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РОСЛИННИЦТВО ТА ЗЕМЕЛЬНІ РЕСУРСИ ГАЛИЧИНИ ЗА ЧАСІВ АВСТРО-УГОРЩИНИ

Анотація. Метою дослідження *є аналіз процесів, які відбувалися у рослинництві в контексті розвитку сільського господарства Галичини на межі XIX–XX ст.* ***Висновки****. У статті розкривається вплив науково-популярної освіти, яка була одним із ключових критеріїв упровадження новітніх методів управління економікою. Це позитивно вплинуло на економічний розвиток регіону, який значно відставав від інших регіонів Австро-Угорської імперії. У досліджуваний період відбувся прорив у методах і підходах до ведення господарства: запроваджувалася механізація процесів, нові технології обробітку ґрунту, меліорація земельних угідь. Почала інтенсивно розвиватися сільськогосподарська переробна галузь. Значна увага приділялася селекції, що позитивно вплинуло на розвиток тваринництва. Всі ці аспекти привели до суттєвого підвищення результатів праці у галузі.*

Тема частково досліджувалася у Польщі та Австрії. В Україні вона малодосліджена, тому потребує ґрунтовного аналізу,

зосібна щодо розвитку кожного сектора сільського господарства Галичини цього періоду. ***Методологія дослідження.*** *У статті зроблена спроба проаналізувати розвиток провідної галузі сільського господарства – рослинництва. У дослідженні використано порівняльний аналіз, який уможливив вибудувати динаміку розвитку рослинництва у регіоні.*

Наукова новизна. *Для комплексної характеристики рослинництва Галичини використані матеріали архівів Івано-Франківська, Львова, Кракова, Варшави, Відня. Історіографію теми дослідження розділено на кілька періодів: публікації кінця XIX – початку XX ст., міжвоєнного періоду, радянської доби, наукові студії незалежної України, сучасні зарубіжні дослідження.*

Аналіз джерельної бази показав позитивну динаміку розвитку рослинництва у переважній більшості його видів. На це вплинула низка об'єктивних факторів, одним із яких було науково-популярне просвітництво і розвиток аграрної науки в Галичині, відкриття спеціалізованих освітніх і наукових закладів, які досліджували проблеми, з якими стикалися господарники галузі.

Ключові слова: *Галичина; сільськогосподарський сектор; меліорація земель; площі, що використовуються у сільському господарстві; сільськогосподарська продукція; урожайність сільськогосподарських культур.*

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CROP PRODUCTION AND LAND RESOURCES IN GALICIA DURING THE AUSTRO-HUNGARIAN PERIOD

Summary. The purpose of this study *is to analyze the processes that took place in crop production within the context of Galicia agriculture development on the cusp of the 19th and 20th centuries.* ***Conclusions.*** *The article recognizes the impact of popular science education, which was one of the key criteria for the introduction of the up-to-date methods of economic management. This had a positive effect on the economic development of the region, which lagged far behind other regions of the Austro-Hungarian Empire. During the study period, there was a breakthrough in the methods and approaches to farming inasmuch as processes of mechanization, novel tillage techniques and land reclamation were introduced. The agricultural processing industry began to develop intensively coupled with a serious consideration given to selective breeding of animals. All these aspects have led to a significant improvement in the industry's performance.*

The subject has been partly studied in Poland and Austria whilst it was insufficiently considered in Ukraine. Therefore, the development of each sector of agriculture of Galicia at the turn of the century requires an extensive review. ***The research methodology.*** *The article offers an attempt to analyze the development of crop production, the leading branch of agriculture. The study employed a comparative analysis, thereby allowing us to establish the dynamics of the crop production development in the region.*

The scientific novelty. *The archive materials of Ivano-Frankivsk, Lviv, Cracow, Warsaw, and Vienna were consulted for a comprehensive characterization of crop production in Galicia. The historiography of the research topic is divided into several periods: published papers of the late 19th – early 20th centuries, the interwar period, the Soviet era, the surveys of independent Ukraine as well as modern international studies.*

Analysis of the sources proved the positive dynamics of the crop production development in the vast majority of its types. This was influenced by a number of objective factors, one of which was the scientific extension and the development of farming research in Galicia, the opening of specialized facilities, educational and scientific institutions that studied the issues faced by the economic managers of the industry.

Key words: *Galicia; agricultural sector; land reclamation; farm lands; agricultural produce; crop productivity.*

Articulation of issue. In the second half of the 19th century and before the outbreak of the First World War there was a significant onward movement in the agricultural sector in Galicia. One of the reasons for the relatively successful growth of the agrarian sector of the Galician economy was the development of sectoral science the findings of which were implemented. Systemic research and scientific experiments have made it possible to carry out both arable farming and animal husbandry advantageously. However, scientific research without further implementation could not significantly affect the industry development in the region. Therefore, it is important to examine and comprehend the practical demonstration of scientific innovations, i.e. the implementation of scientific research results in the agricultural sector of Galicia.

In the series of studies the authors have identified each segment that influenced the evolution of agricultural industry in general and definite structural units of the agricultural sphere in particular: arable farming (grain and other crops), vegetable cultivation (market gardening, horticulture) and animal husbandry (cattle breeding, horse breeding, swine and sheep rearing etc.).

Literature review. The suggested topic is scantily studied in national academic circles. Among other scholars, the subject is partially covered in the works by Mykhailo Klapchuk (1972), Hryhorii Kovalchak (1988), and Volodymyr Klapchuk (2015). The issue was widely examined in Polish scientific information sources both of the period under study (Rewieński, 1890; Walewski & Gieysztor, 1890; Bujak, 1908; Diamand, 1915; Dziewulski, 1918), and in the first half of the twentieth century (Grochowski, 1925, 1927; Pruski, 1925; Przerembel, 1930).

The register of literature on issues relating to agriculture, covering a significant part of the bibliography of the period under inquiry, proved to be valuable for the study (Estreicher, 1959; Kosiek, 1962; Dybiec, 1998).

In addition to scholarly publications, agricultural matters knowledge has been disseminated in the professional periodicals such as *Rozprawy c.k. Galicyjskiego Towarzystwa Gosp.*, *Rolnik*, *Przegląd Weterynarski*, *Ogrodnictwo*, *Bartnik Postępowy*, *Głos Rolniczy*, *Przewodnik Kółek Rolniczych*, etc. It is worth noting that much of the published material in the afore-mentioned titles was a translation of

the foreign scientists' works as well as experts' opinions. Stefan Pawlik, professor of the Agrarian School in Dubliany[1] criticized such narratives in his work *Notes on the influence of the German literature on farms in Poland in the 19th century* (*Uwagi o wpływie literatury niemieckiej w XIX wieku na gospodarstwa w Polsce*, 1903).

It is clear from the analysis that the issue requires a closely and systematic examination, which will provide an opportunity to reconsider the impact of scientific industry achievements on the economic development of then Galicia. The experience of an agricultural system development in Galicia during the Austro-Hungarian period should be thoroughly studied.

Research objectives. The overwhelming majority of Galician residents, which was then an autonomous part of the Austro-Hungarian Empire, were involved in the agricultural sector, earning a living from field-crop cultivation and/or animal husbandry. In order to shape our research objectives, it is very important to understand how agriculture was interpreted in terms of sectoral scientific achievements in that historical period. Thus, for instance, in the *Encyclopedia of Agriculture*, which was published in Lviv, it was noted that by agriculture or agronomy one means all the science that studies land cultivation in order to get heavy yields with the least labor costs ("Rolnictwo", 1907).

Economic Journal of Cracow, in turn, defined agriculture as the art of tilling, fertilizing and tending to the land to produce grain, fruits and plants required for people ("Rolnictwo", 1806). From what has been said, agriculture is physical embodiment of theoretical knowledge and skills gained in the scientific field. So, the main purpose is to study the impact of theoretical scientific advances on human practice in the agricultural field by mainstreamification agricultural knowledge.

Tillage and crop production. Having comprehensively analyzed the statistical data on agricultural development in Galicia in the period under study, we obtain basic results that give an opportunity to substantiate the focal points of our paper.

The level of agriculture in Galicia at that time was definitely much lower than the level of agricultural sector development of the individual (chiefly agrarian) European countries. At the turn of the

[1] Until 1901, it was a school, eventually becoming an academy afterwards.

19th – 20th centuries, grain crops yields in most European countries were twice as high as in Galicia (Table 1) (Diamand, 1915).

Table 1. **Statistical data on staple crops yields in Galicia and Europe, cwt / ha (compiled by the authors)**

States, regions	Wheat	Rye	Barley	Oats	Potato
Belgium	27	24	29	24	175
Germany	23	18	22	19	150
Ireland	23	19	24	23	107
The Netherlands	26	19	28	22	190
Austria	15	15	16	13	100
Sudetenland	17	15	17	18	110
Galicia	*13*	*11.9*	*12.65*	*12*	*126.3*

The above table shows that only potato cultivation in Galicia was relatively competitive on the European agricultural market; grain crops yields were half as low. This was also confirmed by Franciszek Bujak (1917) in his study *Economic Development of Galicia (1772–1914)*. He examined the average yield of agricultural products (cwt / ha) in 1903–1912, defining the scope of examination by the limits of the early twentieth century (Table 2).

Table 2. **Average yield of agricultural products (cwt / ha) in 1903–1912** (Bujak, 1917)

States, regions	Wheat	Rye	Potato	Hay
Galicia	11.5	10.6	113.4	30.9
Czech Republic	17.7	15.8	94.8	32.9
Germany	20.3	17.0	132.4	42.5
Poznań	20.4	16.6	143.2	38.0
Denmark	30.0	19.0	164.0	41.0

However, if we consider the dynamics of yield changes in Galicia between 1872 and 1913, we observe it was positive and constantly growing one (Table 3). The reason for growth can be attributed to agricultural extension, which has been constantly developing in the

region. Scientific achievements in the agrarian sphere aroused increasing interest of the parties in charge of agricultural activity.

Table 3. **Cumulative yield index in Galicia, in quintal per 1 ha** (Jezierski & Wyczański, 2006)

Years	Wheat	Rye	Oats	Barley	Potato
1872–1876	8.8	6.5	5.9	7.9	72
1880–1884	9.1	7.2	6.4	8.0	85
1884–1888	9.5	7.6	7.2	8.5	92
1894–1898	9.2	8.0	7.3	8.2	100
1901–1910	11.0	9.9	9.1	9.7	110
1909–1913	11.7	11.3	10.7	11.2	111

Due to this, in the early 20th century the economic situation has significantly improved in Galicia. In 1917, Franciszek Bujak wrote about it thuswise[2].

> In the last few years before the war, we have been on the right track, we have undertaken extensive work on the rational organization of our economic life, and we have started to make up for our backlog and shortcomings. From a passive society, exploited by strangers from afar, we have become an active society, which has taken itself to use the wealth of its country and to satisfy its needs. If we were given an opportunity to continue along this path with all the perseverance and consistency, the space between us and our western neighbors would undoubtedly be rapidly shrinking. (Bujak, 1917, pp. 57–58)

[2] *Weszliśmy w ostatnich latach przed wojną na dobrą drogę, podjęliśmy rozległe prace około racjonalnej organizacji naszego życia gospodarczego, zaczęliśmy odrabiać zaległości i zaniedbania nasze. Ze społeczeństwa biernego, eksploatowanego przez obcych z daleka, stawaliśmy się społeczeństwem czynnym, które samo wzięło się do zużytkowania bogactw swego kraju i do zaspokajania swoich potrzeb. Gdyby nam było danym iść dalej tą drogą z całą wytrwałością i konsekwencją, to niewątpliwie szybko zmniejszałaby się przestrzeń między nami a naszymi zachodnimi sąsiadami.* Here and subsequently, unless indicated otherwise, translations from Polish are by Ihor Makaruk.

Advance in growing grain varieties in Galicia took place at the turn of the 19th – 20th centuries and was largely the result of increase insight in the field of agriculture, research on enhancing grain crop types and land resources efficiency.

The study further analyzed how agriculturally used areas underwent changes in the structure, under which crops the main arable land was used and how this had a positive impact on the dynamics of yield improvement in Galicia of the day.

Table 4. **Land resources structure in 1852–1902**
(Pilat, 1905)

Agricultural lands	Area, ha		
	1852/1866	**1889**	**1902**
Tillage	3590373	3803444	3799575
Meadows and vegetable gardens	922802	986082	984205
Pasturage	768944	743480	716918
Forests	2113766	2023724	2020212

We conclude (*vide* Table 4) that the structure of land resources changed dynamically in favor of tilled land, meadows and vegetable gardens due to reduction of pasturage and forests. This trend should have influenced the increase in agricultural production in the region.

In addition, in 1900, 13.3% of the arable land in Galicia was lying fallow (Pilat, 1898). This contributed to improved soil fertility and more efficient exploitation of agriculturally used areas, because the land was resting in a loose and weed-free state, which contributed to the accumulation of sufficient moisture in it.

In 1874–1913 (Table 5) the areas of grain crops decreased gradually, albeit the areas for industrial and forage crops increased (Jezierski & Wyczański, 2006).

Decrease in seeding-down the grain crops from 74.6% of all arable lands of Galicia to 67% in 1913, a year before the First World War outbreak, could have a negative impact on meeting the demands

Table 5. **Distribution of ploughland in Galicia (in percentage terms)**

Years	Grain	Leguminous plants	Potato	Forage	*Alios*	In all
1874	74.6	3.7	10.0	6.3	5,4	**100.0**
1881	71.2	4.3	11.3	7.2	6,0	**100.0**
1897	67.4	4.9	13.5	11,6	2,6	**100.0**
1913	67.7	2.5	14.8	12,2	2,8	**100.0**

of the native population for bread. Table 6 summarizes the dynamic pattern in the structure of the agriculturally used areas in Galicia from 1900 (Pilat, 1900) till 1911 (Kryukov, 1915).

Table 6. **Dynamic pattern in the structure of the agriculturally used areas in Galicia**

Agriculturally used areas	Area, ha			
	1900	*% of all used areas*	*1911*	*% of all used areas*
Tillage	3799879	48.41	3806619	48.5
Meadows	875045	11.15	873615	11.1
Pasturage	716848	9.13	738604	9.41
Forests	2021230	25.75	2015528	25.7

At that time, most farmers were employing obsolete cultivation methods coupled with inadequate tools. Thus, in order to alter the situation and improve yields, it was essential to provide instruction among agricultural producers, which consisted in encouraging the use of modern equipment and the application of advanced management methods.

The scholars have observed that as a plough the Galicians normally used a few iron sheets riveted together by a self-taught blacksmith, who did not fully comprehend the value of ploughing and its importance in the future harvest. Therefore, in most cases, such ploughing simply cut the soil into strips and lumps, not hoeing it (Wygoda, 1916).

Jan Feliks Sikorski, professor at the Agrarian School in Dubliany, made an in-depth analysis of powerful methods of ploughing in his work *Mechanical Soil Tillage* (Sikorski, 1898).

The introduction of mechanization in all agricultural activities has greatly facilitated labour-intensive processes and has also had a positive impact on the efficiency of labour outcomes.

It follows from Table 7 that the maximum number of machinery and equipment was assigned to large farms that had tangible gains from agricultural activities whilst small family-operated farms possessed only the most necessary equipment. There were only three steam ploughs in Galicia at the time, and 12 mechanical seeders (Bujak, 1908).

Besides, an important element of yield improvement was not only processes mechanization, but also research study of soils, use of fertilizers, introduction of crop rotations, new methods of land tillage, drainage of swampy fields, and use of melioration (Bujak, 1908; Biernacki, 1913). The significance of drainage systems as well as irrigation of agricultural lands was given scientific credence (Krzyżanowski, 1879). This made it possible to use land plots that had previously been considered unfit for grain crops effectively.

Commencing in 1876, it was with the purpose of intensification of agriculture in the region that active land improvement measures were enacted. Some fertile soil areas were drained and irrigated; the government has bankrolled significantly for this. Thus, in the 1876–1892 timeframe the funds allocated for reclamation works increased by 230 times, amounting to PLN 1607370 (Pilat, 1898).

One more important trend in the development of the sophisticated techniques in agriculture was a selection of grain crops. They worked on it in the above mentioned Agrarain Academy in Dubliany (Mazurkiewicz, 1913), where experiments on different grain varieties were conducted in the field environment. The cultivation of wheat, barley, rye and oats has been subject to in-depth analysis and research; what counted was to understand when to sow grains and when to harvest.

In addition to grain, other crops, such as potatoes and sugar beet, were also valued. In 1906, a professor of the Agrarian Academy in Dubliany and the Jagiellonian University, Stefan Jentys published the work *Agricultural Value of Newer Potato Species* which revealed the experiments that were carried out by the scientists in 1903–1904.

Table 7. **Agricultural machinery and equipment, 1902**
(Bujak, 1908)

Size of farms, ha	***Machinery, pcs.***	**Number of farms possessing machinery and equipment**									
		Fertilizer sowers	***Grain seeders***	***Fodder harvesting machines***	***Reaping machines***	***Potato harvesters***	***Chaff-cutters***	***Centrifugal machines***	***Shot casting plants***	***Milk houses***	***Flour mills***
<2	35533	1	3	0	10	12	32163	10	2829	139	1544
2–5	114009	2	16	2	24	60	108000	23	3865	582	11069
5–10	82164	0	15	1	24	50	77556	38	2609	1586	16243
10–20	24821	1	15	2	9	35	23158	28	1054	2632	9309
20–100	6594	6	137	74	30	45	6209	28	406	2774	3758
>100	3801	276	2138	1211	606	406	3598	213	859	3300	3069
Total	**266922**	**286**	**2324**	**1290**	**703**	**608**	**250684**	**340**	**11622**	**11013**	**44992**

Potatoes were used as a food product as well as the raw materials for production of alcohol, preparation of starch and other derivatives. Significant areas were allotted to potato cultivation as the yield of this crop was quite high in East Galicia (Table 8). Farmers, who grew potatoes, as well as sugar beet farms, had high hopes for the development of the processing industry, namely alcohol production.

Table 8. **Potato yields through 1909 to 1913** (Khraplyvyi, 1936)

Province	Area, ths ha	Gross yield, ths cwt	Yield, cwt / ha
Lviv (Lemberg)	159.2	19258.8	121
Stanislaviv	108.5	9764.1	90
Ternopil	142.2	17778.7	125
Galicia	**409.9**	**46801.6**	**112**

Traditionally, small farms were not engaged in the cultivation of beet, this was done by large and high-capacity farms. The authors on beet growing informed the readers about the results of tests, methods of planting and tendance, winter storage, and seed production (Żeleński, 1894; Turnau, 1903; Kosiński, 1906).

Table 9. **Sugar beet yield growth dynamics in East Galicia, 1884–1906** (Bujak, 1908)

Crop plant	1884–1893	1896–1905	1906	
	Yield, cwt / ha	*Yield, cwt / ha*	*Yield, cwt / ha*	*Gross yield, ths cwt*
Sugar beet	165.1	205.4	212.0	1107

Analyzing the results presented in Table 9, we observe that sugar beet yields have been growing rapidly, although most of the products were processed to produce alcohol rather than sugar (Dąbrowski, 1992).

Researchers and scholars who were engaged in leguminous crops studies attached great significance to the cultivation of clover. The academic papers centred on soil tillage, the variety of cultivars, the traits of sowing, tending, harvesting, drying and threshing (Czaykowski, 1902; Antoniewicz, 1905; "Koniczyna perska", 1913).

Judging from Table 10, one is to observe that the clover was sown to produce hay and seeds alike (Pilat, 1900). Consequently, different methods of sowing, tendance and processing were employed.

The demand for hay and seeds was obviously different and dependent on the exigencies. That is why the average annual area for clover per hay cultivation was much larger than that for clover per seed (Klapchuk, 2015).

Table 10. **Clover crops and harvesting (1889–1898)**

Clover	Area, ha			Crop, cwt	
	Total	*% to agricultural lands*	*% to ploughed fields*	*Gross yield*	*per 1 ha*
For hay	258832	7.93	6.81	8741295	33.77
For seeds	15339	5.93	0.4	23853	1.56

Table 11. **Areas and crop yield in 1899** (Klapchuk, 2015)

Clover	West Galicia			East Galicia		
	Area, ha	*%*	*Crop yields, cwt / ha*	*Area, ha*	*%*	*Crop yields, cwt / ha*
For hay	141256	48.4	43.5	150670	51.6	30.9

The areas used for the cultivation of clover for hay increased from the annual average of 258832 ha in 1889–1898 (see Table 10) to 291926 ha in 1899 (Table 11). There is also a noticeable difference in yield between West Galicia and East Galicia.

The authors who wrote on clover issues emphasized that it is a perfect forage fodder for animals, and its processing enriches the soil with nutrients ("Suszenie koniczyny", 1886; "Siewajcie konicze", 1907; "Konicz czerwony", 1910; "Koniczyna perska", 1913).

Quite intimate knowledge of clover was presented in Bronisław Janowski's work, who offered advanced methods of growing clover mixtures and described the growing practices, harvesting and processing of the finished materials extensively (Janowski, 1908).

The important place among industrial crops was occupied by cultivation of flax for the fibres (Jarosiński, 1916). Several fundamental works of that period contributed to agricultural extension in

this area. It is worth making a careful note of Władysław Noskowski's work, an agronomist and a teacher at the Agrarian School in Dubliany, where he turned the attention of agricultural producers to the number of flax varieties, its sowing features, how to tend to them during growth, how to make fertilizers, how to undertake measures against maladies and pests as well as what the latest methods of harvesting are (Noskowski, 1872).

There was also published Wojciech Chłopiński's *Cultivation and Processing of Flax* (Chłopiński, 1907) which was commissioned by the Galicia Economic Society in Lviv, and testifies to profound interest of farm representatives in flax cultivation. It stands to mention that Wojciech Chłopiński studied flax farming systematically and put high emphasis on this branch of farming operations. In addition to the work just listed, the author had other popular publications relating to flax (Chłopiński, 1913, 1917).

Undoubtedly, science-education works of the study period had a positive impact on the development of flax farming in Galicia; most of them were issued in East Galicia.

Table 12. **Flax crops and harvesting over a period of 1889–1898** (Pilat, 1900)

Crop plant	**Area, ha**			**Crop, cwt**	
	Total	***% to agricultural lands***	***% to ploughed fields***	***Gross yield***	***per 1 ha***
Flax	25280	0.78	0.67	83798	3.31

Table 13. **Areas and crop yields in 1899** (Klapchuk, 2015)

Crop plant	**West Galicia**			**East Galicia**		
	Area, ha	***%***	***Crop yields, cwt / ha***	***Area, ha***	***%***	***Crop yields, cwt / ha***
Flax	11542	48.8	3.2	12088	51.2	3.7

When compared Table 12 with Table 13, we observe that the areas used for flax cultivation in 1899 decreased as compared with the annual average for 1889–1898. However, more consideration was given to flax cultivation in East Galicia than in West Galicia; the crop yields in East Galicia were higher respectively.

Horticulture was coming into ascendance in the region during the study period, which was encouraged for further development and improvement by researchers, scholars, authors of science-education literature (Table 14). The published works gave detailed instructions on how to plant gardens, to tend to them in order to have sufficient yield, the varieties of seedlings; a large number of such studies have been published just as in West Galicia (Giżycki, 1845; Konkolewski, 1847; Kozubowski, 1868; Czepiński & Langie, 1868–1869; Mieroszowska, 1890; Brzeziński, 1897), so in East Galicia (Giżycki, 1845; *Krótki wykład*, 1852; Kisielewski, 1869, Schmidt, 1878; Boberski, 1880; Roehring, 1881; Pierożyński, 1882; Ćwikliński, 1882; Oleskow, 1885).

Table 14. **Fruit tree species in Galicia** (Klapchuk, 2015)

Region	**Proportion of fruit tree species, %**								
	Apple trees	***Pear trees***	***Plum trees***	***Cherry trees***	***Sweet cherry trees***	***Apricot trees***	***Peach trees***	***Mulberry trees***	***Nut trees***
Galicia	58.4	11.1	17.0	7.1	4.3	2.2	0.1	0.1	3.3

In publications related to horticultural development, a point was made to the need to organize a fruit trade, to establish agencies that could purchase and distribute the fruit-growing products (Gniewosz, 1908). The total area used for orcharding in Galicia was 71.1 thousand hectares. At that time more than 6.1 mil. pcs. of fruit trees were growing in Galicia or 129 pcs./ha (Table 15) (Klapchuk, 2015).

Compared to the publications relating to the cultivation of orchard trees, the number of printings on fruit-bush growing was much lower. The reason was that this type of horticulture was underde-

veloped in the region; certain attention in the science-education works was also turned to currants. It was argued and noted that this type of horticulture merits more consideration of local farmers, as its products are tasty and useful ones ("Polepszyć można rodzaj porzeczek", 1887; Tabeau, 1901; Morawski, 1902a).

Table 15. **Orchards in Galicia** (Khraplyvyi, 1936)

Region	Number of trees	Number of trees per 1 ha	Fruit harvesting	
			cwt	*kg per 1 person*
Galicia	6122123	129	1300129	26.4

Popular journals and scientific editions have also published material on the cultivation and tending to gooseberries (Trzebiński, 1904; Namysłowski, 1907, 1913; Chmielewski, 1912), raspberries (Tabeau, 1901; "Jak należy postępować", 1906), and viniculture (Kośnierski, 1881; Brzeziński, 1904; Zając, 1911; Chłapowski, 1912) occasionally.

Hayfields and pasturage were an essential source of natural forage for livestock. There were 562 thousand hectares under hayfields in Galicia. Hayfields were divided into lowland (55.2%), field (42.7%) and reclamative (2.1%). Hayfields of Galicia had high crop yields (Table 16) (Klapchuk, 2015). Low-lying hay meadows yielded 58.5% of all hay which was collected in Galicia, field hay meadows – 36.5% whereas reclamation hay meadows – 5%.

Table 16. **Hay harvesting (ths cwt)**

Region	Lowland			Field			Reclamative			Total
	1 mowing	2 mowing	***Total***	1 mowing	2 mowing	***Total***	1 mowing	2 mowing	***Total***	
Galicia	4594.6	1373.1	***5967.7***	3049.2	683.4	***3732.6***	370.1	134.7	***504.8***	**10206**

As for the pasturage, the farms of Galicia employed 211284 hectares of agricultural land for grazing (Khraplyvyi, 1936). Mountain valleys were at the forefront of unpopulated mountain pasture grounds (Pawłowski, 1928).

The issue of Galicia agricultural industrialization, its economic necessity was a pressing one during the studied period. More and more emphasis was placed on the processing of agricultural products using the then mature technologies: sugar refining, flour manufacture, brewing, and yeast production. Needless to say, evidence-based education could not remain uninvolved in these processes, but tried to influence them positively by generating and publishing new results of agricultural research (Rutowski, 1883; Pawlik, 1902; Bandrowski, 1902; Domański, 1903; Gerasiński, 1904; Gargas, 1904; Pawłowski, 1905).

The foregoing processes were reflected in the works of researchers and scholars who, in due course, analyzed the processes that took place on the eve of the First World War in the historical aspect (Styś, 1936; Wykrętowicz, 1968; Michalewicz, 1993; Spyra, 1994; Kramarz, 2002; Kargol, 2010; Wnęk, 2010; Broński, 2012).

In terms of the current study, a Franciszek Bujak's quotation is appropriate[3],

> Modern farmers set up distilleries and grow potatoes instead of grain, which they sell in the form of spirits and possibly ready-to-use vodkas; they set up sugar mills to grow beets; they set up breweries to bring in better out on barley; they process the wheat into flour and bran in their own mills and make bread in their own bakeries; they keep the gardens from which fruit and vegetables are processed into tinned food and other preserves. (Bujak, 1917, p. 289)

[3] *Rolnicy nowocześni zakładają gorzelnie i zamiast zboża uprawiają ziemniaki, a te sprzedają w formie spirytusu, a ewentualnie gotowych do konsumpcji wódek; zakładają cukrownie, aby uprawiać buraki; zakładają browary, aby lepiej spieniężyć jęczmień; pszenicę przerabiają na mąkę i otręby we własnych młynach, a nawet mąkę na chleb we własnych piekarniach; utrzymują ogrody, z których owoce i jarzyny przerabiają na konserwy i inne przetwory.*

Findings. Thus, the development of agricultural knowledge in Galicia is evidenced by a large number of publications on agricultural issues. It should be noted that there was fostered an awareness of the need to reform outdated and ineffective methods of agriculture under the influence of popular science thought.

Based on the above analysis, we argue that a significant number of scholars, researchers, and reformers, who were engaged in regional distinctive features of farming, believed that agriculture would be more successfully developed than industry in the Galician territory (Wnęk, 2015).

The results of scientific ideas influence on the Galicia agrarian sector development are summarized in Table 17 by the example of the dynamic growth major crop yields in the 1901–1911 timeframe (Table 17).

This was made possible by propagation and education of knowledge on both the latest technologies in agriculture and new methods of work organization in the industry. The problems which did not allow gaining heavy yields were revealed, the scientific approach to soil constitution studying as well as introduction of effective mechanization, use of fertilizers, conducting land reclamation and other things were developed.

A clear-cut breakthrough in vegetable cultivation was the development of new cultivar species, which enabled a significant enhancement in yield.

Table 17. **Gross yield of staple crops** (Kryukov, 1915)

1901–1910		**1911**	
Gross yield, cwt	***Yield, cwt / ha***	***Gross yield, cwt.***	***Yield, cwt / ha***
Rye			
6180353	9.8	8312636	11.9
Barley			
3331236	9.65	4295597	12.65
Oats			
6195941	9.5	8428168	12.0
Maize			
910245	11.4	719291	11.5
Potato			
?	111.2	64794276	126.3

Another important asset of agricultural education was the fact that the authors of scholarly and popular science works gradually instilled in agricultural readers the belief that raising their cultural context level of certain economic processes comprehension would significantly improve their economic situation and increase productivity of farm workers.

The titles also underscored that the work of farmers is a unique and complex activity, which is aimed at obtaining agricultural products that are a source of income for people not only in Galicia but throughout Europe as well.

Having regard to the above, we witness that a substantial advance in the development of agriculture was registered in Galicia of the Austro-Hungarian era. All this would have been impossible without the patient work of agricultural ideologists, who relentlessly and doggedly promoted innovative concepts of working on land.

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