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PAST, PRESENT AND FUTURE PROSPECTS FOR PRE-1989 AGRICULTURAL PREMISES: THE VYSOČINA REGION

Minulost, současnost a budoucnost pro zemědělské areály vybudované před rokem 1989: Kraj Vysočina

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Annotation
The large pre-1989 agricultural premises that were built in the communist period are still with us and considerably shape the face of our villages to the present times. Its new uses are particularly problematic, but some changes took place during the last three decades. That is why we tried to compare former uses with uses to the year of the EU accession, up to date uses and planned uses according to territorial zoning plans. Selected municipalities of the Vysočina Region were chosen as case study. 375 pre-1989 agricultural premises with an area of 709.8 hectares were identified. Spatial expansion of 36.2 ha by biogas stations or composting plants to 2019 was found. Agricultural use has lost 116.2 hectares by the year 2019, i.e.,16.4% of the original area - 49.6% of which are agricultural brownfields. Based on the analyses of territorial zoning plans, it was found that they are prepared "rigidly" and that no significant changes are planned in the future. No plan has been made to return agriculture to areas that lost agricultural use in the previous years. Also, agricultural brownfields will not be widely intended for farming activities.

Key words
brownfields, agriculture, land-use change, reuse of brownfields

Anotace
Velké komunistické zemědělské areály vystavěné před rokem 1989 spoluutváří náš venkov do současnosti. Jejich současné využití je ekonomicky problematické, ale změny v jejich využití se dějí. Naším cílem je posouzení těchto změn k roku 2004, 2019 a plánovaného budoucího využití na příkladu vybraných obcí kraje Vysočina. Na nich bylo identifikováno 375 zemědělských areálů na rozloze 709,8 hektarů. K jejich rozšíření došlo do roku 2019 na 36,2 ha o bioplynové stanice a kompostárny. Ke stejnému roku ztratilo zemědělské využití 116,2 hektarů, což je 16,4% původní rozlohy – 49,6% z toho jsou zemědělské brownfieldy. Budoucí využití podle územních plánů se v drtivé většině případů drží současného využití těchto areálů a není plánováno zemědělské využití pro areály, které toto využití v průběhu času ztratily. Taktéž se do budoucna nepočítá se zemědělským využitím areálů, které jsou dnes nevyužity a/nebo chátrají.

Klíčová slova
brownfield, zemědělství, změny využití území, opětovné využití brownfieldů

JEL classification: R58, Q13, P31

1. Introduction

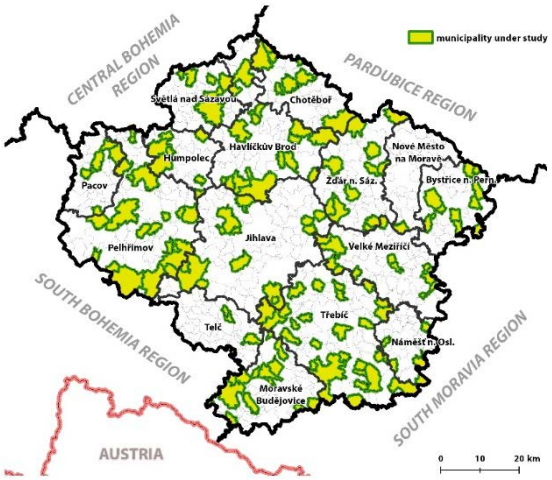
The collectivization of agriculture during the Communist era made it possible to build up large agricultural premises that served as a collective farm, including cowsheds, piggeries, operational buildings or offices (Skala et al., 2013). The communist propaganda widely used the collective farms as a showcase of the economic success of the regime (Pavlicova, 2011). These agricultural premises significantly changed the face of Czech villages and created new centres in the countryside of that time (Lindbloom, 2012). The Iron Curtain fell thirty years ago. The factors influencing the entrepreneurship in the contemporary agriculture have nothing in common with those during the communist period (Veznik and Konecny, 2011) as the agricultural production system has completely changed (Hrabak and Konecny, 2018, Veznik et al., 2013). Yet, the large pre-1989 built agricultural premises stay with us and considerably shape the face of our villages to the present times (Navratil et al., 2019, Klusacek et al., 2013). New usage of these large agricultural premises is particularly problematic. This fact is the reason why many of these sites are abandoned or underused as agricultural brownfields (Svobodova and Veznik, 2009, Klusacek et al., 2013, Krejci et al., 2016). We might state that agricultural brownfields represent an important topic in the contemporary rural development studies that are staying under-researched so far. For a detailed review of the literature, please see (Navratil et al., 2019, Svobodova and Veznik, 2009).

This conference paper aims to assess the links between the past, present and future use of the large agricultural premises. These sites have been analysed on the example of the Vysočina Region.

2. Data and methods

To complete our work with the above-stated aim, the data regarding the past, present and potential future use for pre-1989 agricultural premises needed to gather first. As it is impossible to collect all necessary information for all the pre-1989 agricultural premises (Navratil et al., 2019), we decided to gather data for the selected municipalities throughout the Vysočina Region. We selected the municipalities with freely available of the electronic versions of territorial zoning plans. These data enabled us to analyse the pre-1989 agricultural premises for which we had the information regarding their potential future use. Altogether, we identified 375 premises located on circa one-fifth of the area of the Vysočina Region (Fig. 1).

Fig. 1: The location of municipalities under study within the borders of LAU 1 (NUTS 4) regions.



Source: http://geoportal.kr-vysocina.cz/arcgis/services/UPD/upd/MapServer/WMSServer*?; own elaboration*

2.1 Pre-1989 data on the usage of agricultural premises

The preparation of the pre-1989 uses of agricultural premises followed the methodology of Navrátil et al. (Navratil et al., 2019). Primarily, the topographic maps of Czechoslovakia with a scale of 1:25,000 from the late 1980s and

the first mid-1990s were used. The sites considered to be the pre-1989 agricultural premises were labelled in these maps as (Krejci et al., 2019):

- agricultural properties,
- cowsheds,
- pig farms,
- sheepfolds,
- poultry farms,
- horticultural fields,
- stud farms.

Black and white prints of the aerial images from the early 1990s were used to delimit the borders of these properties. For accuracy of the spatial data used, the analyses of utilisation and changes in utilisation were conducted with an accuracy of 10 × 10 metres square.

2.2 Data on the current use of agricultural premises

The data on the current use of agricultural premises were gathered for the year 2004 (the year when the Czech Republic accessed the European Union) and for the year 2019 (the most up-to-date data). To do this, we have also followed the methodology of Navrátil et al. (2019). The land-use data for both years were gathered from freely available aerial images – two WMS services of The Czech Office for Surveying, Mapping and Cadastre were used: WMS – Orthophoto, WMS – Archival photo. The photos for the year 2004 were taken between the years 2003 and 2005; the photos for the year 2019 were made between the years 2016 and 2018. Six categories were used:

- agricultural utilization,
- non-agricultural utilization (utilization for entrepreneurship but not agricultural, including photovoltaic power plants),
- housing,
- cultivated land (land ploughed, used for grazing or regularly mowed),
- agricultural brownfields.

As the spatial extent of the pre-1989 agricultural premises has increased in some cases since then, we were able to measure these enlargements of the pre-1989 agricultural premises, too.

2.3 Data on the future use of agricultural premises

The future use of land in communities is defined and limited by the regulations within the local development planning. The primary legal conception for the spatial development of communities is the territorial zoning plan (Act no. 183/2006, § 3, paragraph1). Based on this plan, the future use of individual sites can be assessed as well as the use of different plots of land. The limits for the use of the given land are specified here, and particular uses that are allowed (or not allowed) are stated.

The data from the territorial zoning plans in the Vysočina Region are available in a digital format only (and only if these were prepared in accordance with the so-called MINIS methodology). The MINIS methodology aims to ensure that the way how individual zoning plans are elaborated is unified and thus, their usage is easier (Polacek et al., 2018). One of the main advantages of this methodology is a unified legend and a guaranteed homogeneity of interpretations. This way, the comparability of zoning plans among individual regions and areas is ensured even if various companies have created them. One of the disadvantages of this methodology is the fact that such developed territorial zoning plans do not cover the whole area of the region. Thus it is necessary to work with just a selection of communities that may not always be random. The categories that were distinguished are as follows:

- agricultural utilization (according to the MINIS methodology, this is the VZ category – production and storages – agricultural production),
- mixed production (according to the MINIS methodology, this is the VS category - sites of combined production utilization that might include not only sites of the production and storages, but also sites of transport and technical infrastructure, extraction of resources and specific sites),
- light industry (according to the MINIS methodology, this is the VL category – production and storages – light industry),
- crafts (according to the MINIS methodology, this is the VD category – production and storages – small and craft production),
- public spaces (according to the MINIS methodology, this covers O categories – sites of civic facilities),
- housing (according to the MINIS methodology, this is the SV category – sites of mixed housing – rural, and all sites occurring in the B category – sites of housing,

- the greenery (according to the MINIS methodology, this covers all Z categories – sites of greenery, then the NL category – sites of forests, the NP category – natural sites and the W category – water sites and water management sites,
- agricultural land (according to the MINIS methodology, this is the NZ category – agricultural sites).

WMS service labelled as "ÚPD (according to the MINIS methodology)" of the Regional Authority of the Vysočina Region was used – http://geoportal.kr-vysocina.cz/arcgis/services/UPD/upd/MapServer/WMSServer?SERVICE=WMS& REQUEST=GetCapabilities. This database covers circa one-fifth of this region.

2.4 Data processing

Association plots with chi-square test were employed to test and visualize the gradual changes of the usage of agricultural brownfields between the periods studied (2004 vs. 1989, 2019 vs. 2004, and future use vs. 2019). All calculations were undertaken in the R software with "vcd" package – "assoc" function with diversified sets of parameters.

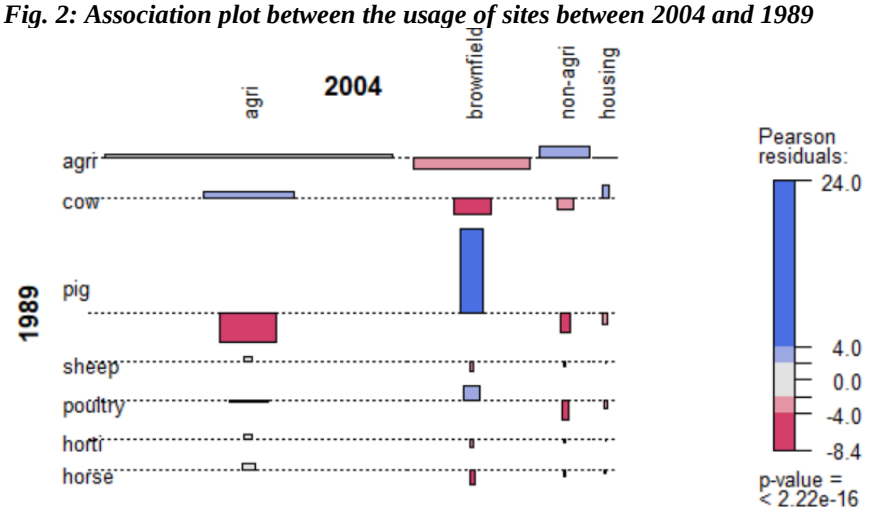
3. Results and Discussion

A total of 375 agricultural premises operating before the year 1989 were identified on the territory of municipalities with developed territorial zoning plan by MINIS methodology. These areas occupied an area of 709.8 hectares. Until 2004, none of these sites had been extensively expanded. Between the years 2018 and 2004, there was a relatively large expansion of 36.2 ha (an increase of 5.1% compared to the year 1989). This area includes only extensions intended for agricultural use and not extensions of areas that have lost agricultural use until the year 2019. After the year 2004, biogas stations or composting plants supported by subventions occupy two-thirds of the extended area (Van der Horst et al., 2018). This trend is, therefore, similar to that observed with the selected types of rural areas in South Bohemia (Navratil et al., 2019).

By contrast, agricultural use has lost 116.2 hectares by the year 2019, i.e. 16.4% of the original area - 49.6% of which are agricultural brownfields. These figures are quite fundamentally different from those obtained in South Bohemia, only for which a comparison is available (Navratil et al., 2019). In the Vysočina Region, the share of non-agricultural use is significantly lower than in all four surveyed regions of South Bohemia. The share of total non-agricultural use ranged from circa 40% in České Budějovice to circa 25% in Dačice region. The percentage of agricultural brownfields in the whole area of pre-1989 agricultural premises is also considerably lower and is only comparable with the situation in Blatná region. The monitored municipalities of the Vysočina Region are analogous to the purely agricultural regions of South Bohemia. The high share of agricultural activities in the former agricultural cooperative farms (JZD) and state farms corresponds to the peripheral undeveloped countryside of Dačice region and low numbers of agricultural brownfields in the developed agriculture area of Blatná region. It is very interesting to look at the development between the years 1989 and 2004 (Fig. 2). The position of pig farms and poultry farms is exceptional as their agricultural use was significantly lower than in other cases of farms. These are principally the facilities where agricultural brownfield is most likely to be developed. The origin of non-agricultural business activities here is also remarkable. These are primarily bound to the sites that were designated as agricultural, i.e. they are larger with originally combined agricultural use. The buildings intended for housing use in the year 2004 had the cowsheds as their original use. There was thus a strong link between the original designation of the site and its reuse in the year 2004 – chi-square = 840.89, df = 18, p-value < 2.2e-16.

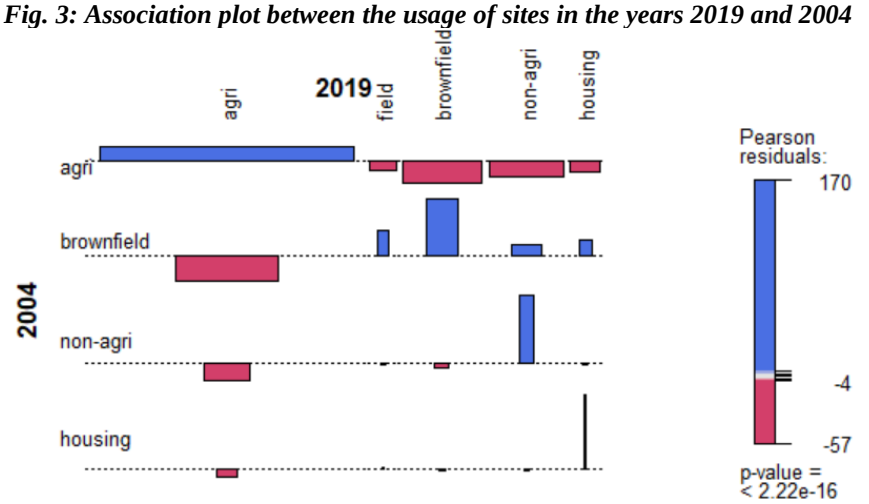
As expected, the major changes that occurred between the years 2004 and 1989 were reflected in the changes in the usage between the years 2019 and 2004 (see Fig. 3), too. The use of non-agricultural sites and housing for other types of use was not statistically probable. The same is also true for agricultural use in the year 2004. In contrast to these findings, a change in the use of agricultural brownfields appears to be highly dynamic and also diversified. It is most likely to remain unused - most agricultural brownfields in the Vysočina Region are long-term. A change to re-agricultural use was unlikely. On the other hand, some of the brownfields from 2004 were repaired and used for housing or commercial non-agricultural activities until the year 2019. Besides, demolition and the creation of open green space for use as agricultural land was obvious. This structure of changes is highly statistically significant - chi-square = 83400, df = 12, p-value <2.2e-16. Compared to the South Bohemian rural regions, this change is analogous to the changes in Dačice Region. With the fact that there are significantly less numerous agricultural brownfields in the higher elevated areas, yet most of them are long-term with all negative impacts (Klusacek et al., 2013, Kunc et al., 2018).

Fig. 2: Association plot between the usage of sites between 2004 and 1989



Source: Authors´ data

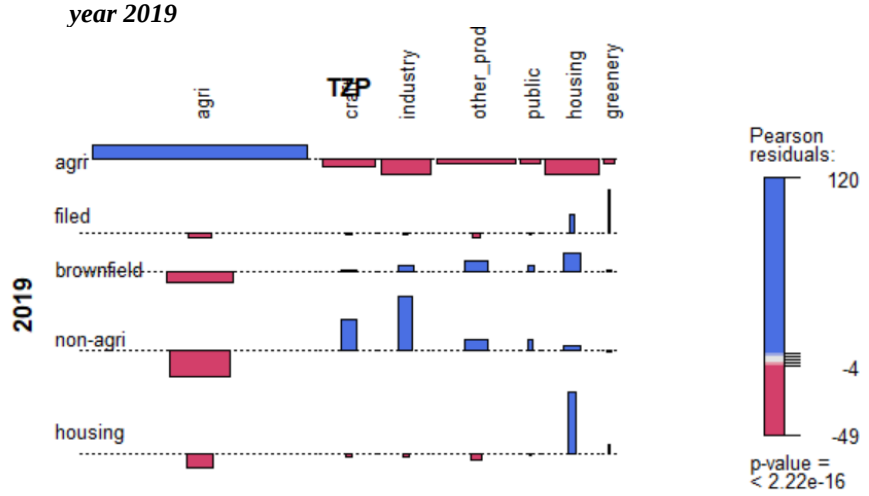
Fig. 3: Association plot between the usage of sites in the years 2019 and 2004



Source: Authors´ data

The intended future use of the sites according to the territorial zoning plans corresponds in most cases to their already existing use (Fig. 4). Interesting is (from the agricultural development point of view) that for the future, the agricultural production is planned only for properties with present agricultural production. This finding applies especially to agricultural brownfields - any other use than agricultural production is more likely. Planned brownfield reuse is, in many cases, housing, with individual business activities, then the use of what we identify as mixed production areas. The areas that are currently used for non-agricultural business use are intended primarily for light industry and craft production. Parts of the sites, which were brownfields as of the year 2004 and were used as agricultural land in the year 2019, are excluded from agricultural land for the construction of new housing.

Fig. 4: Association plot between the usage of sites according to territorial zoning plans and the usage in the year 2019



Source: Authors´data

4. Conclusion and future research

The presented paper brings new knowledge about the utilization of agricultural areas of former agricultural cooperatives and state farms on the example of municipalities of the Vysočina Region. We have found out that the decline of these areas is significantly lower than that identified for the South Bohemian region. The area of abandoned or unused agricultural areas is relatively small here, but in most cases, these are areas that have been left in the long term, which makes their further use difficult. Based on the analyses of territorial zoning plans, we can conclude that they are prepared "rigidly" and that no significant changes are planned in the future. No stated intentions exist to return agriculture to areas that lost agricultural use in the previous years. Also, agricultural brownfields will not be widely intended for agricultural activities.

The most significant result of the analysis of the data presented here is the identification of the apparent spatial differences in individual parts of the Czech Republic (compared to the previously analysed data in the selected areas of South Bohemia). These differences will require more profound analysis of spatial data on changes in utilization of pre-1989 built agricultural premises with socio-economic and agricultural data to identify correlating variables with types of change in utilization. Another study topic that did not fit into the limited space of this conference paper is the assessment of higher-level changes. To conclude, this is only a comparison of the development of pre-1989 agricultural premises between individual studied periods. Still, analysis of the whole trajectory of the development between 1989 and future uses is needed, too. From the mentioned examples, it is evident that there are not only different uses at the level of the whole sample of agricultural sites but also various trajectories of these changes.

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