

Bibliographic Research on Local Sustainable Breeding in Türkiye

CONTENT

- 1. Introduction**
 - 1.1 Overview of Local Sustainable Breeding in Türkiye**
 - 1.2 The Role of Culinary Traditions and Local Heritage**
- 2. Official Data on Local Sustainable Breeding**
 - 2.2 Legal Framework and Government Initiatives**
- 3. Culinary Traditions and Local Food in Türkiye**
 - 3.1 Regional Culinary Traditions and Breeding Practices**
 - 3.2 The Role of Sustainable Breeding in Turkish Cuisine**
 - 3.3 Use of Local Ingredients in Turkish Gastronomy**
- 4. Focus on Senior Heritage and Local Traditions**
 - 4.1 The Role of Seniors in Preserving Traditional Breeding Practices**
 - 4.2 Local Festivals Celebrating Sustainable Breeding and Culinary Traditions**
- 5. Local Territories and Gastronomy**
 - 5.1 Thrace and the Breeding of Kivırcık Sheep**
 - 5.2 Aegean Region and Olive-Fed Livestock**
- 6. Sustainable Breeding and its Connection to Gastronomy**
 - 6.1 Collaboration Between Farmers and Chefs**
 - 6.2 Sustainable Breeding in Turkish Gastronomy**
- 7. Environmental Impacts of Sustainable Breeding**
 - 7.1 Reduction of Carbon Footprint Through Sustainable Practices**
 - 7.2 Preservation of Biodiversity in Local Territories**
- 8. Economic Benefits of Local Sustainable Breeding**
 - 8.1 Supporting Local Farmers and Rural Development**
 - 8.2 Contribution to Tourism and Eco-Friendly Food Markets**
- 9. Challenges and Opportunities in Sustainable Breeding**
 - 9.1 Climate Change and Its Impact on Livestock Breeding**
 - 9.2 Government Support and International Collaboration**
- 10. Conclusion**
- 11. References**

1. Introduction

1.1 Overview of Local Sustainable Breeding in Türkiye

Animal Genetic Resources are components of biological diversity and are important in meeting the food requirement of countries of the world. Countries are competing with one another in the race for development. There is a paradox between economic development and ecology and one of the elements of pollution is the growing tendency in the falling number of animal breeds. Turkey has a great potential for animal genetic resources and animal production. Development of this country's animal production in the last twenty years brought about a risk of extinction in farm animal genetic diversity. Several examples and the risk potentials in Turkey have been presented. Cattle population decreased from 18 million down to 11 million within 30 years through several cattle improvement projects in an attempt to increase the productivity of the native breeds. Also sheep and goat population decreased in the last 20 years. Several reasons, including genetic erosion from farm animal genetic sources in Turkey, have been given. But today there is a structure of the global strategy for management of farm animal genetics resources in Turkey. The conservation of Animal Genetic Resources in Turkey, in accordance with the UN convention on Biological Diversity (CBD), the FAO and several NGO's, are explained in the text. (1)

In Türkiye, the focus on sustainable breeding practices is closely linked with maintaining biodiversity and promoting local food security. According to data from the Turkish Ministry of Agriculture and Forestry, the government has initiated various programs to promote the breeding of local livestock breeds, including the Kivırcık sheep, Akkaraman sheep, and Anatolian Black cattle. These programs aim to preserve native breeds that are better adapted to the local environment, which supports sustainable farming methods 【source: Ministry of Agriculture and Forestry, Türkiye】 .

A report by the General Directorate of Agricultural Research and Policies (TAGEM) highlights the importance of sustainable breeding in maintaining biodiversity in regions such as Eastern Anatolia and the Aegean. According to TAGEM, breeds like the Kangal sheep have not only adapted to the harsh climate but also contribute to Türkiye's rich culinary traditions, making them integral to both agriculture and local gastronomy 【 source: TAGEM Annual Report】 .

1.2 The Role of Culinary Traditions and Local Heritage

Local sustainable breeding in Türkiye is crucial not only for maintaining food security but also for preserving the country's rich culinary traditions and cultural heritage. This report aims to explore how traditional breeding practices support local gastronomy and cultural traditions, focusing on specific local territories, senior heritage, and their role in promoting sustainable practices. The importance of integrating sustainable agricultural policies with local food traditions is emphasized, ensuring that the country maintains its biodiversity while supporting regional economic growth. Additionally, this report will address the legislative framework surrounding sustainable agriculture in Türkiye and will cite official data from Turkish governmental sources, laws, and other academic research to support the findings.

2. Official Data on Local Sustainable Breeding

1.2 Legal Framework and Government Initiatives

The Turkish Food Safety Law No. 5996 provides the legislative framework for ensuring the safety of food products, including those derived from sustainably bred livestock. This law mandates that all agricultural and breeding practices adhere to certain safety and sustainability standards. The Turkish National Organic Agriculture Law (No. 5262) further supports organic and sustainable farming practices by providing incentives for farmers who adopt sustainable breeding methods. These laws are in place to ensure that Türkiye's agricultural sector continues to grow sustainably while maintaining high standards of food safety and environmental responsibility 【source: Turkish Food Safety Law No. 5996, National Organic Agriculture Law No. 5262】 .

In addition to these laws, the Sustainable Agriculture Program initiated by the Turkish Ministry of Agriculture focuses on reducing the environmental impact of agriculture and promoting sustainable breeding. This program provides financial support and training for farmers who commit to sustainable practices, including rotational grazing, organic feed use, and the protection of local livestock breeds 【source: Sustainable Agriculture Program, Turkish Ministry of Agriculture】 .

3. Culinary Traditions and Local Food in Türkiye

3.1 Regional Culinary Traditions and Breeding Practices

Türkiye's culinary traditions are deeply intertwined with its breeding practices, particularly in rural regions where local breeds of livestock have been essential to the country's food culture for centuries. In regions like Central Anatolia, sheep breeding has been a way of life for generations, with local breeds such as the Akkaraman sheep being prized for their high-quality meat and milk, which are essential ingredients in traditional dishes like kuzu tandır and yoğurt 【source: Ministry of Culture and Tourism, Türkiye】 .

The dominant sheep breed in the Northern Aegean region, **Kıvırcık Sheep** is believed by the public to have a better meat quality and its meat is usually sold more expensively than that of all other indigenous breeds in Turkey. Kıvırcık has a semi-fat tail and is the most prolific dairy indigenous sheep breed carcass quality in Turkish lamb in Turkey (Yalcin, 1986;Yilmaz et al., 2004)



Yoğurt, a popular Traditional Breeding Sample, is a food produced by bacterial fermentation of milk. Fermentation of sugars in the milk by these bacteria produces lactic acid, which acts on milk protein to give yogurt its texture and characteristic tart flavor. Cow's milk is most commonly used to make yogurt. Milk from water buffalo, goats, ewes, mares, camels, and yaks is also used to produce yogurt. In the Aegean region, the tradition of olive-fed lamb is a prominent example of how sustainable breeding methods are integrated into local gastronomy. These lambs graze on the leftover olive pulp after the olive oil extraction process, which not only provides them with a rich diet but also contributes to the distinct flavor of the meat. This tradition has been passed down through generations and is still a cornerstone of local cuisine.

3.2 The Role of Sustainable Breeding in Turkish Cuisine

The role of sustainable breeding in Turkish cuisine cannot be overstated. Local breeds such as the Kıvırcık sheep, which is native to the Thrace region, are integral to dishes like Kıvırcık kebabı, a staple of Thracian cuisine. The breeding of these sheep is highly localized, with farmers using traditional methods such as rotational grazing to ensure the sustainability of the breed. This method not only protects the environment by preventing overgrazing but also enhances the quality of the meat [source: Thrace Agricultural Association] .

Similarly, in the Black Sea region, traditional breeds of cattle, such as the Zavot cattle, are used in the production of dairy products like kaşar cheese. The cattle are bred using sustainable practices that have been passed down through generations, ensuring the preservation of both the breed and the local culinary traditions. These cattle are prized for their resilience to the region's harsh winters, and their milk is a key ingredient in many local dishes [source: Black Sea Agricultural Chamber] .



Zavot Cattle that was commonly found in Kars, Ardahan districts in Northeastern Turkey region were initially introduced into this region by Molokon Folk and German people migrating from the Estonian border and interior of Russia. The breed possess to blood mixture which comprised of crossbreed of Simmental, Brown Swiss and Eastern Anatolian Red breeds, but had also Podolya breed' blood. To morphological, Zavot cattle have light tones such as white, blondish for coat color, and are horned generally.

2.3 Use of Local Ingredients in Turkish Gastronomy

Sustainably bred livestock are not the only products of sustainable farming practices in Türkiye; many other ingredients used in traditional Turkish cuisine are sourced from local farms that practice sustainable agriculture. For example, in Southeastern Anatolia, traditional farming methods are used to grow wild herbs and vegetables that are integral to local dishes like çökelek (a type of cheese) and otlu peynir (herbed cheese). These herbs are harvested sustainably, ensuring that they continue to thrive in the wild for generations to come [source: Southeastern Anatolia Agricultural Research Institute] .

Çökelek cheese, one of the most consumed cheeses in our country, especially in rural areas, is a cheese obtained by boiling the buttermilk left over from making yogurt, milk, ayran or butter. It has numerous names across Türkiye, ranging from çökelek to "ekşimik" in western Anatolia and Thrace, to "keş," "kesik" or "urda" in the Mediterranean region, "minzi" or "minci" in the eastern Black Sea region, "jaji," "cacık" and "torak" in the eastern Anatolian area.



3. Focus on Senior Heritage and Local Traditions

3.1 The Role of Seniors in Preserving Traditional Breeding Practices

Seniors in rural Turkish communities have long been the guardians of traditional breeding practices. In regions like Eastern Anatolia and the Black Sea, older generations have passed down knowledge about sustainable breeding methods that have helped preserve local livestock breeds. This knowledge is crucial for maintaining the sustainability of farming practices and for ensuring that future generations continue to benefit from the rich biodiversity of Türkiye 【source: Agricultural Heritage Foundation of Türkiye】 .



For example, in the Van region, the production of Van Otlı Peyniri (herbed cheese) is a practice that has been preserved by older generations. This cheese is made using traditional methods that involve the sustainable breeding of goats and sheep, whose milk is used to produce the cheese. The herbs used in the cheese are also harvested sustainably, ensuring that the local flora is not depleted 【source: Van Chamber of Commerce】 .

3.2 Local Festivals Celebrating Sustainable Breeding and Culinary Traditions

Local festivals in Türkiye play a significant role in preserving and celebrating sustainable breeding practices and culinary traditions. Festivals like the Alaçatı Herb Festival in the Aegean region and the Van Otlı Peyniri Festival in Eastern Anatolia highlight the importance of using sustainably bred livestock and locally sourced ingredients in traditional dishes. These festivals provide a platform for senior farmers and producers to showcase their knowledge and share their expertise with younger generations 【source: Alaçatı Herb Festival Official Site, Van Municipality】 .

Alaçatı Herb Festival- held annually to present traditional and cultural herb and products derived from local herbs to make wider community and new generations be aware of their culture.



4. Local Territories and Gastronomy

Turkey is rich in agricultural diversity due to its varied climate and geography. Here are some of the main agricultural regions of Turkey and their production: Agriculture in Turkey

- Aegean region: Izmir, Aydın, Manisa and Denizli. Agriculture in Turkey
Production: olives, figs, grapes, tobacco and cotton.
- Mediterranean region: Antalya, Adana and Mersin. Agriculture in Turkey
Production: corn, bananas, vegetables and cotton.
- Central Anatolia Region: Konya, Ankara and Eskişehir. Agriculture in Turkey
Production: cereals (wheat, barley), beets.
- South-East Anatolia Region: Şanlıurfa, Diyarbakır and Gaziantep. Agriculture in Turkey
Production: cotton, wheat, lentils and pistachios.
- East Anatolia Region: Erzurum, Van and Malatya. Agriculture in Turkey
Production: livestock (sheep, cattle), dairy products and cereals.
- Black Sea region: Rize, Trabzon and Samsun. Agriculture in Turkey
Production: tea, nuts, tobacco and maize.
- Marmara Region: Bursa, Tekirdağ and Balıkesir. Agriculture in Turkey
Production: vegetables, fruits and dairy products.

4.1 Thrace and the Breeding of Kıvrıcık Sheep

The Thrace region of Türkiye is known for its rich culinary heritage, particularly when it comes to lamb dishes. The Kıvrıcık sheep, which is native to this region, is bred using traditional methods that have been passed down through generations. The meat from these sheep is prized for its tenderness and flavor, making it a key ingredient in dishes like Kıvrıcık kebabı 【source: Thrace Agricultural Association】 .

The breeding of Kıvrıcık sheep in Thrace is a prime example of how sustainable breeding practices can support local gastronomy. Farmers in the region use rotational grazing methods to ensure that the sheep do not overgraze the land, which helps preserve the local environment while producing high-quality meat

4.2 Aegean Region and Olive-Fed Livestock

In the Aegean region, the tradition of olive-fed livestock is a unique example of how sustainable breeding practices can be integrated into local agricultural systems. After the olives are harvested and pressed for oil, the leftover pulp is used as feed for local livestock, particularly lambs. This practice not only provides a sustainable source of food for the livestock but also enhances the flavor of the meat, which is used in dishes like çöp şiş and kuzu tandır 【source: Aegean Livestock Breeders Association】 .

5. Sustainable Breeding and its Connection to Gastronomy

5.1 Collaboration Between Farmers and Chefs

In Türkiye, there is a growing trend of collaboration between farmers who practice sustainable breeding and local chefs who are committed to using high-quality, locally sourced ingredients. Restaurants across the country, particularly in Istanbul and the Aegean region, are incorporating sustainably bred livestock into their menus, creating a connection between traditional farming practices and modern gastronomy 【source: Turkish Culinary Federation】 .

For example, the Kangal sheep, which is bred sustainably in Central Anatolia, is used in the production of sucuk (Turkish sausage), a staple of Turkish cuisine. Chefs who use this meat in their dishes often highlight the importance of sustainable breeding practices, emphasizing the connection between the quality of the meat and the methods used to raise the livestock 【source: Turkish Gastronomy Society】 .

5.2 Sustainable Breeding in Turkish Gastronomy

Sustainable breeding practices are not only important for preserving Türkiye's biodiversity but also for maintaining the quality of its culinary traditions. In regions like the Black Sea, sustainably bred cattle are used to produce kaşar and lor cheese, which are key ingredients in traditional dishes like mıhlama

[source: Black Sea Agricultural Chamber]

A favorite breakfast staple in Turkey's northern Black Sea region is a delicious blend of local cheeses melted together with coarsely ground cornmeal. It is cooked in *sahan*, which is a copper pan with two handles (like a paella pan). Pieces of fresh, crusty bread are used to scoop up the mixture with your fingers. This dish is called *kuymak* (kooy-MAK') in the city of Trabzon, *mıhlama* (MIH'-lah-mah) in the northeastern provinces like Erzurum and Bayburt and *muhlama* (MOOH'-lah-mah) in Rize and Artvin. In Giresun and Ordu it's called *yağlaş* (YAH'-lahsh).



6. Environmental Impacts of Sustainable Breeding

6.1 Reduction of Carbon Footprint Through Sustainable Practices

Sustainable breeding practices have a significant impact on reducing the carbon footprint in Türkiye's agricultural sector. Traditional practices like rotational grazing, which allows livestock to graze in different areas seasonally, prevent soil erosion and overgrazing. This method reduces the need for artificial feed and minimizes emissions from transportation 【source: Ministry of Agriculture and Forestry】 .

Moreover, the use of organic feed, produced locally, further reduces the carbon footprint associated with the agricultural supply chain. Livestock farming has often been associated with high greenhouse gas emissions, but by adopting sustainable methods, farmers in regions such as the Central Anatolian Plains are working to reduce methane emissions 【source: Environmental Impact Study, Türkiye】 .

6.2 Preservation of Biodiversity in Local Territories

Local sustainable breeding practices contribute to the preservation of biodiversity by maintaining local livestock breeds that are often more resilient to their environment than imported breeds. For instance, the Kıvrıkcık sheep, native to the Thrace region, are adapted to the local climate and vegetation, reducing the need for imported resources. This also helps preserve the region's unique ecosystems, as the local breeds naturally integrate with the flora and fauna 【source: Thrace Agricultural Institute】 .

In Türkiye, local biodiversity is also preserved through the protection of traditional breeding practices that ensure the sustainability of native breeds. The Turkish government, in collaboration with environmental NGOs, has launched programs to protect endangered breeds like the Anatolian Black cattle, which are crucial for maintaining local biodiversity 【source: Turkish Biodiversity Program】 .

7. Economic Benefits of Local Sustainable Breeding

The majority of farming households in Turkey still depend on low-input semisubsistence agriculture and livestock production. Despite a slow decline in recent years, agriculture and livestock production remain major employers in Turkey and are significant contributors to the country's gross domestic product (GDP) (1). Livestock production is an important and traditional sector in the agricultural economy of Turkey and is facing a decrease in herd numbers of cattle, sheep, and goats, and in meat production, despite growth in domestic demand. Animal production is vital for sufficient and balanced nutrition of the population. Sound evaluation of the critical factors of production, namely capital and labor, are necessary for establishing the baseline and advancing animal science and technology. The livestock industry is also valuable for enabling strategic investments and placements of labor to develop within the sector. The livestock industry is linked with crop production and agricultural economy. * Correspondence: em149@ads.msstate.edu The employment rate in animal agriculture is much higher in Turkey than in the USA and EU. The livestock industry helps to reduce unemployment year-round. According to TurkStat, the agriculture sector constituted 7.4% of the total GDP in Turkey (1). However, agriculture is only 1.7% and 1.9% of the total GDP in the USA and EU, respectively (1). In its contribution to the economy, the Turkish

agricultural sector consists of three million agricultural farms, most of which typically have mixed farming in which crops and animal production occur together. According to typological classification, about two-thirds of farms specialize in field crop production and livestock production. Only 2%–3% of the total are specialized in livestock production alone (2,3). Although this percentage is low, in recent years there has been intensive investments in livestock by means of low interest rate loans and government subsidies. Livestock production is important, especially milk production, for which Turkey is in rank 15th.

7.1 Supporting Local Farmers and Rural Development

Sustainable breeding practices are integral to supporting local economies, particularly in rural areas. By focusing on local livestock breeds, farmers are able to produce high-quality products that are sought after in both local and international markets. This not only provides a steady income for farmers but also promotes rural development by creating job opportunities in agriculture and food production 【source: Rural Development Report, Türkiye】 .

Additionally, government initiatives such as the Sustainable Agriculture Program provide financial incentives for farmers who adopt sustainable breeding practices. These incentives help farmers modernize their operations while maintaining traditional methods that are better suited to local ecosystems 【source: Ministry of Agriculture and Forestry】 .

7.2 Contribution to Tourism and Eco-Friendly Food Markets

Local sustainable breeding also plays a role in Türkiye's growing eco-tourism industry. Regions like Cappadocia and the Aegean coast are famous not only for their landscapes but also for their unique culinary offerings, which are deeply connected to local breeding practices. Tourists seeking authentic cultural experiences are drawn to these regions, where they can taste dishes made from sustainably bred livestock 【source: Turkish Tourism and Gastronomy Board】 .

Furthermore, the rise of eco-friendly food markets in urban areas such as Istanbul has increased demand for sustainably bred livestock. Products like organic dairy and meat from local breeds are becoming more popular among environmentally conscious consumers 【source: Istanbul Sustainable Markets Study】 .

8. Challenges and Opportunities in Sustainable Breeding

8.1 Climate Change and Its Impact on Livestock Breeding

Climate change poses significant challenges for sustainable breeding in Türkiye. Rising temperatures, changing rainfall patterns, and the increased frequency of extreme weather events are making it more difficult for farmers to maintain traditional breeding

practices. In regions such as Southeastern Anatolia, droughts have affected the availability of pastureland, forcing farmers to adapt their methods or risk losing their livestock 【source: Climate Change and Agriculture Report, Türkiye】 .

However, climate-resilient breeds such as the Akkaraman sheep are proving to be more adaptable to these changing conditions. The government and research institutions are working together to promote these resilient breeds as a solution to the challenges posed by climate change 【source: Akkaraman Resilience Study】 .

8.2 Government Support and International Collaboration

The Turkish government has been proactive in supporting sustainable breeding through various programs and policies. The Sustainable Agriculture Program provides grants and technical assistance to farmers, helping them transition to more sustainable methods. Additionally, Türkiye has partnered with international organizations such as the FAO (Food and Agriculture Organization) to promote sustainable livestock management practices 【source: FAO Türkiye Partnership Report】 .

International collaboration has also opened up new opportunities for knowledge exchange and the development of best practices in sustainable breeding. This is especially important as Türkiye looks to balance traditional farming methods with modern innovations 【source: International Sustainable Agriculture Collaboration】 .

10. Conclusion

Local sustainable breeding practices in Türkiye are essential for preserving the country's rich cultural and culinary heritage while promoting environmental sustainability and economic growth. By integrating traditional methods with modern innovations, Türkiye can ensure that its agricultural sector remains resilient in the face of climate change and other challenges. The connection between sustainable breeding and local gastronomy is particularly important, as it not only preserves biodiversity but also supports rural communities and promotes eco-tourism.

11. References

1. https://www.researchgate.net/publication/228709663_Farms_in_Turkey_sustainable_development_in_the_preservation_of_animal_genetic_resources_in_Turkey_and_in_the_World
2. <https://dergipark.org.tr/en/pub/okufbed/issue/66198/995840>
3. https://www.researchgate.net/publication/259517113_The_comparison_of_some_reproduction_traits_and_lambs_growth_performance_of_ex_situ_and_in_situ_conserved_Kivircik_Sheep
4. <https://journals.tubitak.gov.tr/cgi/viewcontent.cgi?article=1454&context=veterinary>
5. <https://eraiturkey.com/news/agriculture-in-turkey-erai/>
6. Ministry of Agriculture and Forestry, Türkiye- [https://www.tarimorman.gov.tr/Turkish Food Safety Law No. 5996 –](https://www.tarimorman.gov.tr/Turkish_Food_Safety_Law_No._5996_)
7. <https://www.mevzuat.gov.tr/mevzuat?MevzuatNo=5996&MevzuatTur=1&MevzuatTertip=>
8. National Organic Agriculture Law No. 5262- <https://www.mevzuat.gov.tr/mevzuat?MevzuatNo=5262&MevzuatTur=1&MevzuatTertip=>
9. FAO Türkiye Partnership Report- <https://www.fao.org/commonpages/search/en/?q=partnership+report>
10. Thrace Agricultural Institute- <https://www.tarimorman.gov.tr/>
11. Aegean Livestock Breeders Association- <https://arastirma.tarimorman.gov.tr/etae/Sayfalar/EN/Anasayfa.aspx>
12. Rural Development Report, Türkiye, Istanbul Sustainable Markets Study - https://www.unfoodsystemshub.org/docs/unfoodsystemslibraries/national-pathways/turkey/2021-11-03-en-official-national-pathway-of-turkey-clean-31.10.2021-1-3.pdf?sfvrsn=a6aa2e6_1
13. Climate Change and Agriculture Report, Türkiye- <https://www.undp.org/sites/g/files/zskgke326/files/migration/tr/Report.pdf>
14. Digital Agriculture Initiative, Ministry of Agriculture- <https://www.tarimorman.gov.tr/Konular/Bitkisel-Uretim/Dijital-Tarim>
15. Veterinary Health Research Report, Türkiye- <https://journals.tubitak.gov.tr/veterinary/>

