

Development of Ecological Agricultural Production and Its Latest Global Trends before the Economic Crisis

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Abstract – Organic farming is on the rise worldwide. The acreage of organic soil is also on the rise worldwide. At the same time, there is an increase in the number of organic farms, the number of certified agricultural products and the number of certified food products produced from these. There is also an increase in the number of countries embracing the idea of organic farming. In addition to economically developed areas of the world, organic farming is also flourishing in developing countries. As of 2009 these countries are collected on the basis of the criteria defined by the Development Assistance Committee in the official List of Beneficiaries of Government Development Assistance. The so called "DAC list" brings together developing countries with a total area of 8.8 million hectares used in organic farming. The focus of production in these areas is derived from their export orientation, while also maintaining an effort to develop their internal markets. The International Maritime Organization is one of the most important international organizations assisting subjects and areas managed in accordance with the principles of "Organic farming." Since 2001, this organization has implemented the Organic Wild Collection program, whose efforts are primarily focused on developing countries.

Keywords – Agriculture, Agricultural Economics, Developing Countries, Global Trends, Organic Agriculture.

I. INTRODUCTION

Today, agriculture and land management play an important role in efforts to protect the environment. On one hand, it is a risk factor, as non-sustainable agricultural production and the overuse of industrial fertilizers may endanger sources of fresh water. Moreover, the disposal of animal waste and waste water from silage may contaminate agricultural land, and the methane and ammonia originating from decomposition in the system of animal production may pollute the atmosphere. On the other hand, agriculture has a definite positive impact on the natural environment through plants that absorb carbon dioxide, and produces important raw materials and fuels for industry, thus saving natural resources. Agriculture can also efficiently use biogenic wastes that would otherwise be harmful to the environment. These general characteristics of agriculture and its current modus operandi of production indicate the need for ecological farming (Kretter, 2010).

The growing importance of ecological agricultural production is one of the most significant trends in the field of agriculture nowadays (Kozelová *et al.*, 2012). A description of the principles, benefits, legislative restrictions, or options for its practical implementation is not the subject of this article. Our intention is primarily to analyze the latest tendencies and the current state of

ecological agricultural production on a global scale, using a variety of economic and social indicators. In this article, we seek to quantify the most important trends in this field, and thus to highlight the growing importance of "organic farming" in the world.

Given the role that organic farming plays in agricultural production, not only in our country but also in the world, we believe that this issue should be given greater attention, not only among the general public, but primarily among scientists and particularly among economists. Plentiful information is fundamental to understanding the field, and this knowledge is the basis for understanding the ideas and principles of organic agriculture which could help to achieve positive effects on the global scale.

Organic cultivation of plants prohibits (European Commission, 2012):

- Procedures which require the input of industrial fertilizers and plant protection products,
- cultivation of crops in monocultures,
- parallel cultivation of varieties on farms where organic and conventional farming is both used,
- the application of liquid manure and slurry on frozen land or on free land, with the exception of the period before sowing,
- The use of synthetic herbicides, growth regulators and desiccants.
- In organic animal breeding the rules state the physiological, behavioral and ethical requirements of the animals based on specific regulations must be always adhered. It is strictly forbidden to:
- administer drugs to healthy animals, as well as standard prophylactic preparations,
- transfer embryos,
- use hormones for synchronization of the oestrous cycles of the animals,
- Buy animals from conventional breeding.

The basic prerequisite for successful organic land farming is (Kretter, 2010):

- Correct land management that ensures:
 - maintenance and improvements in soil structure and fertility,
 - stable balance of organic matter in soil,
 - enhanced microbial activity,
 - conditions conducive to sustainable development and activity of earthworms and other beneficial soil organisms,
 - a high index of soil coverage (crops, sowing, mulching),
 - Planting permanent or temporary grassland in combination with clover plants.
- A balanced crop rotation that:

- ensures proper crop rotation and intercropping cultivation,
- ensures the reduction of population density of weeds, pathogens and pests of plants surviving in the soil
- takes into account a large enough share of legume crops,
- alternates deep-rooted and shallow-rooted plants,
- ensures a crop rotation with different weed-competitive abilities,
- uses intercropping for green manure.
- The right choice of crops and varieties:
 - the best possible adaptation of cultivated crops and varieties are to local soil and climate conditions
 - the use of crops and varieties that have increased resistance to pests and diseases,
 - if possible, seeds and seedlings must come from organically grown crops.
- the right system of fertilization and plant nutrition:
 - fertilizers of animal origin should be applied,
 - manure from conventional production has to be composted and the use of compost purchased on the market must be in accordance with the list of permitted fertilizers,
 - the amount of nitrogen in livestock manure applied to grassland shall not exceed 85 kg kg.ha⁻¹,
 - Purchased fertilizers may constitute only 30% of applied organic fertilizers (excluding vegetable systems).
- Weed control:
 - Application of preventive measures and measures of indirect control, such as optimizing crop rotation, green manuring, mixed vegetation, mulching, mechanical and physical weed control methods, including thermal methods.

II. MATERIAL AND METHODS

The subject of this scientific article is organic agricultural production. Our aim is to highlight the current status of organic agriculture in the world, while emphasis is placed on select factors of its global development trends. In addressing the problem, the method of analyzing theoretical and empirical knowledge is fixed in the plane of current theories and approaches to the phenomenon. From a methodological point of view, the article analyzes the main theories in the field of study as well as the latest available empirical data derived from global agricultural databases. The article is based on the use of logical-cognitive methods.

III. RESULTS AND DISCUSSION

Organic farming in the world

Currently, there are 30.4 million hectares of farmland managed in organic farming systems worldwide, with 12.4 million hectares in Australia alone. (Statistics of Global Organic Farming, 2011) This area is growing by several thousand hectares every year; in 2006 all continents reported a growth in organic farmland (Figure 1).

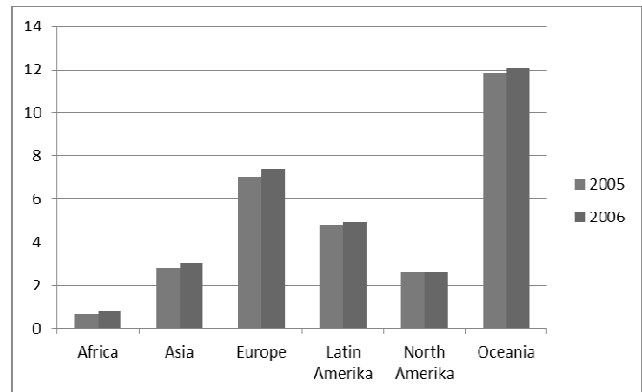


Fig.1. Increase in hectares (Mio ha) under organic farming on different continents in 2005-2006

Source: Data of Statistics of Global Organic Farming, own processing

In general, it is very difficult to describe the development of organic farming on a global scale, due to language and legislative barriers. (Reckeet *et al.*, 2004) Problems arise already while studying the situation of organic farming in Slovakia and in the EU, mainly because of the usage of inconsistent terms that have no official Slovak translation available. This problem is also reflected in scientific literature and official documents which have no unified terminology. The situation is similar in the field of legislation and in the evaluation criteria for the conversion process, the actual operation of the management system of organic farming, its products and food produced from them.

Currently, 69 countries apply a form of legislative regulation of organic farming worldwide and another 21 countries are in the process of its preparation. (Willer-Kilchen, 2009) Unfortunately, the definition of organic farming, its forms, directions and methods of implementation are not uniform throughout the world, so countries issue certificates for organic food products based on different criteria. Due to this fact, there were 468 different ecological certificates issued worldwide in 2008. In Slovakia alone four such certificates are issued – Certificate of organic food from conversion to organic farming, Organic food certificate, Certificate of a product from conversion to organic farming and Organic product certificate.

Organic farming is not only beneficial to the environment or the health of the world's population, but it can be also a source of substantial income. Global sales of products from organic farming reached almost 40 trillion USD in 2006, which is the equivalent of about EUR 28 trillion. For a comparison, the gross domestic product of Slovakia was 64 billion EUR in 2009. The increased revenue stream is the frequent cause of the transition from traditional system of agricultural production to organic farming (FAO, 2012).

Figure 2 describes the situation of organic farming in the world in 2008. As we already mentioned, most land used in organic farming systems is in Australia and Oceania with Europe being in the second place. The paradox is that Australia and Oceania is the smallest of all continents (apart from Antarctica and the Arctic). A similar paradox

can be found also on country level. Although Liechtenstein is one of the smallest countries in the world, nearly 30% of its total agricultural land is managed in organic farming systems (FIBL, 2012).

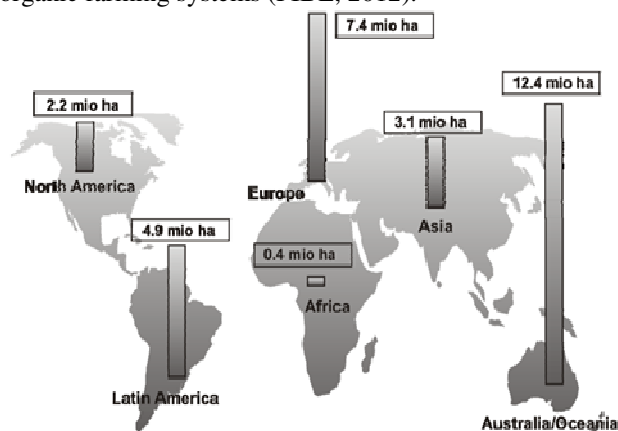


Fig.2. Land used in organic farming systems on different continents in 2008 (millions. ha)

Source: own processing

In addition to agricultural land managed in organic farming systems, national agricultural databases also follow the number of organic farms as a proportion of the total number of farms. (Willer-Yussefi-Sorensen, 2008) As can be seen in Figure 3, almost 32% of the world's organic farms are located in Latin America. Despite the fact that the most of the agricultural land in organic farming systems is located in Australia and Oceania, this area represents only 1 % of the organic farms worldwide. This is mainly due to the fact that in this area each farm has huge acreage, in contrast with Europe, where a large number of farms manage a relatively small area of land.

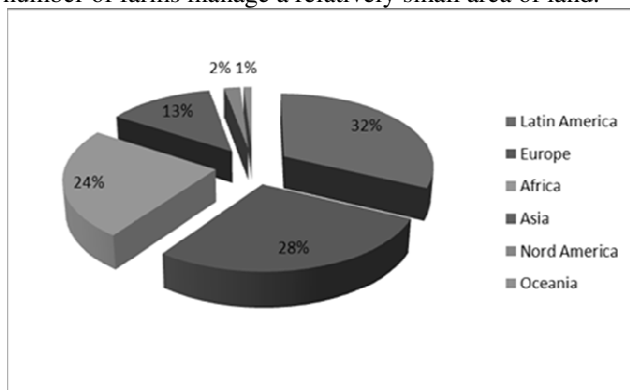


Fig.3. Distribution of farms with organic farming systems in the world in 2006

Source: Data of FAO, own processing

If we compare the acreage of organic soil internationally, Australia is the clear global leader. As Figure 4 shows, Australia has the largest acreage of organic soil with 12.3 million hectares. Here it should be noted that Australia is not only a sovereign country but also a continent and so its global leadership therefore not surprising. China and Argentina are in similar situation, as they are huge countries with their area covering big parts of Asia and Latin America.

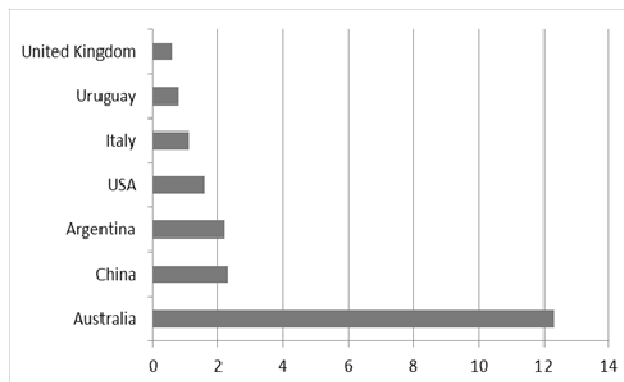


Fig.4. Countries with the largest acreage of organic land (mil. ha)

Source: Data of FAO, own processing

Today, we are able to observe more positive trends concerning the acreage of organic land on all continents. In 2006 the global growth of organic soil increased by 1.8 million hectares compared to 2005. The largest increase was recorded in Australia, with 600 thousand hectares, followed by Europe with 500 thousand hectares. Overall, year 2006 was a record year in the field of organic farming, with 90 countries increasing the acreage of the land under organic cultivation.

Organic farming in developing countries (DAC list)

The global economy is usually divided into developed and developing countries according to a varying list of criteria. The group of developing countries changes frequently and this article does not seek to analyze the various criteria, but in the field of organic farming there is an internationally accepted list of developing countries – the “DAC list”.

In September 2008 OECD's Development Assistance Committee (DAC) released the official list of beneficiaries of government development assistance (List of recipients of Official Development Assistance - ODA). This list is updated every three years, starting in 2009, when economic data for 2008 was used. The document divides countries into groups based on gross national income per capita (GNI), while obtaining this data from the database of least developed countries (LDCs) issued by the World Bank on the basis of official distribution prepared by the United Nations. Countries that achieve a GNI higher than the threshold level in three consecutive calendar years are deleted from the list.

According to the “DAC list” there are 8.8 million hectares of land under organic cultivation in the developing regions of the world. This currently represents about 1/3 of the total area of organically farmed land in the world. Organic farming in developing countries is mostly export oriented, and this is also reflected in land usage. Most of the land is used for the production of permanent crops such as coffee or tropical fruits. A prominent share of the organic soil in developing countries is permanent grassland, especially in Latin America, where it is used for cattle grazing. Figure 5 provides a comprehensive overview of the use of organic soil in developing countries.

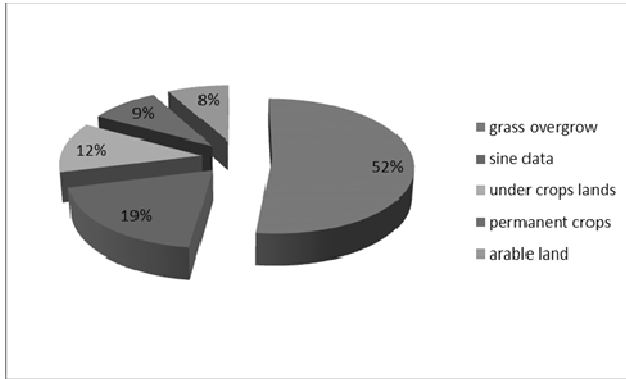


Fig.5. Use of organic soil in developing countries in 2006
 Source: Data of FAO, own processing

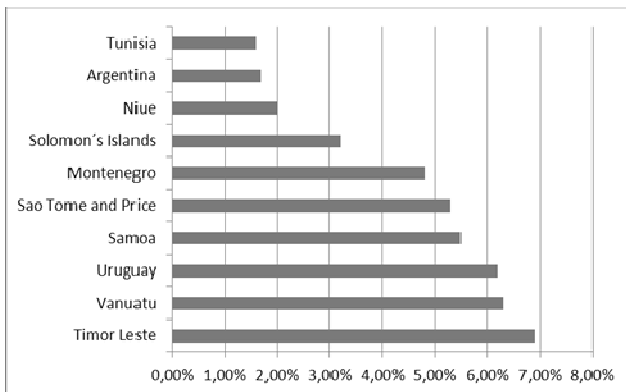


Fig.6. 10 developing countries with the highest proportion of organic land of total area of agricultural land
 Source: Data of FAO, own processing

The share of organic land out of the total agricultural land in developing countries is shown in Figure 6, according which Timor-Leste is the global leader in this indicator. Timor-Leste is a small island state that gained its independence in 2006; its land area is only 15,410 km². As Figure 6 shows, Timor-Leste is not an exception; the top positions are mostly occupied by small states. On the other hand, there are also some notable exceptions. Tunisia is one of them with a total land area of 163 610 km², more than ten times larger than Timor-Leste (FAO, 2012).

Organic Wild Collection Area

Most of the world's organic land used for agricultural purposes is currently certified as Wild Collection. The integration of the organic areas into this system was started by the International Maritime Organization (IMO) with the aim to clarify the system of organic farming and to establish uniform criteria for assessment and support in different areas of the world [8]. Since 2001, IMO initiated the implementation of the Organic Wild Collection program with the support of the Swiss Import Promotion Program (SIPP), which was established to research the areas of Organic Wild Collection in the Balkans [9]. In addition to its other roles, IMO helped to establish control mechanisms, rules and methods allowed in the field of organic farming. For example, no conversion process was required for the entry into the system of organic farming, so the IMO initiated its implementation.

The certification process in the system of Organic Wild Collection is governed by the following regulations:

- EU regulations n. 834/2007 a n. 889/2008,
- US Standard NOP § 205.207,
- Swiss BIO-SUISSE "trademark"

The OWCA certification system was created to achieve the following societal benefits:

- To achieve of higher quality on the individual markets,
- To ensure sustainability,
- To ensure greater quality and control capabilities.

More than 33 million hectares are currently certified under the Organic Wild Collection Area system, with 28 % of the certified land located in Europe [6]. Figure 7 shows the current distribution of the OWCA land in 2006, with an almost equal distribution of certified land between Europe, Asia, Africa and Latin America. North America in a notable exception as its share in the land base certified in the OWCA system is only 1 %.

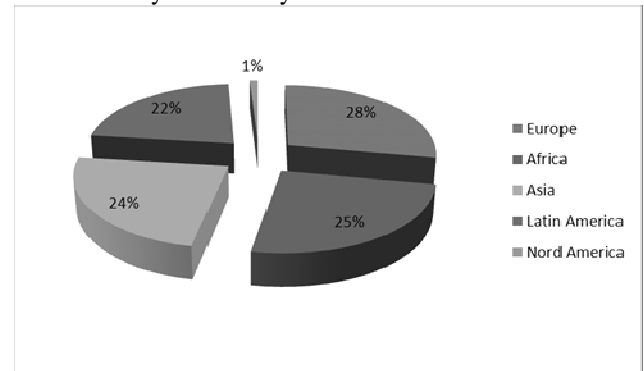


Fig.7. Distribution of the land certified in the OWCA system in the world in 2006
 Source: Data of FAO, own processing

IV. CONCLUSION

Organic farming is on the rise worldwide. Despite the differences in terminology, legislation, geographic location, the area of economic activity or nationality, entities operating in this system of agriculture are unified by the idea of "Organic farming". The acreage of organic soil is also on the rise worldwide. At the same time, there is an increase in the number of organic farms, the number of certified agricultural products and the number of certified food products produced from these. There is also an increase in the number of countries embracing the idea of organic farming. The main problem of organic farming is that the inconsistency in legislation, not only on the global scale, but also within individual communities such as the European Union, which creates all sorts of differences in terminology, which is the main cause of the differences in translations into different languages.

In addition to economically developed areas of the world, organic farming is also flourishing in developing countries. As of 2009 these countries are collected on the basis of the criteria defined by the Development Assistance Committee in the official List of Beneficiaries of Government Development Assistance. The so called "DAC list" brings together developing countries with a total area of 8.8 million hectares used in organic farming.

The focus of production in these areas is derived from their export orientation, while also maintaining an effort to develop their internal markets.

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