Agricultural University of Tirana
Faculty of Agriculture
and Environment

University of Prishtina
Faculty of Agriculture
and Veterinary Sciences

Agricultural University of Plovdiv
Department of Agrochemistry
and Soil Sciences

Corvinus University of Budapest
Department of Ecological
and Sustainable Production

University of Sarajevo
Faculty of Agriculture
and Food Sciences

Research Institute of
Organic Agriculture
Switzerland

Joint Bachelor Course on Organic Agriculture 2014

Lecture 1: Introduction

› Prof Dr Urs Niggli and Prof Dr Shukri Fetahu

SNF/SCOPES

About the module organic farming for BSc students

- The module aims at raising students' interests in the challenges of contemporary agriculture and rural life in general and provides insight into selected topics of the environment, food quality, agricultural law, marketing and social aspects. It uses organic agriculture as a role-model.
- The 15 two-hours lessons encompass an introduction to all aspects of organic farming.
- It should make BSc students familiar with both the opportunities and difficulties of organic farming. It is an excellent first step for a further career in farm management, in consultancy or in business activities of sustainable food and farming.

Contents of the module ‚organic agriculture‘

1. Challenges of modern agriculture, history and principles of organic (2h).
2. Organic agriculture - multifunctionality & sustainability (2h).
3. Standards, legislation, declaration, inspection and certification (2h).
4. Organic agriculture, environment & natural resources (2h).
5. Soil fertility and organic fertilizers (2h)
6. Plant protection in organic agriculture (2h).
7. Plant production I: Arable crops (2h).
8. Plant production II: Horticultural crops and grassland (3h).
9. Animal husbandry: welfare, breeding, feeding and health prevention (3h).
10. Food quality and food processing (2h).
11. Retailing, marketing and labeling (2h)
12. Exercise: Visit of an organic farm (6h)

The problematic impact of modern farming

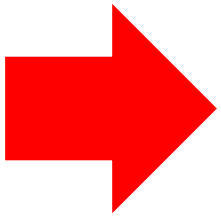
- 60 % of the ecosystem services (e.g. pollination; control of pests through natural enemies; water catchment, filtering of rain water and carbon sequestration in soils) are degraded because of intensive food and fiber production (*Millennium Ecosystem Assessment* , 2005).
- 30 % of global fertile soils were eroded between 1950 and 1990 *(Pimentel et al., 1995).* Current global soil losses between 6 and 10 million hectares per year *(FAO).*
- Agriculture consumes 70 % of all water pumped from aquifers *(FAO).*

The problematic impact of modern farming

- The burden put on the ecosystems make the planet unstable for human survival, especially by agricultural activities such as nitrogen and phosphorous fertilization, degradation of biodiversity and global warming (*Rockström et al., 2009, Nature* 461).
- Industrialization and regional concentration of livestock causes irreparable damages on climate, biodiversity and water *(Steinfeld et al., 2006; Livestock's Long Shadow, FAO).*
- Phosphorous and oil will become short ('peak') in 2 or 3 generations.

Agriculture is challenged by the need for a change

- To halt genetic, species and landscape diversity loss.
- To halt soil degradation.
- To minimize external energy input.
- To minimize mined phosphorous input.
- To minimize pollution of water, air and soils.
- To enable agriculture to better adapt to climate change (droughts, torrential rains and floods).
- To re-orientate the priorities in research and extension towards sustainable, ecosystem-oriented solutions *(IAASTD report, 2008)*



Low input/low impact but high output agriculture.

Different approaches to sustainability

- Improved technologies like minimum/ no tillage or GMO crops
- Integrated Production (IP, IPM)
- Low Input Agriculture (LIA) or Precision Farming
- Low External Input Sustainable Agriculture (LEISA)
- Organic Farming
- Organic Farming & reduced tillage
- Organic (successional) agroforestry systems

Ecological or eco-functional intensification

Characteristics of organic agriculture

- It is characterized by the 4 principles of the International Federation of Organic Agriculture Movements (***IFOAM):***
  - Principle of Health
  - Principle of Ecology
  - Principle of Fairness
  - Principle of Care

- It is an ecologically, economically and socially sustainable agriculture.

Source: http://www.ifoam.org/en/organic-landmarks/principles-organic-agriculture

Specific features of organic agriculture (I)

- Fertile soils as the basis of agricultural productivity (soil conservation).
- Organic matter and nutrients from livestock and/or from green manure and leguminous plants as the basis of yield increases (recycling).
- Diversity in the landscape, on farms and in the field resp. in animal husbandry as a basis of economic and agronomic success (diversification, resilience).

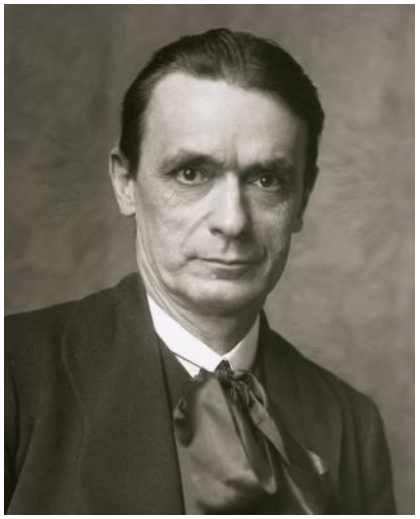
Specific features of organic agriculture (II)

- Diversity of stakeholders (farmers, processors, traders, breeders, advisors, scientists) as the basis for global food security and rural development (empowerment).
- Consumption of natural ressources (e.g. soils, phosphorous, biodiversity) in a speed rate so that they can regenerate (sufficiency).
- No toxic materials and substances in agricultural production and in the food chain. Preference for nature-derived techniques and substances (environment, food safety).
- Respect for societal and ethical values like fair farmer livelyhoods, rural culture and animal welfare.

The history of organic agriculture

- The very first origin of organic farming at the end of the 19th Century ('Life Reform' in Germany and 'Food Reform' in the USA) was a reaction to the urbanization and industrialization of the modern society which deteriorated the living conditions and the diets of people in the growing cities.
- The concept of 'organic farming' is an amalgam of different pioneer personalities in the German-, French- and English-speaking worlds of the first half of the 20th Century.
- It can be interpreted as a reaction to the fast intensification and industrialization of agriculture when nitrogen fertilizers were massively introduced in agriculture (Haber-Bosch process, 1910) and when the pesticides became widely used (from 1940 on).

Some selected pioneers of organic agriculture (I)



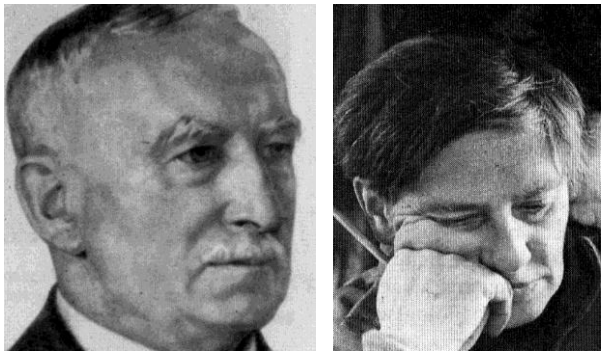
- **Ewald Könemann** (1899-1976) was a pioneer of 'natural farming' in Germany. Main features were conservation tillage, composting, application of rock powder, green manuring with cover crops and legumes. The proponents of 'natural farming' were mainly vegetarian, therefore, they promoted stockless arable and vegetable farming.

  Another pioneer of natural farming and healthy meatless nutrition was the Swiss farmer **Mina Hofstetter** (1883-1967). Her farm close to Zürich was an important training centre.

- A second source of organic farming was the German philosopher **Rudolf Steiner** (1861-1925)**.** His lectures at Koberwitz (Poland) in 1924 were the starting point of bio-dynamic agriculture (labelled Demeter). His ideas: a farm is like an organism; spiritual and cosmic forces influence the productivity, the quality and the health of crops and animals. He introduced the biodynamic preparations.

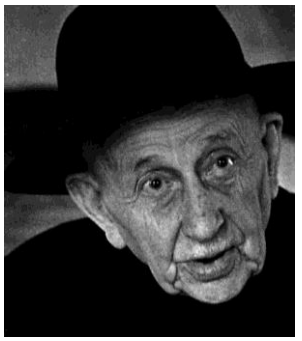
Some selected pioneers of organic agriculture (II)

- The Swiss botanist and politician **Hans Müller** (1891 to1988)**,** his wife **Maria Müller** (1894-1969) and the German microbiologist **Hans Peter Rusch** (1906-1977) developed the organic farming concept. It is based on soil fertility building (manure, compost, legumes) and on the ban of pesticides. Their concept is the basis of modern organic farming.

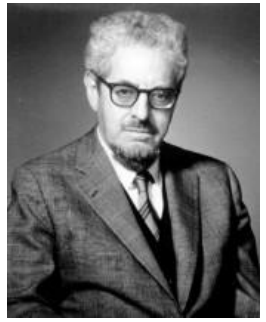


- **Albert Howard** (1873-1947) improved composting techniques in India and did research on the interrelation between soil fertility and plant health. Back in the UK, he published in 1940 the famous book *An Agricultural Testament*. His sentence *"a fertile soil means healthy crops, healthy animals and healthy human beings"* became the axiom of early organic farmers. His work was continued by **Eve Balfour** (1998-1990). She divided her entire farm and compared organic and conventional farming for 30 years with scientific research (Haughley Experiment). She founded Soil Association in the UK.

Some selected pioneers of organic agriculture (III)



- The French pioneers **Raoul Lemaire** (1884-1972) and **Jean Boucher** (1915 -2009) have introduced organic farming in France. Their work was on composting, organic matter in soils, natural fertilizers with algae and on healthy nutrition.

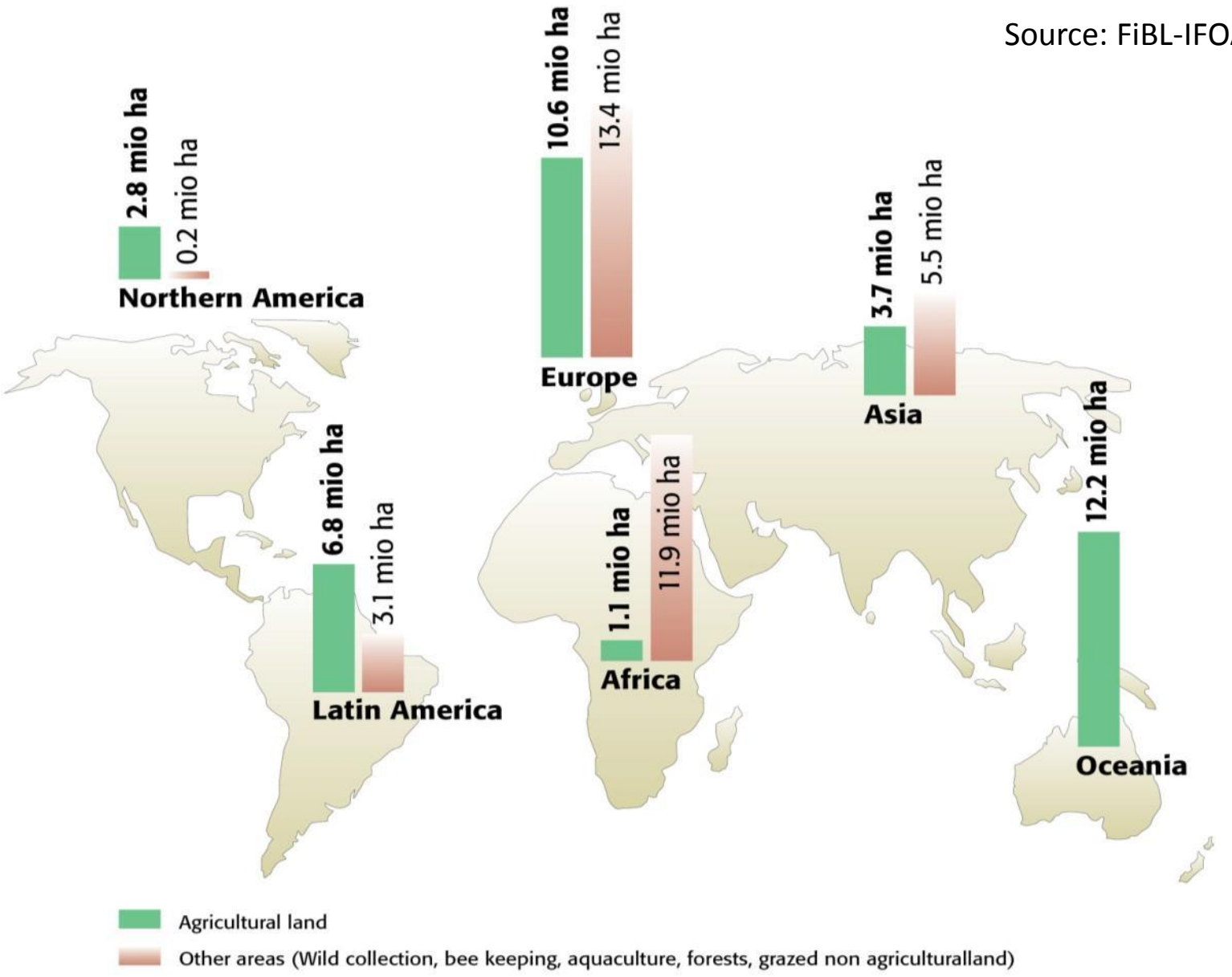


- The editor **Jerome Rodale** (1898-1971) published in 1942 the magazine *Organic Gardening and Farming* for the 1st time. He founded the Rodale Research Institute in Pennsylvania (USA). He is a key figure of organic farming in the USA.

- There are many other scientists and farmers who belong to the **first generation of organic pioneers**. Many of them were committed to soil ecology, environmental protection, animal welfare or healthy nutrition.
- In 1980, the ideas of the pioneers become standardized and national private or public standards were written, e.g. in Switzerland, in Austria or France.
- In 1992, the EU Commission in Brussels regulated organic farming in a law with the aim to protect consumers from fraud. ➔ See more in lecture 3.

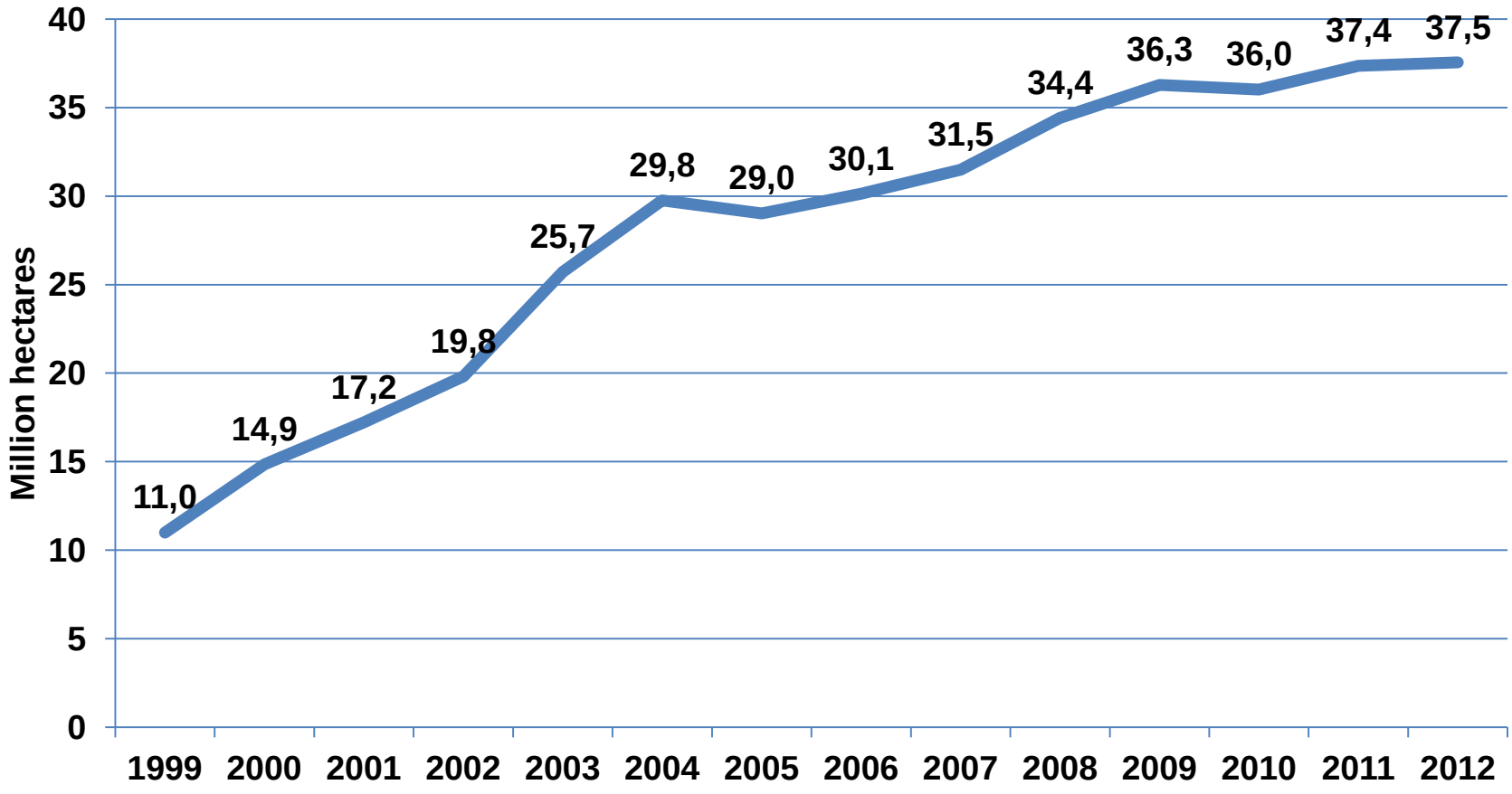
Organic agricultural land and other areas 2012

Source: FiBL-IFOAM Survey 2014



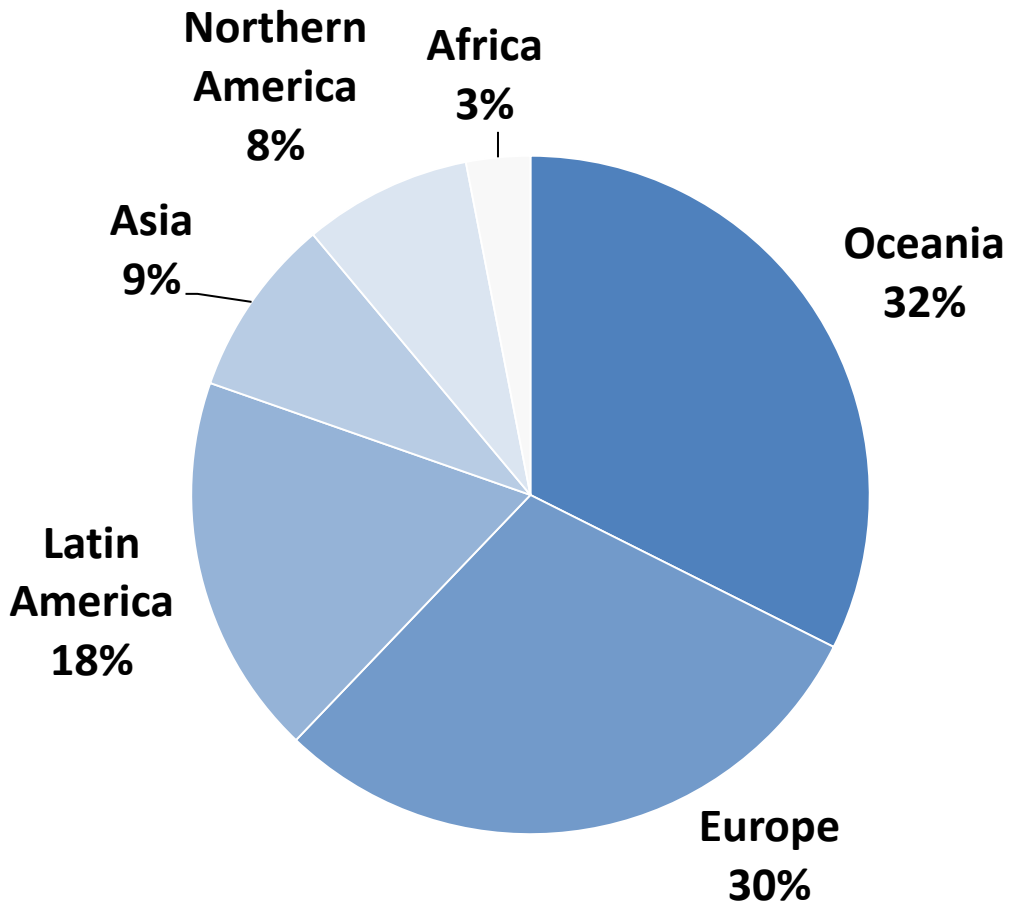
Global growth of the organic agricultural land 1999-2012

Source: FiBL-IFOAM-SOEL-Surveys 1999-2014



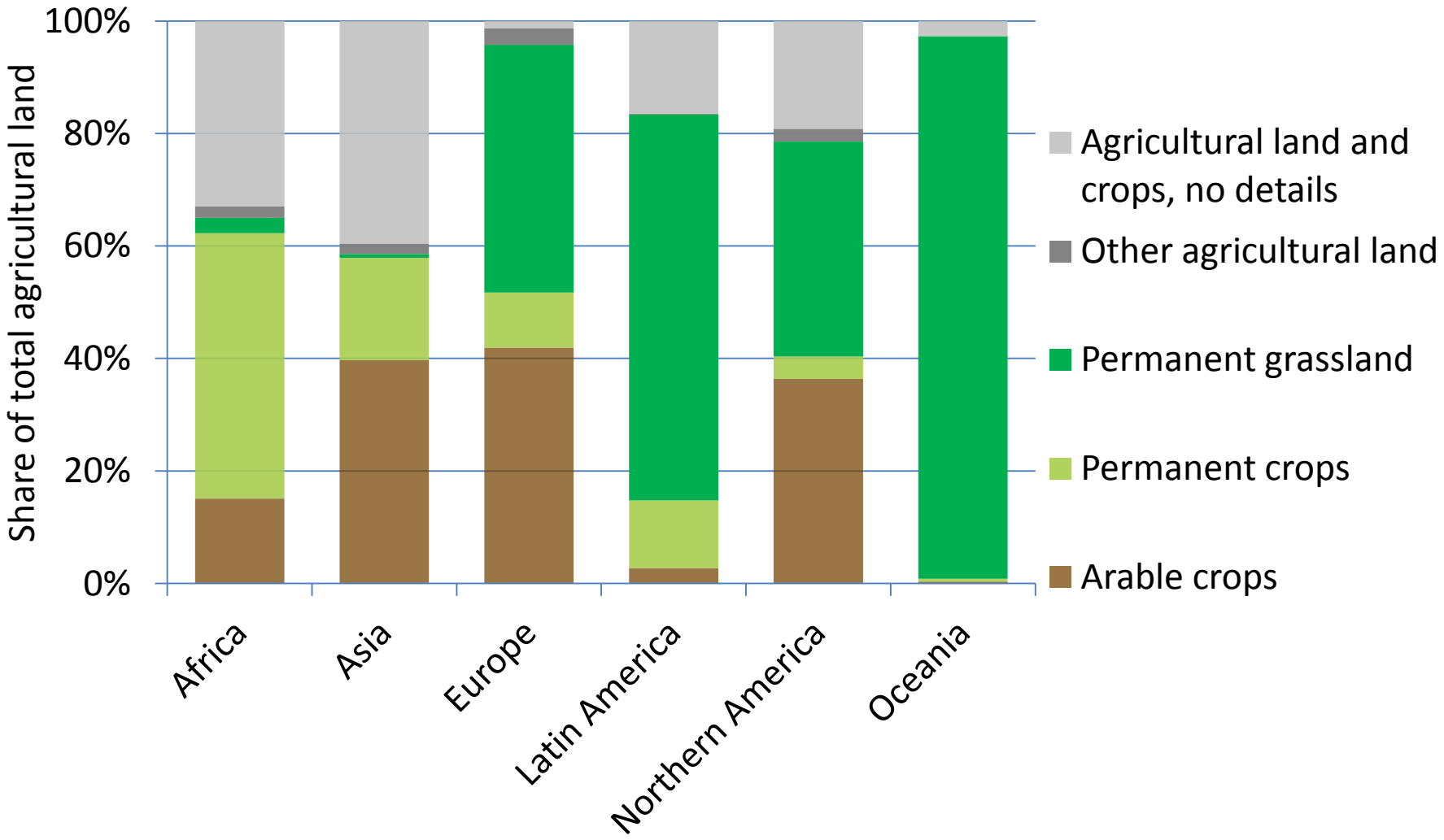
Distribution of organic agricultural land by region 2012

Source: FiBL-IFOAM Survey 2014



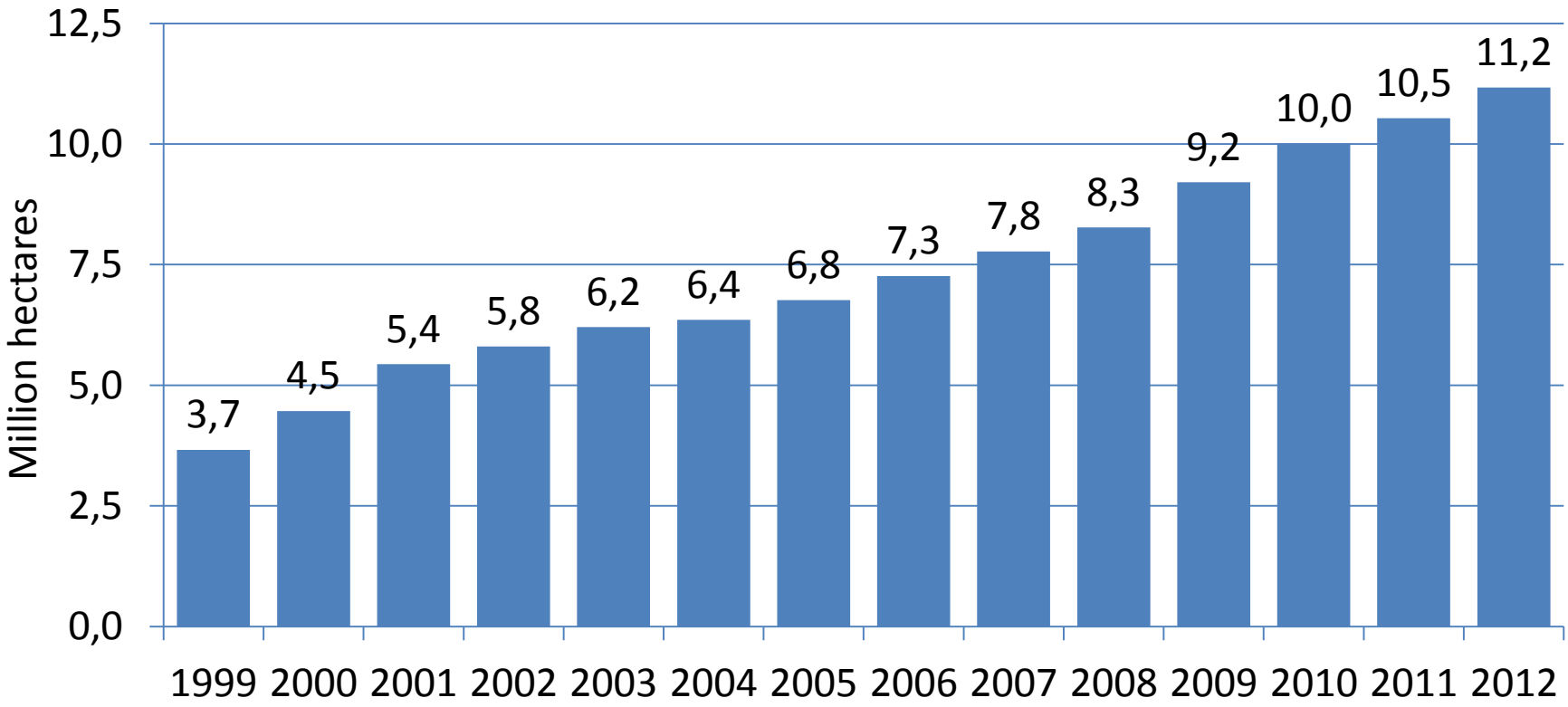
Land use in organic agriculture by region 2012

Source: FiBL-IFOAM survey 2014



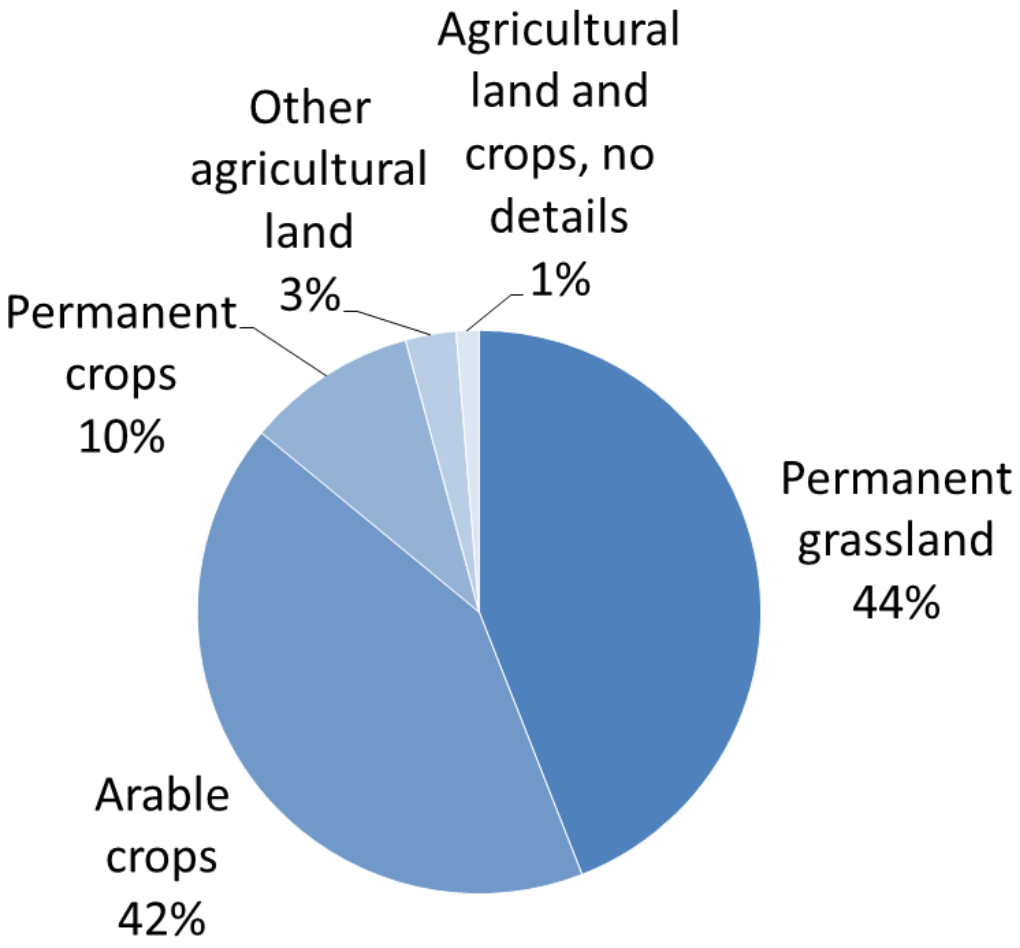
Europe: Development of organic agricultural land 1999 to 2012

Source: Lampkin, Nic and FiBL/AMI/OrganicDataNetwork,
based on national data sources and Eurostat



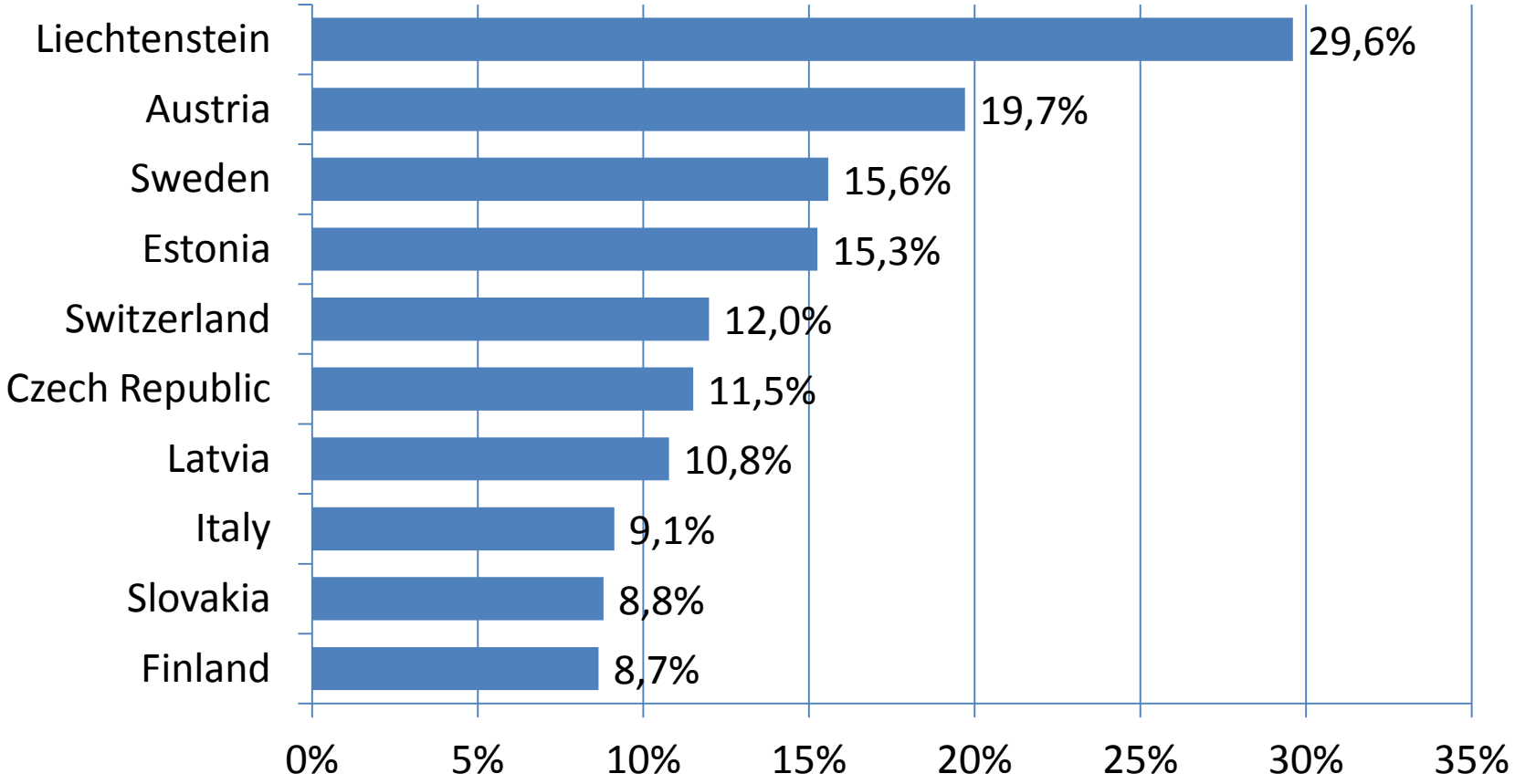
Europe: Use of agricultural organic land 2012

Source: OrganicDataNetwork Survey 2013 based on national data sources and FiBL-AMI survey 2014

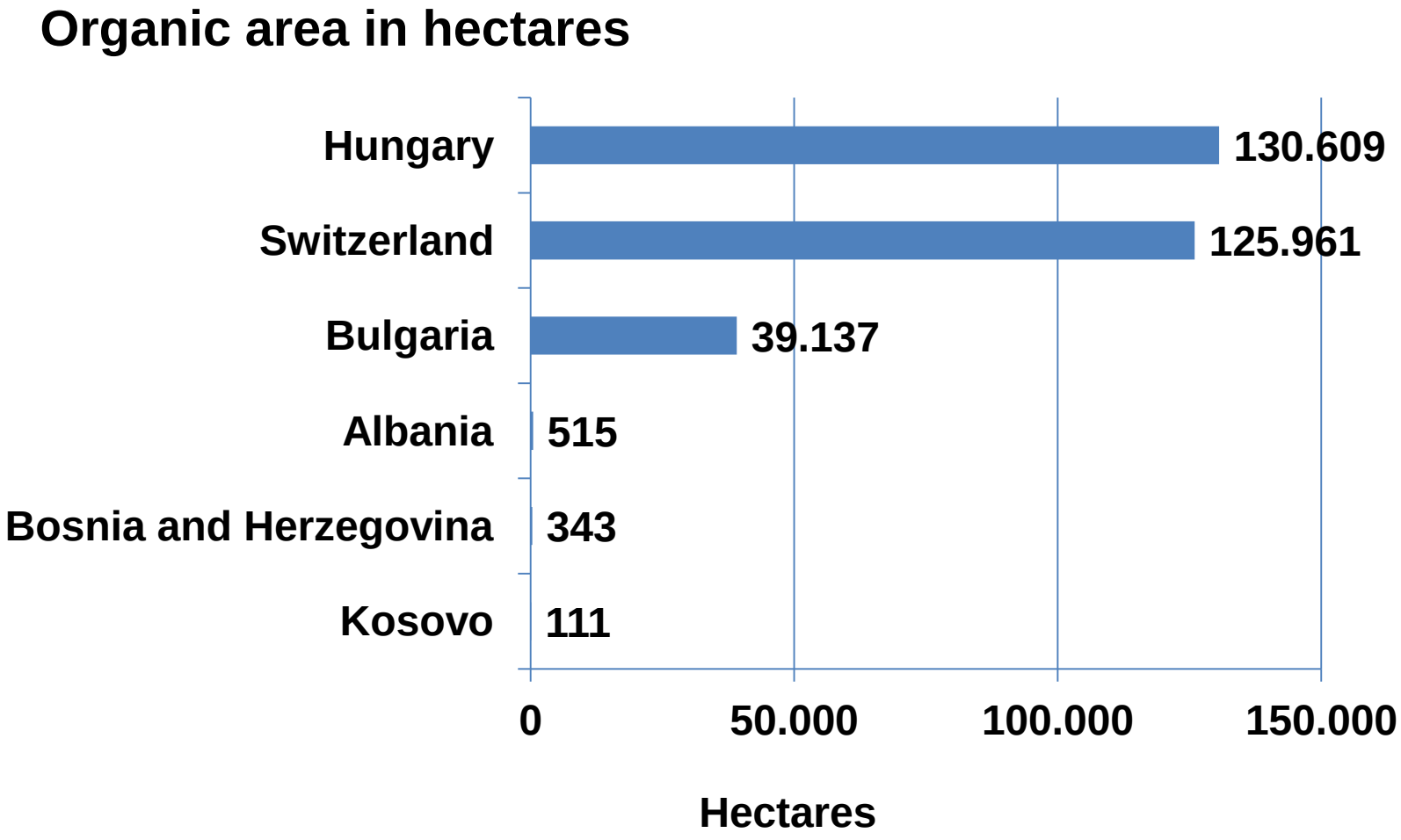


Europe: The countries with the highest share of organic agricultural land 2012

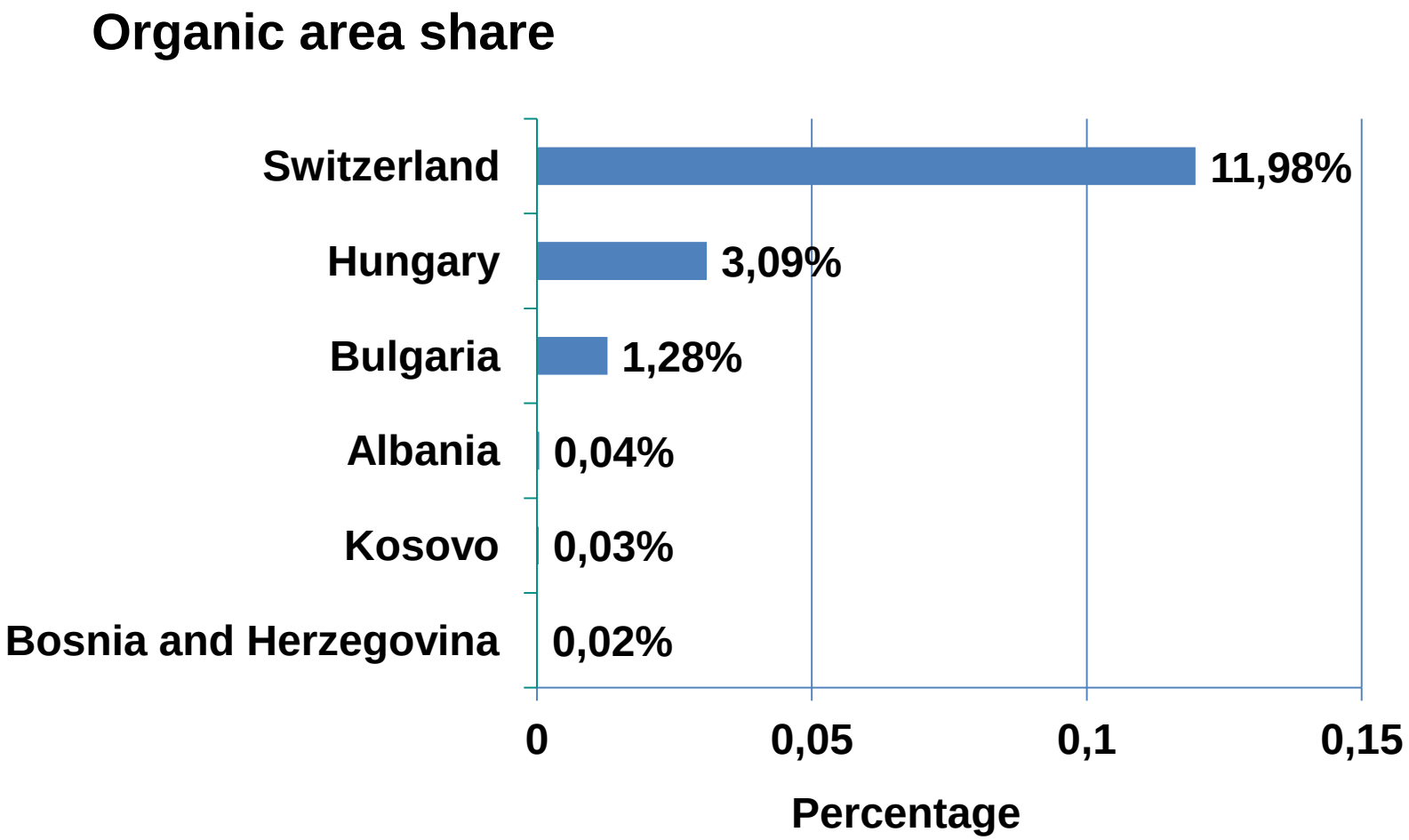
Source: OrganicDataNetwork Survey 2013 based on national data sources and FiBL-AMI survey 2014



The countries cooperating on the BSc course, Status of Organic Farming, 2012



The countries cooperating on the BSc course, Status of Organic Farming, 2012



Organic research

- Global expenditure for food and farming research are 49 billion US$ per year (both private and public). **Much less than 1 %** is spent on specific problems of organic farming.
- Between 2000 and 2012, the EU Commission had funded 49 research projects on organic and low-input agriculture*. The EU is an important supporter for organic farming research. See the new program *Horizon 2020*.
- The most important national organic research communities are in Germany, Denmark, Switzerland, the Netherlands and Austria.
- The **ERAnet CoreOrganic**** is a transnational cooperation of more than 20 European countries supported by the EU Commission. They have an Open Call once a year.

Sources:

* http://ec.europa.eu/research/bioeconomy/pdf/a_decade_of_eu_funded_low-input_organic_agriculture_research_2000-2012_en.pdf

** http://www.coreorganic.org/

Organic Action Plans

- In 2004, the European Commission implemented a **plan with 21 actions** in order to promote organic agriculture.
- The **21 actions** were on (i) *amending the organic regulation*, on (ii) *funding more EU-wide research projects*, on (iii) promoting organic food consumption with *marketing and information campaigns*, and on (iv) *data collection on global and European markets and import/exports for organic food.*
- Many member states implemented **national actions** plans in order to promote organic farming. Some of the member states set clear goals for their policy, e.g. Austria with 20 percent organic land area by 2012. This goal was achieved.
- In 2014, a new action plan is discussed.

Source: http://ec.europa.eu/agriculture/organic/eu-policy/action-plan_en

To think about: Time for a change in agriculture

« All the evidence … indicates that the hegemonic model of global agriculture is obsolete. It is unable to feed the world, it is thermodynamically and socially unsustainable, it pollutes the environment, it is directly and indirectly responsible for biodiversity loss, it impacts seriously on human health.

… conventional agriculture is simply not able to feed the world today, and even less so in 50 years time. We need alternatives.»

Professor Pablo A. Tittonell
Farming Systems Ecology at Wageningen University, Netherlands, on 16 May 2013

Literature/ Sources

CoreOrganics
http://www.coreorganic.org/ (Last Access: 29th April 2014)

European Commission (2014) Agrilcutlre and rural development.
http://ec.europa.eu/agriculture/organic/eu-policy/action-plan_en (Last Access: 29th April 2014)

European Comission (2012) A decade of EU funded low input organic agricutlrueal research 2000 to 2012. resaecrh and Innovation. Brussels
http://ec.europa.eu/research/bioeconomy/pdf/189756_2011_2695_a_decade_of_eu_en.pdf
(Last Access: 29th April 2014)

FiBL. OrganicDataNetwork Survey 2013. Organic farming statistics.
http://www.fibl.org/en/themen/themen-statistiken.html (Last Access: 29th April 2014)

FAO. WATER RESOURCE ISSUES AND AGRICULTURE
http://www.fao.org/docrep/003/t0800e/t0800e0a.htm (Last Access: 29th April 2014)

IFOAM. Principles of Organic Agriculture.
http://www.ifoam.org/en/organic-landmarks/principles-organic-agriculture (Last Access: 29th April 2014)

Pimentel et al. (1995). Environmental and Economic Costs of Soil Erosion and Conservation Benefits. Science
Vol. 267 no. 5201 pp. 1117-1123

Steinfeld, H. ; Gerber, P. ; Wassenaar, T. ; Castel, V. ; Rosales, M. ; de Haan, C., (2006) Livestock's long shadow,. FAO, Rome
http://www.fao.org/docrep/010/a0701e/a0701e00.HTM (Last Access: 29th April 2014)

Walter V. Reid et al. (2005). Ecosystems and Human well-being. Millennium Ecosystem Assessment , Isalnd Press, Washington

Acknowledgement

This lesson was prepared within the project „Advancing training and teaching of organic agriculture in South-East Europe (Albania, Bosnia and Herzegovina, Kosovo, Bulgaria and Hungary)“ , funded by the Swiss National Science Foundation (SNFS) within the SCOPES program 2009-2012 (project No. IZ74Z0_137328).