LOSS OF AGROFORESTRY: SYMBOLIC ANNIHILATION OF MIXED CULTURES IN 19TH CENTURY AGRICULTURAL SCIENCE

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Abstract: There is a lot of promise seen in agroforestry—the deliberate keeping of trees on farmland in various forms and contexts. The Czechia, like many other European countries, experiences farmland soil degradation and erosion, climate and water regime changes, and biodiversity loss. Industrial agriculture with high inputs brings not only high yields but also numerous negative externalities. Mixed cultures on Czech lands were common just 150 years ago. However, they were left out of the new cadastral classification in the 19th century and, as this article shows, did not appear in modern agricultural (and forestry) scientific theory—represented by contemporary scholar book selection in this article. The symbolic annihilation of agroforestry cultures in the official agrarian discourse of the 19th century probably contributed to their disappearance from both land-use theory and practice.

Key words: industrial agriculture, local knowledge, symbolic annihilation, knowledge loss, agroforestry

1. Agricultural diversity loss

In the 19th century, manifold local European agricultures were systematically replaced with a scientific industrial complex. Premodern European agriculture was based on knowledge about the local environment and how to best adapt the commonly used set of techniques, crops, and time schedules. Tradition-based agricultural knowledge was characterized by slow changes (Malanima 2009) and intergenerational and spatial sharing and transfer of know-how and know-why together with crop varieties and technologies. The time schedule of agricultural work was further strengthened by systems of occult or religious rituals. This was key not only to the long-term welfare of the households but also to their survival (Mitterauer 1995). Until a professional schooling system was established, knowledge transfer remained local—family-, village- or regionally based—and took oral, performative, or written form.

Numerous formerly common land-use practices were forgotten in the Czech lands and across Europe during modernization. These practices were not considered valuable enough to be kept; on the contrary, the slow rate of adoption of new techniques by farmers led to a smear campaign against many local agricultural traditions. The observed historical changes can be interpreted as a purification of agriculture knowledge and a provincialization of the scientific capitalistic model.

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Similar biodiversity and cultural knowledge losses connected with the modernization of agriculture are currently happening in developing countries and could be symptomatic of what we now call capitalizing or plantationocene.

However, for several decades now, the values of Western conservation and agricultural policy have changed. Historical land-use practices, landraces, and resulting preindustrial cultural landscapes are considered rare and worth saving or restoring, for cultural reasons and also forecological and economic motives. This paradigmatic change has resulted in an incentive to protect farmland biodiversity (Dicks et al. 2014) on the one hand and to use traditional practices and participative approaches in protected areas on the other (Berkes 1999, Campbell and Vainio-Mattila 2003). The biocultural approach to sustainable food security is profitable in the emerging markets with heritage, health, and free time and can be seen in IUCN, CBD, UNEP and UNESCO policies (Agnoletti and Emanuelli 2016, ICSU and UNESCO 2002, Warren 1991).

2. European and Czech agricultural modernization

The old way of doing agriculture in Europe began a profound change at the end of the 18th century. A modern agricultural knowledge system (with its specific complex of approaches, beliefs, techniques, practices, instruments and also ecologies, species, and relationships in general) was defined and began to be applied. It was based on interpretations of nature from modern scientific and economic theory. The 19th century modernization of agriculture can be characterized by different capital investments into the land (use of machinery and chemical compounds to improve the fecundity of soils instead of human, animal, and natural regeneration agents), optimization, and rationalization of land use (seen in enclosures and other spatial rearrangements of plots, investments preferably into the plots with greater potential revenue due to natural fecundity or proximity of markets), intensification or abandonment of management, change in animal husbandry (year-round stabling, change of fodder) or change in animal and crop varieties to those compatible with the new ways of management (e.g., Krausmann 2004). Agricultural changes were connected to demographic (moving from countryside to cities), technological (electricity, availability of technologies) and energetic (use of fossil fuels) transformations (e.g., Tello, Garrabou and Cusso 2006).

In the Czech lands, up until the second half of the 19th century, around 80% of people lived in the countryside in villages with less than 2,000 heads; 90% of this group worked directly in agriculture (Velková 2007) despite the increase in urban population (Horská, Maur, Musil 1996). The agriculture practiced was of the pre-industrial kind, even though some of the innovations marking the industrialization of agriculture had already been adopted here in the first half of the 19th century (Jeleček 1985). Farmers, who were bound mainly to state-, aristocracy- or clergy-owned land until the emperor ended serfdom in 1848 (ibid.), used an adapted set of techniques, schedules, breeds, and cultivars mirroring both the local ecological ecosystems and place traditions. The land was owned by a suzerain and managed by him as estates (size over 50 ha, 0.52% of farms, 43% of agricultural land at the end of the 19th century); rented by farmers (size 20–50 ha, 4% of farms, 20% of agricultural land; ibid); and smaller farmers (5–10 ha, 14% of farms, 26.2% agricultural lands; ibid.). The rest of the population would have done something else while usually keeping very small-scale agriculture or worked as seasonal agrarian workers or more permanent farm helpers (ibid.).

Three-course crop rotation with soil regeneration through fallow periods prevailed with instruments such as the shallow plough, hooks, and sickles and techniques such as liming or ashing. Local varieties of wheat and rye were sown in autumn and barley and oats in spring. Pulses such as lentils, peas, and beans were common, though intended mostly for local household consumption. Potatoes taken in favour after Napoleonic wars famine, were usually planted on the remaining agricultural land, and linen and hemp were common in higher elevations. The animals were kept for work, manure, milk, eggs, leather, and other needed materials. Until the 19th century, the greatest number of livestock kept were sheep and cattle and the most common were pigs, goats, and poultry, which were usually consumed at home or sold at local markets. Grazing animals were usually pastured outside for a considerable part of the year. Horses, oxen or humans did the work needed (Beranová and Kubačák 2010: 109).

In the first half of the 19th century, new plants such as corn and potatoes were imported and introduced, as were some fodder plants and the general exchange of crops, landraces, and their combinations (Vondra 2013). Due to this, the previously extensively cultivated rye and oats diminished in favour of wheat. The oil seed rape was introduced in the 1830s, and new hops and fruit tree varieties in the 1840s (Beranová and Kubačák 2010: 111). While, in places, fodder plants had been used since the 14th century, artificial fertilizer was first documented in the Czech lands in the 1820s. Around the midpoint of the century, new instruments such as deeper ploughs, the “*ruchadlo*” plough, sowing machines, and others were first applied on the great manors or bigger farms (Vondra 2013: 244). After iron became more readily available in the first half of the 19th century, iron counterparts of formerly wooden instruments became more widespread in the countryside. With better yields and a rising demand for meat, the numbers of cattle increased. New practices arose: Animals were stabled inside for a considerable part of the year, and their diet was enriched by both fodder plants and food industry wastes. The food industry started to be connected with agriculture when the first sugar or starch factories, distilleries, and innovated breweries were built at the large manors. The production was further optimized with the newly spreading railway infrastructure.

The abolition of serfdom in 1848 freed the peasant to a certain extent, which made this social mass a lucrative material to focus on in political economic planning. The Habsburg state wanted to use the economic force hidden here by channelling its development. The aim to improve the functioning of the national economy was pronounced in the political discourse of these days. Around 70% of the greatest Czech manors and 66% of bigger farms (50–100 ha) were fully mechanized in 1902 (Beranová and Kubačák 2010: 110). The innovations were tested at the great estates and then spread among peasants with great effort from the political and economic elites. During the second half of the 19th century, centralized agricultural education, research, and media facilities were established to foster the production and transfer of the new knowledge. To multiply the knowledge, societies with libraries and exemplary farms were set up, and travelling lecturers and exhibitions were organized to encourage peasants to adopt the new methods.

Although the manifold scientific-technological, political, economical, social or ecological changes characteristic of the history of modernization have been described, we still do not fully understand why and how exactly they were established (Van Dulman 2002: 85). Perhaps the aspects of knowledge (re)production should be considered more. The birth of scientific and academic knowledge brought a certain cognitive injustice towards the practitioners and laymen. In the case of agriculture, it resulted in a considerable change in the way food was grown and in the features of the landscape.

3. Forgetting tree permacultures

Cultures mixing crops or animal husbandry with trees are today summed under the term *agroforestry* (Rigueiro-Rodriguez, McAdam and Mosquera-Losada 2009). In Europe, these systems were very diverse due to both the long history of cultivation and human presence and also the high ecological variability *per se*. Today, they can be found mostly as relics in various edaphic and climatic conditions with various tree species and are occasionally managed, for instance, the *montados* in Portugal; *dehesas* in Spain; hedgerows in the United Kingdom; wood meadow and pastures in Baltic Finland, Latvia, Estonia, and also in Alps; or Streuobst systems in Germany and Austria. The decline of these systems in Europe is ascribed to mechanization, rationalization, intensification, or land-use specialization (Eichhorn et al. 2006).

Traditional agroforestry is today a forgotten phenomenon in the Czechia. These systems are not a part of academic or lay discourse; they are not seen in agricultural practice, though trees do occur on farmlands. Just 150 years ago, this was not the case. When mapping started to assess the land tax in the mid-19th century (Franciscan cadastre), a whole 10 of the total 37 registered cultures were dedicated to systems mixing tree cover with crops and animal husbandry. The presence of these cultures in the land-use classification shows their common use in the countryside, while the diversity of categories dedicated to them mirrors their real diversity but also the contemporary fuzziness of boundaries between tree and tree-less cultures. Five of the defined cultures were present in the landscape of Bohemia province in a considerable

number: fields, meadows, pastures with fruit trees, and meadows and pastures with tree use. The cultures with fruits were localized in the fertile lowlands with greater infrastructure and inhabitant density, and the pastures and meadows with wood use in the less-inhabited and less-fertile lands in higher elevations (Krčmářová and Jeleček 2016b).

By the time the Franciscan cadastre was finished, these categories were merged with the pure ones into normal meadows, pastures, and fields and were not considered as stand-alone categories. This exclusion was also seen in the low interest given to these variable cultures in the textual operation of the cadastre, which concentrated more on the pure fields, meadows, pastures, and forests and on the fertile lands and intensification potential in general (Krčmářová and Arnold 2016a). These cultures were present in the Czech countryside until at least the Second World War and their relics can still be found.

4. Search for trees in 19th century agrarian literature

What was the place of the obviously existing and varied tree permacultures in the agricultural discourse presented by agrarian literature of the 19th century? Were they mentioned? If so, how, why, where, and by whom? As the agroforestry practices had been forgotten since, the place they occupied in the agrarian science was unknown but there was a possibility that they were marginalised or utterly ignored, which was further explored.

The process of defining and establishing new agriculture was analysed in regards to the discourse content ("intentionality" and "topics", Grosz and Sidner 1986) and the discourse production and reproduction (Van Dijk 1989). So questions about the topics, their relations, the form of various statements, their public, or use of language were asked together with those about the authors' affiliations and interests.

To find the answers, more than 100 studies, textbooks, journal articles, and lectures concerned with agriculture or its parts stored in the 19th century collection of the Czech Republic National Library and in the Czech Agricultural Library of A. Švehla were studied. In particular, the following authors and their studies were included into the analysis: Antonín Dokoupil (1851–1921), Antonín Emanuel Komers (1814–1893), Karl Josef Ebert (1802–1882), Josef Dumek (1844–1903), Ferdinand Janovský (1839–1888), František Horský (1801–1877), Bedřich Heyduk (1832–1890), Leopold M. Zeithammer (1834–1905), Rudolf Treybal (1854–1911), Josef Munzar (1863–1926) and Alois J. Mollenda (1847–1935).

The authors were also analysed by focusing on questions of who, with what attributes, and in which occasions were allowed, to write an official statement regarding agriculture and generally comment on how agriculture was done. The method of prosopography (Verboven, Carlier and Dumolyn 2007) was used because we can argue that the establishment of a new agriculture through discourse was a result of the conscious effort of a group of particular people.

From the biographical data, we can see that the first agronomists usually came from the middle class. Some of them were educated at aristocratic manors or in the first agrarian schools (e.g., Josef Dumek and Ferdinand Janovský and **Leopold M. Zeithammer** at agricultural school of Libverda, Bedřich Heyduk at agricultural and forestry college in Prague, František Horský at Schwarzenbergs' school in Český Krumlov) and (if) later, at a Prague technical university (Dumek, Alois J. Mollenda, Josef Munzar, Rudolf Treybal). Sometimes, they studied in Western Europe.

Many of them worked as stewards at great estates. For example, Karl J. Ebert has for long years been an agricultural clerk on Duke Alfred Windischgrätz's manor, Zeithammer a steward on Schwarzenbergs' manors, Antonín Emanuel Komers a secretary and later director of the Peruc manor owned by Duke Thun von Hohenstein, Ferdinand Janovský was a steward on Duke Nostic from Slabce's manor, Bedřich Heyduk a clerk of Duke Kinsky's manor and L.M. Zeithammer on Schwarzenbergs' manors. In many cases during such appointments, they were directed also at research for direct agricultural innovation. František Horský, as a steward for Lobkowitz and Schwarzenbergs' manors, experimented with soil betterment, crop rotation, meliorations, fertilization with manure, ashes, potash mineral fertilizers and new crops from the clover and grass sorts. He also invented a spudding and sowing machine and was active in animal breeding.

The authors were also often employed as teachers or/and directors of agricultural and other schools. Antonín Dokoupil was a professor of natural sciences in an agricultural school in Chrudim and founder of linen schools in Trutnov and Humpolec. Josef Dumek was a founder and director of Higher agricultural school in Doubravice at Mohelnice. František Horský was the first director of the Schwarzenbergs' peasant school in Rabín. Ferdinand Janovský was a teacher at Higher Provincial Agricultural School in Tábor (Vyšší zemský ústav hospodářský) and later a director of the Provincial Agricultural school in Horní Heřmanice in Silesia (Zemský hospodářský ústav). A. J. Mollenda was chemistry and science teacher at the agricultural school in Tábor and in Provincial Higher Agricultural School in Roudnice, where he was later appointed as its director; **Josef Munzar** was a teacher at agricultural high schools and colleges and Prague Technical University and later a director of the agricultural school in Pilsen and Slaný and a rector of the Agricultural University in Brno. He also founded the first research station for fodder plants in the Czech lands in Tabor, and founder of the first collection of Czech literature about plant cultivation and soil sciences. Rudolf Treybal gave lectures at several agricultural schools and later was appointed a director at agricultural school in Plzeň. **Leopold M. Zeithammer** was a teacher in Schwarzenbergs' agricultural school in Rabín.

Their educative activities were not aimed only at pupils and students, many of them were active in farmers education- through various journals. For example A. E. Komers was publisher of the journal *Progress in Peasantry: Yearbook for Progressive Farmers*, in Czech Pokrok v rolnictví: ročník pro vlastenecké hospodáře.

J. Dumek was a publisher of *Prague Agricultural Newspaper* (Pražské hospodářské noviny). B. Hejduk was a publisher of *Economic Progress Journal* (Hospodářský rozvoj). Ferdinand Janovský was an editor of journals *Grafter*, *Epistols to Czech-Slovakian Peasants* (Štěpař, Epištoly rolnictvu českoslovanskému) and *Bulletin of Agricultural Societies in Tábor* (Věstník hospodářských spolků jednoty Táborské). R. Treybal was the founder of the journal *Pilsen Agricultural Newspaper* (Plzeňské hospodářské noviny) and *Milk News: Journal dedicated to all agricultural concerns* in years 1897–1906 (Mlékařské rozhledy: časopis věnovaný veškerým zájmům zemědělským).

Support for the transformation of the agricultural system was further supported by political activities of the authors. J. Dumek was elected a member of the Czech Provincial Assembly (Český zemský sněm) and was an inspector for Agricultural Council for the Czech Kingdom (Český odbor zemědělské rady). E. A. Komers was member of the Imperial Assembly in 1849, member of the Czech Provincial Assembly in 1867 and one of the founders of the Agricultural Council for the Czech Kingdom. Rudolf Treybal was a member of the Czech Provincial Assembly in years 1889–1892 (Český zemský sněm).

Texts of the mentioned authors, which were analysed in search for agroforestry, represent first texts published on the topic of agriculture in the Czech lands. Their authors were the most influential agricultural innovators. The texts were treated as primary data, even though they could be referred to as secondary literature. They were seen both as reflections of the contemporary land use and management, peasants' life and the authors' lives, as well as political statements advocating and legitimizing certain procedures in the primary economic sector.

5. Tree cultures marginalization and symbolic annihilation

In the majority of books published in 19th century about agriculture, combining tree cover with agriculture was not mentioned at all. The texts on how fields, meadows, and pastures should look and be managed ignored the tree component. The features of the agricultural system were reminiscent of the industrial one we have today. Despite that, there are remarks about agroforestry cultures in texts concerning the fodder of animals, meadows and pastures, or about cultures for wood use.

Trees are mentioned; for example, in the work about the health of animals by Josef Dumek from 1878 (Dumek 1878a). He wrote about the possibilities of using trees as fodder and bedding for various animals. He suggested giving horses ash and other leaves as a cure and giving acorns, chestnuts, and dried tree leaves to sheep, especially when the year did not bring enough hay and

other fodder. Sheep, in his opinion, prospered under this diet from a young age. He also proposed feeding pigs acorns, chestnuts, and beech acorns (ibid.: 29).

He also made references to trees on pastures and enclosures for animals or planting fruit or forest trees by animal stables as wind shields (ibid.: 35). He advised keeping tree cover when the plots are dry as the *“planting of right trees to make the plot more fertile and propiate for fodder plants to prosper”* (ibid. 34). He suggested planting fruit trees, especially, for ecological, economical, and aesthetical reasons. *“Every tree planted on a pasture not only makes our landscape more beautiful and helps to balance the temperatures and humidity of the place, but would not be our farms by this little investment into fruit trees made more valuable, when the little initial investment would bring considerable yields from fruits? It is a well-known fact that in the natural humidity, the grasses prosper better than in the sun heat and this needed soil humidity is supported by the fruit tree, which with its lush treetop protects the ground and gives the pasturing animals the shelter from sunheat and winds.”* (ibid.: 34).

In his other book, about how peasants could permanently heighten yields (Dumek, 1878b), he mentioned the benefits of keeping trees on pastures and meadows. *“The tree, be it a fruit one or wild one, when well taken care of and protected from the pastured animals, not only gives the pasturing cattle shelter from the heat and wind, but especially contributes to keeping the moisture in the soil, which supports the growth of fodder plants, which bring us only good.”* (ibid.: 19). In this book, the author also advocated planting new and taking better care of standing fruit trees in gardens and other plots. He talked about their various benefits, including giving nesting grounds to insect-eating birds, providing pasture for bees, and shelter to animals and people from the heat, wind, rain, and snow. By keeping the trees and planting more, the peasants also contribute to *“making the land, the whole country, more beautiful”* (ibid.: 23). In his reasoning, he framed the peasants’ custom of keeping the trees on the farms positively and mentioned the cultural role of trees in keeping the local memory vivid. *“It was a really praiseworthy custom of our ancestors, who would celebrate every memorable moment by planting a tree to commemorate that occasion every time their eyes would fall on the tree and talk about it to their descendants.”* (ibid.: 20–21).

In his other book, *Impact of bedding on the quality and goodness of the manure, with special emphasis on the forest bedding* (Dumek 1878c), Josef Dumek again celebrated the benefits of keeping trees on farming plots or on farms in general. In his opinion, the presence of forests or trees in vicinity of the agricultural plots heightened the yields and general health of the landscape. Forest or trees regulate the climate and pests and also can serve as mechanical protection from drought and wind. However, he was critical of the direct use of forest bedding or branches and leaves as animal bedding. In his opinion, these practices *“mutilate and damage the forest trees”* and *“such baleful abuse should not be tolerated among us”* because the trees in the forest should be protected—the sign of being *“the apostles of true agricultural progress”* (ibid.: 8). He criticized the cutting of tree branches in forests for having an impact on the forest structure and climate and was also against the collection of forest bedding because it weakens the trees, as both practices can lower forest yields. The forest bedding and branches of trees were, moreover, not, in his opinion, suitable as animal bedding because of their low absorptivity (ibid.: 15) that could lower the resulting quality of manure and compost (ibid.: 27).

Dumek also wrote a book on the culture of willow trees (Dumek 1884) in which he praised the possibilities of willow planting not only for direct economic uses, but also for drainage (ibid.: 2), fodder for sheep (ibid.: 4), and home craftwork.

Willows were also mentioned by German author, Carl Tragau, in his book *Wiesen und ihre culture* (Tragau: 1883). He made an appeal to better the care of meadows, making a classification of the meadows and then addressed the technical measures of drainage or irrigation, manuring, and rejuvenation. He suggested planting willows on the meadows around ponds and dikes because they improve drainage, their leaves are beneficial fodder for sheep, branches can be used for craftwork and firewood, and the leaf-fall combined in the pond mud is good for compost. No matter how many possible uses he saw for the willow, the trees did not play any systematic role in his view of meadow management. He also wrote a book oriented solely toward the cultivation of willows – *Die korbweidenkultur* (Tragau: 1886), where he, however, only discussed the willow for

craftwork, even though he also mentioned the beneficial landscape and fodder functions of this tree.

Another text, which mentioned the use of trees on farms, is the book of Bedřich Hejduk from 1863 named *The help in times of fodder shortage. Short instruction, what a goodman in this fodder shortage should do, so that he need not sell his cattle, but could keep it safely through winter* (Hejduk 1863: 20). He suggested that farmers substitute the hay and straw in these situations with acorns, chestnut, or branches with tree leaves (lime, poplar, birch, oak, hazel, or wine) (Hejduk 1863: 25). He considered getting these types of fodder laborious and a “resort to extreme and special measures” (ibid.). On the other hand, the “leaves and branches from the mentioned trees have a similar fodder value as hay, the cattle likes to eat them when fresh and if the goodman sees to it, he can collect enough of them needed” (ibid.). He suggested even the purchase of acorns and chestnuts as their nutrition value was high. He also recommended that, in fodder shortage crises when most of the straw was used as fodder, forest leaves should be used for fodder and “forest bedding, coniferous trees branches, moss, ferns, reed and other non-fodder plants” (Hejduk 1863: 27) as well as sod from slopes, bulks, dikes, roads and meadows for bedding (ibid.: 29).

On the other hand, Josef Munzar, in his book *Fodder shortage and cattle winter fodder* (Munzar 1904), did not mention any type of tree-related materials as a solution. He encouraged farmers to feed beet, potatoes, fodder plants, and food-industry wastes (brewery spent grains, potato or beet residues from distilleries or sugar factories) due to their nutritional properties. However, similar to Hejduk, he recommended using peat, forest bedding, and similar stuff as bedding (ibid.: 6). Generally, he suggested that the goodmen should make a rational balance sheet of the numbers of cattle and the amount of fodder and bedding available and optimize these either by selling the first or buying the latter.

In Munzar's book *Meadow science* (Munzar 1895), he first focused on how to heighten the yield of meadows by drainage, irrigation, mechanical adjustments, manuring or sowing grasses or pulses. In his opinion, the “extensive cultivation of meadows is a past thing, the present calls for intensive management” (Munzar 1895: 4). In the second edition of this book, he argued that, considering the fast pace of agricultural progress and the transfer of the agricultural production in favour of animal husbandry, the goodmen had to secure their animals a cheap and natural source of nutrition by efficiently using their meadows. In his opinion, the meadow is defined by grasses; he did not mention or consider tree cover there. As hand labour was being replaced by mechanization, meadows had to be prepared for this. “Surface of meadows should be as flat as possible, so that the mowing by hand or by machine is easy everywhere and there are no places, which has to be left unmowed or mowed in a bad quality. All trees, bushes, stumps, boulders and similar have to be removed, the resulting holes filled in and oversown.” (Munzar 1895: 136). Trees in the vicinity of meadows, for example on balks, were on the other hand welcomed as they provided homes to insect-eating birds and thus reduced the number of pests (ibid.: 141).

In general, agroforestry was a very rare theme in the 19th century official literature concerned with agriculture. Cultures with trees were not (and still are not) considered to be an officially registered land use, culture, or a specific field of agriculture. The frame for use of trees on agricultural grounds was that of a crisis, exactly the conditions that the modernization of agriculture was trying to avoid. As was shown, the agricultural literature of the 19th century did not mention agroforestry. The importance granted to these systems and their management was so little that we might even doubt its existence. As this literature can be seen as a platform for establishing the new form of techno-scientific agriculture, we can conclude that agroforestry was not selected to be part of it.

However, agroforestry was mentioned, and thus, it was a part of contemporary agricultural ecosystem—which corresponds with the fact that it was taxed and part of the land use classification. The theme was most prominent in the work of Josef Dumek. His notion of agriculture and knowledge of the various uses of trees stemmed from his career as a wandering teacher. He, among the studied authors, had spent the most time in personal contact with peasants and their way of life: He prepared about 5,000 lectures about the use of new agricultural methods for them.

There was a difference between the generations of scholars. The older authors—Dumek, Tragau, and Hejduk—considered leaving trees on pastures a common or known, though thematically marginal, practice. Hejduk described feeding animals with tree leaves and fruits as known (and from the side of the animals, welcomed) practice; his note about buying acorns and chestnuts also indicated that these crops were on the market in the 1860s. Tree leaves and fruits were (and could be) used, but were not promoted, experimented with, or considered optimal fodder.

The later author Josef Munzar saw trees on agricultural plots as a hindrance for the proper use of machinery, although he wanted them to be kept nearby. That again indicates they were present at least on meadows (as his remarks about trees come from his work about meadow science). Even more, Munzar did not promote pasturing outside (therefore not addressing themes like trees as shelter or natural fodder additive) but voted for year-round stabling. He suggested feeding cattle with industrial by-products (e.g., residual pulp from sugar beet, potatoes) or generally by fodder, enabling a controlled supply and nutritional value on one side and growth on the other.

6. Selecting and legitimizing the industrial agricultural model

During the second half of the 19th century, only a few of the numerous modes of doing agriculture in the Czech lands made it into the official discourse. Permanent tree cultures were not one of them. They neither established as a theme, land use category nor as a subdiscipline. This ignorance of such a common though economically less important land use brings attention to the selection process used in building the new agricultural model.

We can say that the still-prevalent, traditionally used agroecosystems with their manifold species assemblages and managerial practices were selected from, experimented with. Those considered usable, were scientifically approved to be appropriated in the new agriculture. From an ecological perspective, the promoted ecologies corresponded mostly with the lived words and possibilities of economic elites—the aristocratic owners of estates and industrial bourgeoisie (Pettigrew 1972). Most of the above mentioned scholars were in limited contact with a variety of premodern landscapes and their management; thus, they only concentrated and elaborated on the variants familiar to them. The selection was generalized, and we can say that certain categories and relations characteristic for a certain time and space were elevated as universals. As a consequence, many of the living traditions from the less-fertile lands (like extensive tree meadows and pastures) probably failed to be recognised and or even considered for inclusion into the agricultural theory.

In the 19th century, it was the scientists, manor stewards, politicians, teachers, journalists and clerks who were the producers of official public opinion, norms, values, ethics, and ideologies about using the land, plants, and animals (ibid.). These were also in control of the official discourse (re)production (Pátek 2015, Šouša 2012). Not everyone was enabled to participate in the new project. Demanding that the works about agriculture use scholarly or generally elite language and be published and quoted, and that they adhere to the laws of scientific knowledge production, also controlled who had the ability to publicly speak on this topic (Bourdieu 1963). Socially less-powerful people—such as the common husbandmen—had no access to the production of texts and did not even speak their language on a level high enough to publish or discuss the set themes. There were, however, texts and local lectures offered for peasants that aimed to teach them what agriculture was and how to change what they currently did to meet the new standards. In general, the modernization of agriculture severed applied knowledge from locality and historical tradition.

The new science promoted a particular type of agricultural literacy (expressed through scientific language, a specific type of reasoning and epistemology, the practice of writing, experimenting, lecturing, and similar) and practices (buying seeds abroad, using machines and chemicals, reading books, etc.) and imbued them with value denied to other/traditional types of literacy or practices. Bauman and Briggs (2008) talk about the modern project of disrupting tradition through language and the promotion of decontextualized universal schemes. The needs of small farmers were ignored and their way of understanding and using land and their approach to growing food, which was at many times creative and multifunctional, was deemed “unscientific” in the same way

that traditional ecologic knowledge was in the colonial studies². Modern agrarian science was, from the beginning, created within and for bigger farms and for creating raw materials for industrial production. Industrial agriculture had in its roots a profit-oriented mindset and was not entirely oriented toward growing and consuming food (Massy 2017).

Innovators basically defined what agriculture was and would be from that point forward. They claimed it was essential to base agriculture on knowledge and experience (e.g., Horský 1862 or 1872). However, they did not at all consider that this know-how and experience was already stored in the minds and lives of the majority of people who had actually been labouring with agriculture for centuries—Czech peasants and farmers. Instead, they mostly referred to the knowledge and experience of their peers—the members of a closed-off circle of well-educated and networked scholars of the modern Western European countries—the growing agrarian science society.

In the 19th century, the agricultural innovators/economic elites/nation builders would not value the manifold local traditions. They would pick from the existing diversity only what suited their purposes and which they could apply. The majority of agriculture practitioners did, however, practice a totally different type of agriculture. The huge amount of funds and energy dedicated to disseminating both the ideas and instruments of industrial agriculture resulted in the loss of the other ways of doing agriculture. One of the reasons was the preoccupation with one type of agriculture and the act of disregarding the common people, the locality, and traditions.

The local experience of watching the seasons change, years and harvests go, working while talking to kin or neighbours was pushed back and framed as rigid, chaotic, inappropriate or silly, a “blind faith” behaviour (Skolimowski 1994). Thus, the official agricultural discourse in general ignored the traditional ecological knowledge and served as a means of legitimizing new agricultural and land-use policy and practice (Van Dijk 1989, Szabo 2013). Such denial, not considering the peasants as equals, falls today under the term *cognitive injustice* (Coolsaet 2016). This framing of locals and their perceptions and consequential ways of doing things as less relevant stands on the basis of colonial construction of otherness and the modernity project (Fabian 1983).

However, as Howell notes, even in the contemporary projects, the external agents aiming for sustainable development persistently fail “*to act upon the insight that local practice and ideology provide may be characterized as a repression of knowledge*” (Howell 2017). Even though the policy makers and NGOs wish people the best, the principles of respecting the local culture and human and environmental rights are usually set aside in implementation. The reasons for repression of knowledge that Howell identifies are: time constraints for the implementation of various externally funded projects, desire for universally applicable models, and a sense of uncertainty regarding what to do (Howell 2017: 134). What we see both in many current developmental projects aiming at economic development (Mosse 2013: 229) and conservation (West 2006) and in the presented case study from the 19th century is the simplification of local cultural specifics to fit with the cosmopolitan expert design. As Ellen noted (2000), the developmental paradigms and educational agendas were indifferent to local expertise, not considering it relevant until the 1960s. Yet there are dangers of such scientific top-down selection and of reframing the existing local knowledge by power-endowed interest groups preoccupied with certain crops and techniques. That is why in agricultural development policy today, the value of farmers’ knowledge is more recognized, and its systematic and sophisticated nature acknowledged. The plurality of knowledge systems is starting to be valued in itself as offering sustainability and rural development opportunities (Coolsaet 2016). However, the hegemony of

² In this line of thinking, the European preindustrial agricultural knowledge can be compared to traditional (or local or indigenous) ecologic (or environmental) knowledge (Hunn 2002, Clarkson, Morrisette and Regallet 1992, Berkes 1993, Doubleday 1993, Tyler 1993 and similar)—a term coined in ethnobotany as the reflection of contrast between non-Western people’s complex relationship with their environments and the colonial modern scientific knowledge. This traditional knowledge originates from a human group living closely and long-term within specific local ecological relations. The repeated and imminent contact with the surroundings, and getting subsistence from them, is manifested culturally in perceptual atonement to specific rhythms and structures of the environment and in its naming, classifications, practices, and instruments for monitoring and using it and in cosmologies and narratives.

Western scientific tradition in the way the agriculture is done prevails (Berlin 1992, Richards 1994, Thapa, Sinclair and Walker 1995).

In the analysed case study, the elites and scholars directly and indirectly owned the power to eradicate traditional land uses and ecosystems connected with them from both the common memory and landscape. In the 19th century, the spread of new knowledge among peasants was openly declared to be a key instrument for the adoption of more productive, larger scale commercial industrial agriculture. Founding schools and development societies, supportingscholars, and publishing academic and technical texts and journals—all the material and political support given to agricultural science and education—can be seen as taking control of the process of agricultural knowledge and discourse reproduction and using the social power over the behaviour of the individuals connected to it (Van Dijk 1989: 25).

We can argue that the trend of ignoring what is actually used by the main practitioners continues—the subordination of alternative farming practices, such as agroecology, to industrial high-input farming leads, to the misrecognition of peasant communities (Coolsaet 2016). The policies for participatory and rights-based approaches might be one of the symptoms of this prevailing situation. The knowledge stored in the way actual people do agriculture in the particular local contexts is again and again selected from, simplified, and applied as the only possible option.

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