

# METHODOLOGICAL AND METHODOICAL ISSUES OF THE ECONOMIC SUSTAINABILITY OF AGRICULTURE AND AGRICULTURAL FARMS

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**Abstract:** *Based on a critical review of scientific literature, the category 'economic sustainability' is defined as the dynamic development of agrarian systems over a long period of time in line with the changes in the external and internal environment which ensures efficient performance, good financial condition and competitiveness.*

*We observe the hierarchical levels of the system for assessing economic sustainability to first select the principles, and then the criteria and indicators to be employed in the assessment, so as to reveal the characteristics and the underlying and significant aspects of the performance of the agricultural sector and agricultural farms.*

**Keywords:** *agriculture, agricultural farms, economic sustainability, economic efficiency, competitiveness, financial stability, adaptability.*

**JEL:** Q12, Q56.

**T**he market conditions in which agricultural entities operate are becoming increasingly competitive and change dynamically. This poses serious challenges and stricter requirements to agricultural producers who want to further develop their business. In order to continue to operate, they need to constantly adapt to their changing environment. Hence, the economic sustainability of agrarian systems (i.e. the agricultural sector and agricultural farms) is becoming a major issue in economic theory and practice. So far, there seems to be no common approach to interpreting and assessing economic sustainability. Discussions and research work are still at an early stage, while

publications related to assessing the economic sustainability of agricultural systems are few, despite the significance of the issue.

The aim of our research, therefore, is to study related scientific literature and to define the category 'economic sustainability' of agrarian systems and to design a set of indicators which should be employed when assessing economic sustainability.

## **Defining the Economic Sustainability of Agrarian Systems**

The characteristics of the category 'economic sustainability' are still the subject of lively discussions. There are different opinions as to what the term implies and so far no common approach has been adopted how to define it. Hence, the existing differences in standpoints result in different approaches to and methods of assessment.

J.R. Hicks is considered to be the father of the economic sustainability concept with his research of income that aimed to 'identify the share of income which people could consume without getting poor'. In his 'Value and Capital' (first published in 1939, second edition published in 1946), the author defined 'income' as 'the sum which an individual could spend over a specified period and still be well-off at the end of that period'. The author stated that 'the practical goal of income is to serve as a manual on reasonable behaviour' (J. R. Hicks, 1946; p. 172). Hicks related sustainable development to the necessity to maintain a constant income for mankind which was to be generated by non-diminishing capital stock (Hicks' income).

Conducted research of existing views about the category 'economic sustainability' confirms that they vary widely. In our opinion, some authors focus on individual aspects of the concept without being exhaustive in their approach, whereas other authors' approach is overcomplicated. Some authors try to define economic sustainability broadly, without taking into account its level, while others draw an overt distinction between the sustainability of a national economy and that of an individual business entity.

Based on the critical review we have conducted of existing opinions in related scientific literature, we will attempt to provide our working definition of the category 'economic sustainability' by accounting for the specific nature of agriculture and agricultural farms. We will also seek the answer to the question whether it is necessary to distinguish between the sustainability of an economy and the sustainability of a business entity. Our aim is to provide a feasible definition which will enable us to formulate the principles, criteria and indicators and justify the approach to and methods of quantifying (assessing) economic sustainability as an element of overall sustainability.

Authors agree unanimously that the category 'economic sustainability' refers primarily to economic systems with complex development (national economies and branches at a macro-economic level and business entities at a

micro-economic level) (R. Repetto, 1985; J.H. Spangenberg, 2005; Alber, 2002; Okladskiy, 2000; O. Stoichkova, 2016, etc.), or a production system in particular (A. D. Basiago, 1998).

A number of authors have attempted to define the economic sustainability of an economic system at a macro-economic level. A viewpoint which may be attributed to the group of similar attempts states that economic sustainability implies 'a production system which meets current levels of consumption without compromising on future needs' (A. D. Basiago, 1998; p. 150). Similarly, another author assumes that economic systems 'must be governed so as to live from the dividends we receive from our resources and to maintain and manage our assets in a manner which will allow future generation to live well or better than us' (R. Repetto, 1985; p. 10). The author also relates economic sustainability to a certain level of incomes – 'the largest sum that may be currently consumed without reducing prospective consumption in the future' (R. Repetto, 1985; p. 10). Those definitions clearly reflect the authors' belief that the demands of future generations need to be provided for no less than those of the current generation. We support the view proposed by some authors (S. Anand, A. Sen, 2000; p.2030) who object to a similar definition and point out that sustainability 'makes no point' if 'the currently existing living conditions, which will also be maintained in the future, are unfavourable or even poor'.

A group of authors seek to provide a more general definition of the category and define economic sustainability as 'a sustainable livelihood and improved welfare through economic growth and poverty reduction' (John Nash, 2005). General as it may sound, this definition is more successful in specifying the objective of economic sustainability and the ways in which it may be accomplished.

We still need to specify the type of growth which authors refer to within the context of economic sustainability. Most authors implicitly assume that an incessant or indefinite (or at least long-term) sustainable growth is an element of the sustainable development concept in terms of economic systems. There are other points of view in related theory, too. One of them states that the aim of sustainable economic development is to increase the stock of man-made capital to a sufficient extent so that it would be safe to reduce the stocks of other capital (OECD, 2001). Another author is even more specific by claiming that economic sustainability must be related to the requirements on environmental sustainability, which means that the exploitation of resources should be restricted in order to guarantee the sustainability of natural capital; in other words, the underlying principle is that of 'an economic growth which seeks qualitative, rather than quantitative growth' (A. D. Basiago, 1998; p. 150).

A positive aspect of these points of view is that the authors approach economic sustainability in terms of its dynamics by relating the category to the ability of the system to function in future as well. Any assessment of economic sustainability must give some awareness about the further development of the system rather than merely evaluate its past or current condition. It is therefore

clearly stated that economic sustainability is 'a scientific category which reflects the condition of an economic system in a market environment and guarantees its meaningful development at present and in the foreseeable future' (V. Kasarova, 2010, p. 1)

Yet, there are a several critical remarks to be made in terms of those definitions:

- They fail to approach the economic system in terms of the environment and do not take into account a number of important factors which are external to the system but have an impact on its development, e.g. the institutional environment; the market development; the macro-economic environment, and in the case of agriculture, the natural environment. It is a well-known fact that a sustainability level may vary depending on the specific socio-economic and natural environment in which a system develops. It is therefore necessary to include in the assessment the determining factors and the trends in the development of the economic, institutional and natural environment (Hr. Bashev, 2016). We should also note that in order to be sustainable, an economic system must be able to adapt to changes in the environment (institutional, market, macro-economic, etc.);

- The definitions are rather general and fail to identify the specific features and properties of the economic sustainability of a system.

Some authors attempt to be more specific when defining the category by adding more 'criteria' of economic sustainability at a macro-level, such as innovativeness (Rennings, 2000), competitiveness (Klemmeret al., 1998), government debt (Bundeskanzleramt, 2002). Yet another group of authors prefer to exclude the 'criteria' which cannot be viewed as related to sustainability, such as: inflation or trade imbalances which are politically significant but are broader in scope and refer to the need to keep the balance between different interests (J.H. Spangenberg, 2005); more conventional criteria like aggregate demand or consumption levels due to their limited relevance to the issue (Etxezarretaet al., 2003). Bearing in mind the nature of a principle, i.e. 'an underlying, major rule, an axiom' and that of a criterion – 'a feature, standard or measure of judgment' (according to the dictionary), we believe that these authors refer to the principles and not the criteria of economic sustainability. This group also includes authors who approach economic efficiency as a principle of economic sustainability. They therefore state that 'available production factors should be exploited as efficiently as possible without compromising on their future consumption' (Hák, T., Moldan, B., Dahl, A. L., 2007; p. 311).

A contribution to the theory of sustainability, including economic sustainability, is the so-called Orientor Theory developed by H. Bossel (1999). He claims that 'a chain is only as strong as its weakest link' while according to the theory he proposed, selected indicators should represent the weakest links of a system' (H. Bossel, 1999; p. 86). Being highly abstract in nature, the theory seeks universal answers to the question how to evaluate the scenarios, policies and the paths of development within an evolving system and within a dynamic

system environment and how to design sustainable strategies and management approaches.

In terms of this, six major components (guidelines) have been identified:

- existence and reproduction;
- efficiency;
- freedom of action;
- security;
- adaptability;
- coexistence.

The underlying hypothesis of the theory is that the long-term existence of any system and its sustainability face a serious threat when the performance of any of these components drops below a certain minimum level (J. C. Enders, M. Remig, 2015).

Based on the critical review of scientific literature, we can conclude that in order to be sustainable at a macro-level in the long run, a system must be efficient; competitive and adaptable to the dynamically changing environment so as to ensure expanded reproduction over a long period of time.

A large group of authors approach the category of economic sustainability at the level of business entities. There is a view in related scholarly publications that economic sustainability is 'the ability of an enterprise to maintain a certain level of target accomplishment which has been specified in advance within a dynamically transforming business environment' (O. Stoichkova, 2017). A similar view is supported by a group of authors who define economic sustainability as that condition of an enterprise in which all defining socio-economic parameters maintain the baseline equilibrium and remain within certain set limits under the influence of the internal and the external environment (I. V. Bryantseva, 2007; E.V. Korchagina; A.D. Kanchaveli et al, 2001; O. G. Bodrov, 2000; A.O. Parohin, N.A. Urban, 2015).

The positive aspects of these viewpoints are:

- economic sustainability considered to be a dynamic value;
- economic sustainability is related to the ability of enterprises to adapt to changes in the internal and the external environment.

We tend to disagree, though, with the authors' idea to identify economic sustainability with economic equilibrium which is a major feature of an economic system – opposing forces mutually neutralize each other in their interaction so that the properties of a system remain constant.

Economic equilibrium is approached both as a static condition, i.e. a state of equilibrium, and dynamically, i.e. as a balanced development process. In this sense, economic equilibrium relates to the concept 'sustainability of a system', yet it does not exhaustively convey the meaning of the category 'economic sustainability'.

Another group of authors approach sustainability as 'the ability of an enterprise to retain its financial stability under constant changes in the market environment...' (I.N. Omel'chenko, E. V. Borisova, 2007, p. 65). A major criticism to such an approach is that although financial stability is an essential

feature, it cannot fully reflect the nature of such a complex category as economic sustainability. In our opinion, the authors tend not to differentiate between stability and sustainability of business entities. Although mutually related, the two categories are not identical, since the stability of a system over a given period of time does not imply its sustainability in the long run. On the other hand, the stability of an enterprise depends on its sustainability. Table 1 presents the differences between the two categories. A comparative analysis indicates that economic stability is a short-term feature of a system and is achieved through operations management. In contrast, the sustainability of a system is a long-term feature of a system which relates to strategic management. In terms of development, the sustainability of a system is more important than its stability.

*Table 1*

*Major characteristics of the categories 'economic sustainability' and 'economic stability' of a business*

<b>Economic sustainability</b>	<b>Economic stability</b>
Economic development of the business	Steady performance indicators of the business
Invested capital growth	Planned investment
Estimated increase in remuneration	Remuneration size
Higher dependence on external factors	Higher dependence on internal factors
Expansion of the business activity	Implementation of the business plan
Seeking for opportunities to expand the market	Execution of signed contracts

*Source: quotations after M. E. Tsibareva, 2008, p. 199.*

According to some authors, the economic sustainability of an enterprise may be defined as its ability to counteract to the negative impact of a number of factors. These authors (O. V. Kuz'menko, E. V. Gritsenko, 2016) identify two major groups of factors which have an impact on economic sustainability:

- External factors that cannot be controlled by the enterprise, which renders it necessary for the entity to adapt to their impact – macroeconomic (e.g. the inflation rate; declining national income, instability of tax legislation, etc.); market (e.g. price regulation; market infrastructure development; changes in consumer demand) or other (political factors, demographic issues, economic uncertainty);

- Internal factors – in terms of production (technical and technological level); investment (investment activity; investment risk); organisation and management (management efficiency and quality; labour organisation; management strategy and tactics; marketing, etc.) and other factors (production quality; financial situation; production and resource potential).

Special attention should be paid to P. V. Okladskiy's definition that uses a slightly different approach and describes the category economic sustainability

as 'the dynamic compliance (adequacy) of the parameters related to the condition of the system (or enterprise) with the condition of the external and internal environment which ensures its efficient performance when the influencing factors are unfavourable' (P. V. Okladskiy, 2000; p. 177).

The positive aspects of his point of view are:

- The definition does not have the weaknesses we identified in the other definitions;
- The definition takes into account the constituents which will enable a system to adapt to changes in its environment;
- It identifies a major feature of a sustainable system – its efficiency.

According to another theory in scientific literature, the major components of the sustainable development of an enterprise are: investment and innovation activity; competitiveness; financial stability; ability to diversify while retaining the level of competitiveness of products; organizational and economic flexibility; the reproductive integrity of the system (YE.V.Korchagina, 2005). A positive aspect of this definition is that it identifies further features of economically sustainable enterprises.

According to that definition, the major requirements to the economic sustainability of enterprises are:

- Focus on the accomplishment of strategic goals;
- Compliance with the dynamics of the market needs;
- Independent and adequate management system;
- Certain development potential.

Due to the complex and multi-aspect nature of the category 'economic sustainability', another group of authors (V. Loginov, I. Kurnysheva I., 1996; V.I. Zakharchenko, 2002) define the economic sustainability of enterprises as a complex of production, innovation, and organisation and their interrelation and interdependence; the quality and innovativeness of production; the scientific and technical level of the equipment; the stability of its supply with resources; the condition of the staff and the intellectual potential; the nature of the innovative management. A critical comment to be made on this view is that any economic system is a complex set of the interrelated elements which it enumerates. The elements of any system must have certain features so that the system would be economically sustainable.

Based on these considerations, we believe that the economic sustainability of enterprises would be more accurately defined as 'ensuring the profitability of their production or business operation by increasing the efficiency of employed production resources and production management; good financial position; the efficient development of capacities and the social development of the personnel in a situation of self-funding within a dynamic external environment' (V. Yordanova, 2015, p. 87). The only critical comment we could make on this definition, which is more comprehensive in terms of defining the features of the economic sustainability of enterprises, is that the social development of the personnel is outside the range of issues in consideration, but is subject to the research of social sustainability.

Based on the awareness that common laws affect the development of economic processes at different levels without disturbing the general trend in their development, we could give a general definition of the category economic sustainability of agrarian systems (at a macro-level – branch, sub-branch, a sector; at a micro-level – farms). In support of our statement we will point out that at a macro-level, economic sustainability has an impact on the sustainability of lower levels and vice versa, the economic sustainability of structural elements, i.e. business entities, establish the overall economic sustainability at higher levels.

When determining the economic sustainability of agrarian systems we should take into account their specific features:

- Agriculture is subject to the direct impact of unfavourable weather conditions which render production more risky and unstable;
- The economic process of reproduction relates to biological processes which are typical of the development of living organisms, hence the lack of sustainability implies significant losses;
- The production period does not coincide with the work period, which results in discrepancies between the assessments of the efficiency and the sustainability of the performance of farms during different periods;
- The continuous turnover of financial and tangible resources determine the relatively lower investment activity in agriculture;
- The seasonal character of production renders it necessary to attract borrowed capital.

We can therefore conclude that economic sustainability is a complex, multifaceted and multi-aspect category which is influenced by a complex range of factors, common as well as specific. The critical review of scientific literature indicates that there still seems to be no viewpoint which is generally agreed on. Hence, we give our own definition of the category: ***Economic sustainability is the dynamic development of agrarian systems over a long period of time in compliance with changes of the external and the internal environment which ensure its efficient performance; good financial condition and competitiveness.***

### **Principles, Criteria and Indicators for Assessing the Economic Sustainability of Agriculture and Farms**

Based on the critical review we made of related scientific publications, we can identify the major issues to be considered when designing a set of methods for assessing economic sustainability:

- The complex nature of the assessment which should cover the whole range of factors and related indicators so as to reflect the specific nature of the production and economic activity of agrarian systems;



- The selection of benchmarks to which the values obtained for each indicator will be compared;
- The quantification of indicators. Employed indicators must meet several requirements: they must be economically feasible and objective; they must be susceptible to formalization; obtained values must be specific and clear.

In compliance with the hierarchical levels of the system for assessing economic sustainability, we first selected the principles and then the assessment criteria which reflect key basic aspects of the performance of agriculture and farms. Indicators and their benchmark values were identified on that basis (Table 2).

We identified relevant principles in compliance with the adopted definition of the category economic sustainability which is approached from a static and dynamic perspective.

For each principle, we selected criteria that would be more specific and easy to relate to each of the indicators:

- The criteria to be applied to the principle **economic efficiency** are: profitable economic activity and efficient exploitation of production resources;
- The criteria to be applied to the principle **competitiveness** are: rational resource supply; maintaining or increasing production stock; high cost efficiency; fast return on investment;
- The criteria to be applied to the principle **adaptability to the economic environment** are: sufficient adaptability to the market environment and high investment activity;
- The criteria to be applied to the principle **financial stability** are: reducing the dependency on subsidies; minimizing the dependency on borrowed capital; adequate debt structure and sufficient liquidity.

Based on the identified criteria, we selected a system of indicators. Each indicator characterizes in some extent a certain element of analysed agrarian systems. The criteria and the system of indicators are closely related since the selection of indicators depends on the accurately selected criteria. Hence, the selected system of indicators depends on adequately selected principles and criteria. The system of indicators for assessing economic sustainability includes indicators grouped according to selected criteria:

#### **Indicators for the Criterion Profitable Economic Activity**

At a branch level:

- Level and dynamics of major macro-economic indicators – gross domestic product (GDP), gross added value (GAV), net added value (NAV), net entrepreneurial income. Comparisons with achieved results in other countries may be employed to assess the level, the comparison with average EU values of the indicator being highly useful. Identifying upward or downward trends in the values of indicators are also indicative of the branch development.
- The growth rate of the GDP per one person employed in agriculture is a major determinant of the development of a branch. This complex indicator

Table 2  
Indicators for assessing economic sustainability

Principles	Criteria	Indicators		Description	Benchmark	
		Branch	Farm		Branch	Farm
<b>Economic indicators</b>						
<b>Economic efficiency</b>	Profitable economic activity	GDP	Gross Productivity	Values of the indicator and its dynamics at branch level and average for the Farm	Average EU level of the indicator	Average for the country and the EU according to farm specialization
		Economic growth	Rate of changes in the Gross Productivity	<b>Branch:</b> GDP growth rate/per capita <b>Farm:</b> Rate of change in the Gross Productivity of the Farm/ 1 annual work unit (AWU)	Upward trend – sustainability; Fluctuating or downward trend – non-sustainability	Upward trend – sustainability; Fluctuating or downward trend – non-sustainability
		BDS	Gross Income	Values of the indicator and its dynamics at branch level and average for the Farm	Average EU level of the indicator	Average for the country and the EU according to farm specialization
		Net Value Added (NVA)	Net Value Added (NVA)	Values of the indicator and its dynamics at branch level and average for the Farm	Average EU level of the indicator	Average for the country and the EU according to farm specialization

		Net entrepreneurial income	Net income	Values of the indicator and its dynamics at branch level and average for the Farm	Average EU level of the indicator	Average for the country and the EU according to farm specialization
Efficient exploitation of production resources	Labour productivity	Labour productivity	Labour productivity	<b>Branch:</b> GAV/1 AWU; GAV per man-hour <b>Farm:</b> GAV/1 AWU; NAV/1 AWU	Average EU level of the indicator	Average for the country and the EU according to farm specialization
	Labour productivity growth rate	Labour productivity growth rate	Labour productivity growth rate	<b>Branch and Farm:</b> Dynamics of LP over the analysed period	Upward trend – sustainability; Fluctuating or downward trend – non-sustainability	Upward trend – sustainability; Fluctuating or downward trend – non-sustainability
	Land productivity	Land productivity	Land productivity	<b>Branch:</b> GDP /ha Area of Land Used <b>Farm:</b> GP /ha	Average EU level of the indicator	Average for the country and the EU according to farm specialization
	Productivity of livestock production	Productivity of livestock production	Productivity of livestock production	<b>Branch:</b> GDP from livestock production/livestock unit <b>Farm:</b> GP from livestock production/livestock unit	Average EU level of the indicator	Average for the country and the EU according to farm specialization

		Profitability	Profitability	<b>Branch:</b> Entrepreneurial income /ha; Entrepreneurial income /livestock unit <b>Farm:</b> NI/ha; NI/livestock unit	Average EU level of the indicator	Average for the country and the EU according to farm specialization
		Average crop yield	Average crop yield in the Farm	<b>Branch and Farm:</b> Level and dynamics	Average EU level of the indicator	Average for the country and the EU according to farm specialization
		Average productivity of animal breeding	Average productivity of animal breeding in the Farm	<b>Branch and Farm:</b> Level and dynamics	Average EU level of the indicator	Average for the country and the EU according to farm specialization
		GDP per unit of FTA	GP per unit of FTA	<b>Branch:</b> GDP /FTA <b>Farm:</b> GP /FTA	Average EU level of the indicator	Average for the country and the EU according to farm specialization
						Average for the country and the EU according to farm specialization

<b>Competitiveness</b>	Rational resource supply	Labour intensity	Labour intensity	<b>Branch and Farm:</b> Area of Land Used ha/ AWU Number of livestock heads/ AWU	Average EU level of the indicator	Average for the country and the EU according to farm specialization
		Density of livestock breeding	Density of livestock breeding	<b>Branch and Farm:</b> Number of livestock heads / Area of Land Used ha	Average EU level of the indicator	Average for the country and the EU according to farm specialization
		Availability of capital	Availability of capital	<b>Branch:</b> Consumption of fixed capital/ha Consumption of fixed capital/AWU <b>Farm:</b> Investment/ha; Investment/AWU	Average EU level of the indicator	Average for the country and the EU according to farm specialization
	Maintaining or increasing production stock	Export of agricultural products	Share of produce sold on the market	<b>Branch:</b> Level and dynamics of the export of agricultural products; Share of export in the GDP <b>Farm:</b> Produce sold/total produce *100	Upward trend – sustainability; Fluctuating or downward trend – non-sustainability	Upward trend – sustainability; Fluctuating or downward trend – non-sustainability
		Currency balance from agricultural trade		<b>Branch:</b> level and dynamics of currency balance	Positive - sustainability	
		Export structure		<b>Branch:</b> Relative share of major	Predominant share of	

				agricultural products in agricultural export	processed products	
	High cost efficiency		Profitability rate of production	<b>Farm:Pr</b> =(Revenue – costs) x100/Costs	Average EU level of the indicator	Average for the country and the EU according to farm specialization
	Fast return on investment		Payback period	<b>Farm:</b> Pback= Investment/NI		
			Profitability rate of equity (Pr <sub>e</sub> )	<b>Farm:Pr<sub>e</sub></b> = (NIx100)/Equity		
<b>Adap- tability to the eco- nomic environ- ment</b>	Sufficient adaptability to the market environment		Gross margin	<b>Farm: GP</b> –specific variable costs by crops and livestock; Total gross margin = the sum of gross margins by activities		Gross margin>Fixed costs
			Critical point of production	<b>Farm:Critical yield level</b> = Fixed costs/ cost per unit of production – variable costs per unit of production		
	High investment activity	Gross capital formation	Investment	<b>Branch:</b> Acquisition costs of FTA <b>Farm:</b> Size of average annual investment per farm	Average EU level of the indicator	Average for the country and the EU according to farm specialization

		Net gross capital formation	Net gross capital formation	<b>Branch:</b> Gross capital formation – consumption of equity <b>Farm:</b> Investment - Depreciation	Average EU level of the indicator	Average for the country and the EU according to farm specialization
<b>Financial stability</b>	Reducing the dependency on subsidies	Share of direct payments in the Gross Added Value (GAV)	Share of direct transfers in the Gross Added Value (GAV) and the Net Income (NI)	<b>Branch and farm:</b> % of direct payments in the GAV <b>Farm:</b> % of direct payments in the GAV, NI	≤ 50% -high dependence	≤ 50% - high dependence
	Minimising the dependency on borrowed capital		<b>Ratio</b> of the concentration of equity (financial independence)	<b>Farm:</b> Rfi= Equity/Sum of assets		Recommended value: ≥ 0.5
			<b>Ratio</b> of financial sustainability	<b>Farm:</b> Rfs= Equity+ Fixed debt/ Sum of assets		Recommended value: 0.8-0.9 Critical value: ≤0.65
			<b>Ratio</b> of financial leverage	<b>Farm:</b> Rfl= Debt/Equity		Recommended value: 0.5-1
	Adequate debt structure		<b>Ratio</b> of debt structure	<b>Farm:</b> Rds=Fixed debt/Debt		
			<b>Ratio</b> of fixed debt structure	<b>Farm:</b> Rfds=Fixed debt/Fixed Assets		
	Sufficient liquidity		<b>Ratio</b> of total liquidity	<b>Farm:</b> Rtl= Current assets/ Current debt		Recommended value: 2

cannot be used as a direct measure of sustainable development, yet it is a major tool employed in measuring economic and development-related aspects of sustainable development. A sufficiently high growth rate indicates that a branch can generate further economic resources to meet growing economic needs and make the necessary investment to ensure higher return.

At a farm level:

- The level and dynamics of major economic results of the farm activity – gross production (GP); gross income (GI); net added value and net income (NI). The basis for comparison is the achieved average indicators of farms with the same specialization in our country and the EU. An upward trend in indicators, especially over a long period of time implies that a farm is developing sustainably. Fluctuations or a downward trend in the value of the indicators is a signal for problems in the development of a farm.

### **Indicators for the Criterion Efficient Exploitation of Production Resources**

The same indicators are used for the branch and farm levels, yet, they are computed in a specific manner:

- Labour productivity is a key indicator of the achieved economic level since economic growth might be the result of increased number of the employed and not more efficient work. The indicator is a major measure of economic development. It indicates the contribution to creating the national wealth of the people employed in a branch or farm. Compared to the productivity of labor, productivity per an annual work unit (AWU) gives more accurate information about the level of the indicator than the productivity of per-man hour since it eliminates the differences in the structure of full-time and part-time employment of the workforce by countries and years. The level of labour productivity in agriculture may be compared to the average value of the indicator in the EU. At a farm level, comparisons may be made with the values of the indicator according to the specialization of the farms in the country and the EU.

- Growth rate of labour productivity. Maintaining economic growth is essential for sustainable development, hence it is important to be aware of the factors which result in a steady increase in labour productivity – improved technical equipment; modernization and innovations; improved organisation and features of the human capital.

Productivity is a major economic indicator of the level of economic activity. Higher productivity levels are a prerequisite for the sustainable development of agriculture and brands. It is achieved by producing agricultural produce with higher value added; using more productive varieties of crops and livestock breeds; intensive production and introducing modern technologies. This indicator may also be applied to organic production. Comparisons will then be made only between farms with organic production since their productivity is lower compared to farms engaged in conventional agriculture.



A group of indicators are used to assess productivity: productivity per unit of used land; productivity per unit of livestock; productivity per unit of fixed tangible assets (FTA).

Average EU results may be used as a benchmark of the indicator. Comparisons with average values for the country and the EU according to farm specialization can be employed to assess the level of productivity.

#### **Indicators for the Criterion Rational Resource Supply**

At a branch and farm level:

- Labour intensity. The efficiency of input labour is an important condition for increasing competitiveness. It is computed in one and the same manner at a branch and farm level as the ratio between the factors land/input labour; ha/AWU

- Availability of capital – sufficient capital availability is a condition for more intensive production, on which higher productivity and yield from production depend.

- Density of livestock breeding. This indicator may be used as a complementary one which shows whether land is sufficiently used as a resource for livestock breeding, which results in higher value added.

#### **Indicators for the Criterion Maintaining or Increasing Production Stock**

At a branch level:

- Export of agricultural products. Export makes it possible to sell part of the agricultural products and exploit more extensively the national resources for which the country has comparative advantages. Goods competitiveness has many aspects and indicates the prospects for gaining, maintaining and increasing the export market share. One of the synthetic indicators of competitiveness relates to the quantitative parameters of the branch export as a whole and of individual products.

- Currency balance from agricultural trade. Trade in agricultural products contributes significantly to increasing the foreign commodity trade of the country. A positive foreign currency balance, especially one with an upward trend, indicates competitive advantages and is a condition for the sustainable development of the branch.

- Export structure is a complementary indicator in the analysis of the economic sustainability of agriculture which indicates competitiveness by individual products. Some competitive advantages, such as cheap labour force, become less significant. Sustainable competitive advantages in export are created by increasing the intellectual component in goods (variety seeds, hybrids, plant materials, new varieties of crops and breeds) and products with a higher degree of processing.

At a farm level:

- Share of produce sold on the market. One of the aspects of farm competitiveness is the competitiveness of their products, which depends on their quality, price, supply conditions, selected distribution channels, etc. High

and growing share of sold produce indicates good competitive advantages; revenue sources for expanding production and conditions for the sustainable development of farms.

#### **Indicators for the Criterion High Cost Efficiency**

At a farm level:

- Profitability rate of production. A positive financial result does not necessarily indicate efficient production, but must be correlated to incurred costs. Such a measure is the profitability indicator. One of the indicators employed to measure cost efficiency is the revenue/costs ratio. One of the conditions for a farm to be economically sustainable is efficient production, i.e. generating higher revenue per cost unit.

#### **Indicators for the Criterion Fast Return on Investment**

At a farm level:

- The payback period is an indicator of the efficiency of investment. It indicates the estimated number of years in which there will be return on the investment made in a farm. Viability and sustainable development depend on the capacity of farms for expanded production, which requires investing in land, premises and equipment; in planting and renovating permanent crops. The payback period of investment is extremely important.

- The profitability rate of equity measures the annual return on invested equity. It indicates the percentage of growth or decline in invested capital over the year in result of the generated net income (loss). Higher positive values indicate a good capacity for expanded production; better prospects for the development of a farm; sustainability of competitive advantages and potential for making strategic changes. Negative values of the profitability ratio result in the decapitalisation of farms.

#### **Indicators for the Criterion Sufficient Adaptability to the Market Environment**

At a farm level:

- The gross margin indicator shows whether a farmer has taken into consideration the requirements of the market. One of the advantages of employing this indicator is that it shows the benefits to a farm from the production of different products. It is also an essential tool for short-term planning of the production structure and makes it possible to compare the production of different products in a farm over time in different types of farms and countries.

- Critical point of production. This indicator gives awareness about the volume of produce which must be produced in order for a business to be successful.

#### **Indicators for the Criterion High Investment Activity**

Indicators which have the same meaning when interpreted at a branch and a farm level:

- The gross capital formation indicator refers to the assets which producers have acquired, minus obsolete fixed assets, plus the improvement made to irreproducible assets (e.g. farmland).

- Net gross capital formation is defined by subtracting the sum of equity consumption from the sum of gross capital formation. The indicators show the share of investment in total production. The acquisition of capital goods (buildings, equipment, etc.) largely determines the future economic development of the branch and farms and has an impact on economic growth rates. Therefore the indicators play a major role in assessing sustainable development.

#### **Indicators for the Criterion Reducing the Dependency on Subsidies**

Indicators which have the same meaning when interpreted at a branch and a farm level:

- The share of direct payments in the gross added value indicates the share of financial support to the formation of GAV. To account for the impact of subsidies, an analysis of GAV without subsidies should also be conducted. When the relative share of subsidies is 50% or more, the formation of GAV is highly dependent on them.

#### **Indicators for the Criterion Minimising the Dependency on Borrowed Capital**

These indicators describe capital structure in terms of financial sustainability, i.e. the ability of farms to maintain liquidity and cover their liabilities in the long run (V. Kasarova, 2010, p. 10-11).

At a farm level:

- Ratio of the concentration of equity (financial independence). An increase in the value of the ratio is a result of equity growing faster than liabilities, which indicates that a farm is increasing the level of its financial independence and vice versa.

Indebtedness is not always approached as a negative indicator. If a farm expends borrowed capital rationally, does not have to pay penalties for failure to meet contractual deadline, pays its taxes and contributions to the budget in due time, and outstanding interest payments do not have an extremely negative impact on the financial result, an increase in the profitability of equity may be expected if the findings of the analysis of liquidity indicators are positive.

It is necessary to include this indicator so as to assess the economic results of a farm; the cost of achieving these results; and ascertain whether they relate to a high level of indebtedness.

In most cases, the recommended values of the ratio equal or exceed 0.5.

- Ratio of financial sustainability (investment coverage). The ratio indicates the share of equity and long-term liabilities in the total sum of assets. In the economic practice of developed countries, the normal value of the indicator is considered to range from 0.8-0.9 to 0.65, the latter being considered a critically low value.

- The financial leverage ratio is employed to indicate the dependency of a farm on outside investors and lenders, and based on that, financial sustainability. The ratio may be approached as a mechanism for equity

management by optimising the ratio between the own and the borrowed funds which a farm has expended. Integrated into the economic sustainability model, this indicator directly affects equity profitability.

#### **Indicators for the Criterion Adequate Debt Structure**

- The ratio of debt structure describes long-term loans in the total volume of borrowed capital (V. Kasarova, 2010, p. 12);

- The ratio of fixed debt structure relates to the assumption that long-term debt is used for capital investment. It indicates the share of fixed assets which is financed from external sources (V. Kasarova, 2010, p. 12).

These indicators describe debt structure and are complementary in terms of the financial sustainability of farms.

#### **Indicators for the Criterion Sufficient Liquidity**

At a farm level:

Farm solvency is an external manifestation of the financial stability of farms which indicates their ability to cover their short-term (current) and long-term (fixed) liabilities. Solvency level is mainly revealed by the liquidity indicators – total, fast, immediate and absolute. In our opinion, the most important and comprehensive indicator for assessing financial stability is:

- The Ratio of Total Liquidity. Both low and high values of the indicator are to be avoided, since the former imply insolvency, whereas the latter indicate a generator of foregone earnings. When the value of the indicator deteriorates it implies inefficient management of assets and liabilities, which may result in the sale of fixed assets, insolvency and unsustainable development. Declining liquidity in fact indicates declining profitability, higher losses and inefficient control upon capital management.

In most cases, the recommended value of the ration is 2, yet any analysis should take into account the nature of the branch, the specific conditions in that branch, achieved results in the past, etc.

The system of indicators we have identified reflects the condition of a branch or business unit in terms of achieved results when a given principle is applied. Selected quantitative indicators for assessing the economic sustainability of agrarian systems:

- On the one hand, meet applicable requirements in terms of producing specific and clear results, making comparisons possible and monitoring the dynamics of indicators;

- On the other hand, they reflect the specific properties of the external environment in which agriculture and farms operate, as well as the specifics of the production activity.

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