

Jadwiga Topczewska, Anna K. Rogowska, Małgorzata Ormian

University of Rzeszow, Poland

A STUDY INTO HORSES USE IN ORGANIC FARMING IN THE CONTEXT OF SUSTAINABLE DEVELOPMENT IN SOUTH-EAST POLAND

UŻYTKOWANIE KONI W ROLNICTWIE EKOLOGICZNYM W ASPEKTCIE ZRÓWNOWAŻONEGO ROZWOJU W POŁUDNIOWO-WSCHODNIEJ POLSCE

Key words: draft horses, organic farming, sustainable development

Słowa kluczowe: konie robocze, rolnictwo ekologiczne, rozwój zrównoważony

JEL codes: Q00, Q01

Abstract. The aim of the study is to show the advantages of using horses and modern horse-drawn machines in organic farming. The study presents the benefits derived from using horses in agriculture from the aspects of sustainable development. Workhorses, both in organic farming as well as on small family farms, serve as sources of renewable energy thus contributing to the protection of biodiversity. Modern horse-drawn machines and tools improve farms' self-reliance, enhances the living standards of on-farm workers, empowers local communities and leads to job-creation. The need for further studies and analysis of the use of workhorses in aspects regarding sustainable development in Poland was also signified.

Introduction

Organic farming is a dynamically growing system of production that relies on sustainable plant and animal production. It combines environmental friendliness with farming practices which impacts on the sustenance of biodiversity by exploiting natural processes and ensures the proper welfare of farm animals [Jansen 2000]. The protection of natural resources is a key component of sustainable development, that aims to achieve ecological, economic and social equilibrium [Adamowicz 2005, Staniak 2009, Janikowski 2013]. Small family farms including organic farms perfectly fit into this idea [Zegar 2012].

Data from Helga Willer and Julia Lernoud [2015] indicate that land area devoted to organic farming in Europe as grown ten-fold since 1993 to reach its prevent level of 11 million hectares. Austria leads the pack with 18% of its agricultural land being farmed using organic farming systems [MLÖ, MAFEWM 2015]. The largest organic farming land area Europe is in Spain (1.6 mln ha), followed by Italy (1.3 mln ha), with France and Germany having 1 million hectares each [Willer, Lernoud 2015, Komorowska 2016]. Organic farming has grown dynamically in recent years, as shown by data relating to the number of organic producers as well as organic arable land area [Nowogródzka 2012, GUS 2014a]. Total farmland area devoted to organic farming in 2004 was 82,000 hectares, which grew to over eight times, exceeding 650,000 hectares in 2014. The number of organic farmers exceeded 25,000 at the end of 2014 [IJHARS 2015].

The use of work horse has, in recent years, taken on a new dimension not only in organic farms but also in small family farms [Glover et al. 2011]. The labour force of draft horses is more beneficial in respect of environmental protection and conversion of energy into workforce when compared to modern technologies [Soukup et al. 2008, Mumma 2008].

Material and methods

The objective of the study was to draw attention to the benefits accruing to the use of work-horse in organic farms as well as in small family farms in Podkarpacie province. Indicated hypotheses:

- H 0: Overall land area shows the lack of economic reason of mechanic traction usage
- H 1: Sectoral distribution of cultivation has the great part of meadows and pastures as the basic of herbivorous feeding

- H 2: High population of horses in south-east Poland can be use as work-horses and for recreation.

The research study makes use of data sourced from the branch of the Central Office of Statistics in Rzeszów, the Inspectorate of the Commercial Quality of Agricultural Food Products. Data from the Polish Association of Horse Breeders (PZHK), the Equine Central Database [www.cbdk.pl] were also made use of. The number of horses that can be possibly used in organic as well as small and medium family farms was determined using Podkarpacie province as a case study.

Results and discussion

Agriculture in Podkarpacie is characterized by high farm fragmentation, high subsistent agricultural production and excessive labour force. These factors, besides the natural values of the region, make it a suitable place for the development of organic farming. There existed, in 2014, 132,800 farms in Podkarpacie province, including 1356 organic farms (1.1%) [US Rzeszów 2015]. Arable land made up 584,100 hectares [GUS 2014b], which included 23,509 hectares that practiced organic farming [IJHARS 2015].

A structural analysis of the farmlands showed that farmlands of between 1 and 5 hectares made up 82.5%, taking up 44.4% of cultivable land area. Farmlands of 5-10 hectares constituted 12.4% and 18.7% analogically (Fig. 1). While the figure for organic farmers with farm area not exceeding 5 hectares was 30.9%, that of 5-10 hectares was 33% (Fig. 2). A significant area of the land for crops cultivated organically was occupied by permanent grasslands (Fig.3). This could be due to subsidies obtained as livestock populations kept organically was relatively small [IJHARS 2015]. The Regulation of the Minister of permanent grasslands, farmers are required to own herbivorous animals in numbers not less than 0.3DJP/ha. Agriculture and Natural Resources dated 13th March 2015 [JOL RP 2015].

An average size organic farm in Austria, in comparison, is 20 hectares and maintains on average 26 heads of cattle [Organic farming in Austria, 2015], while in Poland only two heads [IJHARS 2015].

The horse population, in Poland, is estimated to be about 300,000, with more than half being draft horses [PZHK 2015]. There are about 15,000 horses being kept in Podkarpacie province out [www.cbdk.pl] which only 1.2% are in organic farms. The dominance of cold-blooded horses in the stock (almost 60%) is an indication of the huge reserve of labour force (Fig. 4).

One pair of horse can, according to Jan Jansen [2000], can be used in a 10 hectare farm to ensure not only a typical crop rotation, but also vegetable cultivation and a timely execution of field work. On comparing this data with structures of farmlands, it can be demonstrated that farms in south-east Poland with up to 5 hectares (82.5%) can exploit about 5000 work horse, while farms

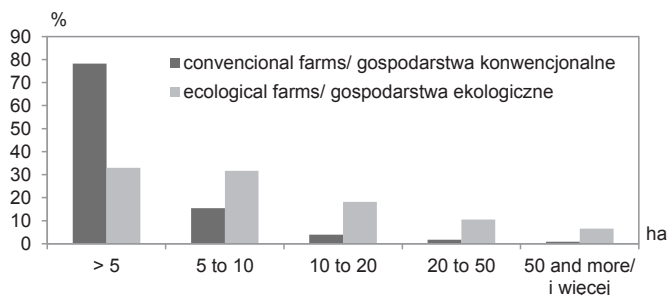


Figure 1. Number of farms in % according to overall area and cultivable land area in Podkarpacie in 2014
Rysunek 1. Liczba gospodarstw i powierzchnia użytków rolnych (%) w grupach obszarowych na Podkarpaciu w 2014 roku

Source: own study based on [US Rzeszów 2015]

Źródło: opracowanie na podstawie [US Rzeszów 2015]

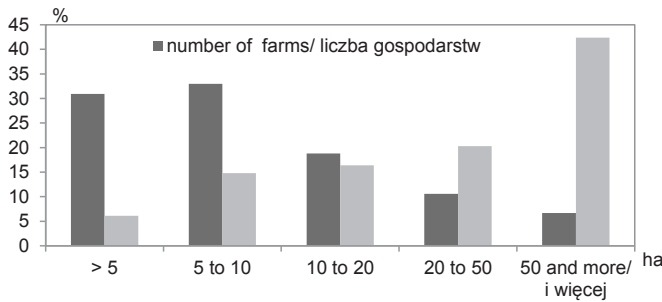


Figure 2. Participation of organic farms in total eco – cultivable land area in Podkarpacie in 2014

Rysunek 2. Liczba gospodarstw ekologicznych i powierzchnia użytków rolnych (%) w grupach obszarowych na Podkarpaciu w 2014 roku

Source: own study based on [IJHARS 2015]

Źródło: opracowanie własne na podstawie [IJHARS 2015]

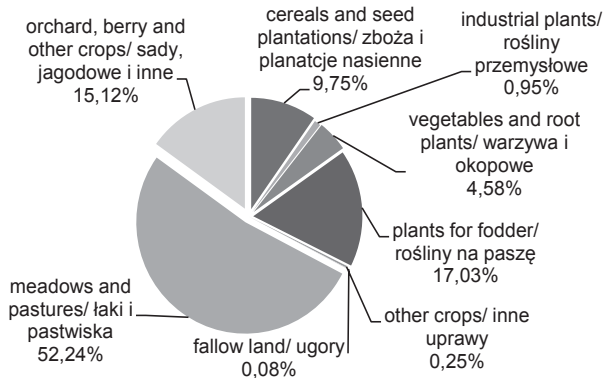


Figure 3. Sectoral distribution of cultivation in organic farms in south-east Poland

Rysunek 3. Struktura upraw w gospodarstwach ekologicznych na terenie południowo-wschodniej Polski

Source: see fig. 2

Źródło: jak na rys. 2

of 5-10 hectares would allow 2500 horses. In analysing the land area patterns of organic farms (Fig. 2), it can be concluded that the farm work can be performed using about 1000 horses.

Horse traction has been seen in many parts of the world as an affordable and sustainable technology [Mumma 2008]. It is more common in organic farms than in conventional ones [Glover et al. 2011], and economically competitive, which is of great significance in terms of limiting production costs [Kendell 2000]. Agricultural work in small farm holdings can be performed using 35Hp (26 kW) tractors, whose prices range from € 7000 while the price of a work horse would range from € 1400 [GUS 2014b]. Basic tillage machines and units significantly increase the cost of running machine parks, while horse-pulled machines are produced mainly in small artisan workshops which additionally contributes to the creation of new jobs. Live tractive force requires people in such occupations as blacksmiths and saddlers. The use of work horse, according to Peter Herold et al. [2009], leads to the decentralisation and attainment of stable economic structures as well as savings on fossil fuel-based energy sources. The use of work horses in agriculture yields energy savings to the tune of 2400 litres of diesel oil, when compared to a tractor. Cold-blooded work horses can, according to Tracy Mumma [2008], attain power of up to 27 Hp within short bursts. They are characterized by

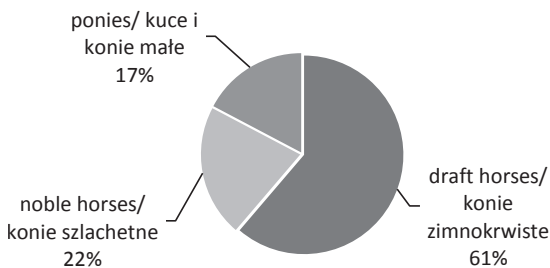


Figure 4. Participation of various horse types in Podkarpacie

Rysunek 4. Udział typów rasowych w pogłowiu koni na Podkarpaciu

Source: own study based on [CBDK 2015]

Źródło: opracowanie własne na podstawie [CBDK 2015]

ease of bondage into units to increase their capacity while retaining their agility. Depreciation is not a question of worry in respect of horses as they can be valuable raw material for slaughter while the use of mares for work purposes could generate profits from the offspring. Horses can, besides farm work, be exploited for recreational purposes by tourists in agri-ecology farms or in forestry.

The energy efficiency of horses is about 30% while that of tractors ranges between 12-20% [Herold et al. 2009]. They constitute a form of clean, renewable energy, which remains a valuable raw material even after their exploitation. Horses used for farm work depends up to 60% on renewable and local sources of energy while the usage by tractors is only 9% [Jansen 2000, Rydberg, Jansen 2002]. Bernard Denegard [2005] maintains that biofuels needed to fuel the work of a tractor for an hour over a year would cover 5 ha, while the horse would need 1.5 ha of arable land and permanent grasslands to ensure the fodder needed for it to work 5 hours daily for one year. Horses can be exploited in landscape management, which may contribute to the preservation of some breeds for example the cold-blooded and other native breeds thus protecting biodiversity. Horse traction is safer for fauna and flora of permanent grasslands, especially for ground nesting birds. Extensively managed grasslands are homes to globally threatened bird species while biodiversity is not unconnected with agricultural practices that are environmentally friendly [Staniak 2009]. Horses are born naturally without being of any burden to the environment and whilst mares bring about generations in their life time, the foals could serve as additional sources of farm income. Horses yield about 33% energy in form of valuable fertilizer (horse manure), which is essential in ensuring soil fertility, amount of humus and nutrients, and hence productivity. The fertilizer can also supply energy in form of biogas [Schroll 2000]. Mieczysław Adamowicz [2005] draws attention to possibilities of avoiding series of negative phenomena that accompanied agricultural transformation in economically developed countries. As an example, one can mention the retention of traditional, family farming systems as well as the mosaic pattern of agricultural landscape of Podkarpacie province.

Conclusions

Modern use of horses in farming in eastern Europe can be traced back to between 19 and 20th centuries. Regional and national specific features call for greater interests of research to enable a reliable assessment of the cost-effectiveness of the use of work horses in Podkarpacie Province and Poland.

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Streszczenie

Wskazano na korzyści wynikające z użytkowania koni w rolnictwie w aspekcie zrównoważonego rozwoju. Konie robocze w rolnictwie ekologicznym, a także w małych gospodarstwach rodzinnych, są źródłem energii odnawialnej, przyczyniają się do ochrony bioróżnorodności. Nowoczesne narzędzia i maszyny konne zwiększają samodzielność gospodarstw, przyczyniają się do poprawy jakości życia pracujących, prowadzą do pobudzenia lokalnych społeczności i tworzenia nowych miejsc pracy. Wskazano na potrzebę podjęcia badań i analiz dotyczących użytkowania koni roboczych w warunkach Polski w aspekcie zrównoważonego rozwoju.

Correspondence addresses

Dr hab. Jadwiga Topczewska prof. UR
 University of Rzeszów, Faculty of Biology and Agriculture
 Department of Animal Production and Poultry Product Evaluation
 Zelwerowicza 4 Str., 35-601 Rzeszów, Poland
 e-mail: j.topczewska@gmail.com