

ZONING OF THE TERRITORY OF THE CZECH REPUBLIC FOR THE PURPOSES OF DUMPING THE AGRICULTURE

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Zoning of agricultural land in the Czech Republic seeks for the answer to the question how to determine regions which are the most suitable for the purposes of conversion of agriculture by the setting aside of land from intensive agricultural production in view of social interests. To specify these zones, zoning uses of principles of multiattribute utility methods with whole-area evaluation and digitization of attributes of the following criteria in square net 10 x 10 km: production potential of soils, degree of preservation of the territory, air quality, erosion exposure of soils. The so-called regional zoning coefficient (KRZ) which gives the relative suitability of the territory (unit areas) for intensive or extensive farming was computed for final evaluation of area of the Czech Republic.

intensive agriculture; extensification; setting aside of agricultural land from intensive production; production potential of area; degree of protection of territory; environmental exposure and sensitivity; regional zoning coefficient; alternative practices of agricultural utilization

Problems with overproduction of foodstuffs and the necessity of dumping (conversion) of agriculture has become one of the most sensitive issues of the Czech agrarian policy since 1990 when our country started on the process towards the transformation of the economy. Nowadays „a surplus“ of agricultural land corresponding to this overproduction is estimated from 10 to 20% of its total area.

On the other hand, a paradox situation occurs, when despite the above facts, foods are continuously produced in the regions totally unsuitable for this purpose, either due to enormous immission loading on the region (particularly in northern Bohemia) where is a danger of food contamination with foreign substances, or due to exploitation of the regions of higher ecological value or zone of surface and ground-water resources, and so on.

The aim of zoning of agricultural land in view of its suitability for intensive utilization (hereinafter „zoning“) is to answer two key questions:

- 1) How to detect regions in the Czech Republic which are the most appropriate in view of social interest to be set aside from intensive agriculture and which factors will play a decisive role in this selection?
- 2) How to use lands set aside from intensive agriculture?

Zoning is based on a social need to provide a necessary amount of quality (health and whole) foods at thorough conservation of natural resources and with understandable effort and maximal economic efficiency.

Fast, though state-controlled procedure in dumping of the Czech agriculture, is needed for several reasons:

- surplus production of foods brings on social and economic shocks
- present condition of nature is alarming, while a part of set aside land may be used for purposes of increase in ecological stability of landscape
- the most part of agricultural land is still state-owned, what allows an easier setting aside.

The possibilities of setting aside of superfluous agricultural land from intensive agricultural production gives the possibility to use this land for ecological stabilization of the landscape. Just in this time when in the Czech Republic restitutions and privatization of agricultural land take place and historic reorganization of agricultural land fund within landscaping associated with it, the unique possibility to renovate original and establishment of new habitats in agricultural landscape arises.

MATERIAL AND METHODS

In the proper choice of regions suitable for setting aside the matter of economic efficiency of agriculture in dependence on environmental specificities and limits of these regions. In congruency with foreign sources (B u c k l e y , 1989) these criteria may be divided into the following three basic groups:

- 1) production potential of area
- 2) degree of preservation of area
- 3) environmental sensitivity and exposure

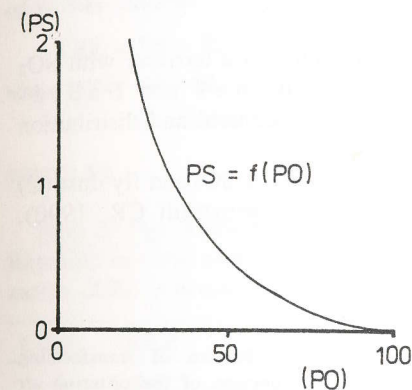
The principles of Multiattribute Utility Theory (Ř í h a , 1987) were used for estimation of these criteria. These principles allow the common appraisal of qualitative and quantitative attributes of used criteria through the transforming functions.

All the below data were evaluated by weighted means for the whole area of the Czech Republic in square net of 10 x 10 km size. Digitization of criteria allowed finally assessment of zoning through the regional zoning coefficient (RZC, Czech abbrev. KRZ) and further applications of this method.

CRITERIA USED FOR ZONING

Production potential of area (PS)

To express natural production coefficient of the given unit area (square of 10 x 10 km), the production evaluation of soil ecological units (Research Institute for Agricultural Economic, 1990) was used. The value of production evaluation (PO) is a percentage from the base (100 points) which was determined for the best land in the Czech Republic. The transforming function suggested is in Fig. 1.



1. Pattern of transforming function of the criterion production potential of the territory

Degree of preservation of area (SO)

Qualitative criterion expresses the value of social interest in protection of the given area in view of the protection of nature, water resources, etc. The degree of protection of an area (SO) is derived from categorization of preserve area in accordance with the Czech legal regulations.

Evaluation:

Category of Preservation (verbal evaluation)	SO
– are without special preservation (production regions)	0
– zone III and IV of protected landscape areas, territory of protected areas of natural accumulation of water, national parks	0.5
– zone III of national parks, zone II of protected landscape areas, significant features of the landscape, zones of hygienic preservation of water resources degree 2 - external and degree 3	1.0

- zone II of national parks, zones of hygienic preservation of water resources degree 2 - internal 1.5
- zone I of national parks and protected landscape areas, small-size protected lands, zones of preservation of water resources of degree 1 ... 2.0

Environmental sensitivity and exposure (ESE)

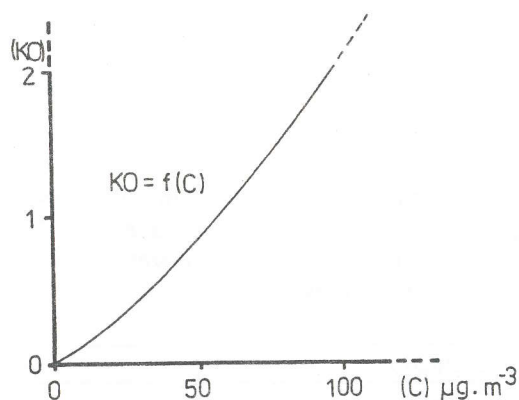
ESE is divided into two partial criteria:

- air quality (KO)
- erosion exposure of territory (ER)

Air quality (KO)

Air quality expresses the degree of contamination of a territory with SO₂ immissions, or with fly dust, and as reported by Beneš and Fabiánová (1987) to a large extent they represent the content and distribution of foreign substances in soil.

Annual arithmetic means of weight concentrations of SO₂ and fly dust (C) were digitized from available resources (Životní prostředí ČR, 1990). Transforming function is in Fig. 2.



2. Pattern of transforming function of the criterion air quality

Erosion exposure of territory (ER)

The degree of erosion exposure of the given territory was found from maps

of occurrence of water and eolian erosion in Czechoslovakia (Holý, 1978). The territories are assessed here in the following way:

Degree of erosion exposure	ER
- more than 25% of territory affected by water erosion	0
- 25-50 % of territory affected by water erosion	0.2
- territory exposed to water erosion	0.2
- 50-75% of territory affected by water erosion	0.5
- more than 75% of territory affected by water erosion	1.0

Resulting coefficient of the regional zoning (KRZ) is calculated as a sum of partial criteria:

$$KRZ = PS + SO + ESE$$

where: ESE = KO + ER

RESULTS

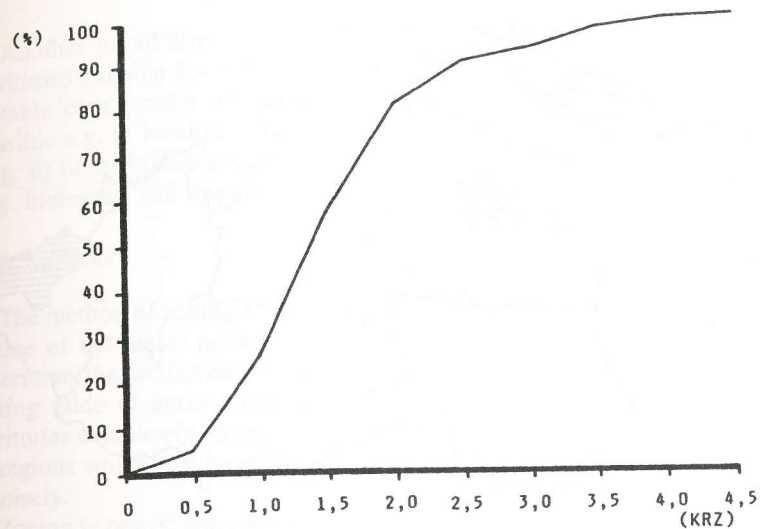
Map in Fig. 3 shows the resulting zoning of the territory of the Czech Republic in view of the suitability of agricultural land for its intensive utilization. KRZ is divided into classes of suitability for intensive agriculture:

Class	KRZ	Verbal evaluation
I	0.0-0.5	Regions much suitable for intensive agriculture
II	0.5-1.0	
III	1.0-1.5	Regions suitable for intensive agriculture
IV	1.5-2.0	
V	2.0-2.5	Regions unsuitable for intensive agriculture
VI	2.5-3.0	
VII	3.0-3.5	Regions fully unsuitable for intensive agriculture
VIII	3.5-4.0	
IX	over 4.0	Regions extremely unsuitable for intensive agriculture

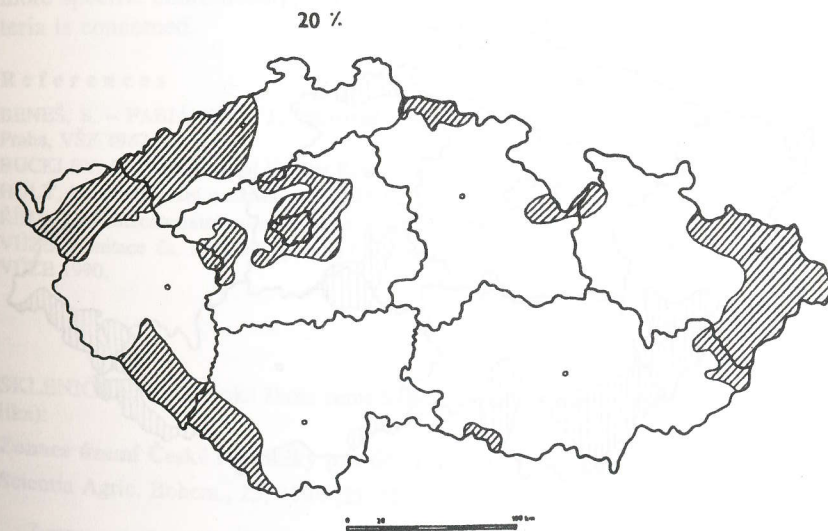
Areal representation of individual classes of suitability (in %) may be expressed by summary curve (Fig. 4). Graph in Fig. 4 allows, among other things, such an application of the zoning method which may find the coefficient KRZ for the given percentage of agricultural land the least suitable for intensive use - Fig. 5 shows this possibility for 20% of agricultural land.



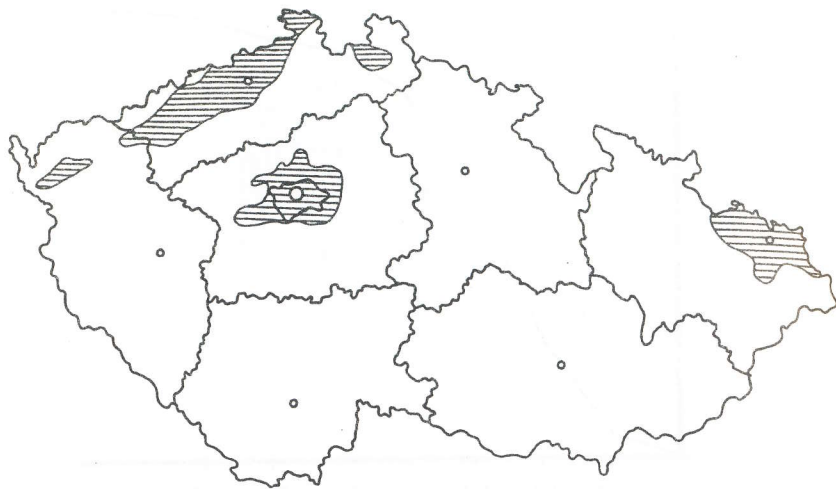
3. Zoning of the territory of the Czech Republic according to the suitability of agricultural land for intensive agricultural production; values of the regional zoning coefficient: 0 – regions the most suitable for intensive agricultural utilization; 4.5 – regions the least suitable for intensive agricultural utilization



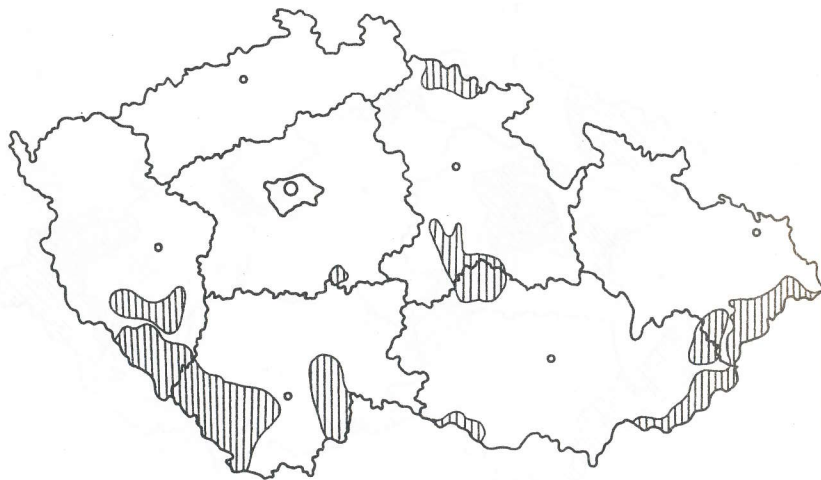
4. Summary line of percentage area of the territory with certain degree of suitability for intensive agricultural utilization



5. Delimitation of 20% of area of the territory the least suitable for intensive agricultural utilization



6. Delimitation of the regions recommended for cultivation of technical crops



7. Delimitation of the regions recommended for ecological agriculture

Another possibility of application of this method is localization of the territories suitable for some alternative ways of agricultural utilization. By suitable combination of individual criteria and defining their limits, it is possible e.g. to localize territories suitable for cultivation of technical crops (Fig. 6) or territories suitable for various forms of nature-closed agriculture (e.g. biological and dynamic, organic – Fig. 7).

DISCUSSION

The method of setting aside of agricultural land from intensive production is one of the major methods of dumping of agriculture. Zoning allows to determine the territories or regions which should be in the focal point in setting aside of agricultural land. It does not lay claims to identify these territories completely unambiguously, but only to do approximate localization of regions which will be studied in this sense and results will be stated more precisely.

Zoning is one of ways how to find quantitative criterion (KRZ) for subsequent economic expression of social preference of certain territories in the process of dumping of agriculture (tax relief, subsidies, grants, etc.).

Simultaneously with it, it can be added that accomplished zoning may be more specific continuously, particularly as far as updating of individual criteria is concerned.

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Pro vymezení těchto oblastí využívá zonace principy multikriteriálních metod s celoplošným vyhodnocením a digitalizací atributů těchto kritérií ve čtvercové síti 10 x 10 km: produkční potenciál půd, stupeň ochrany území, kvalita ovzduší, erozní ohrožení půd.

Pro výsledné vyhodnocení území ČR byl zvolen tzv. koeficient regionální zonace (KRZ), který udává relativní vhodnost území (jednotkové plochy) pro intenzivní, resp. extenzivní obhospodařování.

intenzivní zemědělství; extenzifikace; vynětí zemědělské půdy z intenzivní produkce; produkční potenciál území; stupeň ochrany regionální zonace; alternativní způsoby zemědělského využití

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