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The Need and Opportunity for Sustainability in a Digital World Proposal for Modelling Sustainability

By Dr. Zoltán Verrasztó

Abstract- Our whole life is defined by the SPACE that provides its possibilities, framework and boundaries. For SUSTAINABILITY, it is in this space that we must ensure harmony between natural, social and economic influences and agents.

Today, there are environmental linkages in all of the natural sciences (and beyond!), but they are not built into a system of scientific requirements. The concept of the ENVIRONMENT is changing, legal disputes are based on the nature of environmental data, fact which consists an obstacle in the use of IT technology: exact data interpretation is the basis for the management and organisation of environmental data, for clustering, which is essential in network research - in our practical use,- environmental modelling.

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Today, there are environmental linkages in all of the natural sciences (and beyond!), but they are not built into a system of scientific requirements. The concept of the ENVIRONMENT is changing, legal disputes are based on the nature of environmental data, fact which consists an obstacle in the use of IT technology: exact data interpretation is the basis for the management and organisation of environmental data, for clustering, which is essential in network research - in our practical use,- environmental modelling.

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I. Sustainable Development

"*Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own* needs."[1] Its practice requires harmony between the living systems of nature and the needs of society. Development must reconcile the needs of society, population growth and the use of natural resources, minimising pollution of the environment.

The moral imperative of humanity and the harmony of the laws of nature should be realised by those who manage the economy. The consequences of technocratic rule are borne by the systems of the environment - society is 'merely' the ultimate agent of all this, significantly distant in space and time from the specific uses of the environment. It is in this 'magic' triangle that many of today's environmental conflicts become unresolvable.

This can only be changed by conscious planning based on multi-perspective decision-making, starting from an accurate knowledge and systematisation of environmental data. The concept and expectations of a 'liveable environment' are already undefinable, as we know [16]:

- Different social groups have different expectations of the target state of the environment
- The concept of a 'liveable environment' is a non-negotiable global expectation, but it does not allow for the localisation of specific decisions on the definition of specific environmental target states for local land use,
- The formulation of specific local environmental targets and the planning of environmental uses to maintain or restore the 'functionality' of environmental systems cannot be linked to the satisfaction of human health needs,
- The need for a 'liveable environment' does not provide the basis for the exact expectations or the *environmental data* necessary for planning environmental use, which can consist the basis of environmental modelling,

There is no doubt that the LANDSCAPE is the space [15] in which all the activities of our lives take place. All the natural, social and economic processes that are both necessary and intrinsic to our biological and/or social and economic existence take place in the LANDSCAPE.

The essence of this was already formulated a hundred years ago by Pál Teleki[2] [14], and then the "*geographical idea*" was given an exact geological content by Elemér Szádeczky-Kardoss[3] [13], who, even before J. Lovelock's Gaia theory[4], recognised that the entire material and spiritual culture of mankind forms an interconnected system, and called it *geonomy*. "*Geonomy is not only the investigative unit of the earth sciences, but also includes the fundamental biological subject of the origin of life, its inorganic determination. The real meaning of geonomy is not in the details, but in the study of the interrelationship of details. The new findings of geonomy show that the Earth is a single active system, with each area interconnected with the others....*" [3, 5] He founded environmental science, it would be important to deepen this with the need for *network research*.

In the world we know in increasing detail, which functions as a unified system, our natural and social environment can only be understood in a unified system,

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[1] Brundtland Comission, 1987

[2] https://hu.wikipedia.org › wiki › Teleki_Pál_(politician)

[3] https://hu.wikipedia.org › wiki › Szádeczky-Kardoss_El..

[4] https://hu.wikipedia.org › wiki › Gaia-theory

as a unified system, and only in a unified system, as a unified system can the future state/[condition of existence] of Homo sapiens, the *SUSTAINABLE DEVELOPMENT,* capable of meeting the natural and social needs of the species, be ensured.

II. Environmental Modelling

Nowadays, IT technology makes it possible to study this in detail. The application of GIS in many areas expands the possibilities for identifying, interpreting and analysing transdisciplinary relationships in dynamic relationships, but current practice is limited to the visualisation of information [10]:. The starting point for environmental modelling is that the processes under investigation take place in a common space - in the interpretive domain of earth sciences, this is the landscape. [Verrasztó, 1979]

Natural, social and economic processes are linked here, and their data components can be modelled by a suitably structured overlay map system[5] that represents their real-world relationships. [6] The assessment of sustainability is a spatial, multidimensional decision task.

A distinction is generally made between the natural and the man-made environment, and the relevant scientific literature to date defines the role of human society and its mechanisms of action as landscape-forming factors in their own right. In contrast to this, we believe that human society can in no way be regarded as an independent landscape-forming factor, since its effects, which are beyond any argue decisive, and their consequences are *embedded in the mechanisms of action of landscape-forming factors*, and exert their effects and bear the consequences [16] This statement of professional approach also provides the clarifying the concept of environmental data, their digitalisation and thereby the *possibility of their systematisation.*

Population preservation and production objectives must be reconciled with social, cultural, environmental stabilisation and nature conservation objectives. [19] The map-based decision support we propose will ensure that complex, spatially integrated, multi-perspective decisions can be made accurately. The key to solving this task is the clustering of the "Big Data" dataset, the structuring of the data sets and then the harmonization of the data layers.

The practical implementation of this should be based on: [8]

- To break down the information we have about our environment into data components,
- The placement of the individual data in the environmental system (according to the classification system of thematic maps, see annex),
- The specification of the x, y, z coordinates of each data item,
- Juxtaposition of the date of each data, 'sample',
- Constructing thematic maps from the spatial, temporal and environmental data,
- Designing a visualisation system for thematic maps, with particular attention to the need to examine the relationships between thematic overlays
- However, as society develops, a multitude of interconnected and interacting systems must - or should! – be considered in order that the natural, social and economic factors can be studied and understod together, without which 'sustainable development' will remain an empty slogan.

III. Resource Protection

Many people see resource protection as the task of environmental protection, and in many ways we have to agree with this, but we must not forget that the concept of resources varies in space and time, from rock shale to rare earths. And human history is in fact a struggle for resources.

I consider striking the fact that only two of the 17 sustainability objectives adopted by the UN, the protection of oceans and seas (14) and the protection of terrestrial ecosystems (15), are focused on the natural foundations - however there is no doubt that the local specificities of natural resources provide the limits and opportunities for society and the economy.

It is remarkable that there is no attempt to realise the global social and economic objectives of sustainability in local terms, even though it is the local conditions of the natural environment that provide the constraints and opportunities for society and the economy. It is difficult to reconcile the reduction of the rural way of life and the promotion of urbanisation with the vision of our civilisation! The unbridled energy demand of cities, the vulnerability of their entire supply and the concentrated production of waste, beyond the breakdown of family and social ties, render their future questionable.

Botanical research has shown that the diversity of flora in Central Europe reached its maximum during the industrial revolution. Around 4500 BC, the diversity was less than 50% of this. The massive urbanisation that followed – in fact originated from - the industrial revolution, the concentration of agricultural production, the land use for transportation, mining and industrial production, the overuse of the environment, the disproportionate overuse of energy and the discharge of waste, caused a drastic loss of diversity. What the progressive use of the environment in this respect has built up over 2500 years has been completely destroyed by overuse over the last 250 years. The consequences of continuing this trend are unforeseeable.

[5] https://adoc.tips › download › komplex-water management-t.. *Verrasztó* Zoltán: classification system of *thematic maps*

Ecological economics tries to draw attention to the indispensability of environmental goods, but in its experiments it mostly [17]:

- lacks an exact analysis in an exact environmental system,
- lacks an extended interpretation and analysis of spatial relationships,
- lacks an explicit assessment, interpretation and examination of the different interests in different environmental target states

Nowadays, environmental economists prefer multi-perspective and participatory valuation, pointing out that it allows a much richer definition of value than monetary valuation. It cannot be disputed that their practice reflects the value dimensions, opinions and feelings of the social groups they consider to be 'stakeholders' in relation to ecosystem services, in contrast to the earlier practice of monetary valuation. They believe that these methods are characterised by a value judgement based on the role of the citizen rather than on individual consumer preferences, which can lead to more responsible action that takes into account long-term processes and the interests of future generations.

On the other hand, while not disputing its advantages over previous practices, we would like to point out that *neither* this method reflects the *needs and opportunities* for exploring and communicating the conflicts that arise from real knowledge of science.

We would like to stress that the real value cannot depend on the value judgement of a community, whatever it may be, and that the need for its preservation must not become a function of a social decision whose expertise is very limited and whose interests may be very different from the possible damage to the environmental system. The social interest groups making the decision may also be strongly divided. The spatial and temporal consequences, the advantages and disadvantages, the advantages and the detriments of the environmental use to be implemented are different, as are the advocacy capacities of the social groups concerned.

The practice followed to date has not been able to take into account all the problems arising from

- The different needs of individuals and social groups in different situations with regard to the environmental target status,
- Different spatial and territorial consequences, benefits and harms of environmental use,
- There are differences in the benefits and harms of environmental use in the short, medium and long term,
- The groups involved in the decision-making process differ significantly not only in their needs, but also in their capacity to assert their interests
- The groups involved in the decision-making process do not have sufficient knowledge or depth of information about the real consequences of their decisions

On the other hand, we would like to point out that they do not even express the following as needs

- The need to examine the complexity of natural systems,
- The need for a professional assessment of the consequences for those affected,
- The need to consider the consequences over time,
- The need to weigh potential consequences, which cannot be condensed into a single unit of measurement,
- The assessment of the unique and ungeneralisable characteristics of the subsystems of the environmental-social system functioning as a network

IV. Map Decision Support

Our proposed method of map decision support [1, 8, 11]: includes the need and the possibility of multi-criteria decision support, but does not require the result to be compressed into a single "unit of measurement". The method is suitable for the precise analysis of spatial decisions - i.e. the consequences of a decision - that seek to explore, or attempt to explore, in their own context, the complex system - or network - of natural, social and economic relationships that take place in the *landscape as a given space*. The key word is *'their own context'*, since there is a sharp distinction between the effects of closed inanimate systems and those of open living systems within their own systems, and their interactions in their interrelationships, but the components of these also require different measurement methods and qualitative and quantitative qualification.

Obviously, the accuracy and technical depth of this depends on the data being uploaded at any given time. By applying our concept of ENVIRONMENT = LANDSCAPE [15, 7], we can lay the foundations for seeing/observing and analysing

- The exact network of relationships,
- The main - and subsystems of networks,
- The interconnections between society and its environment,
- The components of a holistic system, thus enabling the realisation of an information system,
- Methodological development of the practice of risk analysis through the information system,
- The possibility of a multidisciplinary and multi-functional extension of the information system,

In order to structure the information available on our environment into data components according to the specific needs and possibilities of the real data relations [1, 2, 5] - in fact network subsystems - to be examined. An essential starting point for all this is

- The conceptual sketch of the environmental system (environment = landscape),
- Interpretation of the concept of environmental data (characteristics of the landscape components)
- landscape characterisation cumulated from exact data (thematic maps)
- Structuring thematic map overlays in a goal-oriented way

Harmony in our time should be ensured by conscious planning, exact calculations and environmental modelling.

The following objectives are set for the implementation of the environmental modelling:

- To link or enable the connection of biologically, physically and/or chemically related processes, and to investigate their spatial relationships
- Enable the investigation, evaluation and comparison together of impact factors and the affected
- Enable the examination in coherent data systems the information and data sets arising from legal obligations (e.g. knowledge of environmental status)
- Possibility of examination of changes over space and time
- Causal relationships between the indications observed for each environmental characteristic can be investigated
- The spatial information system to be developed should be able to meet the decision support needs of public authorities requiring, using and generating spatial data
- The spatial information system to be developed should provide a coherent basis for meeting the requirements of EU regulations on sectoral details
- The spatial information system to be developed should be able to provide information to the widest possible areas of society on the state of the environment and its changes
- The spatial information system to be developed must be able to provide the basis for all social decisions that facilitate the adaptation of society to environmental conditions and their changes.

V. Harmony

Rural areas have been reduced to a mere agricultural production area, losing their biological and social functions. As a consequence, land use and other interventions have been guided only by the need to increase the efficiency of production, thereby - eventually visibly - endangering the functions of living space. Under such circumstances, environmental degradation and the destruction of nature not only lead to a decline in production, but also seriously endanger human livelihoods.

The productive, consumption, social, community and cultural functions of rural areas have thus become 'redundant'. To this day, they are still widely debated by economic decision-makers, their land requirements and aspects are seen as an economic burden. We now know that in the long term, only management based on these three aspects can be sustainable.

The production functions, which are essentially market-driven and which, in addition to the production of food, have become the exclusive preserve of non-food products (renewable raw materials, energy sources, etc.), and the natural, social and cultural functions associated with the environment, the landscape and the land have been essentially eroded as a result of these historical changes.

Local adaptation, reliance on local resources, was not only an ecological or socio-regional, but also an economically rational endeavour in the past.

VI. The Basis of Future Development is the Natural, Social and Economic Cohesion

It has already been pointed out that, since the natural environment determines social and economic possibilities, its spatial limits are an essential requirement for systems analysis. The watershed or the geological landscape is suitable for this purpose.

The LANDSCAPE → LANDSCAPE FORMING FACTORS are geological structure - geological topography - relief - climate - hydrology - biota - land cover, but linking social and economic aspects to this system can generate a number of debates. [16] Although the study of social and economic systems is one of the roots of network research, their *value-driven* nature and analytical practices make the grouping of them less exact and thus more controversial.

As the most important elements of SOCIAL COHESION, attention has been directed towards the study of cultural, religious, linguistic and historical aspects, embodied in traditions, folklore, legends, folk music and elements of folk art. In essence, the notion of COMMON SOCIAL SPACE fills the objective space of the LANDSCAPE, which can be studied by the natural sciences too, with the value-driven functioning of social systems, in which the *past, evolution and present* of a multitude of common actions, beliefs and constructs provide the points of connection and the possibilities of group formation.

Huntington[6], with his astonishing foresight, predicted that after the 20th century, built on the struggle of Western ideologies and concepts of life (Nazism, Communism, liberal democracy), history would not end but, on the contrary, would begin anew, with

[6] https://hu.wikipedia.org › wiki › The Clash of Civilizations

the clashes between religions, cultures and nations that were familiar from the old days. The 21st century will be about the clash of civilisations - *if there are still any left to clash*. There will still be more civilisations and societies, there will be more human beings, because today this is already questionable, at the rate at which we are consuming the Earth's resources and making our living conditions impossible. The examination and interpretation for the future of the relationship between society and its environment cannot be delayed any. We need to find back the harmony we have lost.

An inalienable part of this harmony is our identity, because human identity is made up of many things: gender roles, family patterns, religious beliefs and one of the most important components of human identity: national-cultural identity. Each of these is determined by the landscape that has guided the social development of our families and ethnic groups over the centuries - it is, in fact, the gene of society!

"*Man's consumerist approach, driven by the gears of today's globalised economy, often homogenises cultures and impoverishes the vast cultural diversity that is the treasure of humanity. Therefore, the tendency to solve all difficulties with uniform regulations or technical interventions leads to a disregard for the complexity of local problems that require the active participation of the population. The new processes that are started cannot always be fitted into an external framework, but must be based on local culture. Just as life and the world are dynamic, care for the world must be flexible and dynamic. Highly technical solutions risk taking into account symptoms that do not correspond to the deepest problems. The perspective of the rights of peoples and cultures must also be taken into account, and thus it must be understood that the development of a social group presupposes a historical process in its own cultural context, and requires that the actors of local society play a leading role on a permanent basis, based on their own culture. Even the notion of quality of life cannot be imposed on others, but must be understood within the context of each group of people's own world of symbols and customs.*"[7]

The grouping principles of ECONOMIC COHESION are closely intertwined with the traditional aspects of resources and division of labour, but also with historical relations, natural and social resources, political, institutional and logistical relations, and many elements of social and economic cohesion. Multi-generational family ties are a significant factor in sustainability, but their maintenance and 'operation' can only be based on a range of governmental concepts.

Adaptation must be the basis for planning society's use of the environment. The economic, environmental, social and regional functions of space should be taken into account, and specific trade-offs tailored to local specificities and particularities could at least reduce the gap between the exponentially increasing demands of society and the catastrophic rate of environmental degradation. We have also seen that it is not an easy task to enforce these demands against the day-to-day, short-term profit-maximising intentions of decision-makers.

VII. Epilogue

The particularities of environmental conflicts in society are in fact clashes of land use concepts. They are determined by the expectations of interest groups and the diversity of social demands, but also by the clash of past and future needs, opportunities and interests.

One reason for optimism is that, although in the recent past the social mechanisms were exclusively based on 'one-option decisions' to exploit our environment as a resource, many public and civil society organisations are now trying to impose environmental requirements on the economic players who determine the way the world works. Schumacher has already shown the way: (Small is Beatiful, 1980): *Each development district must have some kind of inner cohesion and identity! We need a cultural structure as well as an economic structure!* -And, we must add, it is essential to know and take into account the links between the natural and *landscape factors* in the history and present of each element, since we know that the principles of social ordering above the individual are in fact group-forming elements, and the task of adaptation has guided their development over a long history.

This is how the practice of environmental protection brings us to the Europe of the Regions.

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