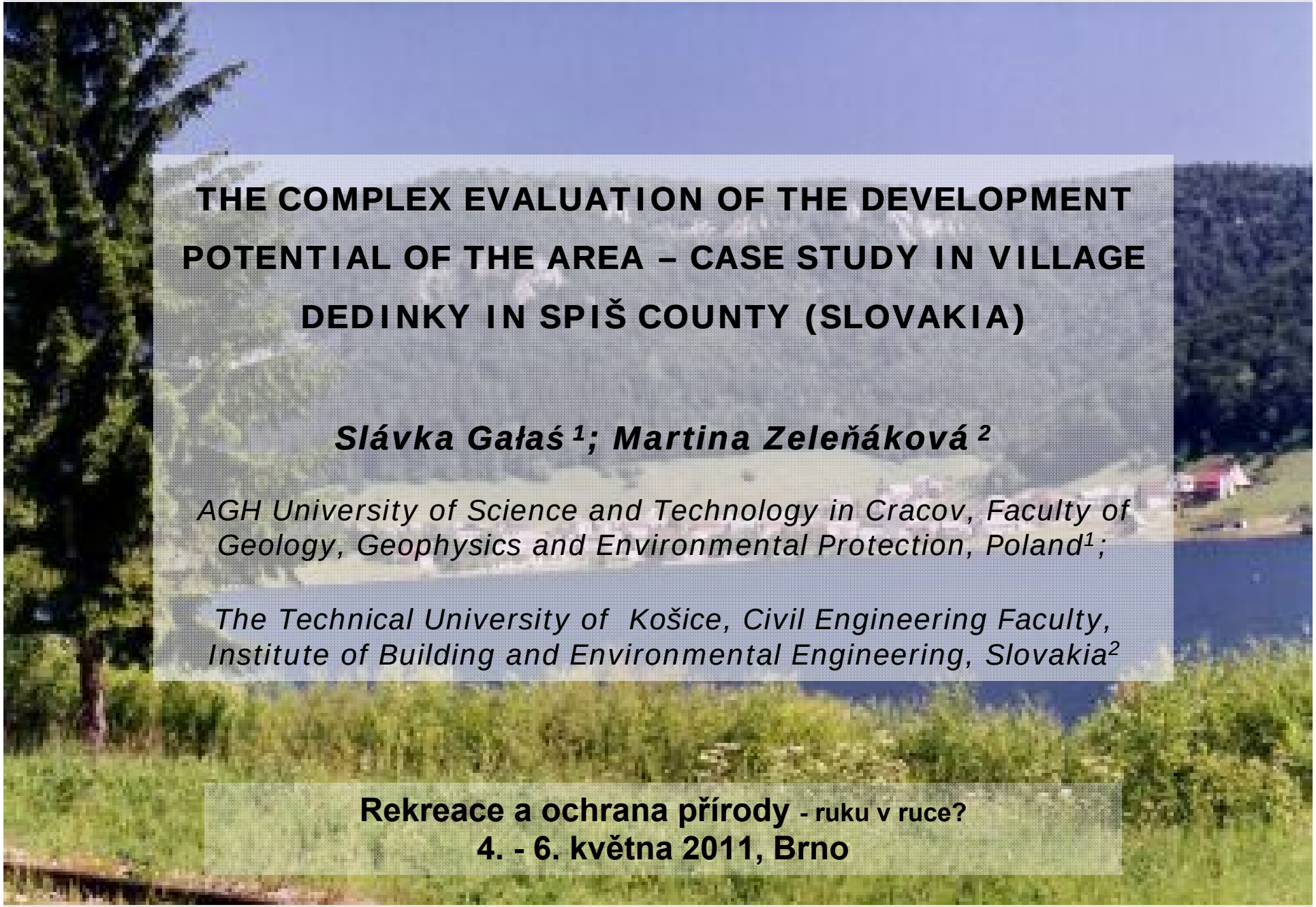

THE COMPLEX EVALUATION OF THE DEVELOPMENT POTENTIAL OF THE AREA – CASE STUDY IN VILLAGE DEDINKY IN SPIŠ COUNTY (SLOVAKIA)

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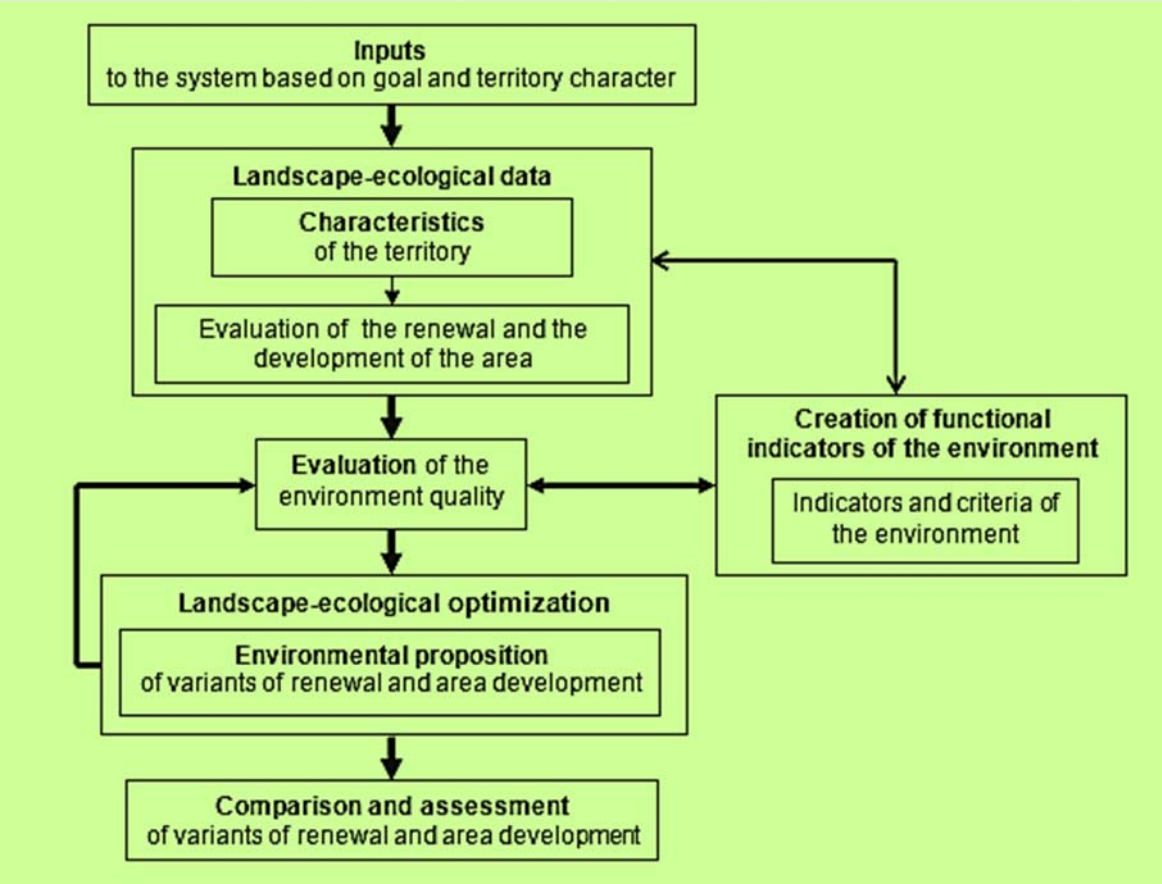
Rekreace a ochrana přírody - ruku v ruce?
4. - 6. května 2011, Brno

Methodology of the environment quality evaluation

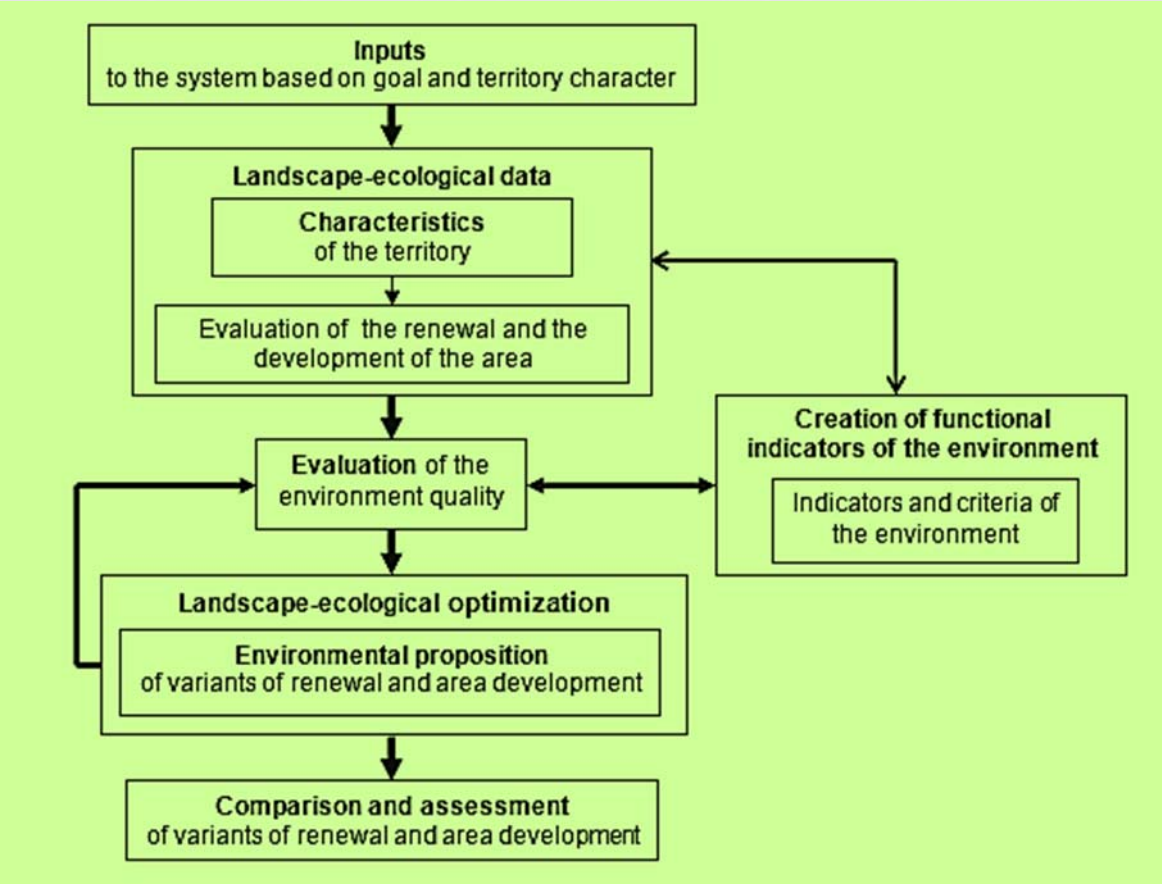


Procedure of the development potential of the environment

Table 1: Classification of indicators for the evaluation of the development potential of the area

Files	Indicators
I. Localisation predispositions	A. Abiotic components (1-4)
	B. Biotic components (5-6)
	C. Elements of current landscape structure (7-9)
	D. Character of the landscape (10-21)
	E. Stress appearances and sources (22-28)
II. Selective predispositions	F. Urban conditions (29-32)
	G. Demographic, socio – economic and other conditions (33-35)
III. Realisation predispositions	H. Communication potential (36-37)
	I. Material and technical potential (38-48)
	J. Investment and service requirements (49-55)

Methodology of the environment quality evaluation



Procedure of the development potential of the environment

Evaluation of the development potential of the area:

a) determination of qualitative multipliers

$U_j = f_j (P_j)$

P_j - *analytical indicator*

$U_j = \langle 0;1 \rangle$

b) determination of quantitative multipliers

w_j - the weights of indicators $\quad 0 \leq w_j < 1 \quad \sum_{j=1}^{55} w_j = 1$

c) determination of the total value of the environment quality

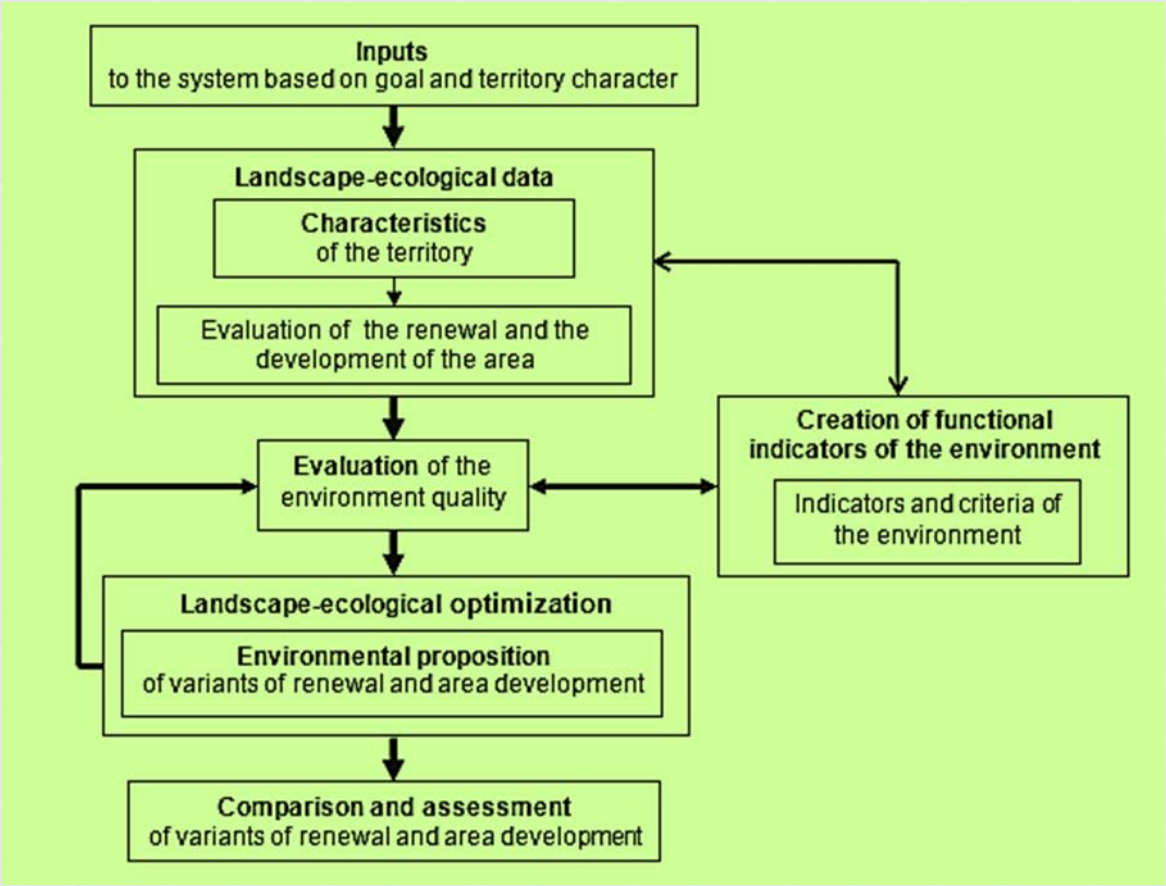
$$U_i = \sum_{j=1}^{55} U_{j(i)} \times w_j$$

U_j – *value of qualitative multiplier* P_j ,

w_j – *value of quantitative multiplier* P_j,

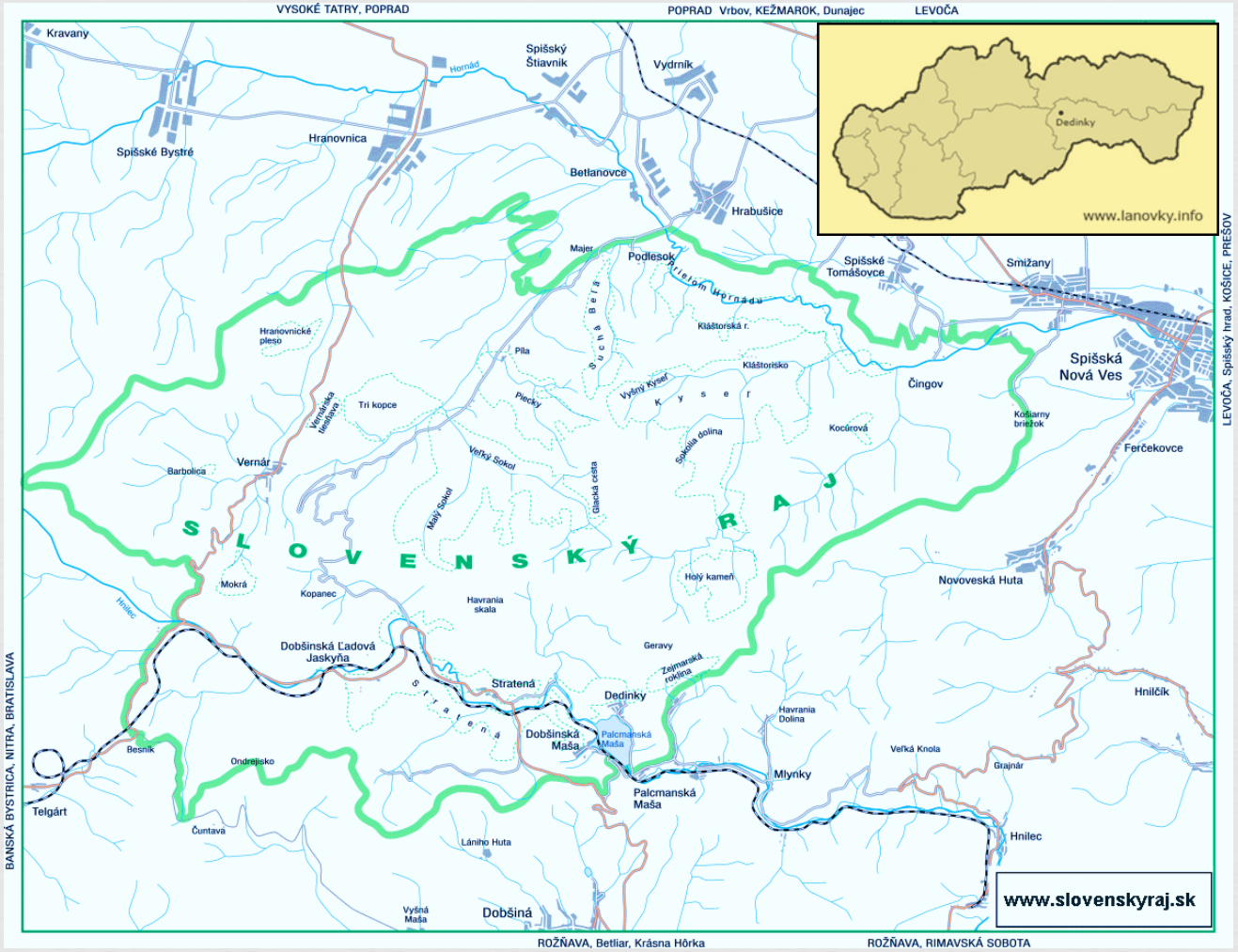
i – variants of solution (V_1, V_2, V_3).

METHODOLOGY OF THE ENVIRONMENT QUALITY EVALUATION



Procedure of the development potential of the environment

CHARACTERISTICS OF THE TERRITORY



Village Dedinky

- Rožňava district
- area - 364 ha
- 340 inhabitants

EVALUATION OF THE RENEWAL AND THE DEVELOPMENT OF THE AREA

Development potential of the village Dedinky

The analysis of current state of the environmental and atrophic conditions:

- environmental,
- demographical,
- economical,
- infrastructural,
- cultural and other ability.

EVALUATION OF THE RENEWAL AND THE DEVELOPMENT OF THE AREA

Territorial elements

Forests	137 ha
Meadows and pastures	78 ha
Agricultural land	15 ha
Orchards	7 ha
Water bodies	85 ha
Urbanized area	42 ha

Barrier of the territory development:

- topography and terrain exposure,
- protection zones in terms of Slovak legislation,
- compliance with the functional hierarchy and spatial layout,
- measures and limits in the field of nature conservation,
- spatial and architectural criteria.

ENVIRONMENTAL PROPOSITION
OF VARIANTS OF RENEWAL AND AREA DEVELOPMENT

Table 2 Suggested activities for each variations of the solution

Zero variation	Variation 1	Variation 2
- Keeping the current state of the model territory	Suggested activities : -building of basic infrastructure in the field of water management, -finishing of road and tourist infrastructure, -development of telecommunication infrastructure, -reconstruction in the division of housing (refurbishment of the folk buildings) and its use for accommodation and/or enterprise, -revival of traditional crafts, -creation of touring road and information system, -establishment of a system of separating waste and alternative energy sources, -security of restoration of the natural environment and the local system of the ecological stability.	Extension of the activities of Variation 1: -building of a sports facilities and a holiday resorts, -finishing of catering establishment and accommodation facilities, -revival of historical wooden bridge constructions and the remaints of the mining activities, -revitalizations of the river beds and small ponds, -removal of dumped waste material,

EVALUATION OF THE ENVIRONMENT QUALITY

TOTAL VALUE OF THE ENVIRONMENT QUALITY

$$U_i = \sum_{j=1}^{55} U_{j(i)} \times w_j$$

Dielčie ukazovatele	w_i	Variant 1			Variant 2		
		P	U_j	$U_j * w_j$	*P*	U_j	$U_j * w_j$
1. Reliéf a topografický charakter	0,01556	200	0,578	0,00899	200	0,578	0,00899
2. Vodný potenciál	0,03307	1,5	0,500	0,01654	1,5	0,500	0,01654
3. Pôdny potenciál	0,03240	2	0,750	0,02430	2	0,750	0,02430
4. Stav ovzdušia	0,03442	20	0,763	0,02626	20	0,763	0,02626
48. Turistický ruch	0,00608	0,25	0,678	0,00412	0,15	0,798	0,00485
49. Ekonomická efektívnosť	0,02093	2	0,370	0,00774	2,6	0,701	0,01467
50. Výkonnosť	0,01183	1,5	0,308	0,00364	2,6	0,784	0,00927
51. Náklady	0,01385	1,5	0,188	0,00260	2,6	0,701	0,00971
52. Výstavba	0,00439	1	0,950	0,00417	1	0,950	0,00417
53. Energetická náročnosť prevádzky	0,01385	1	0,670	0,00928	1	0,670	0,00928
54. Spoľahlivosť a bezpečnosť prevádzky	0,02331	2	0,670	0,01562	2,5	0,830	0,01934
55. Rozvojová adaptabilita v čase	0,00910	2,6	0,944	0,00859	2,6	0,944	0,00859
Ukazovateľ kvality prostredia				**0,47175**			**0,55116**

Territorial elements	k_v	A_i for V_0	A_i for V_1	A_i for V_2
Forests	0,7	137 ha	137 ha	130 ha
Meadows and pastures	0,65	78 ha	78 ha	72 ha
Agricultural land	0,2	15 ha	15 ha	15 ha
Orchards	0,43	7 ha	7 ha	7 ha
Water bodies	0,8	85 ha	85 ha	85 ha
Urbanized area	-0,6	42 ha	42 ha	55 ha
Stability index		0,54	0,54	0,49

ECOLOGICAL STABILITY OF LANDSCAPE

$$K_{SE} = \sum_{j=1}^{m} \frac{k_v . A_j}{p}$$

Jakościowy wskaźnik stabilności ekologicznej K_{SE} (Miklós 1986, Mederly et al., 2006, zmienione)

$$K_{SE} = \sum_{j=1}^{m} \frac{k_v . A_j}{p}$$

p_n - udział powierzchni poszczególnych elementów struktury przestrzenno-funkcjonalnej,

k_{pn} - współczynniki stabilności ekologicznej,

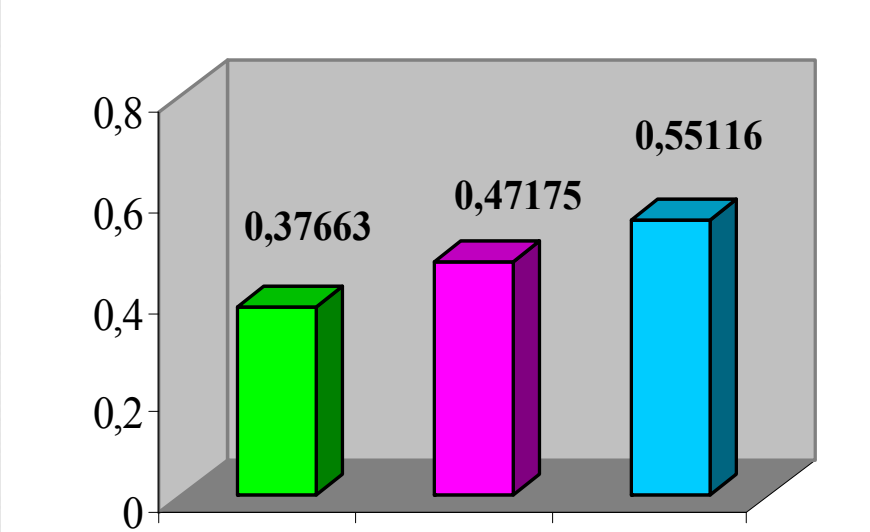
p - powierzchnia badanego obszaru.

Przykłady k_{pn}:
lasy 1,00
zabudowa 0,00
powierzchnie wodne 0,79

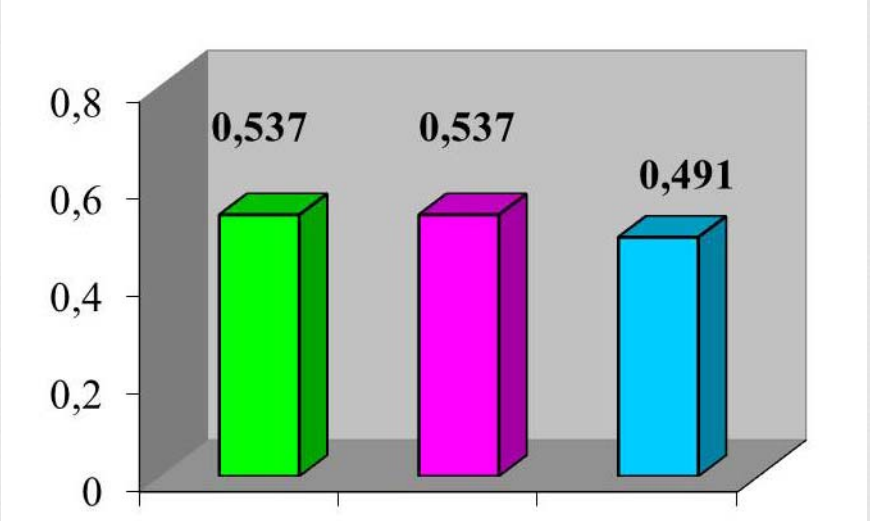
K_{SE2}	Klasyfikacja obszaru
$0{,}80 < K_{SE2} \leq 1{,}00$	obszar wyraźnie stabilny
$0{,}60 < K_{SE2} \leq 0{,}80$	obszar stabilny
$0{,}40 < K_{SE2} \leq 0{,}60$	obszar częściowo stabilny
$0{,}20 < K_{SE2} \leq 0{,}40$	obszar niestabilny
$K_{SE2} \leq 0{,}20$	obszar wyraźnie niestabilny

COMPARISON AND ASSESSMENT OF VARIANTS OF RENEWAL AND AREA DEVELOPMENT

Indicators of the environment quality for separate variants of the development



Indices of the environment stability for variants of model area development



Zero variant Variant 1 Variant 2

COMPARISON AND ASSESSMENT OF VARIANTS OF RENEWAL AND AREA DEVELOPMENT

Zero variant (U_0 = 0,38, IS_0 = 0,54)

- does not represent any basic changes or any interference to the environment,
- from an economic point of view, it takes into account the stagnation of tourism and development of the countryside,
- from an ecological point of view, it looks like the most suitable variation.

Variant 1 (U_1 = 0,48, IS_1 = 0,54)

- suggested activities are focused upon the increasing of region wide importance of particular holiday resorts and their year round use, building a new catering establishments and accommodation and increasing the standard of existing facilities,
- the variation is from environmental and economic point of view – optimal and actual.

Variant 2 (U_2 = 0,55, IS_2 = 0,49)

- from an ecological point of view, this represents an interference with the environment and changing of the countryside in a relatively short space of time,
- it is financially demanding,
- from the point of view of using the potential of the region, it is promising.

CONCLUSION

- *Total index of environment quality presents potential of the model territory for needs of its future development. There were assigned databases of main indicators modified for evaluation of the development potential of the area with the emphasis to technical and civil facilities.*

- *The optimal variant of the development and renewal of the residence must be able to reconcile the requirements of social development with the needs of conservation and natural resources in respect of maintaining the ecological stability of the area.*

- *The introduction of the subjective assessment to the decision model does not distort the essence of the objective methods and based on information and input according to predetermined, formalized procedures contributes to the solution.*

- *The aim is to improve decision making in the environment management using multi-criteria analysis and alternative solutions in terms of the sustainable development of the territory.*

Thanks for your attention!
Ďakujeme za pozornosť!
Dziękujemy za uwagę!
Děkujeme za pozornost!
☺