

## THE CHARACTERISTICS OF MODERN FARM

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### Abstract

The purpose of this paper is to identify the main characteristics of the modern farm in Lithuania and to analyse correlation between features, which should have a modern farm, to understand the age of agricultural system and agricultural concept. The research based on the answers of two groups of experts (180 experts: 98 experts-professionals and 82 experts-farmers). The present paper is examining the characteristics and role of agriculture modernization in the economic and social development of Lithuania. The main characteristics of the modern farm are: new machinery and equipment, technologies, modern production buildings, farms apply a range of innovations, farmers are seeking knowledge are interested in innovation, take part in exhibitions, events, they are energetic, creative and implementing good management practices. Big farms in Lithuania had the opportunity to devote more funds to co-finance structural support, and were able to get more support and modernize faster than small or medium-sized farms. The big farms are more modernised than small ones, but the impact of farm modernization on the rural development sustainability is bigger and more positive from the smaller farms than bigger ones.

**Key words:** modern farm, agriculture, rural development.

### Introduction

Modernization has been a worldwide phenomenon approximately since 18th century. Agricultural modernization is an important aspect of modernization and also an important interdisciplinary component of world modernization. During the twentieth century and especially in the second half of it the world has witnessed very impressive increases in agricultural output. This trend is continuing and achievement is mainly ascribed to the improved agricultural practices leading to higher productivity of land and labour. Lately the contribution of extensive cultivation has not been significant. Bringing more land area under agriculture is becoming more and more difficult in most countries. Since prosperous agriculture is considered to be the most crucial base for economic development particularly in the less developed countries, the only viable option for them is to continue to enhance the productivity of land and labour in agriculture. Increased productivity in agriculture has been achieved in several parts of the world mainly by modernizing agriculture.

The topicality and purpose of the research is based on the facts and prospects of world agricultural production and agricultural factors (China Modernization Report ..., 2012) in the 21<sup>st</sup> century: 1) The agricultural resources per capita will continue to decline. 2) Agricultural labour force will continue to decline in both quantity and ratio, agricultural land intensification will continue to rise, agricultural capital input will continue to increase but change in structure, and the intensity of pesticide and chemical fertilizer use will decline. 3) The ratio of agricultural added value will continue to decline, and the total amount of agricultural added value will drop in some countries. 4) The farmers will become even better qualified, with those in developed countries mostly receiving higher education. Farmer income will continue to

increase, and come from diversified sources. 5) The ratio of world rural population and that of rural agricultural population will continue to decline, and rural infrastructures will continue to develop and improve. 6) The total world agricultural demand will continue to grow, and the problems of agricultural subsidy, agricultural trade and ecological environment will continue to exist. 7) The agricultural science and technology respectively correspond to the age of agricultural economy, the age of industrial economy and the age of knowledge economy. 8) The evolution of agricultural system and agricultural concept can be roughly divided into three major stages: those in the age of agricultural economy, those in the age of industrial economy and those in the age of knowledge economy (China Modernization Report..., 2012).

**Scientific problem:** modernization consists largely of using improved seeds, modern farm machinery such as tractors, harvesters, threshers, etc., chemical fertilizers and pesticides in an optimal combination with water. The agriculture farms modernization is not linked with innovations and sustainability. The theoretical fundamentals formed up to this day are unusable for creation of innovative agriculture farms management opportunities. For this reason the analysis of main characteristics of the modern farm should be defined and justified.

**The object of research** is the characteristics of the farm and agricultural enterprise. **The purpose** of this paper is to identify the main characteristics of the modern farm in Lithuania and to analyse correlation between features, which should have a modern farm, to understand the age of agricultural system and agricultural concept. The present paper is examining the characteristics and role of agriculture modernization in the economic and social development of Lithuania with the help of findings from the case study 'Resilient farming systems and market differentiation:

Challenges and opportunities in farmers’ markets’. This case study is a part of RETHINK ‘Rethinking the links between farm modernization, rural development and resilience in the world of increasing demands and finite resources’ project. This research project funded through RURAGRI is an ERA-NET supported by the European Commission under the 7th Framework Programme and national funding agencies in 14 countries.

**Materials and Methods**

In order to identify the main characteristics of the modern farm in Lithuania and to analyse correlation between features, which should have a modern farm, there were two groups of experts (180 experts: 98 experts-professionals and 82 experts-farmers) selected. Their opinions have allowed the comparison of assumptions regarding the main characteristics of the modern farm in Lithuania. The survey of academics, advisors, and heads of Agriculture departments (on municipal level), Lithuanian Ministry of Agriculture, farmer’s organizations, agricultural companies and farmers nationwide was carried out in June-August 2014. Experts-professionals represented all of the major Lithuanian institutions involved in the agricultural sector in science, education and consulting, rural development administration. An interactive questionnaire available on the web was used for the data collection. The research is based on the positive research paradigm, content and descriptive analysis, empirical study methods, logical and systematical reasoning, graphic presentation, abstracts and other methods.

**Results and Discussion**

*Agricultural modernization - theoretical aspects.* The modern *agricultural revolution* that triumphed in the developed countries from the late 1950s onwards was based on the development of new means of production and trade which, in turn, resulted from revolutions in industry, biotechnology, transport and communications. Agricultural modernization occurred gradually as a result of progress in

industrialization, breeding technology and transport and communications, and in step with the enlargement of farms (The state of food and agriculture, 2000).

Agricultural modernization is mostly analyzed on sector or rural development policy level. ‘It comprises the transition from traditional agriculture (self-sufficient agriculture) to preliminary modern agriculture (marketized agriculture), the transition from preliminary modern agriculture to advanced modern agriculture (knowledge agriculture), the continuous increase of agricultural efficiency and farmer income, the continuous improvement of farmer wellbeing, the assurance of agricultural product supply-demand balance and national food security, and the change of national agricultural status and international agricultural system’ (China Modernization Report..., 2012). In this study it is assumed that farm modernization forms the modern agricultural sector. Rural development policy directs the activities of rural development actors, creates the need for certain purposes.

The specificity of current EU rural development policies reflects the specific nature of rural development practices. At grass root level these rural development practices represent a multifaceted rupture of the prevailing trend towards agricultural modernization. The main contrasts between these two trajectories were summarized by Van der Ploeg J., Jingzhong Y., Schneider S. (2010) in Table 1.

In the rural development policy implementation, there is a participation of many actors and it reflects, even if only partially, their interests, concerns and visions. Rural development policies have to deal with new emerging practices that are seeking to reshape considerable parts of the countryside. Innovative development of the organizations allows to solve many problems of competitiveness and ensures comprehensive improvement of the various chains of organization modernization (Smalskys and Skietrys, 2008; Zakarevicius, 2012). The research results in 865 Dutch farms show that innovative activities are positively related to labour resources (which is highly correlated to farm size), market position (indicating

Table 1

**Strategic contrasts between the practices of agricultural modernization and rural development**

Agricultural modernization	Rural development
Specialization	Multifunctionality
High dependency on agro-industrial inputs and credit	Low external input agriculture
Ongoing scale increase and reduction of rural labour force	Maintenance or even increase of population economically active in agriculture
Spatial concentration in favoured areas	Widely practised (and especially in ‘less favoured areas’)
Ongoing extension, in time and space of food circuits	Shortening and localizing of food circuits
Centrality of capital	Centrality of labour

(Van der Ploeg et al., 2010)

whether a farm produces for a market that permits product differentiation), and a farmer's access to information (where an indicator of the extent of his network is used as a proxy) (Diederer et al., 2003).

Innovative activities are negatively related to solvency. This may indicate that farms with a high solvency rate are risk averse and not eager to innovate. The scientists found that adoption behaviour shows some persistence in time: being an innovator (or a late adopter) in the past increases the probability of being an innovator (a late adopter) in the current period. The characteristics of the business environment matter. Especially, a high degree of market regulation seems to have a negative impact on adoption behaviour (Diederer et al., 2003).

P. Zakarevicius (2012) scientific research was focused on the change of an organization concept, the description of a modern organization paradigm, as well as on the formulation of modern organization features. The following characteristics of a modern organization have been distinguished: developing organization, learning organization, socially responsible organization, entrepreneurial organization, organization satisfying customers' needs, organization ensuring social security, structurally mobile organization.

The scientists Banterle A., Cavaliere A., Carraresi L., Stranieri S. (2011) made research of innovativeness in food small business. The exceptional attention was given to the innovativeness relationship with marketing. With regard to the relation between innovativeness and the firm size, the regression revealed a significant and negative link, underlining that the SMEs can innovate more highly than large companies in the food sector, better adjusting their business to the market evolution and consumer preferences. Good skills in marketing activities lead to a high propensity in adopting the innovative conduct, such as the product improvement and the search for new markets.

Their analysis reveals that not all the steps of the marketing management process affect the firm innovativeness. Market research and marketing strategy are the two steps that showed a significant and positive correlation with the firm innovativeness, whereas the variables connected with planning and implementation, and control and evaluation were not significant, the only exception being the variable concerning benchmarking with the firm's competitors (Banterle et al., 2011).

The research results by Vidickiene D., Melnikiene R., Gedminaitė-Raudonė Z. (2013) revealed that motivation and barriers for applying innovation differs at the farms implementing cost leadership or differentiation strategy. The main reason for different type of innovations is rapid growth of consumers

who decide to opt for healthy and environmentally friendly ways produced food. Increased awareness of consumers for higher quality of local food and increase its consumption, particularly of products from small-scale farms, and also linking these local products to food sovereignty and environmental awareness. Customer needs and interests create new opportunities for farmers from the standard products switch to high quality and exclusive products for the final consumer. In addition to the new production technology is becoming increasingly topical organizational innovation for new marketing, logistics, accounting, working methods for organizing farm activities. Policy makers of the innovation policy should differentiate policy measures based on the competitive strategies used in the farm.

The scientists J. Ramanauskas and J. Kirstukas (2009) offer projects recognized by the EU support to measure not only financial indicators, but also by their innovativeness. Scientists have identified the criteria to determine the evaluation of the level of innovativeness of the investment project. According to J. Ramanauskas and J. Kirstukas (2009), the level of project innovativeness has to be assessed by the following basic criteria: innovation influence on product, influence innovation on production processes, innovation influence on the entity's organizational restructuring, innovation based on results of scientific research, staff training, researchers and highly skilled staff recruitment.

From the perspective of agricultural evolution and agricultural transition, agricultural modernization can advance and succeed in every country. But countries vary from each other in the speed of agricultural advance, the level of agriculture, and the timing of success (China Modernization Report..., 2012).

*The features of a modern farm in Lithuania.* Assessing the situation in Lithuanian agriculture after the restoration of independence in 1990, it was possible to state that the policy makers faced with a situation, similar to what was after the Second World War when economies of many countries were destroyed. They had to start building the private agrarian sector using the extensive growth strategy, i.e. increasing the supply of production supplies; increase the volume of production. Rural policy has been oriented to implement the strategy of extensive growth and achieve production scale effect. Implementation of extensive growth strategy, organizational structure consists of producer households having fixed assets. The main and the only way of improving the organizational structure was an increase in assets for productive activities. There was rapidly improved supply with agricultural machinery and facilities on the means of extensive growth strategy implementation (Vidickiene and Melnikiene, 2014)

Table 2

**Payments to Lithuanian farms (on average by farms) 2004–2012, in thousands EUR**

Farm size, ha of AL	2004	2006	2008	2010	2012
private farms					
< 10.1	909	980	1301	1335	1156
10.1–20.0	2015	2347	2588	2727	2282
20.1–30.0	2822	3932	4860	5122	4718
30.1–40.0	3828	5780	6506	7066	6242
40.1–50.0	4808	7601	7674	8231	7951
50.1–100.0	7604	11289	11472	12953	12628
100.1–150.0	11453	21101	21221	24501	21397
>150	25794	47714	47326	49407	47689
agricultural companies					
> 150.0	25794	47604	47326	49407	47689
< 501	30218	49328	38229	47091	34898
500–1000	66376	88771	106240	116570	111794
> 1000	168769	256751	284291	332515	279979

Source: Lithuanian FADN data

Big farms in Lithuania had the opportunity to allocate more funds to co-finance structural support and were able to get more support and modernize faster than small or medium-sized farms. They could use all the direct payments paid by the EU and the additional national payments for this purpose. Although one of the objectives of the CAP is to support farmers' income, small farms sponsorship was insufficient for their needs. On the contrary, large farm households received resources for extensive development. Received payments of farms larger than 150 hectares was 47.7 thousand EUR, while smaller than 10 hectares farms on the average received less than 1.15 thousand EUR, or 42 times less in 2012 (Table 2).

FADN data show that during the period of 2004–2012, farms smaller than 10 ha, on the average received 2.6 thousand EUR of investment support, 10–20 hectares farms - 6.1 thousand EUR, 20–30 hectares farms – 9.9 thousand EUR, 30–40 hectares farms – 24.1 thousand EUR, 40 - 50 hectares farms - 45.7 thousand EUR, 50–100 hectares farms – 51.1 thousand EUR, 100–150 hectares farms - 67.7 thousand EUR. The largest farms owning more than 150 hectares of land, on the average received investment support during 2004–2012 amounted to 139.1 thousand EUR, which is 54 times higher than the support received by the smallest farms group, managing up to 10 hectares (Vidickiene and Melnikiene, 2014).

While the big farm support, implementing rural policies to promote the production growth, Lithuania has not identified as a priority; support mechanism has enabled increased use of extensive growth strategy-related measures. The performed analysis suggests that farm size was associated with investment size: the larger the farm, the bigger support has received.

#### **Which characteristics do a modern farm and agricultural enterprise in Lithuania have?**

According to the opinion of experts, it was difficult to identify the characteristics of a modern farm, as the first problem is to recognize what a 'modern farm' is. Experts, describing the characteristics of modern farms in Lithuania, paid more attention to one of the principles of social responsibility - taking care of the environment (meeting good agricultural and environmental condition), just a few experts pointed out that modern farms collaborate with scientists working in the field of agriculture, small-farm energy costs, and safe work (Table 3).

Experts observe a direct correlation between farm size and modernity (once large means modern) and the narrow specialization and farm modernity. Experts as features of modern farm in Lithuania have named good farm activity management ('modern management' and 'well-organized farm activity / production', 'order', 'soil testing, animal control, the presence of plans', 'continuous improvement of production'). The characteristics of modern farm production markets in Lithuania ('from the field to the final product', 'selling their products to processors', 'produced crude production', 'agriculture is characterized by unstable production purchase price') show the prevalence of various forms of sales launched to apply a short food supply chain. Identified negative aspects of modern farm in Lithuania: 'farmers' oppressing their staff', 'what is modern is perceived differently; 'wealthy but dishevelled'.

Results of the study in 2007–2013 reflect the established innovation practice, less fuel-efficient and less polluting nature of agricultural machinery has been supported as an innovation (Ramanauskas and Kirstukas, 2009).



Table 3

**Characteristics of modern farm and agricultural enterprise, referred by experts-professionals and experts-farmers, 2014**

Characteristics of modern farm and agricultural enterprises in Lithuania	The number of iterations of arguments support the allegation		Features, which should have a modern farm and agricultural enterprise	The number of iterations of arguments support the allegation
	opinion of experts-professionals	opinion of experts-farmers		opinion of experts-professionals
New machinery and equipment, technology, modern industrial buildings	20	12	New machinery and equipment, technology, modern industrial buildings	10
Introducing different innovations	19	12	Introducing different innovations	13
Socially responsible farm environmentally friendly / high production culture	5	16	Socially responsible farm, sustainable farming and production; follow environmental standards; organic farming methods	13
High economic competitiveness and profitability	5	12	High economic competitiveness and profitability	10
Good management of farm activities	7	11	Good management of farm activities, permanent progress	11
Farmer seeks for knowledge, is interested in innovation, attends exhibitions, events, is impetuous and creative	8	4	Educated, constantly learning farmer, skilled professionals; seek for knowledge; interested in innovation, attends exhibitions and events	9
Oriented to different markets and niches	4	9	Short food supply chains are used, processing and marketing	7
Produce of high-quality and added value products	2	9	Produce of high-quality and added value and new products	3
Good farm base material, purposeful farm investments	5	4	Proper use of investment on the farm	2
Farmer is an independent, quick to make decisions	2	3	Farmer is autonomous, operative, impetuous	3
Farm is of narrow and deep specialization	4	-	Specialized and co-operative farm	4
The farm, which maintains jobs and creates new ones	-	7	-	-
Big farm and high production volumes	5	-	More of modern small farms	2
Grown new varieties of plants and animals	2	-	Ongoing animal and plant breeding	2
The farm has a 3-5 year development vision	2	-	The farm has a 3-5 year vision, smoothly develops	3
Allegations in total	90	99	Allegations in total	90

Source: own calculation based on our survey.

**Which characteristics should have a modern farm and agricultural enterprise?** Experts describing the definition of the components of a modern farm, more focused on two principles of social responsibility - taking care of the environment ('good agricultural and environmental condition maintenance', 'development of sustainable farming', 'sustainable production methods', 'application of environmental standards', 'organic') and self-perception as a socially responsible member of the rural community.

A modern farm is specialized and cooperative, based not only on new technology, but also on the employees' knowledge. The basis of the modern farm - the family farm ('more modern small farms'). Modern agricultural farm products should be 'disposed of without intermediaries', 'from the field to the final product', 'advertise the farm' 'processing of its production and delivery to the end - consumer', 'flexible and focused on domestic and foreign consumers', 'should organize their own processing and marketing'; 'agricultural enterprises, farmers

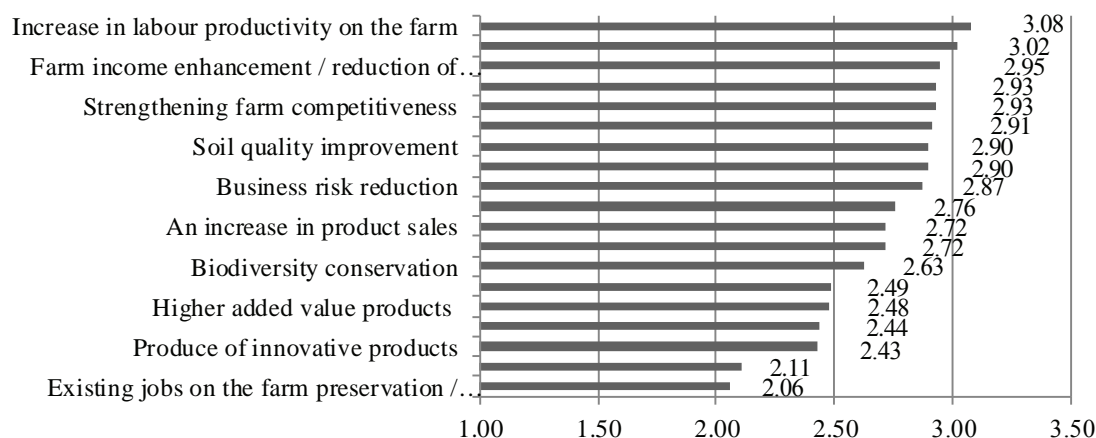


Figure 1. Lithuanian farms and agricultural enterprises modernizing action created benefits, farmers – expert application scorings, 2014.

should form partnerships to realize the production'; 'comprehensive approach to market conditions'). One of the modern farm characteristics often marked by experts is farm operational flexibility ('flexible and focused on domestic and foreign user', 'based on their staff knowledge', 'and valued experiments').

Good management practice should be implemented in a modern farm, i.e.: 'well-structured and balanced production line', 'the rational use of resources', 'a good database', 'everything is computerized', 'high production culture', 'order', 'increased investment to labour resources', 'application of effective disease prevention and control', 'to improve soil quality indicators, to participate in the breeding of plants and animal'.

During survey the experts evaluated how factors of farm and agricultural enterprise modernization contributed to the creation of various benefits. They rank factors from 1 to 4 points: 1 - did not quite contribute, 2 - weakly contributed, 3 - contributed, 4 - contributed significantly (Figure 1).

Lithuanian farms and agricultural enterprises modernization were more oriented to the farm but not to the external effects and rural area sustainability. The main benefits created by farms modernizing action were as follows: an increase in the labour productivity, product quality improvement and farm incomes. Lithuanian agricultural sector 2010 - 2012 is displayed as an example of successful mastering of the EU investment support. Farms have successfully used the Lithuanian Rural Development Programme 2007-2013 measure 'Modernization of agricultural holdings' - purchased modern agricultural techniques (Mokslinës rekomendacijos..., 2013). However, the agricultural modernity for 2007 - 2013 programming period farmers were perceived one-sided. Such a perception is destroying rural living as a 'body' foundation for rural areas equally important for

the survival of the three corner stones - production, environmental protection and social welfare.

### Conclusions

The current generation of Lithuanian rural development policy does not much differ from the previous ones, which were mainly limited to developing countries and basically seen as a support mechanism for agricultural modernization. The agricultural system and agricultural concept in Lithuanian case are still in the age of industrial economy and just same characteristics show features of the age of knowledge economy.

Most often Lithuanian experts indicated the following features of modern Lithuanian farms and agricultural enterprise: new machinery and equipment, technologies, modern production buildings, farms apply a range of innovations, farmers are seeking knowledge, are interested in innovation, take part in exhibitions, events, are energetic, creative and implementing good management practices. The characteristics of modern farm production markets in Lithuania show the prevalence of various forms of sales launched to apply a short food supply chain. Identified negative aspects of modern farm in Lithuania: 'farmers' oppressing their staff', 'what is modern is perceived differently; 'wealthy but dishevelled'.

Big farms in Lithuania had the opportunity to devote more funds to co-finance structural support, and were able to get more support and modernize faster than smaller or medium-sized farms. The big farms are more modernised than small ones, but the impact of farm modernization on the rural development sustainability is bigger and more positive from the small farms than big farms.

The agricultural modernization increased food supply to humanity and raised the income level of

farmers, but the public goods and positive external effects to the rural areas development were not raised satisfactorily. The modern farm not always is innovative and sustainable farm. The main attention has to be paid to the social innovations, creation of new labour places and food safety and security.

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