SOCIAL DIMENSIONS OF ENERGY DEVELOPMENT IN RURAL AREA

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Abstract
Any and all human interference will have effects on the environment in a way. The experts working in development are working hard to have interventions to improve the quality in life of their local community. It could be a city or a town or even a village, this depends on the existing natural conditions, the geographical location, the economic environment that was created and the local community that lives there which actually can be considered the most decisive. The lives of communities, the direction of developments at local levels are largely influenced by local governments, and their decisions often determine the situation of the given settlement for years. In the development of local governments, the protection of the environment and the management of the resources available play a decisive role in economic development. Their interventions primarily and directly serve to strengthen the environmental dimension of sustainability while contributing substantively to the promotion of economic growth. Within the local society, the most open layer of environmental awareness is youth, which in almost all segments of its life strives to take this very important principle into account. The goal of the research is to compile a comparative study on the use of renewable energy sources for a local government and for the population, for young people. In our primary research we examined the attitude of the city and population towards the use of green energy and the impact of local energy development on the local community.

Keywords: government system, local government, renewable energy, environment awareness, young generation.

Introduction

Renewable energies play an increasingly important role in our lives. Besides worldwide, also in our country, we can hear more about of the renewable energy, alternative energy sources and environmental protection (Hahnel, 2010). Many people are aware of the importance of environmental awareness and renewable energy sources, and by the help of some guidance, most of us know what we could or should do to protect our environment (Kovács, 2010). Much of the energy production is based today on exhaustible and non-renewable energy sources, for example in the production of heat for electricity generation and heating itself (Kovács and Mezei, 2013). The Hungarian local government system could not afford to ignore alternative energy sources during its operation. It is a fundamental feature of the system that it is characterized by responsibilities defined and delegated by the state, and on the other hand, the performance of tasks aimed at voluntarily improving the quality of life of the population. If not directly, but economically more efficient operation of these volunteered tasks are contributed by the increasingly widespread renewable energy systems in municipal institutions. Why can this be considered as a "volunteered" task? We can say in good faith that the municipalities are increasingly "getting green", but in reality they have much more economic and rational reasons, given the ever-decreasing normative support system. The application of certain "green systems" in the long run, despite the initial shocking investments, are cheaper and more economical, not to mention their environmentally-friendly operation. Obviously, the positive effects are not only enjoyed by the local governments but also by all those who make up the community of the given settlement. During our research, we wanted to compare the knowledge and methods of the Local Government of Gyöngyös and the inhabitants of the city with renewable energy sources. In order to obtain detailed results, we had to examine how

well the population knows about the types of renewable energy sources in general, such as solar energy, wind energy, hydropower, geothermal energy and biomass (Sembery and Tóth, 2004).

The local government system

The tasks of the local governments in Hungary are essentially broken down to two parts, on the one hand, mandated by the state and supported by the financial framework and on the other hand by voluntary tasks. The principle of voluntary service is the law that everything is able to work that is not forbidden, which means the local government can perform any task that is not prohibited by law. The law also stipulates that voluntary commitments cannot endanger the obligation of the obliged (Jókay et al, 2004). The assets of local governments have had two functions in the last fifteen years. The decisive part of the assets transferred to the local government by the state ensured the material conditions of local public services. The success stories of the local government system include drinking water, landline telephone network and gas pipeline developments. However, these success stories have generated a lot of tension. The development of the drinking water network was unable to follow sewage treatment and drainage capacity, the public utility was growing. The system of central government contributions and subsidies thus made the local governments into 'poor riches' and constantly do it. The most important system inconsistency of the Hungarian model is that local governments were not forced or encouraged to deal adequately with the management of this wealth (Vigyári, 2008). Over the years, with the decreasing central support, the number of tasks are constantly increasing, although over the last ten years, there is no longer just the volume of subsidies but also the quantitative reduction of the tasks to be carried out. The financing of the tasks are achieved by the local governments, not only through the subsidies received and by the increase in the number of taxpayers, but also by contributing to saving from the economical and energy efficient institutional operation. The former central, often prolific, source-user system and thinking was replaced by a new approach of the leaders of the town, which has stimulated responsibility and thoughts about the future. This new attitude, however, is not only observed in the local government, but also among the people living in the settlement and typically the young population, which is most likely to open up to new and alternative solutions and to try to protect their environment and consciously live their everyday lives.

Introduction of Gyöngyös

Gyöngyös is the second largest settlement in Heves County. It is especially famous for its vine growing, winery, commerce and, last but not least, its tourism. However, since the second half of the twentieth century, the industry has become the dominant sector, especially in the fields of microelectronics, machinery manufacturing, railway equipment manufacturing, boiler production and food industry. The industrial park in Gyöngyös won the industrial park title in 2000. The infrastructural advantages of the industrial park include the M3 motorway, so now it is only 70 km away from Budapest, the Csepel public port is 90 km away and the Danube port is 80 km away. The industrial park has an industrial railroad, the Budapest-Miskolc line is 13 km away, the Ferihegy Airport is 1 hour away, and Pipis-mountain Airport is 3 km away (TeIR, 2017).

Gyöngyös has an advanced education and training network. The Károly Róbert College aims to serve the quantitative and qualitative needs of the region's knowledge market, in particular the economics, agribusiness and tourism sectors of the North Hungarian region, with its advisory, logistic, research, training and advanced studies, event organization and information services in the field of training in environmental and rural development. The three-star Opál Hotel, which was inaugurated in 2001 by the Faculty of Business and Agriculture, and the Matra-Tan Research and Training Centre, which was established earlier, began to be built in 2001 by a successful Phare tender. The combined workforce, built infrastructure and the proximity of Budapest could have caused a drastic drop in the number of settlements in 2011 (Figure 1). The Károly Róbert College is also engaged in the development of biomass utilization methods too since 2012 (Boros and Takácsné, 2011). The income levels of the population are constantly exceeding, both the national,

county and district averages. In analysing incomes, we cannot ignore the fact that Budapest is close and presumably high proportion of people travel back and forth. In our opinion, the significant increase in the number of vehicles is related to that the employees have to travel further away to work. It is likely that the income gap is related to a gradual decline in gas consumption, which is due to the transition to alternative energy sources.

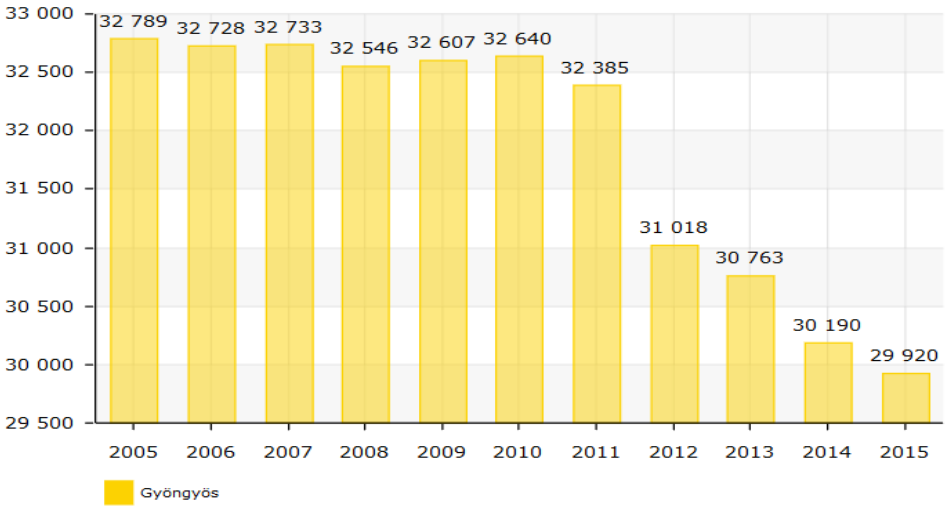


Figure 1. Population of Gyöngyös, 2005-2015 (person)
Source: TeIR, 2017

Mátravidék is fascinated by the unique natural values, natural habitats, unique flora and fauna, geological formations, historical and cultural history. The highest point in Hungary, 1014 meters high Kékes, Matrahaza, Galyatető, Mátrafüred, Mátraháza, Sástó and the 50 meters high lookout tower offers a wide range of sports, hiking and excursion opportunities throughout the year. The Farkasmályi cellar can be developed as a prominent place for wine tourism, with an especially valuable natural (platen and chestnut trees, a forest bridge with stone bridge) and its built environment (16 nationally protected cellars and wine houses). The area is famous for vine growing and its wines. The settlements in the area belong to the Mátraaljai Wine Route. The grapes and wine and the agriculture as a whole play a dominant role in the life of the region (Gyöngyös City Information Portal, 2017). The Local Government of Gyöngyös, in order to protect all these features, puts great emphasis on shaping the environmentally conscious attitude of the population, as well as the attention of local resources (Ritter, 2008). The town's website contains the environmental program of the settlement, composting information and climate change strategy. Among its developments so far, investments such as window-door replacement and optimized thermal insulation have been implemented to protect the environment (Own Research, 2017). The results of the survey reveal that the most active layer within the local society is the adults in the 30s and 40s. We assume this is the layer that has already heard about renewable energy sources and already has the financial resources from which to build these new systems. Longer and deliberately planning, taking into account the future of their children at all stages of their life (Own research, 2017). Concerning its future developments, it has issued a tender for the drainage of rainwater, for the creation of an electric charging station, for the purpose of increasing the urban green area and for the green parking lots (Gyöngyös City website, 2017).

Material and methods

As a first step in our research we became acquainted with the current situation of the use of renewable energies in Hungary and the current literature describing the development of such local government developments. We considered the study of the region's descriptive documents important (Heves County Regional Development Concept and Strategy, Gyöngyös City

Environmental Protection Program, 2012). For a more detailed analysis, we became acquainted with the TEIR Helyzet-Tér-Kép application and the interface of it, and the data within about the City of Gyöngyös (Káposzta and Nagy, 2013). One of the most commonly used methods in social science research is to take surveys based on sample and interviews. The standardized questionnaire guarantees that the same observation procedure is used for each respondent. We also used this method in our research for the total number of 408 respondents. With the questionnaire we tried to examine the willingness of the population and the local government to use renewable energies. The questionnaire was available electronically for locals and we consulted the local government beforehand.

Results and discussion

The aggregate results of the answers to our "What kinds of renewable energies do you know?" question in our questionnaire are shown in Table 1. The most, around 48.53% of respondents know solar energy as a renewable energy source (Table 1). Wind energy was known to almost the same percentage, which was 47.06% in value. This is followed by the third best known energy source: hydropower (44.36%), fourth geothermal energy (36.76%), fifth biofuel (35.78%) and least known renewable energy for the population is biomass (33.33%). 3.19% of respondents were informed of other types of energies.

Table 1. The distribution of the popularity of renewable energies among respondents (%)

No.	Renewable energy sources	The percentage of people asked know the given energy
1.	Biomass (combustible biomass, gasifiable biomass, firewood chips)	33,33%
2.	Biofuel (bioethanol, biodiesel)	35,78%
3.	Geothermal energy	36,76%
4.	Hydropower	44,36%
5.	Wind energy	47,06%
6.	Solar energy	48,53%
7.	Other	3,19%

Note: multiple responses were available. n = 408
Source: Own research and editing, 2017

Based on the results of our primary research, we were able to investigate the proportion of resident population in Gyöngyös who use some renewable energy sources. Based on the results obtained (Figure 2), nearly half of the respondents, about 44.6% of them, do not use any renewable energy sources. This result was surprising, among other things, because current EU tenders are increasingly allowing the number of subsidies to be used for renewable energy developments (MacKay, 2011). Regarding the city of Gyöngyös, solar energy is the most widely used renewable energy source, in the questionnaire we can see it is currently used by 18.4% of the respondents. As regards the location of Gyöngyös, this number may continue to increase in the future, as the utilization rate of solar collectors is significant compared to the number of sunny hours. The use of biofuels (12.3%) and hydropower (8.1%) and biomass (7.6%) can also be highlighted, which are moderately present at the level of household consumption compared to other renewable energy sources. The use of wind power (3.2%) and geothermal energy (2.7%) is negligible, and their utilization can be classified as non-recoverable energy sources for the city, one of which is mainly due to the location of the settlement.

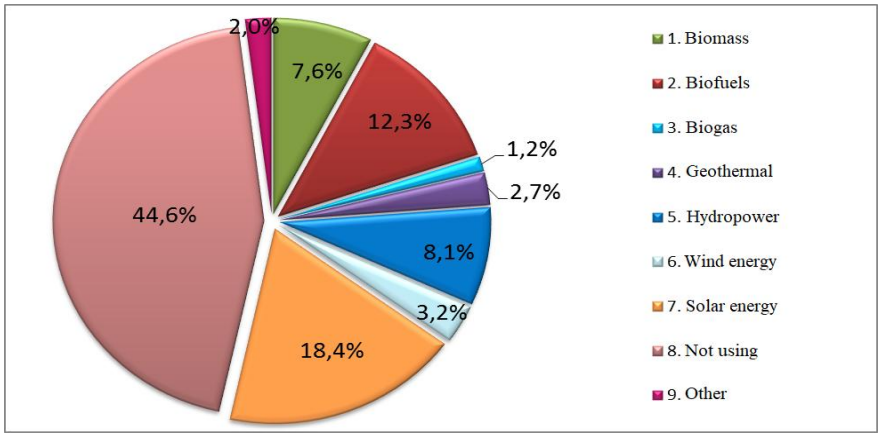


Figure 2. Use of renewable energy sources among the population of Gyöngyös
Source: Own research and editing, 2017 n = 408

In our comparative analysis, we also examined the renewable energy sources used by the local government (Figure 3). Since the local government does not use wind power in any form, therefore, it is not included in the distribution value in Figure 5 although the "not used" aspect is not relevant in this case. In our analysis, we also aimed to examine our assumption that the population and the local government use similar renewable energies. Gyöngyös can successfully develop the use of renewable energy sources through several EU tenders. The amount of investments made so far exceeds 15 million HUF, which can be concluded that this is a major development. For the time period 2016-2020, further projects or tenders will be planned to strengthen the presence and more efficient use of these energy sources (Own Research, 2017).

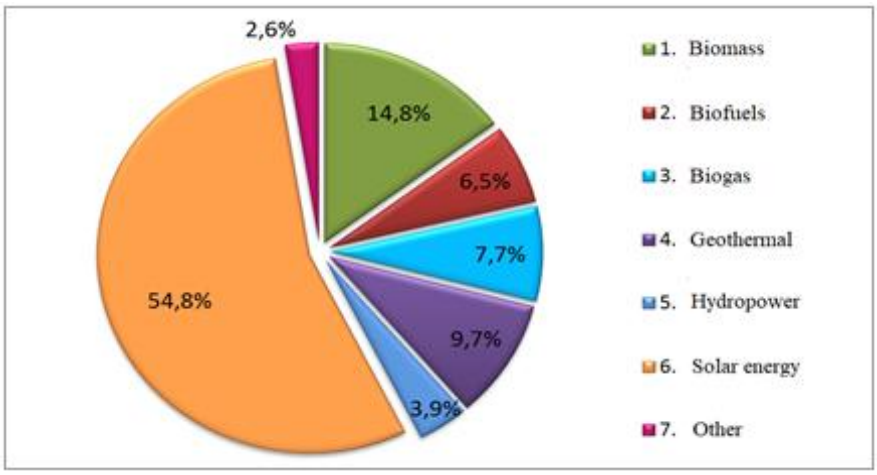


Figure 3. The distribution of the use of renewable energy sources by the municipality of Gyöngyös
Source: Own research and editing, 2017 n = 408

In case of the respondents, we considered that it is important to ask the younger generation of the issue. As the use of renewable energy sources are fundamentally a long-term investment, the positive impact on today's developments will be most appreciated by this generation. Wondering about what age it is considered necessary to educate themselves on environmental awareness. Figure 4 illustrates that the majority of young respondents (83.8%) consider environmental education as early as possible, even in a small age. Minor (10%) is the number of declarants that can solve the issue of environmental protection for involving the younger generation. The question was: *"What do you think, how important is the environmental educations?"*

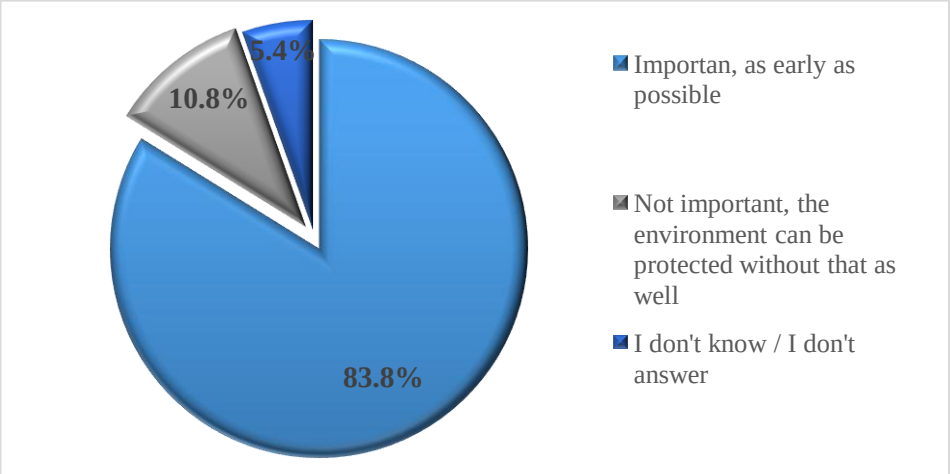


Figure 4. The students' answers about the importance of environmental education
Source: Own research and editing, 2017

Environmentally conscious thinking is indispensable to protect the environment and to maintain good living conditions for the next generation, but it is not enough. In addition to the way of thinking, it is necessary to have this view in our everyday lives. Figure 5 shows how young people live in everyday life, what they are doing and how they protect their environment. In case of Figure 5, it was an open question where the fillers could have given more answers. Generally speaking, the respondents wrote 2-3 answers in most cases, so the figure was summarized on this basis. On the figure, it can be found 9 different answers – 8 positive and 1 neutral ones.
The question was: *"What do you do in your home to protect the environment?"*

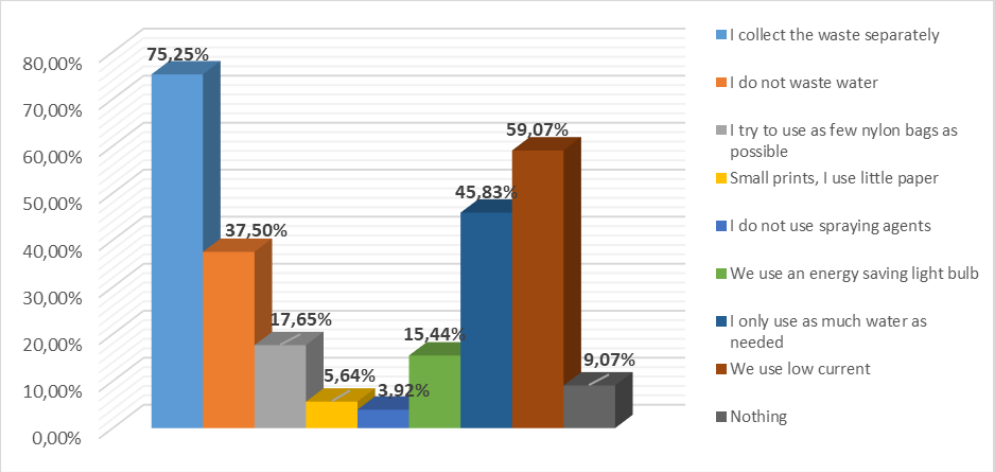


Figure 5. The distribution of answers about what the students do to protect the environment
Source: Own research and editing, 2017

From Figure 5 it can be seen that environmental awareness is the most important to those areas, which are related to utility services. These are selective waste collection, electricity supply and water consumption. Obviously, in these areas, environmental protection can be put into practice if the necessary conditions are met. In Hungary, in the majority of settlements – like in Gyöngyös as well – , the collection of selective waste is solved, so in this area the population has the opportunity to implement environmental protection in practice. This is also apparent to the responses, as more than three-quarters (75.25%) of young people are active in this area. Similarly high proportion (59.07%) was the ratio of the less electricity users. Conscious thinking is more obvious in this area as these consumers consume less electricity without the use of energy-saving light bulbs. The number of people in this category is much less than just 15.44%. The third outstanding category occurs to

water use. The 45.83% of the respondents try to minimize their water consumption. The reason why fewer (3.92%) spontaneous use of a healthy lifestyle may also be due to the fact that relatively few people in the settlement cultivate food (vegetables, fruits) for their own consumption. Apart from the practical environmental protection that we have put into our personal lives, we have also been curious about the environment within which the young people are employed today. Figure 6 shows the answers to the question: *"Rate on a 1 to 6 scale, how much do you care about the following topics?"*

On the scale 1 means: Not interested at all – 6 means: Very interested

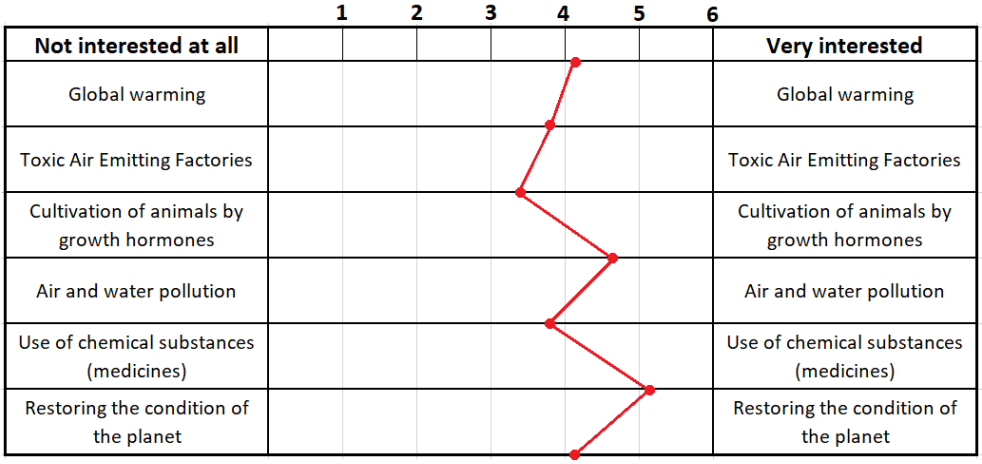


Figure 6. The average rating value of students' answers how much they care the mentioned topics
Source: Own research and editing, 2017

The rates were the following:

- Global warming (4.12)
- Toxic Air Emitting Factories (3.75)
- Cultivation of animals by growth hormones (3.43)
- Air and water pollution (4.56)
- Use of chemical substances [medicines] (3.75)
- Restoring the condition of the planet (5.17)

The greatest interest is the restoration of the planet's condition. This is followed by the issue of air and water pollution. This is what we have seen in the personal life of consciously less water use. Nearly similar concerns are given to global warming. At the same time, they are quite indifferent to the intake of toxic gases emitted by factories, the use of growth hormones used in animals and the use of medicines. The media's ongoing drug advertising campaigns can contribute to the latter's lack of interest as these products appear as part of everyday life. Regardless of the totality of the answers, unfortunately we can say that it is rather indifference to the subject. Despite the fact that the protection of the environment and the importance of it can be met more often by young people, both in print and in electronic media. It seems that this must be improved by involving other means and increasing the efficiency of addressing young people. Our results confirm our assumption that the residents of Gyöngyös and the Municipality of Gyöngyös, who have been interviewed by us, use the same amount of renewable energy sources. According to the survey, the main developments of the local government are focused on solar utilization, such as the use of solar collectors. The same can be observed for residential surveys, where solar energy has also proved to be the most widely used renewable energy source. The second most commonly used renewable energy source for biomass (14.8%) and third for geothermal energy (9.7%), while being moderately used, is biogas (7.7%) and biofuels (6.5%). The use of hydropower (3.9%) is negligible, and other sources of energy (2.6%) are used by the local government.

Conclusions

The question of energy consumption has been the most unsatisfactory situation in recent years (the vulnerable situation of European countries due to energy imports), not only at the national but also at the individual level (see Tóth et al, 2010). One of the most obvious ways of dealing with this situation lies in the use of alternative energies that take into account the natural potential of the given area and their potential for economic exploitation. The effective use of these opportunities and the appropriate institutional and legal background can provide a good basis for eliminating one-sided energy dependency. Our study shows that the Local Government of Gyöngyös lives and sets good examples for local residents regarding the use of alternative energy sources while contributing to reducing their own operating costs. The high percentage is associated with the decreasing state support, and therefore the municipality is forced to have more thoughtful and efficient management. It would be necessary to provide financial support for the population, including the local government, or to introduce local regulations that would encourage the use of alternative energies among residents. Within the population, the younger age group deserves special attention, who considers it necessary to preserve their environment. They are the ones who are willing to make efforts, therefore, for the place that means the cradle of future generations.

Acknowledgments

This study was supported by the ÚNKP-17-3 New National Excellence Program of the Ministry of Human Capacities

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