

Consuming less or consuming differently?

TOWARDS SUSTAINABLE CONSUMPTION

Selected papers of OTKA 68647 Project

Sándor Kerekes – Zsuzsanna Marjainé Szerényi (eds.)

AULA KIADÓ

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Preface

Teaching at a university having age-long traditions is very illustrious; it is even more illustrious to be concerned with a discipline having roots that date back to the dawn of culture. Choosing a discipline, however, that is currently evolving also has some payoffs. In the latter case you grow old with your area of expertise, you do not have to dig deep into works on the history of science as you can find almost all the important details on your office shelf. Basically, having decided to work within environmental economics, a branch of environmental science, this happened to me. I had the privilege of meeting professors Antony Fisher, David Pearce, Tom Titenberg and Robert Costanza in person, who have written the fundamental books of our profession since the early 70's. The environmental movement itself is not that much older either; probably the publishing of 'The Silent Spring' by Rachel Carlson in 1962 should be taken as its beginning. The outstanding researcher and publicist died two years later, but her influential masterpiece has been with us since then. Fifty years have passed and such jubilees may present us good opportunities to make a short inventory of everything that has been achieved so far, or to list the goals we failed to meet. Many justifiably accuse environmentalists that they are constantly alarming people, with a kind of end-of-the-world feeling. According to stubborn facts, humanity has been far over the boundaries of the carrying capacity of planet Earth; therefore our consumption is at the expenses of future generations. In addition, more than three million people live in hunger, out of which at least one billion are not able to satisfy even their most basic human needs. What would happen if they did not starve? Is there such a presumption, that this way we would live at the expenses of future generations even more, valid?

Fifty years ago we had other questions in our minds. City smog, forest devastation, untreated waste and water pollution were visible to the naked eye. Using technology carelessly ended up with disastrous consequences; but the same experts who had invented the polluting technology in an inaccurate coordinate system were able to correct the mistakes and found cleaner, less environment-demanding solutions for us. Technologies have been changing together with social values; and in the end we might not understand what the reason for not using these solutions originally was, as in most of the cases technologies regarded today as "BATs" had already existed in schoolbooks twenty-thirty years ago.

Revealing the "secret" is easy; yes, it is profit, more precisely the short-term profit, as cleaner technologies in the short run usually produce with higher rela-

tive costs than more polluting ones. Later this turned out to be wrong; if we set a limit for pollution, in other words, we punish the ones who pollute the environment needlessly, cleaner production, as an integrated environmental solution is cheaper at the same time. On the whole, we can conclude that environmentalism has achieved remarkable successes in the fields of production, transport and other services; almost everything has become “cleaner” based on relative indicators. Engineers did what was possible, and what is more, they did it with pleasure as solving such problems meant challenge for them.

On the other hand, considering the concepts that have been forming the basic categories for economic thinking in the last hundred years fully, you will realize that their absolutism has resulted in the current economic, social and ecological crisis. Economic development, for example, is beneficial but only if it is for sustainable development. Having three empty shopping malls next to each other is the wild branch of competition, unnecessary waste of natural resources. Global capitalism could make everything cheap but not sustainable. Particle board manufactured from wood chips, sawmill shavings, or even saw dust and a synthetic resin or other suitable binder makes furniture production highly productive, so particle board furniture items are much cheaper than traditional wooden ones. However, the former has a lifespan of maximum 15-20 years. Usually we are bored with them before they physically go to rack and ruin. Their waste material is not usable, not even as fuel. Some pieces of most manufactured goods usually go “tired”. Most of such goods are produced in a way that makes them impossible to disassemble. Almost nothing is worthwhile to be repaired; it is cheaper to dispose them. Even if there are many who can not find a job, many of them could find time (and employment) by repairing broken-down objects. Most of our generated waste is the direct consequence of prodigal consumption that worsens the expectations and possibilities of further generations.

Our civilization has not really managed to move towards the solution of the environmental crisis due to partly overpopulation and partly prodigal consumption despite the fact that eco-efficiency in general has been improved by several order of magnitude in the last decades. Thus, it is time to deal with the issue of sustainable consumption. This is more a social scientific than a technical question; though possibilities lying in technical innovation within this field should not be despised either.

The world of home swimming pools, own saunas, land rovers, skiing areas relying on snowmaking guns and desert golf resorts is what Nature can not afford mankind, or may afford but only “very few chosen ones”.

The situation would be far better if people did not want to possess goods but they would only use them to satisfy their needs. “Sustainable development” could be reached only if you did not equip your home with different machines from the kid’s hair-cutting gadget to appliances for carpet cleaning, wall painting, timber floor polishing and spirit distillation; but these tasks requiring professionals would be done by professionals. All of these objects unnecessarily increase the per capita raw material consumption, which is now measured in tons. Your home should be cleaned by professionals using their professional equipment, providing better quality cleaning as an outcome. This way employment would be increased and environmental stress would be radically reduced without decline of living standards. Natural resource use must be diminished by all means; one way could be for instance if you bought a cinema ticket instead of spending your money on 3D television. Strangely enough, besides using fewer resources, it would have further benefits. Less time spent on watching TV would improve your physical and mental conditions. If you did not listen to countless advertisements you would not aspire to unnecessary objects. You could meet your friends in the cinema, which would considerably promote your social life. I may seem naïve or utopian, the road may seem impossible to follow; but the one that has been taken is a dead end, too. All the current seven and the future nine billion people can not have either their own car or TV; what is more, it is impossible for everyone to possess a washing machine. The reason is that there is not enough matter on Earth for that. Something must change, but what can we do?

Numerous researchers are seeking the answer. We were doing so in the last three years with the support of OTKA. As I mentioned before, the advance of technology has made most of the production more sustainable in the last fifty years. The essays of this book directly or indirectly aim to improve scientific understanding about those economic and social phenomena and their relatedness that may help us make consumption more sustainable. The task now is much more complicated than the cleaning of production was, as this time habits and cultures should be transformed. We can hardly expect great and immediate success.

I am delighted to see so many young researchers who recognized the significance of the case; what is more, their achievements are remarkable. Tamás Kocsis gives a good insight in the theory of consumerism and its main drivers; he critically analyses the related literature.

The paper of Szilvia Luda entitled ‘The Role of the Rural Economy in Sustainable Development’ deals with the notion of social enterprise facilitating both sustainability and decision-making and self-management in food production. By applying Q-methodology and in-depth interviews she reveals the values and motivations of a very specific entrepreneur group.

Zsófia Vetőné Mózner evaluates the effect of international trade on domestic carbon footprint. She concludes that in some fields (for example in case of household equipments) the majority of carbon footprint derives from import, implying that most of our machines are imported.

Zsófia Mózner, Andrea Tabi and Mária Csutora aim at comparing the intensive and extensive agricultural practices and their environmental impacts on the example of three countries: the Netherlands, Hungary and Brazil. They focus on the carbon footprint of food production and find that the prevailing methodology does not take the sustainable yield per unit of land properly and this way it shows intensive agricultural practices using more inputs such as fertilizers in a better light. In her essay Andrea Tabi exploring the essence of discounting in social clusters on the basis of stated preferences.

The paper of Zsuzsanna Szerényi, Ágnes Zsóka and Anna Széchy examines how environmentally aware consumers university students are. Unfortunately there are serious weaknesses even in this category of highest education. Their research reveals that Daniel Goleman is right (after fifty years and even about university students) in saying “Even those of you with good, green intentions are being pretty much ineffective as you grope toward a hazy green mirage. Why? Your ecological intelligence - your knowledge of the real impacts of the things you buy and do - is pitifully low.”

The essays in this book are quite heterogeneous in terms of their topic. Some of them have closer ties to sustainable development than others. The thing that common in their authors is that they regard the questions of sustainable consumptions in a similar way and all of them try to reach the solution of a sub-problem directly. This book may be of interest to scholars as well as to a wider audience of those concerned with the issues of sustainable development.

October 2012, Budapest

Sándor Kerekes

Tamás Kocsis

The problems of consumer society

Materialism and attempts to measure it

From the broad sphere of concepts of materialism I am only going to deal with aspects which are directly related to consumption. Materialism—as defined in the Oxford English Dictionary—is a “*devotion to material needs and desires, the neglect of spiritual matters; a way of life, opinion or tendency based entirely upon material interests*”. According to Russel W. Belk, the best-known researcher of the subject, materialism is “*the importance a consumer attaches to worldly possessions. At the highest levels of materialism, such possessions assume a central place in a person’s life and are believed to provide the greatest sources of satisfaction and dissatisfaction*” (Belk 1984, p. 291).

On the level of society the definition of Chandra Mukerji seems to be the most useful, according to which materialism is a cultural system in which material interests are not subordinated to other social goals and material self-interest is outstanding (Mukerji 1983, p. 8). Several authors note that acquisitive desires have not only emerged in the last few hundred years (see McKendrick, Brewer and Plumb 1982). However, it is without doubt that it has only been in the last centuries that the chance to seek psychological well-being through discretionary consumption has become available for the masses (Belk 1985, p. 265 relying on Mason 1981). This also emphasizes the importance of contemporary research on materialism.¹

To examine the role of materialism in consumer societies attempts to quantify materialism, the researches, which are still at an early stage but are increasingly intensive, serve as a strong basis. It is Belk’s mid-80s attempts that can be considered the first stage of systematic research of materialism (Richins 1999, p. 374; Richins–Rudmin 1994, p. 220), though there are some earlier analyses which have alluded to the subject.² Belk (1985) used three dimensions to describe materialism—possessiveness, nongenerosity and envy—and five-point Likert (agree/disagree) scales to measure the intensity of the dimensions.

¹ Fournier and Richins (1991) describes the relationship between theory and public opinion about materialism.

² For a brief review of them see Belk (1985, p. 267) and Richins–Dawson (1992, pp. 305–7).

The items are listed below in detail, as they are more suggestive than any theoretical description. (An asterisk indicates reverse scored items, that is, the more an individual agrees with it, the less he can be considered as materialistic from that aspect.)

Possessiveness subscale:

1. Renting or leasing a car is more appealing to me than owning one*
2. I tend to hang on to things I should probably throw out
3. I get very upset if something is stolen from me even if it has little monetary value
4. I don't get particularly upset when I lose things*
5. I am less likely than most people to lock things up*
6. I would rather buy something I need than borrow it from someone else
7. I worry about people taking my possessions
8. When I travel I like to take a lot of photographs
9. I never discard old pictures or snapshots³.

Nongenerosity subscale:

1. I enjoy having guests stay in my home*
2. I enjoy sharing what I have*
3. I don't like to lend things even to good friends
4. It makes sense to buy a lawnmower with a neighbor and share it*
5. I don't mind giving rides to those who don't have a car*
6. I don't like to have anyone in my home when I'm not there
7. I enjoy donating things to charities*⁴.

Envy subscale:

1. I am bothered when I see people who can buy anything they want
2. I don't know anyone whose spouse or steady date I would like to have as my own*
3. When friends do better than me in competition it usually makes me happy for them*
4. People who are very wealthy often feel they are too good to talk to average people

³ A revised materialism scale has been published for international comparative studies (see e.g. Ger-Belk 1996, p. 65). In this the possessiveness subscale includes only items 3, 4, 5 as well as item 6 of the nongenerosity subscale (after factor analysis).

⁴ The nongenerosity subscale of the international materialism scale does not include items 4 and 6 but includes item 7 of the possessiveness subscale as well as items 3 and 6 of the envy subscale. It also includes a new item: "I do not enjoy donating things to the needy." (Ger-Belk 1996, p. 65)

5. There are certain people I would like to trade places with
6. When friends have things I cannot afford it bothers me
7. I don't seem to get what is coming to me
8. When Hollywood stars or prominent politicians have things stolen from them I really feel sorry for them* (Belk 1985, p. 270)⁵.

The materialism scale developed by Marsha L. Richins and Scott Dawson includes different questions and focuses on different aspects but—just like Belk's—it clearly describes the nature of materialism. When analyzing separately the five data sets obtained from five locations of the USA with five different sample sizes,⁶ three dimensions (factors) emerged indicating different aspects of materialism. The authors named them success, centrality and happiness. The items of the three dimensions are listed below, the ones marked with an asterisk being reverse scored items. In the survey the above-mentioned five-point Likert scale response format was used.

Success:

1. I admire people who own expensive homes, cars and clothes
2. Some of the most important achievements in life include acquiring material possessions
3. I don't place much emphasis on the amount of material objects people own as a sign of success*
4. The things I own say a lot about how well I'm doing in life
5. I like to own things that impress people
6. I don't pay much attention to the material objects other people own*.

Centrality:

1. I usually buy only the things I need*
2. I try to keep my life simple as far as possessions are concerned*
3. The things I own aren't all that important to me*
4. I enjoy spending money on things that aren't practical

⁵ The envy subscale of the international materialism scale retained only 1, 4, 5 and 7 of the original items and it also has a new item: "If I have to choose between buying something for myself versus for someone I love, I would prefer buying for myself." The international materialism scale includes a new subscale besides the original three described in the main text. It refers to preservation and includes item 2 of the possessiveness subscale as well as two new items: "I like to collect things"; "I have a lot of souvenirs." (Ger-Belk 1996, p. 65)

⁶ Data was obtained from a medium-sized north-eastern city (144 subjects), two large western city (250 and 235 subjects), a north-eastern college town (86 subjects) and a north-eastern rural area (119 subjects) (Richins-Dawson 1992, p. 309).

5. Buying things gives me a lot of pleasure
6. I like a lot of luxury in my life
7. I put less emphasis on material things than most people I know*.

Happiness:

1. I have all the things I really need to enjoy life*
2. My life would be better if I owned certain things I don't have
3. I wouldn't be any happier if I owned nicer things*
4. I'd be happier if I could afford to buy more things
5. It sometimes bothers me quite a bit that I can't afford to buy all the things I'd like (Richins–Dawson 1992, p. 310)⁷.

Both materialism scales are used in practice. The one developed by Richins and Dawson approaches the issue more directly, based on values considered important by people, while Belk's primarily examines relationships between people, which also correlates with materialism, though some experts do not consider them an integral part of materialism (Williams–Bryce 1992, p. 150). The Richins–Dawson scale has proved to be more reliable statistically than Belk's scale (see Ellis 1992). Despite these unquestionable achievements, the research of materialism is rather divided and characterized by the lack of a generally accepted, unified theoretical framework, although there have already been attempts to create one (see Graham 1999).

Phenomena accompanying materialism

Richins and Dawson (1992) carried out a test on a sample of 250 subjects in a large western city of the USA in order to find out whether respondents scoring high in the materialism scale of the authors are less willing to share what they have and rate their personal goals as more important than those of the community. In the survey people were asked what they would do if they were unexpectedly given \$20,000. They were given seven ways in which money could be spent: (1) Buy things I want or need; (2) Give to church organization or charity, (3) Give or lend to friends or relatives; (4) Travel; (5) Pay off debts; (6) Savings or investments; (7) Other.

⁷ The happiness dimension of the Richins–Dawson materialism scale is very similar to the one called consumer saturation in sociology. That asks respondents to define themselves as: *"I have (almost) everything I need."*

"I have (almost) everything but I would like to replace a lot of them with new ones." *"There are things which I would need and do not have."* (Sik 2000, p. 339)

The whole sample was divided into terciles based on their materialism scores and the top (most materialist) and bottom (least materialist) terciles were compared. It was revealed that the most materialist tercile would spend three times as much on things for themselves as would the least materialist one, would contribute less than half of what the least materialists would to charitable or church organizations⁸ and would give less than half as much to friends and family.⁹ The measure of nongenerosity developed by Belk—described in the previous subchapter—was also administered in the survey on the same sample and compared to the scale of Richins and Dawson. The correlation between the two scales was 0.25,¹⁰ implying that nongenerous people are more likely to be found among materialists.

James A. *Muncy* and Jacqueline K. *Eastman* intended to find out if materialistic consumers have different ethical standards than others. Materialism was measured using the Richins–Dawson scale, while the lack of consumer ethics was examined based on four dimensions. The first two dimensions are concerned with situations where the buyer benefits at the expense of the seller, e.g. drinking a can of soft drink in a supermarket without paying for it (proactively benefiting), or not saying anything when the seller miscalculates the total in your favor (passively benefiting). The third dimension includes situations where the buyer is deceiving the seller, e.g. returning a product to a shop claiming that it was a gift when it was not (deceptive practices). The fourth dimension refers to situations where the consumer is not thoughtful enough to perceive harm caused to the seller, e.g. copying an album instead of buying it (“no harm, no foul” attitude).¹¹

The survey was conducted in two large American universities and the subjects were 214 students enrolled in various introductory marketing classes.¹² To find out specific relationships between materialism and consumer ethics, simple bivariate correlational analysis was carried out. Based on this sample,

⁸ $p < 0.001$

⁹ $p < 0.01$

¹⁰ $p < 0.001$

¹¹ For more details about measuring consumer ethics see e.g. Vitell–Muncy (1992).

¹² The sample proved to be more materialistic (with about 5-7 points higher average materialism values on the max. 90-point scale) than the ones surveyed by Richins and Dawson. The authors say they had expected it as the respondents were business students (Muncy–Eastman 1998, p. 140). Williams and Bryce (1992) found a similar, almost 8-point, difference when surveying 151 seniors in New-Zealand, some studying commerce, some arts (the latter were less materialistic) (Williams–Bryce 1992, p. 153). The international version of Belk’s materialism scale gave similar findings in Turkey (Ger–Belk 1996, pp. 68–9).

the correlation between materialism and actively benefiting was (-0.35), passively benefiting (-0.28), deceptive practices (-0.35) and no harm-no foul (-0.46).¹³ This shows a relatively strong relationship, the negative correlation implying that higher levels of materialism are associated with a lower propensity to see non-ethical behavior as being wrong (Muncy–Eastman 1998, pp. 141–2). As this is simple correlation, the direction of causality between the phenomena examined cannot be defined. Maybe it is materialists who make ethical compromises when acquiring things they deeply desire, however it could just as well be true that people with lower ethical standards tend to be more materialistic. Both cases raise some interesting questions for marketing. If marketing encourages materialism, which then leads to lower ethical standards, it can well be accused with being socially irresponsible, the authors say. In the other case marketing would not lead to lower ethical standards but one might also question the prudence of advertising tactics targeting consumers with lower ethical standards (Muncy–Eastman 1998, pp. 142–3).

Richins (1987) in another survey intended to discover the relationship between materialism and the influence of media. Before developing her materialism scale, she used a more simple five-point scale for measuring materialistic attitude, during which she separated a general and a personal materialism variable.¹⁴ Another variable examined to what extent people perceived characters in advertisements to be real persons (perceived realism of advertising) and also measured to what extent respondents are exposed to the impact of media (how many hours a week they watch television and how often they pay attention to television commercials). The sample included 252 respondents from a medium-size Sunbelt city of the USA, and was collected to meet quotas of 50% male/female, 50% over age 40 and 50% under (Richins 1987, p. 353). The correlation between media exposure and general material values was not significant, between media exposure and personal material values it was very weak. However, when splitting the sample into two groups using the median¹⁵ of the realism variable, in the group perceiving character portrayals in commercials to be more accurate (high realism subgroup) there

¹³ Even the lowest value was significant at the $p < 0.0001$ level.

¹⁴ Items of the *personal* variable are (measured by a five-point Likert scale): (1) It is important to me to have really nice things. (2) I would like to be rich enough to buy anything I want. (3) I'd be happier if I could afford to buy more things. (4) It sometimes bothers me quite a bit that I can't afford to buy all the things I would like. Items of the *general* variable are: (1) People place too much emphasis on material things. (reverse scored) (2) It's really true that money can buy happiness. (Richins 1987, p. 354)

¹⁵ The median of a variable is the value at which the variable has the same amount of lower values as higher values.

was a significant relationship between media exposure and both forms of materialism.¹⁶ It implies that among those who tend to believe in the reality of advertising, the ones who spend more time watching television are more materialistic (Richins 1987, p. 354). The direction of the causality cannot be determined in this case either, nevertheless the relationship is remarkable.

Belk and Pollay (1985) conducted a study on newspaper advertisements from the USA of the first 80 years of the 20th century. They concluded that materialistic temptation of luxury goods and pleasures increased in the period examined. Moschis and Moore (1982) analyzed the impact of media on schoolchildren with a longitudinal study, that is, data were collected about the same children in several times in their lives. They found a significant relationship between the effect of television advertisements and materialistic values. The difference was especially great within the group of children who were initially low in materialism. Those who watched more television were significantly higher in materialism 14 months later than those who watched less TV¹⁷ (quoted by Richins 1999, p. 378).

Following the appearance of reliable materialism scales, an increasing number of studies was published in the 1990s about the relationship between family structure and materialism. Rindfleish, Burroughs and Denton (1997) for example used the Richins–Dawson scale to analyze a sample of adults aged 20–32 in a medium-size city in the American Mid-West, some of whose (165 subjects) grew up in intact families (two parents), others (96 subjects) in disrupted families (parents divorced or separated). According to the survey the ones from disrupted families demonstrated significantly higher levels of material values and were more prone to compulsive buying (Rindfleish et al. 1997, p. 318).¹⁸ The biggest difference between the two groups was in the dimension of centrality of the materialism scale (that is, the importance of

¹⁶ The author used multiple regression analyses in which the predictor was the television exposure (number of hours spent watching television), while the dependent variables were the material values scales. For general material values the beta for television exposure was 0.19 ($p < 0.05$) and for personal material values it was 0.29 ($p < 0.01$). The relationship between attention to advertising (how often the respondents pay attention to television commercials) and the two forms of materialism was not significant (Richins 1987, p. 354). It suggests that how much the respondent watches TV is more important than how much attention he thinks he pays to commercials.

¹⁷ In this case the direction of causality can be determined, that is, it is more time spent watching TV that probably results in higher materialism of children not the other way round.

¹⁸ Based on analysis of the average values of the groups. The correlation with materialism was significant at the $p < 0.001$ level, the correlation with compulsive buying at the $p < 0.0001$ level. For further details on compulsive buying see Faber and O'Guinn (1992).

acquisition and possession in general—see previous subchapter for details). Therefore the authors concluded that people from single-parent families tend to use material objects for substituting absent parents and material values and/or compulsive buying for coping with the stress and insecurity accompanying family disruption (Rindfleish et al. 1997, pp. 320, 323).

Flouri's study (1999) of 246 university students in a medium-size Southern England city could not prove a relationship between materialism measured by the Richins–Dawson scale and family structure. However, students high in materialism talked more to their peers about consumption issues, were more susceptible to interpersonal influence, less often attended religious service, received less parental teaching about how to manage money and were less satisfied with their mother (Flouri 1999, p. 714).¹⁹ The author claims that though his research did not reveal a relationship between materialism and poor socio-economic background, it did prove that financial and *personal* insecurity directly or indirectly relate to materialism.²⁰ Family background can directly encourage the materialism of children if the mother is also materialist and indirectly if their spiritual and intrinsic needs are ignored in order to lead a secular way of life. *“On the other hand—says Flouri—parents who encourage conformity and are cold and unsupportive may lead adolescents to turn to their peers, the interactions with whom contribute to the child's learning of the ‘expressive’ elements of consumption. But also ‘broad’ personality factors, such as neuroticism, which was also related to dissatisfaction with interpersonal relationships and financial insecurity may lead to turning to possessions to compensate for feelings of unhappiness and low self-esteem.”* (Flouri 1999, pp. 721–2)

After examining the notion of materialism and analyzing its social implications, the notion of consumption is going to be dealt with including relevant environmental issues.

¹⁹ The author used a regression analysis in which the dependent variable was materialism. The first three correlation in the main text were significant at the $p < 0.001$ level, the last two were significant at the $p < 0.05$ level.

²⁰ Flouri (1999) as well as several of her earlier studies revealed positive correlation between materialism and compulsive consumption, susceptibility to neurosis and impulsive (i.e. unplanned) buying, however, there was negative correlation between materialism and self-esteem or self expression. For further details on the measuring of these phenomena and its findings see Mick (1996).

Overconsumption and misconsumption

In an ecological sense the consumption of every living being—including humans—is natural. In order to survive all organisms must consume and in this way degrade resources. This interpretation of consumption is nonethical, according to it all consumption patterns and their consequences are natural, including population crashes as well as expansion of a species at the expense of another. If, however, the interpretation includes human concern for extinction of species, permanent diminution of ecosystem functioning, diminished reproductive and developmental potential of individuals and other irreversibilities, then consumption acquires an ethical aspect and can be evaluated as “good” or “bad”. In order to be able to analyze the problem more thoroughly, I introduce the concepts of overconsumption and misconsumption.

According to Thomas Princen overconsumption is the level or quality of consumption (1) which undermines a species’ own life-support system and (2) for which individuals or collectivities of the species have other choices in their consuming patterns. Overconsumption is an aggregate level concept. It entails that the species overburdens the regenerative capacity of natural resources and the waste assimilative capacity of its ecosystem. For humans it becomes an ethical problem as well since they are the only species that can reflect on its collective existence.

Misconsumption, on the other hand, is interpreted on an individual level. During it the individual consumes in a way that undermines his own well-being even if there are no aggregate effects on the level of population. Consequently, in case of misconsumption the individual uses resources in a way that results in net loss to him. It has several types. On physiological level there is bulimia or drug addiction, psychologically one can fall into the trap of “perpetual dissatisfaction” owing to advertisements, for example, ecologically the construction of a badly founded house or the use of leaded paint harms the resource (the house) itself or the users (developmental problems of one’s children) (cf. Princen 1999, pp. 356–7).

Obviously, the overexploitation of the ecosystem is caused by overconsumption, while misconsumption is a social problem. However, when analyzing chances to decrease overconsumption, one has to consider whether it is accompanied by misconsumption or not. The relationship of the two phenomena is shown in Figure 1.

Figure 1. Possible Combinations of Overconsumption and Misconsumption

	There is Over-consumption	There is No Overconsumption
<i>There is Misconsumption</i>	A	B
There is No Misconsumption	C	D

Note: Devised graph by using the description of Princen (1999, p. 357).

As Figure 1 shows the ideal situation is cell *D*, where there is neither aggregate overconsumption, nor individual misconsumption. From environmental point of view it is cell *A* and *C* which need careful attention. If overconsumption is accompanied by misconsumption (cell *A*), there is a possibility of following a win-win strategy, that is, increasing the well-being²¹ of people while reducing the risks to the ecosystem. When, however, overconsumption does not entail misconsumption (cell *C*), sacrifices has to be made, which is to say, an ethical as well as political problem occurs. Subsequently, signs are going to be examined which indicate that in developed countries decrease in consumption *may* be accompanied with an increase in well-being, and that is there is overconsumption as well as misconsumption.

Needs and wants

In this subchapter the *theoretical* possibility of the emergence of misconsumption is dealt with. For this first I am going to examine one of the most widespread psychological theory about basic human needs, which was developed by Abraham *Maslow*. According to the theory six types of basic needs can be differentiated: physiological needs, safety needs, belongingness and love needs, esteem needs, self-actualization needs as well as transcendental needs (Figure 2.2)²². It is important to note that they occur in the above order, each of them appearing after the previous one has been satisfied (Maslow 1954, pp. 15–31, in Hungarian e.g. Magyari Beck 2000, pp. 137–9). This nature of

²¹ Well-being is differentiated from welfare. The latter means the possession of material goods, while the former has a much broader meaning.

²² It has to be noted Maslow's work does not include this type of representation and it is often criticized, as it implies that personal development has an end-point (see e.g. Rowan 1998, pp. 88–90). Therefore I would like to note that I also regard opportunities for personal development as infinite.

human needs is considered universal, regardless of cultural background of any individual.

In the above structure of needs economic goods and services are important only at the bottom (physiological) level—and sometimes at the safety level—so humans have to rely on their natural environment as a resource only at this level. Satisfying the needs for love, esteem, self-actualization and transcendental knowledge depends on social conditions, their fulfillment rarely includes materialistic elements, therefore they have low impact on the environment.²³ In an ideal case individuals can easily satisfy their needs of different levels and in this way achieve their full human potential. In this case they usually do not overconsume either on individual or community level, which means they probably are in the ideal cell *D* of Figure 1.²⁴

The emergence of culturally dependent wants can often cause divergence from the ideal state described above.²⁵ Individuals may get stuck on the bottom level, concentrating and spending all energy on pursuing the acquisition of material goods. As a result, top levels temporarily or permanently become unattainable for them. Another form of the same process is when individuals think their needs of the top levels can be fulfilled by possessing material goods. The messages of companies of growth-centered economies often promise to fulfill some of one's security, love, esteem or self-actualization needs by the goods or services offered by them. However, satisfaction achieved in this way is no more than a fleeting illusion, and disappointment is followed by a pursuit of the next material object. Getting stuck on the bottom level and seemingly

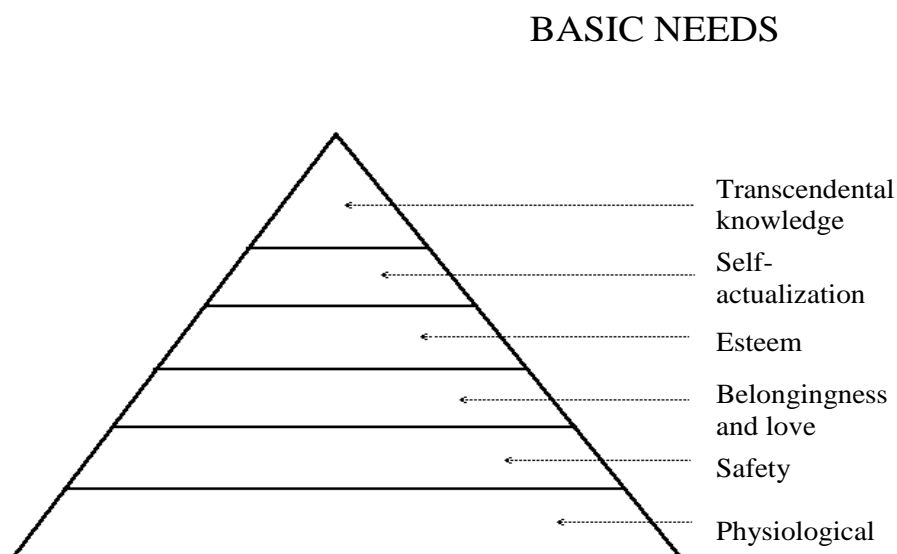
²³ Note that we did not even use all elements of Maslow's model for our argument. For example, it is enough to accept that between the bottom and top levels there is a qualitative difference and that fulfilling (to some extent) the bottom (material) levels is a precondition of reaching the top (immaterial) levels. In this way within the two layers (top and bottom) the order of basic needs and the way of reaching a higher level is insignificant. This will substantially strengthen our arguments against criticism. The distinction between material and immaterial basic needs can also be observed in humanist economics (see e.g. Lutz–Lux 1988, pp. 9–15).

²⁴ In case of overpopulation the community may be in cell *C* but it is not subject matter of the present study.

²⁵ Needs are considered objective while wants are of subjective nature. It is conceptually possible to need what you do not want or do not know about (e.g. heart surgery). It is also possible to want what you do not need but it is impossible to want something without knowing that you want it (e.g. metallic paint for your car). Wants depend on your subjective state of mind while needs are sometimes defined by somebody else (e.g. a professionally qualified doctor) (Berry 1999, p. 401). The difference between needs and luxury is also related to this subject. Livingstone and Lunt (1992) describe it by using opinions of everyday people.

satisfying top level needs with material objects are clearly two aspects of the same thing, reflecting a difference only in attitudes.

Figure 2. Maslow's Hierarchy of Basic Human Needs



In the above-mentioned process goods consumed do not serve to fulfil basic needs any more, they even hinder that, while human efforts are influenced by distorted cultural wants. Supposing that Maslow's theory is correct—and though some of its details are questionable, in general it is not—one can easily realize that the well-being of an individual depends on which level of needs he reached. It follows from this, that modern consumer society can be described by cell A of Figure 1, overconsumption being accompanied by misconsumption.²⁶ Obviously, in this case a possible reduction of consumption could result in an increase in well-being (cf. Jackson–Marks 1999, pp. 439–440).

²⁶ In countries where consumer society has not emerged yet (and only the consumption of a narrow elite is similar to the Western patterns) the community may be in cell B.

The nature of possessiveness

Either we look at accumulation occurring at the bottom, physiological level or at the attempt to satisfy higher level needs with material objects, possessiveness (materialism) is a key element of both. It is possible to group interpretations of possessiveness according to value judgement and origin (see Figure 3).

Selfishness and hedonism connected to material objects are dominant attitudes of contemporary capitalistic cultures, suggesting that possessiveness is innate and desirable. Possessiveness is considered to encourage competition and striving, benefiting both the individual and society. Furthermore, it is innate, part of our genetic heritage, as territoriality is a natural tendency in both man and animals. However, as critics point out, such extreme individualism may distort cooperation between individuals. Also there is an ever expanding need for bigger and bigger pleasures, as one easily becomes adapted to any “level of pleasures”.

Figure 3. Relationship to Possessiveness According to Value Judgement and Origin

	<i>Innate</i>	<i>Acquired</i>
<i>Good</i>	Hedonism	Actualization
<i>Bad</i>	Restraint	Reform

Source: Belk 1983, p. 517.

In the second view, in which possessiveness is judged to be a good, acquired trait, acquiring this trait is recommended and seen as realizing a greater portion of human potential. McClelland (1961) regards possessiveness as one of the most important human drives, which develops in the middle of childhood and is a fixated feature of adult personality. The more ambitious people there are in a society, the bigger economic growth it can achieve. This assumption became especially popular after World War II, when the economy of Western Europe and the United States started to develop fast. The advocates of the idea even tried to make the adult population of less developed regions more ambitious, e.g. by holding training courses for would-be entrepreneurs of India (Belk 1983, p. 518, cf. Gilleard 1999, Székelyi–Tardos 1994).

The third view holds that possessiveness is innate but bad, suggesting that we learn to curb our natural impulses. This is the traditional opinion of most

organized religions. Besides religious concerns three things suggest that people may be socialized to reduce their undesirable materialistic impulses. First, children show an increasing ability to delay consumption as they get older. Second, the ability to share material goods also increases with children's age. Third, their wishes shift from material goods and become more abstract.²⁷

According to the fourth view possessiveness is acquired and bad. It suggests that rather than passively acquiring and then curbing these impulses, causes leading to their forming should be eliminated. This could be achieved in two ways, either by converting society into a less competitive one or by enabling people to value intangibles too.

Obviously, if we aim at reducing the impact of society on the natural environment, we have to regard man's excessive possessiveness as undesirable regardless of it being either innate or acquired. Those who are worried about the integrity of natural (and social) environment therefore have to fight the ideological views of hedonism and actualization, shown in Figure 3. I believe that possessiveness is partly innate, partly acquired, that is why I am first going to consider personal characteristics which play an important role in one's happiness then the influence of one's social environment.

Who is happy?—The role of personal traits

In the first century of its history, psychology was concerned with human suffering and dissatisfaction. In the last few decades, however, positive emotions like happiness and satisfaction have also become subjects of research. They are usually measured by a scale of *subjective well-being*²⁸ and their value is determined by questions referring to people's happiness and their satisfaction with life.

The relationship between wealth and happiness can be examined on three levels (see e.g. Myers–Diener 1995, pp. 12–4). First, *are people in wealthy countries happier than those in not-so rich countries?* A survey including 24 countries discovered a relatively strong, +0.67 correlation between the gross

²⁷ Studies about materialism from childhood to old age are reviewed by Belk (1985, pp. 268–70).

²⁸ For further details about the scale of subjective well-being and different theories of happiness, see Diener (1984) and (in Hungarian) Urbán (1995).

national product (GNP) per capita of a country and the satisfaction of its population. Still, one cannot draw considerable conclusions based on the results, as for example the number of continuous years of democracy showed a +0.85 correlation with average life satisfaction (Inglehart 1990).

Second, *within any country are rich individuals happier than poorer ones?* Obviously, having food, shelter and safety is essential for well-being. Therefore, in poor countries, such as Bangladesh and India, satisfaction with one's financial situation is a moderate predictor of subjective well-being (cf. Diener–Diener 1995). But once one is able to fulfil life's necessities, the increase in wealth plays surprisingly little role in subjective well-being. It has to be acknowledged though that in the same country the wealthier tend to be happier on average than the less well-to-do.²⁹ Wealth is rather like health: its lack can result in misery, though having it is no guarantee of happiness. This seems to support Maslow's theory of all other needs being based on the physiological ones.

Third, *over time, do people become happier, as society becomes more affluent?* By the 1990s American's per capita income had doubled compared to 1957 (from less than \$8,000 to more than \$16,000 expressed in the dollar of the 90s³⁰), moreover, they had twice as many cars per person, plus microwave ovens, color TVs, VCRs, air-conditioners and \$12 billion worth of new brand-name athletic shoes a year. Nevertheless, in 1957 35% of them said they were

²⁹ One of the best known studies examining the richest people in the world was conducted by Ed Diener, Jeff Horwitz and Robert A. Emmons (1985). They carried out the research using the 1983 *Forbes* magazine list containing the 400 wealthiest Americans. The sample of 49 subjects was compared to a comparison group of 62 subjects who were selected based on matching by geographical location. The wealthy said they were happy in 77% of their time, for the non-wealthy the rate was 62%. The average of life satisfaction in the wealthy group was 4.77 (on a six-point scale), in the non-wealthy group it was 3.70. This could suggest that money brings happiness. However, in case of the question "How do you feel about how happy you are?" 37% of the wealthy got a lower score than the average of the non-wealthy, while 45% of the non-wealthy reported a higher level of happiness than the mean of the wealthy group ($p < 0.001$). To open-ended questions inquiring the reasons of happiness respondents rarely mentioned money, most often the reason was good family relations, friends, achievements, relationship with God and health (in both groups) although 84% of the wealthy group and 39% of the non-wealthy group emphasized positive aspects of having money. The survey also tested and did not contradict the theory of Maslow (Diener–Horwitz–Emmons 1985).

³⁰ For comparison: per capita GDP in the United States expressed in 1996 dollars was \$12,725 in 1957, \$27,786 in 1993 and \$33,110 in 2000 (see www.EconoMagic.com).

“very happy”, while in 1993 only 32% said the same.³¹ A 1992 survey analyzing other social phenomena resulted in the following findings: since 1960 the number of divorces had doubled, there had been a slight decline in marital happiness of married couples and the teen suicide rate had tripled. It leads us to conclude that Americans became richer but not happier. Research conducted in Europe and Japan has given similar results (cf. Easterlin 1995, pp. 38–40).

Research about the quality of life in countries with annual per capita income of tens of thousands dollars revealed that in spite of more or less continuous increase in GDP/GNP the increase of complex indices of quality of life usually stops after a time or it can even fall. (These indices include, besides material situation, several factors, such as environmental degradation, inequalities of incomes.) Presumably, there is a threshold of wealth above which the quality of people’s life declines (Max-Neef 1995, cf. Daly 1999).

If, however, possessing material goods does not guarantee happiness, then what makes it more likely? According to research happy people tend to have positive self-esteem, feel they have control over their lives, are usually optimistic and extrovert, have several intimate friends, are happily married, have job-satisfaction and are religious (Myers–Diener 1995, pp. 14–7, cf. Kopp–Skrabski–Szedmák 1998). This list does not entail that all these conditions have to be fulfilled for happiness but that people showing these traits more probably believe themselves to be happy. These characteristics are basically immaterial, so psychological studies examining personal happiness seem to prove our prediction that a potential decrease or stagnation in consumption does not necessarily lead to a fall in personal happiness or social well-being in Western countries. It is usually social conditions that determine the influence of change in material goods on personal happiness.

³¹ Andrew J. Oswald thinks the proportion of happy people in the US still grew in the period examined if you take the decreasing number of “*not too happy*” people into consideration. (The questionnaire included the following question: “*Taken all together, how would you say things are these days—would you say that you are very happy, pretty happy, or not too happy?*”) The increase in happiness is so small, however, that according to the author the rise in incomes in America is not contributing substantially to the quality of people’s lives (Oswald 1997, pp. 1817–8).

Who is happy?—The role of social factors

In this subchapter the relationship between material goods and personal happiness is examined from the viewpoint of general social conditions. The subchapter also intends to reveal the reasons of the phenomena described in the previous subchapter (i.e. the constant well-being of a nation despite economic growth). First let us carry out a simple thought experiment. Imagine that a person's income increases substantially while everyone else's stay the same. Would (s)he feel better? Most people would. Then suppose that his/her income stays the same while everyone else's goes up substantially. How would (s)he feel in this case? Most people would feel less well off, though their objective financial situation would not change. It is empirically proved that one's subjective well-being varies directly with one's own income and inversely with the incomes of others (Easterlin 1995, pp. 35–6, cf. Mishan 1993, pp. 73–4).

The amount considered as minimum comfort budget in a society is also relevant from environmental point of view. Several studies have shown that this amount increases at the same rate as actual per capita income, that is, the higher the average income of a country is, the bigger amount people perceive as necessary to get along (Easterlin 1995, p. 41).³²

The rise in average income therefore does not increase the happiness of the society as the influence of increased (personal) income on well-being is offset by the increase in material norms of the society. When the increase in personal income is accompanied by the increase of the standard of living considered decent by society, one's "rise in the world" can only occur when the others fall behind compared to him. As the number of the members of high society (defined as the richest 10,000) is limited, this way of achieving happiness can be interpreted as a strategy to acquire positional goods whose supply is limited under any circumstances.³³ Some will acquire positional goods but a whole community cannot, since the supply of these goods is by nature limited and cannot be increased by economic growth. Consequently, increasing the supply of existing material goods in a relatively rich society is a wrong strategy.

³² The same question was examined on a Hungarian sample by Szabó and Szabó (1994) in the early 1990s as well as Sági (2000) in the late 1990s and their findings do not contradict the above results. Relationship between satisfaction and materialism will be discussed in the following subchapter.

³³ For further details on positional goods see Hirsch (1976). Some economists even speak about the negative external cost of higher consumption. The increased consumption of a person will reduce the satisfaction of others living around him (see e.g. Frank 1991).

Who is happy?—the role of materialist attitudes

According to adaptation theory (Brickman–Campbell 1971, quoted by Richins 1987, p. 353) the relationship between material values and happiness is reversed, because people adapt to the level of satisfaction or comfort they have achieved. When a desired goal is obtained, expectations also increase resulting in a gap between actual state and expectations. This gap is a source of dissatisfaction (French–Rodgers–Cobb 1974, quoted by Richins 1987, p. 353). Juliet Schor calls the difference between desires and reality *aspirational gap*. She thinks, this gap has widened because previously people used to rely on their neighbors—who usually have similar incomes—as a standard and reference group, nowadays they compare themselves to their workplace superiors and the upper middle class of the United States, seen on television all over the world (Schor 1999, pp. 43–6).³⁴ In this way people expecting happiness from possessing material goods may be satisfied for a while but partly due to adaptation partly due to their rising references, dissatisfaction will emerge again and again.

Studies described at the beginning of the chapter, examining materialism, supplied empirical data which support the adaptation theory (e.g. Belk 1985, p. 271, Richins 1987, pp. 354–5). One of the most comprehensive studies was conducted by Richins and Dawson (1992) in a university town of the north-east of the USA (with 86 subjects) and in a north-eastern rural area (119 subjects). The researchers examined five aspects of satisfaction with life: satisfaction with life as a whole, amount of fun, family life, income or standard of living and relationship with friends using a seven-point delighted-terrible response scale described by Andrews and Withey (1976). The correlation between the Richins–Dawson materialism scale (see, p. 28) and the indices of satisfaction was the following: -0.39 for satisfaction with income and -0.34 , -0.32 , -0.31 and -0.17 for satisfaction with fun, life as a whole, friends and family life respectively (Richins–Dawson 1992, p. 313).³⁵ This finding shows a moderately

³⁴ In a study on the same subject, Sági Matild analyzed data from a Hungarian sample of 3,800 subjects collected by TÁRKI in 1999. She concluded the following: “*Dissatisfaction with the standard of living (in the 1990s) was not only a result of objective factors, but it was also due to the fact that the reference point of the Hungarians changed after the political-economic changes. They do not compare their standard of living to the financial-material position of the population of other Eastern European countries any more. Instead, the standard of living in Western European countries has become the main reference point, especially for those on the top of the Hungarian income hierarchy. The fact that when their income increases, people tend to change their reference groups and compare themselves to the ones with higher standard of living largely contributes to the general dissatisfaction.*” (Sági 2000, p. 285)

³⁵ All values are significant at the level of $p < 0.01$.

strong, negative relationship between materialism and satisfaction, that is, the more materialistic the respondent was, the more probably (s)he said (s)he was dissatisfied with several aspects of life.

The same authors conducted a survey on a sample of 235 subjects from the western part of the United States and asked respondents to indicate the level of annual household income required to fulfil their needs. Respondents were divided into terciles based on their materialism scores and the desired income level of the top and bottom terciles were compared. Respondents in the top tercile (the highest in materialism) said they needed an annual income of \$65,974 on average (in the early 1990s), while the bottom tercile needed only \$44,761 yearly (Richins–Dawson 1992, p. 311).³⁶ As the surveys revealed, materialists will probably try to reach a higher level of consumption (and in this way make a bigger impact on the natural environment) but at the same time they will be less satisfied with material aspects (income) as well as immaterial aspects (friends, family life) of life than less materialist people.

The role of values

The spread of the phenomenon previously defined as materialism or possessiveness on a national level may considerably depend on the proportion of people in the society believing in materialistic or nonmaterialistic values. Ronald *Inglehart*, who is a key figure in international research on personal values as well as changes occurring in them, has been studying the subject since 1970. From our point of view it is important to define factors which can help one to exchange his/her material scale of values to a nonmaterial (termed postmaterial by Inglehart) one.

Inglehart has two theories connected to the question. One of them is called *scarcity theory*, according to which people tend to set a higher value on things which are scarce. The other is called *socialization theory*, which suggests that the basic values of a person mainly depend on the financial situation he or she has been brought up in. The two theories can be integrated based on the state of western civilization following World War Two. Young people brought up in exceptional wealth and lasting peace after 1945 set a much lower value on economic and physical security than older generations, who experienced bigger

³⁶ The difference between the two groups is significant at the level of $p < 0.001$ ($t = 3.65$, $df = 120.1$). Another survey also revealed a similar relationship between materialism (assessed by Belk's scale, see p. 1) and the money needed for comfortable living (101 subjects, $r = 0.23$, $p < 0.01$) (Wachtel–Blatt 1990, p. 411).

economic insecurity. On the other hand, people born after the war appreciate immaterial values, such as community life and the quality of life more, as these could become rather scarce in a society focused on economy and wealth.

Several studies following the proposal of the theory supported Inglehart's assertions and today we can analyze substantially long time series (Inglehart 1990, Abramson–Inglehart 1995). From the viewpoint of this study it is especially important that Inglehart's theories suggest that peace and prosperity can naturally contribute to the change of values from material to postmaterial, decreasing the impact on the environment as well as acknowledging the unnecessary of ever-increasing economic growth. On the level of society it can be considered as some kind of a negative feedback. However, it is also probable that overdominant economic interests exploit this change in values for their own benefit (and at the expense of other considerations) by promoting sales with the image of products being able to fulfil nonmaterial needs. The success of this attempt may offset the benevolent environmental and social effects of welfare states becoming postmaterial and may eliminate the natural feedback reinforcing sustainability.³⁷

Outside consumer society's birthplace

Research in the 1980s revealed some unusual ethnographic/anthropological facts, which made researchers consider several questions. E.g. why do Peruvian Indians carry rocks painted to look like transistor radios? Why do some Chinese wear sunglasses with the brand tags still attached? Why have cheap quartz watches become part of the traditional ceremonial wedding outfit in Niger? Why do natives of Papua New Guinea add ties to their collarless necks and substitute brand-name pens for traditional nose bones? Why do Ethiopian tribesmen pay to watch the film "Pluto Tries to Become a Circus Dog" and why

³⁷ There is an apparent contradiction between the findings Inglehart, interested mainly in social and intercultural issues and the findings of research examining the individuals of a certain culture (Belk, Richins), as the former suggests decreasing the latter ones suggest increasing materialism in industrial countries. The contradiction can be resolved theoretically by referring to the distorting effect of the media and advertising on personal values (cf. Richins 1999, pp. 376–7) as discussed in the main text. Jackson and Marks (1999) supplied empirical evidence by analyzing consumption data from Great Britain between 1954 and 1994, that people spend increasingly more money on their immaterial needs but these still remain unfulfilled. This could answer criticism of Maslow's theory (e.g. Belk 1988, p. 116) saying that it mistakenly predicts the decrease in material values of developed Western countries based on the fulfillment of physiological needs.

does the native band play 'The Sound of Music' when a Swazi princess marries a Zulu king?³⁸

The worldwide spread of Western goods has several detrimental effects on traditional cultures. There is often a tendency that demands for cheaper and similar (or higher) quality local products decreases when prominent Western goods appear on the market. In Brazil, with the appearance of Western luxuries and aggressive marketing, household indebtedness increased and people reduced their consumption of necessities, particularly food.³⁹ Furthermore, the bad health consequences of certain goods (like cigarettes or medicines) are not so well-known in developing countries.⁴⁰ Development priorities also change, e.g. building an expensive network of roads for the benefit of a narrow elite subgroup owning automobiles instead of investing in basic welfare. The interpersonal safety net of being able to rely on others is deteriorating and is being replaced by a reliance on things and money (Belk 1988, pp. 117–9). Money increasingly substitutes for people and some governments are urged by the West to offer consumer goods to consumers willing to be sterilized (Freedman 1976, quoted by Belk 1988, p. 120).⁴¹

The excessive spread of consumer society does not seem to be the answer to environmental problems. Even if we disregard these problems and concentrate on society, there are still several other questions about the development of the Third World to answer. Surveys described in the subchapter about the relationship between materialism and happiness revealed that the correlation between these two phenomena is not positive: materialistic attitudes are usually accompanied by higher level of dissatisfaction. The fact that these results are obtained from wealthy, developed countries should not be considered as reassuring since the gap between material dreams and reality in a poor country is even wider, resulting in

³⁸ The examples are quoted from Arnould and Wilk (1984), Curry (1981), Wallendorf and Arnould (1988) and Sherry (1987) by Belk (1988, p. 117).

³⁹ Belk (1988) mentions several examples which prove that hedonic consumption of Western products is even characteristic of the poorest social groups of Third World countries. They often choose Western goods at the expense of satisfying basic needs.

⁴⁰ Silverman (1976) examined how 40 prescription drugs sold by 23 transnational companies were described to doctors. It turned out that in Latin American countries the same drugs were recommended for far more diseases than in the United States, while the contraindications, warnings and potential adverse reactions were not given in as much detail as in the US (quoted by Jenkins 1988, p. 1366).

⁴¹ According to popular slogan economic growth is the best contraceptive. However, some questions remain unasked, says Herman Daly, e.g. is it necessary for per capita consumption to rise to the Swedish level in a developing country for fertility to fall to the Swedish level, and if so what happens to the ecosystem of this country as a result of that level of total consumption? (Daly 1999, pp. 20–1).

bigger dissatisfaction (Belk 1988, p. 121). In this case just the spread of consumer society in the Third World poses a problem apart from difficulties described above. Though it does not answer the reason of spread, it is still remarkable to note that the rapid expansion of major advertising agencies happened in the decade between 1961 and 1971. During this time they established almost five times as many foreign subsidiaries as in the preceding 45 years (UNCTC 1979) and in the Third World more than two-thirds of all advertising agency revenue was controlled by foreign advertising agencies (Chudnovsky 1979, quoted by Jenkins 1988, p. 1366). It seems, it is not only their branded products that Western countries export to the Third World but also their time-honored advertising techniques to create desire for these products.

A series of surveys for comparing the materialism of different cultures based on the international version of Belk's materialism scale (see p. 9) yielded important findings. The respondents were business and MBA students from 13 countries (1729 subjects altogether) (Ger-Belk 1996, pp. 59–60).⁴²

The reliability of the materialism scale (based on the Cronbach alpha reliability coefficient) was higher in Western countries, which made the researchers conclude that the materialism inherent in consumer culture arose in the West and has diffused from the West to other parts of the world. The absolute value of materialism, however, was not so obvious. The Romanian, US, New Zealander and Ukrainian samples proved to be the most materialist, the German, Turkish, Israeli and Thai subjects were moderately materialistic, while the Indian and non-Germanic Western European students scored low in materialism (Ger-Belk 1996, p. 70).⁴³ The authors suggest that the relatively low materialism of India and non-Germanic Western Europe is explained by the stability of these societies, while the high materialism of subjects in post-communist countries may be due to a sudden release from former systematic consumer deprivation. The relatively high level of materialism in Germany and Turkey may also be the result of drastic social changes. "*Social change and accompanying mobility and confusion in norms coupled with the spread of Western influence and globalization seem to impel materialism*", the authors conclude (Ger-Belk 1996, p. 74).

⁴² Though the sample makes it possible to compare the findings, it does not indicate precisely the materialism of the whole nations involved.

⁴³ The statement that, for example, the materialism of Norwegian students is low according to the sample does make sense only in comparison with the other students of the other countries in the sample. The level of materialism that can be regarded as normal in a certain country remains unanswered. From this aspect it is possible that the Norwegian level, which was lower than the American or the Romanian one, in itself is still too high from a social point of view.

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Szilvia Luda

The Role of the Rural Economy in Sustainable Development

I. Theoretical background

I. 1. Unsustainable Economic Growth

The concepts of agriculture and countryside have always been interrelated, and today this tie is becoming closer than ever because of our sustainable development goals. The view of environmental economists of agriculture has been known for more than forty years now, yet there is hardly any sign of the idea of sustainability in the mainstream economy or in rural development. *“The subsistence of the countryside can not be based on a space solely devoted to production, a sustainable rural economy and society can only exist in a countryside that provides for the appropriate biological conditions of life, and ensures the appropriate supply and the safety of food”* (Ángyán, 2003, p. 625).

The countryside needs to provide a living and to create economic value for its inhabitants. From an environmental economist's point of view however, economic value is very important, though still insufficient. It is becoming more and more typical for high-income individuals in developed countries to concentrate too much on economic factors and hence to misinterpret the concept of value. They actually ask themselves the question how much money or material goods they could make in the time they devote to non-economic activities like socializing with their neighbours, raising their kids or doing housework. Their time has become far too valuable in economic terms. Giving up the income they could make in one hour appears to be too much of a sacrifice compared to what they are able to gain from the “other side”. The extent to which we devote our physical energy to obtaining material goals is proportional to the extent to which our sensitivity to other kinds of benefits diminishes. Our interest in friendships, arts, natural beauty, religion and philosophy is fading away. *“If someone's time is becoming more valuable, it will be less and less rational for them to spend their time on anything but earning money or spending money in a conspicuous way”* (Stephen Lindner, 1970, p. 72). This is why many think that more must probably be better, as well. Yet life is hardly linear. What is benefi-

cial in small quantities often becomes harmful in large doses. *“People are happy not because of what they do, but because of how they do it”* (Csíkszentmihályi, 1990, p. 45) cited by Sándor Kerekes (Kerekes, 2011). Prosperity comes from frugality and not from exaggeration. The values of frugality and economy are important to the members of a sustainable society. Frugality above all – said the Greeks. *“Without frugality, there is no law, no order, no morale and no knowledge”* (Hamvas, 1996, p. 5). In a philosophical sense, *“values are not directly identical with the immanent internal characteristics of things (objects, persons, relationships, activities etc.), they are intellectual objectivations expressing the qualities people have recognized in things or attributed to them”* (Váriné Szilágyi, 1987, p. 19).

It is clearly recognised in the draft of the new National Sustainable Development Strategy, which – quite surprisingly, given the political nature of the document – formulates the sense of a “meaningful life” as being the following: *“Key factors to success are endurance, resourcefulness, innovation skills and empathy towards those to whom our economic activities are addressed – and not tax evasion, corruption or free-riding. Savings, adding to one’s wealth are more important than consumption; enjoying what you already have is more important than acquiring something new”* (NFFS, 2011, p. 4).

I. 2. Basic Characteristics of Country Life

According to a German piece of research (Duenckmann, 2010) rural inhabitants can be divided into three groups based on, what they think about the countryside. The first group has an “idyllic view” of the countryside. This is where “green” city leaders and politicians belong. After the day’s work, most of them return to their small, beautiful, quiet villages, to the suburban towns which we nowadays call sleeping towns. The second group (“reform-oriented view”) features those open to new initiatives and reforms, to organic farming. Those in the third group (“anti-conservationist view”), however, believe intensive agriculture to be the one and only hope for the countryside.

All over Europe, the proportion of elderly people is higher and that of the youth is lower in the countryside. Newcomers to rural areas do not usually come from the same region. An interesting fact about employment is that the proportion of self-employed people (private entrepreneurs) is much higher in true rural areas and significantly lower in urban areas.

A large number of urban employees work in the financial and business services sectors, while these professions can hardly be found outside urban regions. It seems strange, however, that the proportion of managers and senior officials is above the statistical average that one would predict to be living in the countryside. Some of the senior managers can afford to work in a big city but live in a village. Which, in turn, leads to a contradiction: income is not generated in the countryside and it is not spent there, either. They live in the countryside but that is not where they make a living, which also means that their taxes go somewhere else. A major share of the income of rural regions comes from external sources.

Concerning development strategies, an exciting question is why a given township might become a tourist destination. It might not be the best choice, for instance, to locate the hotel in the city – even though that is what the majority of cities want. In a holistic approach, a countryside town, maybe a village, that has some tourist appeal might count as a more suitable location. This could be an important consideration in evaluating development alternatives. It is a strange paradox that food products (vegetables, fruits etc.) are often brought back to the countryside from “outside” – either because they are not produced locally or the supply chain does not allow for the local sale of locally produced food items.

As we all know, a transport project may change the situation of rural areas dramatically. Transport developments do not necessarily improve employment locally, as it might very well happen that people convert to working (and maybe even shopping) somewhere else. Infrastructural developments could eventually lead to the abandonment of villages. A radical increase in the prices of public utilities may also have a similar effect (Kerekes, 2003).

By now, the processes of urban-based globalization have made villages extremely vulnerable to these very same processes. The links of country people – even those living relatively far away from the city – to the cities are getting stronger and more numerous, thus they live an increasingly urban way of life, and demand a matching standard of living. Through the development of the local economy, we need to create opportunities for country people to live a more comfortable life, not to be citizens of “second order” (Kajner, 2010).

It is a common experience that, even though rural development is focused on villages, it is exactly abandoned villages which they try to develop through various tenders – with not much of a success. City and village should be thought of as one region. They should be treated holistically, for that is the way of think-

ing that could bring us closer to meeting the conditions of sustainability. Sustainability is characterized by an integrative approach. There shall be no individual, special development strategy for the countryside but it should rather be developed holistically, along with the nearby city.

Newly-announced government plans aim at re-establishing districts (“járás”), which is indeed an effort to strengthen holistic logic. Up to this point, the intermediate link, formerly represented by the districts, was missing. On a district level, everything is within 30 kilometres, which is, in the automobile age, exactly the distance that anyone can put up with. Development initiatives, the main point of which is the “boosting” of one village at the expense of strangling another, must not be supported. Development is to be executed in an integrated manner, such that each settlement can gain from it, for this is the way how common benefit can be maximized.

I. 3. Sustainable Regionalism

Both international and Hungarian scientists agree that the preconditions for achieving sustainability are: local production and consumption needs to be promoted; ecological farming practices must be followed; renewable energy sources are to be utilized; economization is a must in all fields; as many people as possible must convert to vegetarianism. These measures pave the way for sustainability (Kun, 2009). As Sándor Kerekes put it: *“Anyone could limit their consumption without their quality of life deteriorating, if we lived a life like that of our grandparents, ate less meat and used our muscles for work, as well. Thereby, a significant amount of energy could be saved, and we would also be healthier. People who dig up their backyard in the springtime, and produce vegetables or raise animals spend their spare time in a more sensible way than those who just glare at the TV screen to get to know that Tesco is the cheapest. For those unable to ‘sell’ their free time it is needless to consider whether they are better off producing their own vegetables in the garden or buying them at Tesco”* (Kerekes, 2008, p. 33).

“Research into the growth of agricultural farms may be important not only for agricultural economists but for decision makers, too, as the sector’s decreasing contribution to GDP, the growing pressure for concentration, and the need to increase turnover all act to force small-scale individual farmers to increase their scales of production, maybe to supplement their income from out-

side the agricultural sector or, in an extreme scenario, to give up their activities altogether” (Bakucs & Fertő, 2008, p. 26).

According to the Nobel Prize winner scientist, Amartya Sen, new alternative models could emerge – instead of the idea of endless growth – that would be based on wise self-restriction, that would try to harmonize corporate and individual interests, as today’s society is governed by self-interest to a far too great extent. As aptly formulated by the academic György Enyedi: *“Self-sacrifice is only a trait of mothers – not economic competitors”* (Bod, 2007).

The main priorities of the EU for the planning and budget period 2007-2013 include improving the quality of life in rural areas and encouraging the diversification of the rural economy. The research of Bálint Csatári highlights the problem of the Hungarian countryside – which is that it did not methodically go through the “development stages” (1. common agricultural policy, heavily subsidized towards the interests of the rural areas; 2. conscious development of rural agriculture, improving accessibility; 3. the revaluation of the natural-ecological-scenic values of the countryside; 4. sustainable rural development, rehabilitation of communities, improving rural-urban relationships) that could have led to the new European rural development visions being realized in their full scope and extent (Csatári, 2006). Rural development in Hungary must, even if at an “increased pace”, go through these stages. To the question what the new Hungarian rural development policy should look like, Bálint Csatári provides a rather concise answer: *“integrated, built upon successful inter-ministerial cooperation; sustainable and ensure the preservation of natural, ecological resources; provide delicious and safe food, pursuing both modern, marketable agriculture and eco-social farming; built upon regional partnership, ensuring good accessibility and employment on a micro-regional level through urban-rural relationships; human-centred, gentle, friendly, just like the countryside is in reality, and just like the countryside that the residents and the visitors desire”* (Csatári, 2006, p. 3).

This is easier said than done, obviously, yet one must agree that however difficult it might be to comply with Csatári's principles in practice, compliance should still be set as an objective at least.

I. 4. Sustainability Innovations Aimed at the Preservation of the “Countryside”

The majority of sustainable development experts agree that, even though eco-efficiency usually positively correlates with economies of scale, globalization tends to have a negative effect on the state of the environment, as opposed to the positive impact of the appearance of self-sufficient micro-regions. From amongst all types of micro-regions, rural areas are of special significance. The expression “rural area” stands for a stretch of inland (in a broad sense) or coastal countryside where the agricultural and non-agricultural parts – including small towns and villages – form a whole both in economic and social terms, where the concentration of population and that of the economic, social and cultural structures is significantly lower than in urban areas and where the main part of the area is used for agriculture, forestry, natural reserves and recreation purposes (European Charter for Rural Areas, 1996).

The “countryside” fulfils a number of environmental functions without which the healthy existence of human societies would hardly be possible. The preservation of cultural heritage is not the only reason why the existence of the countryside is crucial. The “countryside” also creates economic and social patterns which might facilitate the recognition, and potentially, the healing of anomalies in the development of the global economy. The analogy might seem a bit far-fetched, but still, the “countryside” can be envisioned as being like the stem-cells of the human body, which not only preserve the individual’s genetic information in its immaculate form but they are also able to regenerate “defective” cells that were produced using damaged code. Of course, in order to fulfil its above-mentioned functions, the countryside must remain “viable” and intact – as is the case with stem-cells. Thousands of years of European history evince European societies’ ability to renew and, maybe, we can also state that, although countries’ capital change over time, rural areas often contributed decisively to the new beginning by becoming the initiators of development through some kind of “innovation”.

Studies into sustainable development devote special attention to rural lifestyles and the development of the countryside. International literature includes a large number of case studies that report rural development experiences which, either intentionally or as a favourable side-effect, also foster the realization of sustainable development objectives.

Below follows a literature-based review of a couple of such cases, the lessons from which could be of practical use in Hungary, as well. According to the literature, social support and the existence of a clear “guiding vision” have a crucial role in the success of rural development strategies. Lately, renewable energies have started to become such a vision in a number of regions. Philipp Späth and Harald Rohrer (Späth and Rohrer, 2010) demonstrate the necessity of such a “vision” in successful development programs in the example of Mura, among others; and earlier, the current author also reported favourable experiences in Hungary, using Szedres as an example (Luda, 2009).

I. 5. Interpreting the Concepts 'Rural' and 'Urban'

The context of sustainable development provides for a new interpretation of the urban / rural categorization. Partly because people in rural areas do not necessarily have to make a living out of agriculture anymore and the service sector has also grown in importance in rural areas. Concerning the population, two trends exist. There are people who live in the countryside and strive to move into a city (urbanization) and there are some who want to leave the city for the outskirts, or for some suburban town. The last couple of decades have witnessed an interesting phenomenon: a significant outflow of people from the big cities to smaller rural areas has started, which has brought about radical changes in rural life and caused various conflicts. According to research conducted in the German city of Panten, located 40 kilometres from Hamburg (Duenckmann, 2010), those who “flee” the cities and settle in villages – so-called newcomers – significantly alter the traditional village structure through their differing cultural and social values. Klára Hajnal (2006) has suggested that “*spatial reorganization and concentration, and the related changes in occupation and lifestyles are taking place so rapidly that seemingly unmanageable conflicts appear between the emptying and structurally distorted rural areas and the overcrowded urban areas*” (Hajnal, 2006, p. 13).

Recently, people have begun, once again, to realize the significance of the country-city relationship – both in Europe and in North America. Even Michael Porter (2004), the world-renowned professor at Harvard Business School, underlined in his article that rural areas now play a greater role in the competitiveness of countries. The performance of rural regions is lagging behind, and the gap between the performance of the cities and the countryside seems to be widening as well. This has triggered a serious response from the US government

which has set aside billions of dollars in its budget for the revival of rural areas (Porter, 2004).

The distinction between rural and urban areas has for long been subject to significant debate in the literature, even though the two concepts, city and countryside, can only be interpreted in context of their relation to each other. Defining and distinguishing between them is problematic everywhere. There is a debate going on in the United Kingdom, as well (just like anywhere else in the world), as to where the boundaries between city and countryside should be placed (Midgley, Ward & Atterton, 2005). One has to ask: is there such a thing as a purely urban life at all? Or a purely rural existence? The reason why the theoretical dispute over the city/countryside dilemma is of interest to us is that it has an influence on the roles and the system of relations between the regions, and their interdependence.

Laura Szabó (1999) mentions several problems related to the “urbanization” of villages: *“(1) The concepts of village and city represent two differing qualities, out of which one, the village in its traditional sense, seems to be disappearing with the appearance of typically urban lifestyle elements. Villages get distorted during their urban-based and urban-direction modernization, as they lose a significant portion of their traditional functions and values, which, however, does not necessarily mean they achieve the city-quality. (2) Because of the differing quality, it is the negative aspects of the urban elements and the distortion-related drawbacks that prevail primarily, while the benefits of urban life hardly ever appear or do so in a distorted form. (3) Following the regime change, villages on the periphery became the targets of the underprivileged population ‘fleeing’ the cities. The aged, disintegrating communities are often helpless against the subculture of the newcomers, therefore the previously typically urban process of ghettoization is starting to conquer the villages, as well. A fundamental problem of today’s villages is the disintegration and erosion of the once active local communities, historically linked to the village as a quality; which is a key issue among others because communities are the most important resource, the capital of villages, one of the main guarantees for their viability”* (Szabó, 1999, p. 170). Researchers in the UK have for long been working on a new method for the categorization of regions based on their functionality; that is the purpose they serve. Jane Midgley, Neil Ward and Jane Atterton (2005) distinguish between three types of geographical areas. The first group includes regions that have a definite purpose, so-called ‘functional urban regions’. The second consists of ‘daily urban’ systems, while the third comprises ‘local labour market areas’ (Midgley, Ward & Atterton, 2005, p. 2).

The “city-region” theory has become widely known during the last five years and it is very popular among officials and politicians dealing with the development of cities and regions. The practicability of the “city-region” concept has been confirmed by experience from the northern territories of the UK, where it was adopted as the basis of their growth strategy.

I. 6. The Basic Types of Rural-Urban Relationship

Midgley, Ward & Atterton (2005, p. 3) found three types of rural-urban relationship that have a role in the growth strategy of Northern England.

“Separable Rural Periphery”, the first type, is a relatively large rural periphery at a relatively large distance from the cities. Consequently, these areas might as well have their own separate rural development strategy. In the vicinity of the “Separable Rural Periphery”, there is no city that could influence the development of the “countryside”. Such areas can be found in Northern England, and obviously, there must be some in Hungary, as well. In Hungary, it is mainly in the northeast and on the Great Plain where we can find areas without any significant city nearby, which could affect the rural area.

The second type, the “Interdependent Rural Periphery”, is characterized by having a couple of large cities scattered throughout the rural areas, yet lacking a clear indication of which city’s catchment area the region belongs to. Influence, in this case, lies with more than one city, thus relationships and dependencies are far stronger and more complex. It is the proximity of large cities that determines the environment and also the lives of rural inhabitants. The authors cited two British city regions as examples: Tyne & Wear and Tees Valley.

The third type to be found in the UK is the “Urban-Rural Mosaic”, characteristic of the southern parts of the Yorkshire and Humber region. Rural areas are situated so close to urban centres that they practically overlap, thus any one of the rural areas is part of several cities’ labour markets. Urban and rural regions tend to overlap and blend in a mosaic pattern.

These three categories could be distinguished in the more or less organically developing North of England, yet none of them exists in Hungary in such a pure form. This categorization, however, can still contribute to our line of thought insofar as we can examine how and why the situation in Hungary is different. Here, it is the rural territories in the catchment areas of Nyíregyháza, Miskolc,

and Debrecen that might qualify as Interdependent Rural Peripheries. These neighbouring urban centres have been traditionally competing with each other for a multitude of reasons due to historical tradition (for instance Nyíregyháza was located close to the sometime Soviet markets, Miskolc was what you could call “A Socialist City” and Debrecen was inhabited by relatively conservative voters). Similar examples are the Transdanubian cities Pécs, Kaposvár and Komló, and Kőszeg and Szombathely. These cities are each other’s competitors regarding both adjustment opportunities and the distribution of EU funding sources.

The Urban-Rural Mosaic type of region is quite rare in today’s Hungary, even though it was very typical for the pre-Trianon structure of the country. For example, Kolozsvár, Nagyvárad, and Szeged might have been such areas in that time, yet later they became separated by a historical border. Now that national borders have practically disappeared within the EU, an interesting question is whether a transition (in an economic sense – labour market, movement of goods and services) will start in the format that the British researchers have described, or whether the political and language boundaries will prevent the evolution of such an organic structure (Kovács, 1989). The Danube separates one Komárom from the other, and Győr and Pozsony might also belong to the third category. Two decades after the regime change, it is already nothing unusual that people from Komárno (Slovakia) have a job in Komárom (Hungary), and some Slovaks even move to live in Hungary. Slovaks often buy plots of land in Hungary because the catchment area of Bratislava extends well over the border and land prices are lower there.

The reason why the British example is interesting from a scientific point of view is that the organic development of the regions was not disturbed by history, that there was no artificial separation. After the Schengen Agreement eliminated the artificial separation (where political boundaries were drawn up to artificially divide what had once been an organic entity), the movement the authors discussed based on UK experience has recommended.

The so-called city regions and rural areas altogether might be developed in two ways. Rural areas within a given region might be developed through separate programs and initiatives aimed at reducing the differences between urban and rural areas. If we strengthen the isolation of rural areas and fail to develop urban-rural relationships through well-focused programs, then the development of these rural areas will have no link to the cities and thus might even lead to an increased degree of separation. Obviously, the other alternative is to regard rural

areas as the subject of an integrated and far more comprehensive and holistic form of regional development, which focuses on the bonds between rural and urban areas. In that case, one has to find those development opportunities which maximize common benefits for both (rural and urban) areas. The city and the countryside need to be treated as a whole, in an integrated, holistic way. They need development projects where both the city and the countryside can perform at their maximum. Instead of creating separate rural development programs, they accept existing links and implement integrated development strategies.

Naturally enough, the various ideas are in competition with each other in Hungary as well. Environmentalists love to talk about the importance of the population-retaining ability of the countryside and of the preservation of rural lifestyles. Consequently, many would prefer that each service (school, nursery school, post office, hairdresser etc.) remain available in all townships. Others, on the contrary, suggest that a country child may only have a fair chance if they attend a school that is good enough to make them competitive in the education 'market' and, later on, in the labour market. Accordingly, rural development should focus on smaller units, so-called districts ("járás" in Hungarian), characterized by analogy in terms of size or function, where both the countryside and the city have their own specific roles ("niches"). One might also establish a good education system by locating a school of appropriate qualities in one of the larger villages (whichever the communities can most easily access), while another township hosts the health care centre and a third one provides some other service. If it has, for instance, favourable natural endowments (spectacular scenery, is well-suited for excursions etc.) then it will be home to restaurants and entertainment facilities. The main point is not trying to establish everything everywhere, as that will most probably use up all the resources.

The rethinking of rural development is inevitable, as if all projects focus on cities because of economies of scale, this will lead to villages being abandoned and slowly dying away.

One of the mistakes present in the majority of Hungarian ecological experiments was that all of them preferred the first model ("Separate Rural Periphery") and did not want the countryside to change. They wanted it to remain as it used to be long ago. People should, as far as possible, live, work, earn a living, become self-sufficient and self-supporting in the very same place as where they were born. Such initiatives, however, only represent an alternative to those fed up with today's busy lifestyles (city people, that is), while they are totally unac-

ceptable to many of the youth who live in the countryside, who would very much like to have a taste of what is meant by teeming city life.

In his comprehensive summary, András Szabó (2006) points out the most significant problems and paints a justifiably pessimistic picture of the future: *“Globalization-based modernization represents a cruel trap for villages, as they are being forced to compete – and fight a battle in a field that is uneven anyway – while losing their most important strength at the very same time. By now, the once – maybe out of necessity, but still – primarily self-sufficient, self-helping, self-organized and efficiency-driven communities have been replaced by groups of disillusioned, desperate, demoralized and (sometimes extremely) mistrustful individuals, who remain untouched by and sceptical of any potential opportunities that might present themselves. The disintegration of communities inherently means individualization and an increased degree of individual freedom, yet it causes a loss of identity, as well. Today, even the problems of the atomized, underprivileged village communities are being discussed on the level of the individual, on the level of human resources, even though trying to manage this moral and social crisis at the individual level is as good as hopeless, as it is nothing else but the community that can create morale and social conditions”* (A. Szabó, 2006, p. 62).

Each and every idea born with sustainability in one’s mind is worth of respect. Yet those formulating such sustainability theories usually live in big cities and imagine countryside life as being an idyllic form of human existence.

Cloke et al. set out to understand what the power of people’s idyllic picture of the countryside derives from. Is this idyllic vision universal or are there differences between different people’s idyllic pictures? What would a realistic picture of rural life look like? Are we able to find in the depths of the countryside idyll the universal needs of the human race, like the need for attachment to a piece of land, to nature and to a community (Cloke, 2003, p. 15)?

In most of the cases, there is an emotional motive in the background, a kind of nostalgia, which acts to suppress reality: a harsh rural way of life intentionally left behind during the era of industrialization.

I. 7. Regional Innovation Systems and Sustainability

Back in the 80's, theories which addressed the revival of the countryside usually centred on technology. They all started out from the issue that the most significant problem of rural areas is a lack of appropriate economic foundations and the resulting lack of appropriate experts. In the beginning of the nineties, after the Brundtland definition of Sustainable Development came out (Brundtland Report, 1987), everything that businesses had believed about innovation changed in the countryside. Consequently, they started to integrate all social and individual knowledge that seemed to be potentially useful in the region. This was also acknowledged in the various EU programs which set social, economic and ecological targets in rural development projects instead of taking a technology-centred approach. While innovation, earlier, had been narrowed down to technical content, they then started to realize that the innovativity of rural areas could only be achieved through integrated thinking and that focusing on a single element only (e.g. the economy or technology) would not yield the desired results. As Géza Molnár reasoned in their 2010 piece of research on Erkecse Ltd, "the country and its natural systems become visible only if we have an understanding of how the system works, and of the essence and the direction of its processes. Approaching a natural system or a country from the individual perspective or from its elements constitutes a very serious methodological mistake. That perspective, namely, will not help us understand either the individual's behaviour or the operation of the system" (Molnár G., 2010, p. 6). It is a fact that the countryside is both less attractive and less of a 'performer' in economic terms. Because of weak regional economies, there are no jobs for highly qualified employees, the mobility of the workforce is low and, consequently, the region's attractivity is less which again leads to a lack of qualification opportunities. This results in a hard-to-break vicious circle. By analyzing the strengths and weaknesses of a region, one can discover the opportunities that may facilitate the development of the area (Gerstlberger, 2004, p. 749).

Researchers (Danielzyk et al. (1998) in Gerstlberger, 2004, p. 750) who have recently been studying regional innovation in relation to sustainable development usually take it for granted that so-called regional innovation systems, being focused on sustainability, indeed open up new opportunities for regional development and do actually differ from what has been experienced so far. It is very interesting that, as far as sustainable development is concerned, knowledge transfer is the rare exception and not the rule throughout the entire European Union. The success stories described in relevant case studies, however, feature an incredibly high number of rare and favourable coincidences. It is coincidence

rather than efforts that decide whether a project turns out to be successful. What represents a new direction in rural policy is the recognition that, in the future, learning opportunities related to sustainable development will need to be implemented in regional innovation systems, the focal elements of which are planning and the transfer of knowledge related to the enterprise.

I. 8. Central Elements of Regional Innovation Systems

The four central elements of regional innovation systems are: “concrete public components”, “concrete private components”, “concrete public-private components”, and the “various individual policies as abstract components”. The balanced presence of these four central groups of elements in addition to the social, ecological, and economic aspects of sustainable development – to be taken into account as equivalents – changes the picture considerably, and even “normal”, average regions can create international success stories. Previously, success always originated from some special capacity and the favourable coincidence of special circumstances. The couple of success stories resulting from such favourable constellations of random factors were then considered exemplary with regard to regional development and the adjustment of depressed regions; – that is, rural policy makers became blinded by illusions (Majer, 1997; Braczyk et al., 1998; Fritsch, 1999, in: Gerstlberger, 2004, p. 750).

In this new approach, regions and projects can be evaluated along the following four dimensions. First, the operation and the value creation of the region are characterized by the material flows which, in a so-called normal region, join the RIS (regional innovation systems) components: the social, ecological and economic aspects of sustainable development. The balance of employment (second dimension) is directly related to innovation, while the balanced development of infrastructure (third factor) is in indirect relation with it. The latter factor includes considerations like existing infrastructure deficiencies (including communication and financial infrastructure) or the extent to which various social institutions (schools, preschools, nurseries, health centres, theatres etc.) are present. The fourth aspect is the quality of regional knowledge transfer as perceived by consumers. What do enterprises, as customers, think about the quality of the transfer of economic, ecological and social knowledge (education, training opportunities)? In which ways can people acquire knowledge?

According to Holzinger (1999), and Hübner and Nill (2001), the idea of sustainable development, to be applied in the creation of sustainable regional inno-

vation systems, can be backed by a number of different theoretical concepts. The five main types are: philosophy-driven theories (St. Gallen approach), the ones driven by discussion (Munich approach), the ones driven by the “promoter” (micropolitical approach), exchange-driven concepts (network approach) and information-driven development theories (Karlsruhe approach) (Holzinger, 1999; Hübner and Nill, 2001; Hübner, 2002) in (Gerstlberger, 2004, p. 751).

It is the combination of these five types of theories that may make an innovation process, a regional innovation system successful. The St. Gallen approach consists of the normative models of business management. The Munich approach is centred on the basic paradigms. The organizational and content-tracking activities of the promoter are the determinants of the micropolitical approach. The Karlsruhe approach is dominated by internal and external information exchange, while the network approach is built upon internal and external organizational cooperation. The presence of success factors, just as well as central success criteria, should be evaluated from the point of view of regional innovation systems. Both success criteria and success factors (factors explaining the outcome) can be considered as being related to any of the five theories mentioned above. Which is exactly the analysis, Gerstlberger (2004) performed and summarized in Table 2.

Table 1 Individual hypotheses for sustainable RIS design

Central success criteria (What can be assessed as SD success in RIS?)	(1)	(2)	(3)	(4)
Success factors (Whereby can SD success in RIS be explained?)	Importance of regional material cycles for operational economy and regional value creation	Balanced employment situation	Balanced development of infrastructure areas with indirect relation to innovation	Quality of regional knowledge transfer from the customers' (enterprises) point of view
Binding effect of explicit normative vision	Positive correlation between the binding effect of the vision and sustainable RIS design (<i>Individual hypothesis 1</i>)			
Density of RIS discourses	Positive correlation between density of institutionalized fora and sustainable RIS design (<i>Individual hypothesis 2</i>)			
Enlistment of RIS promoters	Positive correlation between intensity of promoter activity and sustainable RIS design (<i>Individual hypothesis 3</i>)			
Intensity of RIS exchange of information	Positive correlation between intensity of "classic" technology transfer and sustainable RIS design (<i>Individual hypothesis 4</i>)			
Intensity of inter-organizational cooperation	Positive correlation between intensity of inter-organizational cooperation networks and sustainable RIS design (<i>Individual hypothesis 5</i>)			
Cumulative effect (individual hypotheses 1 to 5)	The success factors for sustainable RIS design, visions, discourses, promoters, exchange of information and networking are mutually strengthening each other in a positive sense (<i>Individual hypothesis 6</i>)			

Source: Gerstlberger (2004).

I. 9. Community Supported Agriculture

I. 9.1. The Role of Social Enterprises

In his article, Christos Zografos (Zografos, 2007) explains the important role social enterprises have in the revitalization of the countryside. A social enterprise is a business enterprise that does not primarily aim at maximizing shareholder revenue, but rather at reinvesting income to achieve societal objectives

that facilitate the revitalization of rural communities. Social enterprises improve employment and by paying taxes; they also contribute to the income of communities. The development trusts mentioned in the article are good examples for this kind of business. Rural development is, in its state-of-the-art interpretation, *“a process that strengthens local human and community resources, local government, entrepreneurial culture, innovation or simply the ability of people to purposefully and efficiently cooperate with each other”* (Jenkins, 2000, in Bodorkós, 2010).

In the developed West (for example in Scotland), efforts aimed at the strengthening, the improving of rural life are very numerous. Still, rural communities have to cope with the low number of new enterprises, low incomes, an aging population and the vulnerability of the natural environment (Edwards, 2005).

In the United Kingdom, social enterprises have a very special role in everyday practice. These social enterprises are basically different from the type of employment we are trying to promote in the rural areas of Hungary. They do not represent a form of public service – they are companies, which are profitable, earn an income and pay taxes on their income. Instead of the highest possible shareholder dividend, their primary goal is of a rather public nature: revitalizing the countryside.

A low number of new enterprises, low incomes, an aging population and a vulnerable natural environment are all characteristic of Hungary, as well. And there is one more condition putting a heavy burden on this very country: a significant part of the population has been forced out of the labour market. Sometimes there is a lack of work even for those who could otherwise be employed. In Hungary, a number of rural settlements have resorted to public service programs in an effort to bring back to the labour market those living on the peripheries of society and economy, also thereby increasing employment prospects.

Social employment and social enterprise are two different matters, yet a move from the former towards the latter (that is, the birth of enterprises which serve local goals and interests, yet are governed by business principles) might represent a potential development path for Hungary. Even though subsidies once labelled 'social allowances' are now distributed as wages (the wages of those in social employment), the assumption is that these enterprises earn their own incomes does not necessarily hold – as for the most part, what they do is provide public services (e.g. cleaning and building canals and ditches, draining

inland inundations etc.). Enterprises of this type are organized by the state or local municipalities.

In Scotland, such projects most frequently aim at making some use of abandoned military bases or other infrastructural objects in one way or another. They have a multitude of renewable energy projects. They are planting community woodlands. They are cleaning up the areas that provide the natural environment for the community. They are creating public green spaces that the community can benefit from. The community-level benefits of social enterprises are indisputable.

According to the so-called reformist view, social enterprises simply constitute an extension of a pre-existing system, the main point of which is that the government withdraws from certain areas where it would like civil initiatives to take over. They want to privatize public tasks. The government simply expands their system of institutions, withdraws from some of its traditional areas of public tasks (like looking after the green spaces in a village, planting public forests, school maintenance, etc.).

However, there is a far more radical interpretation to social enterprise, too, which reckons that institutions are an alternative vision to the desirable way of operating the economy and taking care of local matters. It suggests that the economy should be operated according to an entirely different logic – one serving the welfare of the community. A new foundation needs to be created for the entire economy. The new principles are centred around cooperation. Cooperative economic relationships ensure both the operation of local institutions and the fulfilment of sustainable development goals. Social enterprises are the means by which this can be achieved. Both in academic circles and within the organizations (the development trusts) themselves, debate continues about their role, about the expectations of the various stakeholders.

The diversity of rural life has been discussed by a number of different researchers. Relevant literature (Frouws, 1998) differentiates between three basic groups: agri-ruralists (those farming the land), utilitarianists and hedonists. For some, the countryside means agriculture; for others, it represents something that has utility (because they actually benefit from it), and there are the hedonists, as well, who just want to enjoy the slow rural way of life.

I. 9.2. Food Production Based on Social Participation

The delivery of agricultural product from the farms to the consumer has a very well developed scientific and infrastructural background. In today's globalized world, logistics networks and retail systems have been specialized to perform this very function. Growing competition was first seen in the retail sector, and the response was the heavy concentration of capital and the formation of large-unit (super- and hypermarkets) international retail chains. As a consequence, some 60 to 80 percent of total food sales in the developed parts of the world are controlled by a handful of huge retail organizations (Buday-Sántha, 2004).

During the last couple of decades, Hungarian agriculture has suffered a loss of diversity with the disappearance of small family farms, and their replacement by large-scale agricultural operations, by industrial monocultures. *“Until 1961, when the organization of cooperatives was concluded, the larger part of our total agricultural output had come from small-scale producers (crofts, auxiliary and individual farms). Afterwards, large-scale farming operations became dominant; state-owned and cooperative farms had the double of the one third share of small producers in gross production value”* (Molnár, 2000). In his doctoral thesis, Mihály Ivitz argued for small plot farms, which, even though their efficiency has been questioned by many (*“sounding the death knell for small plot farms”*), still constitute the majority of farms in a number of countries around the world. According to him, *“small plot farms offer the opportunity for a type of farming that is efficient and productive, and even environmentally friendly, which fact needs to be declared to the public by all possible means”* (Ivitz, 2004).

Each element of the agrarian sector – agriculture, food industry, food retail, consumption – is a separate field in itself, even though there is a greater need for a new approach, for the comprehensive treatment of problems. It is not only the direction and the speed that have to be adjusted – our fundamental ideas need to be changed. Considering the development levels of environmentalism (Shnitzer, 1999), we have certainly reached the point where the re-construction of all the processes is inevitable, where radical changes are a must. Finally, we have begun to question whether we really need the lifestyles and the economy we are living in now, whether we could not live in another way (Csutora & Kerekes, 2004).

To make a distinction between industrialized agriculture and local production-based agriculture, US literature originally denoted the latter one using the

term ‘New Agriculture’. Almost simultaneously, however, they also started to use the very same term for GMO-based agriculture. Therefore Thomas A. Lyson introduced a new concept: “Civic Agriculture”. Civic, socially-based agriculture and food production offer an alternative solution to the need for change (Lyson, 2004). Modern agricultural activities are very closely related to the social and economic development of communities. We are witnesses to a new and innovative tendency in production and processing that will rejuvenate local agriculture and food production. It constitutes a socially, economically and environmentally sustainable alternative to the destructive practices that have become a feature of conventional agriculture. This not only has a significant role in satisfying consumer demand (fresh, safe and locally produced foodstuffs), but also creates jobs, strengthens the entrepreneurial spirit and solidifies the identity of the community. It is a real alternative to agribusiness-ruled consumer markets.

The origins of the idea date back far into the past. Having examined three American cities, Wright Mills and Melville Ulmer concluded that people living in cities, relying on local ownership and small enterprises, have a better life than the residents of cities with large corporations but without local owners. The findings of this survey – concluded right after World War II – were presented in an article entitled “Small Business and Civic Welfare” (Lyson, 2004, p. 64). Interestingly enough, their conclusions seem to have remained valid all these years, even for Hungary, especially if welfare is interpreted in a broad sense.

Such positive examples are the practical implementations of Community Supported Agriculture (CSA); in Europe and in Japan, experience dates back as far as the sixties. Japanese women joined forces in order to be able to buy fresh and healthy food products directly from the producers. They were in direct contact with nearby farmers. This system, known as “teiken” (or “food with the face of the producer”) resulted in contact that was beneficial for both parties and reduced the distance between agricultural production and food consumption to a minimum. The theory and the approach of CSA are based on cooperation, for it is a framework where – in contrast to traditional economic ideas – the buyer and the seller are not adversaries (Milánkovics & Matthew, 2002). CSA is an alternative to competition-oriented agriculture (Zsolnai & Podmaniczky, 2010). In North America, the foundations of the CSA movement were laid by the Swiss Jan Vander Tuin in the middle of the 1980s. Among the CSA pioneers were the farm of Robyn Van En (Indian Lane) in Massachusetts and the Temple-Wilton community farm of Trauger Groh in New Hampshire. They established harvest shares. A lady from New York reported with enthusiasm that for her and for her

starving twin-sibling, their CSA work meant an opportunity to become part of a community with a direct relationship with the Earth (Adam, 2006).

According to the definition of the United States Department of Agriculture, CSA is a community of people who are committed to supporting, both legally and spiritually, food production on the community farm. Share-holding members cover (in advance) the costs of the farm's operation, and they receive additional shares in return. Producers and consumers mutually support each other, and share both the risks (including any poor harvests caused by bad weather or pests) and the benefits (sense of satisfaction, feeling of safety through attachment to the land) of food production (DeMuth, 1993).

In a United States survey (Lass, Bevis, Stevenson, Hendrickson, & Ruhf, 2001), 94.1% of responding farmers reported one of their personal goals to be actively sharing their knowledge with others in order to nourish the CSA movement. In contrast to traditional agricultural entrepreneurs, CSA members tend to be characterized by higher qualifications and a younger age, on average. The mode of their ages was 44 years. They have at least 10 years of experience in farming on average, at least 5 of which they have devoted to CSA. Some 51 percent are younger than 45, and only 12.5 percent are above the age of 55. The share of this latter age group is 48.4 percent for traditional farmers. The majority of CSA farms (96%) pursue organic and biodynamic production practices. Typically, farmers only devote a portion of their land to CSA farming. From amongst the various agricultural operations, some 27% use 10% of their land for such purposes, while 36% use this system to cultivate 90% of their plots.

For the most part, the owners and their families also participate in the work. CSA members represent a significant workforce. It has been reported that members work as much as 3.000 hours annually. They employ additional forms of compensation, provide accommodation and offer learning opportunities. They organize dinners, visitors' trips, educational events for the community and local schools. They have many innovative events to foster closer ties between the farms and the communities. Some 56 percent of all farms offer cheap investments for low-income people. Some of their produce is given away each year, and they offer scholarships, as well. Barter markets and food-for-work opportunities are the most popular programs.

In light of the achievements in North America, establishing a direct link between the farmer and the consumer seemed to be the appropriate solution, and thus the CSA approach once again started to conquer Northern Europe. In Eng-

land, young adults left the cities in large numbers in order to revitalize the farms of New England, where they were greeted by the sight of a dying agriculture. Food and dairy products, vegetables, and fruits have practically disappeared from local markets (Adam, 2006). While revitalizing the agricultural areas, these youth have also integrated into the local rural communities.

In Hungary, Community Supported Agriculture is still in its early stages. It was the associates of Nyitott Kert Alapítvány (“Open Garden Foundation”), with support from the Institute of Environmental Management at Szent István University, who took the first steps in Hungary in 1998. By 2002, the group already consisted of 150 families. In their garden (measuring 1.5 ha), they primarily produce vegetables and some fruit for the members of the community, using a biodynamic farming system. Their produce is delivered to consumers in crates, on a weekly basis (Milánkovics & Matthew, 2002). Their goal is to establish a display garden (Babátvölgyi Biokertészet Tanüzem - roughly “Educational Biofarm of Babátvölgy” in English) and to develop a local organic food production and consumption system.

As the Association of Conscious Consumers (Tudatos Vásárlók Egyesülete) puts it, *Community Supported Agriculture “is an opportunity for farmers and consumers to form permanent groups, and operate, co-operate in collegial communities. Their interests do not act against, but rather strengthen each other. Farmers are interested in a stable living, consumers desire healthy food. And the preservation of the biological productivity, beauty and health of their environment is their common interest. This requires, of course, commitment from both sides, which results in consumers getting chemical free, fresh and tasty vegetables, and farmers having a fixed market for their produce. Another advantage of this system is the formation of small, but open communities that are ideal for building human and community relationships”* (Polyák, 2004).

In February 2012, the Research Institute for Organic Agriculture, Tudatos Vásárlók Egyesülete (“Association of Conscious Customers”) and the Environmental Social Science Research Group (ESSRG) at Szent István University organized a one-day event in order to gather together all parties who operate a CSA (or a similar system) in Hungary today. The following groups and organizations were found to “nurse” such community initiatives: the owners of Háromkaptár BioKert (“Three Hives Organic Garden” – Tahitótfalu), Évkerék Ökotanya (“Wheel of the Year Eco-Ranch” – Kistelek), Biokert (“Organic garden” – Szigetmonostor) and Gódor Bio Kertészet (“Gódor Organic Nursery” – Galgahévíz), the participants of “Kecskeméti Kosárcör” (“Basket Club Kec-

kemét”) and the members of Magyar Ökotársulás Kulturális Nonprofit Kft. (“Hungarian Eco-Partnership Cultural Nonprofit LLC”, hereinafter “Ökotársulás” – Herencsény); this last one is discussed in detail as part of the empirical research.

The event provided the time and place for the exchange of experiences, for thinking together in order to find ways to create a model in our local farming and consumer communities that can serve as an example and that may actually gain ground in Hungary with time.

These bottom-up, small-group initiatives in Hungary were, for the most part, set in motion without the majority of the members ever having heard anything about the proud history of community farming in the US or in Switzerland. Local Food Systems (LFS) achieve food self-sufficiency through direct links between local food producers and consumers. The program in Herencsény might also be considered an Alternative Agri-Food Network (AAFN), for it is an example of a new type of solidarity-driven relational dynamics between producers and consumers that represents an alternative to the impersonality of globalized supply chains (Balázs, 2011). Moreover, the birth of Ökotársulás may be regarded as a special form of community organization, knowing that the land is owned by the community and that production is managed by the members of the community, as well.

Ökotársulás, however, does not completely coincide with what you would expect theoretically – as its owners do not live in Herencsény. The idea of making a profit is, in contrast to CSA farms, absent (at least in the form of shares, that is). In return for their investment and support, members who live in the capital receive a weekly supply of biodynamically grown crops from the community; besides, their “virtual account” is also credited with additional benefits like the feeling of being part of a community or of being a part of boosting employment in the countryside. It would be interesting, of course, to create similar, but locally owned enterprises. Naturally enough, a couple of examples for that do exist in Hungary, yet as for now, it is more typical for initiators of Community Supported Enterprises not to come from the local communities.

II. The Empirical Research

Agricultural enterprises do not only provide a living (create economic value and create profits) for people, but they can also extend beyond the scope of the economy, and also create value in the nature and in our society. A beautiful, cultivated agrarian landscape that harmonically complements its natural environment and the enjoyment from one's work are values that need to be realized and recognized whenever rural development is concerned. Development projects tend to ignore the community focus. Underdeveloped regions are prioritized in the majority of rural development initiatives. They use various indicators to define what exactly qualifies as an underdeveloped region. Those most frequently used are per capita income in the region, access to infrastructure, penetration of certain consumer durables, unemployment rate, life expectancy at birth and similar indicators. Those who examine the countryside using statistical data and generally accepted categories (underdeveloped regions) usually fall victim to the pitfall of focusing on the economic aspects of the problem alone, ignoring everything else.

If we accept that diversity is very important to both nature and society, then we can hardly accept that the natural-social units (characterized by differences both in terms of space and time) we refer to as the "countryside" be evaluated using general statistics and various standardized indicators. A region's unique characteristics, resulting from diversity (e.g. how far a rural settlement is from a city or from cultural centres, the (socio-) geographic situation etc.) need to be taken into account.

This is exactly why I decided to survey entrepreneurs from different regions. In my hometown, Jászfényszaru, people still maintain traditions of Jazygian ("jász" in Hungarian) origins, which is why their attachment to the village, to the area also represents an attachment to a sort of minority. This attachment does, most probably, have an influence on how good the inhabitants feel and why their ways of thinking differ from those of others, who, for example, live in an area where none of the ethnicities are present in large numbers (Budapest). I explored the similarities that connect and the differences that distinguish various entrepreneurs. Concerning their success, Hungarian settlements are extremely heterogeneous. An attachment to one of the ethnic groups (in villages of Jazygian or Palóc roots, for example), as mentioned earlier, might be among the reasons, for it might constitute a cohesive force of remarkable strength.

I analyzed what and why the agricultural entrepreneurs living in this settlement do, what system of values they hold and what special combinations of these factors they are characterized by. It is emotional intelligence, most probably, that should be more intensely developed in rural communities, as if we do not succeed in encouraging this, then even the countryside's ability to support our lives becomes questionable. A new sewage system and gas pipe line will all be in vain; youth will move away from the village because of the lack of the cohesion that will be present, even without a sewage system if they do not have an "I feel good in this community"-feeling.

Any research project is bound to be constrained by time and budget limits. These were rather tight in my case, thus I could not commission any third party interviewers. Even though it proved out to be useful that I administered the survey myself, it did obviously impose certain limitations on research methodology.

The resulting selection of sampling areas was intended to allow for the inter-regional differences in history, culture and economic development to be reflected in the results, along with the differences between the individuals themselves. My tight budget was a decisive factor in selecting the concrete sampling area: I had to choose area that were within a reasonable distance, and where I could hope for some sort of assistance. This method of selection does unquestionably influence the generalizability of the results – I believe, however, that the bias will not render my findings invalid. One of these areas was my hometown, Jászfényszaru, where people still maintain traditions of Jazygian ("jász" in Hungarian) origin, which is why their attachment to the village, to the area also represents an attachment to a sort of minority. This attachment does, most probably, have an influence on how well the inhabitants feel and why their ways of thinking differ from those of others, who, for example, live in an area where none of the ethnicities is present in large numbers. Jászfényszaru is, however, not a typical agricultural settlement. Industrial companies have located to the immediate vicinity, and part of the labour force is employed in nearby cities or in the capital, and thus Jászfényszaru has become an expressly open town.

The area to be surveyed first was Jászfényszaru. Owing to my pre-existing contacts, the individuals to be interviewed were relatively easy to select. Jászfényszaru is a relatively small settlement where people know each other and they can also tell you who is an agricultural entrepreneur. My mother works as a kindergarten teacher, so she could easily arrange the interviews for me through her contacts. All but a few agreed to participate in the survey.

The empirical survey consisted of two main stages. For each respondent, a short structured interview was administered first, followed by Q-Methodology. There were 20 respondents in the sample establishing their preferences using the Q-tables. Unstructured in-depth interviews (profile interviews) were also administered to a few subjects from each sample.

II. 1. Narrative Life Profiles, Narrative Autobiographies

One of my own internal motivations – and one of the purposes of my research, as well – was to support my hypothesis that the reason why many are turning away from city life nowadays, and moving to a village or looking for some sort of rural attachment is that their positive childhood memories of the countryside have resurfaced as a result of their dissatisfaction with their present busy lives. Furthermore, I also wanted to illustrate that the childhood experiences of getting in touch with nature, with “completeness” are significantly related to one's attachment to the countryside, to agriculture. For many, these experiences are the only memories they can recall: their grandparents, the life in the rural, plants, animals, flavours, scents etc.

“I'm of peasant origin from my mother's side. The most characteristic, dear memories of my childhood are all linked to the countryside. During the summer vacations, I spent a lot of time in nature, at my relatives' place in Heves county. The aroma of the fresh tomatoes, peppers and spring onions we had for breakfast was a decisive experience for me.”
(Sümi)

In order to prove the above statement, I employed the methods of narrative life profiles (samples from Jászfényszaru). *“The narrative form is the one that 'explores the experiences, observations, desires, emotions etc. of someone, from a subjective point of view, the way they themselves see their own life, and the events that happened to them, and the way they want others to see them”* (Pászka, 2007, in Löffler, 2009, p. 145).

“An autobiography is when the author withdraws to submerge deep in their memories, and to write down whatever events and experiences they consider the most important. Mostly what they can recall from the perspective of the present” (Pászka, 2010).

The “extracts” from the life profiles of the agricultural entrepreneurs from Jászfényszaru were recorded by myself at the same time the survey was administered. I asked the question “What is it that comes first to your mind (childhood memory) when the countryside is mentioned? Has your life been influenced by an acquaintance, relative or family member who lives in a rural area?” I made sure respondents did not have time to think – it was really the memory they would recall first that I was interested in. And we might ask ourselves the very same question, as well. Do not forget: the very first thought! This is important to the evaluation, when trying to answer the question whether childhood experiences and charismatic relatives as role models have a role in one's attachment to agriculture.

The agricultural entrepreneurs of Jászfényszaru reminisced about the following:

Katóka:

“My parents and grandparents, as well, were doing farming along with their jobs, and it seemed like the most natural thing to me, too. I inherited my grandparents’ house, where all the conditions required to go on with farming were in place. In our family, even small children worked together with the adults in roles that suited their ages. The everyday task of rotating the eggs in the chicken incubator, for example, was assigned to us. It had to be done in the evenings, and it really was an experience to see the first chicks hatching. During harvest time, we were assigned some minor tasks, and always got some treats from the market in return. Sweets, fruits (oranges, bananas).”

Ördögné:

“Fear. I was the late-born, only child of my parents. I lived with them and my grandparents in a family house. I was afraid of the dark, and of the dog by the gate of the backyard, yet I still had to feed it every evening. Since we moved to the farm, I am afraid neither of the dark, nor of being alone any more. It was my husband who had the greatest influence. We've been together since I was 17. He is a more close-to-nature person than I am.”

N. Sándor:

“In Sándorfalva, where I was born, the water always flooded the meadows. Inland excess waters were high. We used a huge trough as a boat. It was early springtime. We tipped over, naturally. The water was very cold.

In the wintertime, we used to skate there. I didn't have any relatives who could've influenced my relationship to agriculture, it was later that I developed this kind of attachment."

Izabell:

"We used to pick the potato beetles from the plants in the large garden. There was no spray. Climbing the fruit trees, cooking a "lecsó" together, eating raw artichokes."

S. Andi:

"My parents and grandparents. Picking cucumbers, digging potatoes, and when we used to go into the forcing house with my grandma, where they grew those small peppers. Going hunting with grandpa, chasing the rabbits. Cutting the "piksis". Turf blocks."

Gitta:

"Playing by Lake Boros. Skating there. Falling into the lake. All six siblings are licensed small-scale producers. My parents worked at the cooperative, and they also rented some land. They used to go to the Bosnyák market."

N. Gergő:

"Sitting in the combine harvester, since I was five. Grandpa kept animals and he also planted two rows of corn. I don't want to make a living out of agriculture, for the time being. You can only keep animals if you also cultivate a piece of land. Fodder would be too expensive to buy."

K. Ernő:

"Riding a horse and cart with my grandfather, here in the village. I must have been 2 or 3 years old. Force feeding the geese. There were animals. Living together."

K. Béla:

"I have no such memories. Greenhouse farming was introduced in 1966. My mother already had one by 1967. She also had 40 pigs. Meat was 26 forints a kilogram, but not like now, with all the unpredictable fluctuations. The price was 26 forints in the spring, and it was 26 forints in the fall, too. She always tried to observe others, to figure out what other sort of work she could do. For me, it was the same with beekeeping – I saw others do it. We didn't have any in the family. I was quite fond of honey, so I decided to "catch" a bee colony. That's how they started reproducing."

Rajmund:

“It is the nursery and the red pepper field of my grandfather what comes to my mind first. He used to push his small cart laden with the vegetables and carrots he grew on the Kozma-bank to the grocer’s early in the morning each day. My grandfather was a stubborn, resolute man, always tense as a consequence of four years as a prisoner of war – yet his life has been exemplary to me.”

These life profiles told us that the parents or grandparents of our respondents were, without exception, somehow related to the countryside and they were all running agricultural enterprises. Values like diligent work, humility and fighting for yourself were all conveyed by their parents and grandparents. It is questionable, however, whether our respondents will be able to convey all this – love of work, importance of looking after the animals, maintaining traditions etc. – to their own children and grandchildren. Unfortunately, the number of those who at least have a chance to pass on the positive patterns in rural life has dropped dramatically. Yet all is not lost yet, the generation who keep a memory of their grandparents’ industrious hands and love is still alive. It is maybe the account of Erzsi Sz. where the advantage of the countryside over the city is the most apparent. She has experienced both, she is credible. She felt her soul was dying in the city. She can compare the two, so she can value the countryside. Her nostalgia for rural life is built upon actual experience, unlike the feelings of those who have never lived in the countryside, but just long for it. The present National Rural Strategy, entitled the Darányi Ignác Plan, has formulated the objective of “food safety and food security”, and the need for “sustainable food production that relies on Hungarian and local resources and that strives for quality and diversity” (NVS, 2012). According to the plan, financial security is an important aspect, as well. If rural families have animals and/or some produce in their own garden, those could be sold and thus used to bridge a period of financial distress. Gyula M. regards goat farming to be an opportunity, a source of income in addition to their pensions. Especially that the “bushy mountain meadows” are at hand. Animal husbandry requires a daily routine of care and attention. As a pensioner, he has enough “spare time” to afford to look after animals.

II. 2. Q-Methodology for Determining the Types of Agricultural Entrepreneurs

Most analyses struggle to overcome the problem of trying to characterize certain social categories, groups of people or their opinions in terms of statistical figures (relative frequencies for the most part). All questionnaire methods tend to work along socio-demographic categories, yielding statistics by age group, by profession, by gender or by education. Q-Methodology abandons that approach in order for the subject, the individual to become the object of analysis.

A more or less inherent deficiency of questionnaire methods is that usually, the questions already include the assumptions of the interviewer; that is, what the interviewer would like to prove. To such questions, respondents typically provide the answers they are expected to provide, and thus the majority of questionnaire surveys are plagued by the respondents' will to meet the interviewer's expectations or to appear in a more favourable light. The interviewer, being inevitably driven towards asking questions that tend to confirm their assumptions and hypotheses, and the majority of methods commit the mistake of trying to interpret differences of a mere few percent, whereas the relevant non-sampling error might easily be in the two-digit range. We are trying to interpret differences the extent of which is smaller than the bias caused by respondents' willingness to meet our expectations. Differences of the few-percent range can most probably not be considered significant.

Q-Methodology can eliminate some of the typical deficiencies of questionnaire surveys. The reason why this method is considered special is that respondents have no opportunity to express their willingness to comply with the interviewer's expectations, for it is an integral part of the system that however they distribute the scores (as far as they adhere to the rules), their answers will always follow a standard normal distribution. We do not know the number of respondents who agreed with our statements, nor the extent to which they did so; our sample sizes would have been too small for that, anyway. There will be no percentage statistics, either. We will "only" learn which statements our respondents were in agreement about, and which ones they were significantly divided about.

Q-Methodology is a sort of bridge between qualitative and quantitative analyses. It is based on the mathematical procedure of factor analysis, even though it represents an interpretive and constructivist approach. The qualitative nature of the method comes from the lack of sample size and representativity

requirements (unlike quantitative analyses) (Zsóka, 2005). The “soft side” of the method formulates statements, which are later processed by the “hard side” using mathematical statistical methods. Here, it is not the figures that one should focus on, but rather the statements on which people agreed or disagreed. That is, we are not interested in how many respondents there are in each group, but rather in why they belong to that specific group.

The aspect in which Q-Methodology differs most from the questionnaire methods examining the distribution of individual opinions in a given population is that instead of generating a percentage distribution, it aims at furthering our understanding of the structure, of the frame of reference of people’s opinions on the matter (Duenckmann, 2010). It is not an overstatement to say that Q-Methodology is designed to analyze structures themselves rather than the individuals that make up those structures (Stainton, 1995). Q-Methodology is based on a model of subjectivity that is open to communication and is holistic in nature. The building blocks used by Q-Methodology to build up the factors are individual opinions that can be expressed in terms of respondents’ opinions.

Many of us are inclined to treat statements like “farmers think that” or “well-to-do people think that” as stereotypes – even though these stereotypes do frequently have a real message, a real background. Various studies have confirmed, though not very clearly, that these stereotypes do actually have some deeper roots. Any type of human activity is governed by subjective assumptions or by ideas, mental pictures of something. And it is this very subjectivity that social sciences try to focus on in scientific research projects (Stainton, 1995). Which then, again means that Q-Methodology constitutes a new, fresh opportunity as far as studies of the countryside are concerned.

Q-Methodology was developed by a psychologist and physicist named Stephenson (Stephenson, 1953); its roots date back to the fifties, yet it has only become popular with social scientists during the last couple of decades. In 2003, Müller et al. found some 2800 publications related to the application of Q-Methodology (Müller & Kals, 2004).

II. 3. Q-Sort Technique

The researcher administering the survey presents the statements to respondents in the form of randomly numbered cards. Subjects then have to rank the cards on a predefined scale, relative to each other, according to the extent to which

they agree with each statement. Participants first have to sort each card into one of three groups, according to whether they agree with the statement, disagree with it or it is indifferent to them. Afterwards, they start ranking the statements according to the categories of the evaluation scale, relative to each other, carefully thinking over their decisions one-by-one (Figure 1). The evaluation scale used in the research described consisted of 9 categories (-4...+4), representing the extent to which the respondent agrees with each statement.

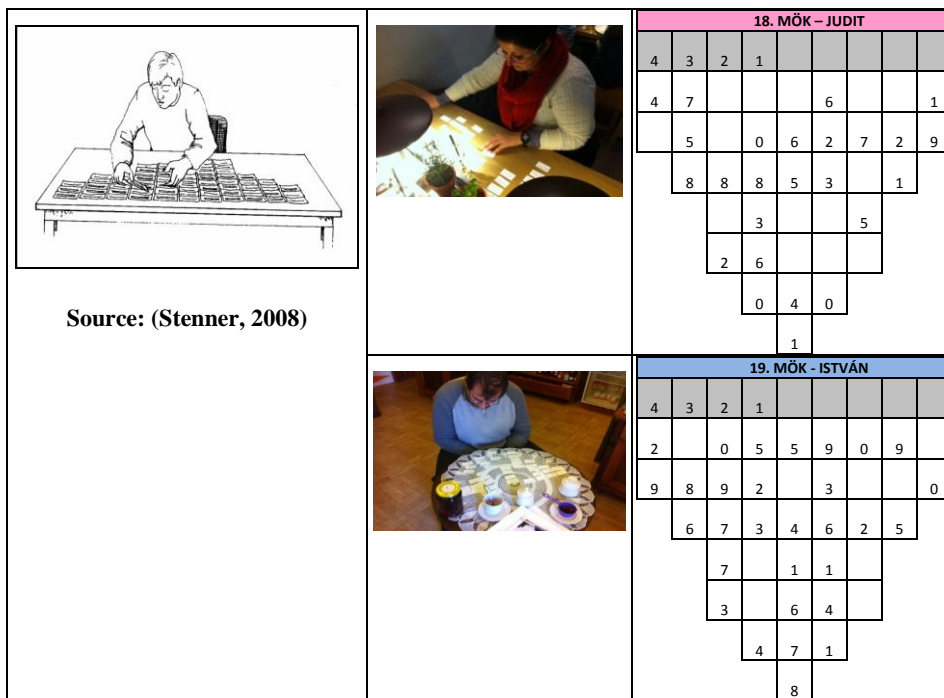


Figure 1 The Q-Sorting process and the resulting tables; two entrepreneurs filling in the tables

Based on the similarities and differences, the method allows for the classification of the individuals evaluating our statements into factors, and for the identification of the reasons why they got classified into the very factor they are in. The evaluation of the statements yields an individual ranking for each individual respondent; these are the so-called Q-Sorts. “The method processes respondents' preference rankings (that is: the Q-sorts) by comparing them pairwise, and determining the relevant correlations. This results in a so-called intercorrelation matrix, which can be used, by employing the principal component or the

centroid method, to extract the factors, that is, those typical Q-Sorts that represent the “common denominator” of the individual opinions” (Zsóka, 2005; Marjainé Szerényi et al., 2011). Each resulting factor contains respondents with very similar views.

II. 4. Some Facts about Jászfényszaru

The ancestors of the population living in the Jászság (a region in Hungary, approx.: “Jazygian area”) belong to the separate ethnic group of the Jazygian people. Their forefathers did not arrive with the first Hungarians, but in several waves before and after the Tartarian invasion. Jazygian people are of Eastern origin, and they have preserved a wide range of traditions (Pethő, 1999). Geographically, Jászság is made up of 18 settlements between Jászladány and Jászfényszaru. Jászfényszaru started to flourish in 1745, the year when they ended their decades of being “sold”, when they managed to pay the appropriate redemption for their privileges to Maria Theresa. Jazygian people have always been especially conscious of their privileges. During the redemption, several rich serfs of non-Jazygian origin paid to redeem plots of land around Jászfényszaru. After 1745, land was owned by the community, and it was distributed for use in proportion of the redemption paid by each family. The freedom of the peasantry induced spectacular economic growth in the Jászság (Farkas, 2007). In 1831, Jászfényszaru received the title of borough (a type of small rural city, “mezőváros” in Hungarian). Jászfényszaru is a small city of nearly six thousand inhabitants in the Jazygian micro-region, located in the north-western part of Jász-Nagykun-Szolnok county, in the northern part of the Great Plain region. The town is situated on the border of three regions, near the confluence of the Zagyva and Galga rivers.

According to the National Spatial Development Concept, Jászfényszaru is located in a semi-rural region with urbanized areas. Its residential area is 398 ha, while non-residential area amounts to 7235 ha. Its most important natural endowments are the fertile soil and (as yet untapped) thermal water sources.

The area is a moderately warm, dry flatland that was filled up by rivers. The dominant soil type is meadow soil; besides tillage (primarily cereals), forestry is significant, as well. The traditions of commercial vegetable production date back to the previous century, for the fast warming-up of the soil is ideal for intensive gardening activities. Commercial vegetable production (both in unheated greenhouses and on plough lands) is significant, too. Large-scale animal

breeding disappeared along with the termination of the sometime agricultural cooperative. Considering local small-scale producers (this is an official category of agricultural entrepreneur, “őstermelő” in Hungarian, which could approximately be interpreted as a “licensed traditional small-scale producer”) the level of animal husbandry is just as low as the country average, and no significant improvement in the count of animals is expected, either (Dankó, 2011).

Owing to the transformation of the agricultural sector, and to depressed producer prices, the profitability of greenhouse cultivation has dropped significantly. “Anyone in the village could tell you stories from the Bosnyák market about how defenseless you can become as a producer bringing their produce to the market. It has happened several times, for example, that a car-load of sweet peppers came that long way in vain, because it could not be sold in the end” (Pethő, 1999, p. 128).

The number of vegetable producers has been stagnant since 2004 (VitalPro, 2010). Those working in agriculture cannot make a living solely out of “the land” anymore; agriculture can only serve as a source of additional income. Only 10 percent of all functioning enterprises belong to the agrarian sector. Industrial enterprises boast a share of 31 percent. Employment in the construction sector (as wage labourers) became dominant after the formation of the agricultural cooperatives. By now, the development of the city's industrial park has created a significant number of industrial jobs. Today, the city can already be considered a transformed agricultural town.

In 1989, the South Korean company Samsung acquired the Orion television factory located in Jászfényszaru. Today, it is the largest Samsung plant in Europe. The Integrated City Development Strategy of Jászfényszaru states that due to the favourable geographical location of Jászfényszaru, and to the role the industrial park and Samsung have in the region, “buses transporting commuting workers arrive each day from as far away as Tiszafüred, which is a 100 km ride” (VitalPro, 2010).

II. 5. Characterization of the Agricultural Entrepreneurs from Jászfényszaru

In Jászfényszaru, twenty individuals filled out the survey. Most of them pursue agricultural entrepreneurship as their main source of living, yet some of them only try to make some additional income in agriculture. The area of the land

they cultivate varies in a very broad range: from a few to around 300 hectares. Some of them pursue intensive or greenhouse farming techniques. Their greenhouse areas range from 150 to 7000 sqms. The majority of these entrepreneurs are professional agricultural engineers, some of them, however, are qualified nursemaids, kindergarten teachers or carpenters/scaffold builders. Some basic facts about the participating entrepreneurs are shown in Table 2.

According to the procedure detailed in the methodological chapter, the respondents filled in the data sheets. I am only going to include a few of the result tables in this paper. One of them is a Correlation Matrix Between Sorts (see Table 3), which shows the similarities between the opinions of our respondents. The matrix alone already indicates that the views of Katóka, Ernő N., Vencel, Jani Ö., Ördögné and Sándor N. are similar. Accordingly, we expect them to be classified into the same factor during the factor analysis. It is exactly these relatively high pairwise correlations that make it possible to “concentrate” the entire body of information about the twenty respondents (“variables”) into a set of a mere 4-5 factors, which is far easier to handle.

Table 2 Some statistical facts about the entrepreneurs from Jászfényszaru

Nr.	Name	Age	Education	Profession	Present job	Livestock	Farming area	Primary product
1.	Katóka	41-50	College	Kindergarten teacher	Just given up greenhouse farming	2 swine, 4 donkeys, 2 sheep, 20 chickens	It was 4pcs of 40m x 12m greenhouses múlté	English cucumbers, sweet peppers
2.	Ördögné	51-60	College	Organic-farmer	Licensed small-scale producer	47 cattle, 3 horses, 9 sheep, 5 swine	57.6 ha	Beef
3.	P.Árpád	51-60	College	Pest control engineer	Agricultural entrepreneur	Swine, horses	300 ha	Pickled cabbage
4.	T.Imre	51-60	College	Horticultural engineer	Licensed small-scale producer	-	7000 m ²	Sweet pepper (white)
5.	János	41-50	Skilled worker	Carpenter/scaffold builder	Licensed small-scale producer	Horses, dogs	-	Processing and sale of pork
6.	P.Vencel	> 60	Skilled worker	Joiner, qualified farmer	In a family farm	-	130 ha	wheat, corn, sunflower
7.	N.Sándor	51-60	University	Agricultural mechanical eng., machine repair spec. eng.	Technical director	1000 cattle	650 ha owned 850 ha rented	milk, sunflower, wheat, corn, rape
8.	Izabell	41-50	Skilled worker	n/a	Nursemaid, greenhouse farming as an extra	Dog only	Sweet pepper in 150m ² greenhouse	Sweet pepper
9.	S.Andi	31-40	College	Kindergarten teacher	Kindergarten teacher, prod. chili peppers as an extra	Poultry, swine	Chili pepper in 10x20m greenhouse	Chili pepper

<i>Nr.</i>	<i>Name</i>	<i>Age</i>	<i>Education</i>	<i>Profession</i>	<i>Present job</i>	<i>Livestock</i>	<i>Farming area</i>	<i>Primary product</i>
10.	P.Gyula	31-40	Skilled worker	n/a	Licensed small-scale producer	-	5000 m ² , vegetab./fruit, flowers	Sw. pepper, chrysanthemum
11.	Gitta	51-60	Skilled worker	n/a	Licensed small-scale producer	-	2000m ² greenh.	Sweet pepper, cucumber, sorrel, spinach
12.	N.Gergő	31-40	High school grad.	n/a	Finance manager, farmer	29 swine, 2cattle, 9 sheep, 3goats, 9 mallards	Fish farm, 6 quintals fish brought in, 4,5 ha terület 100fa vegyes gyű- mölcsös	Fish
13.	László	> 60	College	Agricultural engineer, swine breeding spec. engineer	Pensioner	swine (100 annually)	50 ha, forestry	Logging
14.	K.Ermő	18-30	University	Agricultural engineer - economist	Agricultural entrepreneur	15 sheep	325 ha	Ploughland farming, corn, wheat
15.	É.Vencel	41-50	College	machinist, export salesperson	Licensed small-scale producer	3 horses, 2 cattle, 15 sheep, 8 swine, 3 geese	45 ha rented out, 5 ha manor	Nothing at present
16.	Ö.Jani	18-30	College	Agricultural engineer	Site manager	47 cattle, 3 horses, 9 sheep, 5 swine	57,6 ha	Beef

<i>Nr.</i>	<i>Name</i>	<i>Age</i>	<i>Education</i>	<i>Profession</i>	<i>Present job</i>	<i>Livestock</i>	<i>Farming area</i>	<i>Primary product</i>
17.	É.István	51-60	University	Agricultural mechanical engineer	Agricultural entrepreneur	60 sheep	300 ha	Ploughland produce, sweet pepper, tomato
18.	K.Béla	51-60	Skilled worker	Structural metal worker	Licensed small-scale producer	1 pig	1 ha, 100 bee families	Honey, cabbage
19.	Rajmi	31-40	University	Lic. agricultural engineer	Agricultural entrepreneur	nincs	5 ha + földia	paprika
20.	N.Ernő	51-60	University	Lic. agricultural engineer	Manages family farm	15 sheep	300 ha	Wheat, corn

The software (PQMethod) allows us to determine the number of factors to identify. In our case, the Unrotated Factor Matrix identified eight factors. The theoretical maximum is the number of respondents, which is now twenty. This is actually why the method is called “inverse” (or transposed) factor analysis; it does not use *variables* to create latent variables, but rather classifies respondents into factors – so-called opinion groups – based on the similarities and differences in their views. (That is, the matrix gets transposed – rows become columns and vice versa – as compared to “normal” factor analysis.)

Table 4 Eigenvalues and variance percentages of the unrotated factor matrix for the first 8 factors, Jászfényszaru

FACTOR	1	2	3	4	5	6	7	8
Eigenvalue	7.9242	1.9342	1.6015	1.5253	1.0659	0.9643	0.8073	0.6862
Variance %	40	10	8	8	5	5	4	3

The eigenvalue of the first factor is 7.9242, which means that the first factor explains the opinion of almost 8 out of the total of 20 agricultural entrepreneurs.

The data in the row below express variance in a percentage form. Thus in our case, the first factor explains 40 percent of the total variance of the twenty variables. The second factor explains 10 percent, the third and the fourth factors explain 8 percent each, and so on. As it is apparent from the above, if we do not even go any further than the first four factors, we have already explained 66 percent of the total variance.

After the rotation, the values where the factor loading exceeds 0.55 are denoted with an “X” in the printout of the Factor Matrix (see Table 5). The higher the factor loading, the more characteristic the individual's opinion concerning the factor in question. Of course, there are lower, yet still relatively high (above 0.4) factor loadings, as well. In these cases, the individual's assignment to any one of the factors is questionable, yet other information might help us do the identification. These relatively high factor loadings were denoted with an asterisk (*). Thereby, we managed to cover all 20 respondents with these four factors, and thus, considering ease of use, it would not be worth to use any additional factors in our case. The explained variance figures below 5% tell us the same.

Table 5 Factor matrix of the agricultural entrepreneurs from Jászfényszaru, with the most characteristic factor loadings highlighted/denoted, X denoting the entrepreneurs belonging to each factor

QSORT		1	2	3	4
1	Katoka	0.6274X	0.3639	0.3176	0.2595
2	Ordogne	0.1977	0.2766	0.2553	0.6265X
3	P. Arpad	-0.1072	0.4933*	0.3709	0.4758
4	T. Imre	0.5590	-0.0125	0.1898	0.5936X
5	Janos	0.4031	0.1864	0.6227X	-0.1479
6	P. Vencel	0.5419*	0.4827	0.2426	0.3279
7	N. Sandor	0.1524	0.2630	0.2130	0.7530X
8	Izabell	-0.2130	0.7181X	0.1856	0.1775
9	S. Andi	0.3422	0.6774X	-0.2212	0.2036
10	P. Gyula	-0.3363	0.0320	0.7626X	0.0959
11	Gitta	-0.1166	0.7926X	-0.1252	0.0530
12	N. Gergo	0.2021	0.3158	0.5583*	0.4359
13	Laszlo	-0.0179	0.0851	-0.0033	0.6367X
14	K. Erno	0.7298X	0.1650	0.2627	0.3924
15	E. Vencel	0.0336	0.1058	0.1256	0.7383X
16	O. Jani	0.5318*	0.4482	0.4374	0.0774
17	E. Istvan	0.3777	-0.1803	0.4916*	0.4660
18	K. Bela	0.3727	0.3929	-0.2306	0.5917X
19	Rajmund	0.1203	0.3017	0.5813*	0.4877
20	N. Erno	0.5283*	0.2858	0.4553	0.2503
% expl.Var.		15	15	15	20

Table 5 above shows that it is “K. Ernő” who has the highest factor loading (0.7298) in Factor 1, which means that the first factor contains almost every piece of information associated with him. “Katóka” (0.6274), “P. Vencel” (0.5419), “O. Jani” (0.5318) and “N. Ernő” (0.5283) also belong to the first factor, it is, however, interesting that “P. Vencel” and “O. Jani” have relatively high factor loadings (0.4827 and 0.4482) for Factor 2, as well. Their values do not only overlap with those of the respondents in Factor 1, but also with those of the entrepreneurs found to belong to Factor 2. Thus the similarities we ex-

pected in respondents' opinions based on the correlation matrix are visibly reflected in the factors we identified.

The correlation matrix of factor values (see Table 6) evinces that the correlation between Factor 1 and Factor 4 is relatively high, and the relationship between Factors 1 and 2 is not negligible, either. The opinion of those in the third factor can be relatively sharply distinguished from all the others. While identifying the factors (defining their content and meaning), we found out that Factor 3 comprises those respondents who share true entrepreneurial values. Gyula, the entrepreneur growing sweet pepper and chrysanthemum in 5000 sqms of greenhouses, Rajmund, the agricultural engineer who cultivates five hectares of land, and János, the young agricultural entrepreneur who has specialized in beef cattle. Out of all respondents, we might probably say, they are the professionals who know all the ins and outs about entrepreneurship; their system of values is primarily characterized by rational elements.

Table 6 Correlation matrix of factor values, Jászfényszaru

	Factor 1	Factor 2	Factor 3	Factor 4
Factor 1	1.0000	0.2902	0.2289	<u>0.6401</u>
Factor 2		1.0000	0.0616	0.3695
Factor 3			1.0000	0.2002
Factor 4				1.0000

In order to identify the individual factors, that is, to make apparent the “common” values shared by the respondents in any one factor, the rank statement totals with each factor (shown in Table 6) should be analyzed in detail. We are to look at the first four factors (the details can be seen in Table 7).

The statements with the highest rankings and eigenvalues in Factor 1 are:

- 4. I am ready and willing to cooperate with those pursuing similar activities, we help each other out.(2)
- 6. It is important to me to know the developments concerning my profession, to participate in professional courses. (2)
- 35. Hungary should strive for food self-sufficiency. (3)
- 16. Those employed in agriculture are characterized by systematic thinking. (4)

These are, accordingly, the statements that the “members” of Factor 1 agree with most (Katóka originally a kindergarten teacher, later a greenhouse producer, yet today only has some animals as a source of additional income; Imre,

a horticultural engineer in his fifties, grows produce in greenhouses as a licensed small-scale producer; Vencel, doing a family farm on some 130 hectares; K. Ernő and N. Ernő, father and son, both agricultural engineers, each cultivating a farm of 300 hectares).

Table 7 Rank statement totals with each of the four factors, Jászfényszaru

Statements	Factor 1		Factor 2		Factor 3		Factor 4	
	Eigen-value	Rank	Eigen-value	Rank	Eigen-value	Rank	Eigen-value	Rank
1. The reason why success is important to me is the financial wellbeing of my family.	0.21	20	1.46	2	-0.74	30	0.64	12
2. If I could start over again, I would lead a different life.	-1.17	36	1.32	3	-0.21	26	-1.11	32
3. I would feel regret if country life changed, and most of us had to work for large corporations.	1.16	7	1.22	5	0.42	14	0.72	11
4. I am ready and willing to cooperate with those pursuing similar activities, we help each other out.	1.70	2	0.69	15	0.79	8	1.07	8
5. It is my work that makes up my life and I like to talk about it to the family, to friends.	1.17	5	-0.38	24	0.58	12	0.62	13
6. It is important to me to know the developments concerning my profession, to participate in professional courses.	1.70	2	-0.50	25	0.79	8	0.95	9
7. Alienation and social polarization are inherent to profit-centered societies.	0.32	19	0.19	17	0.00	20	0.28	16
8. I feel my everyday work is not in line with my true interests and values.	-1.49	38	-0.58	27	-0.21	26	-0.41	26
9. The money we spend in our home region contributes to the economic development of the area.	1.16	7	-0.75	30	0.21	17	0.45	14
10. It is not my job that is important but that I earn an income to suit my family's needs.	-1.17	36	0.82	13	-0.58	29	-0.46	27

Statements	Factor 1		Factor 2		Factor 3		Factor 4	
	Eigen-value	Rank	Eigen-value	Rank	Eigen-value	Rank	Eigen-value	Rank
11. In today's society, many are only concerned with themselves while completely ignorant to others' well-being.	0.43	15	1.25	<u>4</u>	1.12	<u>5</u>	1.09	6
12. Home gardening and raising animals for the family are inherent to country life.	-0.53	24	0.05	19	-0.04	21	1.14	<u>5</u>
13. Usually, it is only those who have no hope for improvement who stay in the countryside.	-1.91	<u>39</u>	-1.17	34	-0.79	32	-1.46	<u>35</u>
14. I do not have much trust in contracts, the given word is more valuable.	-0.64	26	-1.59	<u>37</u>	0.54	13	-0.04	22
15. Nowadays, a significant part of rural inhabitants have a lifestyle very similar to that of city people.	0.32	19	-0.17	20	-1.37	36	0.36	15
16. Those employed in agriculture are characterized by systematic thinking.	1.38	<u>4</u>	-0.67	29	0.79	8	0.15	19
17. If you want to be an achiever, you are bound to break some rules.	-1.06	<u>33</u>	1.01	9	2.32	<u>1</u>	-1.52	37
18. Being excellent in one single field is enough to become successful.	-1.16	34	-1.52	<u>36</u>	-1.49	37	-0.18	23
19. There are certain jobs where it is natural that you can never have the good feeling of having done your part of the work.	-0.21	21	0.74	14	-0.42	27	1.07	7
20. The rural lifestyle remains attractive and acceptable to me even if I have to give up a number of things that have become self-evident for city people.	0.95	8	0.48	16	1.95	<u>2</u>	1.87	<u>1</u>
21. The emotional attachment to the rural way of life is more intensive for people who pursue some kind of agricultural activity, even if it is home gardening only, than for those who do not.	0.63	13	0.95	10	0.58	12	1.34	<u>3</u>

Statements	Factor 1		Factor 2		Factor 3		Factor 4	
	Eigen-value	Rank	Eigen-value	Rank	Eigen-value	Rank	Eigen-value	Rank
22. Vegetarianism is the future. We cannot afford to slaughter animals for our own benefit.	-1.06	33	-0.95	33	-2.32	39	-1.30	34
23. Because of the negative views on the countryside, external investors tend to avoid rural areas.	-0.74	28	-0.85	32	1.16	34	-0.81	30
24. It is enough to involve in the management of local matters only those who are respected by the inhabitants of the settlement.	-0.64	26	-1.99	39	0.04	19	-1.47	36
25. Everything being cheaper in the supermarket, there is no sense in home gardening or raising animals.	-0.74	28	-0.80	31	0.25	16	-1.78	39
26. It is the villages in the vicinity of which large industrial corporations are located that can develop appropriately.	0.42	17	0.88	11	-0.21	26	0.03	20
27. An enterprise can be successful even if they do not plan in advance to whom they will sell their product or service.	-0.96	31	-0.63	28	1.12	5	-1.21	33
28. Those who like to work and are employed in agriculture tend to be balanced.	-0.32	22	-0.19	21	0.74	10	0.00	21
29. The local community is far too divided, each group would prefer some other direction.	0.64	12	0.13	18	-0.12	23	0.18	17
30. Anyone might get rich by their own efforts in Hungary.	-0.84	29	-1.72	38	0.12	18	-0.53	28
31. Industrial employers located in the vicinity have an unfavourable effect on the nature of the village.	-0.95	30	-0.23	22	-0.09	22	-0.60	29
32. It is typical for the newcomers in our settlement not to accept our system of values.	0.42	17	-0.27	23	-1.32	35	-0.60	29

Statements	Factor 1		Factor 2		Factor 3		Factor 4	
	Eigen-value	Rank	Eigen-value	Rank	Eigen-value	Rank	Eigen-value	Rank
33. Was it left to me, I would rather choose a job which is stable and where I can feel safe.	0.85	11	1.03	8	-0.91	33	0.17	18
34. Small enterprises have no future as opposed to large corporations.	0.85	11	1.14	6	-0.79	32	-1.59	38
35. Hungary should strive for food self-sufficiency.	1.59	3	1.53	1	-0.54	28	1.85	2
36. I think one's business cannot develop without taking a loan.	0.85	11	-1.35	35	0.25	16	-0.33	25
37. To me, entrepreneurship clearly means a family-run business, I am not fond of cooperating with strangers.	-0.42	23	1.10	7	-1.74	38	0.90	10
38. The organic food issue is overrated, for most of the food we eat does contain chemicals, anyways.	-1.27	37	0.83	12	0.74	10	-1.00	31
39. Before starting up an enterprise, we prepare a business plan and consider whether investment returns are acceptable.	0.53	14	-0.53	26	1.70	3	1.18	4

“17. If you want to be an achiever, you are bound to break some rules.” Respondents in the four different factors were rather divided on statement nr. 17 (shown in Table 7). The first factor agrees with it, yet not as much as the other factors. For Factor 3, this is the statement they agree with most, while for Factor 4, this is the one they *disagree* with most. This variance in entrepreneurs' opinions was, however, not too much of a surprise. Actually, this more or less concurs with what we expected, it is in line with our presumptions. This again confirms the strength of Q-Methodology. The similarities and differences in respondents' opinions that were detected during the structured interviews turned so-to-speak “measurable” based on the preferences respondents expressed in relation to the statements.

The statement “11. In today's society, many are only concerned with themselves while completely ignorant to others' well-being” does not really show any significant differences between the entrepreneurs. This is not the primary problem for those in the first factor, yet the score achieved by the statement

(that is, the extent to which they agreed with it) in all three remaining factors was almost identical.

One would be tempted to assume that people were uniform in their agreement with the statement "35. Hungary should strive for food self-sufficiency." This is, interestingly enough, not the case. The third factor does not agree with the statement at all, while all three remaining factors agree with it for the most part.

Concerning the statement "37. To me, entrepreneurship clearly means a family-run business, I am not fond of cooperating with strangers.", Factors 2 and 4 mostly agree with it, those in Factor 1 do agree with it, yet it is not a very important aspect to them, while for those in Factor 3, this is the statement they agree least with.

"34. Small enterprises have no future as opposed to large corporations." Factors 3 and 4 disagree, Factors 1 and 2 agree with this statement.

"3. I would feel regret if country life changed, and most of us had to work for large corporations." An interesting finding was that, for some reason, the first (7.) and the second (5.) factors agreed with the preceding statement, while those in the third (14.) and fourth (11.) factors were rather indifferent about it. Apparently, those who were born in the countryside and have not "seen the world yet" would not mind it if life in the villages changed. Those who came to the villages from the "outside" want the exact opposite. Responses to this statement clearly reflect the problems that have been characteristic for ecological experiments in general. Those living their everyday lives in the village would like to see some changes, because they do exactly know the numerous drawbacks of rural life. They would like to stay, to live on in the countryside, because that is where they feel good, yet they would also like their lives to change, to become easier. They do not accept that the invariability of village life be an objective on its own.

Table 8 Distance between Factors 1 and 2 by statements, Jászfényszaru

STATEMENTS	Factor 1	Factor 2	Distance between factors
6. It is important to me to know the developments concerning my profession, to participate in professional courses.	1.696	-0.499	2.196
36. I think one's business cannot develop without taking a loan.	0.848	-1.347	2.195
16. Those employed in agriculture are characterized by systematic thinking.	1.378	-0.667	2.045
2. If I could start over again, I would lead a different life.	-1.167	1.324	-2.491
38. The organic food issue is overrated, for most of the food we eat does contain chemicals, anyways.	-1.270	0.830	-2.100
17. If you want to be an achiever, you are bound to break some rules.	-1.059	1.010	-2.069

The two groups (factors) can be sharply distinguished, as there are differences in their views on some decisive issues, like the importance of being up-to-date about advancements in their profession or whether credits are a nothing-out-of-the-ordinary resource. Those in Factor 2 have doubts concerning whether those employed in agriculture actually think systematically. Their utterances implied a sort of scepticism and “apathy”.

Respondents in the first factor made it crystal clear that their work is their life and vice versa, the second factor, however, expressed their dissatisfaction in this respect, as well. This was also confirmed by their responses to statement nr. 2: if they could start all over again, the second factor would typically lead a different life, while the first factor would not.

Table 9 Distance between Factors 1 and 3 by statements, Jászfényszaru

STATEMENTS	Factor 1	Factor 3	Distance between factors
35. Hungary should strive for food self-sufficiency.	1.589	-0.537	2.126
33. Was it left to me, I would rather choose a job which is stable and where I can feel safe.	0.848	-0.909	1.757
32. It is typical for the newcomers in our settlement not to accept our system of values.	0.422	-1.324	1.746
17. If you want to be an achiever, you are bound to break some rules.	-1.059	2.320	-3.379
27. An enterprise can be successful even if they do not plan in advance to whom they will sell their product or service.	-0.956	1.117	-2.072
38. The organic food issue is overrated, for most of the food we eat does contain chemicals, anyways.	-1.270	0.744	-2.015

The entrepreneurs in the third factor are, as we know by the now, the “true” entrepreneurs, who even deny that the country should strive for self-sufficiency, do not fear anything new, they are willing to take risks, and they believe in the viability of small enterprises. They are expressly fond of cooperation and new relationships. They are the ones, too, who accept that certain rules need to be broken. This is self-explanatory to them. These open-to-the-world agricultural entrepreneurs differ from traditional countryside values, they are willing to accept anything new – they are truly open.

Table 10 Distance between Factors 1 and 4 by statements, Jászfényszaru

STATEMENTS	Factor 1	Factor 4	Distance between factors
34. Small enterprises have no future as opposed to large corporations.	0.848	-1.591	2.439
16. Those employed in agriculture are characterized by systematic thinking.	1.378	0.151	1.227
36. I think one's business cannot develop without taking a loan.	0.848	-0.326	1.174
12. Home gardening and raising animals for the family are inherent to country life.	-0.530	1.136	-1.665
37. To me, entrepreneurship clearly means a family-run business, I am not fond of cooperating with strangers.	-0.422	0.898	-1.320
19. There are certain jobs where it is natural that you can never have the good feeling of having done your part of the work.	-0.211	1.075	-1.286

The fourth factor indicates an unconditional attachment to the rural way of life, an obvious acceptance towards traditional countryside values, and the avoidance of any sort of extremist views. It reflects a certain inwardness, that they do not really like to cooperate with others.

They have a less distinct and clear-cut opinion than those in Factor 1, yet their system of values is not significantly different.

Table 11 Distance between Factors 2 and 3 by statements, Jászfényszaru

STATEMENTS	Factor 2	Factor 3	Distance between factors
37. To me, entrepreneurship clearly means a family-run business, I am not fond of cooperating with strangers.	1.097	-1.740	2.837
1. The reason why success is important to me is the financial wellbeing of my family.	1.457	-0.744	2.202
35. Hungary should strive for food self-sufficiency.	1.533	-0.537	2.069
39. Before starting up an enterprise, we prepare a business plan and consider whether investment returns are acceptable.	-0.528	1.697	-2.225
14. I do not have much trust in contracts, the given word is more valuable.	-1.591	0.537	-2.127
24. It is enough to involve in the management of local matters only those who are respected by the inhabitants of the settlement.	-1.985	0.043	-2.029

It is willingness to cooperate where their views are the furthest apart. Factor 2 includes individuals who would rather work with their family, they tend to avoid conflicts, and they value financial security.

With regard to the 'contract vs. given word' issue, Factor 2 is more pessimistic, rather distrustful – contracts are more important to them. It is absolutely clear that “true” entrepreneurs (Factor 3) are definitely more optimistic about one's chances in the countryside than any other factor is.

Table 1 Distance between Factors 2 and 4 by statements, Jászfényszaru

STATEMENTS	Factor 2	Factor 4	Distance between factors
34. Small enterprises have no future as opposed to large corporations.	1.144	-1.591	2.734
17. If you want to be an achiever, you are bound to break some rules.	1.010	-1.523	2.533
2. If I could start over again, I would lead a different life.	1.324	-1.114	2.438
39. Before starting up an enterprise, we prepare a business plan and consider whether investment returns are acceptable.	-0.528	1.182	-1.711
14. I do not have much trust in contracts, the given word is more valuable.	-1.591	-0.037	-1.554
6. It is important to me to know the developments concerning my profession, to participate in professional courses.	-0.499	0.946	-1.445

Respondents in both factors (2 and 4) are basically used to the rural way of life, but while those in Factor 2 are pessimistic, Factor 4 is more optimistic and open. All of them have the roots of their values in the traditional countryside way of life, but those in Factor 2 see no opportunity to break out of their present lives – while the entrepreneurs in Factor 4 do. This latter group considers the advancements in their profession important, they are willing to draw up a business plan before starting a new venture, and they typically think that small-scale farming does indeed have a future.

Table 13 Distance between Factors 3 and 4 by statement, Jászfényszaru

STATEMENTS	Factor 3	Factor 4	Distance between factors
17. If you want to be an achiever, you are bound to break some rules.	2.320	-1.523	3.843
27. An enterprise can be successful even if they do not plan in advance to whom they will sell their product or service.	1.117	-1.213	2.330
25. Everything being cheaper in the supermarket, there is no sense in home gardening or raising animals.	0.251	-1.780	2.031
37. To me, entrepreneurship clearly means a family-run business, I am not fond of cooperating with strangers.	-1.740	0.898	-2.638
35. Hungary should strive for food self-sufficiency.	-0.537	1.850	-2.386
15. Nowadays, a significant part of rural inhabitants have a lifestyle very similar to that of city people.	-1.368	0.358	-1.726

They can be most sharply distinguished by their response to statement nr. 17. The agricultural entrepreneurs in Factor 3 are convinced, most probably as a result of their very own experience, that whoever wants to be an achiever will be forced to break certain rules. Those in Factor 4, on the contrary, either do not believe that they would be forced to break any rules or it is not acceptable to them to do so in any case. This is the item where the two factors are the furthest apart, yet the distance is significant for all statements. Factor 4, based on their healthily-conservative values, strongly believes that home gardening is worth the effort, and they are convinced that Hungary should strive for food self-sufficiency.

II. 6. Identifying the Types of Entrepreneurs in Jászfényszaru

Based on the in-depth interviews, the Q-Sorts, the ranking of the statements, the narrative life profiles, the responses to our questions about the success of enterprises, and the evaluation of statistical elements, the following four types of entrepreneurs could be outlined:

Those following a conscious choice of values (Factor 1)

A group of people satisfied with their position, open to cooperation and economic changes. Positively committed people, who have consciously committed themselves to a rural life, for whom the rural way of life, the traditional rural system of values is self-explanatory.

K. Ernő and Katóka, both identified as Factor 1 individuals, responded to our question whether they think their enterprise is successful as follows:

- “It’s developing. Cost effective production meets higher profits.” K. Ernő
- “My success was limited by sales difficulties, and by our extreme vulnerability to weather.” Katóka

Those eager to change (Factor 2)

According to their ranking of the statements, it is not the countryside what they are talking about but rather their own desire for a change. They do not feel safe. They would rather strive for stability. Characterized by dissatisfaction, a certain kind of general mistrust.

Izabell, S. Andi and Gitta, all three identified as Factor 2 individuals, responded to our question whether they think their enterprise is successful as follows:

- “It’s not, because the profit is low.” Izabell
- “It’s only successful to the extent that people like it, and that what we do is a bit special.” S. Andi
- “The enterprise is not successful, not this year. Producer prices suffer because of the economic crisis.” Gitta

Experienced entrepreneurs (Factor 3)

Experienced, conscious, rational entrepreneurs. Their views are determined by life experience instead of principles. A group of people committed to the entrepreneurial way of life, open to change and to cooperation.

Rajmund, N. Gergő and É. István, all three identified as Factor 3 individuals, responded to our question whether they think their enterprise is successful as follows:

- “Depends on the year. Last year it was successful. This year it's not. This work necessitates precision and due attention.” Rajmund
- “Yes, I do something I like.” N.Gergő
- “Everything is sold, fortunately. And it has also been paid for..” É.István

Followers of tradition (Factor 4)

Traditional agricultural entrepreneurs. The traditional system of values is what determines their lives. A group of people satisfied with their position, unwaveringly positive about the rural way of life. Their work is their life, and they do not want to live a different life. They believe in rural life, failures do not discourage them leading this way of life.

N. Sándor, N. Gergő and É. István, all three identified as Factor 3 individuals, responded to our question whether they think their enterprise is successful as follows:

- “Out of the 11 groups of assets, this was the only one to survive after the privatization, but we aren't successful in terms of profitability.” N. Sándor
- “I wouldn't say we are successful. But maybe moderately. We're still afloat.” K. Béla
- “It's successful, because I always have some work to do, and I can see the result of my work.” Ördögné

III. Summary and Conclusions

My analyses revealed that there are several types of successful business leaders and entrepreneurs in the countryside who have come to identify the values common to the area and the communities they work in, and who have also realized how these values might be incorporated in a business venture. Those who can make a living in the countryside as entrepreneurs do not constitute a homogeneous group – they may differ both in terms of entrepreneurial skills and human qualities. Their attachment to the rural way of life, their roots are, however, undoubtedly common.

Jászfényszaru being a far more open settlement, even industrialized in some sense, where entrepreneurs occasionally attempted to build a career in other types of jobs, as well. What is more, even the influence of the urban agglomeration around Budapest could be detected here. When selecting the sampling regions, I was hoping that Jazygian traditions would have an influence on people's system of values. The existence of such an effect could not be unambiguously confirmed, even though the traditional Jazygian values of independence and autonomy were undoubtedly reflected in people's evaluations of the statements. An indication of this is that it was Jászfényszaru where entrepreneurs were most sharply distinguished from the other groups identified in the region.

There is no development in the countryside without local initiatives. Rural areas cannot be truly successful without local leaders who are accepted by their communities – any external support, financial investment, infrastructure development, knowledge transfer etc. would be in vain. The five value choice types identified by the research need clarification. It is without doubt, nevertheless, that there is a serious need for personality development programs that would tap into latent skills and abilities, and help countryside entrepreneurs (hampered by their isolation-caused low efficiency levels) overcome the psychological barriers that keep them from becoming the natural leaders of their communities. Getting to know rural people better is only one – and maybe the first – milestone in this process.

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Zsófia Vetőné Mózner

Analysing the environmental impact of international trade using the Carbon Footprint indicator

I. Introduction

There is essentially a consensus that anthropogenic carbon emissions contribute to climate change (IPCC, 2007). The indicator of the carbon footprint, which is a well-known and accepted indicator of sustainability, can be a useful indicator to analyze the environmental impacts of emissions, and it can even be useful for political decision-making.

There is a growing trend that the countries of the world become more and more dependant on each other in economic terms in the process of globalization, and they are part of the international trading system. Because of this, the production and consumption of goods and services and their environmental impact have become fairly separated from each other in space as well, and this way, the impact on the biosphere increases (Boda-Pataki, 1995). Due to international trade, nowadays it has become possible for countries to import biocapacity and become dependant on other countries' ecological stock.

It is highly essential to investigate what are the impacts of this phenomenon on the natural stock and sustainability of a country and to move forward an approach where consumer responsibility is dominant.

This paper quantifies Hungarian households' carbon footprints from a consumption perspective, calculating and examining the environmental pressures associated with imports and domestic consumption. The aim is to examine the role of international trade, how the delocalization of production affects the structure of the carbon footprint.

2. Theoretical background

In this section a brief overview is given about the carbon footprint and its origin, followed by a literature review on the relevant studies.

Originally, the carbon footprint was one component of the full ecological footprint analysis, but it can be calculated and discussed separately as well, and because of climate change it has risen to prominence in a very notable way.

The ecological footprint is an indicator, introduced and developed by Wackernagel and Rees (1996). It is defined as the corresponding area of productive land and aquatic ecosystems required to produce the resource used, and to assimilate the waste produced, by a defined population at a specified material standard of living, wherever on Earth that land may be located (Rees, 1996). The ecological footprint can be compared to its biocapacity on an aggregate basis and if the ecological footprint exceeds its biocapacity then there will be an ecological deficit.¹

During the calculation of the carbon footprint, the CO₂ emission data are translated into the area, measured in global hectares, which account for absorbing the carbon emissions. The carbon footprint is the area of annual forestry required to sequester the CO₂ emissions (Monfreda, 2004).

The significance of the carbon footprint is that it can be compared to the biocapacity of the country, thus it can be a mean of illustrating the finite nature of natural capital and it allows quantifying the limits of sustainability. The methodological root of the carbon footprint goes back to the concept of “the energy cost of living” developed in the 1970s, and to the net energy analysis (Herendeen, 1976).

When analysing the footprint, the use of input-output tables in the methodology is essential, as it can reveal the inter-industrial dependencies in the economy (e.g. services indirectly require the use of all other sectors) and by it the emissions and environmental impacts can be allocated to the final consumption categories (Csutora, 2012). The input-output approach has the essential advantage of being able to track the transformation of goods through an economy, tracing impact from final product back to raw resources. It also captures the impact of exchanged goods and services. This application is used after Leontief, whose

¹ Kiss (2012) deals with an other aspect of the Hungarian ecological footprint.

studies (Leontief (1936) and (1970)) can be a starting point for the methodology. The use of the $(I-A)^{-1}$ Leontief inverse matrix in the calculation is of great importance in the sustainability evaluation of trade. Wiedmann et al. (2006) propose the application of input-output analysis to allocate footprint into detailed consumption categories.

In the following section a brief summary is given about studies examining the environmental impact and footprint of international trade, using input-output models.

Van Vuuren et al. (1999) were among the first ones who analysed the relation of the ecological footprint and international trade. They found that the Netherlands uses three-four time as much land as it is geographically comprised of for sustaining its economic activities. Much research examined the regional scale; Ferng (2002) analyzed the energy footprint of international trade in 14 producing sectors, Andersson and Nevalainen (2003) conducted a study on Finnish international trade. Ahmad and Wyckoff (2003) examined in 24 countries the impact of CO₂ emissions of international trade. Peters and Hertwich (2006) used input-output analyses and structural path analyses for examining the environmental impact of international trade in Norway. Turner et al. (2007) gives a detailed insight into the methodology of the ecological footprint of international trade, using input-output tables. Peters (2007) developed this model examining 87 countries in a 57 sectoral model and Wiedmann (2008) produced a comparative study about using the input-output tables of MRIO analysis or the Product Land Use Matrix of the Global Footprint Network.

The calculation using the input-output analysis supports the principle of consumer responsibility, so in this study that kind of analysis is used.

3. Methodology

For calculating the carbon footprint of international trading activities, regarding the footprint of domestic and import consumption, the methodology proposed by Wiedmann (2006), Munksgaard (2001) and Peters (2008) was used.

The general formula calculating the carbon footprint is the following:

$$CF = F (I - A)^{-1} y_{com}$$

Where:

- F is a row vector, each element representing the carbon footprint value (domestic and imported environmental load together) per unit of industry output,
- $(I-A)^{-1}$ represents the direct and indirect requirement matrix calculated from the symmetric input-output (industry by industry) tables. This is the so-called Leontief inverse matrix, showing the input requirements in case of one additional unit of output.
- y_{com} is the vector of the domestic consumption's final demand, in the consumption categories.
- $F(I-A)^{-1}$ is often referred to as the multiplier or total intensity matrix.

The aim of this study is to quantify the environmental load generated by household consumption, according to the principle of consumer responsibility; it can be calculated by utilizing the following formula:

$$CF_{cons} = F (I-A)^{-1} \text{diag} (y)$$

The vector of the domestic final demand needs to be diagonalised in order to obtain the consumer's environmental load.

The carbon footprint of the household's final consumption can be decomposed into two parts.

1. The Carbon Footprint of domestically produced products and services (CF_d), which has been emitted because of the domestic consumer demand. Emissions due to exported products are not included.

$$CF_d = F (I-A_d)^{-1} y_d$$

Where A_d is the matrix of domestic industry requirements of domestically produced products, calculated from the IO table, and y_d is the vector of final demand of domestic consumption.

2. The Carbon Footprint of imported goods and services, which can be further divided according to the origin of the footprint.

$$CF_m = F \{ \underbrace{((I-A)^{-1} - (I-A_d)^{-1}) y_d}_{\text{Inputs for imports used for domestic production}} + \underbrace{(I-A)^{-1} y_m}_{\text{Inputs for imports consumed directly}} \}$$

The carbon footprint of direct imports shows the environmental load of imported products immediately and directly used for final domestic demand. The input which is needed for direct imports is the following:

$(I-A)^{-1} y_m$, where y_m is the vector of import consumption.

The import used for inputs in domestic production for final demand is:

$$((I-A)^{-1} - (I-A_d)^{-1}) y_d$$

In the calculation of the import footprint, the Leontief inverse is used and it is assumed that each commodity imported is produced by using proportionally the same kind of inputs (materials, intermediates, labour and energy) as used in the domestic production sector.

Year 2005 was chosen for the analyses, as the most recent data was available for this year. The symmetric input-output matrix from the Eurostat database was used, and the carbon footprint values were from the database of the Global Footprint Network, used in the environmentally extended matrix, also for year 2005.

As the last step of the calculation, the carbon footprint of final demand was reallocated to final consumption categories, using the COICOP international classification tables. The contribution to the carbon footprint of 12 final consumption categories was analysed.

Decomposing the carbon footprint allows us to identify and analyse the environmental load generated by domestic production or by imports, which can be a new and also politically relevant methodology.

4. Results and Discussion

The carbon footprint of domestic household consumption has been analysed, as there is an increasing awareness of an individual's behaviour or lifestyle as a source of carbon emissions (Bin and Dowlatabandi, 2005). Thus it is essential to get a clear picture of consumer habits and their environmental impacts related to domestic and imported emissions.

The carbon footprint has been decomposed according to the methodology and Figure 1 shows the structure of the carbon footprint.

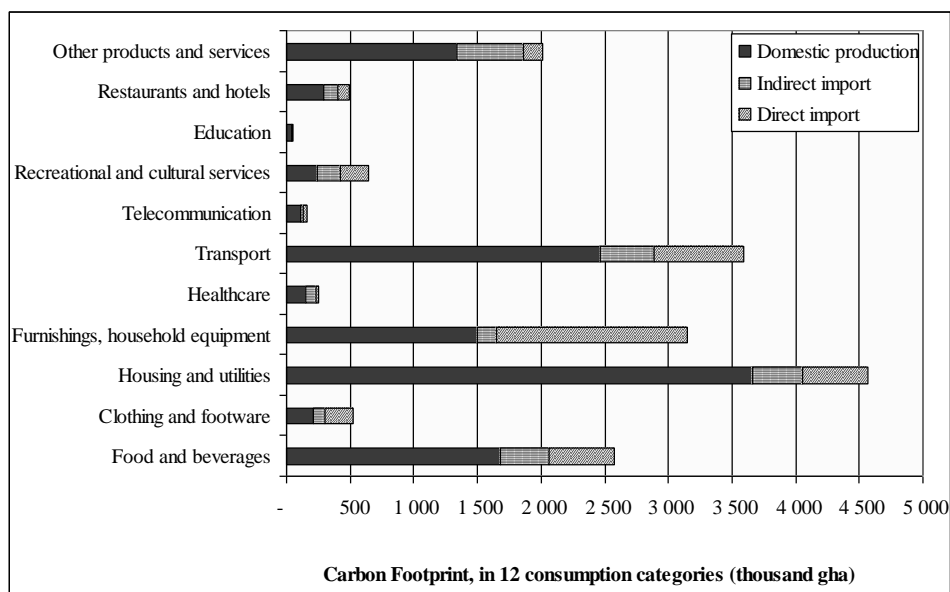


Figure 1. Hungarian household carbon footprint (gha/year) according to origin of environmental load – author's own calculation

It can be seen that the carbon footprint of direct imports is the most significant in the consumption category of furnishings, household equipment and maintenance, followed by transportation. A major part of the energy use of Hungarian households is also covered by imports, thus the housing and utilities consumption sector is also very carbon-intensive in the final consumption sector. The impact of direct imports is also notable in the clothing and footwear category. The impact of indirect imports is significant in healthcare and in other products and services categories.

The footprint related to imported materials or products does not have an environmental load where the products are consumed, but rather in the producing country, thus Hungary imports a great part of biocapacity from its commercial partners.

Because of the results above, there is a need for a further and more detailed examination in the consumption categories where the carbon footprint is very high and international trade plays an important role.

Taking a closer look at the environmental load of Transportation, it can be seen that the Transport services are a major part of the carbon footprint. More precisely, it is the road transport which is the reason for a great part of the emissions (Figure 2). In case of the operation of personal transport equipment, it is the fuel used for operating the equipment which causes the environmental load, but a major part of this kind of emission does not appear in the producing country - the part of the footprint derived from direct imports is rather significant.

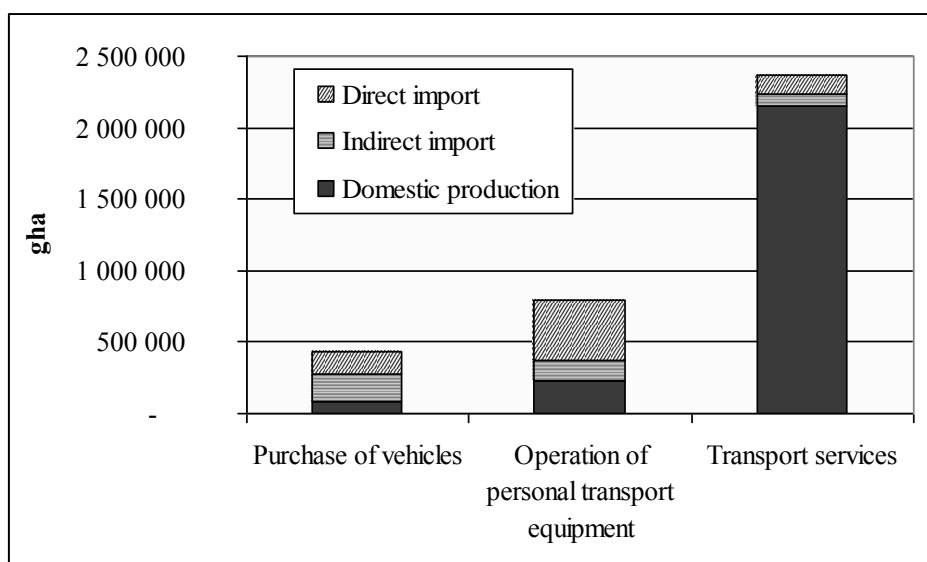


Figure 2. The carbon footprint of the transportation consumption category- author's own calculation

The carbon footprint of furnishings, household equipment and maintenance needs to be analysed as well. Figure 3 shows that the chemicals, household utensils and other household products categories have the highest carbon foot-

print, but only half of it is produced domestically. So, we can say in case of the chemicals, utensils used for households Hungary imports biocapacity, as the emissions do not impact the domestic environment, but that of the producing country. The domestic carbon footprint is significant in the cases of furniture and furnishings. We can conclude as well that indirect imports are not really noteworthy. Summarizing the results, it can be concluded that in this consumption category the impacts of the imported products and materials exceed that of the domestic ones.

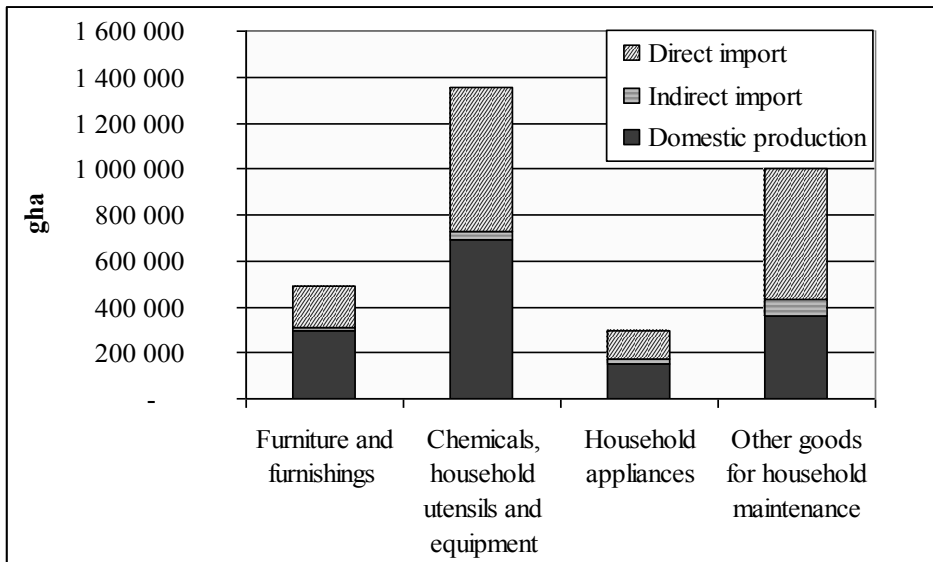


Figure 3. The structure of the carbon footprint of the furnishings, household equipment and maintenance consumption categories – author’s own calculation

5. Conclusions

As international trade increases, it becomes more important to include the impact of it in environmental analyses, as partly it can be a complicating factor driving and also masking unsustainable consumption patterns. The focus of this study was to investigate the impact of domestic and imported emissions, using the carbon footprint as an indicator.

We could see that there are such consumption categories in which Hungarian households cause great environmental impact outside of the country borders, in the producing countries. Using the methodology, which has been introduced and applied here, the impact of international trading activities can easily be analysed. Not only the impacts of the final demand and consumption can be revealed, but also indirect impacts – which play an important role in the structure of the carbon footprint, important to deal with.

It is an important observation that those consumption categories that are responsible for the highest carbon footprint of Hungarian households are those where consumption patterns can directly be influenced by individual consumer behaviour. Consumer lifestyle has an extremely great impact on the environmental load which is why it is important to make analyses using the consumer responsibility principle.

The consumption categories of housing and transportation have the highest footprint, there is direct consumer influence, so it can be modified through conscious consumption decisions. This would be desirable, but unfortunately political efforts do not entirely support this direction – they tend to favour carbon emission reductions from the production side, not promoting efficiently the possibilities of reduction by consumers.

A further investigation of international trade-related environmental impacts is needed in order to analyse the cross-effects of imported products. The methodology of carbon footprint calculation can also be refined in the future. The development of footprinting calculation of shared responsibility principle can be a promising and useful issue, as there is increasing recognition that the impact of international trade should be allocated to the country which generated the demand and where it is consumed.

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**Theoretical deficiencies in the calculation method
of ecological footprint
– Comparing the environmental impacts
of intensive and extensive agricultural practices**

1. Introduction

One of the greatest challenges for the mankind is how to ensure the life conditions for the growing population. The question arises how we will succeed in increasing agricultural production and in minimizing the detrimental impacts of agriculture at the same time. This question has evidently practical significance, and it also highlights a conflict between the neoclassical way of economic thinking and the ecological approach, which takes into account the biophysical limits of production as well.

The introduction of sustainable approach into agricultural practices would be the most effective solution, which sets the goal of the maximization of the net benefits for the society from the production of food and fibre and from ecosystem services (Tilman et al., 2002, Kelemen et al., 2008, Marjainé Szerényi et al., 2011a, Marjainé Szerényi et al., 2011b, Marjainé Szerényi and Eszlári, 2011).

The major issues of agricultural environmental impacts are the effective management of fertilizer use and ecosystem services, namely: nutrient-use, water-use, maintaining the soil fertility content and sustainable livestock production.

The harmful environmental impacts of agriculture basically stem from the transformation of natural habitats to agricultural area. Agricultural practices can change the whole ecosystem through the conversion of the landscape and the usage of fertilizers and pesticides. Due to the spread of agrochemicals the cereal production has doubled in the past 40-50 years (FAO Database, 2010), in order to satisfy increasing demand for food which is the consequence of the growing population and growing income level, which has saved natural habitats from

agricultural conversion. Fertilizers and pesticides (fungicides, herbicides, insecticides etc.) are mostly nitrogen- (NO_x , ammonium), phosphorus- and potassium-based. The overuse of fertilizers and pesticides through leaching into the soil causes its degradation and groundwater pollution.

Nitrates loading to lakes and rivers induce over-enrichment and eutrophication endangering freshwater ecosystem. Crops can take up only 30–50% of nitrogen informs of nitrate (NO_3^-) and ammonium (NH_4^+) and approx. 45% of phosphorus fertilizers, thus great amount of the applied components are lost in the soil polluting groundwater.

Groundwater is the key element of freshwater purification and the main problem is that it can spread the nutrients and toxins in great expanse and load into the lakes and rivers in large distances as well increasing health risks for species, livestock and human beings. The health risk for mammals depends mainly on dose-effect and dose-response relationships, the physical state of the product (fertilizer, pesticide), and contact type (oral, dermal etc.). Organophosphorus insecticides are considered to be very hazardous for animals, other pesticides are classified by the degree of hazard on the basis of LD_{50} (WHO, 1990). It also alters the terrestrial habitats of species, thus it affects the ecosystems by decreasing the biodiversity.

Sustainable agriculture tries to suggest an alternative, which will provide increased crop yields through more effective fertilizer, pesticide, and water use, ecologically conscious practices in soil maintaining and livestock production (Tilman et al., 2002).

In this article we aim at comparing the intensive and extensive agricultural practices and their environmental impacts on the example of three countries: the Netherlands, Hungary and Brazil. We analyze the relation between agricultural yield and its determining factors, in order to reveal the impacts of agricultural practice and in the quest for defining the amount of sustainable yield. Furthermore a proposal is presented how the calculation of the yield factor could possibly be changed. Section 2 gives a detailed insight about the research question of the articles, its importance and focus. In section 3 a definition is given on how extensive and intensive agriculture can be defined and a brief overview is given on the agricultural features of the analyzed countries. In section 4 a literature review is given on the topic discussed here, then in section 5 the research methodology is presented and in section 6 the results and discussions can be found. Finally, conclusions are drawn.

2. Research question

The indicator of the ecological footprint aims at showing the difference between the sustainable way of living and the actual way of life and its impacts. Though, according to the calculation formula of the ecological footprint and the biocapacity, as for the cropland component, the ecological footprint cannot exceed the biocapacity.

The yield factor used in the calculation of the biocapacity is not the sustainable amount of yield for a given area, but is calculated from the real and actual yields, and this way the biocapacity and the ecological footprint for cropland give the same result.

So the biocapacity of cropland does not show the area what the sustainable amount of production would require, but the actual land used for agricultural production.

The reason for this way of calculation is that there is no available data to know what the sustainable amount is. The sustainable yield would be surely lower than the present amount, thus the overexploitation practices could be revealed. The importance of this research topic has already appeared in the study of Wackernagel et al. (2004). They suggest taking into the calculation of the productivity factor, which could be used even in time-series.

The optimal and sustainable production would be needed to calculate the ecological footprint and to show the real overshoot. In this study we aim at examining what the sustainable amount of yield could be and how it can be estimated. We start from the assumption that the regenerative capacity of the land should be taken into account in the calculation, therefore if the excessive fertilizer use cannot contribute anymore to the growth of the yield, then the yield production is beyond the limits of sustainability. A sustainable agriculture is one that is economically viable, provides safe, nutritious food and conserves and enhances the environment. Today, the drive for productivity should be combined with desire for sustainability.

Another problem is with the calculation of the cropland footprint that an increase is shown in the biocapacity, if a more efficient agricultural production manner is found, but it may not be sustainable, the overexploitation of soil by chemicals and fertilizer does not appear in the calculation and results. The real environmental load generated by agriculture is not revealed properly through

ecological footprint indicators, as the type of agricultural farming (thus the nature of the pollution it creates) is not incorporated in calculation processes.

The research question is a real challenge which is discussed here is of severe practical importance from the viewpoint of economics as well, as it incorporates a conflict between the need of providing food for the growing population and the ecological limits of the increasing crop yields. Strong yield growth would be necessary in the area of China, South Asia, Africa, but the environmental constraints will limit this process. As for Harris (1996), there is a conflict between the pressure to increase yields on the demand side and the requisites of long-term sustainability.

There is an ecological cost in achieving food supply for the world population and meeting the sustainability conditions. This cost, associated with supply expansion must be considered, not only the supply capacity of the world agriculture.

The approach of the neoclassical economics focuses classically on yield increases as a result from technological advances and increased input use. So, in this way the biophysical limits and the carrying capacity are not taken into account. Neoclassical economists reject the necessity of taking into account the focus on limits, arguing the technological advances and the trading activities can solve the problem of the excessive use of agricultural land. On the contrary, the view of the ecological economics is based on the environmental limits of the growth system (Harris, 1996). Ecological economists (Martinez-Alier (1991) and Gever et al. (1991)) argued that the agricultural production is needed to be viewed in the perspective of ecological limits on carrying capacity.

3. Intensive and extensive agricultural practices: the comparison of the Hungarian, Dutch and Brazilian agriculture

It is very difficult to define accurately the difference between intensive and extensive agricultural practices; they are usually applied on the same area combined, depending on the availability of resources and farming practices. However, there are some peculiarities for both practice types.

Extensive agriculture generally uses larger land in order to produce the same yields than intensive agriculture and the crop yields primarily depend on the

natural fertility of the soil, climate and availability of water. Contrarily, intensive agricultural practices need larger amounts of capital and application of fertilizers and pesticides and irrigation equipment, which induces greater crop yields per unit of land than extensive agriculture. So, the main features are the scale of crop yield and fertilizer use relative to land area (Norton-Alwang, 1993).

Higher and increasing level of agricultural pollution is common in Europe. In case of Hungary, the present state of the agriculture is not desirable from ecological and social point of view, though the country is well-endowed for agricultural production; there are fertile soils and a high number of sunshine hours. The agricultural traditions are nearly a thousand years old, so because of this and the advantageous geographic features, the Hungarian agriculture can ensure good crop yields both in quality and in quantity. Hungary has a total area of 9.3 million hectares.

Almost two-thirds of the country's total area is under agricultural cultivation, it can be considered high among the European countries. Only Denmark and the United Kingdom have higher proportions. 78% of this cultivable area was arable land and 17% was grassland, while kitchen gardens, orchards and vineyards had a combined share of only 5%. (MARD, 2009).

Agriculture has traditionally been an important sector in the Hungarian national economy. Because of the political transition, economic changes and restructuring have taken place, so the Hungarian agriculture has changed much during the last twenty years. In 1989, when the changes and transition started to take place, the agriculture accounted for 13.7% of the GDP, twenty years later, in 2009, it was only 3.7%.

As for the employment, 4.5% of the total active population is working in the agriculture, the sector does not use a relatively high amount of labour force, and from a social point of view, it does not provide them safe and adequate way of living.

The cereal production is important in Hungary, as in the foreign trade balance the cereal export contributed most to the food export. Hungary produces cereals on half of its agricultural area. The fertilizer application was very high in the 1980s, but after the transition it had fallen significantly. From an environmental point of view, the fertilizer use is not desirable, as in Hungary the rate keeps growing and the dominant practice is the unilateral nitrogenous fertilization, the

phosphorus- and potassium-based fertilization is of less importance. The irrigation is not significant in Hungary, it accounts only for 2% of the total cultivable area (MARD, 2009).

In case of the Netherlands, the country has long practices of intensive production. The Dutch agriculture can be divided into three main areas: crop production, dairy and livestock production, and horticulture. Therefore, the agricultural land can also be divided into three types: grasslands, farmlands, and horticultural lands. The agriculture in the Netherlands corresponds to 10% of the national value added and also the employment is higher, which is also around 10% (AER, 2008).

Because of the geographic situation of the country, extensive waterways and network of dams and dikes have been developed and built, which allow for easy irrigation and have produced very fertile soils. The fertilizer use is of great scale, which has created environmental pressures, as the application is very intensive, because of land shortage.

In the Netherlands without some sort of fertilization, much more land would be required to achieve the same yields as found with fertilized crops.

Table 1. Comparison of the main features of the Hungarian and Dutch agriculture

The scale of intensity of farming in 2005	Hungary	The Netherlands
Proportion of utilized agricultural area to total area	83%	58%
Proportion of arable land to total area	49%	33%
Proportion of cereal area to total arable area	65%	19%
Nitrate content in rivers (mg/l)	6	11
Phosphate in rivers (mg/l)	0.07	0.08
Ammonia emissions (t)	94 252	121 000
Livestock density index (livestock units per hectare)	0.58	3.26
Labour force (1000 person employed full time)	229.40	173.90
GHG emissions in agriculture in 2001 (t, CO ₂ eq per ha)	0.75	10.17

Source: authors' compilation using Eurostat data (2011)

As the biocapacity in Hungary is greater, there is a rationale for extensive farming. For the Netherlands, land is a scarce resource, so intensive farming processes are utilized. The features of the different types of farming are shown in Table 1., where it can be seen that the Netherlands has smaller scale labour force and lower agricultural labour input and the share of agricultural product-specific inputs is lower as well. The Netherlands can be a typical example for intensive agricultural practices. Hungary, using larger proportions of its land for farming, is typically conducting extensive farming. The livestock density index confirms these statements as well.

Comparing extensive farming with intensive, environmental impacts can be seen through the listed categories. Because of intensive farming, spending on fertilizers and soil improvers is 2.55 times higher, and spending on plant protection products is 5.6 times higher in the Netherlands than in Hungary. It is the same story with natural elements when considering the supply of nitrogen and phosphates, and ammonia emissions. The groundwater nitrate content can be a good proxy for evaluating the environmental damages caused by agricultural fertilizer use.

After comparing these figures, we may conclude that intensive farming processes contribute to a higher environmental burden, and it should be indicated by the biocapacity values.

Our third selected country in the analysis is Brazil, because of its transforming situation from extensive to more and more intensive agricultural practices. Over the last decades Brazil became from food importer to the world's largest net agricultural exporter having the largest trade surplus, and crop production has been increased fivefold between 1996 and 2006 (The Economist, 2010). Agriculture belongs to the most dynamic growing sectors in the country, which accounts for 8% of the country's GDP. In 2006 Brazil was the world's largest exporter of the following products: soy products, orange juice, coffee, beef, ethanol, sugar, tobacco, poultry, and a significant world supplier of pork, cotton, cocoa, corn and fresh fruit (Ministry of agriculture of Brazil, 2007).

Due to the pressure for production of emerging countries, the rain forest area have been transformed mostly to cropland during the last decades losing between 1990 and 2005 about 8.1% of its forest cover. The agricultural land area has grown by 70% from 1961 to 2007 (Mongabay, 2010).

4. Literature review – The sustainable yield and the impact of agriculture

The calculation of the cropland and the environmental impact of agricultural practices have already appeared in many studies. Fiala (2008) argues that the environmental impact of agricultural practices does not appear properly in the ecological footprint. If there is a need for increased food production and two countries are given with different efficiency in producing food, then a new equilibrium will be reached by producing and consuming more food, but the amount of land used and its environmental impact is unknown, as the extensive or intensive way of agricultural production cannot be indicated by the footprint of food production.

There would be a need to know what the amount of sustainable yield is in order to calculate the real environmental impact of agriculture. It is highly difficult to define and measure what sustainable yield is. The agricultural yield is affected by soil quality, climate and of course management practices. According to Feng (2005) the agricultural management practices affect the crop yield directly through the pest control, water supply, and indirectly through the influences on soil quality. As for Doran and Zeiss (2000), soil quality is determined by natural factors, e.g. geography and climate and it can be altered by farming practices as well.

The difficulty in defining the amount of sustainable yield is also that the factors which are influencing the yield, are changing themselves as the time goes by and there might be interactions as well. The agricultural management practices can be dominant determining factors of the agricultural yield (Feng, 2005) and the yield potential of a crop can be estimated through a long-time field study on the relationships between the yield crop and its establishes growth environment. In the study of Gilland (1979), he examined the food prospects and yield ceilings up to 2025, which was an ecologically-oriented study of the world agriculture. He calculated a sustainable amount of cropland and yield.

Harris (1996) argues that the application rate of chemical fertilizers is a representative of a whole package of agricultural practices, which characterizes a high-yield farming system. That is why we intend to show the relationship between fertilizer use and crop yield. The cumulative effects of soil erosion and degradation, water overdraft or water shortage, and the environmental impacts of fertilizer and pesticide use, these all combined undermine the yield potential

of agriculture and the sustainability conditions. The chemical and especially fertilizer use of agriculture is regarded as a major source of lake, river and groundwater pollution, loading nitrogen, phosphorus and sediment in the waterways. The agricultural chemicals detected in groundwater may be harmful for human health and the aquatic ecosystems.

Studies, examining the effect of fertilizer use on the production can be positive, but looking at the marginal rates studies have proven that in some circumstances it already became stagnant or even declining. In some regions and countries, the fertilizer use does not add much anymore to the growth of the crop yield and despite the increased use, the yield patterns are characterized by stagnating yields. The diminishing returns to fertilizer use may lead to yield ceilings in many areas. So, the trend of growing crop yields seems to be reaching its limits.

Ko et al. (1998) examined the environmental impacts of economic activities and estimated ecological footprints in five countries (Costa Rica, Korea, Mexico, the Netherlands and the United States). In general, there is a remarkable linearity between resource use and economic and agricultural production over all countries and all years, suggesting severe biophysical constraints to sustainable objectives. Ko et al. found that there is an inverse relationship between the fertilizer use and the yield per unit fertilizer use in the examined five countries.

They also pointed out that the yield per unit fertilizer use can only be increased by reducing intensity of fertilizer use and reducing the intensity of land use. It is a highly important observation.

Tong et al. (2003) carried out a research on the land use change and the relationship between crop production and fertilizer use in China, looking a greater time span, from 1961 to 1998. The overall results have shown that despite that China has increased its yield per capita dramatically, in order to feed its growing population, it has been done through a high increase in the use of fertilizer, so it increased the ecological cost. It could have been done as the government gave subsidies to farmers who produced certain extra cereal, which meant using more fertilizers in the agricultural process. The chemical fertilizer used per unit of area of total cereals has increased from 4.6 kg/ha in 1961 to more than 200 kg/ha in 1995. There was a positive relationship between 1961 and 1996 between chemical fertilizer use and cereal yields. The yield per unit fertilizer use has decreased dramatically over the years from 1961 to 1995. An

important conclusion is that there is a clear inverse relation between fertilizer input intensity and yield per unit chemical fertilizer input: the higher the fertilizer input the lower is the yield per unit fertilizer input. The decline can be explained by the saturation of fertilizer use, which is the outcome of agricultural industrialization. The soil degradation, the inefficient use of fertilizer, the improper ratios between organic and inorganic fertilizers may also explain this phenomenon.

So it can be seen that the excessive fertilizer use results no more in higher yields, but it has negative impact on the soil quality thus does not contribute anymore to higher yields, not to speak of the environmental harm it causes. The efficiency of using fertilizer has decreased because of fertilizer saturation.

5. Methodology

In this study we aimed at showing how the sustainable amount of yield could be analyzed in order to show the overshoot in agricultural production and the cropland as well. We conducted statistical regression analyses between production yields and the main determining features: temperature, precipitation and the amount of fertilizer used, in case of three countries: Hungary, the Netherlands and Brazil. Hungary was chosen to represent a country where farming is mainly extensive, and the Netherlands to represent intensive farming practices. Brazil is an emerging country, having transforming agriculture.

The regression and correlations were calculated for different time periods between the years 1961 and 2007, using data from Eurostat, IFA, EEA Waterbase, FAO and KNMI Climate Explorer.

Furthermore, we constructed a marginal function for each country, representing the relation between chemical fertilizer use and yield per unit fertilizer input. We take fertilizer (per hectare) as a fairly good proxy for the group of agricultural inputs (pesticide, irrigation, mechanization), which characterize and are used by the intensive, high-yield focused agriculture. We use this proxy as historically yields are very strongly correlated with the input of fertilizers. The function can show in what extent an additional amount of fertilizer can contribute to the yield and it questions the rationale behind the excessive use of fertilizers.

In this article, we focus on the cereal production, more specifically on wheat production and yields, examining the regional impact of biophysical constraints. We take wheat yields as a proxy for overall agricultural production and food supply, which is commonly accepted and used in the literature.

In order to specify the amount of sustainable yield, which could be used in the biocapacity calculation, we constructed a marginal curve showing the groundwater nitrate content per fertilizer unit in the case of the Netherlands. Our assumption is that the intersection of the marginal curve of the yield and groundwater nitrate content can show the amount of fertilizer, by the use of which the yield can be sustainable.

6. Results and Discussion

6.1. Analyzing the connection between yield growth and fertilizer use

In order to reveal the sustainable amount of fertilizer used in agricultural production we have to examine other factors, which can influence the national yields. The main determining features are temperature in the growing season of the crop examined, precipitation and agricultural practices, and technology such as irrigation, fertilizer and pesticide use. The area of land under irrigation is not significant in Hungary, thus we carried out a correlation analysis on monthly average temperature (Celsius) and precipitation (mm) variables for April, May and June from 1961-2007, the total fertilizer consumption (nitrates + phosphates + potash) and yields. Wheat was chosen for our analysis, as it is the most important processed crop in Hungary and on global scale as well, it has a strategic role in feeding the humanity.

A linear regression (at 5% significance level) analysis between temperature (the sum of April, May and June), precipitation (the sum of April, May and June) was carried out on wheat yields; the yields as dependent variable and average temperature and precipitation and fertilizer use as independent variables.

In the model a third dependant variable has been taken into account, the cross effect of the temperature and precipitation. These might influence each other, and as for the yields, in case of higher temperatures the water demand increases in the growing season, which impacts the growth of the crop, thus the yield values. Calculating the regression model, the break points of the trend line in

fertilizer use were taken into account, therefore in the case of Hungary the analysis on three time intervals was conducted.

The main goal of this analysis is to point out the ecologically optimal level of using fertilizers and to define the switching point when the amount of fertilizer begins to reduce the yields or not increase them at all, namely: the level of sustainable yield.

I. Hungary

The total fertilizer consumption (kg/ha) in Hungary from 1961 to 2007 has drastically changed two times during this period, it is indicated on Fig. 1. Because of the breaking of the trend, we calculated for three periods the regression functions, considering the break points of the trends as the end point of a period and a starting point of another. It can be seen that in the first period from 1961 to 1974 the fertilizer used in production has exceedingly increased and the wheat yield followed the growth of the fertilizer use with a bit of time lag, but in a liner growing trend.

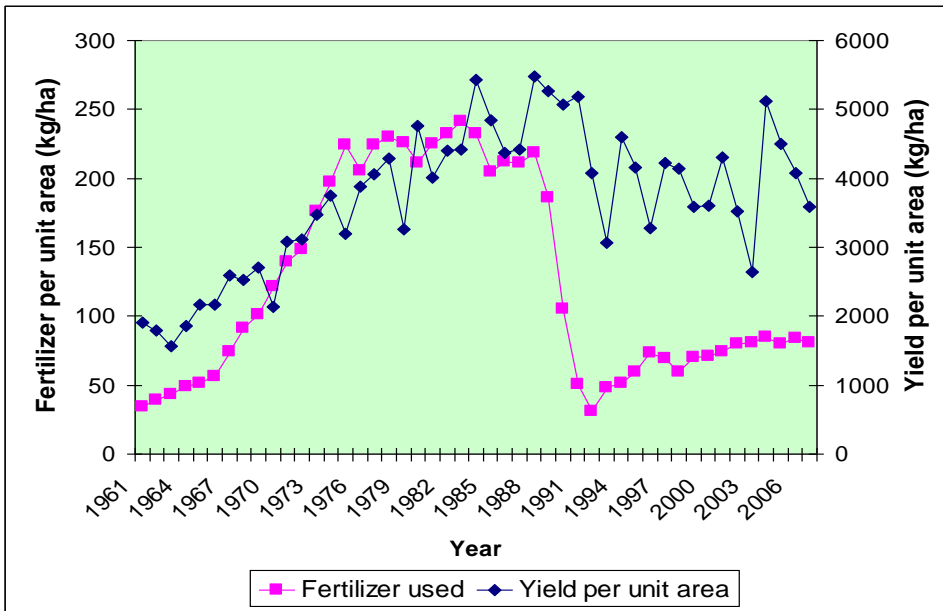


Figure 1. Total wheat production yield per unit area and chemical fertilizer used in Hungary

Having a look at the regression results for this period, significant correlation can be detected only between wheat yields and the amount of fertilizer, which shows a very strong positive connection ($r = 0.930$, $p = 0.000$). The regression analysis resulted, that fertilizer use has a positive effect on wheat yields between 1961 and 1974.

Table 2. Regression analysis results on wheat production in Hungary, in three time periods

Wheat	1961–1974			1975–1989			1990–2007		
R	0.933			0.599			0.868		
R Square	0.870			0.359			0.753		
Adjusted R Square	0.813			0.103			0.677		
SEE	288.337			649.928			403.316		
Coefficients									
	Unstandardized Coeff.	Standardized Beta	Sig.	Unstandardized Coeff.	Standardized Beta	Sig.	Unstandardized Coeff.	Standardized Beta	Sig.
(Constant)	3215.988		0.496	16579.527		0.090	6254.304		0.073
Fertilizer	11.496	0.933	0.000	-2.839	-0.058	0.843	6.085	0.148	0.355
Temperature	11.489	0.041	0.890	-7.451	-0.030	0.939	-195.903	-0.938	0.000
Precipitation	2.221	0.162	0.845	20.051	1.589	0.231	-10.747	-1.040	0.085
Cross-variable	138.703	-0.219	0.780	-742.890	-1.242	0.298	449.065	1.101	0.069

In the next period from 1975 to 1989 it can be observed that the fertilizer use has stagnated around the level of 200 kg/ha, and at the time of transition it has drastically decreased due to the structural changes and the sudden rise in fertilizer prices. As for the yield values, it kept on increasing with a modest rate on average, but looking at Fig. 1, we can see that there were great variations in the examined years. So, it can be concluded that in this time spell there were other significant determining factors concerning the yields. So, there is a need to analyze further the variation of the wheat yield and the influencing factors.

The regression analysis confirms this observation, as during this period the variables only explains the 35.9% of variation, so our model has a very weak goodness-of-fit. Even the temperature, precipitation and cross effect variables are not enough to explain the deviation of the yield values. Additionally, in this time interval we can observe, that fertilizer use and temperature and cross

variable show negative connection with wheat yields. On the whole we can conclude, that from 1975 to 1989 wheat yields are not affected (or negatively influenced) by fertilizer overuse, which also corresponds with our assumption, namely: there is a point where fertilizer use does not contribute any more to increasing the yields and it can even decrease the yields.

As of 1990, a drastic break can be observed in the trend of fertilizer use (Figure 1) the amount of fertilizer has been reduced by one third, due to the price pressure around the time of the political transition and structural changes in the economy. In time interval 1990-2007, wheat yields were negatively influenced the most by the temperature and secondly by precipitation and at least by fertilizers. Although, in the first two examined period the total wheat yield and the yield per unit have been increasing, it can be revealed in our analysis that the yield per unit fertilizer used has been in deed decreasing.

The relation between the fertilizer used per unit area (kg/ha) and the yield per fertilizer unit have also been analyzed, shown on Figure 2.

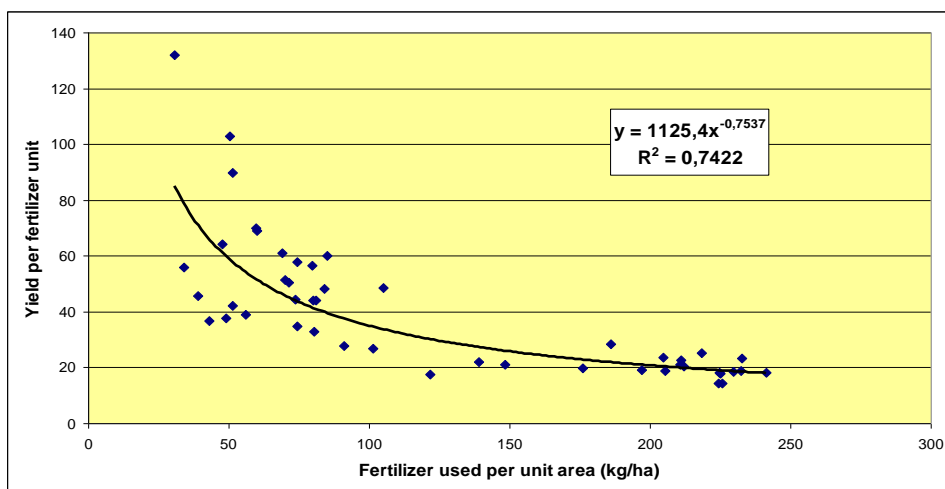


Figure 2. The relation between chemical fertilizer use and yield per unit fertilizer input in Hungary

The relation, which is depicted, can be actually viewed as a marginal curve of fertilizer use. There is a clear inverse relationship between the amount of fertilizer used in the Hungarian agricultural production and the yield per fertilizer unit. The more amount of fertilizer is used the lower is the yield per

fertilizer unit. This result confirms our hypothesis according to which, there is a saturation point of the soil and the additional fertilizer input decreases the marginal yields, and subsequently the ecologically sustainable yield is where the saturation point meets the marginal function.

II. The Netherlands

In case of Netherlands the fertilizer used and the yield per unit area can be seen on Figure 3. Having a look at the fertilizer using trends, it can be seen that there is a breaking point in the trend around 1985. Until that time the chemical fertilizer used shows an explicitly growing trend, from 1960 the use of fertilizer has been increasing until 1984, which is followed by the continuous growth of the wheat yields as well. There was a peak in agricultural fertilizer use around the year 1985, and after it the fertilizer use has been steadily decreasing. Because of this major change in agricultural practice, we have divided the examined period into two parts by the break point of fertilizer use.

From 1961 to 1984 the positive effect of fertilizer use is absolutely detected by regression analysis, in addition, fertilizer use is the key variable in the model. So, the amount of fertilizer used determined very significantly the increase of yields.

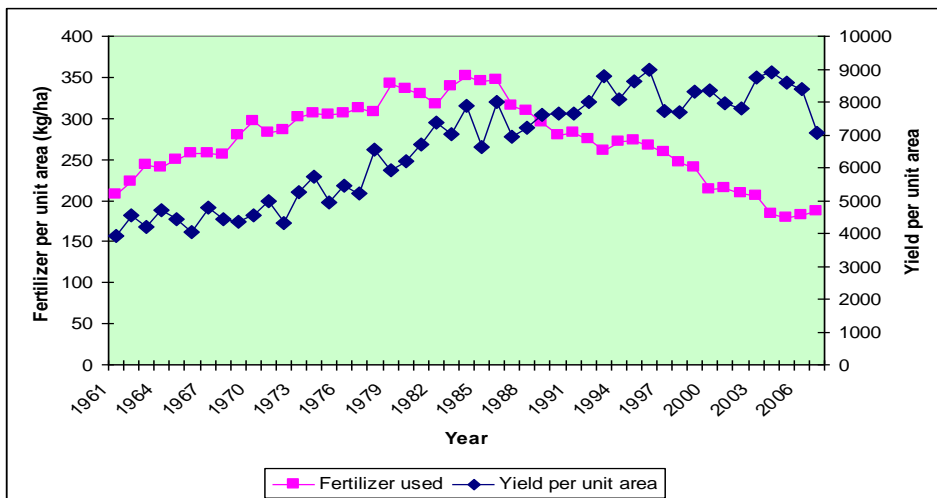


Figure 3. Total wheat production yield per unit area and chemical fertilizer used in the Netherlands

Looking at the yield trends after 1985, it can be observed that in spite of the decrease in fertilizer use, the yield values did not decrease, they kept on growing with a smaller growth rate than before, after 1995 the variation of the yields started to grow. There were years with higher yield, but a stagnating trend can be observed, which could turn easily and not surprisingly into a decreasing trend. This phenomenon can be explained by the saturation of the soil, that even less amount of fertilizer can result in the same level of yield, and another fact, is that it is not only the fertilizer use which determined the yield.

As for the regression results for the second time period examined, after 1984, it is shown in Table 3, that the goodness-of-fit of the model decreases, and fertilizer use have a significantly negative impact on yields.

Table 3. Regression analysis results on wheat production in the Netherlands, in two time periods

Wheat	1961–1984			1985–2007		
R	0.833			0.640		
R Square	0.694			0.409		
Adjusted R Square	0.630			0.278		
SEE	684.419			545.467		
Coefficients						
	Unstandar-dized Coeff.	Standar-dized Beta	Sig.	Unstandar-dized Coeff.	Standar-dized Beta	Sig.
(Constant)	1444.189		0.876	12335.296		0.043
Fertilizer	21.979	0.777	0.000	-8.116	-0.637	0.016
Temperature	-16.343	-0.027	0.888	-30.001	-0.135	0.712
Precipitation	-2.588	-0.115	0.858	-4.393	-0.356	0.671
Cross-variable	-76.049	-0.065	0.920	-20.047	-0.038	0.967

The relation of the fertilizer input intensity and the yield per fertilizer unit shows us an inverse relation, but because of the breaking of the trend and drop in fertilizer use, two branches can be seen when illustrating this relation (Figure 4.).

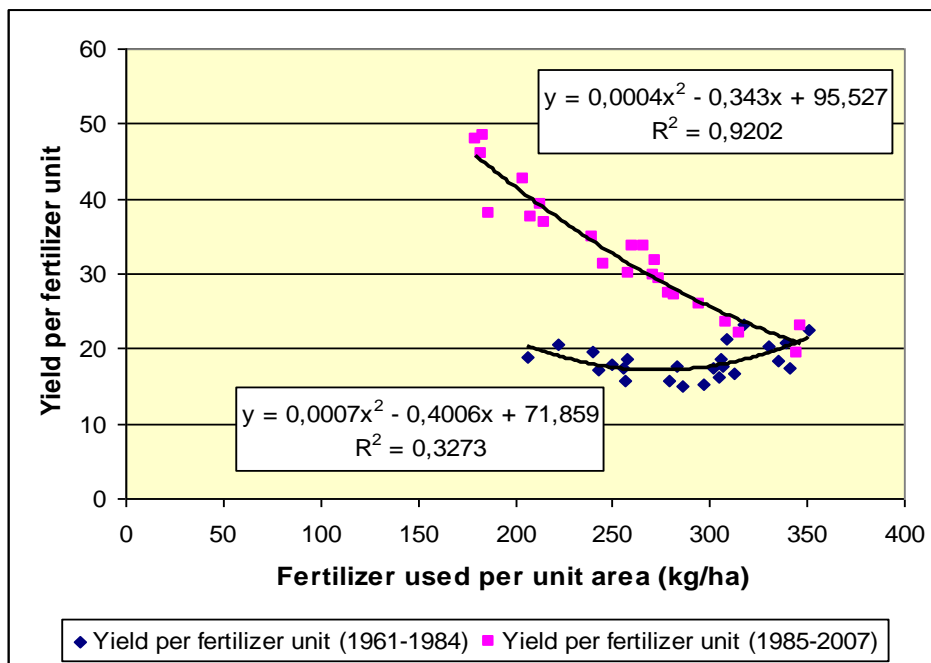


Figure 4. The relation between chemical fertilizer use and yield per unit fertilizer input in the Netherlands

In case of the Netherlands, we found it important not only to look at the yield of wheat, but also examining the yield of potato can give us additional information, as the vegetable and potato production is more typical and of greater scale in the Netherlands than the wheat production.

From the results of the regression, we can conclude mainly the same as in case of the wheat production, as in the first period the fertilizer use is a significant driving force of the yield values. The cross effect of the temperature and precipitation is dominant here. During the second time span the significance of the fertilizer drops, the coefficient becomes negative.

Table 4. Regression analysis results on potato production in the Netherlands, in two time periods

Potato	1961–1984			1985–2007		
R	0.791			0.334		
R Square	0.626			0.112		
Adjusted R Square	0.548			-0.086		
SEE	2836.432			2268.702		
Coefficients						
	Unstandardized Coeff.	Standardized Beta	Sig.	Unstandardized Coeff.	Standardized Beta	Sig.
(Constant)	-50073.097		0.200	29721.339		0.223
Fertilizer	72.681	0.686	0.000	-5.609	-0.130	0.665
Temperature	-1163.953	-0.510	0.024	31.021	0.041	0.927
Precipitation	-151.768	-1.793	0.019	-18.442	-0.440	0.668
Cross-variable	7193.805	1.637	0.031	886.017	0.494	0.662

The Figure 5 showing the fertilizer use in potato production and the yields per unit area, indicates similar trends as in the wheat production. After 1985, the variance of the potato yields is greater, where seasonal impacts can play a major role.

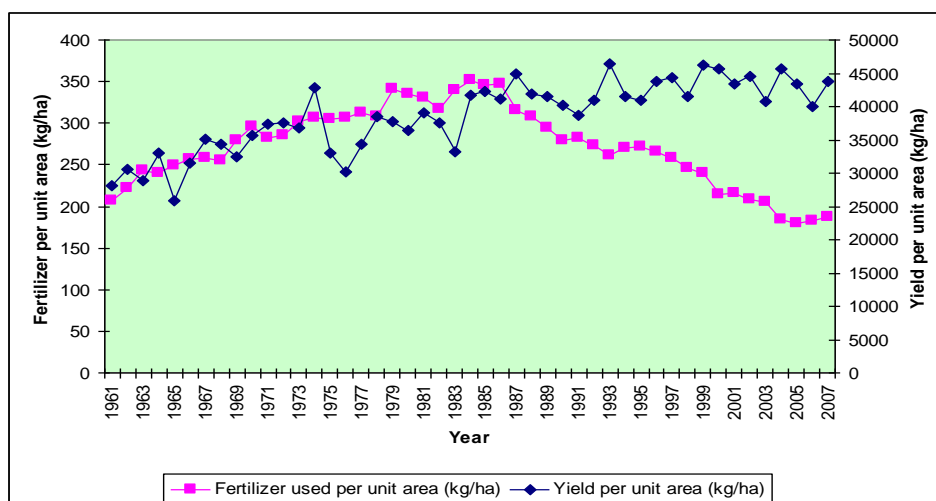


Figure 5. Total potato yield per unit area and chemical fertilizer used in the Netherlands

III. Brazil

Brazil is the third country under examination of its wheat production, which has been permanently growing over the last decades. In Brazil we can observe (Figure 6.) an exponential trend in chemical fertilizer use and wheat yields, due to the permanently increasing agricultural area from 1961 to 2007. As there is no significant breaking point of the trend, we do not need to split the time interval.

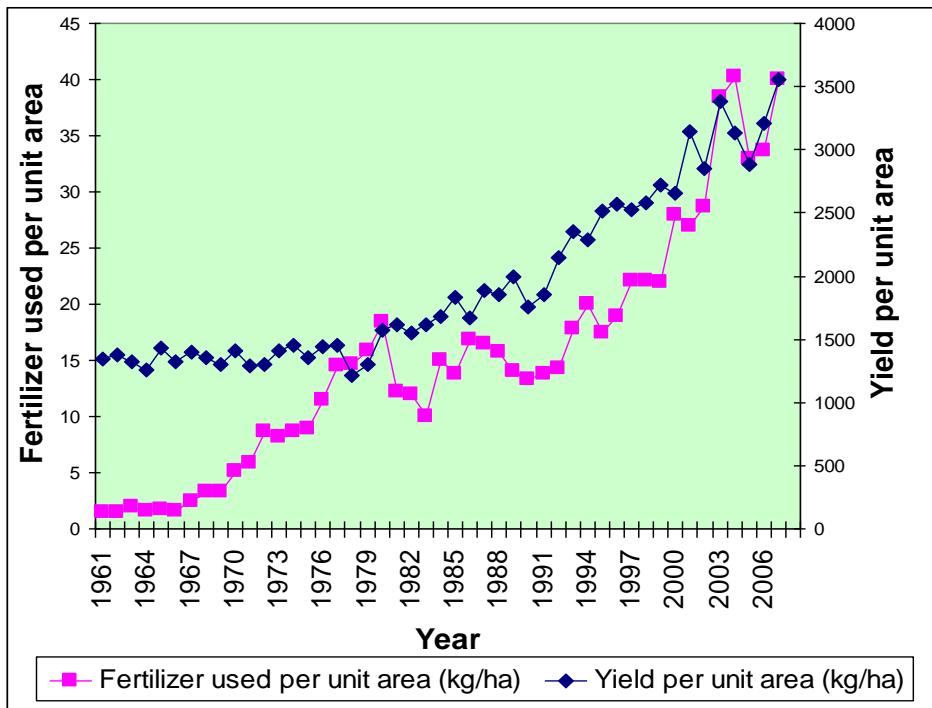


Figure 6. Total wheat production yield per unit area and chemical fertilizer used in Brazil

The strong relationship between fertilizers and wheat yields is absolutely demonstrated by the regression analysis. The fertilizer is the major factor and cause in the increase of the yields.

Table 5. Regression analysis results on wheat production in Brazil

Wheat	1961–2007		
R	0.829		
R Square	0.687		
Adjusted R Square	0.657		
SEE	289.761		
	Coefficients		
	Unstandardized Coeff.	Standardized Beta	Sig.
(Constant)	481.304		0.677
fertilizer	38.173	0.813	0.000
temperature	-7.192	-0.037	0.717
precipitation	0.048	0.012	0.954
cross-effect	28.970	0.142	0.490

Although the constant rise in fertilizer applied, the decreasing marginal curve is illustrating the Brazilian fertilizer use as well (Figure 7.), from which it can be forecasted that after some point the fertilizer use will not be able to contribute to the yield growth and decreasing trends might occur. Today, the Brazilian wheat production and yields are growing, but the effective fertilizer use should be considered in the future.

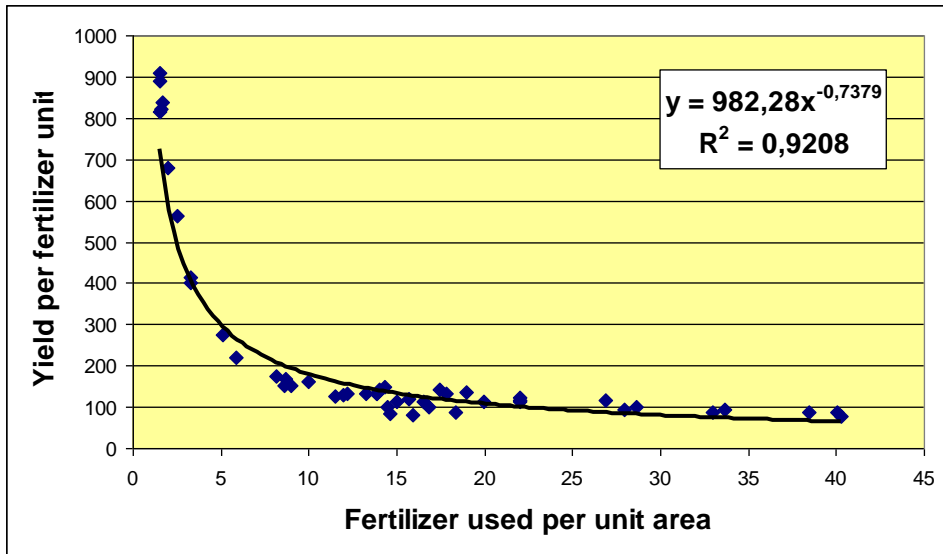


Figure 7. The relation between chemical fertilizer use and yield per unit fertilizer input in Brazil

6.2. Proposal for defining the sustainable yield

As mentioned above, the paper aims at proposing a modification as well, concerning the yield factors in the calculations of biocapacity and at offsetting the distortion stemming from different agricultural practices in different countries. Thus, the aim of the analyses was to find out the relations effecting the agricultural yield, and to find out how the amount of sustainable yield can be defined.

In order to represent the real biological capacity, we have to take into consideration primarily the consequences of applied agricultural practices during the calculation process of the biocapacity. The increased yield values show the real amount of land required, but not what the sustainable amount would be and they generate environmental load. The yield factor represents the national yield relative to global average yields, which does not include the harmful impacts of fertilizer and pesticide use or the animal waste. So, the yield factor applied in the calculation of the biocapacity does not show the sustainability limits.

We reckon, that there is a need for modifying the calculation process of the biocapacity, taking into account the polluting features of agriculture.

Though intensive agriculture gives higher yields at the moment, in the following decades harmful effects such as soil degradation, soil acidification, groundwater pollution, etc. are liable to become significant.

These pollution-related damages do not appear in the biocapacity calculations, but it is important to take them into account and there is a need to quantify the amount of sustainable yield through its influential factors.

In the previous section it has been investigated, that fertilizer applied has the greatest impact on yields, until the soil becomes oversaturated with nitrate, phosphate and other elements, and after the point fertilizer use begin to be ineffective for yields and degrade the soil, groundwater and surface water. Therefore, we suggest, that the national yield factors should be recalculated through the caused damages of over-fertilized soil. As the nitrate contamination nowadays belongs to the most crucial problems of soil conservation, we would thus propose the determination of sustainable yield in terms of harmful nitrate content of soil. The modification of yield factor should include the level of national sustainable yield correlated to real yields expressing whether the extent of yields is in accordance with the sustainability of soil.

Figure 8. shows the yield per fertilizer unit and the groundwater nitrate content per fertilizer unit in the case of the Netherlands. The amount of fertilizer used is within the sustainability limits where the groundwater nitrate content per fertilizer unit is lower than the yield per fertilizer unit. The maximum point of the fertilizer which can be used within the sustainability limits is where the intersection of the two functions is. Thus, it can be specified in case of each country, what the amount of fertilizer to be used could be, the use of which does not exceed the regenerative capacity of the soil. From the amount of fertilizer, the amount of the sustainable yield could be defined.

To put it in numbers, in the case of the Netherlands, the amount of fertilizer to be used in agriculture is 215 (kg/ha). Calculating the amount of sustainable wheat yield the maximum value of it can be 8100 (kg/ha), this value could be used in the biocapacity calculation, thus it indicates the real land area which could be used taking into account the biophysical limits.

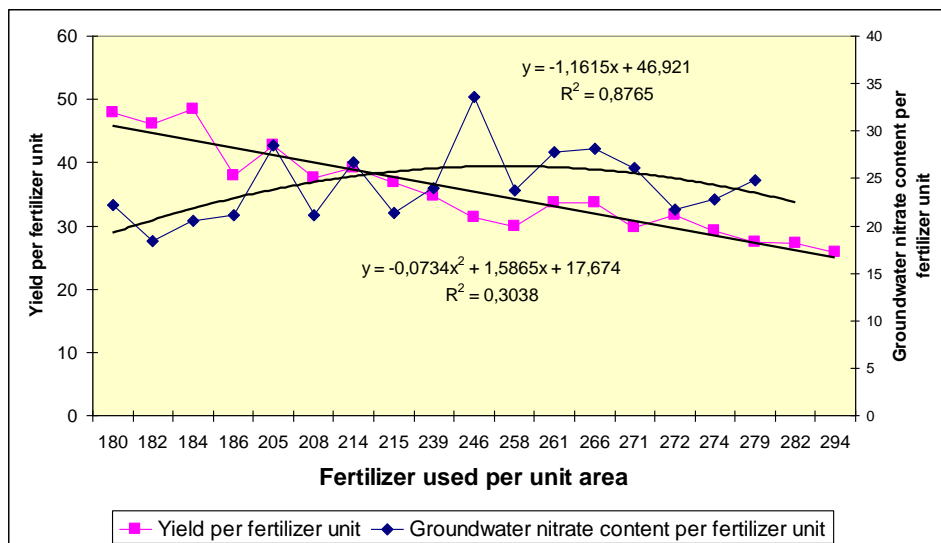


Figure 8. The yield per fertilizer unit and the groundwater nitrate content per fertilizer unit, in case of the Netherlands (Source: EEA Waterbase, 2010 and IFA Database, 2010)

Table 6 shows, how the use of the sustainable yields modify the value of the biocapacity, which this way shows a more realistic picture and can be a good indicator of the sustainable amount of land.

Table 6. Modification of the yield factor

2005	The Netherlands
Wheat yield (t/ha)	8.6
Yield factor of wheat	3.03
Sustainable yield (t/ha)	8.1
Modified yield factor of wheat	2.85

7. Conclusions

As the population of the world grows there will be an increasing demand for greater agricultural output, but this demand conflicts with the claim for a sustainable agriculture. This study has shown the importance of defining the sustainable yield, both from ecological and economical point of view.

In calculating the ecological footprint, we conclude that the structural differences in agriculture have a great impact on the calculation of biocapacity, which indicates rethinking the way this indicator has been estimated so far. We suggest that the long-term environmental impacts of intensive agricultural practices should be built into the ecological footprint model - in this case in the national yield factors should be modified when calculating the biocapacity of a country, and this way it can represent the dominant agricultural structure and its environmental impacts of a country.

The fertilizer use and its marginal contributions appeared to be a great proxy in order to evaluate the impact and efficiency of its use. It is indicated from the results that there are countries where there is no more rationale in the excessive use of fertilizers.

As for the sustainable yield amount, we have shown one possible way how it can be estimated and proposed a modification of the yield factor. Using the sustainable amount of yield in the calculation of the biocapacity in case of cropland is heavily needed. It should be indicated what the biocapacity of a country is, which is within the sustainability limits and could be used for agricultural production without making irreversible harms to the ecosystem.

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Andrea Tabi

Temporal discounting in social clusters on the basis of stated preferences

Introduction

Samuelson's discounted utility (DU) model was introduced in 1937 and applied for policies (e.g. Cost-Benefit Analysis) until recent times and generally accepted as a model which can describe actual intertemporal behavior representing it in one parameter (social discount rate, SDR). But over the last decades a lot of empirical research (Loewenstein and Prelec, 1992; Chapman, Lazaro et al., 2002) have documented anomalies in intertemporal choices. The most important discovery is that the discount rates are not constant over time, but are decreasing and seem to follow a hyperbolic curve. In addition, there are several observed anomalies in responses (Loewenstein and Prelec, 1992), namely: (1) sign effect (gains are discounted more than losses); (2) magnitude effect (small amounts are discounted more than large amounts); (3) delay/speedup asymmetry (greater discounting is shown to avoid delay of a good than to expedite its receipt); (4) improving sequences (in choices over sequences of outcomes, improving sequences are often preferred to declining sequences though positive time preference dictates the opposite); (5) violations of independence and preference for spread (in choices over sequences, violations of independence are pervasive, and people seem to prefer spreading consumption over time). Beyond those anomalies, time effect (inverse relationship between time horizon and discount rates) and domain effects (different discount rates are used for different goods, e.g. money, health) can be observed in case of long-term stated time preferences (Chapman, 1996).

Chapman (2001), Lazaro et al. (2002), Hendrickx and Nicolaij (2004), Berndsen and Pligt (2001) conducted their studies on students and revealed their time preferences on various topics. Lazaro et al. (2002) found that stated preferences do not correspond with the behavior predicted by the axioms of Samuelson's discounted utility model and their results also underpin the assumptions of time effect, magnitude effect and delay/speed-up asymmetry in social intertemporal decisions.

Chapman (2001) has undertaken 3 experiments among a sample of students and studied the difference between intergenerational and intragenerational discounting behavior. Despite the assumption that the intergenerational discount rates should be lower, empirical research shows similar parameters for both time intervals (Chapman, 2001).

Svenson and Karlsson (1989) as well as Hendrickx and Nicolaij (2004) investigate the connection of temporal discounting and environmental risks. Hendrickx and Nicolaij (2004) focus on the ethical and loss-relating concerns related to risk evaluation. Svenson and Karlsson (1989) analyze the significance of time horizons and the discounting of negative consequences using a decision theoretic framework. Both empirical studies found that the majority of people did not discount environmental risks.

Our study is based on representative sample of 1000 elements, in contrast to other authors, who have undertaken their studies on samples of students. We consider that students would not represent the actual attitudes of all social clusters, although they would give us proper and accurate answers. Our survey is representative for the Hungarian population regarding gender, age and income.

The questions in the survey aim to measure personal preferences through getting rewards in the future and also try to capture the personal preferences which concern common decisions mainly through allocation of common costs over time. We also attempt to reveal the long term intergenerational time preferences through saving lives and the last type of question investigates the willingness to pay (WTP) of people about the future costs of climate change.

Methods

As described above, each questionnaire consists of 4 types of questions and each question type contains 11 pairs of 2 alternatives which arranged on an ordinal scale. Thus, it is possible to investigate respondents' "switching point" where they switch from alternative "A" to alternative "B". For example, the first type of question assumes a hypothetical situation, where the respondent wins a certain amount of money, and has to decide when he/she wants to receive it. Alternative "A" involves receiving 100 000 HUF immediately while alternative "B" involves receiving a bigger amount 1 year later (see Table 1).

Table 1. Sample of questions (Winning money 1 year delay)

	A I get NOW	B I get in 1 YEAR	Choice	Do not	X
				know	
a.	100 000 HUF	100 000 HUF	A B	9	X
b.	100 000 HUF	101 000 HUF	A B	9	X
c.	100 000 HUF	102 000 HUF	A B	9	X
d.	100 000 HUF	103 000 HUF	A B	9	X
e.	100 000 HUF	104 000 HUF	A B	9	X
f.	100 000 HUF	105 000 HUF	A B	9	X
g.	100 000 HUF	106 000 HUF	A B	9	X
h.	100 000 HUF	110 000 HUF	A B	9	X
i.	100 000 HUF	115 000 HUF	A B	9	X
j.	100 000 HUF	120 000 HUF	A B	9	X
k.	100 000 HUF	125 000 HUF	A B	9	X

The second type of question refers to social decisions related to flood protection. The hypothetical situation is the following: “Imagine that the state offers a certain amount of money to villages along the river Tisza, which has to be spent on flood protection. If the subsidy is asked for immediately, the state can offer a lower amount, if you wait 1 or 10 years, villages will get a larger sum, which makes more efficient protection possible (e.g. stronger dams). What is your decision?” The purpose of this question is to reveal people’s attitude to urgent and pressing situations, where it is important to act as soon as possible. Our assumption is that in such a decision situation, where intervention is urgent, using time preference rates is meaningless or using stated preferences will lead to a paradox exchange: the quicker the intervention should be, the higher the time preference rate, which induces decisions for postponing actions.

The third question type deals with saving lives, using the following hypothetical situation: “Imagine that you have to decide between two programs, which financially support medicine and therapy researches. In case of Program “A” an already existing treatment is supported, which can save 100 lives immediately. Program “B” supports medicine researches, which could help more than 100 people in 1, 30 or 100 years to stay alive. What is your decision?”

The last group of questions, regarded as the most abstract or hypothetical, deals with the financial consequences of climate change: “Imagine that you have to choose from two options regarding climate costs. Option “A” is that, from now on, you pay a certain amount annually (to cover the costs of climate change), and option “B” involves postponing the costs and paying 1 million HUF (in 10 years) or 10 million Ft (in 30 years), when the catastrophic consequences of climate change occur. What is your decision?”

In all cases, inflation is ignored, 1 HUF now is equal to 1 HUF in the future.

In Table 2 the four types of questions are summarized by temporality, involvement, type of outcome and time horizons.

Table 2. Types of questions

	Domain	Type of discounting	Involvement	Type of outcome	Time intervals
Winning money	money	short term, intragenerational	personal	postponing reward	1, 3, 10 years
Flood	risk	short term intragenerational	social	avoiding costs	1, 10 years
Saving lives	health	long term, intergenerational	social	saving lives (postponing reward)	1, 30, 100 years
Climate costs	money/risk	long term, intergenerational	personal	postponing costs	10, 30 years

Discount rates have been calculated according to the following equation:

$$\text{Discount rate} = \left(\frac{\text{indifference point}}{\text{immediate benefit}} \right)^{\frac{1}{n}} - 1$$

where n is the number of years implied in the choice. The indifference point is the point where the respondent switches from one alternative to another (Chapman, 2001). The indifference number stands with the last preferred immediate benefit (alternative “A”), before alternative “B” is chosen, e.g. if winning 115 000 HUF in 1 year is preferred to getting 100 000 HUF now, but 100 000 HUF now is preferred to getting 110 000 HUF in 1 year, then the indifference point is 110 000 HUF.

Results

Although 1012 individuals completed the questionnaire, there were missing values and in many cases the results were not appropriate for analysis for different reasons. It often occurred that respondents chose two or more switching points, which are not consistent in an ordinal scale, or they did not switch from one alternative to another. The latter event could happen for several reasons: (1) respondents do not want to discount at all (2) the scale is not wide enough, thus they could not find their indifference point (3) respondents do not understand the situation or (4) they do not want to make a decision. Thus, the inconsistent and unusable replies were coded as “do not know” and excluded from the analysis.

Table 3 shows the number of respondents, the minimum and maximum value of discount rates, their means, and standard deviations by question types. Time delays are different because of the various topics, and the involvement of the people.

A repeated measures ANOVA was conducted between time delays within each question group. The results of RM ANOVA suggest that the time delays within all question groups significantly differ from each other (Greenhouse-Geisser and Huynh-Feldt tests show $p=0.000$ significance level), but according to the pairwise comparisons of means by Bonferroni correction in “winning money” the means of time delays 1 and 3 years do not differ statistically ($p = 0.546$).

In case of ‘Saving lives’ and ‘Climate costs’ scenario, we have long term (intergenerational) discount rates, and we can observe that the rates fall as the delay increases (time effect), and there is a significant difference between the discounting of money and health (domain effect). The high rate for flood in a 1 year delay implies a preference for early intervention and the very low number of responses in favour of a 10 year delay also correspond with findings of other research by Svenson and Karlsson (1989) as well as Hendrickx and Nicolaij (2004), illustrating that the majority of people do not discount environmental risks, where they could be involved personally.

Table 3. Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
winning money in 1 year	335	0.00	0.25	0.1440	0.08247
winning money in 3 years	423	0.00	0.26	0.1406	0.08119
winning money in 10 years	541	0.00	0.26	0.1674	0.07641
flood occurs in 1 year	361	0.00	0.67	0.2934	0.19138
flood occurs in 10 years	47	0.00	0.13	0.0474	0.04346
saving lives in 1 year	584	-0.10	0.25	0.0806	0.10189
saving lives in 30 years	385	0.00	0.09	0.0503	0.02999
saving lives in 100 years	355	0.00	0.05	0.0293	0.01698
climate change costs incur in 10 years	302	0.01	0.35	0.1681	0.10161
climate change costs incur in 30 years	300	0.03	0.15	0.0915	0.03553

In our questionnaire, respondents were asked about happiness, life satisfaction, general attitude to the environment (5 questions) and personal data (gender, age, number of children, qualification, net income) as well. The questions about happiness and life satisfaction were measured on a scale from 1 to 10 where 1 means “unhappy/dissatisfied” and 10 means “very happy/very satisfied”. The general attitude questions tried to reveal how people evaluate our environment and what they think should be done to preserve our natural resources for the next generations. Respondents were asked to decide on a 5 grade scale (1 – totally disagree, 5 – totally agree) whether they agree or disagree with the following statements:

1. The state is responsible for preserving our natural resources. (“state”)
2. It is everybody’s right to use natural resources for private purposes. (“private”)
3. I believe that technological development and innovations will solve the environmental problems. (“innov”)
4. We should radically change our consumption behavior in order to preserve our environment. (“change”)

5. People must ensure that natural resources will be available for the next generations. (“nextgen”).

A one-way ANOVA method was conducted in each question group (winning money, flood, saving lives, climate costs), using discount rates as dependent variables. Independent variables were gender, age, net income, qualification, happiness and attitude questions about environmental problems (Table 4 contains only those variables which have statistically significant results).

No connection could be observed between time discounting and gender: women and men use the same discount rates. There was absolutely no statistical connection between age, number of children and time discounting behavior.

Table 4. One-way ANOVA for variables (sig. levels)

	Income	Qualifi- cation	Hap- piness	“State”	“Pri- vate”	“Innov”	“Change”	“Nextgen”
winning money in 1 year	0.288	0.016	0.167	0.002	0.806	0.000	0.000	0.000
winning money in 3 years	0.139	0.001	0.223	0.040	0.384	0.585	0.013	0.000
winning money in 10 years	0.030	0.217	0.017	0.021	0.001	0.052	0.003	0.000
flood occurs in 1 year	0.144	0.903	0.097	0.878	0.684	0.000	0.022	0.187
flood occurs in 10 years	0.420	0.042	0.069	0.384	0.397	0.186	0.282	0.225
saving lives in 1 year	0.236	0.095	0.055	0.003	0.011	0.001	0.007	0.000
saving lives in 30 years	0.031	0.005	0.038	0.269	0.175	0.087	0.000	0.000
saving lives in 100 years	0.046	0.503	0.209	0.175	0.158	0.256	0.039	0.000
climate change costs incur in 10 years	0.030	0.268	0.123	0.908	0.414	0.351	0.015	0.287
climate change costs incur in 30 years	0.167	0.049	0.056	0.930	0.713	0.483	0.007	0.045

In cases of net income, qualification and happiness we can observe a very weak connection with time preference rates, but the strongest relationships are apparent when we look at the attitude questions, especially „change” and „nextgen”.

In order to reveal the correlations between the variables and be able to cluster our sample, principle components analysis was conducted on all variables. The varimax rotation resulted in six factors, which explained 72.18 % of variance (number of factors selected by Mineigen criterion). Factor 1 consists of qualification and net income (income factor), Factor 2 includes happiness and life satisfaction (happiness factor), Factor 3 contains 2 attitude questions: “change” and “nextgen” (change factor), Factor 4 consists of the other 3 attitude questions: “state”, “private” and “innov” (state factor), Factor 5 includes age and the number of children (age factor) and finally, Factor 6 contains gender (gender factor). A two-step cluster analysis was carried out on the 1012-element-representative sample, based on 4 factors: income, change, state and happiness (gender and age factors were excluded because as a result of the one-way ANOVA analysis they do not have any relationship with time discounting behavior). Three clusters were identified.

Table 5 shows the one-way ANOVA results which tested the connection between the identified clusters and discount rates. Thus, we have identified social clusters, where significantly different time discounting behavior is noticeable in two domains: winning money and saving lives. In these two domains the mean of discount rates are increasing in the order of cluster 1, cluster 3, and cluster 2. The main difference between clusters is along the change and state factors, which describe people’s attitude to environmental problems. The happiness factor has the lowest influence and the income factor had a moderate effect on clustering.

Table 5. One-way ANOVA for clusters

Mean	1	2	3	Total	Sig.
winning money in 1 year	0.1044	0.1785	0.1496	0.1440	0.000
winning money in 3 years	0.1091	0.1572	0.1481	0.1399	0.000
winning money in 10 years	0.1299	0.1769	0.1737	0.1634	0.000
flood occurs in 1 year	0.2862	0.3046	0.3235	0.3057	0.449
flood occurs in 10 years	0.0564	0.0367	0.0650	0.0546	0.501
saving lives in 1 year	0.0538	0.0952	0.0922	0.0816	0.003
saving lives in 30 years	0.0371	0.0600	0.0529	0.0508	0.000
saving lives in 100 years	0.0227	0.0337	0.0330	0.0300	0.000
climate change costs incur in 10 years	0.1747	0.1400	0.1693	0.1606	0.075
climate change costs incur in 30 years	0.0943	0.0843	0.0895	0.0890	0.267

Table 6 shows the mean values of variables for the three clusters, where statistically significant differences were found. Cluster 1 contains people, who are typically in the highest income category, have the lowest number of children and their main feature is to have been largely undecided on the attitude questions, usually choosing the value of 3, which is the medium value between agree and disagree. Cluster 2 is regarded as the least well-paid category with the lowest qualification (skilled workers without high school graduation), but they usually agreed with the statements regarding environmental attitudes. Cluster 3 is the mixture of cluster 1 and 2, but the most remarkable observation is that these people usually agreed with the exploitation of nature for private purposes.

Table 6. Means by clusters

	1	2	3	Total	Sig.
Qualification	4.27	3.24	4.48	3.92	0.000
State	3.64	4.20	3.37	3.78	0.000
Private	2.99	2.99	1.41	2.46	0.000
Innov	3.08	4.02	2.66	3.33	0.000
Change	3.27	4.34	4.39	4.09	0.000
Nextgen	3.45	4.64	4.94	4.44	0.000
Number of children	1.28	1.79	1.51	1.57	0.000
Net income (HUF)	254 406	171 862	201 515	202 806	0.000

Conclusions

The paper contrasted temporal discounting in individual and social exchanges. The temporal exchange of different domains like money, lives and environmental risks have been analyzed for different time horizons.

The primary aim of the study was to reveal the time discounting behavior of people and cluster them, based on their attributes and attitudes to environmental problems. For the purposes of the research, a 1000-element representative sample has been used. Although we dispose of a huge sample, only approximately one-third of respondents provided consistent, analyzable answers to the time preference questions. This points out how difficult it would be to design policies on the basis of people's opinion regarding long-term programs or projects.

It is clear that we cannot use the same rates over time or across different domains. The observed methodology of calculating social discount rates consists of two main parts. The first part is called pure time preference rate (p), which describes the attitude of people to next generations' welfare. The second part makes next generations' welfare equal with current generation's welfare. This part is calculated from the product of two parameters; elasticity of marginal utility of consumption (e) and the growth rate of per capita real consumption (g) (Evans and Sezer, 2005). There are several methods for the calculation of each parameter, but most prevalent is the tax-based (mostly income tax) method for the elasticity of marginal utility of consumption (Evans, 2005) and the use of GDP as a growth rate. Our study revealed that time

discounting behavior has no connection with gender, age and is also very weakly connected with qualification, happiness and life satisfaction.

Regarding time discounting patterns, the strongest relationship after clustering was discovered between income levels and the five attitude questions towards the environment. Accordingly, it seems acceptable to reckon observed preferences on the basis of income levels (income taxes) and people's attitude to next generations, which literally corresponds with the meaning of pure time preference rate (p). This rate is calculated based on the number of deaths relative to the population (this rate is called "Changing Life Chance" by Pearce and Ulph, (1995)) and is used in many countries to compute SDR for Cost-Benefit Analysis. The argument for using the death rate as the expression of people's attitude is absolutely refuted by our results. The ageing has no connection with discounting behavior, elderly people discount the same way as young people do. So, it can be concluded that the income level influences our discounting patterns which has to be considered in an SDR model and can be calculated top-down, but the calculation of pure time preference rates should be based on the interpretation of real stated preferences.

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Environmental Education and Pro-environmental Consumer Behaviour – results of a university survey

Introduction

Moving towards environmentally conscious behaviour and sustainable consumption is one of the main challenges for mankind in the following decades. Environmental education and its role in changing the lifestyle and attitudes of students is therefore crucial in altering future consumer behaviour. To explore consumption patterns of students, a questionnaire-based survey was carried out at Corvinus University of Budapest in Autumn 2008 and February 2009, with the participation of 436 respondents.

In accordance with our assumption that environmental education and specializing in environmental issues is closely related to more environmentally conscious behaviour, our sample consisted of various student groups: graduate and undergraduate students, students specializing in environmental issues and students of other specializations. We also formed two control groups from graduate management students specializing in finance, and first year „novice” students who were at the very beginning of their university studies and thus had not completed any environmental course.

The first part of the questionnaire used in the survey was related to environmental education, the second to environmental consciousness, while the third part enquired about consumption and its relation to the environment. The questionnaire concluded with a few questions on demographic and socio-economic characteristics.

The results were interpreted via descriptive statistics as well as factor and cluster analysis.

As pro-environmental behaviour is shaped by several factors, the paper starts with a literature review, presenting a summary on theories and research findings regarding individual environmental awareness.

Approaches to individual environmental awareness

Each and every model to be described below wishes to explain the awareness-shaping stages that the individual goes through and the influencing factors that lead or do not lead to environmentally conscious behaviour. The models generally do not define the concept of pro-environmental behaviour but Courtenay-Hall and Rogers (2002) as well as Gough (2002) underline that this concept is far from being unambiguous and can only be defined in relative terms, which also reflect value judgements.

According to the earliest models of environmental awareness dating back to the early 1970s (e.g. Disposito 1977, Loundsbury és Tournatsky 1977), ecological knowledge (the totality of ecological knowledge and information) leads directly to environmentally related attitudes (concerns, the process of becoming aware of problems, recognising the need to protect the environment, etc.) and finally to pro-environmental behaviour (see in detail Chan 1998).

However, findings of empirical research soon showed that individual behaviour cannot be directly predicted and explained by the individual's environmental attitudes formulated in the light of ecological knowledge. Therefore, researchers started attempting to explore the reasons for gaps between attitudes and actual behaviour. Ajzen and Fishbein (1980) established the "theory of reasoned action", which does not explicitly refer to environmental awareness but deals with reasoned action in general. According to the authors, attitudes do not directly determine behaviour but they influence the intention to act which shapes actual behaviour. Attitudes depend on "evaluative beliefs" (how the individual evaluates the consequences of certain behaviour based on his/her own values and beliefs) and "normative beliefs" (how the individual perceives the ideas of other members of the community related to given behaviour and to what extent he/she is motivated to meet these expectations). Normative beliefs and the motivation to comply with those view influence not only attitudes but also "subjective norms" of the individual. All in all, attitudes, subjective norms as well as the relative importance attached to them, together influence the intention to act. The model is limited in the sense that it always presumes action taken by the indi-

vidual to be rational. In spite of this shortcoming, it has proved useful in further research due to its transparency and simplicity.

Later Ajzen (1991) developed the TORA and elaborated the “theory of planned behaviour” (TPB). In the TPB he introduces new components: the “control beliefs” and the so-called “perceived behavioural control”. Perceived behavioural control is shaped by the control beliefs and characterises how the individual considers the impact of his/her behaviour on the given issue. Persons with strong internal control are convinced that their behaviour can ensure changes, whereas persons with strong external control are convinced of the opposite.

Based on Ajzen’s established theory, Hines, Hungerford and Tomera elaborated the “model of responsible environmental behaviour” (Hines et al. 1986), which summarises their findings of 128 studies focusing on factors which influence environmentally conscious behaviour. The model is more refined than the theory of Ajzen inasmuch as it incorporates factors which influence personality considerations, attaches importance to the knowledge of ecological problems, considers the knowledge of possible action strategies and the person’s action skills as preconditions for the intention to act, and takes into account *situational factors* (economic constraints, social pressure, opportunity to select between various actions, established traditions, the sacrifice required by the behaviour, availability of infrastructure) which definitely influence behaviour in specific situations.

Kollmuss and Agyeman (2002) have developed their own theory by systematically analysing the most important models of environmentally aware behaviour. This model integrates the findings of previous models, identifying demographic, external and internal factors as behaviour-shaping. External factors include institutional constraints, economic (financial) means, social and cultural norms, as well as political support. Internal factors are various and seem to exert a significant impact on individual behaviour (Dietz et al. 1998). The intensity and direction of internal motivation has a significant impact on individual behaviour. Primary motives determine the ambition to lead an environmentally friendly life, whereas selective motives influence a certain action (driving or biking when it is raining). Environmentally conscious behaviour is often hampered by non-environmental motivations of higher intensity (e.g. convenience). Selective motives often “override” primary motives.

Most empirical research came to the conclusion that although the knowledge of environmental problems raises concern in people, this per se is not sufficient to lead to an environmentally conscious form of behaviour. Fliegenschnee and Schelakowsky (1998) claim that 80% of motives influencing environmental awareness or the opposite can be traced back to situational or internal, but not knowledge-related factors. This statement is supported by the striking experience of Kempton et al (1995), according to which the lack of ecological knowledge was of the same degree amongst committed environmentalists as among neutral respondents or amongst those opposing environmental protection. It can also be observed that certain incentives (e.g. economic advantages), cultural values and social norms may encourage individuals to act in an environmentally friendly manner even if they are not driven by concerns about the environment. In the latter case, we cannot ignore the fact that such non-aware or unaware environmentally friendly behaviour is not durable and in the absence of incentives easily reverses, because it is not based on the individual's internal conviction and set of values.

The value system of the individual is most strongly shaped by the stimuli coming from the immediate environment (family, friends, neighbours, teachers, etc.). This is followed by media and politics as influencing factors in the broader environment; and next is the cultural context in which the person lives. Value orientation also has a key role in behaviour. Nordlund and Garvin (2002) come to the conclusion that people with a cooperative value orientation were more aware of threats to the environment and felt a stronger moral obligation to act than persons who gave priority to self-enhancement values.

Regarding attitudes, Diekman and Franzen (1996) claim that the sacrifice required by environmental awareness (e.g. costs, time, efforts) can diminish the positive impact of attitudes on willingness to act. In their research, positive environmental attitude showed significant relation only with behaviour demanding moderate sacrifice (such as selective waste disposal). However, individuals with positive environmental attitudes dispose of a stronger willingness to support political measures which aim to encourage environmentally aware behaviour. This also means that these individuals accept indirect motivation vis-à-vis their own behaviour, they support the application of adequate environmental policy measures to reverse the situation and reduce the relative costs of environmentally aware behaviour.

Chawla (1998) highlights the importance of emotional involvement in shaping individual beliefs, values and attitudes. If external information contradicts

our prevailing beliefs, the ambition to achieve internal consistency leads to a selective perception of information, i.e. we make efforts to avoid cognitive dissonance (see Festinger 1957). If the feelings of fear, sorrow, pain, anger or guilt are accompanied by the conviction that our behaviour does not have any effective influence on the solution, these emotions lead us to non-action. In addition, negative emotions give rise to secondary psychological responses by means of which the human being makes efforts to get rid of these emotions. These defensive mechanisms might take the form of denying the problem (refusal of reality), rational distancing, apathy and resignation (the inability to change), or delegating the problem to other people (passing the buck), in order to dispose of the feeling of guilt.

Our sense of responsibility is significantly shaped by our values and the locus of control (internal or external, depending on personality). In addition, the individual sets priorities amongst which his/her and his/her family's well-being is usually the first (Kollmuss and Agyeman, 2002). If environmentally conscious behaviour is in line with personal priorities, the motivation to act increases (for example, purchasing organic food). If these two factors are contradictory, the likelihood of action is smaller (for example, purchasing a smaller flat, even if the individual could afford to have a bigger one). Furthermore, established habits generally prevent the individual from pursuing environmentally aware behaviour (Arbuthnott, 2009).

According to empirical research (see Jaeger et al., 1993 and Dietz et al., 1998), *socio-cultural factors* like group identity (Bonaiuto et al., 1996), group norms related to pro-environmental behaviour (Widegren, 1998), or the character of interpersonal relations (Jaeger et al. 1993) have a stronger influence on individual environmental awareness than the general concern about ecological problems or socio-demographic variables (e.g. age, gender).

Regarding the pro-environmental behaviour of students, Kagawa (2007) found in her survey of 5729 respondents that most students think of "light green" actions when talking about lifestyle change, such as changing purchasing habits by choosing products which are organic, fair trade, healthy, or stem from socially responsible companies, recycling, saving energy and/or water, as well as using public transportation. Reducing consumption was only mentioned by 1% of respondents as an option that students would be ready to do for a more sustainable personal life. Kagawa detected some dissonance between students' perceptions of sustainability and their reported behaviour patterns. Respondents tend to agree with radical statements but they refuse radical changes in their

personal life as well as at community or societal levels. The maintenance of economic growth is a goal which is not questioned by the respondents. A combination of optimism and pessimism, and mixed feelings towards the future of society were detected by Kagawa, who states that the development of empowering pedagogies should be able to educate students as “change agents”. She believes that in our “rapidly changing and uncertain world faced by sustainability-oriented challenges higher education needs to play an increasingly significant role in helping students become active responsible citizens” (Kagawa, 2007, p. 335).

There have been previous surveys in Hungary addressing the topic of environmental consciousness (see e.g. Kerekes and Kindler, 1993; Székely et al., 2011, Csutora, 2012), but these examined the population as a whole and did not focus on the behaviour of young people/students. Hunyadi and Székely (2003), as well as Székely (2011), provide an overview on the psychology of consumption, with explanation of the motivational background and operation of today’s consumer society as the key obstructive phenomena to sustainable development. Kraiciné Szokoly and Czippán (eds., 2011) summarise studies on the education and communication for sustainable consumption. In the framework of this book, Nagy (2011) analysed specifically the attitudes of students to sustainability and their knowledge on environmental issues, by carrying out a focus group- and a questionnaire-based survey. Due to her results, students specialized in androgogy are significantly split according to the depth of their knowledge on sustainability issues. Half of them are deeply, the other half however just superficially aware of those issues which are preconditions for the evolution of conscious consumer behaviour and lifestyle.

The following sections present the research at Corvinus University of Budapest, beginning with an overview of the sample characteristics followed by the description of our main findings.

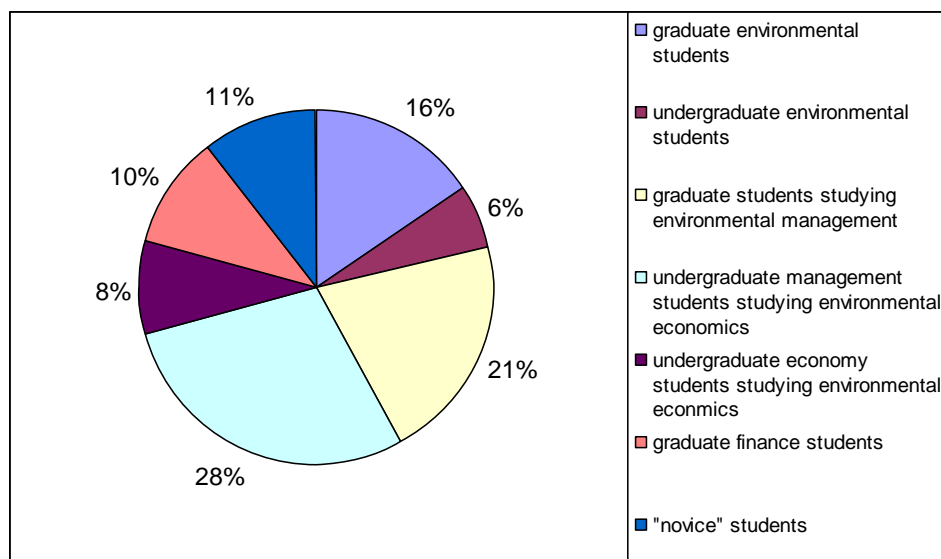
Sample characteristics

Our sample of 436 students consisted of the following student groups (see Figure 1):

- Graduate level management students specialising in the environmental field (n=68)

- Undergraduate level management students specialising in the environmental field (n=25)
- Graduate level management students taking a course on environmental management (n=90)
- Undergraduate level management students taking a basic course on environmental economics (n=125)
- Undergraduate level economics students taking a basic course on environmental economics (n=37)
- Graduate level management students specialising in finance (n=45)
- First year “novice” students right at the start of their university education (n=46).

Figure 1. Breakdown of the sample according to student groups



The gender ratio (female:male) in the overall sample is 2:1, age ranges between 18 and 23 years. The majority of respondents come from families with two children and have parents with university or college degrees. 44% of students in the sample are from Budapest or its surroundings, only 8% from villages. Nearly half of respondents still live with their parents, 18% in their own, and 15% in rented apartments. 17% are staying in student dormitories. 42% do not work parallel to their studies, 30% work occasionally and 28% on a regular basis. Concerning their financial resources, the role of the parents is also dominant, mostly in the form of a regular allowance, while 35% ask the parents for

money as needed. More than 40% also rely on scholarship payments, only 6% took student loans. 30% also cited work as an important source of their income. 46% of respondents spend less than 30 thousand Ft per month over and above housing and groceries, while almost a quarter spend more than 60 thousand Ft and almost 10% more than 100 thousand Ft which is a high amount in the context of Hungarian university students.

Description of students' consumption patterns and pro-environmental behaviour

Regarding their own consumption, students in general tend to believe that they shop and spend less on certain goods than their peers. It is only books and newspapers that a third of the sample consider themselves to be buying more often than the average, and also 26% are spending more on tourism. For most categories however, such as clothes, sporting equipment, cosmetics, electronic devices, partying and other services, most respondents reported a lower level of consumption. The distribution of responses can be seen in Figure 2 and Figure 3. Self reporting bias is a clear possibility; respondents tend to underestimate their spendings compared to the average.

Figure 2. Compared to other university students, how often do you buy...

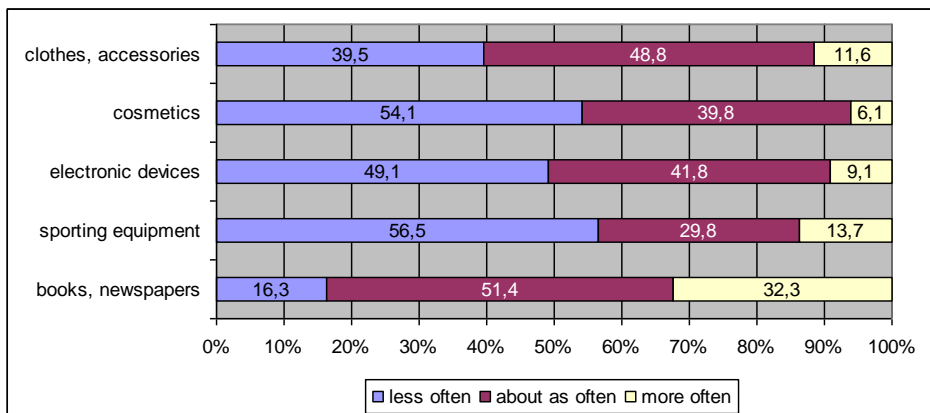
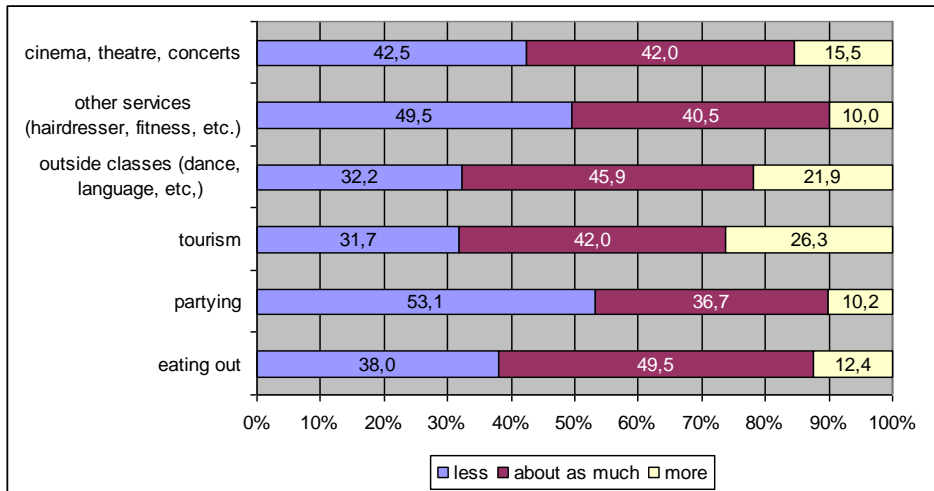


Figure 3. Compared to other university students, how much do you spend on...

Statements related to their shopping habits were rated by the respondents on a 6-level scale (Figure 4). The highest average was reached by the statement „I only buy things if I really need them”, indicating that students believe their consumption patterns to be free from excesses. They also evaluate themselves positively in that they do not shop only because they have money or for the sake of pleasure. However, the average of answers was also higher than the neutral level for finding it difficult to resist discounts and for trying to keep up with fashion/technological trends.

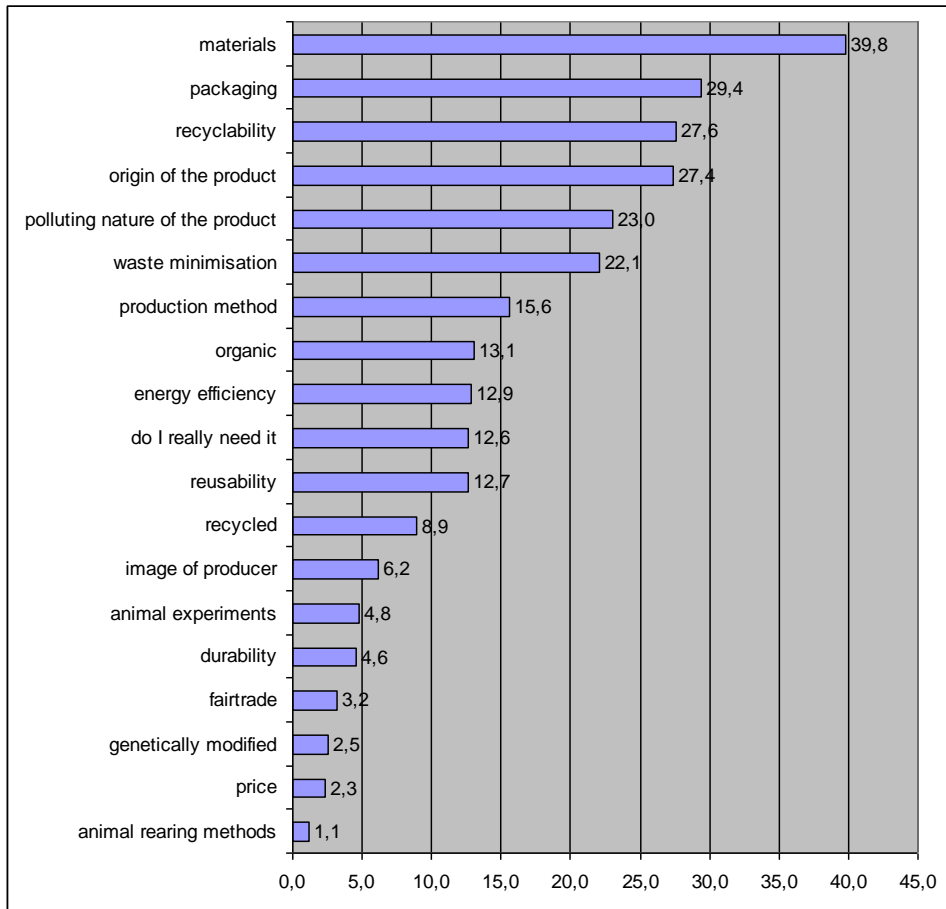
Figure 4. How well do the following statements describe your shopping habits? (averages, 1 to 6 scale)



This results in contradictions even on the level of stated behaviour, as it is difficult to imagine for example that one should need and therefore buy all goods offered at a discount price. Regarding shopping, multiple decision factors are at play which can have opposite effects. Furthermore, considerations on which goods are truly necessary may vary considerably between individuals.

Looking at the student groups in the sample, we found significant differences in their stated consumer behaviour. Among economics students, it is relatively common to shop for the sake of pleasure or because they have money, and they also tend to follow fashion and technological trends more than the average. The last is also true for first year students. On the other end of the spectrum, it is somewhat surprising that it is the finance students who don't shop for fun or spend any money they happen to have. This is probably not due to this group being more environmentally conscious than the others, but may perhaps rather be explained by their highly rational behaviour regarding the value of money, for example preferring to save and invest for a long term benefit.

The survey included an open-ended question on students' opinion as to what factors need to be considered during shopping for the sake of the environment, and to what extent they take these into account in their shopping decisions. The factors named were coded into 19 categories, the frequency of mentions for each of these is shown in Figure 5.

Figure 5. Incidence of factors to be considered during shopping

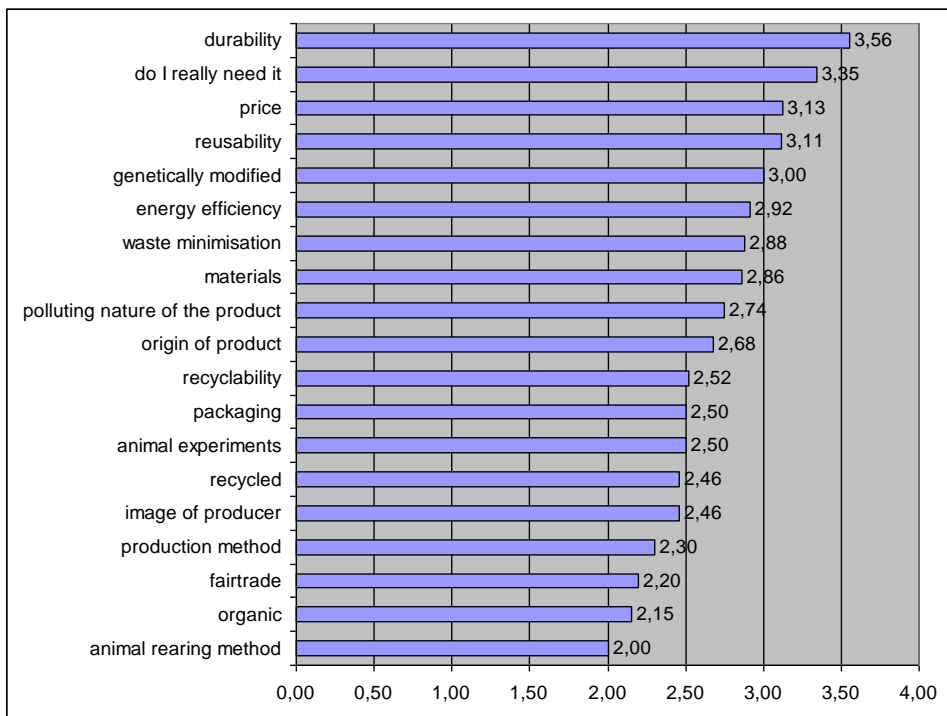
The factors mentioned most often were: the materials the product is composed of, the packaging, the product's recyclability, its origin, its polluting nature, and also minimizing waste by choosing economy size packages. Looking at the level of environmental consciousness reflected in the closed-ended questions, we would have expected most factors to be mentioned much more frequently (for example the actual need for the product in question) – thus the gaps in environmentally conscious behaviour became fairly evident with this question.

The factors mentioned are also at least sometimes taken into account in practice (the end points of the scale were 1: I never take it into account and 4: I

always take it into account); of the factors named frequently, those taken into account the most often are the materials, origin and polluting nature of the product, and waste minimization by buying larger units (see Figure 6). Here, it is interesting to observe that the majority of students, while naming environmental considerations, does not actually take these into account often enough. Thus, consciousness on the level of knowledge does not translate sufficiently into action. However, responses seem far more honest in case of this question than when respondents are only required to make general statements about their environmental consciousness or consumer behaviour.

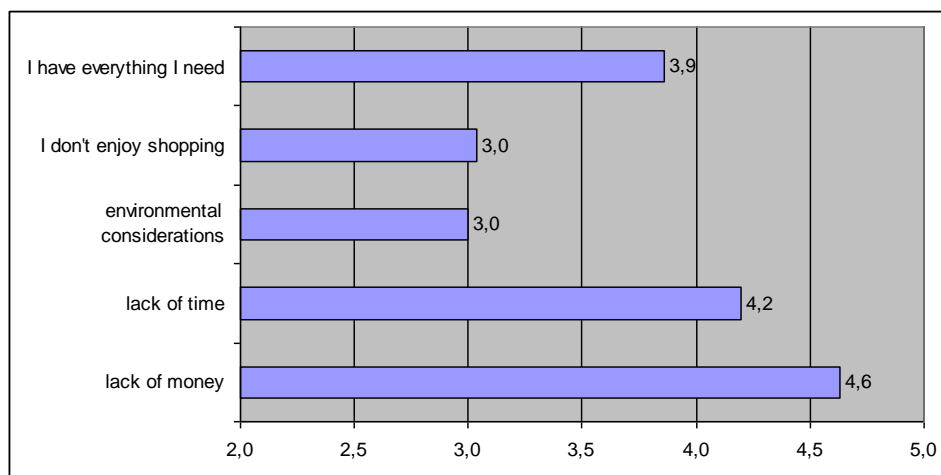
In some cases we could also observe consistent behaviour, as with those students who named aspects of durability, necessity, recyclability and genetic modifications and almost always consider these in their shopping decisions (see Figure 6).

Figure 6. Actual consideration of factors when shopping
(amongst those who mentioned them)



It might be interesting to look at what factors prevent students from shopping more than they currently do (the scale is on 6 levels from 1), as this provides some indication of how their consumer behaviour might change if these barriers are removed – this time in the direction of higher consumption. The factor reaching the highest average (4.6) is the lack of money, which is not very favourable from the point of view of sustainability, since it means that students would gladly be consuming much more if they possessed the means. In second place is the lack of time (4.2), which can also strengthen the above mentioned tendency, although it is not necessarily likely that one would have more time for shopping next to work and family than as a university student. Giving ground for some optimism is the fact that possessing everything they need is also a hindering factor for many respondents (3.9). On the other hand, environmental considerations and dislike for shopping are of marginal importance (Figure 7).

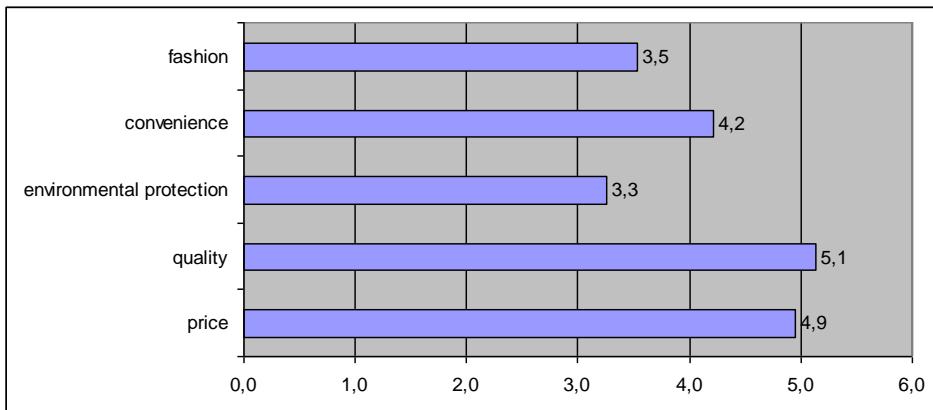
Figure 7. Barriers to higher consumption



We examined what factors influence students when choosing between products or services. We enquired about the role of price, quality, environmental protection, convenience/accessibility and fashion (the distribution of responses is shown in Figure 8, ranging from 1: not at all important to 6: extremely important). Interestingly, quality (average: 5.14) proved more important than price (4.95) – these are followed in order of importance by convenience and accessibility (4.20), fashion (3.53) and, lastly environmental protection (3.26).

Regarding fashion and environmental protection, we found significant differences in the results between various student groups. Fashion is most important for students of the economic faculty (3.81), and least for graduate level environmental students (3.01). Environmental protection is, as expected, most prominent for graduate level environmental students (3.73) and least for graduate level finance students (2.70).

Figure 8. The role of various factors in shopping decisions



One product that most young people today own, and which we assume they like to replace frequently is the mobile phone. Therefore, questions were included about the frequency of replacing their device and the reason for the last replacement. Surprisingly, most students reported to buy a new mobile phone less than once every two years, which can be considered acceptable since mobile service operators also draw contracts for this period (this also corresponds to the physical and psychological obsolescence of the product). Furthermore, 64% reported to have bought a new device only because the last one was no longer functioning properly and 18% because it was lost/stolen. 20% indicated favourable terms or definitely wanting to buy a new model as the reason for the purchase. This latter group are those who can be fairly easily convinced via marketing methods about the „necessity” of changing their mobile phone.

Characterization of behaviour patterns by factor and cluster analysis

For in-depth analysis of the activities connected to an environmentally conscious lifestyle, first, a factor analysis was conducted, using the closed-ended questions on the subject. Several attempts were made at the inclusion of variables in order to arrive at a solution where the factors explain at least 60% of the original variance and have a meaningful content, and the KMO and Bartlett's test values are satisfactory. Finally, the variables involved could be grouped into seven factors¹ – the weights given to the variables in each factor can be seen in the rotated component matrix (Table 1). Based on their content, the factors were named as follows:

1. hedonistic consumer behaviour
2. environmental activist behaviour
3. increasing environmental knowledge
4. buying sporting equipment and electronic devices
5. supporting environmental NGOs
6. good housekeeping practices
7. not keeping electronic devices on stand-by.

The factor *hedonistic consumer behaviour* includes habits related to the consumer society such as shopping for the sake of pleasure, frequent buying of clothes and accessories, keeping up with fashion/technological trends, excessive spending, difficulty to resist discounts and not only buying necessary things (as indicated by the negative sign). The factor *environmental activist behaviour* signifies specific community activities (e.g. collecting litter), participation in environmental demonstrations and performing volunteer work for environmental NGOs. *Increasing environmental knowledge* comprises activities such as reading books, journals or internet sites related to environmental protection or attending conferences on the topic. The factor *buying sporting equipment and electronic devices* contains precisely these activities. *Supporting environmental NGOs* means membership in and financial support of such organizations. *Good housekeeping practices* is composed of turning off the lights and the computer, but despite all efforts, not keeping electronic devices on stand-by constitutes a separate factor.

¹ The analysis was conducted by SPSS using principle component analysis with Varimax rotation. The result was obtained in 6 iterations. The KMO value is 0.75, the result of the Bartlett test is 1639.492, the variance explained is 62.56%. The eigenvalue of the 7th factor is just below 1, but its inclusion increases variance explained by almost 5%.

Table 1. Rotated component matrix

	1: hedonistic consumer behaviour	2: environmental activist behaviour	3: increasing knowledge	4: buying sporting equipments and electronic devices	5: supporting environ- mental NGOs	6: good house- keeping practices	7: not keeping devices on stand-by
Factors Variables							
Shopping for the sake of pleasure	0.740	-0.040	0.038	-0.136	0.135	-0.243	0.009
Frequency of buying clothes and accessories compared to other university students	0.717	0.061	-0.109	0.232	0.011	0.048	0.231
Keeping up with fashion/technological trends	0.698	-0.013	-0.016	0.360	-0.094	0.006	0.102
Buying something when having money	0.666	-0.114	0.065	-0.083	0.044	-0.186	-0.223
Difficulty to resist discounts	0.660	-0.012	-0.068	-0.196	-0.012	0.111	-0.088
Frequency of buying cosmetics compared to other university students	0.651	0.005	-0.043	0.151	-0.052	0.254	0.057
Buying things only if needed	-0.648	0.127	-0.018	0.106	-0.060	0.228	0.083
Environmental activities (eg. collecting litter)	-0.067	0.798	-0.082	-0.031	0.065	-0.027	0.055
Participation in environmental demonstrations	-0.059	0.798	0.145	0.042	0.146	-0.013	0.013
Volunteer work for environmental NGOs	-0.029	0.681	0.249	-0.037	0.104	0.019	-0.109
Browsing the internet on environmental issues	-0.118	0.057	0.801	0.073	-0.016	0.007	0.042

	1: hedonistic consumer behaviour	2: environmental activist behaviour	3: increasing knowledge	4: buying sporting equipments and electronic devices	5: supporting environ- mental NGOs	6: good house- keeping practices	7: not keeping devices on stand-by
Factors Variables							
Reading books/articles on environmental issues	0.083	0.140	0.767	0.023	-0.026	0.072	0.010
Participation in conferences on environmental issues	-0.043	0.062	0.639	-0.122	0.295	0.077	0.076
Frequency of buying sporting equipment compared to other university students	-0.065	-0.005	-0.024	0.802	0.049	-0.005	0.004
Frequency of buying electronic devices compared to other university students	0.070	-0.020	0.030	0.776	-0.013	-0.145	-0.094
Being a member of environmental NGO	0.032	0.171	-0.016	-0.061	0.816	-0.052	0.032
Supporting environmental NGO financially	0.043	0.123	0.173	0.113	0.773	0.128	-0.035
Turning off the computer when not in use	0.001	0.028	0.137	-0.185	-0.028	0.765	-0.005
Turning off the lights when leaving the room	-0.104	-0.055	0.013	0.009	0.098	0.757	0.019
Not keeping electronic devices on stand-by	-0.019	-0.036	0.118	-0.092	0.007	0.011	0.933

The factors identified – with the exception of perhaps the last two factors – contain easily distinguishable patterns of behaviour, providing a good basis for dividing respondents into distinct groups via cluster analysis. This compression of data naturally results in loss of information, however, performing the cluster analysis using too many variables would have rendered the analysis far too complicated. In the experimental phase mainly hierarchical clustering methods were used (eg. between groups linkage and Ward method). We considered various solutions (with 3, 4 and 5 clusters) in order to find one where all factors used as grouping variables are significant, and the clusters obtained are distinct and allow suitable interpretation. A solution with 6 clusters was finally chosen, containing 398 respondents in total.

The result of the cluster analysis performed by the Ward method can be best seen in the Means table (Table 2), showing the number of respondents assigned to each cluster, the averages of the factors used in the analysis for each cluster as well as the standard deviations within the clusters. It is central to the „reliability” of the analysis that each cluster should contain a suitable number of respondents. The solution described fulfills this requirement, as the clusters contain 114, 125, 43, 13, 18 and 85 respondents respectively. Another important requirement is that the standard deviations should be relatively small. This is the least true in case of cluster 4, but is still tolerable.

The averages of the factors as variables and their sign indicate the strength and direction with which each factor is present in each cluster. The ANOVA table shows that all factors included in the analysis are significant.

Table 2. Means table of cluster analysis using hierarchical Ward method with the factors as variables

Best 6 clusters (excluding 8 outliers)			Hedonic consumer behaviour	Environ- mental activist behaviour	Increasing environ- mental knowledge	Buying sporting equipment & electronic devices	Supporting environmental NGOs	Good housekeeping practices	Not keeping devices on stand-by
Knowledge oriented modest students	Mean	-0.7845690	-0.03549947	0.4297666	-0.2576294	0.3420230	0.1096010	-0.0972340	
	N	114	114	114	114	114	114	114	
Consumption oriented students	Mean	0.57972619	0.49397595	1.19489097	0.81083465	0.48629654	0.70279140	0.42190348	
	Std. Dev.	0.7594560	-0.2545159	-0.3298868	-0.3260630	.4423679	-0.1681498	0.0776721	
Indifferent students	Mean	0.0340342	-0.0912573	0.0516009	-0.6649761	-1.6083701	-0.2563829	0.0894377	
	Std. Dev.	0.71642065	0.47723648	0.75984241	0.80406972	0.64209903	0.42129302	0.48314178	
Inconsistent environmental activists	Mean	1.08863681	0.88992338	0.66409486	0.57959842	1.10776344	0.35031846	0.43199757	
	Std. Dev.	0.2909816	1.8758927	0.6006436	0.3495834	0.1656323	-0.6044819	-3.3974076	
Consistent environmental activists	Mean	0.81304285	0.67380533	1.30504655	0.80390224	1.20433981	0.72396274	0.34477061	
	Std. Dev.	-0.5775493	2.9878593	-0.2556305	-0.2773204	0.2203453	-0.4150384	1.3558743	
	Mean	0.70016510	0.63377948	1.16565790	0.96989284	0.44609562	0.50701109	2.78586128	
	Std. Dev.	18	18	18	18	18	18	18	

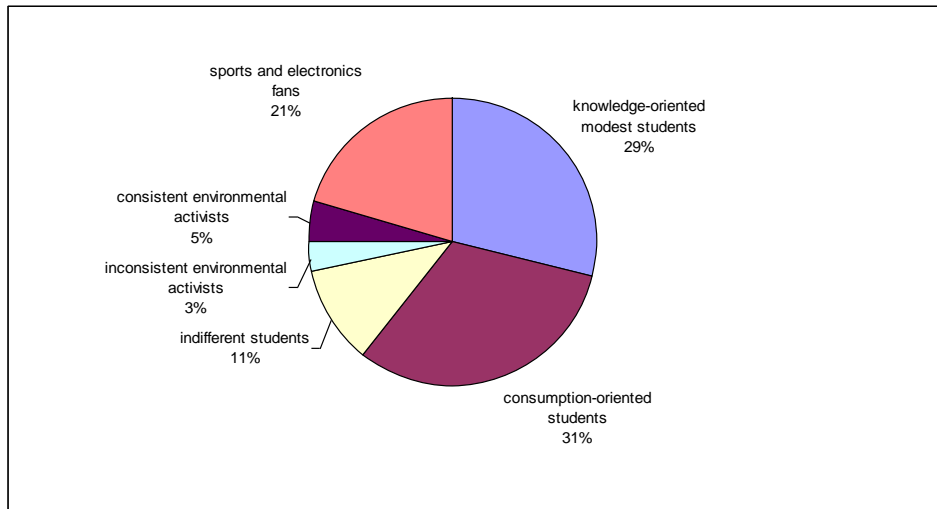
Best 6 clusters (excluding 8 outliers)			Hedonistic consumer behaviour	Environ- mental activist behaviour	Increasing environ- mental knowledge	Buying sporting equipment & electronic devices	Supporting environmental NGOs	Good housekeeping practices	Not keeping devices on stand-by
	Mean	Std. Dev.							
Sports and electronic device fans	Mean		-0.0134949	-0.1456462	-0.1291012	1.1972761	-0.3297009	-0.1318013	0.1615021
	N	85		85	85	85	85	85	85
Total	Mean		0.96801956	0.61829801	0.73943846	0.69628409	0.93373030	0.47223379	0.45936606
	N	398		398	398	398	398	398	398
	Std. Dev.		-0.0020241	-0.0261804	0.0055522	0.0065319	0.0080944	-0.1157807	-0.0089516
	Std. Dev.		0.99850536	0.95787454	0.98216126	1.00089808	0.98206378	0.55907791	0.99809585

Using the Means table (Table 2) we grouped respondents in the following clusters:

- Cluster 1: Knowledge oriented modest students (114)
- Cluster 2: Consumption oriented students (125)
- Cluster 3: Indifferent students (43)
- Cluster 4: Inconsistent environmental activists (13)
- Cluster 5: Consistent environmental activists (18)
- Cluster 6: Sports and electronic device fans (85).

The proportion of students belonging to each cluster is shown in Figure 8.

Figure 8. Proportion of students in each cluster



In the next step, the characteristics of each cluster were examined, as well as the clusters' relationship to the various student groups in the sample. Regarding the characterization of the clusters, the focus is on the difference of the cluster averages from the sample average according to each factor. These relative proportions are more important than the distributions in themselves, as those result from the sample characteristics.

1. Knowledge-oriented modest students

The most important characteristic of this group is that its members (114 students) read substantially more books and internet content related to environmental issues than the average, and they also like to attend conferences on this topic. They are often members or financial supporters of environmental NGOs. Good housekeeping practices are also present to a certain degree (however, they fall below the average when it comes to not leaving electronic devices on stand-by). On the other hand, all factors related to consumption have a negative sign, meaning that this group is not hedonistic and doesn't spend much on sports equipment and electronic devices. It is interesting that these students also avoid „showing off” their environmental orientation attending demonstrations or doing volunteer work for green NGOs.

Graduate level students environmental feature in this cluster twice as heavily as in the overall sample, 52% of them fall into this group. Undergraduate students with environmental specialization are also somewhat overrepresented. The two student groups who are underrepresented in this cluster are undergraduate management and economics students taking a basic course on environmental economics.

2. Consumption-oriented students

Although consumerist attitudes – presumably due to the self-reporting nature of the survey – are not highly characteristic for the overall sample, these 125 students seem more consumption-oriented compared to the other clusters. This is primarily reflected in the frequent purchase of clothes, cosmetics and accessories, the pleasure in shopping and spending money, the attraction towards discounts and the following of fashion trends – however, not at all in the frequent purchase of sporting equipment and electronic devices. This group is apparently not engaged in environmental protection, whether it comes to the level of collecting information, activist behaviour or good housekeeping practices. However, some are members of environmental organizations or provide these with financial support. The latter could be explained (just like their hedonist consumer behaviour) by the relatively good financial situation that is characteristic for students in this cluster.

In the consumption-oriented cluster, all seven student groups are represented according to their presence in the overall sample, with slightly more

undergraduate management students studying environmental economics. Contrary to the expectations, the graduate finance students used as a control group are slightly underrepresented. In this cluster, the proportion of female students is much higher than in the sample (89% instead of 65%).

3. Indifferent students

43 respondents were assigned to the cluster of indifferent students. They do not exceed the sample average any of the factors (except, minimally, not leaving electronic devices on stand-by). They do not support environmental organizations at all, but it is also characteristic that they do not buy sporting equipment or electronic devices. Thus, they can be considered indifferent regarding both the environment and consumerism.

The proportion of economics students in this group is more than double compared to their rate in the overall sample, and first year „novice” students are underrepresented.

4. Inconsistent environmental activists

This is a relatively small group consisting of 13 respondents. They can be characterized by active participation in environmental demonstrations, conferences, they are often members and financial supporters of environmental NGOs. They are interested in environmental protection, browsing the internet and reading books and journals on the topic. Regarding their consumer behaviour, they are also more active than the average, they like to shop for sporting equipment, electronic devices, clothes and cosmetics and follow fashion trends. They do not tend to practice good housekeeping measures, e.g. they leave electronic equipment and lights turned on when not in use. This result indicates that various aspects of environmental consciousness do not always go hand in hand within individuals. Those who consume less are not necessarily active in demonstrations and vice versa. Also, activist behaviour – especially financial support to environmental groups – often serves as a compensation for an environmentally unfriendly lifestyle.

It is contrary to expectations that graduate students specialized in environmental issues are not overrepresented in this cluster. Surprisingly overrepresented are the two control groups, the graduate finance students and

the „novice” students. None of the economics students got assigned to this cluster. (These results have to be interpreted carefully as the cluster only includes 13 respondents.)

5. Consistent environmental activists

This is a group of 18 students who are mainly characterized by their above average participation in environmental demonstrations, membership and support of environmental NGOs and volunteer work. However, increasing their knowledge base does not seem to motivate them, which supports the findings of Chawla (1998) that knowledge and information is not among the strongest drivers for members of environmental organizations². These students are not interested in consumption, they have the second lowest score on hedonistic behaviour, and also do not buy sporting equipment and electronic devices. In their everyday lives they are only active in not using the stand-by function of electronic devices but do not pay attention to turning off the lights and the computer.

Among the consistent environmental activists, graduate students specialized in environmental issues are overrepresented, as are, somewhat surprisingly, the graduate students studying environmental management. Although the latter group did not choose an environmental specialization, they are nevertheless interested in these issues. The proportions of the two control groups are, as expected, only half of those in the overall sample.

6. Sports and electronic device fans

The members of this group (85 students), as is indicated by the name, buy sporting equipment and electronic devices far more often than their peers, while their consumer behaviour regarding other aspects, such as shopping for the sake of pleasure, following fashion trends and buying clothes and cosmetics can be considered average or even slightly more modest. They are not at all interested

² According to Chawla (1998), the environmental orientation of professional environmental activists is mainly based on childhood experiences in nature, environmental values of the family, the influence of environmental organizations, role models (friends, teachers) and education-formation (in decreasing order of importance). This means that the knowledge increasing role played by formal education, although relevant, is not as important as the shaping of attitudes.

in environmental issues or activism, they neither read on the subject, nor attend demonstrations or support environmental groups.

Regarding the student groups, we can find far more undergraduate management students studying environmental economics here, and less of those specializing in the environmental field. Other groups are generally present in average proportions. Looking at the gender distribution, the high share of male respondents in this cluster is apparent (while in the overall sample, the female:male ratio is 2:1, in this group it is 1:2).

Limitations

As in questionnaire-based surveys, self-reporting bias is observable in case of attitude questions and closed-ended questions inquiring about environmentally aware consumer behaviour. However, this means that detected gaps in reported and experienced behaviour of students are in reality even larger, making these inconsistencies even more urgent to address when designing policy and programs for sustainable consumption and effective environmental education.

The research does not cover a longer time horizon, therefore lifestyle changes and longer-term impacts of environmental education on consumption patterns of students can be measured only based on repeated surveys or with the help of a different research methodology.

Conclusions and further research needs

The main goal of our research was to examine the consumer behavior of students of the Corvinus University of Budapest: the sustainable features of their consumption patterns, the degree to which they take environmental considerations into account in their consumption decisions and the consistency of their stated attitudes and actual behaviour. Results show a highly mixed picture.

Sensitivity toward environmental issues does not always go hand in hand with modest, carefully considered, waste-minimizing – thus sustainable – consumption. Environmental consciousness appears quite selectively, in some cases through moderate consumption, in other cases through activist behaviour,

but it rarely covers all aspects of life. Compensating behaviour is widespread, when individuals balance certain unsustainable habits by other pro-environmental activities. At the same time, it can be observed that an attraction to certain products does not always mean overall hedonistic behaviour with high consumption in all categories. There are a lot of young people who do not differ from the average in any dimension: their consumption is not excessive but their concern for environmental issues is also limited.

Identifying and characterizing distinct groups is important in order to be able to find the most effective education tools suitable for promoting students' environmental knowledge, values and attitudes, and also for pushing their lifestyle and consumption patterns into a more environmentally friendly, consistent, sustainable direction. We assume that providing the knowledge-oriented group with the relevant practical guidance could help transfer their knowledge into day-to-day action. For the groups living according to the norms of the consumer society, supplying attractive environmentally friendly alternatives (products and services) that require minimum sacrifice could provide a solution – this also applies to those who are only interested in certain categories of goods. In case of the inconsistent environmental activists, the emphasis needs to be placed on the factors causing the inconsistency. For the consistent environmental activist group, providing positive feedback is the most important to encourage them to persevere in a lifestyle which often requires sacrifices. The indifferent group is likely to be the most difficult to motivate, as the lack of interest is likely to prevent any change of the status quo. In their case it would probably be more helpful to find other (non-environmental) incentives which currently influence their behaviour and could also be in line with sustainability (e.g. low consumption to save money).

Thorough consideration and adaptation of possible tools to the various groups is the subject of research currently in the starting phase, with results to be discussed later.

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