Economic aspects of land use

Bozsik, Norbert – Magda, Róbert

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SUMMARY FINDINGS, CONCLUSIONS, RECOMMENDATIONS

The aim of our paper is to show the economic importance of land usage. This topic is very important because land is the basis of industrial, agricultural production, energy and environmental security. The analysis focuses on the relationship between land use and scarcity, sustainability and competitiveness.

INTRODUCTION

The current global economic crisis may well become and other type of crisis also possible. If trust in finance and economy does not return rapidly, economic reform, socio-economic growth and political stability will suffer. While some confidence in the financial system will return in due course, a new financial architecture is required to strengthen the global economy and increase economic and financial fairness. In the positive hope, in this connection, it is critical that the needs for global food and environmental security are taken into account.

World population growth is the biggest trend-making factor: 70 to 80 million more people a year, close to 7 billion by 2012. Population growth creates demand for food products including feed arising from increasing meat consumption. Other major global trends are globalization and urbanization. Moving production to the most competitive regions causes the food trade to become more liberalized and also more concentrated. Growing energy demand and climate change will also influence food production; agriculture contribute to emissions of GHG into the environment and also suffer or benefit from changing climates, depending on climatic zones. Additional challenges are increasing market volatility resulting from yield and stock fluctuations and consumer sensitivity to food quality, safety, and price. Finally we face the question of who will pay for agricultural public services provided by land managers that the market does not pay for, such as rural landscape maintenance, environmental protection biodiversity, and animal welfare. These challenges are aggravated by global irresponsibility related to food security, water and environmental sustainability and energy security. (13)

Energy prices have seen a decline (in constant dollars) over the past 200 years. The latest fossil energy price hikes have not even brought us back to the price levels of some 30 years ago. The tragic reality is that political zeal led governments to keep fossil energy prices as low as possible, thus frustrating most attempts to increase energy productivity. Energy price elasticity is very much a long-term affair, and return on infrastructure investments crucial to the creation of an energy-efficient society requires time.

Much debate surrounds the potential contribution of agriculture to renewable energies. Unfortunately, existing technologies produce energies that may be renewable, but most are not green. Whether second generation biofuels may eliminate most of the pitfalls of the first generation is open to doubt, although they include saving food components of plants. The re-

search and development focused on biofuel policy must be handled stressedly even if it is now in the background because of nowadays moderate oil prices. The current economic crisis is now the focus of attention, but renewable energy will return as a problem, because of limited disponsable resources.

The environmental resource scarcity issues are entirely real. Over the long term, environmental security is the mirror image of food security, because we have no food without substantial clean water resources, productive soils, and appropriate climate. Climate change must be more important than all businesses for the society. The failure of agriculture already now leads to hunger in developing countries and mass migration of people (half a billion according to the United Nations), mostly to developed countries.

In this period when the world economy has decreased rapidly, it is necesarry to analyse the different possibilities which help us change this negative tendency, and find the right way. So we need to valuate our resources from the human capital to the natural resources. That is the reason why we focus on one of the most determining resource (for Hungary the most important one) which is the arable land. The land as an economic resource is mostly utilised by agriculture. Land usage occurs in a competitive environment (market competition) and economic factors are primary for all farmers. We have to emphasise that land is a natural resource at the same time. No matter who the owner of a given piece of land is. Land is part of the national wealth and it must be used in an optimal way. The regulation of the land use activities is governmental task (e.g. environmental protection).

In our opinion, land usage can be defined as a fine balance between sophisticated and inter-related activities, a precise order and harmony of biological, physical and chemical processes. This system of relations can only be described by using the rules of system theory and its adaptation to the specific conditions of land usage. It is important that land usage is defined on the basis of system theories by the fact that the whole system and the relationship between certain elements must be clearly specified and quantification must also be done. (7)

On the one hand, we have to emphasize that land utilization is a complex category, and agricultural utilization is only one part of it – however, it may be the most important one. On the other hand, the present type of agricultural land usage give us such examples that show us that this question area cannot be defined on its own, only in a complex system compared with other land utilization possibilities. It is true for both micro and macro levels as well. The aim is to find the best solution of utilizing land in the most effective way. We are convinced that in order to make thorough analyses of the most important production factor of the agriculture – arable land – we will have to separate the different forms of land usage and point out its extern and intern relationships.

The concept of land utilization therefore means the territorial usage of the whole country and the description of it by using the methods of system analysis. Knowing the intern relationships of land usage may also help us find and analyze the different ways of land utilizations and agricultural usage within.

The characteristics of this resource are very special. For example when we analyse the global size of land, that is limited, which created the problem of scarcity (+ water scarcity: irrigation water use efficiency is important, produce as much as possible in rain-fed regions without irriga-

tion, etc.). Two other factors – the immobility and durability – are also important when we try to find the best usage.

After finding the best utilisation, our task is to produce in a sustainable manner. Nowadays it is very important – when we use so much limited resources such as oil, gas, arable land. Everybody knows well that we are borrowing land from our grandchildren, so we'll have to give it back after use.

The other important question is the competitiveness. The challenge for us in the future is to find the most competitive way of the utilisation of these fields. One of the key methods could be the production and reproduction of alternative energy sources such as biogas, bio-diesel and bio-ethanol.

RESULTS AND DISCUSSIONS

Land utilisation and scarcity

The problem of how to define, determine and assign the price, or the value of the land, is an important issue in the economic literature. Land could be seen as an asset, but also as a production factor that serves production and consumption purposes. (9) Land assets have three important characteristics: *scarcity* (land exists only in fixed amounts and cannot be created easily), *immobility*, and *durability* (it cannot be destroyed easily: but fertility can be destroyed easily: biodiversity loss: crop production is impossible without biodiversity because that creates food production (crop and grass). These characteristics make land an attractive asset as a productive factor, as a collateral for credit and as a store of wealth.

Scarcity

Total land area of the World is 148 940 000 km^2. Europe has 10 180 000 km^2 land area. Surface of Hungary is only 0.91% of Europe, 93 030 km^2. About half of the total area of Hungary is agricultural area, which is outstanding in the world.

The total amount of land available at a given location is fixed, and the total supply of usable land given from the nature is fixed for the nation. There's also usually more than one competing use for a parcel of land. The rent that can be charged for the use of land depends on its marginal revenue product in the highest.

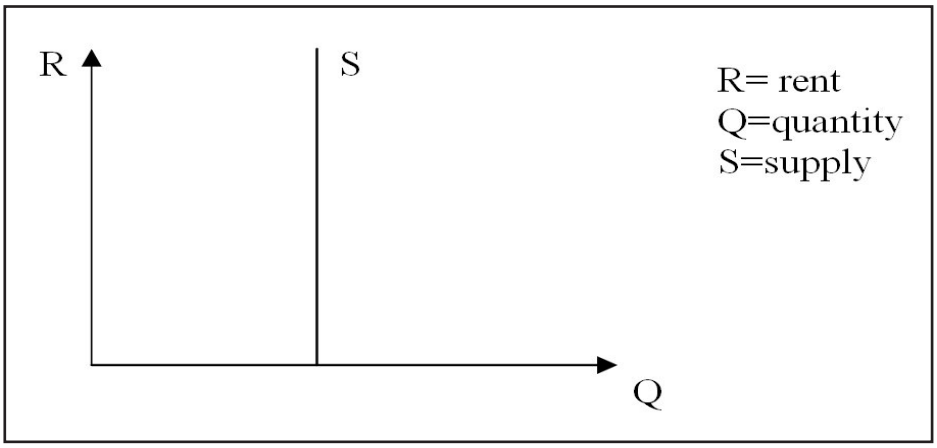
Let us see the supply which is perfectly inelastic. If land rents at that location increase, the quantity of land supplied at that location couldn't increase. Because the supply at a given location is fixed, the price of land depends entirely on the level of demand at that location and governmental subsidies. (9) Governments provide supports to agriculture in the form of transfers through a wide variety of policy measures. (5)

Fortunately, the OECD has created a methodology to calculate the support. The most important are: CSE, PSE. The Consumer Support Estimate (CSE) is an indicator of the annual monetary value of gross transfers to (from) consumers of agricultural commodities, measured at the farm gate (first consumer) level, arising from policy measures which support agriculture, regardless of their nature, objectives or impact on consumption of farm products. The Producer Support Estimate (PSE) is an indicator of the annual monetary value of gross transfers from consumers and taxpayers to support agricultural producers, measured at farm gate level, arising from policy measures, regardless of their nature, objectives or impacts on farm production or income. (17)

On the Fig. 1 we can see the supply of the arable land.

Figure 1

Supply of the arable land



Source: own compilation

Immobility

The land is an immobile resource, because we can not move it one part of the World to the other. The root of this characteristics result in advantages and disadvantages too. If the land is located near the industry and the market, it is an advantage and of course the opposite is a disadvantage. We can abate the problems of the disadvantages with well planned industry location and well planned production structure of the plants.

Durability

This characteristic is true, but not in every case. If we only use the land, without doing any environmental prevention on it, the quality and the productivity of the land will be lower. On the other hand, agriculture uses those part of the land – the topsoil – which is the most dangerous in that case, because it can be easily destroyed by both wind- and the water erosion (and biodiversity loss). So my opinion is the following: durability is true in general, but it is not true in the case of the agricultural land.

Land utilisation and sustainability

It is very difficult to determine a concrete definition about sustainability. In our minds a reasonable definition of sustainable development might be as follows: it involves maximising the net benefits of economic development, subject to maintaining the services and the quality of natural resources over time.

Mankind is directly influenced by the loss of biodiversity. Through the extinction of species, we lose crucial opportunities to solve many problems of our society. Biodiversity provides us directly with essentials like clean water and air and fertile soil; it protects us from floods and avalanches. These benefits can all be valued economically. It is a difficult and complex task, but such a valuation would clearly show how important biodiversity is for human wellbeing and economic development. We think it is very important because many people are unaware of the speed with which we are consuming our natural resources. We are producing waste far faster than it can be recycled. It is important also to compare the needs for public goods and services with argu-

ments whether or not market failures are linked to the provision of services.

Market failure is a crucially important justification for taking measures to protect our landscapes. Corrections in market failures may also be achieved through investments and the provision of payments to reward land managers who provide public goods and services (Table 1). (3)

Table 1

Future Environmental Scenario to 2050

Use	2000	2010	2050	Difference	Difference	Difference
	million km^2			2000 to 2010	2010 to 2050	2000 to 2050
Natural areas	65.5	62.8	58.0	4%	-8%	-11%
Bare natural areas	3.3	3.1	3.0	-6%	-1%	-9%
Managed forests	4.2	4.4	7.0	5%	62%	70%
Extensive agriculture	5.0	4.5	3.0	-9%	-33%	-39%
Intensive agriculture	11.0	12.9	15.8	17%	23%	44%
Woody biofuels	0.1	0.1	0.5	35%	437%	626%
Cultivated grazing	19.1	20.3	20.8	6%	2%	9%
Artificial surfaces	0.2	0.2	0.2	0%	0%	0%
World Total	108.4	108.4	108.4	0%	0%	0%

Source: Braat, L. – Brink, ten P., 2008

When we focus on sustainability, in relation with the land we need to think in the long run. That's why that the basic condition of the long turn sustainable agriculture, to fit in with the environment, which means to use the land everywhere for those production and so intensity which will be the most optimal utilisation without destroying it.

In the beginning of the 1970's at the time of the world oil crisis economists suddenly realised that some of the resources are limited. That was the reason, why so many various dissertations were written about different alternatives of sustainability. One of these documents was the "Limits of growth" by *D. H. Meadows*. Than time to time her purpose was to remind the members of the different national governments of the dangerous situation of the society, with sketching a concrete global problem. From her research we would like to point out only five factors which are in close relationship with the land utilisation.

At first we mention the population growth. When we analyse the Table 2 we can see a huge increase in the number of the world population which will be more than 3.5 times bigger in 2050 than it was in 1950. It will be a great problem because nowadays about 1 billion people starved and it will be increasing in the future. From the Table 2 we can see that the biggest problem occurs in the case of the less- and least developed countries, where this increasing is much more higher than the average.

Table 2

World population (1950-2050)

	1950	2000	2003	2050
Total (million)	2519	6071	6301	8919
Developed countries	813	1194	1203	1220
Less developed countries	1706	4877	5098	7639
Least developed countries	200	668	718	1675

Source: UN, 2003

Less developed countries: each African, Asian countries instead of Japan, Latin-America and Caribbean region

Developed countries: each European countries, North-America, Australia, New-Zealand and Japan

Second problem is the increase in natural resource production. It started in the 18th century after the industrial revolution and has increased step by step, but with a higher rate. On the Table 3 we can see the production of the primary energy in the last decade. In this period in the EU countries – including Hungary – it was decreasing with a small proportion, but the increasing in China in the same years was about 70%. The production in the USA and Japan was really even.

Table 3

Primary energy production (billion tons, oil equivalence)

	2000	2001	2002	2003	2004	2005	2006	2007	2008
EU-27	933.0	932.2	932.1	926.4	922.3	890.2	879.4	859.5	…
USA	1678.8	1699.9	1667.3	1634.5	1647.0	1629.9	1653.1	1665.2	1716.1
Japan	105.8	104.7	96.9	84.0	95.0	99.8	101.3	90.5	87.1
China	1073.0	1104.5	1183.7	1331.3	1509.4	1640.9	1749.3	1814.0	…
Hungary	11.3	10.8	11.1	10.7	10.2	10.4	10.3	10.2	10.4

Source: Hungarian Statistical Yearbook, Hungarian Statistical Office, 2009

The third problem is the expansion of the industrial production – production of electricity is presented in the Table 4 – which is in a close relationship with the increasing of the natural resources production. The electricity is very important because that is the basis of all the other industries.

Table 4

Gross electricity production (billion kWh)

	2000	2001	2002	2003	2004	2005	2006	2007	2008
EU-27	3020.9	3108.1	3116.9	3216.0	3287.6	3308.9	3354.0	3361.7	…
USA	3990.5	3924.1	4050.3	4075.8	4168.1	4257.4	4300.1	4348.9	4354.5
Japan	1057.9	1039.7	1058.3	1082.6	1107.8	1133.6	1102.8	1133.7	1085.2
China	1368.5	1434.6	1654.1	1905.2	2203.7	2474.7	2834.4	3277.7	3103.1
Hungary	35.2	36.4	36.2	34.1	33.7	35.8	35.9	40.0	40.0

Source: Hungarian Statistical Yearbook, Hungarian Statistical Office, 2009

The fourth problem is the environmental pollution which was increasing to a great extent. All three factors – population growth, grow in the natural resources- and industrial production – generate environmental pollution alone, but these are cumulated that's why that we could find a higher increase in this sphere than in the others.

Last but not least we could see a great decrease in the territory of the agricultural area all over the World except for China (Table 5).

Table 5

Agriculture area (1000 ha)

	2000	2001	2002	2003	2004	2005	2006	2007
World	4 960 102.0	4 967 137.1	4 950 709.3	4 937 312.0	4 945 699.0	4 945 770.4	4 937 783.6	4 931 862.0
Europe	486 189.0	483 612.6	481 693.1	479 373.0	477 907.8	476 634.4	475 671.6	474 273.5
USA	414 399.0	414 944.0	416 067.0	416 902.0	414 674.0	412 878.0	411 060.0	411 158.0
Japan	5 258.0	4 793.0	4 763.0	4 736.0	4 714.0	4 692.0	4 671.0	4 650.0
China	544 358.0	543 356.0	541 854.0	541 851.0	543 043.0	547 340.0	550 536.0	552 832.0
Hungary	5 854.0	5 865.0	5 849.0	5 865.0	5 864.0	5 863.0	5 809.0	5 807.0

Source: http://faostat.fao.org/site/377/DesktopDefault.aspx?PageID=377#ancor

These five factors are connected with each other. When the population increase, they need to use more resources that are used by the industry. All of these three factors generate the environmental pollution, and they usually use agricultural areas. It is true all over the world that's why that the quantity, and the ratio of the agricultural land has decreased in the past. On behalf of sustainability *Daniella Meadows* suggested in her survey a zero economic growth, so in her mind it will be necessary to decrease the first four components increasing rates with 30-70% and increase the fifth one in the same ratio.

The previous examinations proved that the increasing of efficiency of usage of agricultural areas is indispensable because of the amount of land is limited, but more and more people must be fed. One way of resolution could be the increasing of average crop and growing of alternative energy sources (for example: energy plants) on the territory of poor quality lands in the developing and developed countries as well. In addition to, in the developing countries more expansion can be realisable by the adaptation of modern technologies in connection with energy production and they could open up the energy sources.

Competitiveness

The discussion of food crisis has faded into the background-overshadowed by the global macroeconomic crisis and the financial crisis, but the importance of that can be seen from written statements above. The sharp rise in prices of basic foodstuffs created extreme difficulties for a large part of the world's population. The food crisis affected more people more severely than the economic issue because the populations most affected by sharply rising food prices spend larger shares of their income on food. The global food crisis produced an extraordinary human impact, larger and more adverse than the global financial crisis.

One indication of the severity is the remarkable amount of recent civil unrest and political instability in dozens of countries (Ethiopia, Egypt, Mexico, Thailand etc.) because people were unable to afford basic nutrition.

Much of the world's system of trade in foodstuffs broke down temporarily as food exporting countries moved to limit or even ban exports in attempts to provide some protection to their domestic consumers. The severe economic slump worldwide represents an extraordinary world downturn-the worst downturn since the great depression. All these issues have diverted the attention from the food crisis. The crisis led many people to write off the food and more broadly the commodity price crisis of 2008 as a widespread belief that the event was a speculative bubble-too many people traded commodities, driving commodity prices to unsustainable levels-and that concerns about ultimate supplies of food were misplaced. (6)

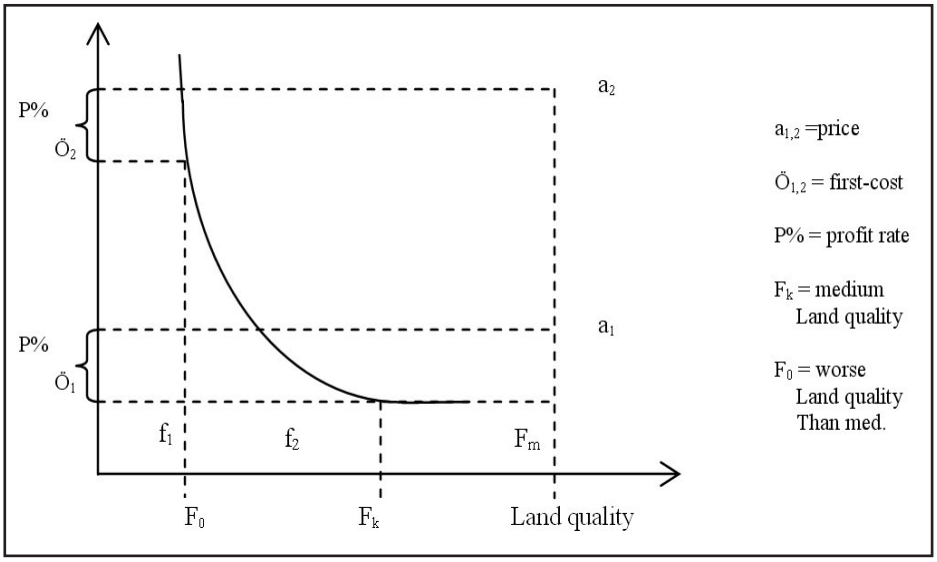
We evaluate the competitiveness as a complex concept. The actuality depends on a lot of factors, and their importance differs in structures and in time too. Competitiveness affect international trade, business strategies, economics, marketing, land utilization and other parts of life, so it is not a surprise that we can find its definition in several cases.

From time to time this notion has already changed, however we cannot speak about a common definition or a synthetic index either. One of the earliest definitions of competitiveness is done by Adam Smith who said that the basis of competitiveness is the absolute advantage, which means cheaper production. In case of the land it is connected to his rent theory. In his work he wrote that we can get a higher income and do more competitive production on those fields of which quality is better.

In the beginning of the 19th century *Ricardo* mentioned the comparative advantage, which comes from the differences between the price- and the cost ratio, and it also has an important role when analysing rational land utilization (Fig. 2).

Figure 2

Relationship between the production prices and the quality of the land



Source: own compilation

The key concept is competitiveness which is in close relationship with rational land utilization. We have to see clearly that this phrase is extremely complex and multi-level and we have to use it very carefully.

In Hungary the production is generally deficient on the unfavorable lands, that is, prices do not include net income or just a little.

Let us assume that there is a linear relationship between the quality of the land and the output, therefore the relationship of these two factors can be defined with the following linear equation:

y = c + bx

where:

y = specific income t/hectare

x = the Gold Crown value of the land (GC/hectare)

In this case land efficiency is the following (produced goods/gc):

$$M = \frac{c + bx}{x} = \frac{c}{x} + b \quad \text{and}$$

$$M = kg / GC$$

Let us assume that the value balanced price of produced goods is a2 and the effective price is a1. So in this situation the total income/gc is the following

- balanced price: $T_{a_2} = \left(\frac{c}{x} + b\right) a_2$

- effective price: $T_{a_1} = \left(\frac{c}{x} + b\right) a_1$

From these functions we can deduce those income indexes which belong to different levels of land quality.

If selling has a cost, the produced academic income/GC and the effective income/GC will be the following:

- produced academic income: $J_{a_2} = T_{a_2} - (x + s)$

- effective income: $J_{a_1} = T_{a_1} - (x + s)$

In this relationship we can get the answer to the following question: what kind of efficiency and income relations can emerge in reality at different levels of production costs/he, and what if we use balanced price.

Analyzing the economical efficiency of the usage of natural resources a Hungarian scientist attaches importance to the changes of the world market prices. The starting point of our analyses is the basic theory according to which geographically limited and different natural resource prices depend on the production costs of those habitats and deposits which are indispensable for satisfying social demands.

To the economists, familiar argument that the decisions are (or should be) made at the margin comparing marginal, or additional, costs and benefits of the proposed action. If marginal benefits exceed marginal cost, go ahead, deploy more resource to provide more environmental service until the benefits fall and/or costs rise to equate the two. We should break off the standard microeconomic approach that the optimal (profit maximizing) output can be found where the marginal cost is equal to marginal revenue, because we should take into consideration the sustainability. In principle, there should be no difference whether this rule is applied to non-market services like the environment or marketed services. There is also a mistrust amongst some economists, especially those familiar with analyzing farmer subsidy programmes, that public goods or environmental services is just the latest in a long line of 'excuses to justify their subsidies'. Simply because environmental services are joint products with farm products, there is a tendency amongst this group to presume either that the environmental services will be delivered anyway. (2)

Generally this marginal cost derived from the world market price can be much more or much less, if social demands differ from private one. It may also change according to the supply and demand ratio, and temporarily may differ from those dominant marginal costs which determine the average world price centre. In these cases the normal natural rents temporarily might be either lower (maybe totally disappear) or higher and appear as extra rents.

What are the impedimental factors of competitiveness?

This question has deep roots but now we would like to introduce some question areas which help us find these causes. In our country we would have to change a lot of things if we liked to be competitive in the future and it is true in connection with land utilization analysis as well.

In the future, agricultural policy will need to respond to public demands linked to the maintenance of landscapes, the conservation of natural resources and biodiversity, food safety and sustainability. In terms of rural development, the European Commission is introducing an extension of the axes of the current programmes (Health Check) to four new challenges: climate change, energy, water management and biodiversity. In order to finance the new measures, additional modulation has been introduced. (8)

The changes are necessary because there is an increase in the dependency of energy import. In the last 15 years this dependency has been growing, because the utilization of those resources of which we do not have enough has been increasing. (The utilisation of fossil minerals.) That is why our energy balance is worse than it was at the beginning of the 1990s. We can clearly see the numbers in the Table 6 which show the weak points. In 1990, production was similar to imports and it has absolutely changed by 2008, when the production was 435.9 petajoule and the imports were 868.0. So it means that nowadays we use two times more imported energy than we produce. We can see from the Table 6 that the ratio of energy import has also increased in the last 18 years, but the quantity of the exports is much lower than that of the imports, and that is the main point in our analysis (Table 6).

Table 6

Energy balance from 1990 to 2008 in Hungary (petajoule)

Year	Production	Imports	Sources, total	Exports	Change in stocks	Energy consumption, total
1990	634.1	653.5	1287.6	70.8	13.1	1203.7
1995	575.0	617.5	1192.5	98.8	9.1	1084.6
2000	485.2	665.4	1150.6	82.8	12.7	1055.1
2005	428.0	873.5	1301.5	140.8	7.5	1153.2
2008	435.9	868.0	1303.9	145.3	32.3	1126.3

Source: http://portal.ksh.hu/pls/ksh/docs/hun/xstadat/xstadat_eves/tabl3_08_01i.html

The second important thing is the increase in prices of fossil minerals. Everybody knows well that the price of crude oil has been increasing in the last 35 years which we are presented in the Table 7. The nominal USD/t price has increased more than 24 times between 1970-2005, but if we analyse only the last 30 years, the inc-

rease then was 478%. The changes in real prices – without inflation – was also high, because it was 515% from 1970 to 2005, it was also lower if we analyse only the last 30 years because the value of the increase was 138%. These values had grown worse – a bit later those have been correcting – in the last four years, when the price of crude oil exceeded the 140 dollar per barrel.

We think these data from the last 35 years show the tendency of oil prices which might be dangerous in the future. This increase is due to the political situation of the oil producer countries and the extraction of the oil stocks decrease in the last 10 years. Another important issue is in connection with the Asian countries – China, India –, where the use of oil was rapidly increasing in the last decade. So we think these factors are enough to be sure that the prices will be higher in the future, but the ratio of the increase depends on the utilization of the alternative resources (Table 7).

Table 7

Real and nominal world market prices of Brent oil between 1970-2005 (deflated by the USA consumer price index at 1995 prices)

Year	Real price USD/barell	Real price USD/t	Nominal price USD/barell	Nominal price USD/t
1970	8.75	65.65	2.23	16.73
1975	32.57	244.26	11.50	86.25
1980	70.14	526.07	37.89	284.19
1985	39.12	293.39	27.61	207.09
1990	27.55	206.64	23.71	177.84
1995	17.06	127.94	17.06	127.93
2000	25.04	187.80	28.31	212.31
2005	45.10	338.25	55.00	412.50

Source: http://www.mnb.hu/engine.aspx?page=mnbhu_statisztikak&ContentID=2516

The third examined thing is the food and oil exchange ratio decline 1970-2000. What was the reason for the decrease? In Hungary animal husbandry production rapidly decreased and the sowing structure was not able to adapt to the new situation. We can also find decrease in vegetable and fruit production meanwhile oil prices were increased, as we have presented before.

That is the reason why the food and oil exchange ratio is worse now than it was 30 years ago. The decline of the food and oil ratio was different in wheat (6.2), in maize (8.28) and in beef (11.0), which we present in Table 8.

Table 8

Exchange rate – in nominal prices – of the main agricultural products in oil, from 1970 to 2005

Appellation	1970	1980	1990	2000	2005
Wheat	0.30	1.65	1.03	1.86	2.73
Maize	0.29	2.27	1.63	2.40	4.30
Beef	0.01	0.10	0.07	0.11	0.07

Source: Gergely S. – Magda S., 2006 and own calculation

What would be the solution?

In this situation one of the practicable way to increase competitiveness is to produce energy crop, and it could be a new alternative in land utilization as well. I divide it into three parts:

Energetic commodity production (a)

- arable land (energy herbs, cannabis, Chinese reed);
- forest (acacia, poplar, osier).

Energetic commodity production (b)

- bBiogas production (fragments, communal dumps, manures, communal cesswater, butchery secondary products).

Energetic commodity production (c)

- bio-propellants (bio alcohol, bio diesel).

We can see that this kind of production is also possible on arable lands, forests, etc. These utilizations help us solve those problems which I have already written about (increase in the dependency of energy import, increase in prices of fossil minerals, food and oil exchange ratio decline).

CONCLUSION

Population growth creates a rapidly growing demand for crop products. Growing energy demand and climate change will also influence food production; agriculture will contribute to emissions into the environment and also suffer or benefit from changing climates, depending on climatic zones. Additional challenges are increasing market volatility resulting from yield and end stock fluctuations and consumer sensitivity to food quality, safety, and price. The challenges are aggravated by global irresponsibility related to food security, water and environmental sustainability-and energy security. The exploitation of our entire ecosystem and the depletion of natural resources carry a price that must be paid today to compensate future generations for the losses they will face in the future. The food crisis affected more people more severely than the macroeconomic issue because the populations most affected by sharply rising food prices spend larger shares of their income on food. The global food crisis produced an extraordinary human impact, larger and more adverse than the global financial crisis. Resource productivity should become the core of our next industrial revolution. There are five factors in close relationship with the land utilisation. These are the next: rapid population growth, increasing utilization of natural resources, expansion of industrial production, increasing environmental pollution, decrease in territory of agricultural area.

The land as an economic resource is mostly utilised by the agriculture. It could be seen as an asset, but also as production factor that serves production and consumption purposes and have three important characteristics: scarcity, immobile, and durable. It is constitutes part of the national wealth and it must be used in an optimal way. The land utilization is a complex category, and agricultural utilization is only one part of it – however, it may be the most important one. The land utilisation is needed being in accord with sustainability. The root of the problem is the population growth, which will be more than 3.5 times bigger in 2050 than it was in 1950. It will be a great problem because nowadays about 1 billion people are hunger and it will be increasing in the future. About forty years ago when the price of oil went up in the world the economists suddenly realised that some of the resources are limited. In addition to, other crucial problems emerged, like the increasing of the natural resources production, the expansion of the industrial production and the environmental pollution which has been increasing multiplied. It is very dangerous because the population has increased in a high ratio and need more territories for producing basic materials for the food industry. That's why we have to use the

land in rational ways and we have to maintain and even to increase our competitiveness in the world. We think that the one of the best ways to increase the competitiveness is to produce energetic commodities, and it could be a new alternative land utilization as well. The energetic commodity production is obtainable from: arable land (energy herbs, cannabis, Chinese reed), forest (acacia, poplar, osier); biogas production (fragments, communal dumps, manures, communal cess-water, butchery secondary products) and bio-propellants (bio alcohol, bio diesel).

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ADDRESS:

Dr. Bozsik Norbert, docens, Károly Róbert Főiskola, Gazdaság- és Társadalomtudományi Kar, Közgazdasági és Jogi Tanszék
associate professor, Károly Róbert College, Faculty of Economics and Social Sciences, Department of Public Services Management and Law
Gyöngyös, Mátrai u. 36., Tel.: +36-37-518-360; Fax: +36-37-518-343, E-mail: nbozsik@karolyrobert.hu

Dr. Magda Róbert, egyetemi docens, tanszékvezető, Károly Róbert Főiskola, Gazdaság- és Társadalomtudományi Kar, Közgazdasági és Jogi Tanszék
associate professor, head of department, Károly Róbert College, Faculty of Economics and Social Sciences, Department of Public Services Management and Law
Gyöngyös, Mátrai u. 36., Tel.: +36-37-518-360; Fax: +36-37-518-343, E-mail: rmagda@karolyrobert.hu