UPLanD
Journal of Urban Planning, Landscape & Environmental Design

Research & experimentation
Ricerca e sperimentazione

System of non-forest woody vegetation considered in relation to the landscape character (face) and impact on it

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Highlights

- Spread out landscape greenery importantly supplements the complex landscape picture.
- Comparing existing elements of non-forest woody vegetation with newly proposed elements.
- Impact of non-forest woody vegetation on the value of the landscape character.
- Relationship between elements in landscape vegetation, the regional system of ecological stability, and the landscape face.
- Landscape sustainability.

Abstract

Non-forest woody vegetation (scattered greenery, landscape vegetation, landscape greenery) is a common feature in the landscape of the European countryside. In the Czech Republic, it is typical for both agricultural and un-utilised land, comprising floriculture growth (forests, wilderness, uncultivated land, and orchards) and woods which were either purposefully planted or spread spontaneously. They exist in the Czech landscape mostly as lines often existing in the land fund in small area dispositions, or completely as solitaires. In exceptional situations they occur as an area form. Non-forest woody vegetation provides an important ecological service and fulfils specific non-substitutable functions that circulate substances and energy through the landscape. This study examines the indispensability of non-forest woody vegetation in the landscape. As the basis of this research, differences in species composition, space structures, area sizes, and newly proposed elements of non-forest woody vegetation in selected landscape types were explored. Comparing existing elements of non-forest woody vegetation with newly proposed elements, relationships between the area spread of non-forest woody vegetation and the value of the landscape face and the newly proposed elements in regional systems of ecological stability were found. The presented research lists specific local elements of non-forest woody vegetation in selected regional types within the studied area in the Czech Republic.

Article history

Received: March 24, 2018
Reviewed: June 23, 2018
Accepted: July 12, 2018
On line: July 16, 2018

Keywords

Non-forest woody vegetation
Landscape vegetation
Landscape greenery
Landscape character (face)
Regional system of landscape stability
Value of landscape character

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1. Introduction

Vegetation in the Central European landscape has developed closely with land utilisation and means of economic activity. Undoubtedly, human activities have had an important and deterministic impact on the current composition of vegetation species and the spread of some plant species. Various opinions (Zlatník 1976, Demková 2014) explore the development and original forms of vegetation types existing in the Czech Republic's landscape, as well as their natural potential situations. It is clear, though, that some species would not exist in many areas without human activity. The diversion from traditional and extensive economic activities considered today as less efficient meant fundamental changes occurred in the landscape during the twentieth century (Sklenička, 2003).

In the second half of the twentieth century, a trend of destabilisation and destruction of landscape systems prevailed in the Czech Republic and adjusted the landscape under unified technological processes used in agricultural and forestry production and the urbanisation needs. This trend featured gigantomania that targeted the largest possible blocks of arable land produced very long sections of straightened and concreted or even piped water flows, and created extended ecologically labile spruce and pine monocultures in forests (Prudký, 2001). This means that in relatively short period, many centuries-old and in the ancient lowland settled areas even thousands of years of existing development in the countryside landscape aimed at progressive achievement of balance between the natural and man-caused landscape creating elements were disrupted. The multifaceted and varied countryside landscape was degraded to an agro-industrial production environment (Buček, Lacina 1994).

Spread out greenery was eliminated from the landscape as it was considered an obstacle to movement by heavy mechanisms, or it was reduced and harmed or pushed to extreme places. In 35 years (1950–1985), 3600 hectares of greenery was removed from the Czech agricultural landscape, 4000 km of line greenery from an area of 1400 hectares, and the area of greenery around countryside settlements decreased by at least 2000 hectares (Trnka, 2001).

No central or regional registration of spread out greenery exists in our country. A qualified estimate made in the mid-1980s showed the total area of spread out greenery in the Czech Republic was 0.3–0.5 %. Spread out greenery of various origins and appearance exists in all landscape types. However, various requirements for its optimal presence exist in each landscape type.

Based on detailed research activities, it was advised that the minimal proportion of spread out greenery that can still fulfil its polyfunctional role must be higher than 1.5 % of the agricultural land fund. (Sklenička, 2003). However, this size is valid mainly for flat terrain where spread out greenery is optimally placed to fulfil its anti-deflationary function while other functions are respected.

In more rugged terrains existing in submontane and highland areas, especially in places threatened or subjected to water erosion, this proportion of spread out greenery should be substantially higher — about 6 % of the agricultural land fund. The importance of forms of spread out greenery has been underestimated from the point of view of the ecological stability of agrocenoses because a belief existed that the natural self-regulating mechanisms might be replaced in simplified agro-ecosystems by the use of chemicals, especially in the field of plant protection (Forman, Gordon, 1986).

The current landscape vegetation covers 43.4% of the total area of the Czech Republic, with forests covering 35.1 % and spread out greenery with tree growth covering 2.9 %. The reminder is spread out greenery consisting of herbs and shrub vegetation. Forest species composition is dominated by spruces and pines (54.9 %). Representation of fourteen tree types exceeds 1 % (spruce – Picea sp., fir – Abies sp., pine – Pinus sp., larch – Larix sp., oak – Quercus sp., beech – Fagus sp., hornbeam – Carpinus sp., maple – Acer sp., ash – Fraxinus sp., birch – Betula sp., mountain ash – Sorbus sp., linden – Tilia sp., alder – Alnus sp., and willow – Salix sp.). Spread out tree greenery with a total area of 221 thousand hectares is dominated by deciduous trees (79.9 %). The representation of fourteen tree types exceeds 1 % (ash – Fraxinus sp., birch – Betula sp., cherry – Prunus sp., alder – Alnus sp., willow – Salix sp., oak – Quercus sp., maple – Acer sp., acacia – Robinnia sp., mountain ash – Sorbus sp., pear – Pyrus sp., apple – Malus sp., linden – Tilia sp., poplars – Populus sp., and pine – Pinus sp.) (Lipský, 2000).

1.1 Definitions of terms

- Landscape character – "The landscape character comprises mainly the natural, cultural and historic characteristics of a certain place or area. It is protected against devaluation, i.e., by activities reducing its aesthetic and natural values. It is defined by features and signs cre-

Table 1: Landscape vegetation categories (non-forest woody greenery) in the Czech Republic. *Source: Bulíř, Škorpík (1987)*

LINE	POINT	AREA	LINE INTERRUPTED
Alleys – trees planted in a single line and at regular distances	**Solitaire** – the planting/existence of a single or up to 3 individuals growing close together	**Niche** – shrubs and trees usually of spontaneous origin growing densely or freely on a land lot bigger than 500 m2, almost always of irregular shape (barren, devastated, uncultivated lots – slopes, ravines, quarries or landfills)	**Interrupted alleys** – trees planted mutually irregularly
Strip – a single line to free lines, dense planting or spontaneous existence of shrubs or shrubs and trees		**Bosks/groves** – dense Gross of woods having regular or irregular arrangements (of the size 100–500 m2) growing in unharvested enclaves on lots utilised by agriculture (mineral outcrops, stone piles, cuts or embankments)	**Interrupted strip** – dense planting/existence of shrubs, shrubs and trees, or a tree only in irregular interrupted strips
Lane – multi strip planting or existing woods with a width of 5–30 m		**Cluster** – dense Gross of woods in regular or irregular arrangement up to 100 m2 existing or planted mostly in places not used by agriculture	**Interrupted lane** – Planting/existence of woods in an irregular line and width
		Group – sparse planting or a spread of more than three wood individuals in a smaller area	

ating its uniqueness and difference, for example, by the terrain's morphology, the character of water flows and areas, vegetation cover, or settlements". (Sklenička, 2003).

- Natural characteristics of the landscape character – include landscape properties determined by natural conditions, which are mostly geological, geomorphologic, climatic and biogeographical situations, and the actual situations in the ecosystem (Löw, 1990).
- Value of the landscape character – the natural values of the landscape face are created by a set of signs of natural character which together create the natural characteristics of an area or place, their presence rate, quality and perceptible presentation. The quality level of the natural value depends not only on the level of presence of natural signs of characteristics in the landscape, but also on their ratio compared to others (Vorel et coll., 2004).
- Spread out greenery – "The term of spread out greenery means all growths and solitaires of woods, including herbs species, which are not considered as forest, agriculture or a part of the greenery system within settlements or some other buildings in the landscape". (Bulíř, Škorpík, 1988).
- Non-forest woody vegetation – trees and shrubs, their groups or lines, point or area elements (see Table 1) which grow in land lots other than forests (Bulíř, Škorpík, 1988).
- Regional system of ecological stability – means the mutually interconnected set of natural and adjusted but close to nature ecosystems which maintain natural balance. The main purpose of USES is strengthening the landscape's ecological stability by maintaining or renewing stable ecosystems and their relationships (Buček, Lacina, 1994).

1.2 Research methodology

A village in the Central Bohemian Region in the Posázaví area called Samopše (e.g. Fig. 1) was selected as a model research area. Based on preliminary explorations, the area was determined as a possible suitable representative sample for this research.

The registration land of the researched area consists of 5 independent settlements (Samopše, Přívlaky, Budín, Mrchojedy and Talmberk). Each

Table 2: Landscape vegetation categories in the researched area and its settlements. *Source: Bauthor's elaboration based on Löw, Novák (2006)*

Name	Marking	Landscape type	Characteristics
Budín	Settlement 1	Forest landscape	Landscape types changed by human activities, rare almost natural landscape types. Forest landscapes feature mostly forest growths (at least 70 % of the area). With some exceptions, it is the basic type of matrix of our potential vegetation. They have a closed view character.
Přívlaky	Settlement 5	Landscape featuring pronounced valleys	The structure type of a "landscape with pronounced valleys", featuring a river and valleys of its tributaries, usually forested, often with rocky outcrops in slopes and at the upper edges. A landscape with high relief dynamics and high natural values.
Talmberk	Settlement 3	Forest-agricultural landscape	From an internal structure point of view, it is a heterogeneous transitional landscape type featuring alternate forested and non-forested places. The areas featuring woody vegetation fluctuate between 10 % and 70 %. The landscapes have mostly a semi-opened character.
Mrchojedy	Settlement 4	Agricultural landscape	The landscape type is heavily changed by human activities. Forests cover less than 10 % of the area. Agricultural fields and permanent grassy growths cover 90 % of the area. The areas have an open view character.
Samopše	Settlement 2	Forest-agricultural landscape	A type of "forest-agricultural landscape". A harmonic countryside landscape with varied representation of "soft" relief forms and means of landscape utilisation; due to the varied relief, the landscape usually features more natural and smaller groves, some balks, embankment growths of water flows, areas of secondary grass, as well as utilised areas. They have a semi-opened character.

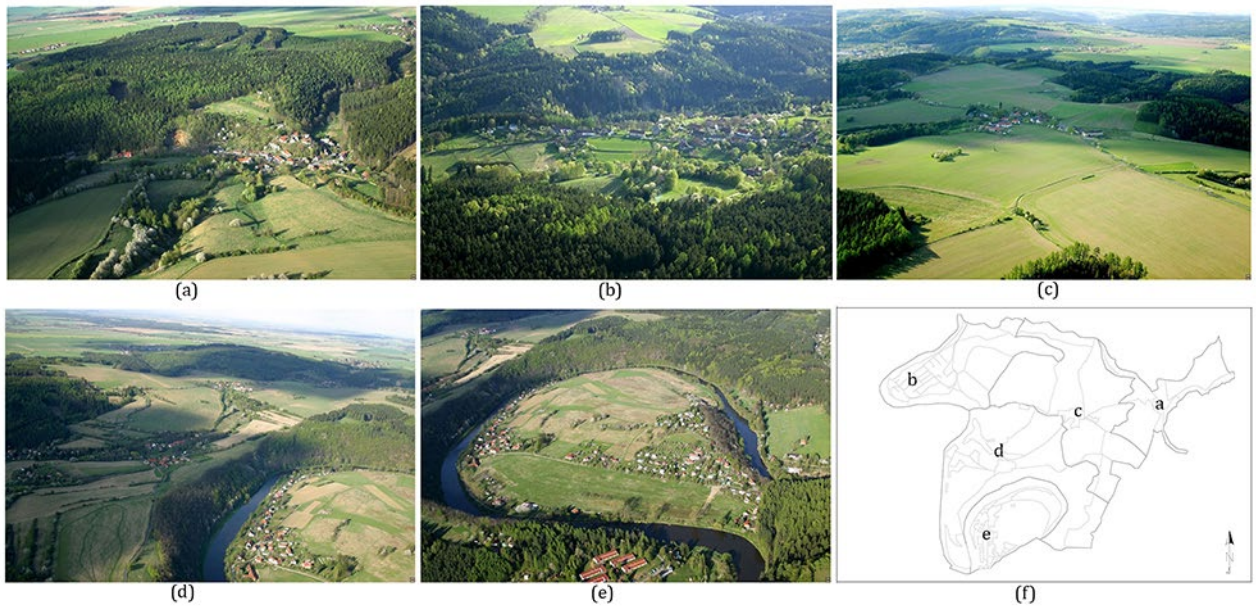

Figure 1: Landscape of the researched area: (a) Settlement 3 Talmberk, (b) Settlement 1 Budín, (c) Settlement 4 Mrchojedy, (d) Settlement 2 Samopše, (e) Settlement 5 Přívlaky, (f) orientation map of the researched area. *Source: author's elaboration.*

settlement is different (e.g. Tab. 2). The total registration land forms a part of the forest-agricultural landscape, and from an internal structure point of view, it is a heterogenous transitional landscape type featuring alternate forest and non-forest places. The forested areas fluctuate between 10 % and 70 % and the landscape character is semi-opened. Detailed field research was conducted in the researched Municipality of the Samopše registration area to gain the necessary information about the sizes, situations and types of spread out greenery elements. The complex methodology of the research includes dendrology research of the current situation in growths of non-forest woody structures based on typology (Bulíř, Škorpík, 1988), vitality structures of spread out greenery, following the methodology (Mareček, 1986), the suitability of species according to the map of potentially natural vegetation in the Czech Republic (Neuhäuslová, 2001), species composition, and species determination (Koblížek, 2000). Special attention was given to dendrological research and the sizes of individual existing elements of non-forest woody vegetation (field measurements taken during 2016–2017). In conclusion, the value of the landscape face following the methodology has been determined (Vorel, Kupka, 2009).

2. System of non-forest woody vegetation

2.1 Current situation of non-forest woody vegetation in the area of interest – first stage of the research project

The dendrology study shows the high importance of spread out vegetation in landscape structures. The area representation of vegetation in the landscape picture, based on partial area research, has proved the dominant representation of this element in the landscape face of the Settlement (2) of Samopše, while the least in the Settlement (3) of Talmberk (e.g. Tab. 3).

In total, 20 wood species were found in the free landscape of the researched area. Most of them were deciduous trees – a total of 18, while the remainder featured spruce (Picea abies L.) and pine (Pinus sylvestris L.). The most often represented trees not providing fruit were ash trees (Fraxinus excelsior L) and birch (Betula pendula Roth.). The most often represented fruit providing woods were blackthorns (Prunus spinosa ssp. L) and prune trees (Prunus domestica ssp. L), less represented by cherry (Prunus cerasus ssp. L.), apple (Malus domestica ssp. L.) and pear trees (Pyrus commnis ssp. L.). Self-seeding woods comprised roses (Rosa canina L.) and black alders (Sambucus nigra). Mainly alder species (Alnus glutinosa L) and willow (Salix alba L. and Salix caprea L.) were close to water flows (areas).

The segments of spread out vegetation were analysed in various places. This inventory confirmed the theoretical knowledge about the composition of vegetation in the researched area: in the case of water flows, typical communities of hygrophilous species (genus Salix sp. And the genus Alnus sp.) were evident, while vegetation along roads shows human influences (planting, cutting, etc. – genus Prunus sp.) and balks had a species composition usual for forest growth (genus Carpinus sp. and genus Fagus sp.).

A total of 177 segments of non-forest woody vegetation (e.g. Fig. 2) was evaluated in the researched area. Of those, 92 were evaluated as containing high vitality and orchard value. This indicator shows very good vitality of the vegetation in the researched area, with high potential in the future. All segments of spread out vegetation were assessed from the point of view of species composition according to a map of potentially natural vegetation (Neuhäuslová, 2001).

Line communities are the prevailing ground plan type of non-forest woody vegetation. They accompany water flows and roads. They grow at the edges of built-up areas, and in Settlement (2) Samopše, they present themselves in the form of balks. The system of non-forest woody vegetation is not

Table 3: Current sizes of elements of non-forest woody vegetation in m^2 and % of the total land fund. *Source: author's elaboration.*

Name	**Budín**	**Přívlaky**	**Talmberk**	**Mrchojedy**	**Samopše**
Marking	Settlement (1)	Settlement (5)	Settlement (3)	Settlement (4)	Settlement (2)
Current area of non-forest vegetation in m^2	36.365	42.849	7.838	13.854	73.928
% of current non-forest vegetation in the total area	2.60 %	4.76 %	1.15 %	0.77 %	2.92 %

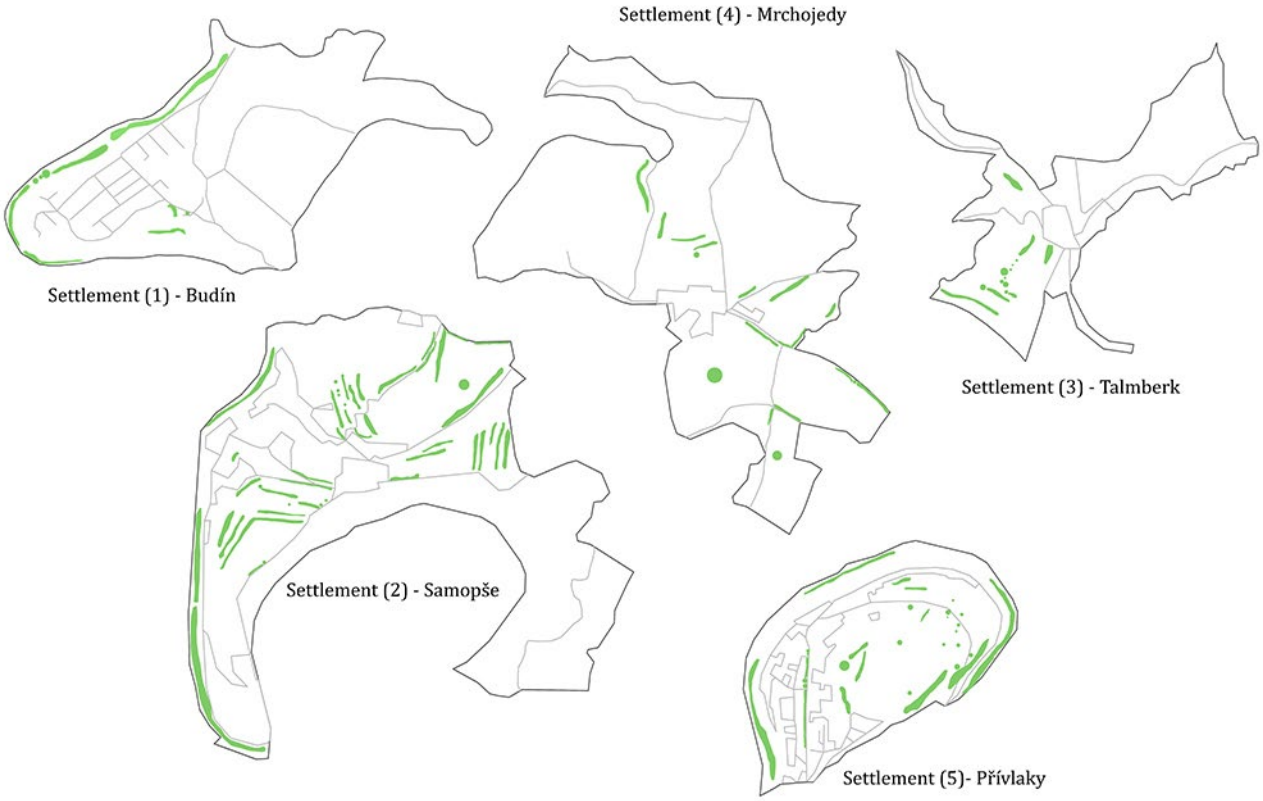

Figure 2: Orientation maps of analysed structures of non-forest woody vegetation in the area of interest. *Source: author's elaboration.*

as pronounced in the landscape face of Settlement (2) Samopše (e.g. Fig. 2).
By comparing the individual landscape elements, the non-substitution of spread out vegetation in the landscape picture of the Settlement (2) Samopše and the Settlement (5) Přívlaky is demonstrated. The maintenance of spread out vegetation is a necessary condition for future maintenance of the characteristics of the landscape face. The aspect of planted assortments, which provide the typical identity to the researched area, cannot be avoided.

2.2 Value of the natural landscape face characteristics

The landscape face characteristics are made by signs which can be found and described in the landscape. The natural characteristics in the landscape face are made by natural elements and landscape elements such as the relief, vegetation, geomorphology, water flows, etc. (Ložek, 2007). The water flow of the River Sázava and its characteristic meandering accompanied by low land river vegetation are the most pronounced features in the landscape picture of the researched area (e.g. Fig. 1). The terrain relief and network of water flows creates the basic segmentation of the landscape of interest. This therefore creates the spatial framework, spatial determinations and the basic features of the configuration, spatial and scale relationships. The situation finalises the landscape picture and its spatial arrangement. At the same time, it participates in the natural, detailed composition of the landscape scene and co-creates the picture of the landscape's economic utilisation. This shows the current and historical cultivation methods and landscape changes. Spread out non-forest woody vegetation is an important part of the landscape scene in the researched area and it co-determines or creates its character mainly with shrubs and mature trees, which are often accompanied by cultural landscape elements (the surviving balks, small clusters and groups, alleys, and embankment growths). The value of the landscape face of natural elements in all settlements in the researched areas was determined (e.g. Tab. 4) by evaluation of the table (Vorel, Kupka, 2009). The highest value of the landscape face was assigned to Settlement (5) Přívlaky, while the lowest value was assigned to Settlement (3) Talmberk and Settlement (4) Mrchojedy (e.g. Fig. 3), where a system of non-forest

Table 4: Current value of natural landscape face characteristics. The evaluation scale (x) fundamental and unique, (xx) co-determining and important, (xxx) supplemental and common. *Source: author's elaboration.*

Settlement name	**Budín**	**Přívlaky**	**Talmberk**	**Mrchojedy**	**Samopše**
Marking	Settlement (1)	Settlement (5)	Settlement (3)	Settlement (4)	Settlement (2)
Value of the current landscape face	xx	xxx	0	0	xx

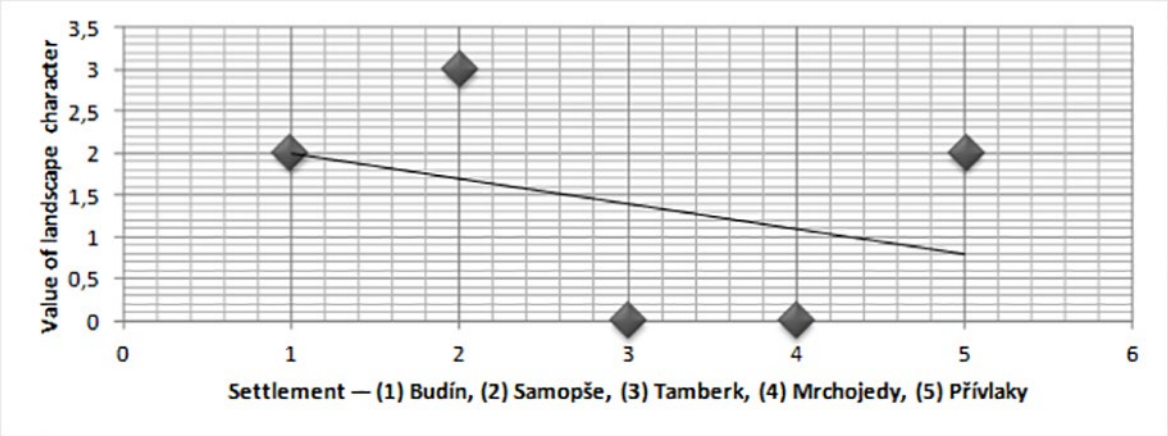

Figure 3: Point graph of values of natural landscape face characteristics. Evaluation scale: ≥ 1.5 % = 0 (-), 1.6–2.5% = 1 (x), 2.6–3.5 % = 2 (xx), ≤ 3.6 % = 3(xxx). *Source: author's elaboration.*

landscape structures is not featured in the landscape face because their area representation was lower than 1.5 % of the land fund.

2.3 Newly proposed elements of non-forest woody vegetation in the researched area

To demonstrate the influence of landscape vegetation on the landscape face and its positive value, new elements in the current conditions of non-forest woody vegetation need to be theoretically modelled (e.g. Fig. 4). This allows the current landscape face value to be compared with the landscape face value enriched by newly proposed elements of non-forest woody vegetation (e.g. Tab. 6). The largest proportion of area of the newly proposed elements focuses on Settlement (4) Mrchojedy (e.g. Tab. 5) where an agricultural character dominates and has a negative impact on landscape functions (erosion, large arable fields, and open areas). By contrast, the lowest proportion of the non-forest vegetation structures is proposed for Settlement (1) Budín due to the predominantly forest landscape character with no agricultural activities. The structures of spread out greenery have been proposed based on field research which has established their shape, species composition, spatial arrangements and orientation (along to contour lines). This ensures they will look natural and purposeful, not forced. Landscape vegetation performs specific and non-substitutable functions of substance circulation and energy in the landscape. Producing biomass, it provides feeds herbivores and provides the main source of organic mass in soils. It speeds up mineral weathering, contributes to the creation and development of soils, and by supporting the Earth's surface prevents erosion. It also reduces temperature extremes and regulates evaporation and water modes in the landscape. More pronounced removal of vegetation from landscapes leads unavoidably to changes in dissipation of solar energy and, consequently, changes in air circulation and distribution of precipitation (Trnka, 2007; Sgobbo, 2017-2018). Greenery (woods, herbs, and their communities) is the living system which impacts all environments naturally and polyfunctionally (independently of humans). Targeted creation and cultivation may focus vegetation effects (its functions) as needed (Bulíř, Škorpík 1988). Vegetation has always belonged historically to distinctly variable values dependent on human activities, which influences the landscape face and it complex landscape arrangement (Löw, Míchal, 2003).

Table 5: Newly proposed size of elements of non-forest woody vegetation in m² and % of the total land fund. *Source: author's elaboration.*

Settlement name	**Budín**	**Přívlaky**	**Talm-berk**	**Mrcho-jedy**	**Samopše**
Marking	Settle-ment (1)	Settle-ment (5)	Settle-ment (3)	Settle-ment (4)	Settle-ment (2)
Proposed situation of non-forest vegetation in m²	2.860	9.420	7.370	50.349	21.784
% of the proposed non-forest vegetation in the total land area	0.20 %	1.05 %	1.08 %	2.78 %	0.86 %

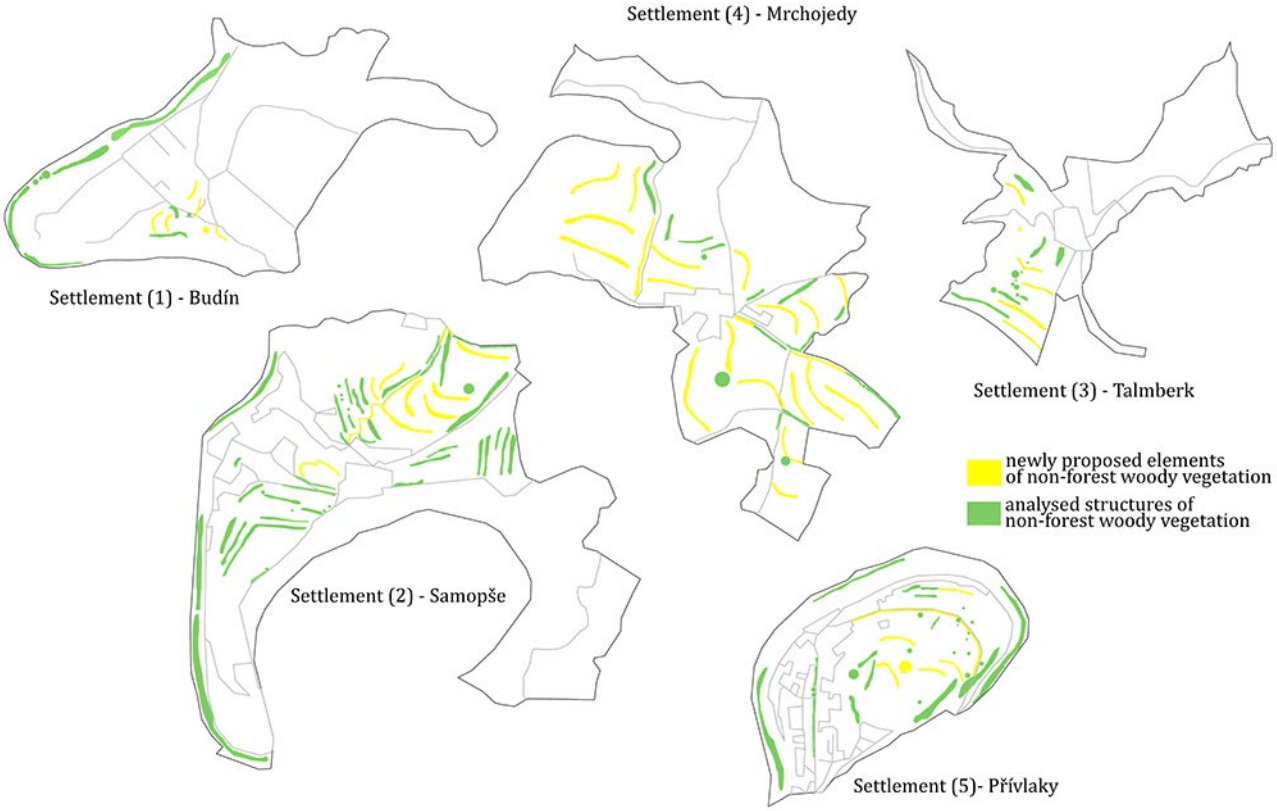

Figure 4: Orientation maps of newly proposed size of elements of non-forest woody vegetation in the area of interest. *Source: author's elaboration.*

2.4 Value of the landscape face of the researched area with the newly proposed elements of non-forest woody vegetation

The total value of the landscape face when the proposed structures of non-forest woody vegetation were added to the model showed in specific cases of three out of five of the settlements in the researched area (e.g. Tab. 6). The value of the landscape face changed the most in the case of Settlement (4) Mrchojedy, where 50,349 m2 was proposed and the landscape face value changed from 0(-) to 2(xx). In the case of Settlements (1) Budín and (5) Přívlaky, the value of the landscape face did not change. In the case of Settlements (3) Talmberk and (2) Samopše, the value of the landscaped face increased by 1(x).

The theoretical model of newly proposed structures of non-forest woody vegetation demonstrates a positive effect of landscape greenery on the landscape face. The lowest landscape face value is characteristic for Settlement (3) Talmberk, where the forest-agricultural landscape type prevails and is surrounded by forest growths in the rocky terrain (e.g. Fig. 5). The highest value of the landscape face belongs to Settlements (2) Samopše and (5) Přívlaky, where the area of the

Table 6: Summary table of effects of the area of current/proposed non-forest woody vegetation on the value of the landscape face. Evaluation scale for the landscape face: (x) fundamental and unique, (xx) co-determining and important, (xxx) supplementing and common. *Source: author's elaboration.*

Settlement name	**Budín**	**Přívlaky**	**Talmberk**	**Mrcho-jedy**	**Samopše**
Marking	Settle-ment (1)	Settle-ment (5)	Settle-ment (3)	Settlement (4)	Settle-ment (2)
Current area of non-forest vegetation in m^2	36.365	42.849	7.838	13.854	73.928
Proposed situation in non-forest vegetation in m^2	2.860	9.420	7.370	50.349	21.784
Current + proposed situation in non-forest vegetation in m^2	39.225	52.269	15.208	64.203	65.203
% of the current non-forest vegetation in the total area	2.60 %	4.76 %	1.15 %	0.77 %	2.92 %
% of the proposed non-forest vegetation in the total area	0.20 %	1.05 %	1.08 %	2.78 %	0.86 %
% of the summary non-forest vegetation in the total area	2.80 %	5.81 %	2.23 %	3.55 %	3.79 %
Value of the current landscape face	xx	xxx	0	0	xx
Value of the landscape face with the proposed non-forest vegetation	0	0	0	xx	0
Value of the landscape face with the newly proposed elements of non-forest vegetation	xx	xxx	x	xx	xxx
Increase/decrease in the value of the landscape face	**-**	**-**	**↑ 1**	**↑ 2**	**↑ 1**

non-forest woody vegetation covers more than 3.6 % of the total area and the structures of non-forest woody vegetation comprise an important element of the landscape face.

The theoretical model of the proposed structures of non-forest woody vegetation allows the relationship of non-forest woody vegetation to the landscape face to be understood, which is positive in all directions, including the impact of landscape vegetation on the arrangement of land systems of ecological stability. The theoretical model of new structures in spread out greenery assumes a positive impact on landscape sustainability in the researched area.

3. Summary of the research

The research project succeeded in demonstrating that non-forest woody vegetation only has a positive impact on the landscape face value, which is given by the area (proportional) representation of its structures. If the area of non-forest woody vegetation increases in the registration area by 91,783m^2, the landscape face value will increase by 4 points. This shows that to make the value of the landscape face increase by only 1 point, 22,946 m^2 of non-forest woody vegetation structures must be applied in the landscape.

Theoretically, we might deduce that 1 m^2 of non-forest woody vegetation allocates, on average, about 30 m^2 of area. New elements of non-forest woody vegetation are proposed for the landscape due to increases in landscape stability and the renewal of natural functions on one side, and to make the ecological relationship stable within the wider landscape context (e.g. Tab. 7) on the other (Schaefer, 1991). For this purpose, the units of spread out greenery must be mutually interconnected. This is achieved by creating a network of survival centres (bio centres) interconnected with migration routes (bio corridors). This creates the substance behind the concept of regional systems of ecological stability (USES). Even the smallest fragments of valuable greenery may then become involved in the local USES as so-called interactive elements (Sklenička, 2003).

Table 7: Relationship between elements in landscape vegetation, the regional system of ecological stability, and the landscape face. *Source: author's elaboration.*

Relationships between elements of landscape vegetation	USES	Landscape vegetation	Landscape face
	Bio centre	Area (niche, cluster, bosk or group)	Out of forest spread communities; permanent grassy growths; important landscape units
	Bio corridor	Line (alley, strip, lane or balk)	Line communities, road accompanying growths, embankment vegetation, areas along open agricultural fields and alleys
	Interactive element	Point (solitaires)	Independently standing woody elements, ecotonic communities

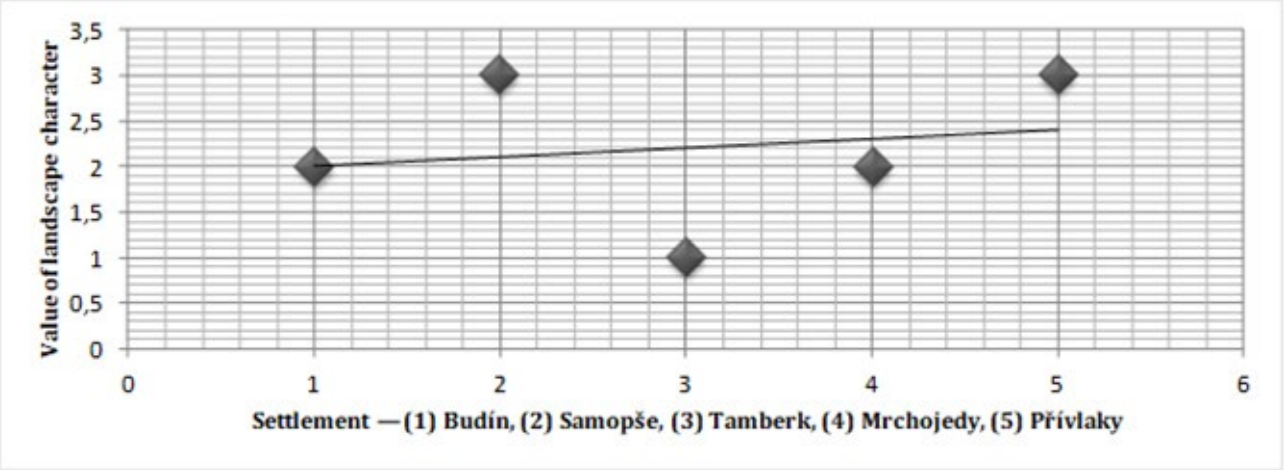

Figure 5: Point graph with the values of natural landscape face characteristics in the current and newly proposed structures of non-forest woody vegetation. Evaluation scale: ≥ 1.5 % = 0 (-), 1.6–2.5 % = 1 (x), 2.6–3.5 % = 2 (xx), ≤ 3.6 % = 3(xxx). *Source: author's elaboration.*

4. Conclusions

The characteristics of the natural landscape face are given by natural conditions. Certain key natural conditions present themselves predominantly in the picture of a given landscape and make up a part of the typical features of a given landscape face. There are also those natural conditions important which influence, at an important rate, the use of natural resources in the area and create a framework for the long-term utilisation of the landscape by people. From the point of view of impact on typical features in the landscape face, the result of the effects by the relief, geological base and reserves of mineral resources, hydrological properties, soils, climatic and bio geographic situations is especially important.

Non-forest woody vegetation is a living system which affects any environment naturally and polyfunctionally (Bulíř, Škorpík, 1988). Vegetation has always belonged among the historically very variable values depending on human activities that impact the landscape face and the total landscape arrangement. Spread out landscape greenery importantly supplements the complex landscape picture. It must be protected and, within the scope of economic activity, be renewed, supplemented and freshly proposed for the landscape (Bennet, 1990).

The return of valuable, spread out, non-forest woody vegetation back to the landscape is the necessary prerequisite for stopping destabilisation processes occurring in the agrarian landscape and preventing reduction of natural biodiversity, and encouraging renewal of landscape diversity and life.

Acknowledgements

Author thanks village Samopse for granting the right to publish the images in fig.1

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