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Green farming development opportunities: the case of Lithuania

**JEL Classification:** Q13

**Keywords:** green business; green farming; organic foods; Lithuania

**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 green farming development. Although previous studies examine different aspects of green business, the factors that facilitate or impede the development of green farming, especially at the national level, are hardly considered. In order to fill this gap in the scientific literature, we formulate the following problem of the research: what opportunities of green farming development can be envisaged in Lithuania?

**Purpose of the article:** To explore the opportunities of green farming development in Lithuania on the basis of the general features of green business development.

**Methods:** Comparative and systematic analysis of the scientific literature, graphic and comparative data analyses, and expert evaluation. The results of the survey conducted among experts were processed with application of the following statistical methods: Kendall’s coefficient of concordance and Cronbach alpha coefficient.

**Findings & Value added:** The research has enabled to identify the factors that facilitate and impede green farming development in Lithuania. On the basis of the results of the expert evaluation, the recommendations for green farming development in Lithuania were provid-
ed. It was found that the main barriers that disturb smooth development of green farming in Lithuania mainly include economic and social obstacles. Frequently changing regulations on organic farming, complicated procedures of green farming certification, and lack of information about the support and subsidies call for the development of a consistent green farming monitoring system and conduct of the efficient green market research. 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

The deteriorating impact of human activities on natural ecosystems has become one of the most urgent socio-economic issues over the last few decades. Rapid paces of urbanisation and industrialisation are causing acute threat to the natural environment by deepening the problems of pollution, extinction of flora and fauna, and disruption of the balance in the ecosystem ‘human–nature’. Consideration of the destructive effects of human activities have ceased to be the problem of a single country or nation. The problems of this type call for global solutions. Continuous depletion of natural resources, which determines the increase in air and water pollution indicators, is already felt all over the region. Biosphere is no longer able to purify itself, which, in turn causes further threat to the civilization. Due to the harmful impact of unfavourable environmental conditions, the system of human body functioning is becoming increasingly vulnerable: a substantial share of the world’s population develop weak immunity, infectious, oncologic and genetic diseases.

An important role in the area of protection of environment is played by the development of national economies, in particular, the development of green businesses. Usage of eco-fuels, recycling, consumption of organic foods or introduction of eco-innovations are the measures that promote creation of sustainable environment. 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 green farming development. Although previous studies examine different issues of green business (for instance, the concept of green business and peculiarities of green business funding were addressed by Hall (2013, pp. 4–52), Miryala and Mennakanti (2016, pp. 5–198), Berle (1991, pp. 5–200), Polonsky et al. (1998, pp. 22–43), Rouf (2012, pp. 148–161) and others; the determinants of green business development were analysed by Padel (2002, pp. 1–210) and Skulskis (2010, pp. 158–165); the features and models of green business were studied by Mish-
ra and Sharma (2010, pp. 9–14), Chen and Chai (2010, pp. 27–39), Glebavičiūtė et al. (2011, pp. 5–300), Abuzeinab et al. (2016, pp. 478–490) and others; the main aims of green production were defined by Shrivastava and Hart (2007, pp. 607–635); the barriers of green business development were researched by Maskoliūnaitė (2004, pp. 5–98); the processes of green business certification and the main principles of green farming were analysed by the public institution ‘Ekoagros’ (2014, pp. 1–22), the factors that facilitate or impede the development of green farming are hardly considered. In order to fill this gap in the scientific literature, we formulate the following research problem: what opportunities of green farming development can be envisaged in Lithuania?

The subjects that want to start-up green farming in Lithuania face numerous problems, which, first of all, are related to strict requirements of organic product certification, eco-labelling, product realization, etc. The findings of this research will provide a deeper insight in the factors that facilitate and impede the development of green farming in Lithuania.

The main aim of this research is to explore the opportunities of green farming development in Lithuania on the basis of the general features of green business development.

The object of the research is green farming development. In order to fulfil the main aim of the research, the following objectives were raised:
1. to analyse the theoretical aspects of green business development;
2. to prepare the methodology that would allow to assess the opportunities of green farming development;
3. to conduct the empirical research in green farming development opportunities in Lithuania.

**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;
In this research, assessment of the opportunities of green farming development in Lithuania is based on the method of expert evaluation, which included expert survey, verification of compatibility of the experts’ opinions and interpretation of the results.

Expert evaluation is the method which allows to find a general solution to a problem while leaning on the experience and knowledge of the experts. According to Tidikis (2003, pp. 4–627), an expert is a person who due to his/her professional activities and competences can reliably and rather comprehensively reveal the information about the problem under research. While researching a problem, a process or a phenomenon, an expert’s professional competence is extremely important (Augustinaitis et al., 2009, pp. 1–352).

Expert evaluation is based on the presumption that a solution to a problem can be found only when experts’ opinions are compatible. In case of incompatibility, the aim of the research is still fulfilled — it is concluded that no consensus of the experts’ opinions can be observed.

According to Augustinaitis et al. (2009, pp. 1–352), the methodology of expert evaluation is based on the following presumptions:

− an expert has acquired large quantities of rationally accumulated information (has much experience, can free rely on intuition, etc.), so he/she can be considered a good source of qualitative information;
− the opinion of an expert group is close to the real solution of the problem.

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 opportunities of green farming development in Lithuania. For the accomplishment of this aim, the following objectives were raised:
1. to identify the factors that facilitate and impede green farming development in Lithuania;
2. to provide the recommendations for green farming development in the country.
The expert survey provided the answers to the target questions and helped to structure the process of information collection. The method of expert survey was selected for several reasons:
1. it ensured anonymity of the respondents;
2. provision of multiple answers helped to facilitate the task of the respondents.

The questionnaire included 7 target questions. It was distributed to the experts by e-mail and in person (at the convenience of the experts). The data was processed with SPSS (‘Statistical Package for Social Sciences’) and ‘Microsoft Excel’ software. Leaning on the results, qualitative analysis of the data was conducted.

Compatibility of the experts’ opinions was verified by employing coefficients of concordance. The general process of verification comprised several stages (Augustinaitis et al., 2009, pp. 1–352):
1. the measure of the assessment of the opinion compatibility was selected;
2. the reference model for opposing evaluations was developed;
3. the distribution of the assessment measure within the reference model was estimated while making particular presumptions about the parameters of the model.

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:

\( H_0: \) expert evaluations are opposing (i.e. coefficient of concordance is equal to zero);

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

**Estimation algorithm**

Rank average \( a \) can be estimated by the formula:

\[
a = 0.5m (k + 1)
\]  

(1)

Square sum of the deviation from the rank average is equal to:
\[ S^2 = \sum_{j=1}^{k} \left( \sum_{i=1}^{m} x_{ij} - a \right)^2 \]  

(2)

where: \( m \) – the number of the experts; \( k \) – the number of the expertise objects.

The maximum value of the deviation from the rank average square sum, which can be achieved only under the complete compatibility of the expert opinions, is estimated by the formula:

\[ S_{\text{max}}^2 = \frac{m^2 (k^3 - k)}{12} \]  

(3)

If no coinciding values are observed, the coefficient of concordance is estimated by the formula:

\[ W = \frac{12 S^2}{m^2 (k^3 - k)} \]  

(4)

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 \textit{Cronbach alpha} coefficient should be considered. \textit{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. According to Nunnally and Bernstein (1994, pp. 5–752), the value of \textit{Cronbach alpha} coefficient should be higher than 0.7, while other scientists propose that the lowest critical limit of the questionnaire reliability is 0.6. Hence, the selection of the lowest critical limit of the questionnaire reliability is a subjective matter that depends on the nature and qualitative aspects of the research. For this empirical research, we selected 0.6 as the lowest critical value of \textit{Cronbach alpha} coefficient.
Theoretical concept of green business

The concept of green business is multifaceted. On the one hand, green business can be interpreted as a business obligation to conduct responsible activities. Socially responsible companies are environmentally friendly, they care about waste recycling and energy saving. On the other hand, green business can be interpreted as manufacturing of organic products, which contributes to promotion of healthy lifestyles and population’s general well-being.

Green business comprises two main categories of green companies:
1. the ones that use only renewable energy resources;
2. the ones that sell eco-friendly and organic products or provide eco-services (e.g. eco-tourism services) (United Nations and World Tourism Organisation, 2005, pp. 7–210).

The differences between green and traditional businesses were highlighted in the report presented by the public institution ‘Ekoagros’ (2014, pp. 1–22). In reference to this report, traditional business is ‘a process in a particular environment, which calls for careful planning and organisation’ (‘Ekoagros’, 2014, p. 5). Green business is conducted following the same principles as traditional business, but all the activities of green business are directed towards minimisation of the negative industrial impact that could be made on global or local environment, society or community (Miryala & Mennakanti, 2016, pp. 5–198). The main aim of green companies is to make and deliver the product which would not cause any negative effects on environment over its entire life cycle. To accomplish this aim, green companies do not use poisonous chemicals, antibiotics, or pesticides. In other words, they make sure that their products do not make any harm to the environment. According to Polonsky et al. (1998, pp. 22–43), green companies not only diminish the destructive industrial effects, but also develop a competitive advantage by differentiating operations and implementing ecological innovations. What is more, they balance consumer-business benefits. To gain ecological efficiency, companies optimize the quantities of raw materials, reduce waste and implement waste recycling systems. This way, they reduce environmental damage and supply markets with products at competitive prices, which, in turn, corresponds to consumers’ needs and promotes population’s general welfare.

‘Not any business that leaves the world worse than it was for future generations can be treated as green; on the contrary, it should be treated as an imposter business because the main aim of green business is generation of the ideas which may help improve the current state of the Earth and maintain the vitality of ecosystems’ (Hall, 2013, p. 27). The above-
presented quotation proposes that green business incorporates different methods and techniques which help to turn our unsustainable economy into a sustainable one. Improvement of the situation calls for the assessment and elimination of the disadvantages of traditional business.

The analysis of the scientific literature has revealed that different scientists propose different interpretations of green business. Contribution to sustainable environment and balance of ecosystems, as well as refusal of harmful substances in the processes of production are considered the main aims of green business. The concepts of green business, proposed in the scientific literature, have been systematised in Table 1.

It can be concluded that the main difference between green and traditional business is that green business focuses on sustainability of economic and social resources over the entire product’s life cycle, which, in turn, determines positive effects of the business on environment, society and state economy. Nevertheless, green business incorporates longer production processes, difficult legal regulation and certification. What is more, it requires special conditions for product storage.

**The results of the empirical research**

The empirical research ‘Green farming development opportunities in Lithuania’ was aimed at identification of green farming development determinants and definition green farming development directions in Lithuania. 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 first part of the questionnaire helped to collect the general information about the experts: the survey involved 40 percent of the experts with 7–10 years’ experience, 30 percent of the experts with 10–15 years’ experience, 20 percent of the experts with 5–7 years’ experience, and 10 percent of the experts with the experience of over 15 years in the area of green farming.

The second part of the questionnaire helped to identify the determinants of successful and unsuccessful green farming development. Question No. 4
revealed the motives which prompted the experts to develop green farming. The value of Cronbach alpha coefficient estimated for the answers to this questions 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. The experts were asked to provide the evaluations of particular motives on a scale from 1 to 5 (where 1 stooded for the lowest possible, and 5 — for the highest possible evaluation) (see Fig. 1).

The data in Figure 1 show that the main motives of green business development in Lithuania are positive attitudes towards public health and nature protection (the average rank is equal to 4.4), the demand for organic products (the average rank is equal to 3.5), governmental support and subsidising (the average rank is equal to 3.3), and possession of badlands (the average rank is equal to 3.1). Earning of higher revenues from farming was indicated as a completely unimportant motive (with the average rank equal to 2.5).

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). The value of Cronbach alpha coefficient estimated for the answers to this questions is equal to 0.680, which shows that all the determinants on the scale reflect the researched dimension with appropriate accuracy. Kendall’s coefficient of concordance (W(a)) is equal to 0.121 and value p is equal to 0.0283<0.05, which proposes that the expert evaluations are compatible. 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 different incentives, grant tax exemptions and provide subsidies for current and potential farmers.

Question No. 6 helped to identify the determinants of farmers’ dissatisfaction with the system of green farming in Lithuania (11 proposed determinants were provided for the experts’ consideration) (see Fig. 3).
The value of *Cronbach alpha* coefficient, equal to 0.831, proposes that the question is logical and dimensional. The value of Kendall’s coefficient of concordance (W(a)), equal to 0.472, along with value p=0.001<0.05 propose that the opinions of the experts are compatible. The results of the survey have revealed that the most significant determinants of farmers’ dissatisfaction with the system of green farming in Lithuania (the average ranks are equal to 4.9) include:

- refusal of the managers of large shopping centres to buy and sell perishable organic products;
- poor dissemination of the information about the special value of organic products (which are commonly more expensive than non-organic products);
- frequent changes of the regulations on organic farming and production.

The demand for organic products in the market calls for the efficient distribution of these products. Previous studies disclosed that organic food buyers are residents of the major Lithuanian cities with relatively high-income and high education. The buyers attributable to this category are busy people who save their time and therefore visit large supermarkets near their homes. Unfortunately, large supermarkets, which may have a great impact on the general sales of organic products, often refuse to have perishable organic products in their stocks. For this reason, green farmers often face the problems of product realization: they are forced not only to grow organic foods, but also to find the markets for sales and develop loyalty of consumers.

In order for large supermarkets to see it purposeful to broaden the assortment of organic products in their stocks, first of all, communication between them and consumers has to be improved (consumers should be informed about the specific value of organic products, which are commonly more expensive than non-organic products; consumers should also know about positive characteristics of organic products that prove the reasonability of the current price-quality balance). Large supermarkets should avoid unreasonably high overcharging and try to attract more consumers of organic foods by labelling important details of product quality or announcing price promotions, which are uncommon in terms of the sales of organic foods. What is more, large supermarkets could host weekly farmers’ meetings and let green farmers sell their certified organic products.

Another important determinant of farmers’ dissatisfaction with the system of green farming in Lithuania is high costs of green farming certification (the average rank is equal to 4.6). One of the experts noted that the general green farming certification fee in Lithuania composed 1200 Litas (347.5 EUR) per year between 2013 and 2014. High certification fees in-
deed discourage famers from green farming start-up or development and make them return to traditional farming.

Question No. 7 helped to identify the determinants of green farming development in Lithuania. The experts were asked to provide the evaluations (on a scale from 1 to 5) of particular governmental actions that could serve as major contributors to green farming development in the country. The value of Cronbach alpha coefficient equal to 0.529 showed that the question is reasonable, but the experts found it difficult to indicate the determinants with highest values. The value of Kendall’s coefficient of concordance (W(a)) equal to 0.153, and value p=0.0176<0.05 showed that the researched dimension is significant and the opinions of the experts were compatible, but there was not pointed the dominant determinant of green farming development (see Fig. 4).

The data in Figure 4 show that the government should create a consistent green farming monitoring system (the average rank is equal to 4.7) and conduct the efficient green market research (the average rank is equal to 4.3), which would ensure smooth and gradual green farming development in the country. Purposeful research would provide more information about the current market state and would make potential farmers more confident. 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.

Green farming development would also be facilitated by provision of non-financial support (e.g. provision of information about green farming certification procedures, eco-labelling, etc.) and promotion of the motivation of large supermarkets to expand their sections of organic products (the average ranks estimated for the above-mentioned determinants are equal to 4.4).

Reduction of the initial capital required for the establishment of an enterprise (currently, it amounts to 2500 EUR for establishment of a company of limited liability, and 40000 EUR for establishment of a joint-stock company) was noted as the least important determinant (the average rank is equal to 3.6) of green farming development in Lithuania.

Conclusions

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 con-
sistent 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.

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. Abundance and purposefulness of the scientific studies along with accumulation of the statistical data would generate more opportunities for organic food processing entities to share their competences and so improve distribution of organic products in the market.

References


Annex

Table 1. The concepts of green business proposed in the studies of Lithuanian and foreign authors

<table>
<thead>
<tr>
<th>Author(s), year</th>
<th>Concept</th>
</tr>
</thead>
<tbody>
<tr>
<td>Miryala, Mennakanti, 2016, p. 7</td>
<td><strong>Green business</strong> follows the same principles as traditional business, but all the activities are directed towards minimisation of the negative industrial impacts made on local environment, society, community or state economy</td>
</tr>
<tr>
<td>Hall, 2013, p. 27</td>
<td>‘Not any business that leaves the world worse than it was for future generations can be treated as green; on the contrary, it should be treated as an imposter business because the main aim of green business is generation of the ideas which may help improve the current state of the Earth and maintain the vitality of ecosystems’.</td>
</tr>
<tr>
<td>Berle, 1991, p. 8</td>
<td><strong>Green entrepreneurship</strong> refers to the opportunities of business to save the world and earn money</td>
</tr>
<tr>
<td>Hinterberger et al., 2002, p. 114</td>
<td><strong>Green business</strong> is a drive of the contemporary economics</td>
</tr>
<tr>
<td>Polonsky et al., 1998, p. 23</td>
<td><strong>Green companies</strong> not only diminish the destructive industrial effects, but also gain a substantial competitive advantage</td>
</tr>
</tbody>
</table>

Note: the concepts that may correspond to the concept of ‘green business’ are green entrepreneurship, green industry and sustainable business.

Figure 1. The motives of green business development, average ranks

<table>
<thead>
<tr>
<th>Motive</th>
<th>Average Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive attitudes towards public health</td>
<td>4.4</td>
</tr>
<tr>
<td>Positive attitudes towards nature protection</td>
<td>4.4</td>
</tr>
<tr>
<td>Demand for organic products</td>
<td>3.5</td>
</tr>
<tr>
<td>Governmental support and subsidising</td>
<td>3.3</td>
</tr>
<tr>
<td>Possession of badlands</td>
<td>3.1</td>
</tr>
<tr>
<td>Earning of higher revenues from farming</td>
<td>2.5</td>
</tr>
<tr>
<td>Healthy lifestyle</td>
<td>4</td>
</tr>
</tbody>
</table>
Figure 2. The determinants affecting the system of green farming in Lithuania, average ranks

- Education level makes a positive impact on green farming development
- The level of social responsibility helps to survive in the market
- Previous experience ensures more successful business development
- Spread of information about positive features of organic products promotes green farming
- Financial restrictions discourage from green farming startup
- Complicated system of certification makes a negative impact on green farming development
- Strict legal regulation is one of the main barriers of green business development
- Provision of financial support promotes green business development
- Non-financial measures of support promote green business development
- Lack of information about green farming promotion burdens green farming development

Figure 3. The determinants of farmers’ dissatisfaction with the system of green farming in Lithuania, average ranks

- Frequent amendments of regulations
- Lack of information about the changes in regulations
- Requirements to keep registers
- Unclear regulations
- High costs of product certification
- High fees for eco-labelling
- Niggling inspection of operational activities conducted by authorized certification institutions
- Long and complicated procedures of governmental support provision
- Poor public spread of information about organic products
- The impact of large supermarkets
- A farmer is forced to grow organic foods, find markets and educate loyal consumers
Figure 4. Governmental actions that could serve as contributors to green farming development in Lithuania, average ranks