BELIEFS AND MISBELIEFS ABOUT SUSTAINABILITY IN AGRICULTURE

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Sustainability has recently become one of the most frequently used and interpreted, often misinterpreted notions. The one-sided conservationist approaches are placed more and more often in the forefront of the concept, in contrast with the previously frequent economic interests and aspects. Since 60–90% of each country's territory is occupied by agricultural areas, most of the conflicts arise around agricultural production. The increasingly aggressively articulated false charges awake uncertainty in the organization of production and even environmentally conscious producers are groundlessly and permanently forced to defend. The basic problem of conservationist attacks is the lack of a future-oriented mentality in the consideration of the ongoing processes, instead their starting base is the conservation of the status quo, or rather the reconversion of the past natural states which is unacceptable from developmental point of view.[1]

Keywords: agriculture, sustainabilty, eco-farming, integrated farming, industrial farming

Introduction

Sustainability, which has been the basic concept of environmental protection since the UN Conference in Stockholm in 1972, was first defined by the Brundtland Commission's Report in 1987. It has become an essential part of international political thinking, and, since then, it has been both widely used and interpreted (in many cases misinterpreted). In spite of the fact that the definition of 'sustainability' requires sustainability simultaneously in economy, in society and in ecology, at least some of the actions taken in the name of the concept break the unity of the three requirements. Earlier, economic interests ignored the ecological and social requirements (especially the latter), but today the ecologists do precisely the same with the other two factors. Their increasingly extreme and belligerent appearance often heightens social hostility – the exact opposite of the basic aim of environmental protection, which is to ease social tension and avoid unnecessary stress.

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The most important paradox is derived from the perception of the environment. The lop-sided ecological perception of environmental protection has the declared aim of protecting, broadening and enforcing the principles of the so-called "natural environment". The truth of the matter, however, is that – at least in Europe – man has transformed his environment to such a degree that we can no longer talk about "natural ecosystems" – not even in "protected natural areas". Water habitats, marshlands and highland forests, the areas which are considered to be the most untouched, can only exist in their current condition because, in earlier times, man deemed it economically pointless to try to exploit them: only after their value was recognised were these areas protected. At that point, humans took over – at least partly – the regulatory role, although this, in many cases, resulted in the artificial obstruction of ecological succession. For example, in order to halt sedimentation in a lake or in fenland, it may be preferable to remove the unwanted sludge; or, should the problem be drying up, water replacement might be the solution. As a direct consequence, of course, the protected ecosystem survives – but not as a result of natural processes. The same situation occurs when new species naturally appear in a protected ecosystem (aggressively spreading weeds, bushes or trees) and man roots them out to protect the natural values.

In the case of rural areas (60–90% of every country) it is even more contradictory to enforce ecological principals concerning natural ecosystems. These are semi-natural ecosystems, where the main regulator is man. These areas (ecosystems) are basically subordinated to human economic needs, and so they must be considered when striving for the most favourable ecological status. One must possess not only ecological but also extensive agro-economic knowledge, and so the most appropriate farming methods must be developed by agrarian experts with broad vision, and not by ecologists.

It is not possible to enforce unilateral environmental requirements, especially when they go against the principles of ecology. A good example of this can lie in those grasslands – rich in species – which really belong to forests in terms of their climate and soil. The grasslands in these areas were formed by deforestation and were maintained by continuous grazing and cropping. With the declining economic importance of grazing farming, these areas are transformed into either fields or forests, or, if they are left to themselves, reforestation will occur in a natural way. Grazing farming can be maintained by continuous assistance in some of these areas, but not on in the long term and not on huge areas of land. Therefore we must take the simple view of environmental protection – 'everything should stay as it is' – with a pinch of salt, since it often contradicts not only economic and social requirements, but also ecological ones. In such cases we are talking not only about the deliberate obstruction of ecological succession, but also about climate change or the appearance of new species – which in themselves challenge this standpoint. There is also a

geological side, which means the continuous filling of the lowlands, and a biological side, which means that the biome or ecosystem has to adapt to the changed habitat.

Controversial Issues

As agriculture, forestry and freshwater fish farming cover most of the areas, environmental protectionist proposals aiming to influence agriculture and also the requirements concern this sector the most. These proposals serve to achieve certain environmental goals, but they never consider the socio-economic or even the environmental sacrifices which have to be made in order to achieve them. Perhaps we can now highlight these contradictions:

1. If we are to maintain and increase biodiversity, it is necessary to use small parcel or strip farming in fields! Major tracts are no more than "ecological, cultural deserts"!

It is undeniable that, on small parcels, the richness of species and biodiversity are greater, but at what price? The domestication of plants and their cultivation, which started 10,000 years ago, meant the most drastic intervention in natural ecosystems. The basic feature is that, totally unnaturally, only one breed is cultivated on a specific piece of land and other breeds of plants – and the animals consuming the specific cultivated plant – must either be destroyed or, ideally, kept away. This is a fundamental contradiction. The situation has improved over the last few thousand years in the sense that mankind started to use different methods. These included different approaches: crop change and crop rotation, 'plant association' cultivation (e.g. corn + beans), grass cover sowing (between lines as in orchards or vineyards) or the modern pest control which no longer means the extermination of "pests" but keeping them below a specific economic threshold. So- called "permaculture", a newly promoted farming method has tried to increase biodiversity, although, as yet, with no practical success. The reason for the failure is simple: every plant means competition for water and minerals for the cultivated plant, and so its yield decreases. Breaking fields up can have negative consequences for other reasons also:

- Production on small parcels of land can increase the need for machinery, the cost of energy and of production 3- or 4-fold, but the actual yield cannot be expanded;
- With small parcels it is also inevitable that chemicals spread onto other parcels; not only is output damage likely, but problems with food safety can also arise;

- The intensive use of machinery and the tight manoeuvres needed will compact the soil excessively, damaging natural air and water passage and decreasing productivity.

Table 1
Specific data of machinery work necessary for a field of 98 ha. (=100%)

Name	0.5	2.0	4.5	18.0	50.0	98.0
	Size of field (ha)					
	The proportion of the cost of machine operation (%)					
Wheat	477.6	213.2	155.7	114.1	103.4	100.0
Maize	488.4	224.5	162.1	115.7	103.8	100.0
Alfalfa	429.9	198.4	149.1	113.5	103.3	100.0
Sugar beet	301.2	162.9	132.2	108.8	102.2	100.0
	Machinery operating time as proportion (%)					
Wheat	724.8	280.2	173.7	114.2	103.3	100.0
Maize	833.9	322.9	189.8	116.4	103.4	100.0
Alfalfa	569.6	246.2	181.6	114.2	103.2	100.0
Sugar beet	425.0	190.3	138.1	109.0	101.4	100.0

Note. Data obtained from Gockler (2009) p. 114.

Finally it should be underlined that the term "ecological cultural desert" is somewhat extravagant and not accurate, as, despite the intensive use of chemicals in orchards, hundreds of plant and pest breeds can be detected.

2. Small scale production is environmentally friendly whilst large-scale production is damaging!

How production strains the environment depends, on the one hand, on the amount of utilised material and the energy consumed on one unit of land and, on the other hand, on the technology applied and the level of technology. Even if we do not take the above disadvantages into account, it is obvious that, due to their greater financial strength, large manufacturers with well-qualified management can afford to buy modern technology and make use of professional forecasting and monitoring systems. In order to be able to sell the products constantly these plants with established market connections must maintain "good production practice" and guarantee food safety. On the other hand, small producers must become highly specialised in order to produce market-compatible products and reduce equipment needs. They are unable to indulge in professional crop change policy or crop rotation farming methods. As a result, the soils are overloaded, and so their only advantage, greater biodiversity, is likely to vanish.

3. Products from small producers are healthy, those from large manufacturers are unhealthy!

The degree of 'healthiness' is a consequence of the level of production technology, of hygiene conditions and of the proficiency of technological leadership. These factors are readily available at the large manufacturers. Products are continuously inspected by the large producers, but, with the lower volume of products of the small producers, this particular process, due to its high cost, is missing, and so the differences are not obvious. Concerning the products where inspections were carried out (e.g. milk), the disadvantage to small producers was clear.

4. The only environmentally friendly way of farming is eco-farming!

Eco- or bio-production in farming is a method which primarily uses local resources and pays special attention to the soil, to the flora and fauna and to human health – and so tries to eliminate chemicals to produce high-quality products. The target group in the market is those people who are able and willing to pay the higher price. The main difference between traditional and eco-production is that the latter rejects synthetic chemicals (fertilizers, pesticides) and so forgoes this possibility of boosting the yield or effectively protecting the crop. As a result, production is some 20–40% lower, more unbalanced and less "market compatible". By eliminating chemicals, the bio-producer lowers the "chemical risk" to the consumers – in other words, produces a special quality. However, he also takes risks and accepts extra costs, which can only be compensated by prices at least 30–50% higher. These, already higher, producer prices are often at least doubled by the traders and these prices not only cannot be paid by consumers, but are also unreasonable, assuming controlled food supply. Eco-production can only guarantee chemical-free products – which may be good – but not healthy products. 'Healthiness' can only be proved by lengthy inspection; since limiting the use of chemicals can increase the risk of fungal infection, and the damage caused by fungal toxins could be even higher than any chemical residues in the crops.

5. Eco-products are healthier than industrially produced products!

That may be true, although industrial production has already been replaced by other methods of production. Industrial production in agriculture was the result of cheap oil (energy), when the industry could supply agriculture with relatively cheap production aids (fertilizers, pesticide, machines etc.) and so their use was unlimited. Production became unilaterally yield-oriented. As a result of the unreasonably high and simply mechanical use of industrial assets and the non-utilization of by-products (manure, straw etc…) agriculture polluted the environment. Radically increasing energy prices post-1973 and more stringent environmental requirements made the system's reason for existence questionable both in economic and environmental terms, and enforced changes. One mode of change was input-saving eco- production and another was improved industrial

production – that is, integrated production. Integrated farming production is a market-oriented system, which holistically uses the advantages of intensive farming (fertilisers, crop-change, crop rotation etc…), of industrial farming (mechanisation, chemicals) and eco-farming (preservation and improvement of soil fertility, mulching) in order to increase yields, economic efficiency and marketability. At the same time it complies with environmental, natural and food safety requirements. This can be achieved by a high level of technology and expertise and the use of forecasting and monitoring systems at every stage in production. In this way input consumption can be rationalised and outstanding performance can be achieved (apples: 60–80 tons/hectare, maize: 8–12 tons/hectare and milk: 8–12,000 litres/cow). It is expected that future production will supply 90-95% of food requirements by integrated production and only 5–10% by eco-production. The two types of farming, however, are not opposed to each other; they are complementary. Integrated production satisfies mass consumption needs and eco-production meets special needs since it can be especially favourable for those who are intolerant of chemicals (e.g. infants or invalids). It must also be underlined that the products of both farming methods products are controlled and guarantee healthy products 'from field to table'.

6. Traditional local breeds should be preferred to the large-scale production of uniform world breeds!

The preservation of traditional, local breeds is of fundamental economic interest, as they have features (frost tolerance, resistance to disease, taste, etc…) which are of great importance in the age of modern breeding processes, and especially of genetic modification. However, it is no accident that they are overshadowed. Their yield, appearance, shelf life, nutrient composition and nutrition cannot meet the needs of modern consumers and markets. Since the end of the 19th century Hungarian Grey cattle have been almost totally ousted from the market by Hungarian Simmental cattle and Mangalica pigs have been replaced by White Meat-type pigs. In the 1960s Bánkút wheat yielding 2 tons/hectare was replaced by Bezostaya wheat yielding 4 tons/hectare. The large, juicy Hungarian tomato and the very tasty but a too rapidly softening Hungarian apricot went in the same direction. Of the annually produced thousands, or even tens of thousands, of traditional breeds, only a few can live up to the complex requirements of the modern food production and supply. This narrows the use of breeds as increasingly uniform tastes appear on the markets, and, if one wishes to stay competitive, this must be taken into consideration. Contrary to the opinions deriving from nostalgia, the production of modern breeds does not increase the exploitation of the environment. The larger yields are achieved by better use of soil nutrient content and water and they produce more valuable products. To confirm this let us examine some figures.

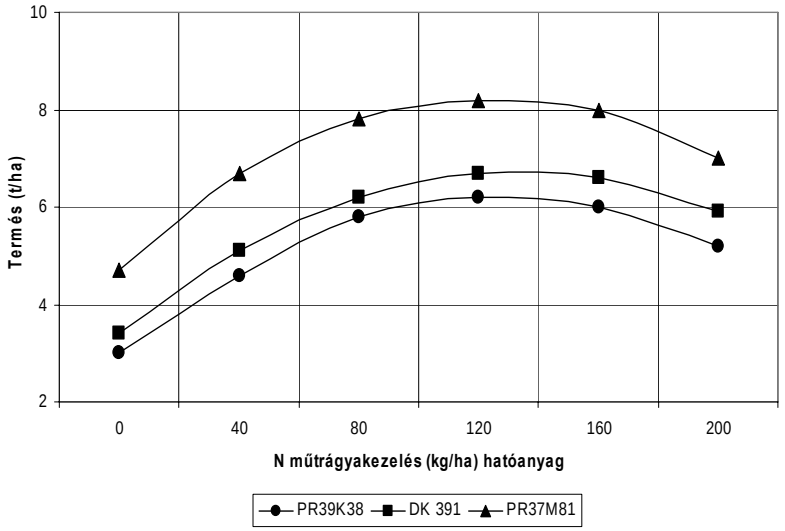

Figure 1. Fertilizer utilization of different types of maize hybrids in case of increasing portions of fertilizers. Data obtained from Futó (2009) p. 39.

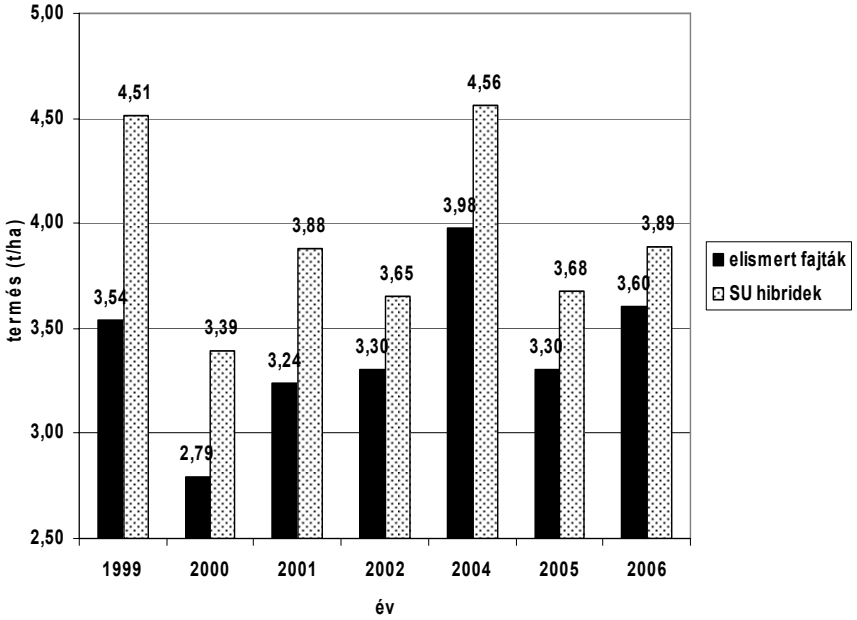

Figure 2. The hybrid advantage in colza cultivation (OMMI–MgSzH 1999–2006). Data obtained from Blum (2008) p. 39.

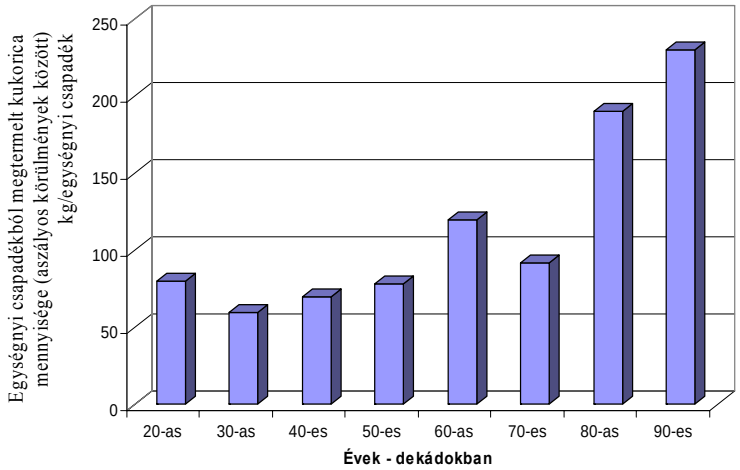

Figure 3. The efficiency of water utilization of maize as of nowadays. Data obtained from "A 2007-es aszály első tapasztalatai a Pioneer kukoricák termesztésében" (2007)

Table 2
The difference in performance of large (Type 2004) turkey and the native bronze turkeys (male)

Type	On the hoof in the age of 20 weeks, kg	Fodder sale, fodder kg on the hoof	The weight of breast fillet, kg
BUT Big 6	18.2	2.9	5.09
Bronze turkey	6.4	3.3	0.83

Note. Data obtained from Horn et al. (2005), Wixey (2002), Sütő et al. (2004). In Horn (2007) p. 399.

Table 3
The water and fodder demand for producing one kg of breast fillet for different types of male turkeys

Type	For producing one kg		
	Fodder, kg	Water, l	Water to produce the fodder, l
BUT Big 6	10.5	21	10500
Bronze turkey	25.3	50.6	25300

Note. 2 to 1 ratio of water and fodder, 5 t/ha (cereals and maize production, 500 mm of annual rainfall. Data obtained from Horn (2007) p. 399.

The above seen tables and figures obviously show that holding on to traditional breeds causes market and economic losses. The followers of this are from those who live under the circumstances of safe food supply. They totally neglect the quality and price competition occurring on solvent markets, and what

is more, they forget about the fact that even on the current production level there are more than 1 billion people starving. In the meantime the world population is growing by 70–80 million annually, therefore in 2050 the food supply of 2.5 billion more people must be solved using smaller fields than today. In order to reach this we must use the modern breeding methods, including the results of GM because sustainability can only be achieved by smaller resource and energy supply and by the lower level of environmental impact.

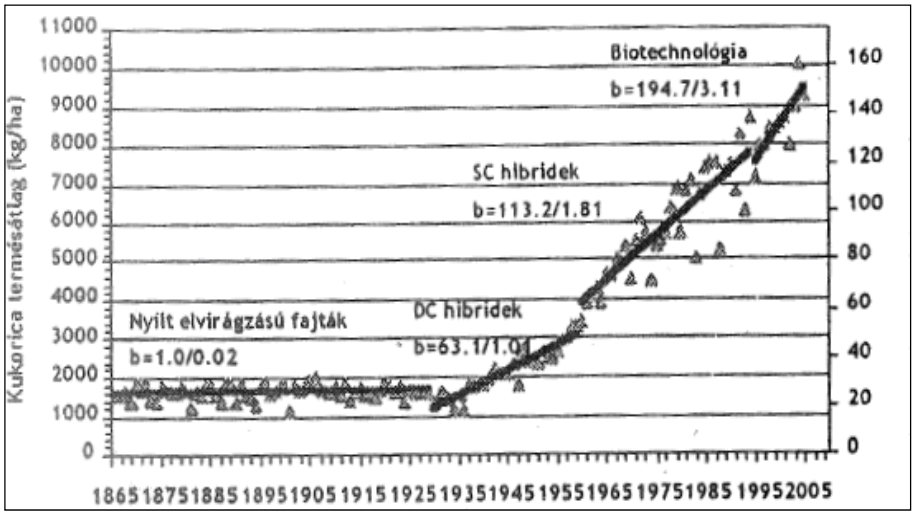

Figure 4. The average yield of maize in the USA. Data obtained from Szanyi (2007).

Conclusion

The pure aim of environmental protection is not against development. It sees the solution in sustainable development which is prudent and aims at the maintenance of environmental systems. Based on the Vienna Report of the Club of Rome in 1979 the condition of it is the innovative learning, whose most important element is the future oriented thinking (anticipation). Future oriented thinking can create the requirements of sustainable development, the basic aim of environmental protection and the balance of the lives of the people by holistically using sustainability in parallel in the economy, in society and in ecology. This development must be in simultaneously moral and rational, because the most rational decision must be made between the morally acceptable (so both ecologically and socially impeccable) development purposes. This means on the one hand an extended openness and a foresight towards everything new, and on the other hand the strict refuse of unscientific manipulation regardless of financial interest or the misconception of the situation.

References

A 2007-es aszály első tapasztalatai a Pioneer kukoricák termesztésében (2007). *Agrofórum*. *18*(10).

BLUM Z. (2008). Saaten Union: Innováció, teljesítmény és biztonság a repcetermesztő számára. *Agroinform*, *19*(7).

BUDAY-SÁNTHA A. (2011). *Agrár- és vidékpolitika*. Budapest: Saldo Zrt.

FUTÓ Z. (2009). A kukorica starter-trágyázása. *Agrofórum*, *20*(4).

GOCKLER L. (2009). A mezőgazdaság gépüzemeltetési költsége 2009-ben. *Agrofórum*, *20*(4).

HORN P. (2007). Intenzív és extenzív állattenyésztés a fenntartható mezőgazdaságban. *Állattenyésztés és Takarmányozás*, *56*(5).

SZANYI I. (2007). Monsanto-megoldások a globális felmelegedés és az aszály kihívásaira. *Agrofórum*, *18*(11).