professional measures and financial support from the national government, not only has genetic heritage been preserved, but many breeds have shown substantial recovery in population size.

Breeders who raise endangered local (autochthonous) breeds receive financial support under the EU Common Agricultural Policy and the national long-term programme for the conservation of livestock diversity. The support is based on data regarding the number of purebred female and male breeding animals and the overall population size, which serves as the basis for assessing each breed's risk status. This article presents an overview on the scope and amount of financial support allocated to breeders for the conservation of endangered local (autochthonous) Slovenian breeds in the period 2007–2024.

Keywords: animal genetic resources, biodiversity, endangered breeds, financial support measures

Introduction

Conservation of animal genetic resources for food and agriculture encompasses the diversity of genes, breeds, and populations of animal species that contribute to food production and sustainable agricultural systems. This dimension of biodiversity constitutes a fundamental basis for agricultural development and represents a key element in global efforts to ensure food security and combat hunger (BOETTCHER et al., 2010; CBD, 2011; FAO, 2007).

Local (autochthonous) breeds are livestock populations that have developed through long-term adaptation to specific agro-ecological conditions, traditional farming systems, and cultural environments. They originate from defined geographical regions, exhibit traits shaped by local environmental pressures, and are predominantly utilised within these areas (FAO, 2013). However, in recent decades, the survival of local (autochthonous) breeds has been increasingly threatened by the expansion of intensive livestock production, genetic homogenisation, and broader processes of economic globalisation. According to FAO (2021), almost 30% of the world's local (autochthonous) breeds are currently classified as at risk of extinction. In Slovenia, the conservation of animal genetic resources (AnGR) is embedded in sectoral strategies, national plans, and long-term programmes. The Long-Term Programme for the Conservation of Biodiversity of AnGR serves as a central strategic document, identifying priority measures for the preservation of genetic resources, with a particular focus on Slovenian local (autochthonous) breeds (MKGP, 2023a). National legislation officially recognises 14 breeds and one subspecies as local (autochthonous): five sheep breeds, four horse breeds, one cattle breed, one pig breed, one goat breed, one chicken breed, and the Carniolan honeybee (*Apis mellifera carnica*).

At the beginning of the 2000s, several Slovenian local (autochthonous) breeds were considered critically endangered. Through the implementation of targeted conservation measures and financial support provided by the national government, population recovery has been substantial. Not only has the genetic heritage been safeguarded, but population sizes have also markedly increased. The most notable recovery has been observed in the Cika cattle, whose population grew 5.4-fold during the monitoring period. Significant growth was also recorded in the populations of the Krškopolje pig, Drežnica goat, and Posavje horse, each more than doubling in size.

Under the framework of the EU Common Agricultural Policy (CAP) and Slovenia's long-term programme for the conservation of livestock genetic resources, farmers engaged in breeding endangered local (autochthonous) breeds are eligible for targeted financial incentives. Support allocation is based on demographic indicators such as the number of registered purebred breeding females and males and the effective population size, which together inform risk status assessments of each breed.

This paper aims to provide a comprehensive analysis of the scope and scale of financial measures implemented to support breeders in conserving endangered Slovenian local (autochthonous) breeds during the period 2007–2024.

Status of animal genetic resources in Slovenia

For decades, the FAO has encouraged member states to prioritise the conservation of animal genetic resources (AnGR) that are essential for agriculture and food security (HOFFMANN, 2011). A comprehensive understanding of the biodiversity, distribution, phenotypic characteristics, and productive performance of AnGR is indispensable for their effective and sustainable utilisation, improvement, and long-term conservation. One of the most important instruments to achieve these objectives is the systematic monitoring and analysis of population status and demographic trends at global, regional, and national levels (FAO, 2007).

Slovenia has established a policy framework for the monitoring of livestock biodiversity through the Livestock Breeding Act (Ur. list RS, 2002) and the Biodiversity Regulation (UR. LIST RS, 2004a). The national Breed Register with zootechnical assessment (REGISTER, 2024) currently recognises 14 local (autochthonous) breeds, 14 traditional breeds, 27 foreign breeds, and one additional breed that does not fall into any of these categories. The highest number of recognised breeds is recorded in cattle and horses (12 each), while goats account for four breeds and chickens for five breeds. Local (autochthonous) breeds represent only 17.6% of all purebred animals in Slovenia, whereas traditional breeds account for 40.1% and foreign breeds for 41.3%. Notably, most of these breeds have been incorporated into structured breeding programmes and systematic selection schemes for over two decades.

Among the local (autochthonous) breeds, the largest populations are represented by the Jezersko-Solčava sheep (Figure 1), the Improved Jezersko-Solčava sheep, the Cika cattle, and the Bovec sheep. Collectively, these four breeds constitute 73.5% of all breeding animals within the category of local (autochthonous) breeds. By contrast, the smallest populations are observed in the Bosnian Mountain Horse, followed by the Lipizzaner horse and the Drežnica goat. Within the group of traditional breeds, Simmental cattle is the most numerous, followed by Brown cattle. Excluding these two dominant breeds, the remaining traditional breeds account for only 5.8% of the total population. The group of foreign breeds is overwhelmingly dominated by Black-and-White cattle, which represent 90.5% of all purebred animals in this category.

Population dynamics between 2003 and 2024 reveal divergent trends. Most local breeds have shown population growth, while the majority of traditional breeds have declined. The strongest increase was observed in Cika cattle: in 2006, only 567

purebred females and males were registered, but by 2024 the number had risen 5.4-fold, reaching 3,371 animals recorded in the herd book. Other breeds with notable population recovery include the Krškopolje pig (Figure 1), the Drežnica goat, and the Posavje horse, all of which have increased by at least 2.8-fold during the same observation period.



Figure 1: left: Jezersko-Solčava sheep, right: Krškopolje pig

Financial support for conservation of animal genetic resources in Slovenia

In Slovenia, the conservation of animal genetic resources (AnGR) relevant for agriculture and food production is primarily regulated by the Livestock Breeding Act (UR. LIST RS, 2002) and by measures implemented within the framework of the Common Agricultural Policy (CAP). The Livestock Breeding Act explicitly recognises the protection of local (autochthonous) livestock breeds and establishes the principal conservation methods (*ex situ* and *in situ*), along with the objectives and guidelines of the National Programme for the Protection of Biodiversity in Livestock Breeding.

Building on this legislative basis, the Rules on Biodiversity (UR. LIST RS, 2004a) further specify the practical conservation approaches, define the structure and content of the biodiversity conservation programme, regulate the operation of the national gene bank, and establish the criteria for determining the endangered status of breeds.

On this foundation, the Ministry of Agriculture has adopted a series of long-term programmes for the conservation and sustainable use of AnGR:

- **2001–2008** – the first comprehensive national programme,
- **2010–2016** – continuation with emphasis on monitoring,
- **2017–2023** – updated alignment with EU policy,
- **2024–2030** – the current programme with a stronger focus on sustainability and international commitments.

These strategic documents were developed in accordance with international and European policy frameworks, most notably: the Convention on Biological Diversity (UN, 1992), the Global Plan of Action for Animal Genetic Resources (FAO, 2007), and the EU Biodiversity Strategy to 2030 (CBD, 2020). The financial framework for the implementation of conservation activities and programme tasks during the period 2007–2024 is presented in Figure 2.

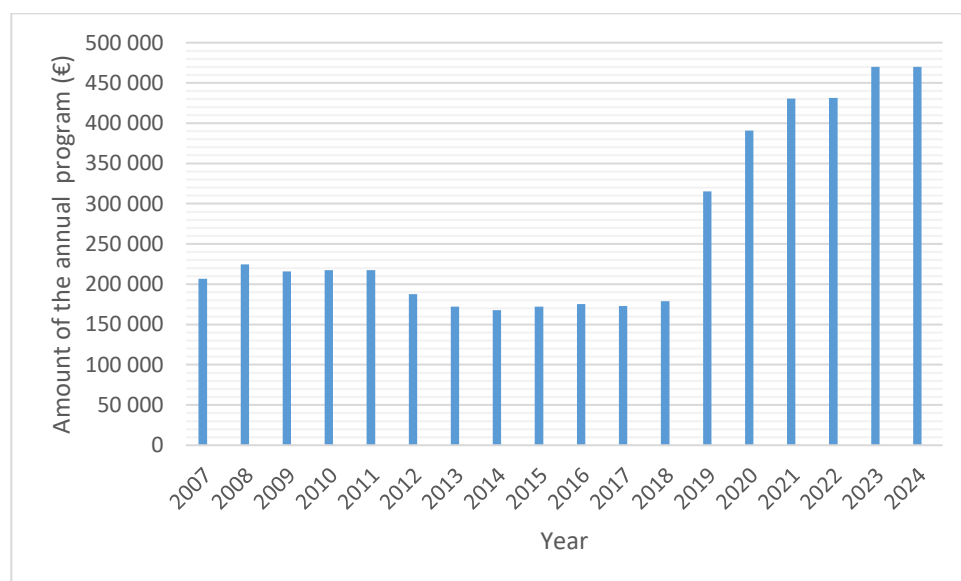


Figure 2: Financial framework for the implementation of the Biodiversity Conservation Program in Slovenian livestock 2007-2024

Support for breeders of local (autochthonous) and traditional breeds within Agri-Environmental Schemes

Since Slovenia's accession to the European Union in 2004, the breeding of local (autochthonous) livestock breeds at risk of extinction has been financially supported through agri-environmental programmes (Ur. list RS, 2004b). Beginning in 2023, this support has been incorporated into the "Local Breeds" intervention within the framework of the national CAP Strategic Plan.

The payment levels per individual animal or per livestock unit have varied substantially across different programming periods. In the initial years of programme implementation, the total funds disbursed for conservation activities remained relatively stagnant. However, from 2014 onwards, a consistent annual increase has been recorded. This positive trend can be attributed to several interrelated factors:

- gradual increases in the payment rate per animal,

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- a rising number of participating breeders, and
- an expansion in the number of animals registered under the “*Breeding of local breeds*” measure.

The aggregate funds allocated for the conservation of Slovenian local (autochthonous) and traditional breeds under agri-environmental and CAP measures during the period 2007–2024 are presented in Figure 3.

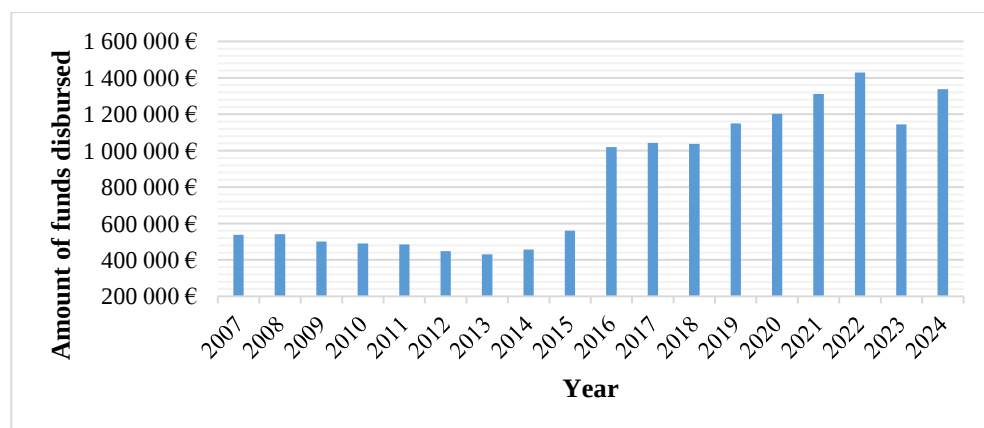


Figure 3: The total amount of funds disbursed under the strategic plan for local (autochthonous) and traditional breeds

In Slovenia, *in situ* conservation is implemented through CAP measures, the funding of collective breeding programmes, and activities carried out under the national conservation programme. The conservation of local (autochthonous) and traditional farm animal breeds encompasses a range of strategies aimed at maintaining genetic diversity, promoting sustainable utilisation, and ensuring long-term survival (FAO, 2009).

In situ conservation refers to the maintenance of local (autochthonous) breeds within the production systems in which they have developed their specific traits and where they traditionally occur (FAO, 2013). In Slovenia, the payment levels per individual animal for the measure “*Breeding of local breeds*”, which targets breeds threatened with extinction, are presented in Table 1.

Table 1: Payment amounts per individual animal of local (autochthonous) breeds (Ur. list RS. 2004b; MKGP, 2023b).

Year of implementation	2004-2006	2007-2010	2007-2014	2015	2016-2022		2024	
					indigenous	traditional	indigenous	traditional
Payment	€/LU*	€/LU*	€/LU*	€/LU*	€/LU*	€/LU*	€/LU*	€/LU*
Cattle/horses	120	72	89.38	116.17	193.62	116.17	168.79	112.52
Sheep/Goats	120	10.8	89.38	116.17	193.62	116.17	168.79	112.52
Pigs	120	28	89.38	116.17	193.62	116.17	168.79	112.52
Poultry	120	1.008	89.38	116.17	193.62	116.17	168.79	112.52

*LU=livestock unit

In 2024, financial support under the CAP was provided for 19,825 animals belonging to Slovenian local (autochthonous) breeds. Within this group, the Jezersko-Solčava sheep, the improved Jezersko-Solčava sheep, and the Cika cattle accounted for the highest share of payments. Among the horse breeds, the Slovenian Cold-blooded horse received the largest amount of support, followed by the Posavje horse, the Lipizzaner, and the Bosnian Mountain horse (Table 2).

Table 2: Number of animals of individual local (autochthonous) breeds for which breeders have received agri-environmental payments under the measure "*Breeding of local breeds*"

Breed/Year	2004	2008	2012	2016	2020	2024
Lipizzan horse	504	587	517	539	513	614
Posavje horse	368	567	492	617	813	1130
Slovenian cold-blooded horse	1520	2053	1282	992	1130	1336
Bosnian mountain horse	/	/	/	/	/	36
Cika cattle	434	829	905	1451	2168	2952
Krškopolje pig	292	566	471	983	1327	1074
Jezersko-Solčava sheep	3828	4810	3855	3275	3444	4227
Improved Jezersko-Solčava sheep	/	/	/	/	/	3928
Istrian pramenka	661	752	542	662	670	735
Bela Krajina Pramenka	439	588	406	503	552	487
Bovec sheep	1353	1543	1608	1635	1848	1951
Drežnica goat	210	288	255	372	450	712
Styrian hen	410	360	/	601	628	643

The distribution of payments reflects both the demographic structure and the conservation status of Slovenian local (autochthonous) breeds. The Jezersko-Solčava sheep, the improved Jezersko-Solčava sheep, the Cika cattle, and the Bovec sheep received the largest share of support, which is consistent with their relatively large population sizes and their central role in traditional farming systems. These breeds represent the backbone of local production and, despite their recovery in recent decades, remain classified as endangered, thereby justifying targeted financial incentives.

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Among horses, the predominance of payments for the Slovenian Cold-blooded horse and the Posavje horse corresponds to their economic importance and wider distribution, while the Lipizzaner and the Bosnian Mountain horse received smaller shares, reflecting their lower population sizes and narrower breeding bases. The structure of financial support therefore mirrors the dual objectives of conservation policy: to prevent further decline of numerically small populations and to sustain breeds with a stronger role in agricultural practice.

The common breeding programmes are financed by the Ministry of Agriculture, Forestry and Food in accordance with Regulation (EU) 2016/1012, which obliges Member States to support sustainable breeding schemes aimed at both the improvement and conservation of breeds. Particular emphasis is placed on endangered local (autochthonous) breeds, while maintaining genetic diversity within and between populations. In Slovenia, the total funding allocated for all breeding programmes amounts to approximately 8.8 million euros. In comparison, payments provided through the CAP for the conservation of local (autochthonous) and traditional breeds account for about 1.4 million euros. The number of breeders receiving CAP payments for the breeding of local (autochthonous) breeds is presented in Table 3.

Table 3: Number of breeders receiving payments for the breeding of autochthonous breeds

Breed/Year	2004	2008	2012	2016	2020	2024
Lipizzan horse	87	83	47	47	44	62
Posavje horse	123	161	89	89	112	164
Slovenian cold-blooded horse	589	616	287	189	186	232
Bosnian mountain horse						12
Cika cattle	189	226	178	259	319	437
Krškopolje pig	30	48	35	50	50	41
Jezersko-Solčava sheep	122	136	102	93	90	101
Improved Jezersko-Solčava sheep						67
Istrian pamenka sheep	5	4	3	3	4	8
Bela-Krajina sheep	17	18	13	17	17	18
Bovec sheep	23	25	18	16	18	17
Drežnica goat	16	17	14	17	22	45
Styrian hen	9	2	/	7	9	8

The data in Table 3 illustrate the number of breeders participating in CAP measures for the conservation of local (autochthonous) breeds. The trends are heterogeneous: while participation has increased substantially for some breeds, such as Cika cattle, Posavje horse, and Drežnica goat, other breeds, including the Slovenian Cold-blooded horse, Lipizzaner, and Jezersko-Solčava sheep, have experienced a decline in breeder numbers over the observation period. These fluctuations are closely linked

to changes in payment rates per animal, administrative requirements, and the demographic dynamics of breeding populations. For newly included breeds, such as the Improved Jezersko-Solčava sheep and the Bosnian Mountain horse, participation in 2024 reflects their more recent recognition within conservation programmes.

The number of breeders is therefore not only a direct indicator of financial support but also a proxy for the long-term viability of conservation efforts. A stable or increasing breeder base is essential to ensure the continuity of breeding activities, maintain effective population sizes, and safeguard genetic diversity for the future.

The Rural Development Programme also introduced several measures with an indirect but significant impact on the conservation and breeding of local (autochthonous) livestock breeds. Among these are the agri-environmental measures “*Alpine pasture farming*” and “*Breeding of livestock in areas where large carnivores occur*.” The beneficiaries of these measures were frequently breeders of local (autochthonous) Slovenian sheep and cattle breeds in alpine and karst regions, where adaptation to challenging environments is an essential trait. Another relevant measure is *Organic farming*, which is closely linked to the robustness and resilience of local (autochthonous) breeds. Their adaptive traits can contribute substantially to the long-term sustainability and productivity of organic systems (BIEBER et al., 2019). Payments for farming in areas with natural or other specific constraints also play an important role, as they provide additional income support in regions particularly well suited to the maintenance of local breeds. These measures have been retained and further developed within the Common Agricultural Policy Strategic Plan 2023–2027 (MKGP, 2023b), demonstrating continuity in policy support and recognition of the broader multifunctional role of local (autochthonous) breeds in sustainable farming systems.

De minimis support for endangered Slovenian local (autochthonous) breeds

According to the Long-Term Conservation Programme (MKGP, 2023a), breeders of endangered and critically endangered Slovenian local (autochthonous) breeds are eligible for financial support under the *de minimis* aid system. This form of support is financed from the budget of the Republic of Slovenia and operates within the framework of EU state aid rules, which allow limited financial assistance to be granted without prior notification to the European Commission. The main advantage of *de minimis* aid is its administrative simplicity and targeted nature, which enables timely support for small-scale breeders who play a crucial role in conserving local (autochthonous) genetic resources. In practice, such aid can provide a significant contribution to the viability of farms located in remote or mountainous areas, where production conditions are demanding and alternative income sources limited. However, the system also has certain limitations. The maximum amount of aid that can be granted to a single beneficiary is capped under EU legislation, which may

restrict the overall impact on larger breeding populations or on breeders with higher conservation costs. In addition, *de minimis* aid is typically granted on a short-term basis, which can limit its effectiveness as a long-term incentive for sustainable breeding of endangered populations. Despite these limitations, *de minimis* aid represents an important complementary tool alongside CAP measures and national breeding programmes. It contributes to the overarching goals of maintaining genetic diversity, preventing inbreeding, and sustaining traditional livestock breeding in regions where such activities are of both cultural and ecological importance.

Conclusion and recommendation

Animal genetic resources play a vital role in ensuring food security, maintaining genetic diversity, and enabling adaptation to climate change. The erosion or loss of livestock breeds entails the disappearance of unique traits characteristic of local (autochthonous) populations, such as disease resistance and environmental adaptability, as well as the irreversible loss of specific genes underlying these adaptive features (REIST-MARTI & SIMIANER, 2006). Breed loss is also associated with the decline of traditional breeding practices and the erosion of related knowledge and skills, including techniques for processing animal products into traditional agricultural and food products.

In Slovenia, the conservation of local (autochthonous) and traditional breeds threatened with extinction has been supported by agri-environmental payments since 2004. In parallel, the state provides funding for professional breeding organizations, the implementation of breeding programmes, and complementary biodiversity conservation measures. These interventions have contributed to changes in population dynamics, with most local (autochthonous) breeds showing significant growth since 2003.

Looking ahead, it is crucial to ensure the continuity of conservation efforts for endangered Slovenian breeds. Sustained support should be provided primarily through financial incentives, but additional mechanisms are required to buffer breeders against risks associated with sudden disease outbreaks or force majeure events that can decimate livestock populations. Strengthening resilience in this way is essential not only for the preservation of genetic resources, but also for the protection of cultural heritage and the long-term sustainability of Slovenian livestock farming.

References

- BIEBER, A. – WALLENBECK, A. – LEIBER, F. - FUERST-WALTL, B. – WINCKLER, C. – GULLSTRAD, P. – WALCZAK, J. – WÓJCIK, P. - SPENGLER NEFF, A. (2019): Production level, fertility, health traits, and longevity in local and commercial dairy breeds under organic production conditions in Austria, Switzerland, Poland, and Sweden. *Journal of Dairy Science*, 102, 6: 5330–5341, <https://doi.org/10.3168/jds.2018-16147>
- BOETTCHER, P. J. - TIXIER-BOICHARD, M. – TORO, M. A. – SIMIANER, H. - EDING, H. (2010): Animal genetic resources and the need for a conservation paradigm. *Animal Genetics*, 41, S1: 1–2.
- CBD. (2011): Convention on Biological Diversity. Canada. Secretariat of the Convention on Biological Diversity, <https://www.cbd.int/doc/legal/cbd-en.pdf>
- FAO. (2007): Global plan of action for animal genetic resources and the Interlaken declaration. Rome, Food and Agriculture Organization of the United Nations
- FAO. (2021): Domestic Animal Diversity Information System (DAD-IS). Food and Agriculture Organization of the United Nations (<http://www.fao.org/dad-is/en/?sid=-1,50006200>)
- Hoffmann, B. (2011). Livestock biodiversity and sustainability, *Livestock Science*, 139, 1/2: 69–79, <https://doi.org/10.1016/j.livsci.2011.03.016>
- MKGP. 2023a. Program varstva biotske raznovrstnosti v živinoreji za obdobje 2024–2030. Ljubljana, Ministrstvo za kmetijstvo, gozdarstvo in prehrano, https://www.gov.si/assets/ministrstva/MKGP/PODROCJA/KMETIJSTVO/ZIVINOREJA/BIO_TSKA-RAZNOVRSTNOST-V-ZIVINOREJI/Program_2024-2030.pdf
- MKGP. 2023b. Strateški načrt skupne kmetijske politike 2023–2027 za Slovenijo, različica 3.0. Ljubljana, Ministrstvo za kmetijstvo, gozdarstvo in prehrano, <https://skp.si/skupna-kmetijska-politika-2023-2027/arhiv-sn-skp>
- REGISTER OF BREEDS WITH ZOOTECHNICAL ASSESSMENT. (2024). (http://www.genskabanka.si/wcontent/uploads/2021/02/RegisterPasem_Drobnica_2024.xls) (08th August 2025)
- Ur. list RS. 2002. Zakon o živinoreji. Uradni list RS, št. 18/02, 110/02 – ZUreP-1, 45/04 – ZdZPKG, 90/12 – ZdZPVHVVR in 45/15
- UN. 1992. Convention on Biological Diversity. New York, United Nations
- Ur. list RS. 2004a. Pravilnik o ohranjanju biotske raznovrstnosti v živinoreji. Uradni list RS, št. 90/04 in 88/14
- Ur. list RS. 2004b. Program razvoja podeželja za Republiko Slovenijo 2004–2006. Uradni list RS, št. 116/04, 45/06, 70/07, 124/07 in 107/08