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MODELLING THE DETERMINANTS OF ORGANIC FARMING

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INTRODUCTION

Relevance of the research topic. Organic farming is gaining recognition as an aspect of sustainable agriculture and is significantly oriented (has potential possibilities) towards the solving of the issues related to *the competitiveness* of agricultural products, *employment* of the rural population and *additional income* simultaneously functioning as a preventive *environmental measure* (Scialabba, Hattam, 2002; Offermann, Lampkin, 2005; Alrøe, Kristensen, 2004; Kristiansen et al., 2006 ir kt.). Although at present the principles of sustainable development are being successfully implemented in organic agriculture, the results of foreign scientists' researches have revealed that the scope and pace of the development of organic farming in the world in general and in its individual regions are insufficient aiming to:

1) put into practice the principles of sustainable development on purpose to guarantee the preservation and the increase of the productivity of existing natural resources on which basis agriculture is being developed;
2) reduce the pollution of the environment caused by conventional agriculture;
3) ensure the food quality and safety.

According to Čiegis (2009), the organic farming practice as the strategy of the sustainable agricultural development is possible only on the mutual efforts of state institutions, municipalities and non-governmental organisations, active and purposive activities of the general public. The organic farmers are one of the most important groups of the producers of agricultural products, which have a positive impact on the natural environment and sustainable development of agriculture.

From the point of view of agriculture as an economic activity, organic farming usually is recognised as a certain form of business and the philosophy of a healthy lifestyle, the farming family lifestyle. Practically there are opinions that the farmers engaged in organic farming strive only for higher purposes that are incompatible with the increase of profit in this economic activity. On the purpose of evidence, it should be stated that in this dissertation, with reference to the theories of *general systems* and *farming/farms systems*, organic farming is recognized as a homogenous system from the agro-ecological approach but a heterogeneous system from the socio-economic approach; it is characterized by the diversity of elements (Fresco, Westphal, 1988; Roersma, 1997; Dixon, Gulliver, Gibbon, 2001 ir kt.) influencing both the family business and its lifestyle. With reference to the statement of the theory of *farming systems* that the diversity of farming systems is caused by very many different agro-technological and socio-economic characteristics, it is possible to assume that there are many different factors affecting farmers' decisions in the context of both the agricultural business and the family lifestyle. Hence, naturally arise a question what factors do condition these decisions because exactly the authority and public institutions managing them could have the most effective influence on the process of organic farming development?

Current status of the problem. Organic farming displays one of the highest forms of the sustainable development in agriculture and motivates to strive for the economic (Scialabba, 2000; Kilcher, 2001; Dalgaard et al., 2003; Stalenga et al., 2005; Zundel, Kilcher, 2007 et al.), social (Alrøe, Kristensen, 2004; Brandt, 2007; Kilcher, 2007; Mathur, 2007 et al.) and environmental (Cobb et al., 1999; Scialabba, 2003; Haas et al., 2005; Leu, 2005; Kristiansen et al., 2006 et al.) goals. It should be noted that the management of the farm under the conditions of organic farming

has its own particularity that corresponds to the concept of sustainable agricultural development (Čiegis, 2003, 2004, 2009; Niggli et al., 2007).

The opinions of scientists concerning the issues of the development of organic farming differ. Some of them think that organic farming is a suitable decision in small farms that hardly can compete on the current agricultural market (Scialabba, Hattam, 2002; Wos, Joswiak, 2003; Burke, 2007; Thamaga-Chitja et al., 2007; Vaidya, Partap, 2007 et al.). It is like a recommendation to occupy a specific niche, which due to its specifics is not attractive yet as a sphere of mass production. On the other hand, at once there would be created the preconditions for the reduction of environmental problems and for the meeting of some consumer needs for healthy, safe and better quality food products (a link to the science of consumer behaviour). However, in the opinion of some scientists, the quality of some organic products often is lower than that of conventional products (in most cases with regard to the quality parameters of wheat harvest (Baltramaitytė 2000; Rutkovienė et al., 2003). Besides, long-term organic farming leads to the extensive production and reduces humus and other useful chemical substances in soil, therefore, the quality of soil is becoming worse (Mažvila et al., 2003; Pekarskas, Raškauskienė, 2005; Fiessbach et al., 2007, et al). A fair number of scientists think, that organic farming differs essentially from conventional farming (Padel et al., 2005; Ulmer et al., 2005; Best, 2006), therefore, there are differences in food quality and a different impact on natural environment and farmers living conditions. Thus, arise a question, what is the true value of organic farming and how it is realized by farmers, consumers and the general public?

Organic farming also should be considered in the aspects of income and economic motives. For the last 20 years some scientists (Padel, Lampkin 1994; Offermann, Nieberg, 2000; Nieberg, Offermann 2003; Offermann, Lampkin, 2005; Sanders, 2006) studied related topics and assessed that the revenues (including subsidies) of organic farmers are larger than those of conventional farmers. The Estonian scientists Koorberg, Lahesoo, Mikk (2005) carried out a similar research and estimated that the state support in the conventional farms accounted for 39.8% in the total revenue while in the organic farms it reached even 52.5%. The importance of economic factors emphasised and many other scientists (Latacz-Lohman, Renwick, 2002; Harring et al., 2004; Stalenga et al., 2006). Considering the fact that in Lithuania starting 2004 (after joining the EU) for organic farming was given almost the maximum available support, it is likely that its share in the structure of farm revenue is even larger and, first of all, motivates a number of organic agricultural entities to think about the support and only later about the production of organic products, their competitiveness and realisation. To the same conclusion lead and the findings of the survey carried out in Panevežys County (Skulskis, Kairytė, Zemeckis, 2006a) on the factors of organic farming which eventually lead to particular attitude towards organic farming and priorities.

The process of the formation of attitudes and priorities of agricultural entities is rather specific. Gasson (1973), one of the foremost scientists in this field, the factors affecting this process classified into four groups:

means to obtain sufficient income – pleasant working conditions and the environment, to ensure the development of business and the sense of security*;*

social values – the family traditions and their continuity, prestige, a membership in a certain community, good working contacts with workers;

forms of self-expression in farming – pride, personal fulfillment and creativity;

internal values – hobbies, natural lifestyle, doing the work you like, and management of processes.

Padel (2006) concentrated her research on the attitudes of farmers towards organic farming and analysed the farmers affecting factors, grouping them into three groups *personal – individual; specific – characterising the farm*; *external* (it should be noted that in the previous years this author classified three groups and a few subgroups). The farmer more or less can manage the factors of the first two groups but practically he has no real impact on the factors of the third group or such a possibility is very low. Therefore, the study of the dissertation was focussed on the identification of the determinants of organic farming according to the aforesaid classification groups and on the assessment of these determinants' significance to the farmers' decision-making.

On the basis of theoretical and empirical investigations, the foreign and Lithuanian scientists have come to a single conclusion that although the private ownership makes the preconditions to strive for the economic efficiency and the farmer's intention to receive greater support accelerates the development of this activity, only the society of well-established democratic traditions has the potential to encourage sustainable development. However, with reference to the current EU (and Lithuanian) experience in the development of organic farming and its promotion, it can be stated that this process lacks the singleness and as often as not the political incentive measures have both positive and negative effects as well.

It is noted that despite the fact that in the world organic farming has being practiced already for a few decades, from the point of view of different related sciences (theory of agricultural systems, farm management, ecology, agro-technologies, theory of sustainable development, etc.) so far scientists have no single opinion concerning the determinant factors. One of the reasons is the heterogeneity of organic farms as socio-economic systems. The heterogeneity determined the fact that in the previous researches scientists made an attempt to identify the factors of organic farming and describe them according to various economic and social characteristics of organic farms or farmers, including and rapidly changeable parameters. Consequently many previous researches resulted in a mixed matrix of the factors. Besides, the analysis of methodologies and results of the previous researches showed that the factors of organic farming often (except consumer opinion and qualitative researches) were analysed and described according to the whole of organic respondents as a homogenous group (alternative to the conventional farms) or according to certain their groups classified by a certain characteristic of the respondents.

The scientific problem of the research: how could be possible to encourage the development of organic agriculture while identifying the determinants of organic farming according to their significance?

The object of the dissertation is the factors influencing the decision to farm organically.

The aim of the dissertation is after the classification of the respondents engaged in organic farming by priority of their activity, to assess the significance of the determinants on the development of organic farming.

To achieve the aim, the following **goals** are set:

1) to analyse organic farming systematically and from the point of view of the sustainable development in agriculture;

2) after the analysis of methodology and results of the previous researches on the factors of organic farming, to reason the methodological assumptions for research of the aforesaid factors;

3) to make the theoretical model for the research of the determinants of organic farming and to test it empirically;

4) to analyse the factors of organic farming in the formed clusters of the respondents engaged in organic farming;

5) to rank the determinants influencing organic farming by their significance in the formed clusters of the respondents engaged in organic farming;

6) to identify the determinants affecting farmers' strategic decision to farm organically.

The originality and scientific value of the dissertation. The analysis of the theoretical and empirical researches shows the originality and scientific value of the dissertation research:

1) the organic farming concept has been revealed through an interdisciplinary approach and highlighted the content of particular categories (e. g. "system", "system agro-ecological, socio-economic elements and their interaction", system management", etc.) of the theory of management in it;

2) with reference to the previous researches of Western and Lithuanian scientists, the theories of organic farming factors' classification, synthesis, farming system elements and their interaction, the four major groups of the organic farming encouraging factors were formed;

3) the research theoretical model for the assessment of the organic farming factors was established combining the procedures of the identification of socio-economically homogenous organic farms and the significance of the factors on the strategic farmers' decision concerning the method of organic farming;

4) the cluster analysis method was used to identify the homogenous features of organic farms "hidden" among heterogeneous socio-economic characteristics;

5) the research on the factors encouraging organic farming is carried out for the first time revealing the significance of the determinants on the strategic farmers decision regarding the method of organic farming and classifying the organic respondents depending on the activity priorities into two homogenous groups (profit-oriented and organic-oriented lifestyle).

The originality and scientific value of the research are in a close relation with the **practical value**:

1) the research enables to assess the factors of organic farming more systematically than heretofore;

2) the results of the research could be a basis for the rational policy-making in the development of organic agriculture (in a narrow sense) and sustainable agriculture (in a broad sense), especially in Lithuania and other new EU countries;

3) the results of the research provide with new knowledge the farmers, especially those who are preparing to make the strategic decisions regarding the method of agricultural production.

Methodology of the research

- The research was based on the analysis of the scientific literature related to the trends and perspectives of the system theory, organic farming, sustainable agriculture development and rural development, protection of the environment, food quality and safety and the motivation theory as well as on the analysis of empiric models and their applicability in the context of Lithuania. Besides, the attention was paid to the analysis of reports of the applied researches carried out in Lithuania and related to the development of organic farming and the reasonableness of politic and management decisions made in this sphere.
- To assess the organic farming affecting factors, the quantitative research on Lithuanian organic farmers' opinions was carried out (459 respondents or 20.3% of the total number of organic farmers).
- The data of empirical research were analysed using the descriptive and multidimensional statistical methods (*general analysis of variance (ANOVA), factorial analysis, MDS (multidimensional scaling)), and cluster analysis (non-hierarchical k-means clustering, multidimensional regression, Ward method etc*.). Statistics software SPSS (Statistical Package for the Social Sciences) 15.0 and 16.0 were used to process the collected data.

Limitation of the dissertation research

The questionnaires had been done before the Ministry of Agriculture made a decision to reduce considerably the governmental support for organic farming, therefore, it might have a significant impact on potential candidates to develop such production method.

Financial support and the experience gained during the research the dissertation. The research was supported by:

- one-year doctoral student grant from the Lithuanian State Science and Studies Foundation;
- six-month vocations for the research from the Lithuanian Institute of Agrarian Economics, the employer of the doctoral student.

The experience gained during the implementation of the following projects and used in the research of the dissertation:

- The adoption of organic farming practices in six high diffusion regions of new EU Member States (contract No QLK5-CT-2002-02718) financed under EU 5th Framework programme;
- Improving information, communication and knowledge systems for sustainable and organic agriculture (contract No TCP/LIT/3002 (A)) financed by the Food and Agriculture Organization (FAO) of the United Nations.

Publication of the research findings. Scientific papers on the research findings in peer-reviewed publications:

1. Skulskis, V., Vitunskienė, V. (2008). Internal factors of organic farming, *Management theory and studies for rural business and infrastructure development.* Nr. 15 (4), pp. 143-152. ISSN 1822-6760 (EBSCO (Peer-Reviewed) International database).

2. Skulskis, V., Vitunskienė, V. (2008). External factors of organic farming, *Management theory and studies for rural business and infrastructure development.* Nr. 14 (3), pp. 141-149. ISSN 1822-6760 (EBSCO (Peer-Reviewed) International database).

Scientific papers on the issues related to research findings in peer-reviewed publications:

1. Skulskis, V., Girgždienė, V. (2009). Consumption of organic food products and promoting information sources in Lithuania, *Agricultural sciences*. Vilnius: Lithuanian Academy of Sciences Publishers, T 16 Nr. 3-4, p. 157-164. ISSN 1392-0200 (CABI Publishing, EBSCO Current Abstracts international database).
2. Skulskis, V., Kairytė, E., Zemeckis, R. (2006). Evaluation of factors encouraging organic farming, *Agricultural sciences*. Vilnius: Lithuanian Academy of Sciences Publishers, No 1 (supplement), p. 55-61. ISSN 1392-0200 (CABI Publishing international database).

A scientific paper in the International conference proceedings:

Skulskis, V., Kairytė, E., Zemeckis, R. (2006). Organic farming practices in Lithuania. *TRANSACTIONS*, Estonian University of Life Sciences, 223, p. 332–340. ISSN 1406-4049.

Presentations of the research findings in 6 international scientific conferences in Lithuania:

1. Skulskis V. *Lithuanian organic farmers' priorities and evaluation of factors influencing them,* international scientific conference Sustainable consumption: the present and prospects. Lithuanian Consumer Institute, Vilnius, Lithuania, 21 January 2010.
2. Skulskis V. *Evaluation of organic farming factors in Lithuania,* international scientific conference „EU support in 2007–2013: challenges and innovations of the agricultural and food sector. Lithuanian Institute of Agrarian Economics and Lithuanian Academy of Sciences, Vilnius, Lithuania, 27–29 May 2009.
3. Skulskis V. *Organic farming and sustainable development,* international scientific conference Influence of the EU support on structural changes in the agricultural and food sector, Lithuanian Institute of Agrarian Economics and Lithuanian Academy of Sciences, Vilnius, Lithuania, 27–28 March 2007.
4. Skulskis V. *The evaluation of organic farming encouraging factors,* international scientific conference Rural Development Plan – Scientific Approach: the challenges for the food sector and rural development in 2007–2013, Lithuanian Institute of Agrarian Economics and Lithuanian Academy of Sciences, Vilnius, Lithuania, 15–16 December 2005.
5. Skulskis V. *Aspects of trade in organic products,* international conference Processing and trade of organic products, Lithuanian University of Agriculture, Kaunas, Lithuania, 27 September 2005.
6. Skulskis V. *Knowledge and informing importance in the promotion of consumption of organic products,* international scientific and practical conference Knowledge management and public initiatives, Institute of New Economy, Vilnius, Lithuania, 2–3 June 2005.

BRIEF SUMMARY OF DISSERTATION CONTENTS

1. Theoretical assumptions of the organic farming influencing factors

The first section presents shortly a system approach to farming and the farm from the point of view of management science aiming to prepare theoretical grounds for the analysis of the factors encouraging organic farming. On the basis of the theories of general systems and agricultural systems is made an assumption that the crucial impact on the development of organic farming system has its agro-ecological and socio-economic subsystems and in their interrelation the active role, i. e. the decision-making function goes to the socio-economic organisation – the farmer's farm and immediately to the farmer itself.

The system theory and, based on it, the method of systemic analysis formed in the second half of the last century already took a proper place in the field of scientific research in agriculture/farming/farm systems and management. The farming system approach or farming system analysis (FSA) is used not only in individual fields of agricultural sciences but also is applied in an interdisciplinary context because many researchers argue that the characteristics of the farms as the systems are caused by agro-ecological and socio-economic factors. Roersma (1997) noted that the necessity of the systemic approach to the farm emerges and from the point of view of the behavioural sciences. At the level of every individual farm are made decisions, therefore the management is a significant factor since it determines the decisions of the farm systems regarding their objectives and the structure of internal and external relations. On this basis the author stressed that the aspect of farm decision-making is an essential in the process of the analysis of farm variety, preparing the programmes or strategies of their development and planning political interventions.

In the end of the XX century the society understood that organic farming was not only an ecological and environmental measure, but also it could be a certain alternative for the business of agriculture. Therefore, the development of the concept of organic farming during the past decade is presented: the definitions more and more involve the management decisions that are oriented towards the aspiration for the compatibility of environmental, social and economic conditions of the production of agricultural products. In this dissertation is chosen the following definition of Ivanikova and Ruževičius (2008): *organic farming* is a farming system that relies on natural biological processes and substances and ensures the production and realisation of high quality and more natural agricultural products.

The next section presents the assessment of different scientists about organic farming regarding the scope and character of production, the increase of income, the environmental standards, food safety and other characteristics that have the most impact on the development of organic farming (Kilcher, 2007; Mathur, 2007). Management of organic farming answers the best to the concept of the development of sustainable agriculture (Čiegis, 2003, 2004, 2009; Niggli, Earley, Ogorzalek, 2007). Although quite a number of scientists agree to the said attitudes, the methodology for the assessment of the impact of this production method is under discussions.

In the third section with reference to the analysis of scientific literature is made a preliminary conclusion that farmers are a certain specific producer group, the results of which are mainly reached on the personal or family members' work, the hiring of

employees is not popular due to the small scope of work in the farm. Most often the farmer develops the activity together with his family members, therefore, it is likely that the strategic decisions (such as selection or change of the production method) the farmer makes also together with his family members, and after the conversion to organic farming simultaneously makes an additional possibility for the family members to have a workplace, thus, builds stronger relationships in the family.

The fourth section describes the grouping of the organic farming encouraging factors that were identified by some authors. There are presented different variants of the grouping results but the author of the dissertation has set the following classification of the organic farming affecting factors:

- external factors related to governmental decisions and activity of authorized state institutions;
- external factors related to the market;
- internal factors determining specific farm characteristics;
- Individual, i.e. personal characteristics and attitudes of the farmer.

Later the author of the dissertation analyses chronologically the researches on the economic issues and farmers' opinion in which the other scientists assess the authorities' decisions related to the organic farming process. Under the free market economy the state support is as an injection that increases the capability of the organisation to operate and makes the conditions for this. The overview of the analysed researches allow to make a preliminary conclusion that in the short-term future the support is a very significant (perhaps the most important) factor motivating the farmer to convert the conventional method of production into organic farming.

One of the distinctive characteristics of organic farming is the fact that farmers must follow the rules of organic agriculture, and products must overcome the certification process. It guarantees the processors, traders and consumers the better quality products, makes the recognition of such products easier, and the farmers realise the certification as the required condition.

Later is shortly presented the information characterising the market of organic products and elaborated the researches of other scientists in the field of consumption. The overview of researches allows to state about the better quality of organic products, and the consumers believe that these products are healthier. This enables to make a preliminary conclusion that the consumers, considering the better quality of organic products, accept the higher (by 15–25%) price. The significance of this factor is extremely relevant and enables to make the assumption that in the long-term future the price of organic products might be the factor ensuring the development of production of the said products. However, the scientists bring up the problem that consumers are insufficiently informed about organic products; this supposes special measures to change the situation.

In this section the author of the dissertation analyses the collected researches carried out by other scientists and related to the assessment of specific characteristics of the respondent farms, working conditions, animal welfare and farmers' attitudes. On the grounds of the results some authors classified the respondents into the following groups: 1) "idealists pioneers"; 2) "professionals oriented to the market"; 3) "beginners"; 4) "farmers developing the method of organic production as a new marketing strategy.

The overview of the abovementioned researches enables to state that the working conditions in the individual farm are important and considered as safer and

healthier and make assumptions to assess them as an additional benefit for the entities developing the method of organic production. The change of production method the organic farmers consider more risky than the traditional farmers. The latter related the risk to the production costs and animal welfare requirements while the organic farmers considered being greater the institutional risk related to corresponding political decisions on the support for such production (Lien et al., 2005).

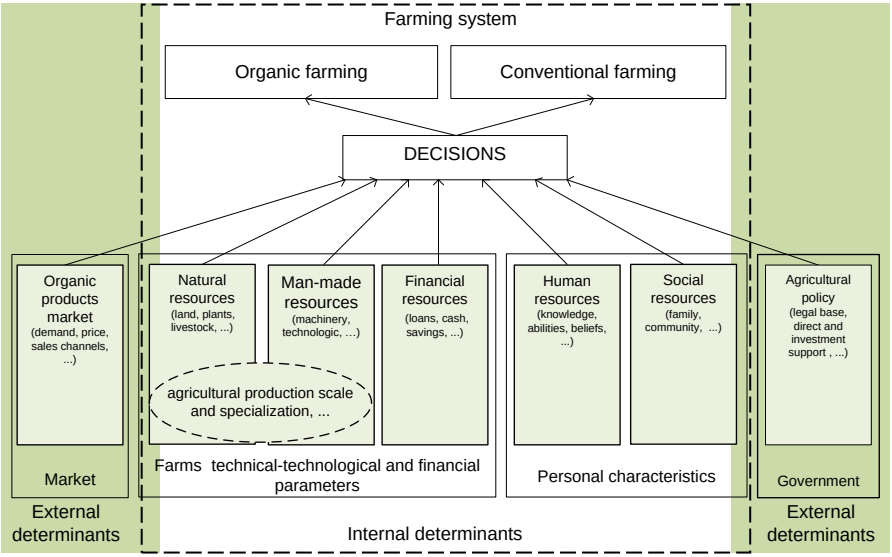
The greater demand for labour resources in the farm requires some management functions that should be done by the farmer of a larger farm, starting with the search of workers of the necessary skills and concluding with the control of work quality of hired workers. It is supposed that an individual farmer converting the production method from traditional into organic creates additional work places for the family members as well. Lund (2002) noticed that an organic lifestyle is more typical to the farmers who were the pioneers in organic farming. Although animal welfare in the organic farms is ensured slightly better, the differences are not very significant and in individual farms might be no differences at all.

Analysing the personal characteristics encouraging organic farming, a special emphasis is given to particular personal characteristics and features which have or might have some impact on the decision to choose such an economic activity in rural areas. The national peculiarities also may have some impact since Lithuanians are the nation of farmers, the Lithuanian family used to have own land plot that was the main source of subsistence, and this eventually formed the features of independence and individualism (Zakarevičius, 2002). The results of these researches enable to make a preliminary conclusion that the factors such as personal health, a healthy lifestyle and a positive attitude to the environment issues have an integrated impact on the rapid development of organic agriculture. Analysing the organic farming encouraging factors it is necessary to consider the farmers obligations as well. Usually they have a legal form, but some of them become internal, i.e. the psychological obligations that also are significant.

On the basis of generalised results of the research it can be made the assumption that the personal attitudes of the farmers, who have started organic farming earlier and pursue it for a longer period, towards this farming method are stronger and well-established (Lund, 2002; Lund et al., 2004; Best, 2006, 2008; Flaten, Lien, 2006; Flaten et al., 2007; Padel, 2008). Although the respondents of different research periods named different determinant factors, their significance can vary, but this does not make a reason to state that the farmers who started to farm organically later have only homogenous aims since so far there were not attempts to classify (at least not published) the priority goals or target orientation of the farmers who started such production method around the same time period. *A priori* it can be stated that the goal of one farmers' group is to maximize profit, while the other farmers' group is oriented towards diverse goals, the goals can vary depending on the change of environment conditions.

The farmers, planning to change the conventional production method into organic farming, are affected by both the external and internal factors, the significance of which is being attempted to assess in the study. To assess their significance, a logical scheme and within it a theoretical model of the empirical research is presented, where four groups of factors are analysed: government, market and farm parameters and personal characteristics of the farmer.

Figure 1. **Theoretical model for the analysis of the determinants affecting the farmers' decision to farm organically**



The established research model of the determinant factors affecting the farmers' decision to farm organically enabled to determine the respondents' target orientation in such economic activity, to identify the determinant factors and to assess them. This model enabled to establish the instrument for the evaluation of attitudes; the results of the evaluation of the factors and their components' significance and their role should make the preconditions to form long-term measures to reach the desired results, to find a balance between the goal to maximize profit and organic and sustainable development attitudes, between long-term and short-term goals.

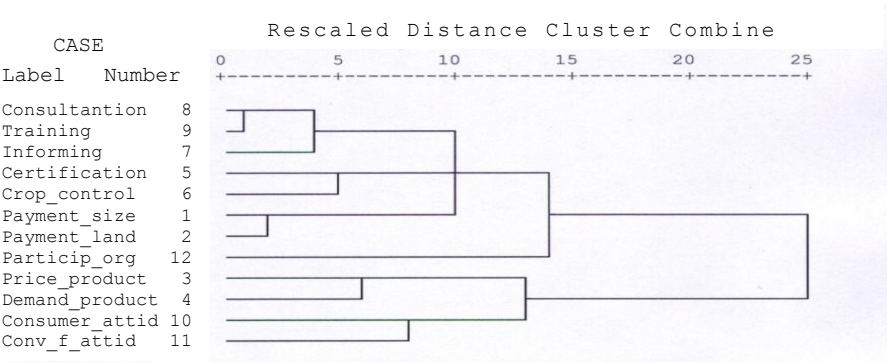
2. Research methodology

The aim of the empirical research is to analyse the opinion of organic farmers about such a way of farming, to establish the assessment of external and internal determinants. A questionnaire-based survey shall ensure that the sample of respondents is reliable and represents the whole population. To identify the whole population of organic farmers, secondary statistical data (the database of the certification institution "Ekoagros") were used. In total 2348 farms independent of the legal status were certified for organic farming in 2006. Since the object of the research is the factors that have an impact on farmers' decision to farm organically, the farms of legal persons were not included into the survey, as a result, the number of potential respondents was 2261. To estimate the size of random sample was used the corrected formula of the sample recommended by Malhotra (2007) (the size of the sample calculated using the initial formula considerably exceeds 10% of the total population). Thus, the necessary size of the sample is 328.

The questionnaires were collected in December 2007 – February 2008; in total were received 459 eligible questionnaires. Their distribution corresponds to the territorial distribution of organic farmers (population) in the country; the respondents correspond to the whole population according to the duration of organic farming practice. The collected initial data were processed and assessed using statistics software SPSS. The subscales of respondents' assessment distinguished for high characteristics of the methodological quality and the coefficients of their internal consistency (Cronbach – α) were high and equal to 0.55–0.85. This enabled to make a conclusion that the sample is reliable and its size is sufficient to solve the goals set in the dissertation study.

To assess the survey results was used the cluster analysis or clustering, the method that enables to identify homogenous groups (clusters) of objects or observations in a way that in the same cluster they are similar in some sense and the differences between them are minimal while the differences between the clusters are maximal. In such a way for the analysis 24 clusters were formed, and a dendrogram of the cluster analysis showed that the surveyed characteristics can be classified by two relative criteria.

Figure 2. **Dendrogram for the cluster model of the organic farmers' opinion survey**



The final results of the analysed two clusters revealed that the respondents depending on their goals were classified into two orientation groups: profit-oriented (162 respondents) and organic-oriented lifestyle (296 respondents). This grouping is proved by a few tests and is sufficiently reasoned and reliable from the statistical approach.

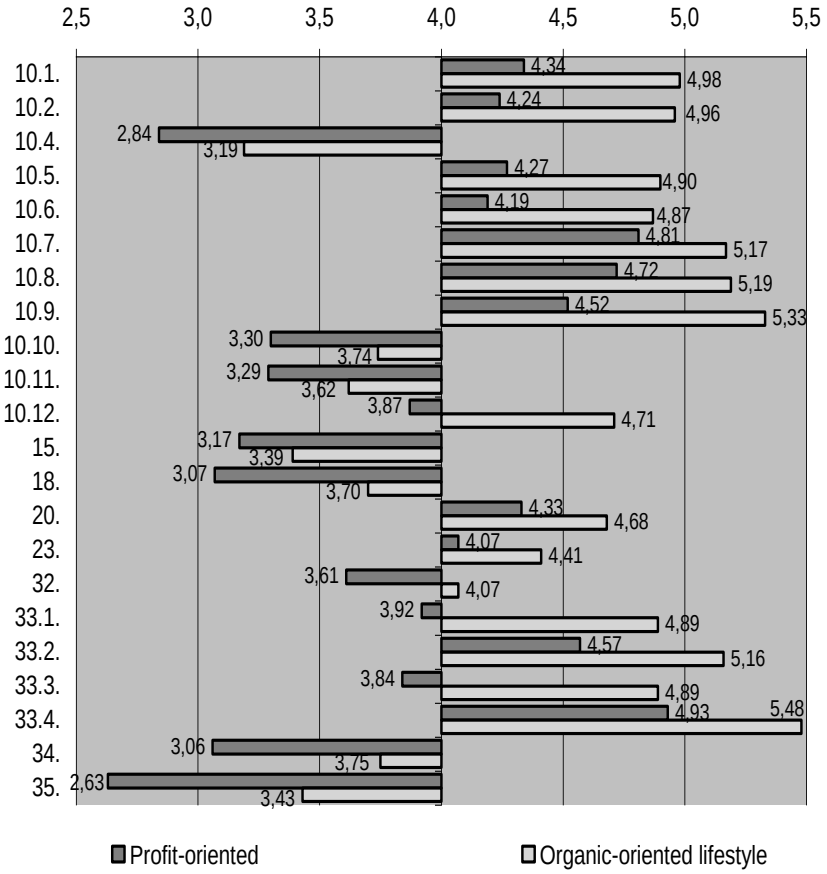
The results showed that in both groups the respondents are from all country's counties and their percentage in the groups is similar, the most noticeable deviation is in Alytus and Telšiai counties. The respondents in the groups depending on the duration of the organic farming practice also differ insignificantly. Since the tests should be based on the unique methodology, and the numerical results of testing used for ranking, therefore the Kruskal–Wallis H test was used as the most widely known from a few available SPSS tests. The respondents by the duration of organic farming practice were classified into three groups of short, medium and long-lasting periods, and their answers were ranked. These additional tests also enabled to

make a conclusion that the samples of different respondents' groups by the duration of organic farming practice are reliable and the data are suitable for the further analysis as well as additionally confirmed that the two distinct groups of the respondents are formed properly.

3. Results of the empirical study on the organic farming factors

In this chapter the answers of respondents and their distribution, general physical indicators of the farms – physical parameters, farmers' attitude to a farming method as to a professional activity and to the support are analysed by orientation group. The respondents assessed the certification system, the market of organic products, the increase of labour resources in the farm, the needs of information and specific knowledge, cooperation and representation of joint interests and other questions.

Figure 2. **Distribution of the means of the factors affecting the respondents**

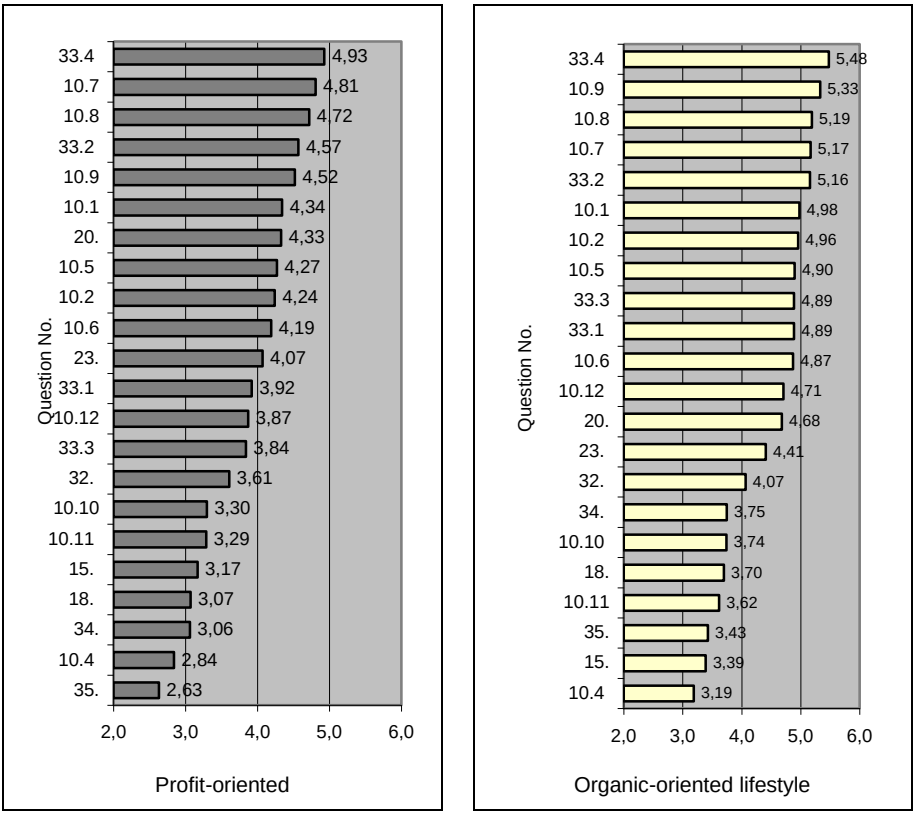


A statistical reliability of the absolute majority answers does not exceed the significance level 0.05, thus, there is an essential distinction between the analysed groups.

The results have showed the general tendency of answers: the respondents of the group of organic-oriented lifestyle assessed the majority of the answers better that the respondents of the profit-oriented group (the mean in the profit-oriented group was 3.89, while in the group of organic-oriented lifestyle was 4.48).

About 67% of such variable values are within the standard deviation interval. The means of answers have revealed that the respondents of both groups assessed most highly the obligation to submit annually the crop declaration. The respondents of the group of organic-oriented lifestyle most negatively evaluated the demand for organic products, while the respondents of profit-oriented group think that the easier getting of organic products into the market in comparison to the conventional products is most unfavourable.

Figure 3. **The significance of the factors in the respondent orientation groups**



During the research it was identified that the support factor had influence on 59.9% of the respondents making the decision to change the method of production, of which nearly 24% were influenced very much. 54.1% of the respondents positively assessed the control of payments for crop area (the difference between the groups was very large 23.6% points), the amount of support satisfied 61.8% of the respondents.

55.2% of the respondents positively evaluated the rules of certification, and 59.2% of the respondents would repeat the certification process (if it were necessary from the beginning). The accessibility of information about organic farming satisfied 65.9% of the respondents, short-term training – 64.3%, consultation on the issues of organic farming – 64.6%.

Regarding the assessment of the market for organic products, the demand for these products satisfied only 19.2% of the respondents, and the prices of organic products – 21.1%. In the opinion of the respondents, the consumer attitude to organic products satisfied only 28.4% (in groups from 19.1% to 33.7%)

Rather a large share of the respondents (39.9%) named farming organically as a difficulty (there are noticed differences between groups: 49.7% and 34.8%), and 7.4% of the respondents thought that this production method is very difficult. Concerning the difficulties that the respondents face with the certification system, the most significant were: 1) the annual procedure of certification (31.8%), very noticeable variations in groups: 46.0% and 24.1%) and 2) the prohibition to use synthetic chemical fertilisers (29.2%, rather noticeable variations in groups: 39.2% and 24.1%).

The protection of the environment (soil, water resources, etc.) on the farm level 55.5% of the respondents named as very important, but in the groups their opinion was very different: only 13.6% in the profit-oriented group and even 78.4% in the group of organic-oriented lifestyle.

87.6% of the respondents the questions about health assessed as important; healthy food and safer working conditions were named as very important respectively by 71.0% and 37.0% of the respondents. In regard to the analysis of the farm size, age and education of the respondents, and the duration of the farming organically, the distinguished tendencies were identified, but differences in the groups were very noticeable (health – 26.6% point, healthy food – 34.2% point, safer working conditions – even 45.8% point).

The chapter concludes with the analysis of further possibilities for the modelling of organic farming and the scientific discussion, where, with reference to the results of the research, is going an indirect polemic dispute between the doctoral student and other authors regarding the factors of organic farming.

CONCLUSIONS

1. The results of the analysis of scientific literature lead to the conclusion that academic society, politicians and producers of agricultural products more and more realise the importance and significance of organic farming on the development of society through the prism of the sustainable development and understand that organic farming creates the preconditions for the solution of environmental, economic and social problems in agriculture.

Since the concept of systemic management treats an organisation as a system, the systemic approach to the organic farm enables to treat it as the organisation with specific characteristics (the farm system is a group of people – a farming family (social system), establishing a household (economic system), and the farm system also is an object of a primary production process). With reference to the categories of the theories of general systems and agricultural systems, there has been made a conclusion that:

- a system of organic farming is homogenous from the agro-ecological point of view and heterogeneous from the socio-economic point of view;
- the crucial impact on the development of this system has its agro-ecological and socio-economic subsystems;
- in their interaction an active role, i.e. the decision-making function, plays a socio-economic organisation, i.e. a household, and the farmer itself and/or his family;
- the majority of farmers run the agricultural activity as a family business, but the family dimension in this business is considered insufficiently, often the functions of the family intersect with the family business.

The need for the system approach to organic farming/farm emerges when seen through the perspective of the theory of organisation behaviour. Decisions are made at the level of every individual farm, and management is a significant variable since it characterises the decisions of the farm systems related to their objectives and the structure of internal and external relations. So the aspect of farm decision-making is essential in the analysis of the diversity of farms and in the creation of programmes and strategies of their development. It all goes to reason the idea of this research to consider farmers' decisions as an initial point for the analysis and modelling of the determinants of organic farming, while for the quantitative research to use subjective data, i. e. the attitudes and opinions of the respondents engaged in organic farming.

2. The analysis of the previous methodologies and results regarding the factors of organic farming has enabled the following conclusions to be drawn:

- the quantitative researches based on the farmers' opinions dominated. The opinion of consumers was used rarely, and the qualitative experimental researches were ever so seldom. It is likely, that the reason of such a situation was the said assumption that the decision to change the method of production was the prerogative of the farmer and his family;
- already the initial period (until the seventies of the last century) of the studies on the factors of conventional farming has revealed that the respondents named many factors encouraging them to run the agricultural activity. This encouraged in later researches to classify the factors of organic farming by different characteristics. It should be noted that the conclusions of studies of the said initial period stressed the importance of the external factors such as the market of organic products, promotional policy, consumer opinion. In the results of slightly later studies the

prominence was given to the personal characteristics of the farmers, and were stressed the elements of farming systems, the significance of their interaction and links with the external environment, i.e. it was an attempt to emphasise the significance of the factors of the farm internal environment. Eventually, the studies started to treat as significant both the internal and external factors. It all goes to cause the mixed matrix of the identified factors;

- for quite a long time it was an attempt to identify the organic farming influencing factors analysing the organic farmers as a homogeneous group, i. e. as an alternative to the conventional farmers. Only since mid-nineties of the last century it was started to search for the dividing line among the respondents farming organically classifying them by certain features, i. e. by different characteristics of the surveyed farmers or their farms. However, for this reason the matrix of the identified factors has become even more mixed, and the opinions of researchers on the factors' significance to the farmers have divided even more.

The analysis has showed and supposed the grounds for the classification of organic farmers into different groups by priority of activity independent of the duration of the development of organic farming and on this basis to identify the significance of the determinants of organic farming.

3. The model for research of the determinants of organic farming includes two groups of factors (the external and internal) affecting the farmers' decision to farm organically and four subgroups (respectively, the government and the market, and the farm and the personality of farmer). The research model was tested on the opinions of the respondents engaged in organic farming. The results of the empiric research proved the rightness of the theoretical model and enabled to clarify that in Lithuania under the present conditions the respondents engaged in organic farming assessed the groups of determinants differently.

The cluster analysis of the empiric research enabled to identify two groups of organic respondents depending on statistically significant differences of activity priorities: profit-oriented and organic-oriented lifestyle (in the beginning of the clustering process 24 cluster groups of the respondents were formed). This shows that the clustering enabled the elimination of the socio-economic heterogeneity of organic farms while identifying the organic farming encouraging factors.

4. The results of the empiric research have showed that in the opinion of the respondents engaged in organic farming the external factors are more significant than the internal; the external determinants are more encouraging but not limiting organic farming. The regressive analysis of the factors of organic farming has revealed that for both cluster groups of the respondents (profit-oriented and organic-oriented lifestyle) the external and internal determinants have different significance. Only 5 determinants the respondents of the both target groups assessed alike or almost alike, i. e. the differences of the assessment were statistically insignificant. This proves the statement that the clustering of organic farmers by different priorities of the activity makes the methodological assumptions for the classification of the determinants of organic farming by differences of their significance and for the modelling of the determinants of organic farming or their combinations depending on different purposes of farmers' activity and on the significance of the determinants.

5. The assessment of the determinants of organic farming depending on their importance and significance in the both identified cluster groups of the respondents has revealed the following differences:

- the majority of the determinants encouraging organic farming the respondents of organic-oriented lifestyle assessed more favourably than the profit-oriented respondents;
- the respondents of both groups the most favourably assessed the obligatory procedure, i. e. the obligation to submit annually the crop declaration; the respondents ranked second the factor of short-term training in the group of organic-oriented lifestyle and the accessibility of information on organic farming – in the profit-oriented group; the consultations on the issues of organic production were ranked third by the respondents of both groups;
- both groups of respondents considered most unfavourably almost the same factors (they can be named as limiting organic farming): the demand for organic products was the most disadvantageous determinant in the group of organic-oriented lifestyle, while in the group of profit-oriented this factor was next-to-last; the easier getting into the market as the advantage of organic farming over conventional production was considered most unfavourably in the group of profit-oriented respondents, while in the group of organic-oriented lifestyle this factor was- as one of the three most negative factors.
- the opinion of both groups' respondents was the most different concerning the importance of the environmental issues (soil, water resources, etc.) on the farm;

6. The analysis of the survey of respondents concerning the significance of the determinants on farmers' strategic decisions to farm organically has revealed that:

- the support for organic farming is one of the most significant external determinants influencing the farmers' decision to convert to the organic production method; it was equally significant in both groups of respondents. On the other hand, the respondents of different cluster groups assessed unequally the significance of the support on the strategic decision on the continuity of organic production. In case the support were withdrawn or the payments were set for the sold organic products, a considerably less number of the respondents would continue to farm organically, but the number of the respondents of the group of organic-oriented lifestyle were twice more than of the profit-oriented group, while the changes in the number of the farmers reducing the production volume in both groups were insignificant;
- the demand for organic products and the market prices satisfied only one fifth of the respondents (differences in groups were slight). This enables to make the assumption that for the meantime the market, in comparison to the support, is the determinant noticeably poorer encouraging organic farming. The respondents of both cluster groups were rather passive in the search for the markets to sell products, and their stressed insufficient informing of consumers about organic products supposes the necessity to revise the promotional measures for organic farming;
- the majority of both groups' respondents indicated a positive impact of organic farming on health, healthy food and safe working conditions as very important, but a rather large number of the respondents of the group of organic-oriented lifestyle indicated that the conversion to organic farming had a poor impact on the habits of respondents' nutrition and lifestyle.

The results of the research on the said determinants by farmers' orientation groups (profit-oriented and organic-oriented lifestyle) have revealed the differences of their significance. This supposes the necessity to apply a differentiated approach and measures in the management of the development of organic agriculture both at the micro (the farms) and the macro (the state) levels.