Sustainable development of landscape and village – the criterion of multi-functionality

Trvale udržitelný rozvoj krajiny a vesnice kritériem multifunkcionality

V. JENÍČEK

Czech University of Agriculture, Prague, Czech Republic

Abstract: Description of village and landscape sustainable development: ecosystems in the landscape, types of the territory utilisation, protection of natural resources, way of living. As to the sustainable development of country regions, we can consider these priorities: the renewal and development of villages, the protection and the preservation of the heritage of countryside, the development and the improvement of infrastructure, the support of tourism and crafts, services for country economy and finance. The development of multifunctional agriculture and forestry should be concentrated: in the less favourable regions and the regions with worse natural conditions (LFA), necessary agroenvironmental arrangements for zones with ecological restrictions, afforestation projects, the protection of water resources, the improvement of life environment and its protection, the preservation of landscape, the improvement of the care of animals.

Key words: sustainable development, landscape, village

Abstrakt: Deskripce trvale udržitelného rozvoje krajiny a vesnice: ekosystémy v krajině, typy užití území, ochrana přírodních zdrojů, způsob života lidí. Trvale udržitelný rozvoj venkovských oblastí zahrnuje především: renovaci a rozvoj vesnice, rozvoj a zachování dědictví venkova, rozvoj a zlepšování infrastruktur spojených se zemědělstvím, podporu a zvýšení aktivity turistiky a řemesel, základní služby pro ekonomiku venkova, finančnictví a rozvoj služeb. Multifunkčnost zemědělství, lesnictví a vodního hospodářství zahrnuje především: podporu méně příznivým oblastem a oblastem s horšími přírodními podmínkami (LFA), agroenvironmentální opatření pro oblasti s ekologickými omezeními, zalesňování ploch, zlepšování kvality půdy, novou parcelaci pozemků, diverzifikaci zemědělských činností, ochranu životního prostředí, zachování krajiny, zdroje vody, zlepšování péče o zvířata.

Klíčová slova: trvale udržitelný rozvoj, krajina, vesnice

Sustainable development can be understood, in general, as such process of changes, at which the utilisation of resources, management of constructions, orientation of the technology development, as well as institutional renewal proceed in the mutual harmony and excite the present and future potential to the fulfilment of human needs.

PRESERVATION OF ECOSYSTEMS IN THE LANDSCAPE

At present, human society realises still more its responsibility for the natural ecosystems preservation. The beginnings of this consciousness were connected, at first, with the measures aimed at the protection of the most sensitive and valuable parts of the natural environment. However, this was in the past century, when the landscape, in its more or less natural state, covered the majority of the Earth surface and the need of human care for the nature as a whole was not, therefore, perceived.

It became obvious, with the still more pronounced urbanisation, with extending area of the urbanised areas and with still bigger interferences of man into the countryside, that is was not sufficient to protect individual, mutually isolated, even if often quite extensive, parts of the countryside only. It is not sufficient any more to define only individual natural parks, protected areas and unique natural creations. Man has begun to feel, quite adequately, responsibility for nature as a whole, even if it might be thought, that it would be perhaps best to leave nature to itself and to rely on its own regeneration and auto-regulation abilities.

It is, however, obvious at present that such an opinion could not ensure preservation of ecosystems at the unique and isolated places. That is so not only in the

The contibution presented at the international conference Agrarian Perspectives XI (CUA Prague, September 18–19, 2002).

intensively urbanised areas, but at present, also in such countrysides which are created by mountains, rain forests, tundras, savannas or waters and seas. Various researches show, that even these, seemingly intact, areas are still more influenced by human activities, immisions of pollutants from very distant resources, extension of agricultural land, building of different communications, tubes and rails, mining of natural resources, water stream regulations and, last but not least, also by the regardless deposits of refuse, which is very often harmful and toxic.

Substantial interferences with the hitherto intact nature are, during the last time, the consequence of the increased pressure of millions of tourists, who infiltrate en masse even the deepest ices, the highest mountains, under the sea surfaces as well as to the poles. At all these places, their penetration is accompanied by building of the housing and catering facilities, more comfortable roads or camping sites and – of course, the same as elsewhere – by masses of refuse.

By all the mentioned ways, man disturbs and usually also damages natural ecosystems, to the balance and optimal state of which, the following is the most harmful:
– taking elements from the ecosystem, what disturbs their balances. At present, man is unable to replace the taken elements by any other, or to return them to the ecosystems in the initial quantity and quality;
– input of undesired alien elements and also energies – for example heat – into ecosystems in such a quantity or quality, which the ecosystem is unable to absorb by its own mechanisms and to include it into the material and energetic circulation without damaging its substance. These input elements and energies then remain outside the ecological metabolism as a refuse and pollute all the parts of the ecosystem;
– other various interferences changing the ecosystem, among the impacts of which there belongs opening way for the air and water erosion, shortage of water and other parts of the ecosystem and other.

Just in the conflict of the economic needs of man and the necessity to preserve natural ecosystems, there lays one of the biggest problems of sustainability. The base for solving the problem is *the success in taking the ecological aims out of their isolation as being contrary to the economic aims. It is necessary to include them among other decisive political goals, because only thus the real innovation in the sense of ecological renewal of the whole economy and the way of the area utilisation can be reached.*

Human society must feel responsibility above all for the ecological sustainability of ecosystems and to protect them against extraordinary external changes and impacts, to which ecosystem is not adapted. Only thus it is possible to contribute substantially to sustaining the inner environmental stability of ecosystems and to sustaining their auto-regulation abilities.

The base of the regional system of ecological stability lays in imbuing the countryside by a system of the so-called bio-centres and bio-corridors, which are mutually interconnected into a cohering net. Thus, there is created in the countryside an "ecological framework" with utilising all the preserved natural elements – forests, meadow-lands, meadows, copses, natural watersides, marshes. For efficiency of the environmental stability systems, it is necessary – as follows from their name – to be really stabilised so that they could fully effect in their function, enabling mutual interconnection of the individual bio-centres, migration of plants and creatures and therefore also mutual enrichment of bio-diversity.

In the CR, such systems of environmental stability are already part of the spatial as well as urbanistic concepts. They are proposed as local, regional and supra-regional, which should become a part of the European system.

UTILISATION OF THE AREA

After the call of creating, preserving and eventually also development of the environmental stability in the countryside, there immediately follows the problematics of the countryside utilisation as such and namely the complicated problem of the human sites utilisation.

Area utilisation really is of extraordinary importance, what usually is rightly underlined at all international negotiations regarding environment protection and care. Justifiably, there is stressed the fact, that *space is a strategic variable*. The topic of area utilisation really is one of the most complicated, as it is influenced by the fact, that plots are the object of personal ownership and represent big values. On the other side, they are part of the bio-sphere and thus the way of their utilisation is closely connected to the existence of ecosystems and is therefore decisive for their natural bearability.

The notion of bearability or potential of the area itself is interpreted in different ways. The countryside potential is understood as the complex of the countryside qualities, important for its optimum utilisation. We can follow utilisation as partial (with regard to single activity), total (with regard to all demanded activities), real as well as absolute. The limit, maximally possible measure of the countryside burdening is given by the margin of its stability.

Bearability has got its global measure, where it is connected to the world population level, the level of sea pollution, total need of energy, the scope of deforestation, agricultural systems and finally the total measure of devastation. Justly, it is mentioned that for example the present level of world population is still bearable only because most of the population lives in the developing world with minimum demand on resources. The computations showed, that the present population would long ago, if it lived up to the standards of the wealthiest countries, become totally unbearable for the Earth from the point of view of resources, energy and production of refuse.

In the regional scope, bearability is connected to other approaches, which can be divide into economic, environmental and socio-psychological. Economic views are connected to the possible measure of satiating the area

with economic activities. Environmental aspects are much more complex, since they are tied to the partial aspects climatic, soil, water balance and cycling and to the environmental aspects as such. The socio-psychological views are closely connected to the way of life, local traditions, religion and culture.

The way of area utilisation has got its contradictory aspects also in its own conceptual sphere. On one hand, it is stressed that *space must be utilised in such a way, that it leaves a maximally open way for future alternative possibilities of its utilisation*.

However, on the other hand, space still more belongs among the really limited, non-expandable and non-renewable resources. That should lead to its very responsible utilisation. However, mankind shows even towards this resource an unbelievable irresponsibility wastefulness. Thus there are, for example yearly lost the following areas of agricultural land:

– 8 million hectares through excluding from agricultural land for other utilisation,
– 3 million hectares through erosion,
– 2 million hectares by dilapidation,
– 2 million hectares by pollution.

In total, the losses amount approximately to 15 million hectares, what is more than the area of the Czech Republic and Slovak Republic together.

NATURAL RESOURCES PROTECTION

The call for saving approach to the energy and raw material resources belong among the basic prerequisites of the real sustainability of development. On the most general level, this call was formulated by the WB economist H. Dali as follows:

For sustainable resources – soil, water, forests and fish – sustainable intensity of consumption cannot be higher than the regeneration rate (therefore, for example fish is utilised in a sustainable way, if the remaining fish population is able to reproduce the catch volume).

For non-sustainable resources – fossil fuels, raw materials of high quality, fossil underground water – sustainable intensity of consumption cannot be higher than the rate of their replacing by sustainable resources used in a sustainable way. (For example, oil resources would be utilised in sustainable way, if part of the profit were systematically invested into sun collectors or planting trees. In the moment of oil resources exhaustion, there thus would be an equivalent flow of renewable energy to disposal.)

From the development sustainability viewpoint, surely the call for saving natural resources is of the decisive ones. At the same time, it is indubitable, that human abodes have got to have a decisive share in this friendly approach to the energy and raw material resources, since their are the major consumers of them. Numerous studies have already proved, that this saving approach is really possible without the use of any extraordinary and technologically impossible procedures.

AGRICULTURE

Intensive agriculture is in its primary function typical by a high transport and energetic demands, extensive mono-cultures and stressing large-scale breeds of animals. It causes pollution of surface and underground waters by artificial fertilisers, chemical protection substances, silage juices and animal excrements. All these impacts increase costs of drinking water, deteriorate the quality of recreational waters by the support of allergy causing algae and limit bio-diversity.

Soil is often submitted to degradation both physical (solidification, erosion), chemical (acidification, contamination by pesticides and products of their dissolving, heavy metals and inappropriate amount of phosphorus and ammonium) and biological (decrease of the humus content). Into the atmosphere, ammoniac (which also acidifies soil and water) and methane, which causes the origin of the "hot-house effect" are emitted. The countryside-forming elements (grass borders, copses) which are simultaneously also the natural sites of different species of fauna and flora, are sustained only at the most inaccessible places.

Under the influence of agriculture, alien chemical substances including hormones and heavy metals are entering the food chain. Inappropriate use of antibiotics in curing the animals has brought about the origin of resting microbiologic species and the use of animal refuses in feeding induced the BSE.

It means, that agriculture has got, as a part of the countryside care, a whole series of its own problems and tasks.

WAY OF LIFE

Sustainable development indubitably depends on population development, the ability to feed mankind, raw material resources and energy consumption, production of refuse etc., but above all it depends on the fact, whether people would decide to do something at all for sustainable development and to adapt their behaviour and life-style to its demands.

Awareness of the importance of the sustainability principle led as early as in 1982 to calling of the U.N. conference, the topic of which was the relationship of the way of life, environment and development from the European perspective. At this conference, there was submitted the report called "Search for sustainable development – long-term perspectives for sustainable development and life-styles in the industrially developed countries in global relations". In this report, there was evaluated, as the life-style, namely the relationship of the population to the policies of sustainable development and the necessity of their active incorporation into decision-making regarding these problems.

The MIT economist L. Thurov has reflected the relationship between the life-style and sustainable development in the following aphorism: "If the world population had the productivity of Switzerland, consumer habits of

the Chinese, the Swedish sense for equality and the Japanese social discipline, the Planet would bore a multiple number of the present population without any privation for anybody. On the other hand, if the world population had the productivity of Chad, consumer habits of the United States, the Indian sense for inequality and the social awareness of Argentina, the Planet would not be able to bear the population which would only approach the present numbers."

However, it seems that the rich countries inhabitants way of life has still a very small tendency to limiting consumption and to the "sustainable" behaviour. On contrary, according to the findings of the UNEP conference "Alternative ways of development and life in Asia and Pacific", it shows that the development is just the opposite. On the other hand, poor countries elites adopt the prodigal ways of life of the rich countries elites. It reflects not only in the relationship to environment and in wasting of resources, but also in the social sphere by their separating from the remaining population of their countries, the traditional relationship to which they are in fact losing. The majority of these elites therefore do not feel the need to engage in the real interests of their country, including environment protection and sustainable development.

RURAL ENVIRONMENT

Rural sites do not represent by themselves so problems from the sustainable development viewpoint as the urban ones. There id not the threat of enormous expansion into the countryside nor such transport demands, which would deteriorate environment on a large scale. Rural population does show a similar environmental problems as that in cities., however, on the more manageable scale. A specific problem of rural sites is of course agricultural production, which has its own problems of the negative environmental impacts. However, these are easier to solve because it regards – with the exception of different chemicals – mainly natural substances.

Much more difficult to realise are those demands on rural population, which are connected to its possible function as a counterpart to cities. If villages are to become an attractive environment not only for living, but also for different smaller enterprises, then it should be able to offer a certain civilisation standards like water supply, sewage, transport accessibility, communication means, services and trade facilities. Efficiency of the services and equipment is connected to the number of inhabitants, it can, however, be missed only in the smallest communes, offering to some, as a compensation, the desired quiet and distance from the present world riot.

Second, still more substantial factor of the desired attractiveness of rural habitation, which is, at the same time, very important from the sustainable development viewpoint, is sustaining and support of the rural inhabitation typical features. Whoever is to take the decision whether to live or to found business in a rural area, such a person does not look for a misshapen town miniature with multi-stored tenement houses, overcrowded roads etc. On the contrary, he or she would appreciate a pleasant environment, proximity of nature and recreational possibilities, interesting folk architecture of buildings, well arranged public space planted with trees and flowers. Such a person would rather expect neighbourly relationships among people in contrast to the anonymous urban environment – which, on the other hand, some people prefer.

Sustainable development of human abodes and their contribution to the overall sustainability can differ considerably in different conditions of the wider habitation systems. For example, the communes which are part of urban agglomerations have a specific features. They are "urbanised" with all the accompanying phenomena of land plot speculation, maximum utilisation of building plots and the pressure on building recreation villas, houses and cottages in the most valuable natural sites in attractive and well accessible areas. Other problems must be solved by communes in the predominantly agricultural, mountain or sub-mountain areas, where, however, many of them might become a favourite destination of recreational stays.

However, the sustainability views cannot be evaluated separately from the problematics of countryside.

The relationship of human habitations and countryside has come through several characteristic and mutually different stages during the last two centuries. Still up to the end of XVIII. century, the habitation net was created by individual towns, which were characterised, with only few exceptions, by a meagre number of inhabitants and a not very extensive area. The Earth surface was formed mainly by natural ecosystems, even if, namely in Europe, it was already the countryside transformed by man according to his interests and needs.

The next phase was the urbanisation process, which increased the number of urban inhabitants considerably, but the towns still remained compact and rather densely populated habitation units. That means, that habitation covered certain hitherto natural spaces, but countryside still prevailed in the habitation picture even in considerably urbanised countries.

A considerable change was brought about only in the third stage, which uses to be called sub-urbanisation. For that, there is characteristic an extraordinary pressure on occupation of the hitherto natural areas for urban sites, which grew enormously and often merged into conglomerations. That means, that instead of the former urbanisation inside human habitations, there occurred urbanisation of the whole countryside.

In the landscapes specific by their attractiveness and natural values, the numbers of recreational facilities – cottages and houses, pensions and hotels, camps and parkings – is growing continually. In the agricultural areas, that is again the equipment for agricultural plant and animal production, including silos, barns, stores etc. Namely in the background of big cities, there are still often placed different buildings and constructions which

formerly were to be seen only in cities. These are groups of family houses, cheaper hotels, motels, shopping centers, superstores, car services, gas stations and other facilities. They are allocated there either because they look for an attractive environment, or, on the contrary, because they want to utilise cheaper sites and at the same time easier transport with additional parking plots and arriving from frequented communications.

If mankind would seriously like to strive for sustaining life at this planet and will seek ways to this goal also in the arrangement and development of its habitats, it will have to take interest not only in its own habitations, but also in the impacts of their development at the open countryside. That then becomes the only possibility for sustaining the desirable diversity of plants and animals in the urbanised countries. Only nature is able to create and continually multiply organic matters through photosynthesis efficiently and with the real sustainability. They then stand at the beginning of the food chains and are thus the prerequisite of the life existence at the Earth.

Therefore, the problematics of sustainability regards primarily countryside and natural environment, the state of which is connected closely to the existence and further development of human habitations. At that, it does not regard only quantitative data expressed in hectares and square kilometres. Not less important is, whether the countryside will be covered by agricultural and forest mono-cultures or whether there will be enough space in it, where natural ecosystems, which are the only guarantee of the nature survival, could develop organically.

CONCLUSIONS

Diversity of the countryside and its image was always appreciated in our country. On a not very large areas, we can find here forests as well as fields, meadows and lowlands, hills and plains, ponds as well as rivers and swamps, alleys and copses, groups of trees as well as of stones.

Preservation, renovation and further enrichment of this unique wealth is undoubtedly one of the bases of further sustainability of the man-inhabited country. In the Agenda 21, which is, among other, dedicated to support of the sustainable development of agriculture and rural areas, the following programme tasks are defined:

– Evaluation of agricultural policy, planning and integrated programmes reflecting the multi-functionality of agriculture. These activities should be realised namely with regard to securing food and sustainable development.
– Securing the participation of the population and support of the human resources development for sustainable agriculture.
– Improvement of agricultural production and farming systems through diversification of the labour on farms as well as outside them and through the infrastructure development.
– Information on the land resources planning and agricultural education.
– Sustaining of land and its reproduction.
– Water for sustainable food production and sustainable development of rural areas.
– Sustaining and sustainable utilisation of the plant genetic potential for food production and sustainable agriculture.
– Complex procedures of the pest protection in agriculture and their monitoring.
– Sustainable plant fertilisation for increased food production.
– Change of energy production ways in rural areas, leading to higher efficiency.
– Evaluation of the impacts of the ultra-violet rays caused by the ozone layer decrease, on plants and animals.

Part of the Agenda 21, which regards sustaining of biodiversity, is connected to the countryside, stating that without regard to the not negligible streaming of the last years, the bio-diversity losses are still continuing in the whole world, including namely destruction of the natural environment, reaching of excessive yields, pollution and unsuitable introduction of alien plants and animals into the environment. It is further justifiably stated, that "the present decreasing of bio-diversity is, from a great part, the consequence of human activities and presents a grave threat to the development of mankind".

Securing of the human abodes sustainability, or, eventually, such transformation of them, which would not become an obstacle, but rather a support of the sustainability of life, is closely connected to the question, what future is expecting human habitation as such. The problem then is, that the future habitation conditions will not be connected to the demands of sustainability only, but will undoubtedly be conditioned by a number of other factors, some which we can already estimate with regard to the present trends, but other cam be surprising and unpredictable.

The combination of telecommunications and data processing on the widest scope are developing the possibilities of "ruralisation" of the small scale modern production and the tertiary activities. We will have to re-evaluate carefully the concept of external economic effects, called out by the concentration of industry and habitation. The same regards also the enterprise economic effects of scale.

Can it be reasonably expected, that there will emerge a more balanced way of the area utilisation in this century, which will endanger the environment less and will consume less energy? Will this development be connected with the shift toward more environment-friendly agricultural technologies, demanding lower industrial inputs and a better utilisation of the biological knowledge? If this happens, life styles can change considerably for many people. People will move from cities into the countryside, where they will live and work and will only visit the cities with their cultural facilities on feast days and long weekends.

In favour of the de-urbanisation, there also speaks the fact, that it is more easily possible to utilise sustainable energy resources, such as solar or wind energy, energy

circulators etc., in few-storied isolated houses in gardens. The same can be said also for for the suitable biological methods of processing a certain part of the communal refuse, for example by composting, as well as for sewage water cleaning. Not less important is also that gardens offer the prerequisites for the self-supply organic food growing.

The mentioned outlook, namely when confronted with the environment failings in the cities, is undoubtedly attractive and tempting for many inhabitants. It can be still judged, however, that this would be, at least at the present level of technology, rather an extreme reflection of sub-urbanisation. It would mean enormous demands on agricultural land, because it would mean, at the present average population density of about 100 people per hectare in bigger towns, that it would be possible to reach at the utmost one tenth of this density level in the less compact habitation forms. For example, it would mean that the capital of Prague, which urbanised area covers about 300 square kilometres at present, would thus cover a ten times larger area and would reach approximately from the river Labe to the river Sázava and from the town of Kladno to that of Český Brod.

In the countryside, such a dispersed inhabitation would be, even using the non-traditional energy resources, extraordinarily energy-demanding and – as testified by the little-house suburbs of the American cities – would depend on individual car transport. Moreover, completing such an idea evokes a question on the way of services utilisation, health care organisation, school education and many other. Thus, the idea gets to a sci-fi border, where all direct human contacts are replaced by the TV screen, videophones, fax, e-mail and internet.

REFERENCES:

European Sustainable Cities (1994). EU Expert Group on Environment. Summary of the 1st report. October.

U.N. Conference on Environment and Development (1992). Documents and comments. Rio de Janeiro.

Meadows D.H., Meadows D.I., Randers I. (1995): Překročení mezí – konfrontace globálního kolapsu s představou trvale udržitelné budoucnosti, Praha.

Naše společná budoucnost (1991). Světová komise pro životní prostředí a rozvoj. Praha.

The Challenges Facing European Society With the Approach of the Year 2000 (1994). The outlook for sustainable development and its implications on regional/spatial planning. European Regional Planning No. 54. Council of Europe Press, Strasbourg.

Arrived on 22nd January 2003

Contact address:

Doc. Ing. Vladimír Jeníček, DrSc., Česká zemědělská univerzita v Praze, Kamýcká 129, 165 21 Praha 6-Suchdol, Česká republika
tel.: +420 224 382 502, e-mail: jenicek@itsz.czu.cz