

Development of sustainable agriculture based on integrated and organic guidelines and terminological barriers (the case of Slovenia)

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Abstract

Different understanding and different development of sustainable agriculture are often spread phenomena. The fact is that terms like sustainable development and sustainable agriculture, sustainable animal production, good agricultural practice, integrated crop management, ecological agriculture, biological agriculture, organic agriculture, permaculture, peaceful agriculture, etc. are differently interpreted and understood by professional and laic public. With intention of better understanding the review and meaning of the terms are presented. The possibilities for further development based on environmental measures are discussed. The data about organic agriculture and integrated crop and vegetable production on the fields in Slovenia are analysed. The data showed that from 1998 the number of farms under integrated vegetable production increased from 8 to 408 in 2005, the number of organic farms from 41 to 1718 in same period. The number of integrated filed crop states increased from 920 to 1572 from start in 2004 to 2006. Based on this data and practical experiences of the authors, who participated in establishment of organic and integrated agriculture, the questions about new challenges are exposed.

Key words: sustainable agriculture, integrated crop management, integrated vegetable production, organic farming, terminology, development

Introduction

In Slovenia we have had a lot of misunderstanding and contrarities about sustainable agriculture by professionals (speaking like integrated crop management do not exist like real category, acceptance of organic farming would return us on the branches); journalists (they do not understand and represents well differences between integrated and organic production systems, changing of photos and information about basic principles are very often); also acceptance of sustainable agriculture and differentiation of production systems by governmental clerks was very slow (in the nineties all Slovenian agriculture was declared like sustainable, thinking that food safety is terminology just for organic products, etc.); in many cases people mixed many terms and activities like biodynamic or permaculture principles with official EU or IFOAM standards, etc. On the contrary clear aims, definitions, regulations, production guidelines, inspection, certification and consequences for avoid obligations make the system more transparent; we can represent it's like 'brussels' category vs. common (public, society, philosophical,...) category. These 'Brussels' categories are a part of European rural development program 2000-2006 and 2007-2013, and the supplement to the rules of GAP (Good Agriculture Practice), CAP (Common Agriculture Policy) and Lisbon strategy. For example performing of nitrate directive as a part GAP need to be basic condition for accreditation environmental programs like organic farming,... On this base in Slovenian environmental program are included over 20 different measures like sustainable animal production, integrated fruit and grape production, some individual actions like crop rotation, rare genotypes,.. In this paper in addition to mentioned barriers, development and their main characteristics of integrated vegetable production (established in 1998; Bavec, 2000), organic farming (established in 1998; Bavec et al., 2000a) and integrated crop management (established in 2003; Bavec et al., 2004) are described.

Theoretical and practical understanding of sustainable agriculture and 'non Brussels' categories

(i) The word sustain become from lat. word *sustinere* (*sus* – from below, *tenere* – to sustain). The term sustainable development should be considered like principle for sociology, philosophy, health care and geography in the concept of humans friendly development, and sustainable agriculture as a part of integrated activities. Sustainable agriculture was the first term for organic agriculture (IFOAM Congress, 1977 in Switzerland) due to Fisher introduction, who explained that sustainable agriculture based on nature friendly activities, use renewable source, is in accordance with the nature, includes many sociological aspects, etc. Many different interpretations is used. IASA (International Alliance for Sustainable Agriculture, 170 countries) from 1992 defined that sustainable agriculture is in accordance to the ecology, economical survival, social rightful and humane. FAO and SARD (Sustainable agriculture and rural development) added that sustainable agriculture based on holistic research principles (Gafsi et al., 2006; Drumond, 2006; Wahlstedt et al, 2006); and long term productivity (FAO 2005, ESIA, 2006). All the activities needs to be associated by standards, like the first of them IOBC (International Organization for Biological and Integrated Control of Noxious Animal and Plants) standards, especially research in environmental pollution (Macgregor and Warren, 2006). Agricultural department of USA state (USDA, 2006) is less strict. Sustainable agriculture should be organic agriculture or even open system for all registered chemicals, GMO plants, growth regulators, etc. However, in EU documents and CAP (Common Agricultural Policy, 2000) reforms sustainable agriculture is not precisely defined, but all activities are sustainable oriented, including support of special quality of food and organic agriculture. (ii) The aim of conservation agriculture is sustainability and profitability based on three main principles like decreasing of soil destroy, cover the surface of fields and organized crop rotation (FAO, 2005, Hobbs, 2006). Ideas and professional basis are given from ECAF (European conservation Agriculture Federation, 2006) associated from 15 partner countries. The research base correspondent with many references also outside Europe (Hobbs, 2006); due to discussion from ESA (European Society of Agronomy) congress in 2007, the idea needs to be realised in EU regulations. A few terminological aspect are not clear. (iii) Alternative agriculture should be everything deviate from conventional agriculture, like organic farming, use of GMO, etc. (iv) Environmental friendly agriculture is not defined. It should be organic and also integrated farming system. (v) Peaceful agriculture is no animal explore agriculture with vegan style of people life.

Development of sustainability as defined 'Brussels' environmental measures

In Slovenia sustainable agriculture like integrated crop management, integrated vegetable production, integrated fruit and grape production, organic farming (table 1), sustainable animal production now has a clear legislative basis and certification schemes for production and processing. Government has taken a major role in defining production systems by creating legal standards. Especially for organic farming many countries all over the world have established a certification and accreditation system in order to protect the justified expectations of consumers with regard processing and controlling the product quality of organic goods and protecting producers from fraudulent trade practices.

Table 1. Certified integrated and organic production in the year 2005

Branch	Whole area (ha)	Integrated (ha)	Share (%) of integrated	Organic (ha)	Share (%) of organic
Field crops	169139	32820	19.3	1255	0.7
Vegetables – all	3614			116	3.2
- market	1708	1028	60.2	65	3.8
Orchards	9997			359	3.6
-high population	4545	2187	48.1		
Grapes	16428	8554	52.1	67	0.4
Sum	199178	44589	22.3	1977	0.9

a) Integrated crop management (ICM)

ICM is a way of sustainable production systems organized by societies or regions. ICM is established on like over standard of GAP, from EU members established only in Slovenia. ICM organized such as national project in Slovenia, according to additional demands to EU GAP, is a new quality of environmental standards for more environmental friendly activities for sustainable agriculture. Initiatives for ICM based on requirements of ESIA (European Initiative for Sustainable Development in Agriculture), EU CAP, Slovene Agri-Environmental Programme 2001-2006 and numerous national environmental, plant protectional and other agricultural regulations in accordance with EU laws and recommendations. Strategy of Slovene ICM is a long term field crop production on whole farm (or in combination with organic production system), which is based on sustainable principles of farm management, with more ecologically friendly inputs, including modern machinery and equipment. This activity needs to support economically efficient crop production (yielding), which results with higher quality and safety of food than in case of conventional crop production. The aims for first ICM guidelines in Slovenia were formed on the base of Agra CEAS report of Integrated Crop management systems in the EU from different regions and Associations from 15 EU countries (Agra CEAS, 2002) as follows: reduction of inputs of chemicals and better management, involved new technologies of production based on sustainable principles, with long term conservation of good soil structure and soil fertility, produce quality food (without dangerous organisms, appropriate calibration of yields, ...) or industrial food products, economically efficient use of production materials, economically and environmental friendly use of modern machines, etc. The over standard regulations according to guidelines of ICM are adopted every year, in 2006 are described in 70 p. The main key rules are follows: crop rotation, except use of perennial legumes, during the five years period minimum 3 different crops must be included into crop rotation, rules about allowed groups of plant species in crop rotation are obligatory; the least of one of weeding per year must be without herbicides (mechanical, physical,...); soil pH and organic matter in the soil are the strong condition for participating in this ICM system; in case of low pH under the fields can not be part of ICM, and also low organic matter in the soil need to manage additional organic inputs into the soils; analyses for better nitrogen management are one of most important conditions in this ICM system; plant protection activities must be in accordance with economically thresholds of damage with specially allowed substances for ICM; GAP and other EU and national standards are used for nutrient management, conservation and development of biodiversity use the chemicals for plant protection, etc.

The total amount of Slovenian arable land under gardens and fields (vegetable, crop and animal feed production) is 172.753 ha, from this area approximately 20.1 % in 2006 (table 2) is inspected and certificated such as ICM and products, which has also national traceability and labelling. The number of ICM producers increased from 920 in 2004, when ICM in Slovenia started to 1572 in 2006.

Table 2. Total amount of integrated arable area and number of integrated farms in comparison with integrated field crop management (ICM) in Slovenia from 2003 to 2006.

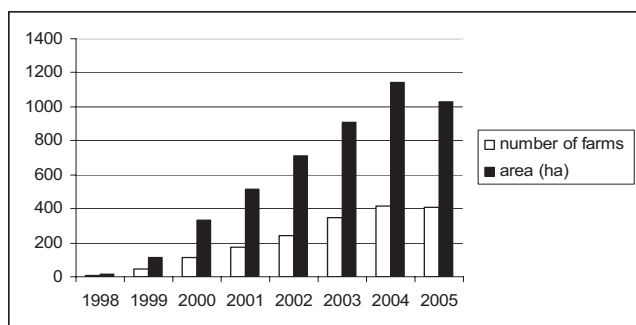
Year	Total area of integrated arable land		ICM	
	Number of farmers	Area (ha)	Number of farmers	Area (ha)
2003	2949	1195	-	-
2004	4572	42534	920	28487
2005	5530	44589	1394	32820
2006*	5767	48130	1572	34744

* Data from 17.5. 2006 are proximate, source: Ministry of Agriculture, Forestry and Food, with permission

b) Integrated vegetable production

Integrated vegetable production started in Podravje region as research and development project on 9 farms with 14 ha vegetable production in the year 1998 and first guidelines for integrated vegetable production were developed (Bavec, 2000). In the year 1999 different education activities has been prepared as a part of Phare CBC project for advisors and farmers and after involving extension service in following 3 years it was

spread over all regions producing vegetables in Slovenia. In the year 2000 Association for integrated vegetable production in Slovenia has been established and it has taken guidelines as a base for their members integrated vegetable production. Special logo for integrated vegetable production has been introduced. In the year 2001 integrated vegetable production became one of the measures of Slovene agri environmental program with 400 EUR/ha support and in the period 2004 – 2006 part of Rural development program where 0.3 ha area is minimum for getting support. Project was a base for the state Rule for integrated vegetable production (Ur. l. RS 63/2002) and new Guidelines for integrated vegetable production for 2003. Guidelines are each year improved with new knowledge and review of allowed pesticides. Integrated vegetable production is under inspection and certification. In the year 2006 5 certification bodies are operating according to the standard SIST 45011. Today certified integrated vegetable production means approximately 70-80% of Slovene market vegetables. As farmers have to give guarantee to the customers about the internal quality (f.i. no pesticide rests over allowed values), certificate for integrated vegetable production is a kind of guarantee also for the chains and others. In the last three years the share of integrated vegetable production is over 70% concerning the area of integrated vegetable production and 25% concerning the number of market vegetable producers (table 3) and almost opposite is the situation concerning conventional vegetable production. In last years the increase of organic vegetable production is noticed – about 50 to 60 ha is estimated market organic vegetable production in 2006. As at this moment 0.3 ha is a minimum to get support in the agri environmental program, there is not possible to expect further conversion from conventional into integrated production. The average area in conventional vegetable production was in the year 2004 0.29 ha per farm (table 3).



Graph 1. Development of integrated vegetable production in Slovenia.

Table 3. Methods of vegetable production in 2004.

Method of production	Number	Share (%)	Area (ha)	Share (%)	Average area (ha) per farm
Organic	65	4	86 (35**)	5 (2 **)	0.54
Integrated	417	25	1134	72	2.72
Conventional	1197	71	352	23	0.29
market veg. production*	1679	100	1572	100	0.94

*- Horticulture survey, Slovenia, 2003 (Statistical office of Republic of Slovenia), ** - estimation of market organic vegetable production – approximately 1/3 to 1/2 of inspected area

Integrated vegetable production improved way of farming and brought on the vegetable farms new knowledge, reduced costs for mineral fertilizers, improved crop protection (use only tested pesticide sprayers, organize safe storages for pesticides,..) and introduced new concepts of crop protection (preventive measures, predators,...), improved hygiene standards in harvesting and storing,... The main unsolved problem are at this moment registrations of some pesticides and predators which are needed in production, but there is no interest from supplying companies to take the official procedures for a few hectares of some vegetable in Slovenia (f.i. 14 ha chinese cabbage, 35 ha garlic or 52 ha peas produced in 2004). In spite of many farmers and advisors efforts, there are still some problems which have been notices in inspection and certification process (table 4).

Table 4. Some problems/mistakes noticed by inspection of integrated vegetable production.

Inspection point	Problem / mistake / weak points
Crop rotation	- not proper crop rotation - not enough green manure crops and over winter mulch crops to avoid nitrate leaching are used
Soil management	- over winter there is no crop on the field - unbalanced humus management
fertilizing	- results of AL soil analysis are not taken into account in fertilizing - high rest of mineral nitrogen after harvesting - missing Nmin soil analysis before nitrogen fertilizing
Plant protection	- missing records about plant protection - wrong records about plant protection
Hygiene	- not proper storage possibilities

c) Organic agriculture

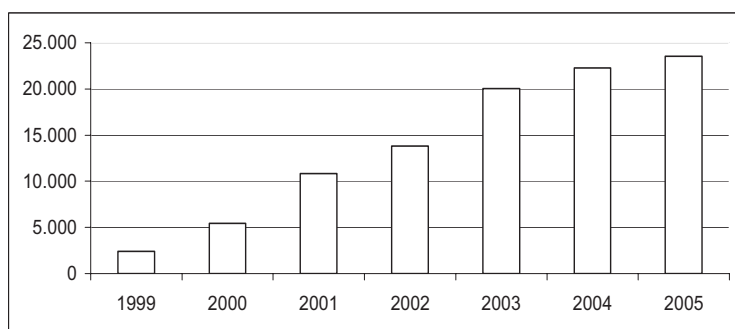
Introduction of organic farming into Slovenian official agriculture was associated with many misunderstandings. Due to the first terminology of sustainable agriculture (used in IFOAM congress in 1977) for later named organic agriculture/framing used in English speaking countries, different terminologies are used like biological (biologique, biologico, biologisch) farming in Roman-German speaking areas, ecological (ekologisk, Økologisk) in scandinavian countries, Spain (ecologico), Germany and Austria (ökologisch) and also Slovenia accepted term 'ekološko'. The most problematic understanding was about 16 different terms like byodynamic agriculture, permaculture, regenerative agriculture, peaceful agriculture, etc. Different organic crop production practices have been developed, based on organic agriculture legislation and IFOAM (International Federation of Organic Agricultural Movements), Codex Alimentarius, and several organic farmers' association (Demeter, Bioland, Naturland, Biodar, BioErnte, etc.) standards. According to 2nd paragraph of EC regulation 2092/91 there is no differences among basic principles of EU standards of organic farming. Organic agriculture has become an important alternative to intensive, conventional farming. International understanding of organic agriculture as a production and processing management system based on the standards set by the IFOAM, national and community laws and programs, and production guidelines for farmers and their associations supported by society and public policy. The organic farming system does not allow the use of synthetic chemical insecticides, fungicides, herbicides, and fertilizers; synthetic additives and growth regulators; antibiotics and hormones for increased animal production; or gene manipulation of any organism that is a part of food production or processing. Practices relevant to consumers do not include synthetic pesticides and industrial fertilizers, genetically modified organisms (GMOs) in food production, synthetic growth enhancers, or colour additives in fodder. These same practices include only medicinal use of antibiotics, security zones to separate organic farmland from conventional farmland and roads, and restricted use of additives in processed foods. Practices relevant to environmental concerns include maximal use of local resources and recycling of organic material, avoiding nitrogen leaching, and reducing the use of fossil resources in transportation. Ethical considerations include enhancing biological diversity, keeping high ethical standards in animal husbandry, acknowledging the animals' innate nature and needs, and working for a socially just food-system. Adopting formal rules was the best way to give organic farming credibility in the quality products niche market. The European Community adopted a legal framework (Regulation (EEC) No. 2092/91) in the early 1990s. Regulation (EEC) No. 2078/922 provided further opportunities for the eligibility of financial support for organic farming. The movement toward official recognition of organic farming later spread to several other countries, and was followed by international initiatives. In 1999, the Codex Alimentarius Commission adopted Guidelines for the Production, Processing, Labelling, and Marketing of Organically Produced Foods. These guidelines set out the principles of organic production from the farming stage through the preparation, storage, transport, labelling, and marketing of crop products. They are intended to enable member countries to draw up their own rules, on the basis of the principles, while taking account of specific national features. According to the Codex, organic farming involves holistic

production-management systems for crops and livestock which emphasize management practices (bought outside the farm) inputs. This is accomplished by using cultural, biological, and mechanical methods instead of synthetic materials whenever possible (Le Guillou and Sharpé, 2001). There are strict rules for the labelling and advertising of organic products in many countries (Bavec and Bavec, 2006).

Consumer interest has grown in response to repeated food-safety scares and animal-welfare concerns, among others regarding the impact of industrial agriculture on the environment. Producers have also been attracted because of environmental concerns as well as the potential health impacts of using agrochemicals and the economics of organic production relative to conventional agriculture. This latter factor has been affected by the fact that many governments are encouraging more producers to adopt organic techniques (Rigby and Cáceres, 2001).

With the continuous growth of the organic sector, and the challenges and opportunities that come with that growth, the 2005 IFOAM General Assembly in Adelaide came to the conclusion that the basic values—the fundamental underpinnings of organic agriculture—needed further reflection and discussion. The approved “Principles of Organic Agriculture” consist of four objectives upon which organic agriculture is based: (i) The Principle of Health — Organic Agriculture should sustain and enhance the health of soil, plant, animal, and human as one and indivisible; (ii) The Principle of Ecology — Organic Agriculture should be based on living ecological systems and cycles, work with them, emulate them, and help sustain them; (iii) The Principle of Fairness — Organic Agriculture should build on relationships that ensure fairness with regard to the common environment and life opportunities (iv) The Principle of Care — Organic Agriculture should be managed in a precautionary and responsible manner to protect the health and well being of current and future generations and the environment (IFOAM, 2006).

First 41 farms were inspected according to the EC rule 2092/91 in Slovenia in 1998. In the framework of Reform of Agricultural Policy 1999 to 2002 the subventions per ha were established. About 600 organic farms were inspected in 2000, the first of them were certified and got possibility of use trademark Biodar. Over 1800 farms and 25000 ha area (93% grassland) was inspected in 2006. From the year 2000 in Maribor, Ljubljana and Celje farmers are selling their organic products in organic green markets, but selling in supermarkets and in tourism is still in not well organised till now. Financial support by the Ministry of Agric. Forst. and Food started in the year 1999 and given to the first 41 farms in conversion in the previous year. From the year 2001 it is also a measure in Slovene agrienvironmental programme. In the year 2006 different amounts were given for different types of organic production: field crops 463 EUR per ha, vegetables – field production 548 EUR per ha; vegetables (glasshouses) 590 EUR per ha, orchards (high density) 800 EUR per ha; meadow orchards 295 EUR per ha; vineyards, asparagus, hop plantations 800 per ha; grassland (0.2 to 1.9 animals capita/ha) 232 EUR per ha; support for inspections and other costs 110 EUR per farm. Although the amount was increased from 2003 to 2004 for about 25% it didn't have important impact on increase of farms in conversion. It means that only financial support is not enough for developing this sector and that there is more important access to the market, promotion, developing processing plants, advisory support...



Graph 2. Area (ha) in organic farming inspection from 1999 to 2005.

Future development of integrated crop and vegetable production and organic farming

Integrated production and organic farming will be supported also in the next financial period 2007-2013 as a part of agrienviromental program which is the only obligatory measure in EU rural development program. Due to higher and higher demands of legislative including incorporation of good agriculture practice as minimal obligation for getting any state support the difference among integrated and conventional vegetable production is each year smaller – except inspection and certification which is obligatory in integrated production. New approach in market vegetable and fruit production is Eurep GAP standard which seems to be demand from the chains in the near future. It is horizontal standard for food safety which beside ruled for integrated crop management take into account more environmental aspects, HACCP, condition for workers,... Slovene Government accepted in November 2005 Action plan for organic farming until the year 2015 which is very ambitious (ANEK, 2006). The most important goals until 2015 are: 15% of all farms organic (in 2005 it was 2.5%); 20 % of utilized agriculture area organic (in 2005 it was 5%); 10% share of organic food on market (it is less than 1%) and increasing of organic tourist farms to 120 (3x more). There are good possibilities for further development of organic farming if there will be developed new marketing strategies for organic products on domestic and also on foreign market. As some goals from Action plan are included in Rural development program 2007-2012 there can be expected some positive effects. Organic farming should be the main way of agriculture on underground water protected areas, in Natura 2000 regions, national and regional nature parks... Promotion, organic tourist farms, new ways of selling of organic foods (public kitchens), investments in food processing on organic farms, establishing marketing/trading organization for organic products are needed. Threat about introducing GMO seeds is making concerns among organic and integrated farmers and also among many inhabitants in Slovenia whose attitude towards using them as food and spreading them over the fields is majority negative. It was the reason that “GMO free Alpe Adria region« declaration among Slovenia, Corinthian and NE Italian regions - was signed on June 10th, 2003, in Ljubljana. Law about GMO coexistence is in procedure now.

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Razvoj 'održive' poljoprivrede utemeljene na integriranim i ekološkim usmjerenjima u Sloveniji i terminološke barijere

Sažetak

Različito razumijevanje i razlike u razvoju održive poljoprivrede su opšte raširen fenomen. Terminologija kao što su održiva poljoprivreda, održivi razvoj, organska poljoprivreda, ekološka poljoprivreda, biološka poljoprivreda, dobra poljoprivredna praksa, integralna poljoprivreda odnosno integralno ratarstvo, biodinamička poljoprivreda, permakultura, mirotvorna poljoprivreda je često različito interpretirana i nejednako razumijeva kod stručne i laičke javnosti. Zbog boljeg razumijevanja je predstavljen pregled najčešće upotrijebljenih interpretacija i njihov realni značaj u praksi. Analizirani su podaci o razvoju ekološke poljoprivrede, kao i integrirane proizvodnje ratarskih in povrtlarskih kultura gajenih na njivama u Sloveniji. Podaci kažu porast integrirane povrćarske proizvodnje od 8 na 408 proizvođača od 1998. do 2005. godine, a proizvođača u ekološkoj poljoprivredi od 41 na 1718 u istom periodu. Broj proizvođača integrirane ratarske proizvodnje se je od 2004. do 2006. godine povećao od 920 na 1572. Na osnovu podataka i iskustava autora u organiziranju tih oblika održive poljoprivrede postavljena su pitanja i izazovi za daljnji razvoj.

Ključne riječi: održiva poljoprivreda, integrirana ratarska proizvodnja, integrirana povrćarska proizvodnja, ekološka poljoprivreda, terminologija, razvoj