

CURRENT ISSUES AND PROSPECTS IN THE CONSERVATION OF SHEEP GENETIC RESOURCES IN POLAND

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Abstract

The objective of this study is to investigate the present condition of the population of native sheep breeds and the key concerns and prospects for conserving ovine genetic resources in Poland. The presentation includes statistics from the National Research Institute of Animal Production's (henceforth 'IZ PIB') database, which covers the last decade, on the quantity and geographical distribution of sheep flocks protected under the genetic resources conservation programme. A model established by the IZ PIB has been used to evaluate the endangered status of genetic resources in the most recent era of the conservation programme. Upon analysing the population size over the last ten years, it can be concluded that the conservation programme remains a successful means of safeguarding the species' biodiversity. Furthermore, there has been a consistent rise in the population under protection since the programme's inception. Local sheep breeding is geographically specific, with indigenous sheep breeds mostly preserved in their respective regions of origin, where a robust breeding history exists. The designation of an endangered category implies that ongoing monitoring and protection of sheep genetic resources are necessary. An advantageous component of the genetic resources conservation strategy is the incorporation of complementary measures that leverage the unproductive function of sheep and foster the establishment of a market for goods derived from native breeds. To ensure the widespread adoption of animal genetic resource conservation, it is essential to provide sufficient financial assistance and actively disseminate information while marketing relevant services and goods. The CAP 2023-2027 establishes the goals and criteria for financially supporting the conservation of the biodiversity of this significant species.

Keywords: indigenous breeds, sheep, genetic resources, prospects

Introduction

Ovine genetic resources have been protected in Poland since the 1970s. Scientific institutions and sheep breeders' groups successfully recovered and reintroduced breeds that were previously deemed extinct, such as the Polish Heath Sheep, Świniarka Sheep, and Olkuska Sheep, via restitution initiatives. During the 1990s, Poland saw a significant decrease in the total sheep population, putting several less productive, mostly native breeds at risk of extinction. In 1999, Poland initiated the National Programme for the Conservation of Animal Genetic Resources. As a consequence, the Polish Minister of Agriculture and Rural Development made the decision to develop programmes aimed at safeguarding the genetic resources of livestock populations, including sheep. The sheep genetic resources conservation strategy has been successful in preserving the biodiversity of this species since its establishment (Krupinski et al., 2017).

The ovine genetic resources conservation programme is implemented by the breeder, who owns the sheep flock, the Polish Sheep Association, and the Regional Associations of Sheep and Goat Breeders. These organisations maintain the sheep flock records and evaluate the usefulness of the sheep. Additionally, the IZ PIB is responsible for implementing and coordinating the efforts to protect the genetic resources of livestock. The programmes outline the goals, schedule of activities, and the extent of *in situ* and *ex situ* conservation efforts. They also detail the breeding methods and identify the organisations responsible for their execution. These programmes may be revised if needed (<http://owce.bioroznorodnosc.izoo.krakow.pl/>).

The aim of the study is to examine the present condition of the population of indigenous sheep breeds and the key concerns and prospects for the preservation of sheep genetic resources in Poland.

Materials and methods

The study analysed data on the population size of 17 different sheep breeds that are part of the genetic resources conservation programme. The data was obtained from the 'Bio-owce' database, which is kept by the IZ PIB. The study focused on the last 10 years, the period from 2014 to 2023. The analysis covered the following breeds: Whiteheaded Mutton, Podhale Zackel, Kamieniecka sheep, Corriedale, Polish Coloured Merino, Old-type Polish Merino, Olkuska sheep, Polish Mountain Sheep, Coloured Polish Mountain Sheep, Pomeranian sheep, Świniarka sheep, Uhruska sheep, Wielkopolska sheep, Polish Heath Sheep, Żelaźnińska sheep, Polish Pogórza Sheep, and Blackheaded Sheep. The examination was conducted on numerical data from the last ten years, specifically focusing on the quantities of flocks, ewes, replacement ewes, and rams within different breeds. The evaluation also included the quantity of applications received from sheep farmers in the current year (2023) for the RDP and Intervention 8.6 'Preservation of endangered animal genetic resources in agriculture' under the CAP for the period of 2023-2027. The examination was conducted to analyse the distribution of indigenous sheep breeds in certain provinces, as well as to investigate the breed composition in chosen areas of Poland that have the highest sheep populations.

The study also assessed the current danger level during the last phase of the genetic resources conservation programme. The computations were made using a model suggested by the IZ PIB, which incorporates three factors: demographic, genetic, and socio-economic (Polak et al., 2020).

The endangered condition is estimated based on the following formula:

$$X = (L + Ne + 0.5D) / 3$$

Where:

- X – endangered condition,
- L - total number of females,
- Ne - effective population size,
- D - sum of additional elements.

Results

The total population of indigenous sheep breeds in Poland in 2023 was 75,605, with 71,847 of these being ewes. A total of 867 flocks of sheep existed in Poland, as shown in Table 1. Currently, the Polish Heath Sheep has the highest population in the conservation programme, with a total of 8,334 ewes. The Polish Mountain Sheep (331 ewes) has the smallest population size among the protected breeds.

Issues and prospects in the conservation of ovine genetic resources in Poland

Tabela 1. Liczba stad i owiec ras rodzimych w programie ochrony zasobów genetycznych w 2023 r.

Table 1. Number of flocks and sheep of native breeds in the genetic resources conservation programme in 2023

Rasa Breed	Liczba stad No. of flocks	Liczba macierek No. of ewes	Liczba tryków No. of rams
Białogłowa owca mięsna/Whiteheaded Mutton	17	834	60
Cakiel podhalański/Podhale Zackel	106	7972	409
Czarnogłówka/Blackheaded	68	3963	213
Kamieniecka	57	5824	271
Koridel/Corriedale	26	2087	106
Merynos polski odm. barwnej/Polish Coloured Merino	8	886	50
Merynos polski w starym typie/Old-type Polish Merino	56	7769	571
Olkuska	41	1236	76
Polska owca górską/Polish Mountain Sheep	10	331	26
Polska owca górską odm. barwnej/ Coloured Polish Mountain Sheep	32	2528	123
Polska owca pogórza/Polish Pogórza sheep	25	1834	79
Pomorska/Pomeranian	91	8163	408
Świniarka	38	2373	155
Uhruska	106	7570	369
Wielkopolska	58	7939	374
Wrzosówka	100	8334	355
Żelaźnińska	28	2204	113
RAZEM TOTAL	867	71847	3758

Tabela 2. Liczba nowych stad w roku 2023

Table 2. Number of new flocks in 2023

Rasa Breed	Liczba stad No. of flocks	Liczba macierek No. of ewes	Liczba tryków No. of rams
Białogłowa owca mięsna/Whiteheaded Mutton	2	33	2
Cakiel podhalański/Podhale Zackel	4	241	13
Czarnogłówka/Blackheaded	5	83	6
Kamieniecka	4	268	15
Koridel/Corriedale	4	186	15
Merynos polski w starym typie/Old-type Polish Merino	4	490	24
Olkuska	1	30	2
Polska owca górską odm. barwnej/ Coloured Polish Mountain Sheep	1	40	2
Polska owca pogórza/Polish Pogórza sheep	3	51	4
Pomorska/Pomeranian	8	276	14
Świniarka	4	154	8
Uhruska	6	429	19
Wielkopolska	1	100	4
Wrzosówka	5	210	9
Żelaźnińska	3	65	4
RAZEM TOTAL	55	2 656	141

In 2023, the conservation programme welcomed 55 new breeders who began breeding the specific species. They either established a new flock or acquired an existing one via purchase or transfer under the existing commitments. The Old-type Polish Merino breed had

the largest number of new registrations, whilst the Olkuska breed had the lowest number of registrations (Table 2).

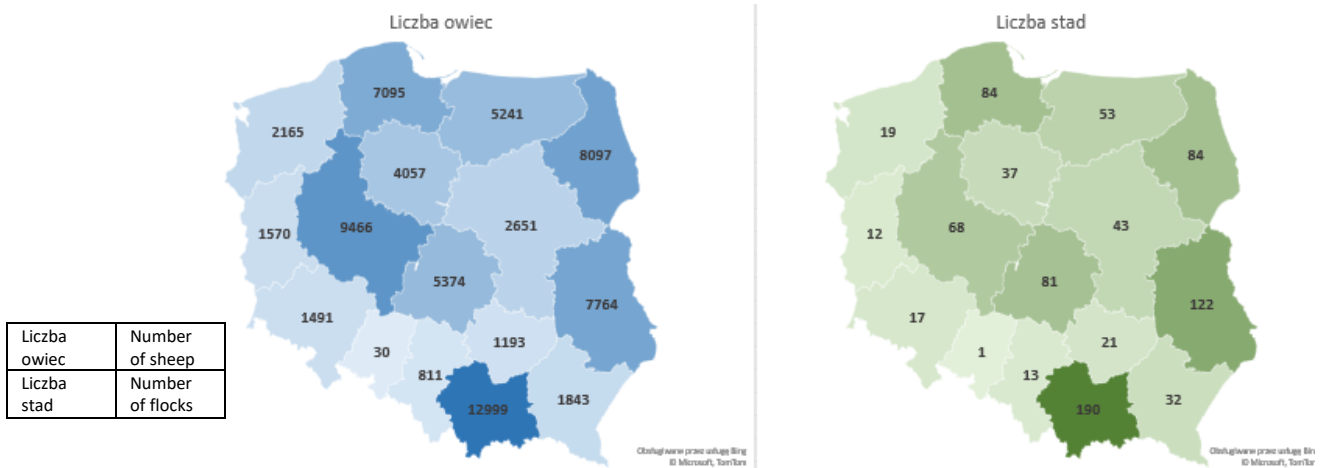
The remaining breeders continued their commitments under the RDP or the new intervention (412 flocks, including 33,869 ewes and 1,896 rams). The breed with the highest number of registrations was the Podhale Zackel (5990 ewes) and the lowest – the Whiteheaded Mutton (33 ewes) (Table 3).

Tabela 3. Liczba stad i owiec w ramach interwencji 8.6. WPR 2023–2027

Table 3. Number of flocks and sheep under intervention 8.6. CAP 2023–2027

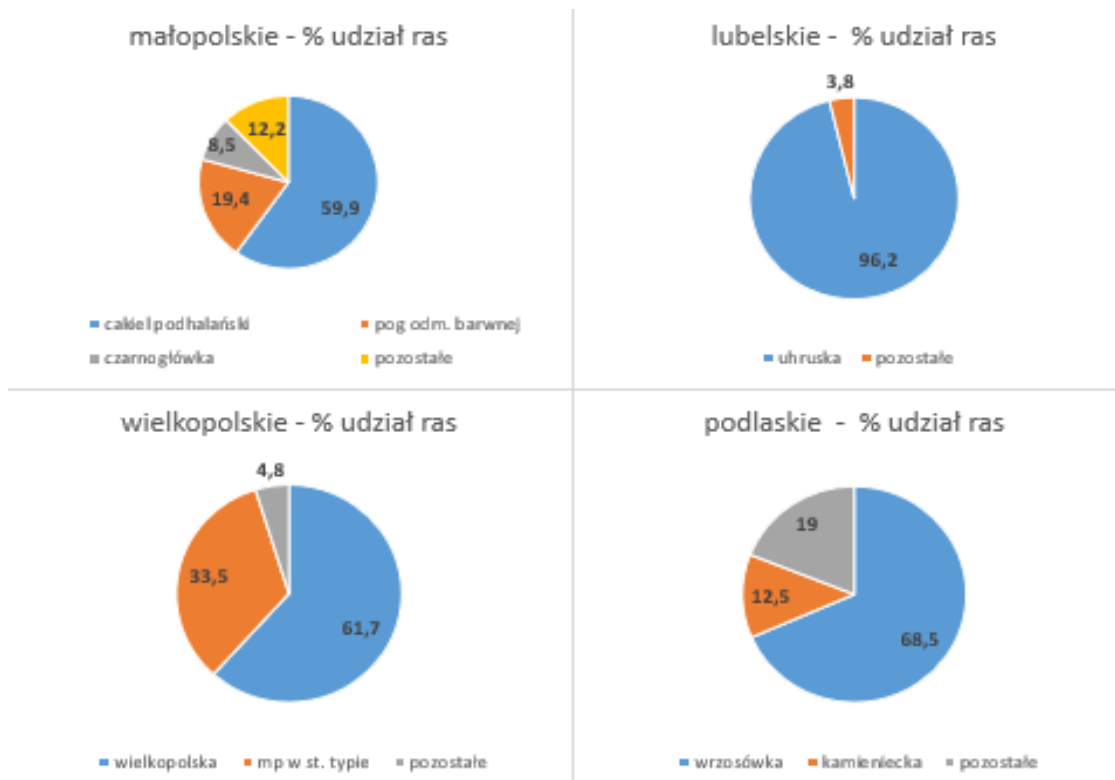
Rasa Breed	Liczba stad No. of flocks	Liczba macierek No. of ewes	Liczba tryków No. of rams
Białogłowa owca mięsna/Whiteheaded Mutton	2	33	2
Cakiel podhalański/Podhale Zackel	78	5990	311
Czarnogłówka/Blackheaded	25	1299	68
Kamieniecka	18	1617	91
Koridel/Corriedale	10	798	46
Merynos polski odm. barwnej/Polish Coloured Merino	5	630	41
Merynos polski w starym typie/Old-type Polish Merino	37	5720	469
Olkuska	13	325	22
Polska owca góraska odm. barwnej/ Coloured Polish Mountain Sheep	18	1346	64
Polska owca pogórza/Polish Pogórza sheep	10	741	32
Pomorska/Pomeranian	39	3107	158
Świniarka	19	1155	74
Uhruska	55	4234	202
Wielkopolska	25	2575	125
Wrzosówka	45	3517	153
Żelaźnińska	13	782	38
RAZEM TOTAL	412	33 869	1 896

The breeding of indigenous sheep breeds in Poland is not uniformly distributed throughout the country (Figure 1). Małopolskie Province, specifically the foothills region, has the most vigorous history of sheep husbandry and breeding, resulting in the largest number of sheep in this region, with 12,999 ewes. Wielkopolskie Province has the second highest number of ewes, with a total of 9,466. Opole and Silesian Provinces have the lowest sheep population, with a total of 841 ewes. In 2023, Małopolskie and Lubelskie Provinces had the largest number of flocks of indigenous breeds, with 190 and 122 respectively. Conversely, Opolskie Province had just one reported sheep flock (Figure 1).



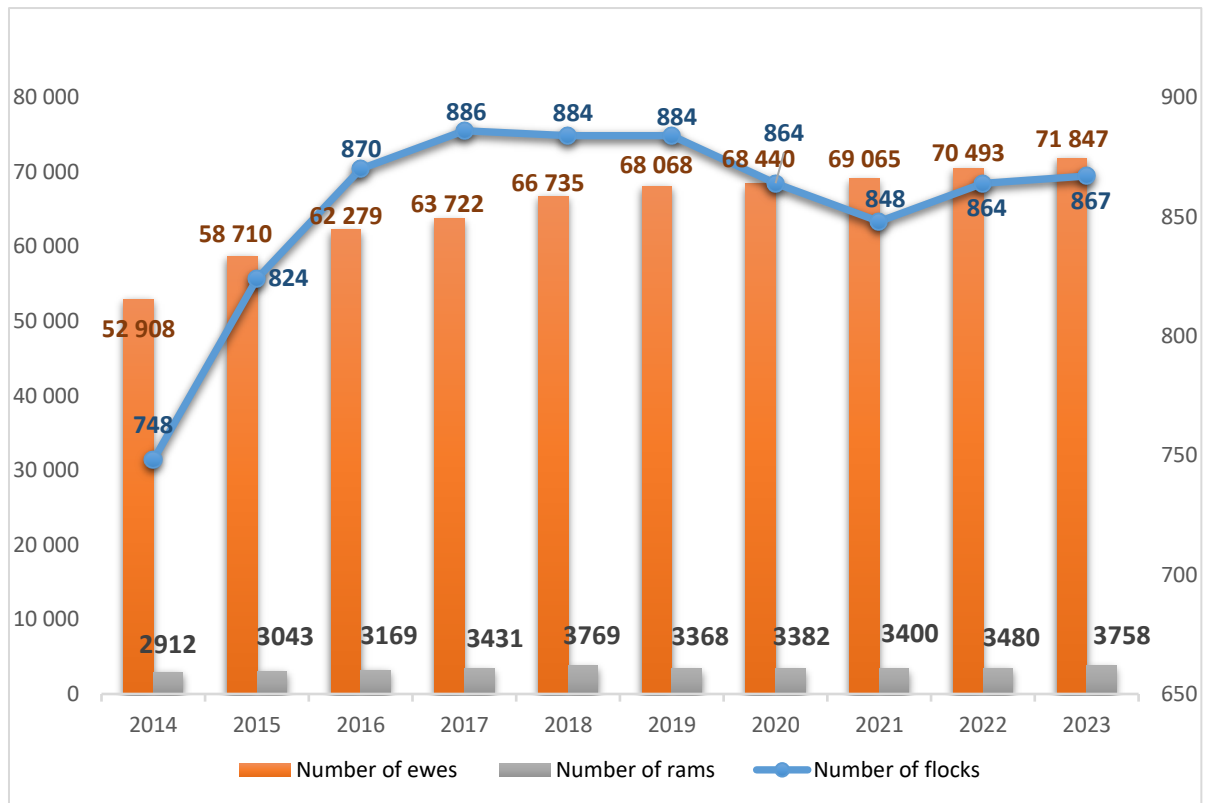
Rysunek 1. Liczba stad i owiec ras rodzimych na terenie Polski w 2023 roku
 Figure 1. Number of flocks and sheep of native breeds in Poland in 2023

The breed structure in selected provinces is shown in Figure 2. The largest sheep breeding centres were dominated by breeds that have been traditionally kept there for years, i.e. the Podhale Zackel in Małopolska, the Uhruska sheep in Lubelskie Province, which accounted for the majority of the stock, the Wielkopolska sheep in Wielkopolska and the Polish Heath Sheep in Podlasie.



Rysunek 2. Struktura rasowa owiec ras rodzimych w województwach o największej liczebności поголовья (2023)
 Figure 2. Breed structure of native breeds of sheep in the voivodeships with the largest population (2023)

Upon analysing the fluctuations in the population of indigenous breeds, it was found that there had been a notable rise of 18,939 female sheep over the course of the last ten years (Figure 3). The flock population reached its peak in 2017, followed by a slight decline and then a small rise in the last two years.



Rysunek 3. Zmiany liczebności rodzimych ras owiec w okresie realizacji programów ochrony zasobów genetycznych owiec

Figure 3. Changes in the number of native sheep breeds during the implementation of sheep genetic resources conservation programmes

When analysing the endangered condition of indigenous sheep breeds in certain years, risk status scores ranging from 0 to 3 were used: ≤ 1 - critically endangered; > 1 and ≤ 2 - breed at risk, requiring conservation efforts; > 2 and < 3 - breed at risk, requiring monitoring; ≥ 3 - breed not at risk. Table 4 reveals that there are nine breeds classified as endangered, six kinds that need monitoring, and one species, the Polish Mountain Sheep, that is critically endangered. During the studied years, there were minimal fluctuations in the point values, with no observed change in the breed's status.

Tabela 4. Status zagrożenia rodzimych ras owiec w latach 2018, 2021 i 2023

Table 4. Risk status of native sheep breeds in 2018, 2021 and 2023

Rasa Breed	Suma końcowa pkt Final total points	Status zagrożenia Risk status	Suma końcowa pkt Final total points	Status zagrożenia Risk status	Suma końcowa pkt Final total points	Status zagrożenia Risk status
	2018		2021		2023	
Białogłowa owca mięsna/Whiteheaded Mutton	-	-	1,17	Z	1,17	Z
Cakiel podhalański/Podhale Zackel	2,5	ZM	2,33	ZM	2,33	ZM
Czarnogłówka/Blackheaded	1,9	Z	1,75	Z	1,75	Z
Kamieniecka	1,9	Z	1,67	Z	1,67	Z
Koridel/Corriedale	1,8	Z	1,67	Z	1,67	Z
Merynos polski odm. barwnej/Polish Coloured Merino	1,3	Z	1,00	Z	1,00	Z
Merynos polski w starym typie/Old-type Polish Merino	2,4	ZM	2,33	ZM	2,33	ZM
Olkuska	1,8	Z	1,67	Z	1,67	Z
Polska owca góraska/Polish Mountain Sheep	-	-	0,58	K	0,92	K
Polska owca góraska odm. barwnej/ Coloured Polish Mountain Sheep	1,8	Z	1,67	Z	1,67	Z
Polska owca pogórza/Polish Pogórza sheep	1,6	Z	1,42	Z	1,42	Z
Pomorska/Pomeranian	2,6	ZM	2,33	ZM	2,33	ZM
Świniarka	1,8	Z	1,58	Z	1,58	Z
Uhruska	2,3	ZM	2,08	ZM	2,08	ZM
Wielkopolska	2,2	ZM	2,00	Z	2,00	Z
Wrzosówka	2,2	ZM	1,92	Z	2,25	ZM
Żelaźnieńska	1,9	Z	1,75	Z	1,75	Z

Z – zagrożona, ZM – zagrożona, wymagająca monitoringu, K – krytycznie zagrożona

Z – endangered, ZM – endangered breed, requiring monitoring, K – critically endangered

Discussion

The objective of the programme for the conservation of genetic resources of native sheep breeds is to conserve the most desirable breed traits, boost the population size of the protected breeds, stabilise and uphold the breed's pattern, and retain the current genetic diversity. The present scope of the programme for the conservation of genetic resources in Poland includes 17 native sheep breeds. Since its inception, there has been a consistent growth in the number of individuals under protection, but the rate of rise has slowed down compared to the initial years. The programme was launched in 2005, including the conservation of 11 protected breeds among 145 flocks. Over the course of 10 years, the protected population saw a significant eight-fold increase in size (Sikora et al., 2015). In 2008, the conservation strategy incorporated the Old-type Polish Merino Sheep and Podhale Zackel, which are often kept in large flocks. The Blackheaded and Polish Pogórza breeds were added to the programme in 2015, followed by the inclusion of the breeds Whiteheaded Mutton and Polish Mountain Sheep in 2022. As a consequence, the inclusion of the Podhale Zackel and Old-type Polish Merino breeds in the programme led to a rise in the number of flocks. However, owing to the small size of these populations, the growth rate of the protected population was not as quick as before (Kawęcka et al., 2022).

Other countries have also implemented such conservation programmes. An animal genetic resources conservation project was launched in Turkey in 1995. The initiative focused on the preservation of three specific sheep breeds (Golceada, Sakiz, and Turkish Merino) as well as other livestock species, using an *in vivo* conservation strategy. Subsequently, the Turkish Animal Breeding Act went into effect in 2001, including measures for the official recognition of novel breeds and the safeguarding of genetic reservoirs for cattle, sheep, goats, bees, and water buffalo, all of which face the risk of extinction. Financial assistance is provided to breeders that preserve native breeds, particularly in their original territories. Additionally, specific project coordinators and growth areas have been designated for each breed individually (Tesema and Shenkute, 2019).

In Italy, regional development policies have had a role in the growth of the population of protected breeds of small ruminants in recent years. Various sorts of projects have been carried out there, such as INCIPIT and SHEEP UP, with the purpose of identifying and analysing the outcomes of the breeding of specific native sheep in designated locations, including mountainous areas. D'Oronzio's team (2022) reported a decrease in the population of native sheep and goat breeds in the Basilicata area from 2017 to 2021. Measures aimed at promoting the use of meat and dairy products derived from sheep and goats were implemented, along with the establishment of an integrated supply chain. Nevertheless, the need is emphasised for enacting assistance measures to provide financial restitution for the harm that was incurred due to the decreased production of indigenous breeds (D'Oronzio et al., 2022).

Polish farmers of native sheep breeds have been receiving financial assistance since 2005. This support comes primarily from EU funds through the Rural Development Programmes, specifically the agri-environmental programmes RDP 2004-2006, 2007-2013, and 2014-2020. Starting from 2023, breeders also receive support through the intervention called 'Conservation of endangered animal genetic resources in agriculture'. The payments serve as compensation to farmers for the expenses they have incurred and the revenue they have lost due to the performance of multi-annual obligations. The intervention 'Conservation of endangered animal genetic resources in agriculture' builds upon the previous action focused on conserving animal genetic resources by providing financial support for the maintenance of males, which was previously unavailable (Krupinski et al., 2017; Kawęcka et al., 2022; MARD, 2023).

Variant 3: 'Conservation of local sheep breeds', is a form of aid provided to farmers who engage in genetic resource conservation programmes for indigenous sheep breeds. This aid is managed by the IZ PIB in Balice. In Variant 3, the basic requirements are identical to those in the RDP. Firstly, it is obligatory to possess a group of mother sheep from an endangered breed, whose usefulness has been evaluated, and to be engaged in the implementation of a programme for safeguarding this particular breed. Additionally, since the payment for female sheep covers the expenses of maintaining the male sheep, it is necessary to have a specific number of male sheep in the flock – one male sheep per every 30 female sheep. As of 2023, breeders who join the sheep genetic resources conservation programme must follow the rules to be eligible for payments under the intervention called 'Conservation of endangered animal genetic resources in agriculture' (CAP 2023-2027). Breeders who are already part of the programme must adhere to the regulations for RDP 2014-2020. The additional responsibilities, such as payment for males, have thus covered about 50% of the flocks that preserve indigenous breeds (Sikora et al., 2015, 2018; MARD, 2023).

The distribution of native farm-bred sheep breeds is unevenly spread across the country. Małopolskie Province, especially in the foothills area, remains the most prominent location for the practice of sheep rearing and breeding, resulting in the greatest sheep population. Based on statistics provided by the Polish Central Statistical Office, Małopolskie Province is home to 30% of the whole sheep population in the country (PZO, 2022). The Podhale Zackel breed has

the highest position in the Małopolska area. However, it is important to mention that other mountain breeds, such as the Coloured Polish Mountain Sheep and the Polish Mountain Sheep protected since 2022, are only found in this province. Małopolskie Province is also home to other breeds such as the Blackheaded Sheep, Olkuska Sheep, Polish Mountain Sheep, Świniarka Sheep, and Polish Heath Sheep. Wielkopolska is the second major hub for sheep breeding, with the Wielkopolska breed being the dominant and most populous breed among lowland sheep. The region also has a substantial population of the Old-type Polish Merino. Native sheep breeding has a high degree of regionalization. Indigenous sheep breeds are mostly kept in the areas of their origin, with very occasional deviations caused by emergencies. Regionalization is evident in conservation programmes, which specify the geographical scope for programme implementation, taking into account traditional livestock systems and adhering to welfare standards (Kawęcka et al., 2022; <http://owce.bioroznorodnosc.izoo.krakow.pl/programy-ochrony>).

The 2021 revised conservation programmes included a new clause regarding the endangered status, marking the first time this inclusion had been made. Evaluating the endangered status of both local and transboundary livestock breeds is a crucial method for ensuring their successful preservation. In Poland, as well as in the whole European Union, the European Commission Regulation 1974/2006 was in effect until 2014 to determine the endangered status of breeds. This regulation established criteria based on the number of females in each species. The choice to save a certain breed was determined by a unique criterion – the quantity of female individuals belonging to that breed (as specified in EC Regulation 1974/2006). For sheep, that figure stood at 10,000. The first study to classify the endangered status was conducted by Gandini et al. (2005). The evaluation included analysing the vulnerability of cattle breeds by considering their demographic and genetic characteristics, as well as the duration required to achieve a critical population level. Alderson (2010) noted that threat indicators should possess qualities of reliability, ease of measurement, robustness, and implementability. He listed four fundamental indicators: numerical (quantitative representation of females and effective population size), geographical (concentration of individuals within a certain geographic area), genetic (genetic erosion), and introgression (level of interbreeding between different populations). Additional reasons that contribute to the endangered status of breeds include the presence of the same breed in many nations, as well as human-induced, climatic, and epidemiological issues. Estimation techniques for determining the level of risk differ across European Union nations. In Germany, the endangered status of cattle, horses, sheep, goats, and pigs is determined by assessing the effective population size (N_e) of each breed. The FAO has developed an alternative model that incorporates three specific factors: total population size, abundance, and reproductive ability. The statistics submitted by individual countries to the DAD-IS (www.fao.org/dadis) served as the foundation upon which to evaluate the global endangered status using this method. Nevertheless, the FAO highlights the need for tailored solutions that take into account the unique circumstances of each country (Hall, 2016; Polak et al., 2020).

The current Regulation (EU) 2016/1012 of the European Parliament and of the Council of 8 June 2016 states that an endangered breed means ‘local breeds recognised by Member States as being at risk of extinction, genetically adapted to one or more production systems in that country and whose endangered status has been scientifically confirmed by an authority with the necessary skills and knowledge in the field of endangered breeds’. In Poland, a model based on 3 factors has been proposed for the assessment of endangered status: demographic, genetic and socio-economic (Polak et al., 2020). Considering the results of international research and the conservation programmes implemented in Poland, a model was developed to reflect two main factors: the number of females (L) and the effective population size (N_e), as well as a further factor (D) consisting of six components: 1. geographical concentration; 2.

demographic trend over the last 5 years; 3. cultural value; 4. origin control (DNA testing); 5. *ex situ* conservation; 6. anthropogenic factors (existence of breeder organisations, financial support, activity and age of breeders) (Polak et al., 2020). The periodically estimated endangered status indicates that there is still a need to monitor and protect the genetic resources of native sheep breeds kept in Poland.

The adoption of conservation programmes and the potential eligibility for subsidies for farming protected sheep breeds significantly influences sheep husbandry in Poland. Upon examining the prevalence of indigenous sheep in relation to the overall active population in the whole country, it was discovered that they already constitute over 80% of the entire embryonic population (PZO, 2022). Its share stood at 61% in 2014 (PZO, 2015).

An advantageous component of the sheep genetic resources conservation project is the inclusion of accompanying measures that capitalise on the non-productive function of the species. The practice of extensive sheep grazing for environment conservation aims to preserve naturally valuable landscapes and the cultural heritage associated with sheep farming, while also preventing forest succession. The indigenous sheep breeds are well-adapted for extensive grazing in regions of high ecological importance and conservation, where they play a crucial role in plant management and landscape preservation. Grazing has a crucial role in preserving the distinct characteristics of ecosystems and the richness of free-living animals, particularly birds. Additionally, it is used as a preservation method in the protected regions of the majority of national and landscape parks in Poland. This includes its application in the preservation of xerothermic grasslands, as shown by studies conducted by Kawęcka et al. (2017), Gruszecki et al. (2017), Niżnikowski et al. (2017a, b), and Gruszecki et al. (2019). The practice of livestock grazing in mountainous regions is marked by distinct cultural functions, setting these locations apart from other regions of the country and contributing to the unique character of highland culture as a whole. Pastoral farming has significant economic and social value. By encouraging the growth of tourism, it helps to generate job opportunities and enhances the welfare of the local population. Therefore, it is necessary to establish cultural grazing as a formal practice by creating a social programme that considers various factors involved in preserving this type of farming. This includes safeguarding it as a cultural element that greatly impacts the growth of local communities' capital (Kawęcka et al., 2017; Molik et al., 2017).

Another benefit of conservation breeding is the activity geared towards the market for traditional and regional products linked to local sheep breeds (Sikora et al., 2015). All products made from the milk of mountain sheep are entered on the List of Traditional Products, kept by the Ministry of Agriculture and Rural Development, where more than 2,000 items can be found, of which 125 are cheeses and dairy products alone (<https://www.gov.pl/web/rolnictwo/lista-produktow-tradycyjnych12>). The List includes products whose unique characteristics and properties or quality result from the use of traditional production methods (used for at least 25 years). A large group of listed goods includes traditional products made from sheep. Some of them, such as traditional cheeses – oscypek, redykołka and bryndza podhalańska – were entered in the Register of Protected Designations of Origin (PDO), approved by the European Commission. More products from sheep can be found on the List of Traditional Products. Dairy products include traditional żentyca (drink made from sheep milk whey) and various types of cheese (bundz, grudka, bryndza żywiecka, bryndza wołoska and klagany). As demonstrated by numerous studies by the IZ PIB, traditional dairy products from native sheep breeds, such as bundz, oscypek and żentyca, have many valuable and healthy components, such as immunoglobulins, amino acids or unsaturated fatty acids (Kawęcka et al., 2020; Kawęcka and Pasternak, 2020; 2022).

Meat products from indigenous breeds of sheep also appear on the List of Traditional Products: beskidzka lamb, świniarka lamb, Wielkopolska sheep lamb, Jurassic lamb from Olkuska sheep, leg of lamb from Pomeranian sheep with garlic. The listed meat product that

has been granted EU Protected Geographical Indication (PGI) status is Podhalańska lamb (Kawęcka and Krupiński, 2014; www.gov.pl/web/rolnictwo/lista-produktow-tradycyjnych).

These supplementary measures are likewise based on the conservation initiatives. Each of these provisions includes measures that assist the execution of the breeding programme for a particular breed, taking into consideration its unique characteristics. The programme for the protection of genetic resources of Polish mountain sheep (<http://owce.bioroznorodnosc.izoo.krakow.pl/programy-ochrony>) involves several activities. These include conducting scientific research to evaluate the quality of products derived from mountain sheep. Additionally, the programme aims to revive small abattoirs as an alternative to exporting mountain lambs, which has become increasingly challenging for mountain sheep breeders. Furthermore, the programme focuses on promoting and marketing products of exceptional quality from this breed, which are produced under natural conditions. It also aims to encourage the use of sheep in the mountains, primarily for environmental and landscape conservation purposes, as well as in agrotourism. Lastly, the programme recognises the significance of mountain sheep in the Podtatrze landscape and its folklore.

Summary

Indigenous sheep breeds serve essential production purposes by offering a variety of useful products. Additionally, they play a significant role in maintaining the natural environment and are a testament to the enduring traditions and culture of local people. There are now 17 sheep breeds in Poland, covered by the genetic resources preservation programme, which remains a very successful mechanism for safeguarding the biodiversity of this particular species. Since its inception, there has been a consistent rise in the size of the population. Native sheep breeding is geographically specific, with indigenous sheep breeds being raised in their areas of origin, where a robust breeding heritage persists. The predicted endangered status necessitates continued monitoring and protection of the genetic resources of indigenous sheep breeds. One good feature of implementing the genetic resources preservation programme is the inclusion of measures that use the non-productive function of sheep and promote the growth of a market for products derived from local breeds. In order for the conservation of animal genetic resources to become widespread practice, it is essential to give enough assistance, both monetarily and in terms of sharing information and advertising services and goods. The Common Agricultural Policy (CAP) 2023-2037 lays out the aims and criteria while providing financial assistance for the protection of the biodiversity of this key species.

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