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The eco-village concept and its place in sustainable settlement and rural development

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I. Introduction

“An eco-village is not the redeemer for the urbanised civilisation merely its desire and self-consciousness.”

Imre Dunai (DUNAI I. 1998)

The key document of sustainable human settlement development is the paper published as Chapter Seven of the comprehensive agenda of the UN Conference on Environment and Development (UNCED) under the management of the UN Environmental Programme (UNEP) entitled Promoting Sustainable Human Settlement Development. This document is far too comprehensive and generic and therefore difficult to translate into practical terms. If you want to transform global objectives into local action, any sustainable development attempts can only be made in a bottom up approach with local or regional initiatives. At the regional and local levels the key principle is man to strive to close cooperation with nature adapting to the environment and the locally available resources trying to use as little import as possible. Biological diversity is to be preserved and the potentials for land use patterns, landscape management and use, sustainable husbandry and natural industries.

In addition to settlement policy approaches organised in a top down manner there are also other initiatives trying to do something to improve the human experience and to develop settlement patterns thought to be sustainable from the ecological perspective with the help of grassroots non-governmental organisations. The best founded and most comprehensive concepts apply a system level approach. The collective designation applied to the type of social initiatives focusing on sustainable settlement and rural development in the past few decades is “eco-village”.

The eco-village concept is based on the principles of sustainable development and the findings of ecology as the underlying discipline. It is focused on the implementation of human settlement pattern or model which can be smoothly integrated into the surrounding environment, therefore eco-villages come naturally in the most diverse and versatile forms, adapted to the local natural and social environment.

The narrower scope of this PhD thesis is Gyűrűfü eco-village, existing among the hills of the Southern Zselic in this form since 1991, partly founded and for a long time managed by the author of this paper (formally up to 1st January, 2000). The work focused naturally onto

the settlement geography and settlement development aspects of the multifaceted project as the scientific profile of the Institute of Geography requires, and looks for the answers with the help of the case study how and to which extent the eco-village as a form of human settlement and grassroots initiative can be integrated into the Hungarian network of settlements under the conditions of the present and to which extent it meets the needs of sustainable settlement and rural development.

II. Background and objectives

The signs which alluded to the unsustainable aspects of the human endeavour and economic growth have first been systemically assessed by researchers with the widest intellectual horizon back in the end of sixties, beginning of seventies (EHRlich, P. 1968, COMMONER, B 1971, WARD B. – DUBOS, R. 1972). In the wake of their findings *The Ecologist* magazine published a timely warning (GOLDSMITH, E. et al. 1972). On the other hand, scientists of urban development noticed that uncontrolled propagation of big cities threatens viability of the human living space and the quality of life (DANSERAU, P. 1970, MICHENER, J. 1970). These dangers were recognised and identified quite early by a man who was later to become the world famous critic of urban development, Lewis Mumford (MUMFORD, L. 1934, 1967), but several other books were published in the sixties and seventies on the same issue such as (WARNER et. al. 1969). It has been recognised that for a convenient life to have the help of a purely technical civilisation was not essential (EISELEY, L. 1969).

The most famous of all however is doubtlessly the report commissioned by the Club of Rome and published under the title “The Limits to Growth”. This stated that in the event the current trends of industrialisation and consumption are carried on unchallenged, including the ever increasing use of energy, the most probable consequence will be a sudden and dramatic collapse of society as we know it, affecting both the number of population and the capacity of industrial production (MEADOWS et al. 1972). The thick volume assessing the state of Europe’s environment called the Dobriš-assessment substantiated with facts and figures that the system analysts were right and the crisis was here (STANNERS, D. – BORDEAU, P 1995). Authors of *The Limits to Growth* reiterated their warning after thirty years saying that “survivable development could be much more appropriate to say instead of sustainable development” (MEADOWS et al. 2004).

Many dealt with the issues of defining the concept of sustainable development (World Commission on Environment and Development, 1987, IUCN, UNEP and WWF 1991, BORSOS, B. 1993, VÉGH L. 1993, O’SULLIVAN 1999, GYULAI I. 2002, HAJNAL K. 2006), while an outline of the development issues in settlements is summarised in DÖVÉNYI Z. 2003, MEGGYESI T. 2002/1-2, KÓSZEGHFALVY GY. – TÓTH J. 2002. Linking the two, i.e. the basics of a sustainable settlement development theory can be found in the work of HAJNAL K. 2006. Utilisation on ecological grounds of the wider geographic environment of a settlement is the

subject matter of bioregionalism (TODD, J. – TUKEL, G. 1981, TUKEL, G. 1982, SALE K. 1991), while the eco-village concept itself has been formulated several times and in many different ways (GILMAN ÉS GILMAN 1991, O’SULLIVAN 2000, KENNEDY, D. 2002). Implemented examples on the ground can be found in many places and in a great diversity worldwide, their international cooperation network is GEN (Global Eco-village Network). The forerunners of Gyűrűfü eco-village include mainly Village Homes, Davis, California, and Crystal Waters, Maleny, Australia.

In the light what was said above, the main objective of the experiment was to *develop and implement a small scale sustainable settlement development model based on ecological principles*. During the development of the model, the following tasks were identified:

- Exploration and identification of the relationship between the eco-village and rural development patterns, the structure of Hungarian settlements and available natural conditions which all have to be taken into consideration during planning.
- Resolve as much as possible the contradiction between the backward rural area and the foreign body embedded in it (i.e. the eco-village).
- Objective: to set up a small settlement of approximately 300 people with the more properties of communities the better, possibly self-sustaining, open to information and as much as possible closed in terms of material flows.

III. Research methodology and experimental methods

The eco-village concept and design principles provide an excellent example to the overall spatial development aspects of human societies as formulated by the geographic sciences. Any social organisation has its own physical, regional or local components. Consequently, a social development model will necessarily have organic connections with all the three major areas of geographic sciences (physical geography, social geography and regional geography) being an interdisciplinary approach just like geography itself.

In the case of Gyűrűfü, neither the model was not completed, nor the natural environment was not identified yet. One had to be searched for, the other developed. During the exploration phase certain criteria were defined on the *regional* level in order to allow for the manageability and monitorability of the experiment to be made. The following considerations have to be regarded as the key factors deciding upon the final choice of location:

1. Appropriate distance from Budapest in order to avoid the agglomeration effect,
2. possibly not too precious land in order to make reasonable financing feasible,

3. independent, outstanding watershed and hillside landscape to provide physical limits to the site,
4. few industries and traffic to mitigate environmental effects,
5. uninhabited yet habitable land to avoid influences from existing infrastructure, settlement patterns and social relationships as much as possible.

After a sporadic and random assessment in the Göcsej, Zala, the Tolna hill range and the Zselic the choice of the current site was made due to personal reasons and the symbolic name (Gyűrűfű has become a symbol of abandoned small villages in the Hungary of the seventies), which site however meets fully all the pre-requisites above. Upon the birth of the theoretical concept two contradictory approaches has to be reconciled – more efficient resource use / denser settlement pattern, and natural way of living / airy, spacious arrangements, respectively – and a vision presented which can be attractive for prospective settlers and at the same time translates as much as possible from the planning and design principles of sustainable settlements (such as negative feedback, development without growth, biological-ecological compatibility, and so on).

Planning:

An ecological design system named *permaculture* (MOLLISON, B. – HOLMGREN, D. 1978), and its more advanced version suited best to the goals of the project (MOLLISON, B. 1988, MOLLISON, B. – SLAY, R.M. 1991). Of the principles laid down here, Gyűrűfű primarily strived to focus on *watershed based design, use of local materials and resources, low external input and labour intensity, amalgamation of old and new solution as well as the establishment of local cycles.*

The first step of the actual design work was the procurement of the surface-contour map of the experimental site and delineation of the watershed of the water catchment area. Fortunately this has mainly concurred with the administrative and hence, the design boundaries and a relatively uniform structure of ownership was present on it. Following this a landscape assessment was made with the help of site visits and field work. In the Zselic hillside the original biotic association would be a dense stand of predominantly Sessile Oak or Durmast Oak (*Quercus petraea*) mixed with hornbeam (*Carpinus betulus*). However, due to century-long human presence these woods have been transformed and in many places they are replaced by formerly cultivated land, mainly grassland and meadows, on the bottom of the valleys by unregulated water courses. Abandoned areas are prone to secondary succession. The former village site is situated in the middle of the water catchment area, on the southern slope of a North-South ridge. Based on the land assessment categories set up by LÓCZY D. –

GYENIZSE P. (2003) the Gyűrűfü area belongs to group four: “*erosion-derasion hill range in an elevation of 250 to 350 metres above sea level, featuring clay-leached brown forest soil; remnants of oak woods with beech and hornbeam, partly under crop.*”

In the next step of planning a thorough survey of the site was made in many aspects: geology, hydrogeology and environmental geology (KOCH L. 1992, KONRÁD Gy. – BARABÁS A. 1992), soil types of the landscape (JÁKI I. 1991), agro-ecological potential (DEZSÉNY Z. 1991), farming possibilities in the Permaculture system (BAJI B. 1992), application of Permaculture as a design system at the level of a scattered, clustered village pattern (KILIÁN I. 1992) the state of its forests (LEHOCZKY I. 1992), sustainable settlement design alternatives (GUYON J. 1991, 1992), water management and waste management concepts (LICSKÓ et al. 1991, 1992, ZAJA P. 1992), as well as the existing and potential energy infrastructure of the area (UNK J. 1992).

Extensive research was carried out in relation to the old Gyűrűfü village as well. Exploration of the causes for abandonment seemed to prove that in addition to political causes emigration was reinforced by the physical geographic situation in the middle of a hill-range, cut off from traffic routes.

Statutory enforcement of the ecological organising principles seemed to be best served in the middle of the nineties by the preparation of a village master plan. Land use patterns outlined in the master plan were driven by the desire to reconcile ecological considerations with primary human needs. *With the help of overlapping maps* the designers tried to identify the sites most suitable for human settling (i.e. housing plots), in other words the focus was not so much on pre-existing social or infrastructural, much rather natural environmental features (such as exposition, aspect, slope categories, inflexion points, forest cover, erosion risk, and so on). Due to the natural fissuration of the landscape this resulted in a pretty fragmented land use proposal, accompanied with exact requirements for construction methods, land and landscape use. The master plan was subsequently amended in 2006 in conjunction with the master plan of the neighbouring existing village, Ibafa, the administrative centre, as part of a mandatory review. In order to mark the ecological settlement development pattern, the local government at Ibafa community declared the entire watershed to be a nature reserve.

IV. Results, detailed analysis of the results

Implementation:

Building up of the organisational framework was also commenced (a foundation, later on a civic association and a branch of the local authority were established and various businesses started), and land property consolidation. The legal form of the foundation proved to be a quite unfortunate choice later on due to changes in legislation and difficulties in organisation, while the landed property ownership has been hopelessly confused during the compensation process. Amendment of the Land Use Act in 2002 rendered the earlier concept of joint land use practices impossible. No wonder that disputes, bitter disappointment and civil lawsuits, state administration actions started to overshadow the everyday life of the worthy initiative. The first version of the master plan was also getting out of date since it has become apparent that the intensive forestation renders agricultural land use impossible and is therefore untenable. The function which was the key objective of the foundation upon incorporation, i.e. to raise funds for the project, became partly irrelevant and was partly raised to higher dimensions. Self-governance of the villagers is shown by the setup of the Gyűrűfü Association, a non-governmental organisation serving entirely the interests of the villagers, which mainly manages cultural and community programmes, and a branch of the local council. Ensuring livelihood for dwellers in the village was and still is a great challenge. Moving in entails radical change in lifestyle at any rate, which is sometimes reflected in the changes of the employment pattern.

Livelihood options are illustrated in the following summary (2006):

Number of housing units	12
Number of adult villagers	23
Qualified (university or college)	12
Other (skilled, trained worker, housewife, etc.)	11
Livelihood locally or dependant	12
Commuting	11
White collar workers	5
Mixed	2
Blue collar workers	16

Gyűrűfü today has a considerable impact on the parent village, Ibafa as well. According to the statistics, only Gyűrűfü is regarded in the outskirts as “*dwelling place not associated with farming or other functions*”, while the inhabitant population was determined in the 2001 census as 26 people. Since then the number has grown (July 2006: 33 inhabitants).

During physical implementation the energy system was given an important role which is different mainly in terms of its approaches from that of conventional settlements and the construction technologies applied, including solutions of building engineering, water supply, waste water disposal, heating, hot water and waste management.

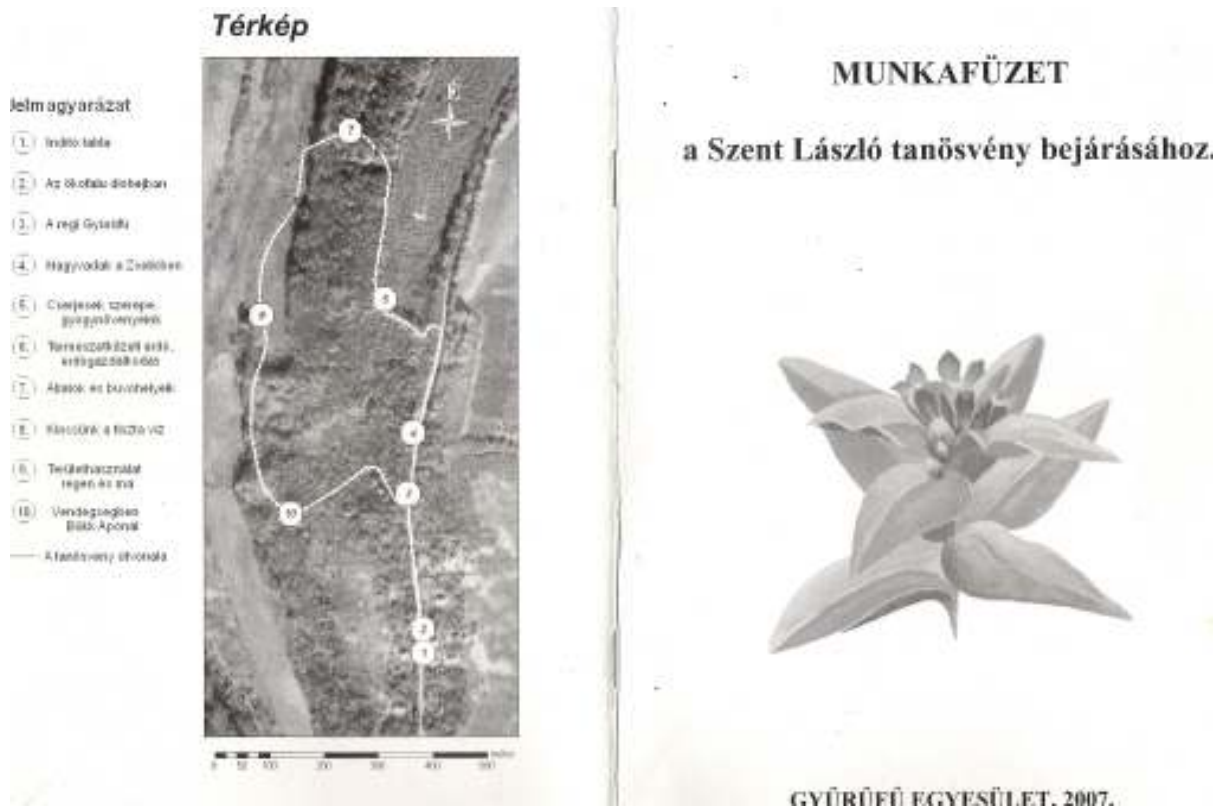
Energy supply was only one aspect of a very complex design challenge and therefore due to the necessary compromises apparently not all solutions could be implemented which otherwise from the technical or physical geographical perspective was feasible. The most important thing to say is that no comprehensive plans were made to replace electricity needs, therefore no cost efficient and feasible alternative exist to the conventional power grid. At the same time the mitigation of demand for electricity, the use of passive solar energy, integration of biomass energy in the system and energy saving were all basic objectives during the design phase.

The most important local construction material, the clayey loess soil of the surrounding region is most suitable for the building of rammed earth houses. The first building permits were issued for Gyűrűfű in 1996, after a little hesitation with the reed bed systems as the waste water treatment method (no standards were in place for such things at the time) and with the endorsement of the local medical officer on “experimental” grounds. The main construction material was the locally found earth and sun-dried mud bricks, supplemented with a number of other "products" which can not be standardised and even less marketed, while after the water tests were completed, water supply was installed from freshly prepared dig out wells, cleaned old groundwater wells and rainwater collected from rooftops to meet domestic water supply needs.

Building engineering solutions included wood-fired individual heating systems such as cockle-stoves, lime-washed ovens, hot-air heating, domestic hot water generation based on stoves and solar thermo collectors as well as composting toilets. Organic farming is a requirement for all farmers on the territory and ecological principles are being enforced in forestry management as well. The nature conservation management plan was completed for the area which provides the framework for the ways of farming and forestry here. The access road to the site was completed in two construction phases thus providing connections to the nascent settlement and connecting it to the national network of public roads. Also, information technology infrastructure was installed (both voice and data communication), which expands the livelihood options and allows for the use of telecommunication services.

The success of the eco-village concept is demonstrated by the fact that during the First Hungarian Biodiversity Day organised for the first time in 2006 and later in 2007 repeatedly jointly by the Hungarian Association of Ornithologists and the Gyűrűfű Association 24 field scientists managed to identify more than estimated previously, a total of 1656 multicellular organisms, animal, plant and fungi species over a 24 hour period in the Szentlélek-valley, on a merely one square kilometre sample plot. People living here have always made a point of

demonstrating the model value of the village. In Spring 2007 the Szent László nature conservation trail was opened, providing an excellent summary of all things happening at Gyűrűfű with the help of an open air exhibition and a tracking path.



The booklet provided for people touring the Szent László trail

V. Summary of results

Results and conclusions of the fifteen years of work can be evaluated in many different ways.

1. Of the design options the spacious, airy arrangement with farm holdings was implemented, where in addition to the application of environmentally conscious, material and energy saving methods high tech solutions are also present in particular in the field of communication and information technology.
2. During the past few years in many aspects (sectors) serious progress was made (building technology, water management, telecommunication, energy supply solutions, farming), while in other fields development is stagnant (generic electricity supply, forestry management, traffic, education) and *social, legal, sociological* aspects of the project are coming more and more to the forefront,

which sometimes exceed the framework of physical geography in the narrower sense.

3. The ecological building, construction technology, water supply, sewage treatment, gardening, agricultural methods developed were successfully adapted to the geographic conditions. At the same time the project failed in reducing the role of mobility and traffic, phasing out commuting, in implementing a large part of the forestry management concept, and also communication possibilities were also stuck at a given level by the setting up of the telecom infrastructure. No viable, renewable based alternative could be found to replace electricity from the grid. Retrospectively, the organisational framework around a foundation must be deemed erroneous and the concept of unified common land ownership futile.
4. Since the start of the project the system of external boundary conditions were changed extensively, not only in terms of legal and regulatory aspects, but in many other ways ranging from international politics to technological development.
5. Due to the diminishing interest and eagerness to act on behalf of society at large, worsening economic situation and standard of living, as well as the changing legislation, the settling of newcomers has become more and more difficult in spite of the fact that from the objective point of view the existing infrastructure could facilitate such a move. The architecture of the new settlement does not really fit the dominant settlement development patterns of the 21st century, either, because these trends continue to favour the generation of large agglomerates and the depopulation of the countryside.
6. The predominant policies and the business sector do not support teleworking or the creation of small, self-sustaining farming operations or the establishment of small independent enterprises. You need to have very serious human resources, perseverance, diverse qualifications and wide ranging experiences if you want to secure a standard of living and quality of life meeting the requirements of human dignity for your family in a settlement environment like the one at Gyűrűfű.
7. At the community and settlement development level the only possibility to set up and operate the branch of the local council. Both the Municipality Act and related legislation and the political will prefer recentralisation continuously and at all levels since the political transition was made, in terms of employment, public education, health care and state administration alike.

8. A settlement and rural development policy claiming to be ecologically and economically sustainable must offer an alternative livelihood policy for those living in the country. The reformation of the Common Agricultural Policy of the European Union and the rural development strategies provide an excellent foundation to build on (at least in theory), while the design principles of the eco-village fit perfectly the European Union concept, since the strategic objectives set for the new rural development concepts and the settlement pattern implemented in Gyűrűfű concur.
9. Unfortunately, it was in vain to reconcile rural development and agricultural strategies with the needs of land use in the interest of nature conservation and ecology with the help of the so-called multifunctional agrarian model (in Hungary under the National Agricultural Environmental Protection Programme), when other social factors such as employment, traffic patterns, social web, communication infrastructure, lacking political will and the behavioural patterns wide spread amongst the youth not enough glue is produced on the small settlements to retain people. The New Hungary Rural Development Strategic Plan argues consistently for the intensive agrarian model, in other words even the present results achieved so far will be jeopardised. An eco-village is an artificially created formation, not the result of organic social mobility, therefore it is not quite probable that it could play any decisive role in changes of the settlement portfolio in addition to the examples of practical land use and settlement layout, in other words it is highly unlikely that the majority of the existing small villages in the countryside would turn to eco-village overnight, or that considerable numbers of the currently urban population would migrate to eco-villages.

The properties described above in details can be systematised with the help of the SWOT analysis, known from the international literature (strength and weaknesses, opportunities and threats) as follows:

Strength	Weaknesses
<ul style="list-style-type: none"> - concept, design, post industrialist dual model (ecotech + high tech) - building technology, water management, waste management, passive solar, agriculture - flexibility, adaptability - transfer of experiences 	<ul style="list-style-type: none"> - organisational structure, ownership pattern (foundation) - electricity, forestry, traffic (commuting, road quality), education, supplies; - social, sociological basics, cohesion, community life (joining together) - integration into the settlement network

<ul style="list-style-type: none"> - local government - natural lifestyle - community life (housing and working community) 	<ul style="list-style-type: none"> - telecommunication (currently)
Opportunities	Threats
<ul style="list-style-type: none"> - acquisition of landed property, - rural development policy (when good) - fame and recognition - infrastructure developed - common agrarian policy, CAP (in principle) - telecommunication (in the future) - accumulated experiences - integration into the settlement network 	<ul style="list-style-type: none"> - social disintegration, poor maintenance (road, community building) - lacking social needs, interest - overall economic situation - legal changes, recentralisation - rural development policy (if bad) - common agrarian policy, CAP (in practice) - changes in external conditions

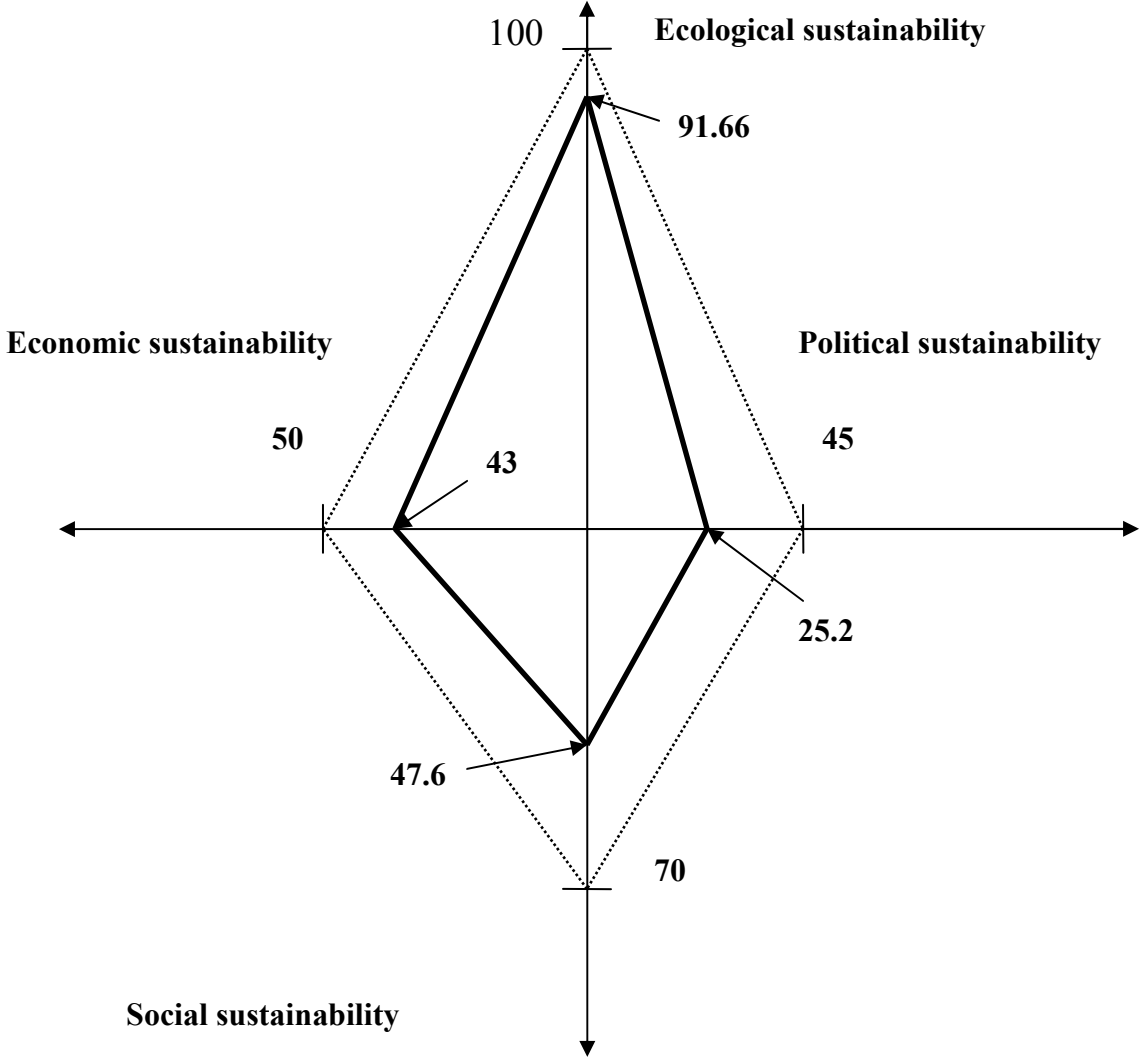
Much is at stake on the legislative background. In this respect, the following would be needed:

- *deregulation*, make more simple rules and legal provisions
- *devolution*, localize rules
- *economy of scale* in regulation, different legal and administrative requirements for small and major communities
- *larger degree of freedom*, in order to allow citizens to shape their own lives.

Maybe it is not an exaggeration to say that *Gyűrűfű has grasped a historical opportunity, it was organised in a time window, which has since been closed*. No other experiment is made these days in Hungary which would be based on a similarly comprehensive concept and the fundamental principles and experiences of ecological settlement development formulated and obtained at Gyűrűfű.

To measure the sustainability of the eco-village was so far probed by only one rough and by far not reliable attempt, which however took into account political considerations as well in addition to the environmental ecological, social and economic indicators. The outcome of this attempt was that many of these values differ from a conventional Hungarian community. Unfortunately, in the absence of a control experiment these data can only be endorsed with reservations as anecdotic. Besides the evaluation based on very approximate estimates and no actual measurements were carried out, additional difficulties were raised by the incomparability of the various units of measurement. This problem could be overcome by putting the values received on an imaginary scale of 100 (compute percentages, if you want). Based on this sketchy picture, sustainability at Gyűrűfű is as follows. You can notice that the

graphic interpretation shows social-political future to be most doubtful, while economic sustainability is reduced dramatically due to a number of external impacts (upon evaluation of the individual score a weighing factor was used).



Source: BALÁS D. 2006

In summary, you can conclude that as usual with living systems, *stability and variability* are present simultaneously in the development patterns of such a community which focuses on ecological principles of organisation, and it is the evidence to the viability of the project that it had adequate responses to all challenges so far and could preserve its original ecological features whilst being able to change to such extent as to avoid the traps of impossibility.

VI. Directions of further research

In the subsequent process of eco-village building there will be a number of factors to be taken into account, originally not known at the beginnings and further plans to be amended accordingly. Potential consequences of our nation's accession to the European Union to the development of eco-villages and in particular at Gyűrűfű have to be assessed. Potential and actual impacts of changing legislation, the effects of uniformisation tendencies enforced through standards and legal provisions, and the situation occurred due to the coverage of sustainable development strategies by power control and the moment of inertia resisting paradigm change. Bureaucratic expectations will have to be met and avoided as much as possible, while the possibilities of involvement of the stakeholders in settlement and regional planning must be exploited (RÁCZ D. 2002).

Expected changes in land prices and land use patterns as well as land consolidation need to be monitored, financing possibilities offered by the central redistribution mechanisms exploited (EU subsidies, regional operative programmes, national development plan, structural and cohesion funds). Within these special attention is to be paid to the Union level conceptual transformation, support given to rural development, small settlements and small enterprises and the role of small regions. It has to be accepted that human consciousness is changing towards consumerism but appropriate strategic counter-measures can be taken. Further implementation of the development concept is much more difficult against a basically apathic and disinterested public, where nobody is interested any more in the countryside or in ecology.

At the same time in spite of the overwhelmingly negative tendencies listed above in the case of Gyűrűfű there is already an important aspect to be considered: there is something on the ground to be built on. Such a statement can only be comprehended by someone who has seen how the scenery in this little Baranya county village, sacrificed for the sake of the Socialist cooperatives, looked like back in 1990: a mixture of bushes and earth roads in total disrepair. Now infrastructure, blossoming life provide the cornerstone. Yet newer and newer construction sites are started, most of those already settled stay on and the viability of the eco-village concept is indicated by the recent decrease of nitrate contamination in the freshly used dig out well. However, sustenance can only be ensured when the things still to be done are taken seriously. These can be more or less summarised as follows:

- the application of the sustainability indicators and measurements made to authenticate the results of Gyűrűfű. For this you need the development of a relevant methodology which is credible on the small scale and provides quantitative outputs, furthermore carrying out the appropriate control measurements;

- development of the village and the setting up of a compact unit. In its current form one of the key concept of the eco-village is not implemented, the cooperation of co-existing sub-units, and you can see a certain disintegration of the space and inconsistent use of space;
- related to this is the development of a flexible and transparent, functionally appropriate organisation structure, separately for land management, meeting community and social functions, managing fund raising activities and administrative tasks;
- best use of legal and regulatory opportunities and the setting up of an alternative strategy;
- final and reassuring consolidation of land properties and ownership rights. This is an indispensable prerequisite for long term balanced land use, in particular concerning the currently unused areas in various stages of secondary forestation and succession;
- searching for solutions of components stressed in the original concept but implemented less successfully: energy supply, in particular the choice of electricity sources, reduction of mobility needs, advancement of the waste management concept, plans to utilise currently unused land, launching watershed based water management in the area, larger scale projects like swales, water catchment ponds);
- strengthening international cooperation, development of the Hungarian and English web site and publications.

Maybe it can be stated with confidence that the eco-village as one of the sustainable settlement models will once take its place in the ever changing pattern of the network created by the Hungarian settlements. Both the community building and immigration at Gyűrűfű and the national and continental eco-village movement are growing slowly but safely. There is no reason not to believe that the eco-village as such could become a viable and liveable, long term sustainable form of settlement enriching the Hungarian landscape.

VII. Acknowledgements

I am indebted for all those people who have participated in or contributed to the experiment which provided the subject matter for this paper or the preparation of the thesis, advisors, scientists, experts, designers, certain helpful civil servants of certain authorities, project team members, manual labourers, inhabitants of the surrounding villages and former villagers of Gyűrűfű as well as my family who have endured patiently all difficulties and grievances implied in both building the eco-village and writing the present paper.

VIII. List of Publications

1. Publications related to the thesis

1. **BORSOS B.** 1990: Milyen bolygót akarunk? Környezetvédelmi stratégiák az ezredfordulón. *Regio, kisebbségtudományi szemle*, I. évf. 3. szám, pp. 245-257.
2. **BORSOS B.** 1991: A környezetvédelem koncepcionális kérdéseiről. *Öko*, II. évf. 3-4. szám, pp. 2-7.
1. **BORSOS B.** 1991: A szivárványkígyó tojása. A permakultúrás tervezési rendszer. *Országépítő*, 2. szám, pp. 25-29.
3. **BORSOS B.** 1991: Tulajdonképpen: mi is az az ökofalu? *Öko*, II. évf. 2. szám, pp. 37-41.
4. **BORSOS B.** 1993: Gyűrűfű Eco-village, Hungary. In: PERRY, S. – SKOVGAARD, B. – ANDERSEN, T. (eds.): *Report IP5, Fifth International Permaculture Conference*. International Permaculture Institute Copenhagen, pp. 61-62.
2. **BORSOS B.** 1993: Fenntarthatatlan fejlődés. *Liget*, VI. évf. 3. szám, pp. 3-20.
5. **BORSOS B. P.** – **BORSOS B.** 1994: Rural Environmental Planning Gyűrűfű: A Case Study. In: HANAUOSKOVÁ, I. – LAPKA, M. – CUDLINOVA, E. (eds.): *The Challenge of the 21st Century*. Ceské Budejovice, pp. 185-188.
6. **BORSOS B.** 1998: Építkezési tapasztalatok Gyűrűfűn. *Élet és Tudomány*, LIII. évf. 15. szám, pp. 465-466.
7. **BORSOS B.** 1998: Creating a community. *Living Lightly*, Summer Issue 4, pp. 18-19.
8. **BORSOS B.** 1998: Gyűrűfű: Kísérlet egy ökológiai alapokon álló, emberi léptékű vidéki területfejlesztési modell megalapozására. In: GYULAI I. (szerk.): *Ötletek a fenntartható vidékfejlesztési programok tervezéséhez*. CEEWEB Hungary, Miskolc, pp. 19-35.
9. **BORSOS B.** 1998: Sustainable rural development in Gyűrűfű. In: GYULAI I. (ed.): *Best Practices of Sustainable Rural Development in Hungary. Gömörszőlős, Gyűrűfű, Boronka Region, Ormánság*. Compiled by the Central and Eastern European Working Group for the Enhancement of Biodiversity. Lánchíd Kiadó, pp. 19-33.
10. **BORSOS B.** 1999: Gyűrűfű: egy ökofalu építésének problémái. *Ökotáj*, 22. szám p19.
11. **BORSOS B.** 2000: Egy év Gyűrűfűn. 1999-2000 nyár. *Ökotáj*, 25-26. szám, pp. 120-123.
12. **BORSOS B.** 2001: Keljfeljancsi: a feje tetejére állított világ. Vidékfejlesztés alulnézetből. *A falu. A vidékfejlesztők és környezetgazdák folyóirata*, XVI. évf. 2. szám, pp. 7-14.
13. **BORSOS B.** 2003: Természetközeli élet – itthon. *Kagylókiért*, 34. szám, pp. 78-80.
14. **BORSOS B.** – BÁNVÖLGYI T. 2003/2: Átfogó területfejlesztési elképzelések lehetőségei a Kárpát-medence egyes területein az ökológiai adottságok figyelembe vételével, *A fenntartható fejlődés kihívásai a Kárpát medencében, Konferencia kiadvány*, Pécs, 2003, sajtó alatt
15. **BORSOS B.** – T. BÁNVÖLGYI 2003/3: Possibilities for a comprehensive spatial development scheme in certain areas of the Carpathian basin with a view of taking into account local ecological characteristics, *Proceedings of the Conference on Sustainable Development Challenges in the Carpathian Basin*, Pécs 2003, in press

16. **BORSOS B.** 2004: Fenntartható Gyűrűfű: Egy kisléptékű területfejlesztési modell. *Élet és Tudomány*, LIX. évf. 19. szám, pp. 588-590.
17. **BORSOS B.** 2005: Alternatív energetikai megoldások lehetőségei a fenntartható településfejlesztés vidéki példáin: Gyűrűfű – esettanulmány. In: PIRISI G. – TRÓCSÁNYI A. (szerk.): *Tanulmányok Tóth Józsefnek a PTE Földtudományok Doktori Iskola hallgatóitól*. PTE Földrajzi Intézet, Pécs, pp. 111-120.
18. **BORSOS B.** 2006: Jogszabályi környezet és kisléptékű fenntartható településfejlesztés Magyarországon 1989 és 2004 között. In: BARANYAI G. – TÓTH J. (szerk.): *Földrajzi tanulmányok a pécsi doktoriskolából V*. PTE Földrajzi Intézet, Pécs, pp. 25-35.
19. **BORSOS B.:** Az ökológiai tájértékelés elveinek integrálása a fenntartható településfejlesztés módszertanába egy zselici kistelepülés, Gyűrűfű példáján. *Földrajzi Közlemények*, sajtó alatt

2. Presentation related to the thesis

1. **BORSOS B.** 1994: *The Building of an Eco-village: Multi-Disciplinary Regional Planning*. Special Seminar, Departments of Biology and Global and Multicultural Studies, Ithaca College 5 April, 1994.
2. **BORSOS B. - BÁNVÖLGYI T.** 2003: *Településfejlesztés ökológiai alapokon – egy magyar példa*. Magyar Ökológus Kongresszus, Gödöllő, 2003. augusztus 27-29.
3. **BORSOS B.** 2004: *Merre tart a világ a fenntartható település nézőpontjából?* Kapolcsi Napok, Kapolcs, 2004. július 29.

3. Other publications

3. **BORSOS B.** 1982: *A veszetheztség járványtani helyzete és egyes diagnosztikai kérdései Magyarországon az Országos Állategészségügyi Intézet vizsgálatainak tükrében*. Állatorvostudományi Egyetem, Járványtani Tanszék, Budapest, 39 p. (kézirat)
4. **BORSOS B.** 1986: "Az agresszivitás idegéletani alapjai", In: Csányi V. (szerk.): *Agresszió az élővilágban*. Natura, Budapest, pp. 99-133.
5. **BORSOS B.** 1986: A megcsapolt patkórák: hogyan mutatják ki a baktériumok méreganyagait. *Élet és Tudomány*, XLI. évf. 40. szám, pp. 1262-1264.
6. **BORSOS B.** 1988: Hogyan hat a baktériumméreg. *Élet és Tudomány*, XLIII. évf. 27. szám, pp. 835-838.
7. **BORSOS B.** 1988: Védekezés „emlékezetből”. *Élet és Tudomány*, XLIII. évf. 28. szám, pp. 873-875.
8. **BORSOS B.** 1988: A hosszúsárnyú bálnák hosszú utazása. *Élet és Tudomány*, XLIII. évf. 33. szám, pp. 1042-1045.
9. **BORSOS B.** 1989: Békés egymás mellett viszálykodás: ugorok és kínaiak Hszincsiangban. *Élet és Tudomány*, XLIV. évf. 8. szám, pp. 242-244
10. **BORSOS B.** 1989: Alternatív energia politika. *Impulzus*, V. (XLIV.) évf. 5. szám, pp. 50-56.
11. **BORSOS B.** 1989: A vér völgye. *Világ Ifjúsága*, 1989/7. szám, pp. 6-7.

12. **BORSOS B.** 1989: Foglyul ejtett energia: szélből áram. *Búvár*, 4. szám, pp. 32-33.
13. **BORSOS B.** 1989: Szervezetünk csodafegyvere: az endotoxin tolerancia. *Természet Világa*, 120. évf. 6. szám, pp. 255-259.
20. **BORSOS B.** 1990: Nagypolitika, ökológia...és a nemzetközi egyezmények. *Öko*, I. évf. 1. szám, pp. 58-59.
14. **BORSOS B.** 1990: A Transzhimalája népei. *Élet és Tudomány*, XLV. évf. 33. szám, pp. 1037-1040.
15. **BORSOS B.** 1990: Házak alá bújt sziget (Ruad). *Műzsák Magazin*, XXI. évf. 3-4. szám, pp. 66-67.
16. **BORSOS B.** 1990: Ökológiai elvek a régi Indiában. *Országépítő*, 3. szám, pp. 12-13.
17. **BORSOS B.** 1991: Görögök a gyapotvárban (Pamukkale). *Műzsák Magazin*, XXII. évf. 2. szám, pp. 16-18.
18. **BORSOS B.** 1991: A fejlődés paradoxona a mezőgazdaságban. *Liget*, IV. évf. 2. szám.
19. BODÓ IMRE, **BORSOS B.** 1991: Új utak a változó mezőgazdaság és állattenyésztés számára, 1. közlemény. *Állattenyésztés és Takarmányozás*, Tom. 40. No. 5. pp. 393-397.
20. **BORSOS B.** 1991: The proper use of animals (?). *Proceedings of the International Conference on Alternatives in Animal Husbandry*. Witzenhausen Germany, July 22-25, 1991.
21. **BORSOS B.** 1991: Socio-political aspects of the Bős-Nagymaros dam system. *International Water Power & Dam Construction* Volume 43. No. 5. pp. 57-61.
22. **BORSOS B.** 1992: Is The Journey Worth The Effort? *FORUM for Applied Research and Public Policy*. The University of Tennessee. Vol. 7. No. 4. pp. 115-116.
23. BODÓ IMRE, **BORSOS B.** 1992: Új utak a változó mezőgazdaság és állattenyésztés számára, 2. közlemény. *Állattenyésztés és Takarmányozás*, Tom. 41. No. 2. pp. 103-107.
24. **BORSOS B.** 1992: Az állatok hasznáról és káráról. *Liget*, V. évf. 2. szám, pp. 134-138.
25. **BORSOS B.** 1993: Aszklepeiosz modern szentélye: orvoslás és élet. *Liget*, VI. évf. 2. szám, pp. 99-108
26. **BORSOS B.** 1993: Animals and the Cult of Science: The Ecological System Approach and the Scientific Paradigm, In E.K. HICKS (ed.): *Science and the Human-Animal Relationship*, SISWO (Netherlands Universities Institute for Co-ordination of Research in Social Sciences) Amsterdam, pp. 203-207.
27. **BORSOS B.** 1993: *Alternatív mezőgazdasági rendszerek*. Egyetemi jegyzet. Kézirat. Állatorvostudományi Egyetem Budapest, 176 p.
28. **BORSOS B.** 1994: The Role of Animals in Alternative Agriculture Systems. In: *Proceedings of the Intl. Seminar for Policy Makers on The Contribution of Organic Agriculture to Sustainable Rural Development in Central and Eastern Europe*. Organised by The Avalon Foundation in Bohdalov, The Czech Republic, June 1994. pp. 146-150.
29. **BORSOS B.** 1994: *Az élet kereke*. Tanulmánykötet. Liget Könyvek, Budapest, 267 p.

21. **BORSOS B.** 1995: Ecological Agriculture in the Balance in Hungary. *Global Pesticide Campaigner*, Vol. 5. No. 1. pp. 14-18.
30. **BORSOS B.** 2000: A probléma a megoldás. *Liget*, XIII. évf. pp. 72-77.
31. **BORSOS B.** 2000: Enyém, tiéd, övé 1–3. *Liget*, XIII. évf. pp. 74-81., július pp. 88-93, augusztus pp. 73-84
32. **BORSOS B.** 2002: *Azok a bizonyos könnyű léptek* I. Ökológia és rendszerelmélet. Egyetemi tankönyv. L'Harmattan, Budapest, 244 p.
33. **BORSOS B.** 2003: Szomjas világ. *Egyenlítő*, 3. szám, pp. 23-30.
34. **BORSOS B.** 2003: *Ázsiától Ázsiáig*. Útleírás. L'Harmattan, Budapest, 223 p.
35. **BORSOS B.** 2005: A probléma a megoldás. In: Borsos Balázs: *Elefánt a hídon. Gondolatok az ökológiai antropológiáról*. L'Harmattan, Budapest, pp. 135-141.
36. **BORSOS B.** 2005: Öntözéses gazdálkodás és régi vízhasználati módszerek Ázsiában. In: BALOGH T. – BAYANKHUU B. – KISS K. – ULCZ GY (szerk.): *Keleti Kiskönyvtár* (sorozatszerk: WILHELM Z.) PTE TTK Földrajzi Intézet Ázsia Központ, Pécs, pp. 101-115.

Presentations published in abstracts only

1. TAKÁTS A., **BORSOS B.**, BERTÓK L. 1985: Bakteriális endotoxinok hatása az adenilcikláz enzimrendszerre in vitro. Absztrakt. *Membrán-Transzport Konferencia*, Sümeg.
2. TAKÁTS A., **BORSOS B.**, BERTÓK L. 1985: Effects of bacterial endotoxins on the adenylate cyclase system in vitro. Abstract. *FEBS*, Amsterdam.
3. TAKÁTS A., **BORSOS B.**, BERTÓK L. 1986: Az endotoxin membránhatásainak további vizsgálata. Absztrakt. *Membrán-Transzport Konferencia*, Sümeg.
4. TAKÁTS A., **BORSOS B.**, BERTÓK L. 1986: Inhibition of adenylate cyclase by endotoxin. Abstract. *Congress on Endotoxin* Bari, Italy.

4. Other presentations

1. TAKÁTS A., **BORSOS B.**, BERTÓK L. 1986: *Sanarelli-Schwartzman jelenség kiváltása endotoxinnal és forskolinnal*. Magyar Immunológusok Társasága Vándorgyűlés, Nyíregyháza.
2. **BORSOS B.** 1990: *Children of Demeter — on the Philosophy of an Agriculture*. 8th International IFOAM Conference: Socio-Economics of Organic Agriculture, August 27th - 30th 1990, Budapest.