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THE MARKET AND THE ROLE OF THE STATE IN THE ECONOMIC CRISIS: LESSONS FROM THE THREAT OF BANKRUPTCY OF AGRICULTURAL BIOGAS PLANTS

Abstract: The scale of bankruptcies and business failures aggravates during the economic crisis. This phenomenon is also observed in the agribusiness sector. Agribusiness characteristics - unique for this subset of the economy - determine not only their specificity, but also the propensity of economic operators to develop and fail in this environment. The properties of agribusiness can either catalyze or inhibit liquidation of the business operator. The primary goal of the paper was to identify the role of the state as regards counteracting crisis-related phenomena as compared to the self-regulating market mechanism. The article presents threats and barriers to the development of agricultural biogas plants using a PESTLE analysis. The research identified high expenditures and the long investment period as principal factors of risk of bankruptcy of agricultural biogas plants. The correct location of an agricultural biogas plant is also very important, that is whether it is located near the source of raw material for the production of biogas and a consumer of heat. The bankruptcy of a biogas plant entails job cuts and an increase in unemployment in rural areas, thus there is room for the role of the state to develop institutional and financial instruments that would make it possible to counteract/reduce these adverse social phenomena.

Key words: market, state, economic crisis, business failure, agricultural biogas plant

INTRODUCTION

In economic science, theories derived from natural science are distinguished. They refer to the stages of life of a living organisms. As assumed, industries and enterprises are subject to cycles correlated with specific stages of development. Based on the "birth" and "death" of the individual, the concept of natural evolution and the theory of the company's life cycle considers the issues of its creation, development, survival and bankruptcy. Bankruptcy is then viewed as an inseparable part of a properly operating system, leading in a more or less predictable way, to the natural decline of the company's life (Pieńkowska 2005). When examining the life cycle of an agribusiness enterprise, it should be noted that each phase of its life features different dynamics and diversified development trends. In the growth phase, a start-up tends to be capital-intensive and intensifies production. Liquidity problems may then arise, production develops, the number of buyers and the amount of revenue increases. The use of production capacity and fixed assets improves, while technological and economic efficiency increases. Meanwhile, work expenses grow. The company is slowly "maturing," it has already established a stable market position in the local environment, which matters for institutional contacts. As growth proceeds, production and income stabilizes. Next, the enterprise enters its decline phase. This manifests itself in a reduction in the production and supply rate, coupled with a mismatch between business and market needs. The company may last many years in this phase, with the owner not even realizing that the company is in decline or waning.

In the theory of Nassim Nicholas Taleb, the crisis was called a "black swan in the order of events," a phenomenon that is very rare and difficult to predict. Nouriel Roubini enters into polemics with this statement, calling it a "white swan." He claims that crises are predictable and quite often recurring phenomena (Roubini, Mihm, 2011). During the global economic crisis, the scale of business bankruptcies intensified. Uncertainty prevailed, both on stock exchanges and in financial institutions. The investment banks and other entities that invested in subprime loans

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incurred heavy losses. Furthermore, no-one knew who held these financial instruments in their portfolios, or how much they held. The uncertainty as to risk location developed into overall distrust and anxiety in financial institutions around the world. It created a crisis of confidence among banks, and credit transactions dried up on the interbank market. Banks became reluctant to lend to other banks and enterprises. Lending for the economy decreased, amidst tightened credit terms and conditions. This factor particularly affected the crisis of non-financial sectors of economy (Stiglitz, 2010).

Both before and during the crisis, many threats to the global food economy emerged. Growing protectionism and speculation rank among the most important ones. Worldwide price increases affected virtually all commodities. Prices also soared on the agricultural commodity markets. The price of cereals and rice rose two-and-a-half-fold, of meat, one-and-half-fold, and of sugar, more than two-fold. According to Orłowski (2011), commodity supply lagged behind growing demand. Woś (2004) claimed that the external situation of agriculture, and especially the process of integration with the EU, required active state participation, which leads to the strategy of regulated changes. Exogenous and endogenous determinants of business bankruptcies can be distinguished. In agribusiness, there are factors that can catalyze or inhibit this phenomenon, generating social and private costs for many stakeholders. The point is how to finance these costs. The paper seeks to identify the role of the market mechanism and the state, which can introduce regulatory instruments through their institutions and in this way counteract crisis-related phenomena and curb the scale of bankruptcies in agribusiness. Examination of bankruptcies of agribusiness enterprises should take account of the diverse nature of the system entities. The available statistics only cover companies across part of agribusiness, being the food industry and agriculture, apart from private farms. Meanwhile, the bankruptcy of agricultural biogas plants is hardly covered in the literature, so it is worth identifying and closing the research gap, both cognitive and empirical in this field of research.

RESEARCH METHODOLOGY

The paper explores the role of the state in counteracting crisis phenomena vis-à-vis the self-regulating market mechanism. The following specific objectives are identified:

- to discuss bankruptcy in a market economy,
- to define the role of the state and the market in the crisis in selected economic thoughts,
- to present the operation and role of agricultural biogas plants in Poland,
- to determine the risk factors for bankruptcy of agricultural biogas plants and the role of the State in counteracting crises.

The author follows such research methods as descriptive analysis, comparative analysis and the PESTLE method. The article presents threats and barriers to the development of agricultural biogas plants, using a PESTLE analysis, which extends the PEST method. This tool examines the company's macro-environment. The authorship of this concept is credited to Francis Aguilar (1967), the Harvard professor who defined a tool called ETPS (later PEST). The name is an acronym for four English words that describe particular areas of a macro-environment. These are: the political environment (**P**olitical), for instance, developing food policy; the economic environment (**E**conomic), by way of illustration, interest rates, inflation, economic growth/crisis, the unemployment rate; the socio-cultural environment (**S**ocial/Socio-cultural), to name a few examples, issues related to the country's demography and the preferred lifestyle of its consumers; the technological environment (**T**echnological), such as the level of innovation and new technologies. The PESTLE analysis additionally includes the legal (**L**egal) and environmental (**E**nvironmental) background. It is also worth taking into account the ethical aspects (**E**thical) of industry operations. Once the macroenvironmental factors have been determined, their positive (chances) and negative (threat) impact on the business of agricultural biogas plants can be assessed. The paper mainly identifies threats and barriers in the operation of agricultural biogas, which may



lead to their liquidation. Individual macro-factors often interact with one another and it is difficult to clearly assign them to only one group.

THE BANKRUPTCY OF ENTERPRISES IN A MARKET ECONOMY

Experience from the recent crisis in the global economy shows that bankruptcies are inseparable from the essence of a market economy. Quoting F. Borman, *"Capitalism without bankruptcy is like Christianity without hell."* The market has a self-cleaning function for ineffective entities. Their resources can be used more effectively by more competitive operators. According to J. Schumpeter's "creative destruction" theory, the market eliminates the unfit or least fit actors. As the rate of changes in the modern world increases, the economy becomes the "economy of impermanence." *"... Almost all forms of business become impermanent and their life cycles get shorter and shorter. This applies not only to technologies, products, but also to workstations, methods of communication, production and trade, education, and even models of family and professional life..."* (Mączyńska 2009, pp. 138-139).

Not only individual units, but also entire industries or even countries, can go insolvent. During a recession in an industry or region, the number of bankruptcies increases, thus supporting the supply of assets of liquidated entities, which reduces their prices and extends the liquidation process. According to Mączyńska (Bankruptcy... 2010, p. 5, 10) *"Bankruptcy by liquidation should be the last resort, since this form of bankruptcy involves particularly high costs, including externalities, mainly social ones. By way of illustration, bankruptcy and liquidation of enterprises stimulate unemployment, and thus boost expenditure on unemployment benefits"*. Interestingly enough, arrangement and recovery proceedings are not very popular in Poland. Undoubtedly, growth in successful recovery and restructuring processes could contain social costs. The Act of 15 May 2015 Restructuring Law (Journal of Laws of 2015, item 978, as amended), which entered into force on 1 January 2016, superseded the Act of 28 February 2003 Bankruptcy and Reorganization Law (Journal of Laws of 2003, No. 60, item 535, as amended) and marked a positive change.

THE ROLE OF THE STATE AND THE MARKET IN THE CRISIS IN SELECTED ECONOMIC SCHOOLS

Table 1 presents the results of a comparative analysis pointing out the main differences between the role of the State and the market in counteracting imbalances and bankruptcies in selected economic theories.

The classical school (from the mid-19th century to the 1930s) examined the economy in a state of equilibrium with a perfectly developed mechanism for adjusting the market system dysfunctions. Accordingly, any intervention is unnecessary, as market mechanisms suffice. The neoclassical school extended the classical economy of A. Smith. The most prominent followers of this theory included W.S. Jevons, A. Marshall, K. Menger and L. Walras. The key assumptions of the neoclassical school include: perfect competition, J.P. Say's market mechanism and law of markets. According to the authors of this school, public investments are unnecessary, and public funds fully "push out" private funds (Table 1).

The neoclassical school gave rise to the Austrian school, which presents a very extreme subjective-marginalist approach. Its origins date back to the 19th century and the works of C. Menger. Other representatives of this school include F. Hayek, L. von Mises, F. von Wieser, M. Rothbard and J.H. De Soto. According to its assumptions, the business cycle in modern economies is primarily due to excessive credit expansion. This, in turn, causes information disruptions on the market and subsequently, incorrect allocation decisions of businesses. Restrictions may also occur in capital and other production factors. The growing demand for capital goods boosts their prices. As the cost of capital, labor, etc. grows, so do consumer prices. Further credit expansion is the only remedy for the flagging economic conditions, which intensifies the crisis (Koryś).

Table 1. The role of the State and the market in crisis conditions in selected economic theories

State	Market
Classical school	
- State intervention is unnecessary,	- a well-developed mechanism for correcting the market system deficiency, - market mechanisms suffice,
Neoclassical school	
- the business cycle in modern economies mainly reflects excessive credit expansion, - it causes information disruptions on the market and then wrong allocation decisions of businesses, the role of the State-created legal and institutional framework in ensuring full competition in the economy, - macroeconomic policy should only protect and strengthen the action of the market mechanism, State intervention disturbs the market mechanism,	- free price formation and perfect competition, as the pivotal elements coordinating the operation of entities in the conditions of continuous states of imbalance and uncertainty,
Monetarism	
- minimal state interference, - deactivation of economic policy in all areas, except monetary policy,	- a vision of ideal free-market based society,
Keynesian school	
- J.M. Keynes challenged the prevailing belief of economists that where the government does not disturb economic processes, the market itself develops the equilibrium of full employment,	- recessions during the business cycle, due to naturally self-regulating processes, are short-lived phenomena,

Source: Own study based on Roubini, Mihm, 2011; Zamora 2015; Koryś.

The neoclassical school prioritizes the free market, free price formation and perfect competition as the key elements coordinating the activities of entities amidst continuous imbalance and uncertainty (Table 1). Austrian school supporters highlight the State-created legal and institutional framework in ensuring full competition in the economy. They also call for "privatizing" the issuing of money, limiting income redistribution, or abandoning price controls. Macroeconomic policy should only protect and strengthen the operation of the market mechanism. Only a free market, a flexible labor market, low taxes and stable law can help. They oppose State intervention as it disturbs the market mechanism. Austrian school concepts have failed to play an important role in the mainstream economic theory or in macroeconomic policy.

M. Friedman, the founder of monetarism, formulated a theory which incorporated the vision of an ideal free-market-based society and a thesis about the exogenous nature of the money supply. According to M. Friedman, the scope of economic policy should be significantly reduced, while extending market mechanisms (Koćwin). A free market economy, in which state interference is minimal, is stable (Table 1).

New classical macroeconomics, developed in the 1970s by R. Lucas, M. Parkin, R. Barro, T. Sargent, E. Prescott, and P. Minford, represented a new approach to neoclassical thought. The approach rests on three assumptions: the rationality of expectations, assumption of continuous cleaning up of markets, and aggregate supply, that is, rational decisions of enterprises and employees (Landsberg 2009). State intervention regarding fiscal and monetary policy was not accepted in the aggregate supply school. Economic policy should be limited to the minimum and focus on price stabilization and supply policy. State intervention is unnecessary both in the short and long term, because business operators adapt to the State policy.

The concept of rational expectations is another school linked to the neoclassical theory. It was founded in 1961 by J. Muth, and developed in the 1970s by R. Lucas, T. Sargent and N. Wallace.



The main assumption is the ineffectiveness of macroeconomic policy, because entities, acting in their own interest and predicting economic phenomena based on all available information, are able to take rational decisions and modify their expectations in accordance with their knowledge, etc. The business cycle theory assumes that production and employment fluctuations reflect changes in real factors in the economy, with quickly adapting markets that remain in equilibrium. The school was founded by Finn E. Kydland and Edward C. Prescott (<https://www.nbportal.pl/slownik/teoria-realnego-cyklu-koniunkturalnego>).

The economics of supply draws on classical economics (among others, D. Hume, A. Smith) and Austrian school (L. von Mises, F. von Hayek). R. Mundell, A. Laffer and J. Wanniski are founders of this school. They assumed that it was State intervention, pursued in accordance with the theory of John M. Keynes that has pushed the American economy into crisis since the mid-1970s. They argued that the crisis may not be overcome by State intervention measures, which only distort the market mechanism. Supply economics derives from two assumptions: long-term stability of the market system, and the decisive role of the individual in the course of economic processes. According to the economics of supply, production or supply is the key to well-being, while consumption or demand is only its effect. Just as consumption is secondary to production, aggregate macroeconomic demand depends solely on aggregate supply. This is the essence of J. B. Say's law, which supply economics seeks to rehabilitate following the criticism of J. M. Keynes made in Keynesian law (aggregate demand principally determines macroeconomic conditions) (Zamora 2015, p. 21).

Along with the neoclassical school, the Keynesian idea is the most influential thought in macroeconomics. The inspiration behind this approach was the work of J.M. Keynes: *General theory of employment, interest and money*, which came out in 1936. This work came as a response to the major economic crisis in the USA in the 1920s and 1930s. J.M. Keynes questioned the widespread belief of economists that where the government does not disturb economic processes, the market itself develops equilibrium at full employment. According to the classical theory, the very nature of market equilibrium prevents overproduction and economic crises in the long run, and thus the economy may not reach equilibrium amidst high unemployment (Koryś). Respectively, unemployment is the major economic problem and will tend to remain low over the long term thanks to self-regulating market mechanisms. Recessions during the business cycle, coming as a result of naturally triggered self-regulatory processes, are short-lived phenomena (Zamora 2015, p. 22).

Exchange rate fluctuations in the Polish zloty, payment bottlenecks and a drop in demand on the Polish market were considered to be the major risks stemming from the crisis by Polish enterprises. A decline in revenues and orders coupled with an increase in costs (in particular, of materials and commodities used in operations), lending constraints and suspension of investments were the most common consequences of the crisis. Enterprises also faced problems with growing debt and debt service cost. The crisis most often impacted enterprises through a shrinking trade portfolio (85% of responses). On the other hand, recession-typical phenomena were less frequent, such as a decrease in profitability (27%) and late payments (24%) (*Światowy kryzys ...*, 2011, p. 12).

THE ROLE OF AGRICULTURAL BIOGAS PLANTS IN POLAND

According to Majewski, Sulewski & Wąs (2016, p. 5) the issue of renewable energy sources is one of the most frequently discussed lastly and this refers to the future of energy sector considerations. Many factors influence on that topic, namely: the limited resources of raw materials fossil and a large share of energy in greenhouse gases emission as well as increase of energy sector security. The climate and energy package that was adopted by EU Member States in 2007 assumes, among the others the limit of greenhouse gases emissions and improvement of energy security.

Considering, it is important to increase the share of energy from renewable resources in the total energy consumption. The research by Dzikuć & Urban (2014) indicates that negative impact on the environment resulting from the use of coal in energy production is an incentive for Poland to take actions aiming at increasing renewable energy sources in this process.

The national renewable energy action plans (RES) primarily assume the development of sources based on wind energy, biomass and biogas production. According to the national renewable energy action plans (2010), the overall national target for the share of energy from renewable sources in the final gross energy consumption is to stand at 15% in 2020 (7.2% in 2005), and the expected volume of energy from renewable sources corresponding to the 2020 target is 10380 tons. The share of energy from renewable energy sources pursued a path of steady increase in Poland between 2003 and 2011 (*Energia ... 2013*). Renewable energy in Poland is developing fastest in regions featuring high RES potential. The interest of investors and the supportive attitude of local authorities are also important. The most renewable energy is produced in the following provinces: Kujawsko-Pomorskie, Zachodniopomorskie, Pomorskie and Wielkopolskie. Biogas technology in Poland is based on organic commodities, including agricultural waste.

Biogas technologies that include agricultural biogas have a small share in renewable energy sources in Poland. Figure 1 presents changes in number of agricultural biogas plants. In 2011 the register of Agricultural Market Agency included only 8 installations. The number of agricultural biogas plants increased to 78 in 2016. This was a significant increase (Figure 1).

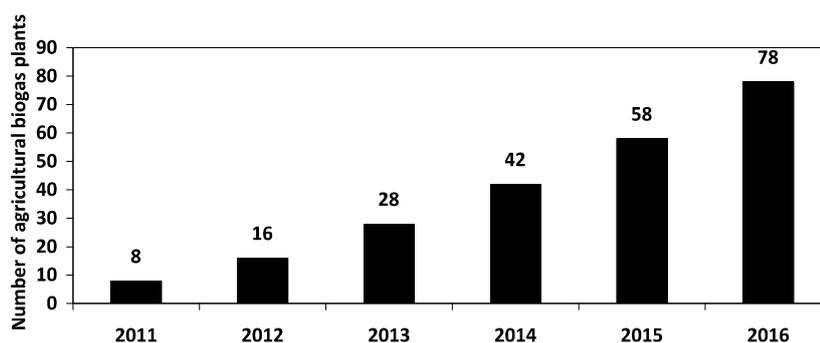


Figure 1. Number of agricultural biogas plants in Poland in 2011-2016

Source: Dane dotyczące działalności wytwórców biogazu rolniczego w latach 2011 – 2016, Biuletyn Informacji Publicznej Krajowego Ośrodka Wsparcia Rolnictwa, <http://bip.kowr.gov.pl/informacje-publiczne/odnawialne-zrodla-energii/biogaz-rolniczy/dane-dotyczace-dzialalnosci-wytworcow-biogazu-rolniczego-w-latach-2011-2016> (retrived: 04.01.2018).

Table 2 includes information about quantity of biogas, electricity and heat that was produced by agricultural biogas plants. It is worth mentioning that the quantity of agricultural biogas production and the quantity of electricity from agricultural biogas production increased almost six times in the analyzed period. This indicates quantitative development of agricultural biogas plants. On the other hand, the majority of these entities struggling with some financial troubles. There is still a huge gap comparing the level of domestic electricity production by agricultural biogas plants (0,14% of total domestic consumption) to the level of total domestic electricity consumption (161438 GWh in 2015). Considering the plans of 2000 agricultural biogas



plants creation by 2020, it seems that this strategy is not succeed. The policy that supports more ecological economic growth and positive impact on development of renewable energy sources is badly needed.

Table 2. Production of agricultural biogas, electricity and heat from agricultural biogas in 2011-2015

Year of production	Quantity of agricultural biogas production (in mln m ³)	Quantity of electricity from agricultural biogas production (in GWh)	Quantity of heat from agricultural biogas production (in GWh)
2011	36,646	73,433	82,638
2012	73,152	141,804	160,128
2013	112,412	227,890	246,557
2014	174,253	354,978	373,906
2015	206,236	429,400	224,996

Source: Dane dotyczące działalności wytwórców biogazu rolniczego w latach 2011 – 2016, Biuletyn Informacji Publicznej Krajowego Ośrodka Wsparcia Rolnictwa,
<http://bip.kowr.gov.pl/informacje-publiczne/odnawialne-zrodla-energii/biogaz-rolniczy/dane-dotyczace-dzialalnosci-wytworcow-biogazu-rolniczego-w-latach-2011-2016> (retrived: 04.01.2018)

The main objective of the study by Piwowar & Dzikuć (2013) was a comparative evaluation of the technical potential of existing installations for the production of agricultural biogas in Poland by region and voivodeship. The study discusses the technical parameters of agricultural biogas manufacturing installations, including annual yield, installed power (electrical and thermal), as well as their annual electrical and thermal output (Table 3). Table 3 presents technical parameters of installations in agricultural biogas plants in Poland by region. Most of installations of agricultural biogas plants is located in the North-western and Northern regions. The North-western and Northern regions present the highest annual output of agricultural biogas manufacturing installations as well the highest installed power of the system and the highest annual output of manufacturing installations. The Southern region represents the lowest level of all of these above parameters (Table 3).

Table 3. Technical parameters of installations in agricultural biogas plants in Poland by region

Specification	Number of installations (pcs.)	Annual output of agricultural biogas manufacturing installations (m ³ /year)	Installed power of the system		Annual output of manufacturing installations	
			electrical (MW _e)	thermal (MW _t)	electricity (MWh _e /year)	heat (MWh _t /year)
Central region	1	7 920 000	2,00	2,13	15 920,00	1 7024,00
Southern region	1	1 106 683	0,53	0,54	4 471,00	4 625,00
Eastern region	3	10 870 960	3,00	3,06	2 4076,12	24 149,36
North-western region	10	34 196 875	9,09	9,57	72 683,00	76 268,85
South-western region	4	18 226 875	5,43	5,76	44 312,00	46 922,00
Northern region	10	48 939 325	13,34	12,05	100 557,84	92 639,11
Total	29	121 260 718	33,38	33,10	262 019,96	261 628,32

Source: Piwowar, A, Dzikuć, M. (2013). Charakterystyka podmiotów zajmujących się wytwarzaniem biogazu rolniczego w Polsce, *Journal of Agribusiness and Rural Development*, 1(27) 2013, p. 211.

The principal threats and barriers to the development of agricultural biogas plants in Poland include: legal barriers, environmental protection issues (fertilization rules, connection conditions, environmental impact), financial barriers (low capital expenditure, insufficient competence of financial institutions' employees about biogas plants, subsidies not being involved), organizational barriers (lack of skills, insufficient knowledge and education). The main risk factors for bankruptcy of agricultural biogas plants are shown in Figure 2.

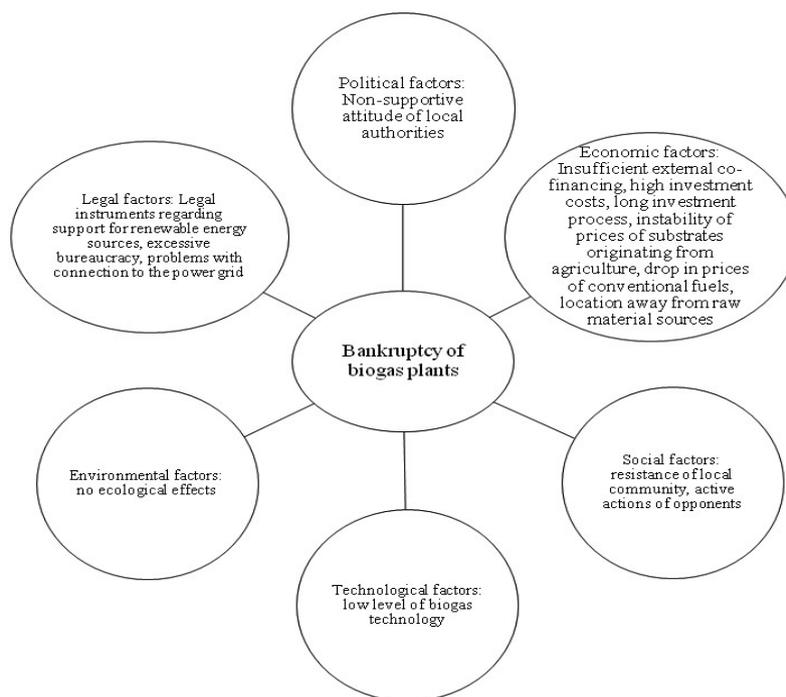


Figure 2. Risk factors for bankruptcy of agricultural biogas using the PESTEL method

Source: Own study.

The relevant system of supporting and financing measures in this area and crisis prevention is one of the cornerstones for the development of biobusiness. Potential sources of financing investments in biobusiness include, to name a few, assistance funds (for instance EU structural funds) and loans from the banking and non-bank sector. Budgetary determinants which stimulate the innovative potential of biogas plants via appropriate tax solutions, such as tax credits for the purchase of new technology, may also play an important role. Furthermore, a significant mission as regards counteracting the crisis in agribusiness has been vested in the State.

SUMMARY

In the theory of economics and individual economic schools, various methods of influencing the economy by the State during the crisis were pointed out. Individual states or supranational institutions influence the economic situation during the crisis. Further efforts are required as regards, for example, financial market regulation. The post-crisis situation shows that the current macroeconomic equilibrium in the majority of countries that have dealt with the crisis is of a short-lived nature and stabilization is not deep. Various scenarios are possible, ranging from rapid economic growth to long-lasting stagflation and possible further recession.



Agricultural biogas plants are gaining popularity, however, they operate in a turbulent environment, which increases bankruptcy risk. Among the main risk factors of bankruptcy, high expenditures and a long investment period have been identified. The correct location of the agricultural biogas plants is very important, that is, near the source of a commodity for the production of biogas and the consumers of heat. Bankruptcy of biogas plants means job cuts and higher joblessness in rural areas. Simplification of laws and increasing financial aid would contribute to faster development of biogas technology in Poland.

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