

Introduction

From the early 1960s to the present day, global meat production has experienced an approximately fourfold increase, leading to a 2018 output of 340 million tonnes and the annual slaughter of 80 billion animals (Ritchie et al., 2019., 'https://ourworldindata.org/meat-production'). Similarly, the worldwide production of milk has seen a rapid expansion from 231 million tonnes in 1961 to 860 million tonnes in 2020 (FAO). Accompanying this surge in production, there has been a significant rise in the animal population, with livestock units increasing from 11.7 billion in 1961 to 23.5 billion in 2020. On the one hand, these processes have contributed to a more substantial environmental burden, including increasing greenhouse gas emissions and pollution from animal farms and the food industry (Herrero et al., 2016., https://doi.org/10.1038/s43016-020-0063-2; Adegbeye et al., 2020., https://doi.org/10.1016/j.jclepro.2019.118319). On the other hand, they have also initiated industrialization and intense farm concentration processes (Steinfeld et al., 2006., https://www.fao.org/3/a0701e/a0701e.pdf) that potentially have negative impacts on rural communities (Welsh, 2009., https://doi.org/10.1007/s10460-008-9184-3).

The aim of this research is to examine the industrialization and concentration processes that have taken place in Hungarian livestock farming during the past three decades, and to identify the significant environmental, economic, and social consequences. In addition, we have interviewed young livestock breeders to gain insights into their experiences and challenges in starting and running their businesses. This analysis will provide valuable insights into how contemporary practices in animal husbandry have given rise to sustainability issues and have impacted the progress of rural areas in Hungary.

Materials and methods

This study utilized multiple data sources, including agricultural statistics from Eurostat, the Hungarian Central Statistical Office, and the Hungarian State Treasury database. These sources facilitated the identification of general livestock sector trends, while the Agricultural Census highlighted the decline of small-scale animal husbandry during the 2000s. The National Environmental Information System was the primary data source for analyzing the environmental impacts of animal husbandry, including wastewater and pollutant emissions at the community level. To demonstrate the loss of biodiversity, the bird population database of the Hungarian Society for Bird and Nature Conservation was employed, and landscape degradation processes were illustrated using the National GIS Database of Invasive Species. Policy documents, reports from the Agricultural Committee of the Hungarian Parliament, news from the National Chamber of Agriculture and agricultural portals were also analyzed. Additionally, a literature review identified positive environmental, economic, and social aspects of extensive livestock production, and good practices were gathered to provide an example and vision for Hungarian livestock production.

We used mixed methods to gain deeper insights in our research, combining qualitative and quantitative research activities. To explore main priorities and trends in the Hungarian livestock sector, we analyzed sectorial policy documents and strategic plans at the national level. To highlight macro trends and changes in production patterns in rural areas, we used quantitative analysis of agricultural and livestock sector data of settlements with less than 10,000 people. For the environmental impact analysis of the livestock sector, we used descriptive statistical analysis. To investigate the micro-level situation of agricultural producers, we conducted interviews with 66 farmers involved in animal husbandry under 40 years old in the Homokhátság region of Hungary, using snowball sampling.

Results

According to research findings, Hungarian animal husbandry has undergone a significant decline (Table 1), structural changes (Figure 1) and concentration over the past 30 years, resulting in small family farms playing a minimal role in production.

	2000	2010	2020	Change between 2000-2020 (%)
Pigs	3854428	2453426	2506409	-34,97
Cows	659433	518895	745613	13,06
Sheep	1019526	963919	796905	-21,83
Chickens	33116311	27307460	25917932	-21,73

Table 1. Drop in the number of livestock in Hungarian rural settlements between 2000 and 2020.

Source of data: Agricultural Censuses

Furthermore, household farms have all but disappeared from rural settlements, thus reducing their contribution to supplementary income production. Despite the fact that animal husbandry was a crucial sector of the rural economy in the socialist system, it has lost its significance from the perspective of rural development. This is attributed to various complex reasons, including the loss of foreign and domestic markets in the 1990s, the weakening of cooperatives, the misguided privatization of the food industry, the tightening of animal welfare measures, and the spread of hypermarket chains where food was always available at a low price.

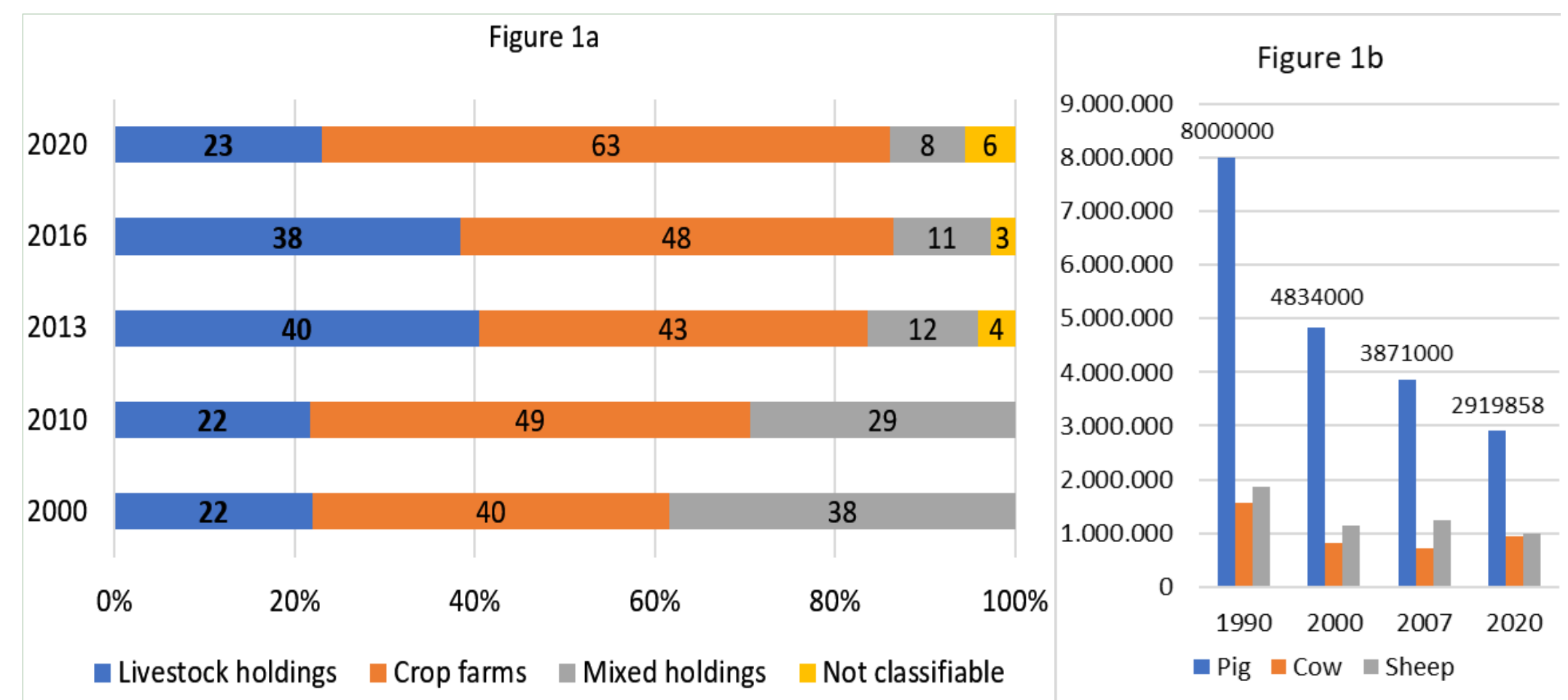
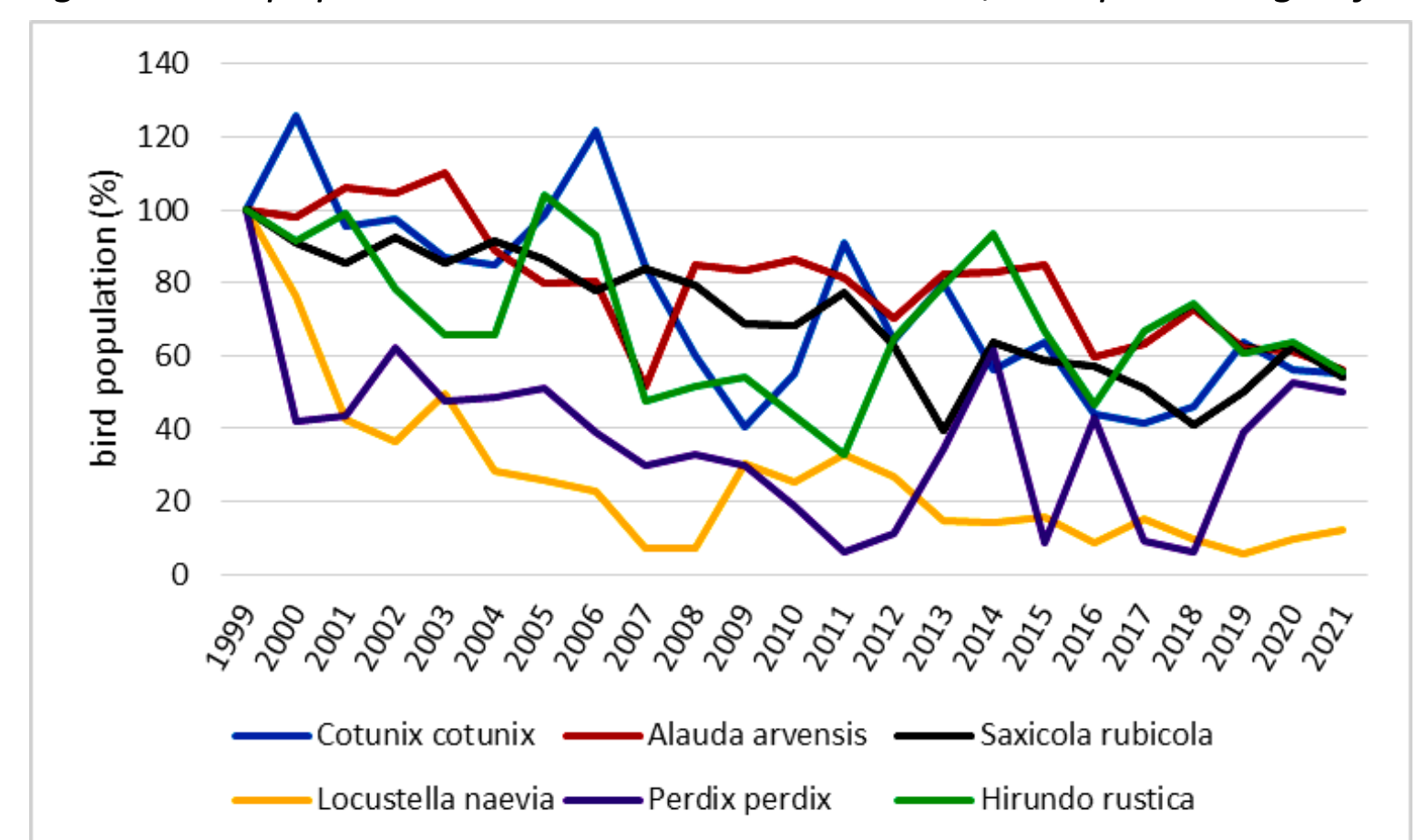


Figure 1 a-b. Distribution of farms by their main type of activity (%) and changes in number of livestock in Hungary.

Source of data: Agricultural Censuses

From an environmental perspective, an increase in grassland area is observed, but their ecological condition is deteriorating, various invasive plant species are spreading rapidly, and biodiversity is significantly decreasing (Figure 2).

Figure 2. Changes in bird populations between 1999 and 2021, as a percentage of the 1999 level.



Source of data: https://www.mme.hu/magyarorszagmadarai/madaradatbazis

Moreover, the large animal farms and meat industry generate significant environmental burden, resulting in 260,000 tons of liquid manure and an additional 9,000 tons of animal waste annually. The livestock sector also contributes significantly to GHG emissions, with 76% of all methane emissions from agriculture associated primarily with beef cattle breeding.

The interviewed young farmers face challenges such as land, capital, and labor shortages, rising input costs, and the increasing risk of various animal diseases. These factors have led them to abandon their farming activities, casting doubt on the effectiveness of measures taken so far to change the generation of farmers. On the other hand, large-scale farms have been successful only in cattle breeding due to agricultural subsidies.

Conclusions

Existing large-scale animal husbandry is not multifunctional, and only its environmental burden is apparent, without positive effects on rural areas and communities. Recent events, such as the Covid-19 pandemic, the Ukrainian-Russian war and last year drought have highlighted the importance of food self-sufficiency, food security, and preserving ecosystem services. In our view, a paradigm shift and new policy tools are needed in Hungarian agricultural policy to deviate from the current competitiveness, efficiency, and digitalization-oriented approach (Hoyk et al., 2022., https://doi.org/10.47833/2022.2.AGR.003). While we acknowledge that this approach can improve the environmental and economic sustainability of crop and animal production, it falls short in promoting biodiversity or regenerating ecosystem services, only reducing environmental harm. Moreover, it neglects social aspects and cannot effectively facilitate the renewal of the farming community. Additionally, it struggles to adjust to changing consumer demands, including quality and environmental expectations. Finally, the production relying on a few large farms is considerably more vulnerable to external factors, such as animal diseases.

In our opinion, due to the aforementioned reasons, it is necessary to review the policy goals and measures for the Hungarian livestock sector. In this regard, we consider two fundamental components to be essential: 1) a diversified farming system (DFS) (Kremen et al., 2012., http://dx.doi.org/10.5751/ES-05103-170444) and 2) the adaptation of the new agro-social paradigm (Tulla et al., 2017., https://doi.org/10.5719/hgeo.2017.111.2).

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