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CASE STUDY

The prospects for organic agriculture in Hungary – A human ecological approach

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Abstract – The natural, social, and economic issues and problems of today and the near future pose new challenges for researchers and educators in every discipline. In this complex situation, human ecology, which synthesizes the knowledge of individual disciplines and focuses on connections and interactions, has a special role to meet this challenge. In the service of practical sustainability, it helps to reveal the complexity of the agricultural sector and to prepare public policy decisions, taking the special features and capabilities of the particular environments into account. In the complex understanding of the operation of highly complex living systems, in mitigating the effects of climate change, in conserving biodiversity, in assessing the effects of biogeochemical processes, and in solving many other problems at the local and global level, the holistic system-approach is needed for putting them in contexts. In this study, we highlight the reasonableness and the vital role of human ecology in organic farming as well as outline its future challenges and possibilities.

Keywords – human ecology, sustainable food production, organic agriculture, system contexts

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INTRODUCTION

There has been an intensive tug-of-war between economy (that is, economic growth and interests) and nature (declining natural resources) for many centuries of human history. Ecological sustainability, as Kopnina describes, is about „how biological systems remain diverse, robust, and productive over time” (Kopina, 2014, p.932), and that only nature in its integrity can further provide natural resources for the well-being of humanity as well as for other species. As Karl Polanyi famously wrote in the middle of the 20th century, “to allow the market mechanism to be the sole director of the fate of human beings and their natural environment…would result in the demolition of society…Nature would be reduced to its elements, neighbourhoods and landscapes defiled, rivers polluted, military safety jeopardized, the power to produce food and raw materials destroyed” (Polanyi, 2001, p.76).

Agriculture is of fundamental importance and it has life-determining challenges in achieving widest-scale sustainability. Its decisive role is well summarized in a relevant publication of the United Nations’ Food and Agricultural Organization (FAO) on this basic and complex sector entitled “The future of food and agriculture – Trends and challenges”, arguing that high-input and resource-intensive farming systems cause massive deforestation, water scarcities or pollution, soil depletion, high levels of greenhouse gas emissions, and does not secure sustainable food and agricultural production. The overdependence of industrial agriculture on fertilisers, pesticides and other synthetic materials is just one aspect of the economic and social consequences of industrial farming. Its ecological impacts are also high in relation to greenhouse gas emissions, the acidification and erosion of soil, water pollution and eutrophication, and biodiversity loss (FAO, 2017).

Bliss (2019) argues that „today’s food systems fail to realize the normative foundations of ecological economics: justice, sustainability, efficiency, and value pluralism”, and that „markets, as an institution for governing food systems, hinder the realization of these objectives”. Markets encourage shifting costs on nature, and cause unsustainability in many ways, not supporting wider social, cultural, spiritual, moral, and environmental values. Such irrationalities make societies less resilient to sudden and unexpected changes (BLISS, 2019). The ultimate goals of higher food security can be achieved by better harmonizing the biogeochemical cycles, reducing wastes and pollutions at the landscape level, increasing the economic efficiency at the farm level, and therefore, by improving the efficiency of food production while providing complex environmental benefits (FAO, 2015; Searchinger et al., 2019). Therefore, "needed are innovative systems that protect and enhance the natural resource base while increasing productivity. Needed is a transformative process towards 'holistic' approaches, such as agroecology, agro-forestry, climate-smart agriculture, and conservation agriculture, which also build upon indigenous and traditional knowledge. Technological improvements, along with drastic cuts in economy-wide and agricultural fossil fuel use, would help address climate change and the intensification of natural hazards, which affect all ecosystems and every aspect of human life." (FAO, 2017, xi).

Organic agriculture has a variety of ideological foundations. These various sustainable food systems are based on a rich set of concepts and values, including, for example, autonomy, fairness, responsibility, frugality, resilience, sharing traditional ecological knowledge fitted to different environments, which are addressing our dependence on the biophysical and ecological limits of the biosphere (Martin et al., 2016; Pascual et al., 2017). Contrasting to the dominant worldview of the industrial societies that consider nature as a resource for human exploitation, organic farming has different methods based on a common way of ecological thinking that nature is a wonderful living system existing in its impressive complexity and interrelations. Ecocentrism „recognizes that the current state of the planet is the product of a strong hierarchisation between human life and nonhuman life, including ecological collectives" (Washington et al., 2017, p. 372). If we want to „survive ourselves", we must stop seeing nature as merely something to exploit.

Organic farming systems avoiding synthetic pesticide and fertiliser application and consequently reducing groundwater pollution, eutrophication and algal blooms offer various sustainable food production alternatives for industrial production (Jones et al., 2012). Organic management practices employing conservation tillage, cover crops, enhanced crop rotations, residue retention, and using biological pest control can use less (fossil) energy input and maximize carbon fixation while minimizing the loss of soil carbon, and therefore offer a viable alternative to industrial agriculture in lowering the greenhouse effect. Even the long-debated yield seems to be comparable (Lasalle and Hepperly; 2008; Rodale Institute, 2011; Delate et al., 2015).

HUMAN ECOLOGY – THE SCIENCE OF SYNTHESIS

Accumulating scientific knowledge is of basic importance in supporting sound environmental decisions, but disciplinary boundaries often limit the valuable integration of the complementary information, therefore, human ecology with its interdisciplinary approaches are of particular relevance in this aspect (Ives et al., 2017). The main focus of human ecology—as well as that of the general subject of ecology—is life in its complexity. This is reflected in its holistic and system-based approach. The integrating role of human ecology is based on its scientific approach putting a great emphasis on the interacting processes, their interrelations and interdependence. With the endless flow of information of various disciplines, it is particularly important to put them in context.

System thinking incorporates the recognition of the various biophysical and socio-economical components in a particular environmental context and reveals their interrelations (McBride et al., 2013). Historical and recent lessons that contribute to the revelation and understanding of complex ecological processes are used for better understanding the interrelations of the different 'spheres' which our world is organized around, including the atmosphere, the hydrosphere, the pedosphere, the biosphere, the sociosphere, and the econo-technosphere. The availability, access to, and management of these vital natural resources are of fundamental importance for sustaining life on this planet. In the age of fast environmental, social and economic changes including the increments of the numbers of our human populations and productions (Ripple et al., 2020), as well as life-threatening local, regional and global problems (Steffen et al., 2015), the discipline of human ecology is gaining an increasing vital significance also in agriculture.

Aspects	Conventional farming	Organic farming
Worldview	More anthropocentric	More ecocentric
Operation	Industrial	Generally smaller scale
Values – interest	Human-centred economical	System-centred economical
Production system	Mostly monoculture	Mostly polyculture
Cultivation	Conventional tillage	No- or low-tillage
Mechanization	Large machineries	Smaller or large machineries
Irrigation	More prodigal	More frugal
Chemicals used	Synthetic chemicals	Organic chemicals (manure, compost)
Pollution	Higher incidence	Lower incidences
Biodiversity	Decreasing	Enriching
Climatic effects	Mostly higher	Mostly lower
Market orientation	Large-scale (national-international)	Small (local) to large (national-international)

MATERIALS AND METHODS

58 Hungarian farmers from all over the country were chosen randomly at the 33rd Bábolna Farmers Fair which (held on 10-12 September 2020 in Bábolna, North-West Hungary; GPS: 47.641822918353 + 17.981058120728), and their attitudes were surveyed using a short questionary with seven choice questions and three open questions. These questions included age, gender, size of the farm, and their knowledge, experiences, and attitudes about organic agriculture. They

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were also asked about their most significant environmental effects which put restraints on their production. Around one quarter (25.9%) of the farmer responders were females, and 74.1 percent were males. The average age for females was 57.5 years, while that of males was slightly lower (51.7 years).

Results and Discussion

The number of organic farmers has been growing more than threefold during the last 15 years (from 1.551 in 2005 to 5.136 in 2019), and their cumulative area was more than doubled (from 123.536 in 2005 to 303.190 in 2019) as these are registered by the Hungarian Central Statistics Office (HCSO, 2020), and is shown in Figure 1A. The average size of an organic farm was 81.3 hectares during the 10 years lasting from 2005 to 2014 but fell considerably to an average of 57.5 hectares during the 5 years from 2015 to 2019 (Figure 1B).

(32%) of the farms of the responders were less than 10 hectares, 46 percent felt between 10 and 100 hectares, and the remaining 22 percent were greater than 100 hectares (10 farmers, equivalent of 17.2 percent did not fill their farm sizes up). Only 16 percent of the responders are organic farmers, while more than one quarter (26.8 percent) stated that they are planning to change their farming system from conventional to organic production. Only 3.6 percent reported that they would change from conventional farming to organic one if the economic conditions would be more advantageous for organic production.

Over seventy percent of the responder farmers have positive or partly positive opinion about organic agriculture (Figure 2A). When asked about the knowledge about organic farming, the majority (55.2%) of the farmers reported that they have some information, and around one quarter (25.8%) of them stated that they have detailed knowledge about it

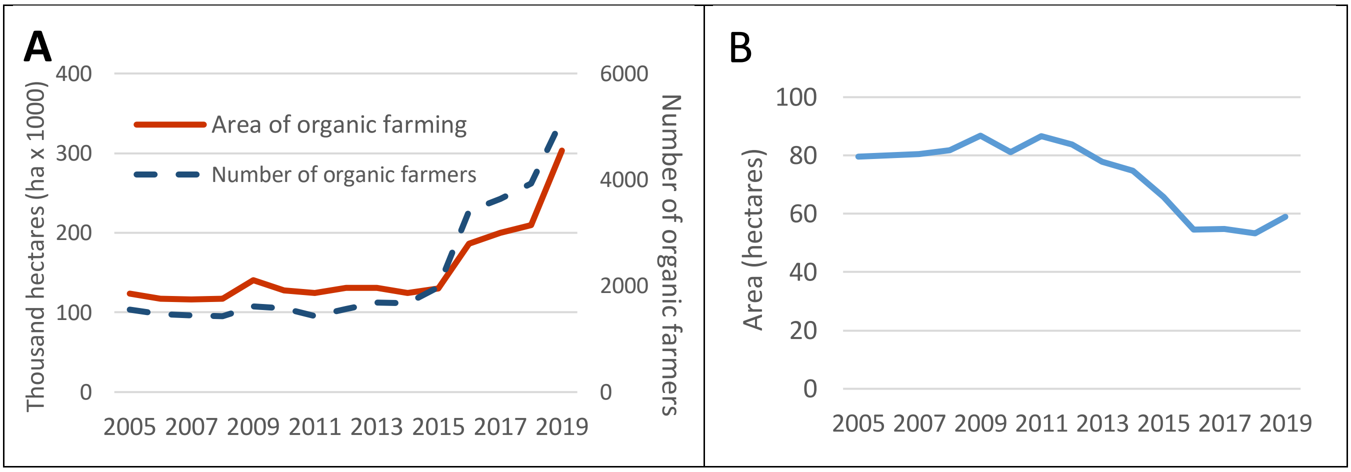

Figure 1. The total area of organic farming and number of organic farmers (A), and the average area of organic farms (B) in Hungary (data from HCSO, 2020).

Two third of the responder farmers are producing plants, 11.1 percent of them are working in animal husbandries, while 22.2 percent are doing mixed-profile farming. The average size of their farms was 71.4 hectares, and almost one third

(Figure 2B). However, there were almost seven percent more farmers (25.8%, in Figure 2A) who could not formed either positive or negative opinion about organic farming than those

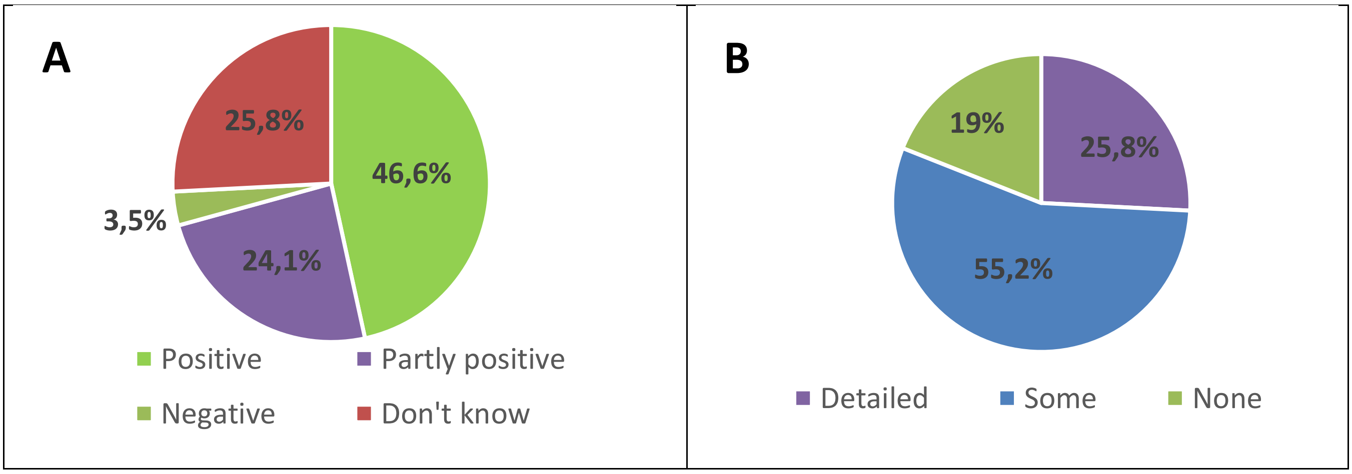

Figure 2. The opinion of Hungarian farmers surveyed in this study about organic agriculture (A) and the levels of their knowledge based on self-reports (B), (n = 58).

(19%) who declared not having any information on organic agriculture.

More than one quarter (27.3%) of the farmers reported that they would not change from conventional production to the organic one in any condition, while 18.2, 25.4, and 29.1 percent declared that they would change a part, or half, or even their total areas from conventional production to organic agriculture, respectively.

When the farmers reported the most significant limiting conditions in their production, most of them denoted the weather conditions (33.1%), and specifically drought (27.1%) as the most important ones (Figure 3A). It seems that the weather patterns experienced during the last couple of years continue to bring some extreme anomalies including record-breaking warmth with extreme peak temperatures (when the daily maximum temperature exceeds 30 degrees Celsius) several times a year in Central-Eastern Europe[1]. These phenomena have a significant impact on the productivity of agriculture (Kuti and Nagy, 2015). Farmers are experiencing weather phenomena such as heatwaves, increasing length of drought periods during all seasons, and that the annual precipitation is now gradually falling in the form of intense, rapid showers instead of evenly dispersed rains, especially in summer floods in Hungary (Spinoni et al., 2015).

More than two thirds (67.2%) of the farmers stated that organic farming would be a significant contributor to environmental protection, while 25.9 percent of them ascribe a certain role to it (Figure 3B). Although 93.1 percent giving a positive response about the potential environmental advantages of organic agriculture, a considerable part of these responders might form this opinion based only on their optimistic attitudes as almost 30 percent of them reported that they have either negative or no opinion about organic farming (Figure 2A), and 19 percent of them reported no knowledge about i tat al (Figure 2B).

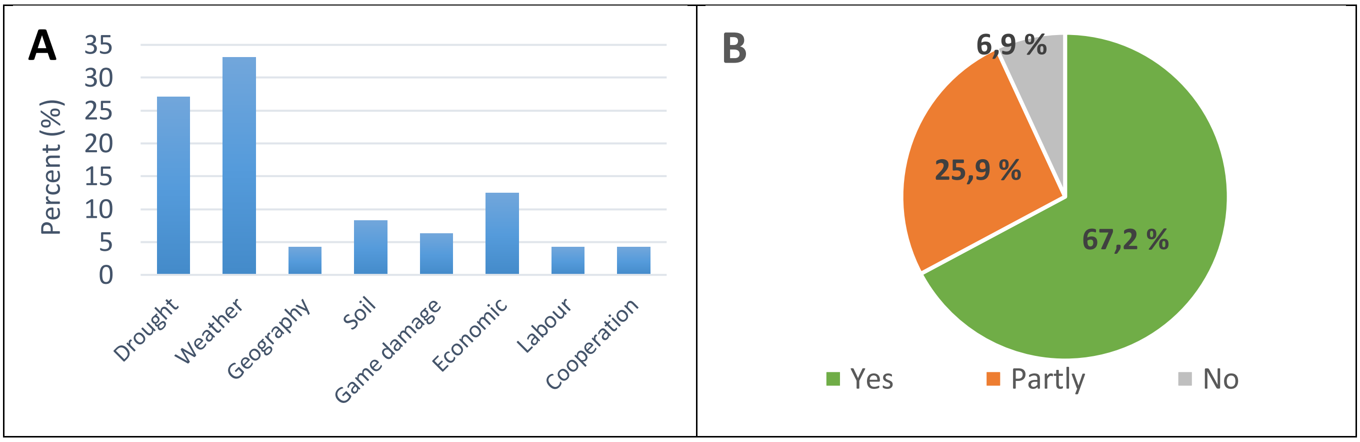

Figure 3. Self-reported hardships in farming for Hungarian farmers surveyed in this study (A) and their opinion whether organic agriculture have the potential to contribute to better environmental health (B), (n = 58).

CONCLUSIONS

Generally, as can be determined by data collected in this study, Hungarian farmers have positive opinions about and supportive attitudes toward organic agriculture, although only a part of them are in fact organic farmers. However, there is a considerable lack in their information and knowledge about it, which hamper a well-funded opinion to be formed. This highlights the importance of better and more widely distributed reliable information about the wide-scale scientific results of organic agriculture in general and its diverse methods in particular. This should include the support of diverse platforms for a more efficient knowledge-transfer and the share of practical expertise. Providing more room for citizen science in this field could also be of great potential. Human ecology with its wide scope and interdisciplinarity can also play an important role for organic agriculture revealing the complexly interlinked ecology and an integrated and comprehensive view and judgment of land use and ecosystem services (Foley et al., 2005) that justify the more favourable social and economic environment for organic farming, and also contribute to support it more sustainably. Producing more food with fewer effects on the environment requires a radical shift in thinking by the agricultural communities, now not simply to increase yields but to optimize the whole production systems across a much more complex set of objectives, with a particular emphasis on sustainable use of inputs while reducing harmful human and environmental outputs (Godfray, 2011). Production systems that can simultaneously meet both production and environmental targets while helping farmers adapt to emerging challenges, such as drought, soil and water pollution, eutrophication and deflation, biodiversity loss, and the changing climate (Hunter et al., 2017).

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[1] https://www.severe-weather.eu/tag/hungary/

034570 allowing him to study relevant aspects of these complex topics in broad contexts.

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