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SOCIAL AND ENVIRONMENTAL BENEFITS RELATED TO LOCAL FOOD SYSTEMS IN THE ASSESSMENT OF FARMERS KEEPING NATIVE BREED ANIMALS¹

Key words: farms, local food systems, native breed animals, social benefits,
environmental benefits

ABSTRACT. The aim of this study is to present the opinion of farmers keeping native breeds of animals regarding selected social and environmental benefits associated with the functioning of local food systems. Local food systems are classified as so-called alternative food systems, which differ significantly from conventional systems. Their special feature is that the production, processing, trading and consumption of food occur in a relatively small geographical area. As a result, these systems create a certain set of interrelated processes linking producers with consumers, as well as with the local society, the environment and the economy. The method of direct interview was used to obtain information. The study involved 144 farmers selected in a purposeful manner. The territorial range of the research included three voivodships of south-eastern Poland. The regionalization of the study was due to the specificity of agriculture in these areas, favoring keeping the livestock of native breeds. It was found that in the area of social benefits, the highest acceptance was for the statement that local food systems allow for the traceability of products with the area of their origin. The hierarchy of assessments for the presented areas of environmental benefits indicates that the hierarchy of assessments for the presented areas of environmental benefits indicates that farmers are most supportive of the statement that local food systems can contribute to the conservation of biodiversity and the development of native animal breeds.

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INTRODUCTION

Local food systems (LFS) are regarded as alternative systems to conventional (industrial, global) food systems [Gołębiewski 2019]. Although there is no one universal definition of local food systems, it can be assumed that they are cooperation networks that integrate sustainable food production, processing, distribution, consumption and waste management, which leads to the improvement of the economic, environmental and social situation of the area on which they function [Community-wealth.org 2022]. The term “locality” refers to a set of relationships of a diverse nature (including economic, historical, social and cultural) occurring on a small spatial scale [Klekotko, Gerlach 2020].

Local food systems, apart from the production and supply of food, influence the formation of sustainable rural development [Mount 2012], contributing to economic, social, environmental and even cultural benefits. The functioning of efficient local food systems favors the relocation of agriculture, which should be understood as an approximation of producers and consumers. “Proximity” can have many dimensions [Enthoven, Van den Broeck 2021]. In local food systems, geographical proximity plays an important role and can be considered in two contexts. The first is the distance between the farm and the consumer, measured by the number of intermediaries. Food supply chain models in local food systems are based on the most direct possible links between the farm and consumers, eliminating intermediaries in this exchange completely or reducing their number to a minimum (one intermediary) [Tundys 2015]. The intermediary may be a local restaurant or a local store which sells products to a consumer. Geographic proximity can also be defined by the physical distance between the farmer and consumers, which refers to the length of transportation or so-called food miles, which is the distance that food travels between the place of production and the consumption market [Pretty et al. 2005]. Geographical proximity is also interpreted as something that occurs in a specific place or region [Galli, Brunori 2013]. However, due to the regional and cultural diversity of food systems, there is no universal definition that identifies the optimal physical distance between producers and consumers.

Another type of proximity found in local food systems is social proximity, which characterizes certain relationships between producers and consumers. It means the possibility of creating a communication channel between producers and consumers on a feedback basis. Such a channel gives the first of these entities the possibility of controlling the information provided to consumers, but also to receive feedback from them on their perception and assessment of food quality features, agricultural practices, as well as the ethical and social values of this process [Marsden et al. 2000].

In agriculture, which is the basis of local food systems, there are both farms with high production potential as well as small family farms, considered to be of particular importance in maintaining the non-productive functions of agriculture. Often such farms keep animals of native breeds [Hoffman 2011, Krawczyk, Krupiński 2016], that fit in perfectly with the

concept of local food systems. Native breeds are breeds used in one country or geographical area, of little importance and local scale [Hoffman 2010]. These breeds are important because of the role they have played in the history of the development of the regions from which they originate. The economic importance of animals of native breeds is due to the fact that they are very well adapted to local environmental conditions. They are perfectly suited to maintain on traditional farms with extensive production [Florek et al. 2017] and, at the same time, they have relatively low requirements in terms of nutrition, which means that they can make full use of even poor feed resources [Szulc 2011]. In addition, by keeping animals of native breeds it is also possible to use land that could not otherwise be used. This is important in the regions of southern and eastern Poland where legally protected areas occur, which in many regions exceed half of the agricultural land.

The raw materials from animals of native breeds can also be used to obtain products of unique quality and taste [Barłowska 2011]. Livestock farmers can be direct participants in local food systems and offer products made on their farms to the market (Figure 1).

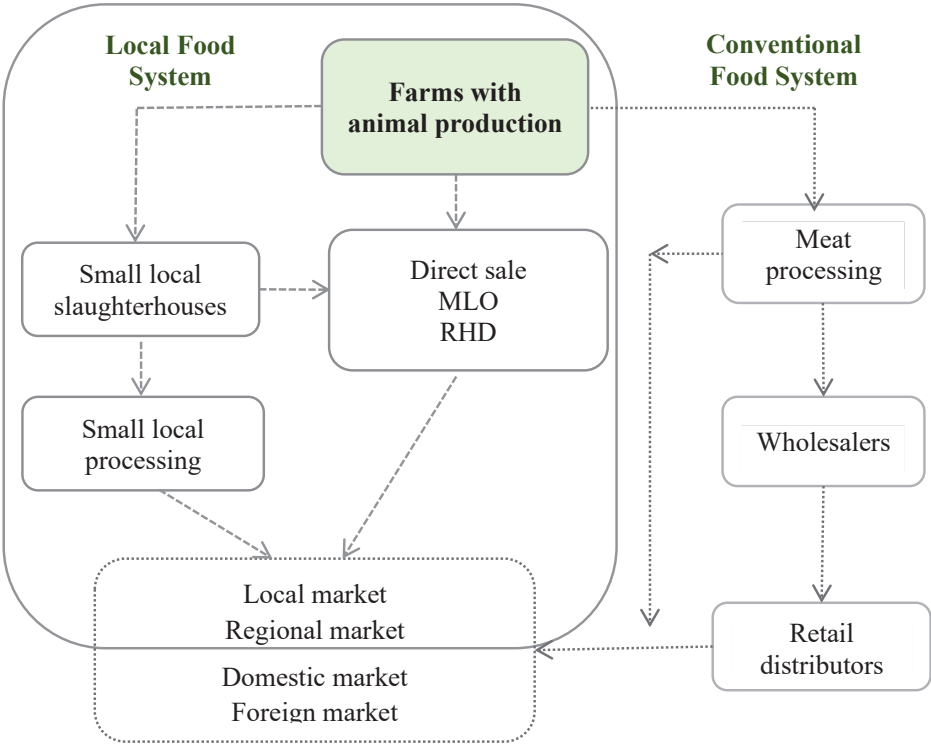


Figure 1. Model of links between farms with animal production and elements of local and conventional food systems
Source: own elaboration

In Poland, the law allows farmers to sell food products of animal origin thanks to regulations governing direct sale, as well as marginal, local and limited activity (MLO) and agricultural retail trade (RHD) [Matysik-Pejas 2020]. As a result, there is a slow increase in interest in recreating local food systems, both among farmers and consumers.

The main ideas of local food systems fit in with the “Farm to Fork Strategy”, which is part of the European Green Deal. This new strategy will be implemented by EU Member States in the financial perspective for 2021-2027 and implemented under the Common Agricultural Policy. The actions of the strategy are aimed at encouraging food processors to produce and retailers to offer more sustainable food, preventing food waste and supporting consumers to make healthy and sustainable food choices [EC 2019]. The “Farm to Fork Strategy” is a kind of response to the coronavirus crisis, which has highlighted the importance of an efficient, resilient and sustainable food system, which can also operate under all conditions and is able to provide society with access to a sufficient supply of food at affordable prices.

MATERIAL AND METHODS

The aim of the study is to present the opinion of farmers keeping native breeds of animals on selected social and environmental benefits associated with the operation of local food systems. The empirical material was the primary information obtained in the research conducted using the direct interview method (PAPI) in 2017. The study involved 144 owners of farms selected in a purposeful manner, located in the Małopolskie, Lubelskie and Podkarpackie voivodeship. The farms kept native breeds of animals such as cattle, sheep and pigs.

The questions asked in the research questionnaire, in part used in this study, concerned the assessment of phenomena that could be the effect of the functioning of local food systems in the context of social and environmental benefits. The list of assessed benefits is based on the document, the “Opinion of the Committee of the Regions on Local food systems” presented by the European Committee of Regions in 2011 [EC 2011].

To determine the degree of acceptance of the presented phenomena by farm owners, a five-point Likert scale was used, where 1 meant “I completely disagree” and 5 – “I completely agree”. The reliability of measurement scales for individual areas of benefits associated with local food systems was determined using the Cronbach’s α coefficient. The Cronbach’s α coefficient ranges from 0 to 1 – the higher the value, the higher the scale reliability. It is believed that values above 0.7 indicate the correct reliability of the scale [Tavakol, Dennick 2011]. The obtained values of the Cronbach’s α coefficients confirmed the reliability of the measurement scales used in the study (Table 1).

Table 1. Values of Cronbach's α coefficients for the measurement scales used in the study

Measurement scales	Number of items on the scale	The value of Cronbach's α coefficient
Area of social benefits	4	0.765
Area of environmental benefits	3	0.726

Source: own study

In the descriptive analysis of the results, the arithmetic mean (M) and the standard deviation (SD) were used. The analysis of empirical material was carried out considering the species of animals kept in the farms and the voivodeship in which they were located. A one-way analysis of variance [Mynarski 2003] was used to test the significance of differences between the mean assessments made by k-independent groups of respondents. The null hypothesis (H_0) assumes no difference between the means against the alternative hypothesis (H_1) that the means differ significantly. The Tukey's post-hoc RIR test was performed to determine statistically significant differences between mean scores. The accepted significance level (p) for all analyses was 0.05.

RESULTS

The largest share in the sample, over 36%, was held by farms from the Lubelskie Voivodship, while farms from the other two voivodships accounted for approx. 33% (the Małopolskie Voivodship) and approx. 31% (the Podkarpackie Voivodship). Only one species of native breed animals was kept in the researched farms. In over 51% of the surveyed farms these were native breeds of sheep and in over 35% native breeds of dairy cattle. The other farms kept pigs (Figure 2).

The farmers participating in the study assessed the potential social benefits resulting from local food systems. The highest mean assessment was obtained for the statement that local food systems enable the traceability of products ($M = 4.10$; $SD = 0.93$) – Table 2. Traceability, as a product feature, can be understood broadly and identified with the specific geographical area from which the product originates. This translates into associations of potential consumers, e.g., with the natural features of these areas and their culture, tradition, or values accepted by the local community [Carbone 2018]. Product traceability can also be understood in a narrower sense. Consumers will associate the product with a particular name (brand), the farmer-producer and a particular place where it can be purchased.

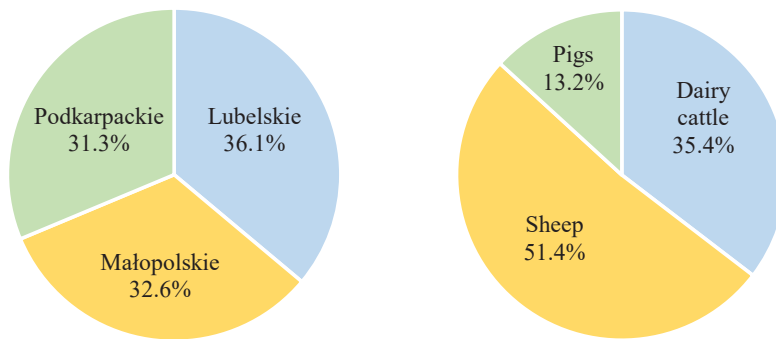


Figure 2. The structure of the surveyed sample of farms by voivodeship and species of native breeds of animals (N = 144)

Source: own study

This makes consumers more aware of where, by whom and how the food they buy is produced. An example of the importance of product traceability is the certification of regional and traditional products and their designation as protected designation of origin (PDO), protected geographical indication (PGI) and geographical indication (GI).

Further social benefits implied by local food systems in the forms of ensuring a basic level of food sovereignty and improving the health of society, thanks to the preservation of all the values of food products, were assessed by farmers at a very similar level. The above-mentioned benefits achieved a mean assessment of 3.76 (SD = 0.87) and 3.74 (SD = 1.03) on a five-point scale (Table 2). Food sovereignty means that local food systems can provide local communities with autonomy in the supply of basic food products. This is because they are independent of global supply chains and more resilient to crises. At the same time, food from small family farms is produced in a more sustainable way than on large-scale farms. A low-input animal production system is more and more desired by conscious consumers who may associate it, among other things, with animal welfare. Sustainable production practices are environmentally friendly, favor the production of high-quality animal raw materials and their health safety. Local food systems offer less processed products that retain more nutrients than those offered in conventional (industrial) systems. Thus, the production of food in a traditional way by small farmers increases the public's access to food of better quality. This can motivate and encourage consumers to make healthier food choices and, as a result, improve the health of the society [Enthoven, Van den Broeck 2021].

The social benefit of local food systems is also the fact that the places of sale are a link in the process of social inclusion and integration for consumers and producers/sellers. This factor received a mean assessment of 3.67 (SD = 0.88) – Table 2.

Table 2. An assessment of social benefits related to the LFS made by farmers keeping native breeds of animals

Social benefits of LFS	Mean (M)	Standard deviation (SD)
Allow for traceability of products	4.10	0.93
Provide a basic level of food sovereignty	3.76	0.87
Improve the health of the society, thanks to the preservation of all the values of food products	3.74	1.03
Points of sale are a link in the process of social inclusion and integration for consumers and producers/sellers	3.67	0.88

Source: own study

Local food systems play an important role in building social connections [Gale 1997]. They favor the processes of interaction between farmers (food producers) and consumers, as well as the local community. This builds trust between these market actors and even develops social capital [Hunt 2007]. Moreover, the social connections that are formed marginalize the phenomenon of isolation of small producers and contribute to their development and more direct participation in the food market [Serafin 2018]. It also influences the reconstruction of local identity, which forms the basis for other initiatives for the development of the region, and the developing sense of community leads to cooperation between farmers and can foster the creation of agricultural producer groups and organizations. A sense of pride and belonging can emerge among rural communities, while strengthening social cohesion and supporting more sustainable development. In addition, the relationship between rural and urban areas can be recreated, enabling the urban population to gain more knowledge about the consumed products and the methods of their production [Peters 2012].

The analysis of variance showed that detailed assessments for the statement that local food systems allow for the traceability of products differed statistically depending on the species of animals kept on the farm ($F = 3.604$; $p = 0.030$) – Table 3. They were assessed highest by owners of cattle farms ($M = 4.37$) and lowest by owners of pig farms ($M = 3.84$). The location of the farm was also a factor that statistically differentiated the assessment of these benefits ($F = 7.939$, $p = 0.001$). In this case, the highest score was obtained in farms from the Małopolskie Voivodeship ($M = 4.51$) and the lowest from the Podkarpackie Voivodeship ($M = 3.80$).

As mentioned, the ratings obtained for the benefits of providing a basic level of food sovereignty and improving the health of the society, thanks to the preservation of all

Table 3. Results of the analysis of variance for social benefits of LFS

Social benefits of LFS	Animal species		Adopted hypothesis	Voivodeship		Adopted hypothesis
	F	p		F	p	
Allow for the traceability of products	3.604	0.030	H ₁	7.939	0.001	H ₁
Can provide a basic level of food sovereignty	1.554	0.215	H ₀	3.835	0.024	H ₁
Can improve the health of the society, thanks to the preservation of all the values of food products	0.563	0.571	H ₀	6.774	0.002	H ₁
Points of sale are a link in the process of social inclusion and integration for consumers and producers/sellers	0.885	0.415	H ₀	1.045	0.354	H ₀

Source: own study

the values of food products, were assessed by farmers at a very similar level and, in the case of farms, keeping individual species of animals, they did not differ significantly ($p > 0.05$) – Table 3. On the other hand, the assessments obtained on farms according to their location in the voivodeships of south-eastern Poland showed significant differences both for pointing to the provision of a basic level of food sovereignty ($F = 3.835$; $p = 0.024$) and the improvement of public health ($F = 6.774$; $p = 0.002$) – Table 3. In the case of benefits ensuring a basic level of food sovereignty, the highest score was obtained in the Małopolskie Voivodship (3.98), while the lowest in the Podkarpackie Voivodship (3.49). In the case of benefits associated with the improvement of public health, the highest score was again obtained in farms located in the Małopolskie Voivodship (4.15), while the lowest score was obtained in farms from the Lubelskie Voivodship.

The analysis of variance did not show statistically significant differences between the assessments made by farm owners depending on the species of animals kept and their location ($p > 0.05$) in relation to the benefits that the points of sale are a link in the process of social inclusion and integration for consumers and producers/sellers (Table 3).

Among the environmental benefits related to local food systems presented for evaluation, farmers rated their impact on biodiversity conservation and the development of native breeds highest ($M = 3.92$; $SD = 0.92$) – Table 4. A fairly high assessment of these benefits is rather obvious in the case of farmers who themselves take part in the system of biodiversity protection and the conservation of livestock genetic resources. In agriculture, over the years, biodiversity has been replaced by highly efficient breeds in animal production and crops in plant production. Thus, most food produced in conventional (industrial) food systems comes from an increasingly narrow genetic base [Jaroszewska,

Table 4. An assessment of environmental benefits related to the LFS made by farmers keeping native breeds of animals

Environmental benefits of LFS	Mean (M)	Standard deviation (SD)
Can contribute to the preservation of biodiversity and the development of native animal breeds	3.92	0.92
Can reduce the impact of transport-related factors	3.65	0.83
Are linked to organic waste management, water management, the reuse of production residues and renewable energy	3.28	0.88

Source: own study

Prandecki 2016]. In the case of local food systems, issues related to efficiency, having appropriate processing properties important for the mass production of food or adaptation to the transport of raw materials over long distances are of little importance. In contrast, the genetic diversity of animals (and plants), brings a number of specific benefits affecting the diversification of agricultural systems and is fundamental to ensuring food security for future generations [Bedla et al. 2020].

The environmental benefits of local food systems related to the reduction of the environmental impact of transport factors were assessed by the surveyed farmers at an average level of 3.65 (SD = 0.83) – Table 4. Food that is produced, sold and consumed locally does not have to be transported to long distances. This prevents food from losing nutritional value, the quality of which can decrease in a long supply chain, and there is no loss resulting from the destruction of food (e.g., spoilage). Long-distance transport also affects the state of the natural environment and climate change [Enthoven, Van den Broeck 2021]. The longer the food's way to the consumer, the greater the environmental pollution caused by the emission of harmful gases into the atmosphere, the contamination of water, soil and noise associated with transport and distribution processes.

A relatively low mean assessment was obtained for the statement that local food systems are linked to organic waste management, water management, the reuse of production residues and renewable energy (M = 3.28; SD = 0.88) – Table 4. The not very high assessment of these benefits is perhaps due to the fact that farmers have to apply at least some of the indicated elements of environmental sustainability in their daily production practice. This concerns the management of organic waste and the reuse of production residues such as animal manure, crop residues, stems, leaves, roots, etc., which must be properly managed or disposed of without harming the environment. On the other hand, water management in rural and agricultural areas is aimed at limiting the effects of drought, which is important for every farmer, regardless of the market for which it is

Table 5. Results of the analysis of variance for the environmental benefits of LFS

Environmental benefits of LFS	Animal species		Adopted hypothesis	Voivodeship		Adopted hypothesis
	F	p		F	p	
Can contribute to the preservation of biodiversity and the development of native animal breeds	0.569	0.567	H ₀	5.043	0.002	H ₁
Can reduce the impact of transport-related factors	2.613	0.077	H ₀	3.141	0.027	H ₁
Are linked to organic waste management, water management, the reuse of production residues and renewable energy	2.178	0.117	H ₀	1.388	0.253	H ₀

Source: own study

produced. Also, the use of renewable energy sources (water, sun, wind, biomass, biogas and geothermal energy) does not have to only be associated with local food systems. At the same time, farm involvement in local food systems can contribute to producing less waste that is not directly related to production (e.g., no food packaging), as well as the participation of farms in environmental protection projects, such as agri-environmental programs [Nowakowska-Grunt, Kielbasa 2017].

The analysis of variance showed that the mean assessments obtained for environmental benefits in the form of their influence on the preservation of biodiversity and the development of native breeds in farms keeping particular animal species did not differ significantly ($p > 0.05$), but the average assessments of these benefits, considering the location of farms, did ($F = 7.092$; $p = 0.001$) – Table 5. These benefits were rated highest by farms located in the Małopolskie Voivodeship (4.28), and lowest by farms from the Podkarpackie Voivodeship (3.62).

Also, in the case of environmental benefits related to reducing the impact of transport-related factors, no significant differences in their assessment were noted among farms breeding particular animal species ($p > 0.05$). However, such differences occurred in relation to the location of the farm ($F = 3.141$; $p = 0.027$) – Table 5. The highest score for these benefits was obtained in farms in the Małopolskie Voivodeship (3.89), and the lowest in farms in the Podkarpackie Voivodeship (3.51).

There were no statistically significant differences between the assessments made by farmers keeping particular animal species and coming from the three studied voivodeships for the benefits of linking local food systems with organic waste management, water management, the reuse of production residues and renewable energy ($p > 0.05$) – Table 5.

CONCLUSIONS

Local food systems have many advantages. They imply a series of social and environmental benefits. Authorities at various levels (from local to European) are interested in their creation, as well as agricultural producers themselves, who can, thus, become direct market participants. Local food systems are very valuable initiatives, not only for participating farms, but also for consumers, who are paying more and more attention to the quality and originality of food and its local origin. In the case of farms keeping animals of native breeds, this has an additional benefit – the preservation of biodiversity as an added value that consumers would be aware of.

The results of the conducted analyses allow to state that, in the area of social benefits, the highest degree of acceptance among farmers keeping animals of native breeds was obtained for the statement that local food systems allow for the traceability of products with the area of their origin. The hierarchy of environmental benefits indicates that farm owners are most favorable to the statement that local food systems can contribute to biodiversity conservation and the development of native breeds of animal.

A detailed analysis, taking into account the species of animals kept on the farm and the location of the farm (voivodeship), indicates that location was more likely to influence the significance of differences in farmer assessments of both social and environmental benefits. The highest ratings were obtained in the case of farms from the Małopolskie Voivodeship and the lowest, usually, in the case of farms from the Podkarpackie voivodeship.

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KORZYŚCI SPOŁECZNE I ŚRODOWISKOWE ZWIĄZANE Z LOKALNYMI SYSTEMAMI ŻYWNOŚCIOWYMI W OCENIE ROLNIKÓW UTRZYMUJĄCYCH ZWIERZĘTA RAS RODZIMYCH

Słowa kluczowe: gospodarstwa rolne, lokalne systemy żywnościowe, zwierzęta ras rodzimych, korzyści społeczne, korzyści środowiskowe

ABSTRAKT

Celem opracowania jest przedstawienie opinii rolników utrzymujących rodzime rasy zwierząt na temat wybranych społecznych i środowiskowych korzyści związanych z funkcjonowaniem lokalnych systemów żywnościowych. Lokalne systemy żywnościowe zaliczane są do tzw. alternatywnych systemów żywnościowych, które znacznie różnią się od systemów konwencjonalnych. Ich szczególną cechą jest to, że produkcja, przetwarzanie żywności, obrót tą żywnością i jej spożycie występują na stosunkowo niewielkim obszarze geograficznym. Powoduje to, że systemy te tworzą pewien układ wzajemnie powiązanych procesów, łączących producentów z konsumentami, a także z lokalnym społeczeństwem, środowiskiem i gospodarką. Do pozyskania informacji wykorzystano metodę wywiadu bezpośredniego. W badaniu wzięło udział 144 rolników dobranych w sposób celowy. Zasięg terytorialny badań obejmował trzy województwa Polski południowo-wschodniej. Rejonizacja badań wynikała ze specyfiki rolnictwa tych województw, sprzyjającej utrzymywaniu zwierząt gospodarskich ras rodzimych. Stwierdzono, że w obszarze korzyści społecznych najwyższą akceptację uzyskano dla stwierdzenia, że lokalne systemy żywnościowe pozwalają na identyfikowalność produktów z obszarem ich pochodzenia. Hierarchia ocen dla przedstawionych obszarów korzyści środowiskowych wskazuje, że rolnicy są najbardziej przychylni stwierdzeniu, że lokalne systemy żywnościowe mogą przyczynić się do zachowania różnorodności biologicznej i rozwoju ras rodzimych zwierząt.

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