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Factors influencing green farming

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Abstract

Research background: The increase in the demand for organic products prompts the establishment of green farms. In spite of the large global interest in green farming, scientific literature is not rich in the studies that cover the issues of the factors of green farming. Although previous studies examine different factors of green farming (organic farming), the factors that facilitate or impede the development of green farming, especially at the national level (the case of Lithuania), are hardly considered. In order to fill this gap in the scientific literature, we formulate the following problem of the research: what factors promote green farming?
Purpose of the article: to identify the main factors influencing the green farming business.
Methodology/methods: Comparative and systematic analysis of the scientific literature, expert evaluation.
Findings: The researched has enabled to identify the factors that facilitate and impede green farming in Lithuania. On the basis of the results of the expert evaluation, the factors of green farming development in Lithuania were identified. It was found that the main motives of green farming in Lithuania are positive attitudes towards public health and nature protection, the demand for organic, governmental support and subsidising and possession of badlands. Complicated procedures of green farming certification pose serious problems to Lithuanian farmers, who would prefer clearer and simplified certification, as well as consideration of the nature and scopes of farming operations. Extensive networking systems would provide the opportunities for green farmers to share their experience and observe all the economic changes: new market niches, demand-supply indicators, new channels of product delivery, etc. Non-financial green farming support measures

(e.g. consultations, training, provision of information, etc.) could substantially contribute to the development of green farming in Lithuania.

Introduction

Topicality of the problem. Organic (or green) farming is one of the best-known alternative production systems, participating in which agricultural communities contribute to economic welfare and protection of soil, environment and health. Official documents and scientific studies (Koesling, Flaten, Lien, 2008; Ullah, et al., 2015) state that organic farming also raises food safety, ensures the variety of products, provides numerous environmental benefits and promotes the development of rural areas. The rapid growth in the demand for organic products is becoming a perfect opportunity to expand this business. For implementation of the appropriate promotive measures, it is necessary to understand the motives of particular economic entities to start-up the systems of organic farming.

The governments of developed countries (e.g. Norway) employ different initiatives to increase the number of green farms. Since the middle of 1980, politicians, environmentalists, consumers and farmers have been actively participating in the regulation and support of the organic farming sector. With reference to Willer, Klicher (2009), organic foods are produced on a commercial basis in at least 141 country worldwide. The necessity to expand the sector of green farming was recognized in 2007. At present it is rapidly growing. The fields of organic products occupy nearly 32.2 million hectares all over the world; the sector of organic farming unifies over 1.2 million producers, including small farmers.

Subsidization of organic farming to a large extent depends on the factors that determine a farmer's decision to start-up the business of organic farming. The determinants of green farming were researched in some previous scientific studies. Ullah et al. (2015), who analysed the impact of an organic farming system implementation on a farmer's general business, found that organic farming positively affects a farmer's general business through such indicators as costs, efficiency, profitability and productivity. Apart from higher income, organic farming generates behavioural changes and raises the awareness of the new way of farming. Koesling, Flaten, Lien (2008) disclosed that the main motive to start-up green farming is the financial aim to earn higher income. In this case, if motivation is based only on short-term aims, which are stimulated by the direct EU funding, shrinking economies may return farmers to regular ways of farming. Shams et al. (2017) researched economic, social, structural and institutional determi-

nants of green farming. The scientists found that farmers' attitudes towards ecology serve as the most influential determinants, but the impact of such demographic characteristic, as a farmer's age, was found to be threefold. Scientific literature indeed proposes a wide variety of green farming motives and determinants. In the frame of this research, we formulate the following scientific problem: what factors promote green farming?

The object of the article – the factors influencing green farming business.

The purpose of the article – to identify the factors that determine green farming start-up and present the recommendations on how to increase the attractiveness of green farming.

For fulfilment of the defined purpose, the following objectives were raised:

1) to select and introduce the methodology of the research;
2) to analyse the determinants of a farmer's motivation to start-up green farming;
3) to conduct the empirical analysis of the factors that determine green farming start-up in Lithuania.

Methodology/methods: Comparative and systematic analysis of the scientific literature, expert evaluation.

Research methodology

The area of green farming shows the trends of expansion, although it is hardly researched and remains a relatively new issue in economic studies.

The direction of green farming was selected for the following reasons:

1) this area of green business earns considerable governmental attention: green farmers are provided with governmental support, subsidies, different exemptions;
2) green farming may cover a variety of industries: crop, livestock, fishery, horticulture or mixed agricultural activities; the above-mentioned industries share the common goals – production of organic foods and promotion of healthy lifestyles;

Expert survey and evaluation were conducted in the following *stages:*

1) the experts with high competence were selected;
2) the questionnaire for the experts, who were able to assess the opportunities of green farming development in Lithuania, was developed;
3) the questionnaire survey was conducted;
4) the results of the expert survey were processed;

5) compatibility of the experts' opinions was verified, the results of the survey were summarised, and the recommendations for green farming development in Lithuania were provided.

The aim of the expert evaluation was to assess the factors of green farming in Lithuania.

Compatibility of the experts' opinions was verified by employing coefficients of concordance.

Expert evaluations were ranked by Kendall's coefficient of concordance. Let us suppose that the group composed of *m* (the numerical value) experts evaluated *k* (the numerical value) alternatives. At first, the values in each of the columns were converted to ranks; after that, it was verified whether the expert evaluations are compatible; finally, the following hypotheses were formulated:

H0: expert evaluations are opposing (i.e. coefficient of concordance is equal to zero);

HA: expert evaluations are compatible (i.e. coefficient of concordance is not equal to zero).

Coefficient of concordance *W* varies in the interval from 0 to 1 *(0<W<1)*; value 0 refers to complete incompatibility, while value 1 means complete compatibility of the expert evaluations.

While presenting the results of the empirical research, possible interpretations of the values of *Cronbach alpha* coefficient should be considered. *Cronbach alpha* coefficient helps to measure credibility of the test, but the value of this coefficient much depends on variance of the respondents' answers to the same questions: high variance shows that the results of the test are not credible, and vice versa.

The analysis of green farming factors: theoretical perspective

Intensive agricultural systems have caused the pressure of natural resources and raised the usage of agricultural chemicals. Combination of these factors has led to environmental pollution and health risk. Green farming has become one of the ways to protect the environment and save natural resources.

Green farming is based on the efficient management of pollutants and ecosystems. Synthetic materials (e.g. fertilisers, weed killers, veterinary medicines and genetically-modified seeds) are changed with the ones obtained by applying agronomical, biological and mechanical methods which are adjusted to local environmental conditions and needs (Kallas, et al., 2009).

Awareness of the factors that motivate farmers to start-up this ecological way of farming is a necessary condition to form appropriate political directions and to transfer from the current situation to a much safer farming practice (Shaban, 2015). Previous studies mainly researched socio-economic and demographic determinants of green farming (farmers' education, knowledge, attitudes, perceptions, devotion to green farming, etc.). This set of determinants, however, may vary depending on the level of a country's development, regional and local peculiarities. Thus, it is purposeful to research the impact of these factors with consideration of national/regional/local characteristics. The review of the scientific studies that focused on the factors influencing green farming has been presented in Table 1.

Table 1. Factors influencing green farming

Author(s), year	Factors
Shams, et al., 2017, p. 2212	Farmers with a high level of education, high income, big farm size, deep knowledge in organic farming and access to informational resources have favourable attitudes towards organic farming; in contrast, older farmers with big household sizes and longer farming experience have neutral attitudes.
Shaban, 2015, p. 85	There are three potential factors that can influence farmers' decision to convert to organic agriculture. These factors include farmers' socio-economic and demographic characteristics, attitudes towards organic farming and the perceived economic benefit of organic farming.
Kallas, et. al., 2009, p. 4	1. Farmer Characteristics: gender, education, age, experience, etc. 2. Farm Structure: location, farm size, soil type, machinery, etc. 3. Farm Management: input use, crop diversification, crop rotation, etc. 4. Exogenous factors: output and input prices, market size, subsidies, information access, transition costs, policy reforms, etc. 5. Attitudes and opinions: farmer beliefs about the environment, acceptance within the rural community, life style, health and environmental preoccupations, etc.
Karki et.al, 2011, p. 120	The different reasons for conversion to organic production by Nepalese tea farmers can be summarized into four factors: "environmental awareness", "bright market prospects", "observable economic benefit" and "health consciousness".
López, Requena, 2005, p. 7	Farm characteristics (area cultivated, yield, year of plantation, varieties of olives, tenure, tree density, slope of the land, etc.) Dedication to agriculture (the importance of agriculture in the interviewee's income, number of years devoted to agriculture, type of work performed, training in agriculture, etc.). Degree of contact with sources of information (attendance at courses and conferences on agricultural topics, the amount of reading undertaken regarding agricultural topics, membership of agrarian and non-agrarian organisations, place of residence, trips outside the place of residence, etc.). Assessment of other factors from a grower's point of view (economic profits, avoidance of risk, personal prestige, environmental protection, production of healthy products, etc.). Steps leading to individual adoption or rejection of organic practices

Table 2. Continued

	(knowledge of organic olive growing, sources of information through which the existence of organic cultivation was discovered, sources of further information, and the moment when organic practices were either adopted or rejected, etc.). Attitude towards organic agriculture as an innovation (image that the interviewee has of these practices, economic advantages offered, time and effort saved, social prestige, etc.). Personal information (age, sex, marital status, amount of formal education).
Njeru, 2016, p. 94	Gender of the farmer has great influence on adoption of organic farming where women adopt organic farming practices faster than men. This is because women, given their nurturing roles, are closer to the environment and agriculture than men are. Contrary topopular belief,all farmers, their family size notwithstanding, land size and level of education, could adopt organic farming.

Source: compiled by the authors.

In general sense, the factors that influence the decision to start-up green farming fall into two large groups: non-economic and economic. The first group covers farmers' attitudes, opinions and aims, while the second groups includes market prices, profit maximisation and public support. Starting-up green farming is naturally easier for the farmers with larger farms and sufficient capital as they are capable of assuming higher risks, adapting new production methods and funding ecologic farming certification at their own costs (Karki, et al., 2011). Kretter, Ubrežiová (2006) highlight slightly different factors: external environment conditions, ecological both producers and processors, trade organizations, consumers.

The authors of this article support the position that neither of the above-discussed factor groups is prevalent because both of them significantly affect the decision to start-up green farming. Apart from a huge impact of psychological factors (attitudes, aims, opinions about the necessity of sustainable development, etc.), an important role of farmers' education should also be noted. The studies, which were conducted in different countries, provide similar results: farmers with higher education are more inclined to convert from traditional to green farming. According to Karki, et al. (2011), studies motivate farmers to apply new technologies, especially in developing economies, like Nepal, as less educated or even illiterate farmers are not able to take advantage informational materials without the assistance of educated people. Scientists (Karki, et al., 2011) found that the farmers who act at longer distances from regional markets, older farmers, farmers with higher education, farmers linked to governmental institutions and farmers with larger farms are more inclined to start-up green farming. What is more, environmental awareness, clear market prognoses, measurable eco-

nomic benefits and health are the main factors that affect farmers' decision to shift to organic farming.

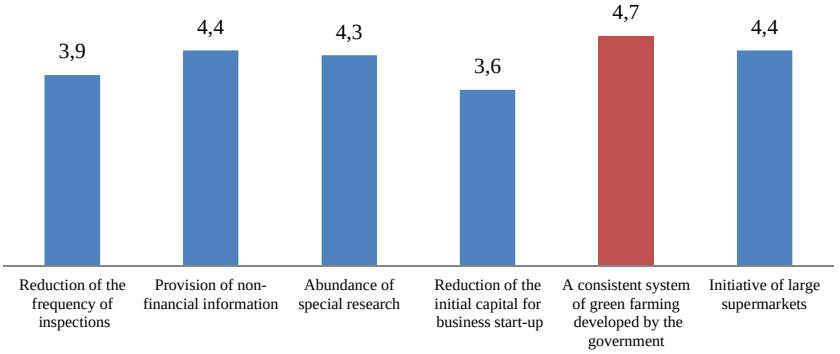
Therefore, it can be stated that provision of the knowledge about green farming would highlight the benefits of this way of farming to society and environment and could significantly contribute to the formation of positive attitudes.

The results of the empirical research

The empirical research 'Green farming factors in Lithuania' was aimed at identification of green farming determinants. According to Augustinaitis *et al.* (2009, pp. 1-352), accuracy and credibility of an expert evaluation is ensured when the group of the experts consists of at least 5 people. Our research involved 10 selected experts. The value of *Cronbach alpha* coefficient, estimated for all question groups in the questionnaire, is equal to 0.630, which confirms the appropriate composition of the questionnaire and compatibility of the questions. The general value of Kendall's coefficient of concordance (W(a)) is equal to 0.288, and value p is equal to 0,001<0,05, which proposes that the experts' opinions are compatible, although the degree of compatibility of relatively low.

The most important part of the questionnaire helped to identify the determinants of successful and unsuccessful green farming. Question No. 4 revealed the motives which prompted the experts to develop green farming. *Cronbach alpha* coefficient is equal to 0.750; Kendall's coefficient of concordance (W(a)) is equal to 0.444, and value p is equal to 0,001<0,05, which proposes that the expert evaluations are compatible (see Fig. 1).

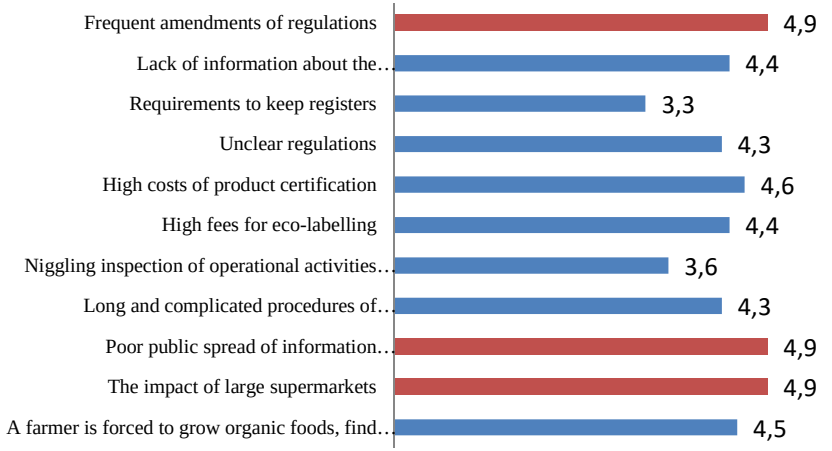
Figure 1. The motives of green farming, average ranks



Source: compiled by the authors with reference to the results of the empirical survey.

The data in Figure 1 show that the main motives of green farming in Lithuania are positive attitudes towards public health and nature protection, the demand for organic, governmental support and subsidising and possession of badlands. Earning of higher revenues from farming was indicated as a completely unimportant motive. The question No. 5 helped to identify the determinants which have the greatest impact on the system of green farming in Lithuania (8 proposed determinants were provided for the experts' consideration) (see Fig. 2).

Figure 2. The determinants affecting the system of green farming in Lithuania, average ranks



Source: compiled by the authors with reference to the results of the empirical survey.

The value of *Cronbach alpha* coefficient estimated for the answers to this questions is equal to 0.680; W(a) is equal to 0.121, and value p is equal to 0.0283>0.05. Nevertheless, distribution of the answers shows that complicated procedures of green farming certification (the average rank is equal to 4.5.) pose serious problems to Lithuanian farmers, who would prefer clearer and simplified certification, as well as consideration of the nature and scopes of farming operations. The following determinants (with the average ranks equal to 4.4) were also recognised as influential in the system of green farming in Lithuania: the level of public awareness, personal and social responsibility (high level of awareness and responsibility helps to stay in business); financial restrictions (e.g. unfavourable crediting policies, high interest rates, lack of savings, etc.) (large financial restrictions discourage farmers from starting-up green

farming). To promote the smooth development of green farming in the country, the government should introduce diffent incentives, grant tax exemptions and provide subsidies for current and potential farmers.

Conclusions

The negative environmental impact of increasing agricultural industrialisation and the wrong belief that agricultural problems can be solved by using machinery and chemicals have prompted the development of alternative farming, in particular, organic production and green entrepreneurship.

Frequently changing regulations on organic farming, complicated procedures of green farming certification and lack of information about the support and subsidies for green farming call for the development of a consistent green farming monitoring system and conduct of the efficient green market research, which would ensure smooth and gradual progress of this industry. Extensive networking systems would provide the opportunities for green farmers to share their experience and observe all the economic changes: new market niches, demand-supply indicators, new channels of product delivery, etc.

Large supermarkets must be prompted to increase the sales of organic foods. For instance, they could be motivated to announce price promotions or attract consumers' attention by highlighting peculiarities, specific value and quality of organic products. For this reason, large supermarkets, for example, could host weekly farmers' meetings and let green farmers sell their certified organic products.

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