DILEMMAS OF MEASURING AND EVALUATING INCOME IN AGRICULTURE IN THE EUROPEAN UNION

Key words: agricultural income, measurement and evaluation dilemmas, European Union

ABSTRACT. The aim of the article is to outline problems related to the measurement and assessment of income in European Union agriculture. Research shows that measuring agricultural income, as well as assessing differences in income between EU countries are a matter of many doubts. They not only result from problems of a methodical nature, but also from specific solutions of a cultural nature (e.g. sale of a successor farm or free family transfer). The methodology used to determine income in agriculture currently used in the European Union only takes income resulting from agricultural production and the processing of agricultural products as well as other activities directly related to agricultural production into account. Other sources of farmer income are ignored. This applies, for example, to remuneration for work outside the farm, social allowances and revenues from the lease or rental of property resources. Thus, the methodology used to determine the income of persons related to agriculture prevents or at least hinders the full assessment of the income situation of farmers in the EU and in individual countries, including Poland. The current way of measuring farmer income causes certain economic and social repercussions and is often criticized. The conclusion is that there is a need to improve the methodology of measuring income in agriculture.

INTRODUCTION

Income largely determines the level of wealth of the population. This, in turn, often affects the quality of life and degree of implementation of the needs and aspirations of individuals. Not only the absolute level of earned income is important here, but also their relation to the income of other social groups, or the average level of remuneration in the economy [Zegar 2001, 2012]. Ensuring adequate income in agriculture is an important goal of the European Union’s common agricultural policy and national agricultural policies [Czyżewski 2005, Baer-Nawrocka 2013]. The level of income is largely due to the way it is measured. This applies, in particular, to agriculture. Agricultural income is determined on the basis of two EU data sources. They come from economic accounts for agriculture (EAA), which are a variation of national accounts adapted to the specific features of the agricultural sector, and from farm accounting FADN [Vrolijk et al. 2007, Goraj 2011].

The specific features of the functioning of family farms cause problems with measuring and determining the total income of this professional group, whose members often appear
as persons performing two or more professions. On the one hand, these people conduct productive activity on a farm, while, on the other, they also work outside the farm and perform other professions. They can also use retirement or disability pensions or other forms of social assistance. Finally, they can use farm products produced on the farm to feed their families, taking advantage of the difference in prices (costs) of their purchase in relation to the retail prices of food products.

Income thus obtained not only determines possible consumption, but also the level of accumulation and development abilities of agricultural workshops. The problem in shaping the income of the agricultural population is fluctuation in individual years, as well as in individual months of the year. It depends on the delay in the phase of incurring expenditure and obtaining revenue, as well as changing climate conditions over time. The consequence of this are changes in the volume of production, and then also the prices of agricultural products and prices of the means of production purchased.

In closed economies, price changes are influenced by the law of supply and demand. In turn, in open economies, the mechanism resulting from this rule, especially on a local scale, does not have to be revealed, which further complicates the shaping of a farmer’s income situation. In closed economies, a decline in the production and supply of agricultural products as a result of crop failure causes an increase in market prices of agricultural products; and, in fertile periods, it causes the opposite situation.

It is different in open economies, covered by the globalization process. Locally occurring declines or increases in production and supply need not cause local changes in market prices. As a result, this mechanism does not work and does not limit the income fluctuations of agricultural producers. The level of agricultural product prices at a local level is increasingly determined by production and the economic situation at a global level. In addition, the importance of speculation on the global market is growing, which is not indifferent to the prices of agricultural products on the world market. As a result, the amplitudes of farm and farmer income fluctuations over time are increasing. [Hergrenes et al. 2001, Zegar 2001, Phimister et al. 2004, Vrolijk et al. 2007, Niezgoda 2009, Runowski 2010, Hill 2012, Runowski 2014, Czyżewski 2015, 2017].

This then translates into instability in social moods among farmers and other professional groups. In periods of declining income in agriculture, emerging dissatisfaction with income among farmers is generally understood in broad public view. However, during periods of a favourable income situation in agriculture, opinions on unjustified economic privileges for agricultural producers are not uncommon. In assessing the level of income of the agricultural population, one should take the method used to measure the income of the agricultural population as well as the trends of their change over time and in relation to the income of non-agricultural population into account. The aim of the research was to identify problems related to the measurement of income in agriculture of the European Union as well as trends in their development in the years 2005-2017. The article looked for answers to the following questions: 1. How is agricultural income measured in the European Union? 2. What are the trends in the development of income in EU agriculture? 3. What is and how does the relation of income of the agricultural population to the income of the non-agricultural population change over time?
MATERIAL AND METHODS

Literature on the subject was used in the analysis of problems related to income measurement, while DG Agriculture and Rural Development, FADN and Eurostat data were used to assess changes in the income situation in agriculture.

For this purpose, agricultural statistics data, including information necessary to determine the income of agricultural holdings (e.g. harvests of agricultural products, livestock and animal product production, purchase prices of agricultural products, material and labour inputs, or other types of costs) as well as data from other official databases (e.g. subsidies and taxes) was used. Individual European Union countries prepare national and regional data in accordance with an applicable procedure. On their basis, Eurostat generates aggregated data for the EU. Income in agriculture is the result of the involvement of basic production factors (land, capital and labour), regardless of the type of ownership. It is the difference between the value of agricultural production increased by subsidies and the costs incurred to obtain it. It is calculated for both family and corporate farms. After deducting the costs of external factors (paid employment, interest on borrowed capital and rent) as well as the value of intermediate consumption (current assets), the income of an agricultural entrepreneur, which constitutes the remuneration for own factors of production, is obtained. For comparative purposes, income determined in this way is referred to the unit of human work. The second source of information on agricultural income is the farm accounting system (FADN). It is an annual survey of farm income. The system covers farms that exceed determined economic values at a national level. The representation of all holdings above these economic thresholds is ensured. Individual countries record data for farms covered by the FADN accounting system in accordance with EU regulations, and relevant European Commission departments recognize this data for the entire EU.

FINDINGS

The conducted research indicates that, in the European Union, a diversified dynamics of changes in prices of agricultural products and prices of means of production in the analyzed period is observed (Figure 1). This is a characteristic pattern, especially for the agricultural sector, which has close contact with nature. It also has its sources in the differences in the scale and market power of agricultural entities and entities operating in the agricultural environment.

Entities operating in a supportive environment and in connection with agriculture usually have greater market power than individual farms operating in a dispersed manner. This is reflected in the unfavourable development of the relation between the prices of means of production and the prices of agricultural products. Along with the changing dynamics of agricultural product prices, the prices of agricultural input also change. As a consequence, this results in the so-called scissors for agricultural product prices and input prices, which is unfavourable for the income level of the agricultural population and leads to a drainage of agricultural income to other sectors [Czyżewski 2005, Runowski 2010]. This phenomenon is observed in particular in countries where farms are small in terms of economic strength and where, at the same time, the advancement of horizontal and vertical integration processes is low.
Individual European Union countries differ in the size and structure of agricultural production. They are characterized by different amounts of plant yield and animal productivity. At the same time, the volume and structure of expenditure on production varies. All this translates into a diversified level of achieved income of farms and people related to agriculture [Niezgoda 2009, Phimister et al. 2004, Runowski 2014, Zawalińska et al. 2015]. Hence, among the main tasks of the common agricultural policy is the pursuit of ensuring an adequate and stable income for the agricultural population. The basic ways of measuring agricultural income in the European Union include the reference of the net value added of the agricultural sector per full-time employed person in agriculture (AWU) and, in particular, per person of a member of the agricultural family (FWU). Figure 2 presents the amount of income in EU agriculture in 2005-2017.

It shows that the level of income of the agricultural population in individual countries of the European Union is influenced by the net value added and the number of persons employed full-time in agriculture (AWU) or the number of persons employed as full-time members of the agricultural family (FWU). The net value added is calculated by subtracting incurred outlays of current assets (the value of intermediate consumption), the value of consumption of fixed assets (depreciation), taking into account the balance of subsidies, subsidies and taxes, from the value of achieved agricultural production. The net value added calculated in this way is a kind of income, constituting the remuneration for the use of basic production factors in the production process, i.e. land, labour and capital. It should be noted that due to the variability of climate conditions and market conditions observed over time, revenues show variation in individual years (Figure 2). Income volatility over time is a significant problem of common agricultural policy. So far, no effective ways or actions have been developed to stabilize agricultural income. It seems that due to the specificity of agriculture, it is necessary to change the approach to assessing the income situation in agriculture by determining the average income over several years in the form of a so-called moving average, e.g. from 3 or 5 years. In addition, the introduction of farm income insurance and the creation of an income stabilization fund should be considered.
It is also necessary to make farmers aware that fluctuations in the volume and value of production and income are a natural feature of agricultural production. This implies the need to create certain financial reserves in good times that will serve to supplement the shortfall of financial resources in bad times.

Relative measures are often used to assess changes in the income situation of agriculture in the European Union and in individual countries as well as individual types of farms. Entrepreneurs, including farmers, are also trying to analyse income change trends. The basis for this type of comparison is the reference of income from a given year to the income from previous years expressed as percentage indices (indices). The weakness of this approach is due to the fact that it does not allow for the assessment of absolute changes in the level of agricultural incomes, or learning about differences in the level of income between countries or farms. However, it allows you to assess the direction and pace of income change compared to the previous year or to a level from a longer period. Information on relative change in income is not only of significant economic importance, but also psychological and affects the degree of satisfaction of farmers and the assessment of the marginal utility of income achieved. It provides the basis for comparisons and inferences on the scale and direction of changes in the income situation in a given country or farm in relation to the previous period and other reference grounds (country, type of farm or other). Due to the observed variability of revenues from year to year, it may be advisable to make comparisons not only to the previous year, but also to the year or years from further back in time. This approach gives a more complete picture of changes in the income situation in agriculture (Figure 3).

Figure 3 shows that the indexes of changes in agricultural income in 2017 compared to 2010 in individual countries are different. The lowest (downward) are found to be in the agriculture of Malta, Finland, Belgium, Slovenia and Greece, while the highest (upward) in Bulgaria, Slovakia, Hungary, Ireland and the Czech Republic. The index for Poland corresponds to the average index for the EU-28. The differences observed in this respect indicate that, within the single European market, in the same time frame, some countries improved their income situation in agriculture, while others, in turn, noted its significant deterioration. This leads to conclusions for the common agricultural policy that should encompass and counteract such a phenomenon.
However, it should be remembered that income in agriculture only consists of the income that comes from agricultural production and other production carried out on the farm, e.g. processing activity. Income from other sources is not included. The conviction of methodical imperfections in measuring agricultural income is not common. So far, no major efforts have been made to integrate the income of agricultural families as a whole.

Another problem concerns the method of taxing income. From the point of view of the farmer and his family, it is not income as such, but income after tax that matters. In countries with universally applicable income tax, the resulting income is then subject to general taxation. In other countries where agriculture is not subject to general taxation, the income generated is exempt from general income tax. This is another problem in providing a fully comparable picture of the income situation of farmers in individual European Union countries. Another problem arises from the fact that agricultural income is the result of the involvement of all three basic factors of production, namely land, labour and capital. When it comes to the labour factor, the work of own farming family members and hired labour is meant. Therefore, it is moving towards determining income from work, i.e. after deducting the costs of involvement of external factors of production, i.e. the amount of land and capital. This method of calculation means that income from work is lower than the total income of a farm (Figure 4) and increases the scale of income disparity in the agriculture of the European Union.

When assessing the level of income in agriculture, it is worth referring to the issue of excessive involvement of capital in relation to needs. This is, inter alia, related to the scope of investments implemented by farmers, which do not always have economic and technological justification. The issue of overinvesting in farms is often emphasized. The result is high depreciation and, consequently, a reduction in income. Admittedly, increased depreciation does not lead to an increased outflow of cash, but results in a decrease in income. However, investments implemented beyond existing needs require capital commitment, which, if comes from external sources, generates costs in the form of debt service,
which also reduces the income of households, worsening their relation to the income of the population in the total economy. Investing “exaggerated” over the existing needs of a farm is often the case. Thus, the question must be posed: can a farmer investing beyond necessary necessity and need expect such cost and input to be recognized as a socially justified cost of obtaining income? The answer to this question is important because, as recent experience shows, if there are problems in servicing the debt of investment loans, agricultural entrepreneurs expect state aid to solve them. It seems that such expectations do not deserve social acceptance. Thus, in public opinion, especially in periods of good economic growth in agriculture, there are voices of opposition to additional financial support for agricultural entrepreneurs. When discussing the differences in the income of the agricultural population in relation to the average income in the economy, one cannot lose sight of the fact that the agricultural population has wider access to public goods generated by agriculture in relation to the non-agricultural population, and in particular the urban population. A certain obstacle in this respect is the unsolved problem of valuing the value of public goods and the perception of their usefulness by consumers.

When referring to measuring income in agriculture, it is worth bearing in mind some methodological differences arising from the scope of agricultural accounting and taxation methods in individual countries. Although the general accounting principles are the same throughout the European Union, there are some differences characteristic of the country. Here are some examples. When determining the cost of labour on farms in Denmark, the work of family members is valued and included in the costs, excluding a farmer’s work, which is not a cost. It is different, e.g. in Poland, where the costs do not include the work of family members. The rules for taking over farms are also different between countries. In Denmark, there is usually a transfer of a farm on the basis of its purchase by a successor, who usually has to take a long-term loan for this purpose. This means that, in Danish farms, the cost of servicing long-term debt is a very important item in total costs. Thus, agriculture in Denmark is characterized by a relatively low level of profitability, in relation to the scale of production present there and high technical efficiency of production processes. In many other countries, in turn, as in Poland, the successor takes over the farm free of charge. There are other differences between countries that ultimately affect
agricultural income. This applies, for example, to the number of hours worked per year as a full-time employee. In Poland, it amounts to 2120 hours per year, and in France, for example, 1,600 hours, respectively. This affects the number of people employed full time in agriculture in the country, and ultimately the level of income per person. The analyses carried out by the European Court of Auditors show that there are practices aimed at increasing the number of working hours on farms, and consequently leading to an increase in the number of full-time employed in agriculture. Another issue is the various methods of depreciating fixed assets. The use of higher depreciation rates generates higher costs of consumption of fixed assets, thus reducing farm income. The level of income generated in agriculture in individual countries is also affected by the level of agriculture; support from the European Union budget, which varies between countries, as well as the level of support for agriculture from national budgets, the scale of which varies from country to country. In general, wealthier countries subsidize agriculture more than less prosperous countries.

There are also other restrictions on the full comparability of agricultural income per capita between individual EU countries. In addition to the already mentioned principles for calculating the depreciation of fixed assets, there are some differences in determining the standard costs of agricultural land rent and national budget support programmes. An important issue in measuring agricultural income is the occurrence of the so-called shadow economy in the economy, its scale, and methods of accounting and taxation used. Irrespective of the comments and problems related to the objective measurement of agricultural income, a large variation in the income level between countries can be observed [Hill, Dylan 2015], as illustrated in Figure 5.

Figure 5 shows that, in the year under analysis, the lowest income per capita was recorded in the agriculture of Romania, Slovenia, Croatia, Poland and Lithuania, and the highest in the agriculture of the Netherlands, Denmark, Great Britain, Belgium and Germany. This is a result of the impact of many factors, including farm size, production structure, and efficiency of manufacturing processes. In the quest to level out income dif-

![Figure 5](image-url)
ferences in agriculture, one cannot ignore significant differences in labour productivity between countries, types of farms, and between sectors of the economy. Higher incomes should result from higher labour productivity.

The method of measuring agricultural income in the European Union is subject to criticism. It is pointed out that there is no system that would provide information on the full income of farmer households. Eurostat uses three indicators (Indicator A, B and C) in measuring income in agriculture [Zawalińska et al. 2015], the base of reference is different in each of them. This means that sometimes income is given for a full-time employee in total, and at other times for a full-time employee of the family. There is a need to exercise caution when interpreting agricultural income.

Recently, there has been a discussion on the international arena about the desirability of subsidizing agriculture, especially in highly developed countries [Soliwoda et al. 2016]. It emphasizes that financial support for agriculture in richer countries limits the production capacity in agriculture in less developed countries. In the absence of funds for financing their own farming, the latter are unable to establish international competition on the global agricultural market. Also, in discussions held in the country there are questions about the legitimacy of increasing financial support for agriculture from the state budget, the more so because the current financing strategies are aimed at compensating the costs of producing public goods by agriculture, and not at supporting agricultural income. In conditions of previously used agricultural policies (before 2003), financial support served mainly to supplement income. This was accompanied by a relative cheapness of agricultural products and then also food, which was beneficial for consumers. Consumers cannot currently count on such a market effect when financial support targeted at agriculture is primarily used to offset additional costs associated with efforts to strengthen the production of public goods (biodiversity, environmental protection, animal welfare, greening, etc.). Thus, it is difficult to count on a further increase in financial support for the agricultural sector both in the European Union and in individual countries, which will also affect the income situation in agriculture.

SUMMARY

Ensuring adequate income in agriculture is an important goal of the European Union’s common agricultural policy and national agricultural policies. In assessing the level of income, the method of measuring the level of income generated in agriculture is important. There are still a number of unsolved problems in this respect. They relate to the methodology of measuring income in agriculture, how they are recognized and presented, as well as comparative possibilities between EU countries. According to the methodology used in the European Union, agricultural income only includes income from agricultural production and from those activities related to agricultural production (e.g. agricultural processing). Instead, other sources of income are ignored. These may include remuneration for work performed outside the farm, retirement or disability benefits received, social benefits or income from rent. Thus, an objective assessment of the income situation in EU agriculture and in individual countries is difficult. It follows the need to improve the methodology of measuring income in the agriculture of the European Union in order to
provide objective information on the full income of farmer households in the EU, as well as their full comparability between EU countries. Analysis shows that the trends in shaping income in agriculture in individual European Union countries are not the same. Over the same period, a decline was recorded in a group of countries, while in another group there was an increase in income. On average, there is an upward trend in EU agriculture. Nevertheless, it should be taken into account that the derived information on the average level of income does not reflect the situation in individual countries. For this reason, it is necessary to analyze the income situation in individual countries, regions or farm types. In assessing the income of the agricultural population, it is important to compare them to the income of the population employed in the total economy. The conducted research showed that, in the analyzed period, benefits for the people employed in agriculture was observed in this respect, although this income was still at a much lower level than the income of the population employed in other branches of the national economy. Therefore, measuring and assessing income in agriculture is a complex issue. This issue requires further research.

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**DYLEMATY POMIARU I OCENY DOCHODÓW W ROLNICTWIE**

Słowa kluczowe: dochody rolnicze, dylematy pomiaru i oceny, Unia Europejska

**ABSTRAKT**

Celem artykułu jest nakreślenie problemów związanych z pomiarem i oceną dochodów w rolnictwie. Z badań wynika, że zarówno pomiar dochodów rolniczych, jak i ocena ich zróżnicowania między krajami UE są złożonym zagadnieniem. Wynika to nie tylko z problemów natury metodycznej, ale również szczegółowych rozwiązań o charakterze kulturowym – np. sprzedaż gospodarstwa następcy lub bezpłatne przekazywanie rodzinne. W aktualnie stosowanej w Unii Europejskiej metodyce oceny sytuacji dochodowej producentów rolnych ujmuje się wyłącznie te dochody, które mają swoje źródło w produkcji rolniczej i produkcji z nią związanej – np. przetworstwo rolne realizowane w gospodarstwie. Nie uwzględnia się innych źródeł dochodów, np. takich jak dochody osiągane z pracy poza gospodarstwem rolnym, ewentualnych świadczeń emerytalno-rentowych i socjalnych, przychodów z czynników produkcji (dzierżawa, wynajem). To niewątpliwie utrudnia obiektywną ocenę faktycznej sytuacji dochodowej rolników w UE i w poszczególnych krajach, w tym w Polsce. Z tego względu stosowany w UE sposób pomiaru dochodów rolników jest krytykowany. Zachodzi zatem potrzeba doskonalenia systemu pomiaru dochodów w rolnictwie.

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