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Ph.D. thesis

ENVIRONMENTAL CONSCIOUSNESS AND THE ROLE OF SUBSIDIES IN PRIVATE FARMS CARRYING OUT ORGANIC FARMING

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DEBRECEN
2008

1. THE OBJECTIVES OF THE RESEARCH

The European Union considers the controlled organic farming as one of the clue fields of the secure and environmental friendly food production and handles its development in a highlighted way. The reason chiefly is that the organic farming due to its principles and legal background meet considerably the up-to-date environmental, rural development, animal welfare and food safety expectations.

The aim of developing organic farming has already been set since the beginning of the 1990'ies in Hungary. Based on the data in the New Hungary Rural Development Strategic Plan, the ministry wishes to raise the area of controlled organic farming to 300 thousand hectares by the year 2013. Because of the decrease of production size and the number of farmers having been noticed since 2004, the little hope for reaching the set aim seems to fall to the ground. At present 1200 farmers, mainly private farmers carry out controlled organic farming on an agricultural land of just 120 thousand hectares. The withdrawal in the development of the enterprise is explained by presumably the present subsidy system as well beside the production and market problems.

The subsidy system of organic farming works within the frame of the agri-environmental farming (AEF) measures. The AEF measures have two general objectives. First, it concerns the development of the environmentally conscious production behavior; second, it wishes to help in the economic viability for participants in the program.

The development of the environmentally conscious production behavior is justified by the fact that the regulation of agri-environment and solving its tasks may only be effective at national and regional levels if the decrease of environmental burden realizes at a local level that is in decisions of agricultural producers relating to farming. The environmentally conscious behavior of agricultural producers, however, is significantly influenced by the agri-environmental farming measures mainly by keeping laws and directions; the potential subsidies urge the appearance of the environmentally consciousness in producers' decisions. The environmentally conscious behavior may only be expected if the farmer can carry out his producing activity in case of adequate profit and financial security.

Though the relevant literature dealing with organic farming is rather abundant, there is little information on the fact that in what ratio the aim of the AEF subsidy system realizes in accordance with organic farming. According to my previous knowledge relating to the relevant literature, the determination of the environmentally conscious production (farming) behavior is incomplete; at the same time in order to measure the behavior on the basis of primer data

gathering it is essential to define the subject of the investigation. According to all these, the main objectives of my dissertation are the followings:

1. Defining the concept of environmentally conscious production (farming) behavior on the basis of relevant literature relating to environmentally consciousness and environmentally conscious behavior.
2. According to a questionnaire-based survey done among private farmers in Hajdú-Bihar county, comparing the environmentally conscious production behaviors of organic farmers and farmers being not involved in organic farming especially focusing on the role of agri-environmental farming subsidies in the environmentally conscious production behavior.
3. Determining the long-term economic viability of organic farming at different subsidy levels by the help of a farm economic model based on a producers' survey carried out among private farmers around Hortobagy.

2. PRELIMINARIES AND THE UTILIZED METHODS

I review the preliminaries and the utilized methods of the examinations in the structure of the main objectives.

2.1. Defining the Concept of Environmentally Conscious Production (Farming) Behavior

In order to realize the first objective, I reviewed the relevant literature in connection with environmentally conscious behavior. After analyzing sources in agri-sociological, psychological, marketing and business technical journals mostly in foreign language, I formulated the concept of environmentally conscious farming behavior in a hypothetic approach and defined its variables being relevant from the aspect of my investigation. During literature overview, I studied the major steps of developing agricultural producing view, the elements of the conception of organic farming, and the market features of this farming method in the European Union and Hungary.

2.2. Investigating the Environmentally conscious Production Behavior

In accordance with the second objective, I carried out a questionnaire-based survey among private farms dealing with agricultural production in Hajdú-Bihar county. ***According to my hypothesis relating to my survey, the environmentally conscious production behavior of organic farmers is at a higher level than that of conventional farmers thank to the principles and conception of organic farming; furthermore the effects of the participation in agri-environmental programs on the producers' environmentally conscious production behavior may be calculated***.

By the investigation I wished to measure not basically the knowledge of farmers on laws in connection with agri-environment and observing them but I looked for the answer that what role the environmentally consciousness plays in farming activities less concerned by agri-environmental measures. For this sake I examined the agricultural producers' environmentally conscious behavior in the field of waste management as because of lack of direct payments[1], this activity relating to the production reflects well the environmental values and behavior of farmers, moreover the rules of handling wastes of agricultural origin does not differ between organic and conventional farmers.

I considered the basic population in the survey as the private farmers using land area of Hajdú-Bihar county. From the available features of the basic population, the use of land area seemed to

[1] At the time of the survey (2006), in 2007, however, payments are available for costs incurring during neutralizing by-products of animal origin, which is uniformly 8 HUF per kilogram (MK, 2007).

be the most obvious feature in order to realize representative conditions. Basing on the relevant data of the Hungarian Central Statistical Office (HSCO) within the probability sampling method I used stratified random sampling method. I set the element number of the sample in 100 farms.

Based on the relevant overviewed literature and according to the objectives, the necessary measurable variables were determined. My investigations related to the followings:

- environmental knowledge,
- environmental attitudes,
- environmental responsibility,
- sensed efficiency,
- demographical (school, living place, age) characteristics,
- economic (participation in agri-environmental farming programs, participation in organic farming, farm size) factors as well as
- environmental behavior (waste management).

By combining the quantitative and qualitative method, I used closed ended and open ended questions as well. Within closed questions, accordingly to its changing feature, I formulated two and multiple choice questions (dichotomous and alternative questions), three- and five-level Likert scales and qualifying scale and as a combination of scaling and alternative questions I set rank-order questions.

By coding the data in the survey, the database was worked out and processed by the program Microsoft SPSS 13.0 for Windows. During the detailed statistical analysis on the basis of demographic and economic features I segmented the sample and determined the differences of the variables even in case of the sub-samples.

Beside the descriptive statistical methods I carried out statistical tests being in accordance with the objectives and the level of measurement of the variables. To investigate the difference of ordinal measurement of independent variables non-parametric methods were used (such as Kruskal-Wallis, Mann-Whitney and Wilcoxon tests), to compare frequencies Chi^2 test was carried out. To investigate connections of variables Spearman's correlation analysis and analysis of variance (ANOVA and Tukey tests) were done. The reliability of the statistical analysis was accepted at a probability level of 5% (P=5%).

2.3. Investigating the Long-term Viability of Organic Farming

In accordance with the third objective, I analyzed the profitability of an organic farm of a typical size and activity in the region of Hortobágy at different subsidy levels by the help of farm economic modeling based on the farmers' survey. This was compared to the minimal profit requirement, which is necessary from the aspect of long-term economic viability.

On the basis of the starting hypothesis of the examination, the subsidies of AEF aiming at organic farming have an outstanding role in the profitability of organic farming, without these the organic farming cannot be considered as viable for a long run from economic aspects.

During my analytic work the agricultural producer unit was considered as viable for a long run from economic aspects which annual profit from producing activity covers at least the wages of the entrepreneur calculated by minimal wage, the capital need of the invested assets[2], and the annual development costs of the enterprise calculated in a minimal way.

During sampling private farms dealing with organic arable plant production on grassland solonetz soil and with animal keeping were considered as basic population. Based on professional considerations, I selected four farms of them which production standard is accepted by experts, and may be regarded as converted farms on the basis of the rules of organic farming and regularly carry out developments relating to their producing activity. The gathered producing and technological data were analyzed in a detailed way and were constructed into the features of the model farm. The size of the modeled private farm is 60 hectares, from which 40 hectares are arable land, 20 hectares are grass land and the farm rents half of its agricultural land according to my data gathering. The most frequent plants typical to Hortobágy are cultivated on the arable land, and Hungarian merinos (50 ewes) are kept on the grassland in accordance with the rules of organic farming. The evaluation of the input-output data of the model farm based on data gathering happened on prices valid for the year 2007 and being typical to the region.

During the investigation the subsidy levels detailed in *Table 1* were taken into consideration. The entitlement conditions incurring at the different subsidy levels were calculated according to the relevant laws similar to the ratio of subsidies and relating to the year 2007.

[2] This is regarded as a normal profit in the examination.

Table 1: **Denomination and Ratio of Subsidies in the Model Versions**

Payments	Unit	Subsidy levels				
		Without subsidy	*+SAPS and Top-Up*	*+LFA*[3]	*+AEF*	*+LFA and AEF*
SAPS	HUF/ha	0,0	25582,5	25582,5	25582,5	25582,5
National Top-Up:						
Land	HUF/ha	0,0	11541,6	11541,6	11541,6	11541,6
Livestock[4]	HUF/ animal	0,0	1600,0	1600,0	1600,0	1600,0
LFA:						
Land[5]	HUF/ha	0,0	0,0	19380,8	0,0	19380,8
Livestock	HUF/ animal	0,0	0,0	1200,0	0,0	1200,0
AEF:						
Organic arable plant production scheme	HUF/ha	0,0	0,0	0,0	31553,2	31553,2
Organic grassland farming scheme	HUF/ha	0,0	0,0	0,0	14789,7	14789,7

Source: Own construction

The profit conditions of the model farm were examined in the whole period of the crop rotation (*Table 2*), altogether during a period of seven years. Beside the cost, yield and profit conditions of certain enterprises resulted from the given cropping structure, the production value, cost and profit of the main enterprises were analyzed in a detailed way at the examined subsidy levels. The generating farm outcome (gross profit) was evaluated from the aspect of the criteria of long-term economic viability determining the annual minimal profit requirement of the model farm. The efficiency indicators being important for farming were calculated and evaluated on every subsidy level, relating to the main enterprises and to the whole farm.

Table 2: **Crop Rotations and Annual Cropping Structures in the Model**

Years	Parcels (4x10 ha)			
	1.	*2.*	*3.*	*4.*
1.	Sunflower	Alfalfa	Winter wheat	Pea
2.	Pea	Alfalfa	Mustard	Winter wheat
3.	Winter wheat	Alfalfa	Oat	Mustard
4.	Mustard	Alfalfa	Pea	Oat
5.	Oat	Sunflower	Spelt	Pea
6.	Pea	Spring barley	Sunflower	Spelt
7.	Spelt	Spelt	Pea	Sunflower

Source: Construction based on own data gathering

[3] Compensation payments for less-favoured areas
[4] In case of subsidies built in every model, subsidies concerning sheep relate to ewes.
[5] The size of the model farm is 60 hectares, thus on the basis of the 25/2007 (IV. 17.) regulation of the Ministry of Agriculture and Rural Development, the model farm is entitled to 90% of the per hectare payment, which appears in the table.

3. MAJOR FINDINGS OF THE THESIS

I review the relevant findings of the investigations of the dissertation in the structure of the objectives.

3.1. Defining the Concept of Environmentally Conscious Production (Farming) Behavior

Based on relevant literature sources I concluded that the definition of the environmentally conscious behavior is incomplete with respect to agricultural producing activity. The examination and the definition of the mentioned behavior at the level of individuals usually concentrates only on the dimension of the consumer behavior, in this way starting from this I defined the concept of the environmentally conscious production behavior in a hypothetic approach.

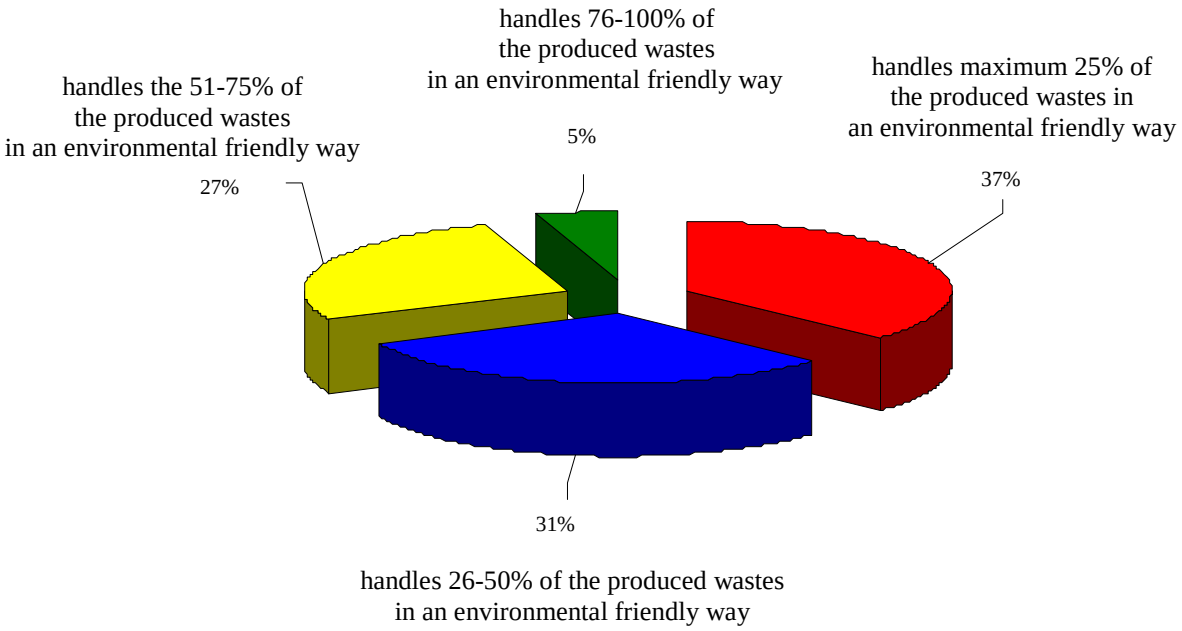
In my own conception I consider the environmentally conscious production behavior as the conscious human behavior, which is based on factual and real environmental information and knowledge, and realizes in decisions made on the basis of the individual's environmental values in connection with farming activity. Its aim is to reduce environment burden by ensuring the livelihood of farmers.

On the basis of the overviewed literature when analyzing the environmentally conscious production behavior similar to the consumer behavior the investigation of demographic and non-demographic factors may be adapted supplemented by economic features such as farming size, participation in subsidy system aiming at environmentally conscious production behavior, as these factors influence the livelihood of the farmers and by this presumably the decisions relating to the producing activity.

3.2. Investigating Environmentally Conscious Production Behavior

Based on the results of the examination focusing on environmentally conscious waste management (*Figure 1*) I concluded that more than one third of the farmers asked handle up to 25% of the produced wastes in an environmental friendly way, from which 17% does not care about the produced dangerous waste by an environmental sound method at all. Farmers who handle at least 76% of the wastes in an environmental friendly way constitute only 5% in the sample. The highest value in waste management is 88%. Based on all these I concluded that handling the generating waste during farming in an environmental friendly way is at a low level among the examined agricultural producers constituting the sample. There are

deficiencies especially in the field of wastes of wrapping materials and handling animal dead bodies.



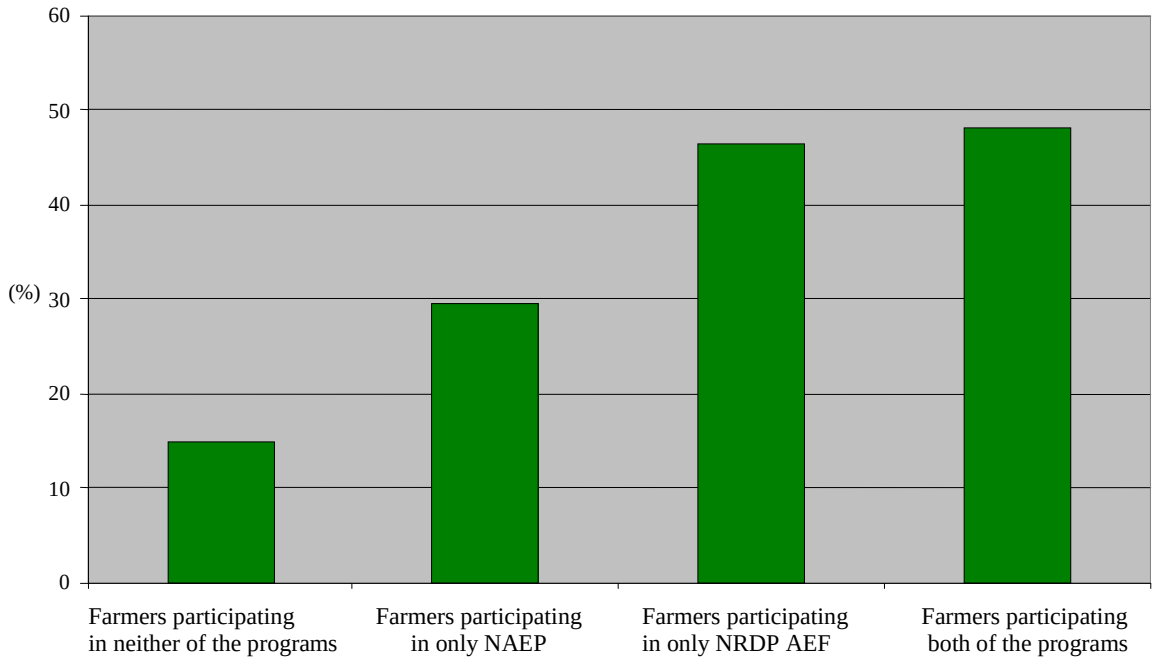
Source: *Calculation based on own data gathering*

Figure 1: **Waste Managing Behavior of Farmers in the Sample**

Significant difference was not measured between the standard of waste management behavior of the organic farmers and "conventional" farmers comparing them by analysis of variance expressed in ratio scales. On the basis of the results I concluded that the controlled organic farmers, inspite of the fact that they reach better results in several independent variables (such as environmental knowledge, environmental responsibility) in a significant way than the conventional farmers, do not behave in a more environmental friendly way in the field of handling wastes of agricultural origin. According to the principles of organic farming it is important to minimize wastes producing in the farm at the same time the regulation does not cover handling wastes. Thus the same waste handling regulations apply to both organic farmers and conventional farmers. I explain by this that the controlled organic farmers are not more environmentally conscious than the conventional farmers with respect to handling wastes of agricultural origin.

By segmenting the values of the waste management behavior according to participations in agri-environmental farming measures, I measured difference between the farming groups at a significance level of P=5% by analyzing of variance (*Figure 2*). During the comparison in pairs by the help of Tukey analysis, I concluded that private farmers participating in the AEF of

National Rural Development Plan (NRDP) may be characterized by a significant higher waste management behavior than farmers who took part only in the National Agri-Environmental Program (NAEP) at one time or who are not involved in any agri-environmental program. When comparing the standards of waste management behavior of farmers taking part in the NAEP and farmers being not involved in any agri-environmental program I found that participants in the NAEP may by characterized by a significant higher (P=5%) waste management.



Source: Own data gathering and calculation

Figure 2.: **The Level of Environmentally Conscious Waste Management Segmented the Participation in Agri-Environmental Measures**

The results of the survey prove that the participations in agri-environmental programs have calculable effects on the environmentally conscious waste managing behavior even after taking part in the programs. The fact that the behaviors of participants in NRDP AEF are significant higher than that of farmers being not involved may be justified that controlling attached to subsidy payments expands to even administrative controlling of handling dangerous wastes ordered in laws.

The farming size of the economic factors still reflects an unambiguous correlation with the standard of waste management behavior. The reason is that keeping the environmental rules may be better controlled in case of bigger farms, which is a relevant motivation for them.

Only the residence of the farmer of the demographic features, more precisely the similarity of the residence and the location of the producing activity, shows a positive effect on the

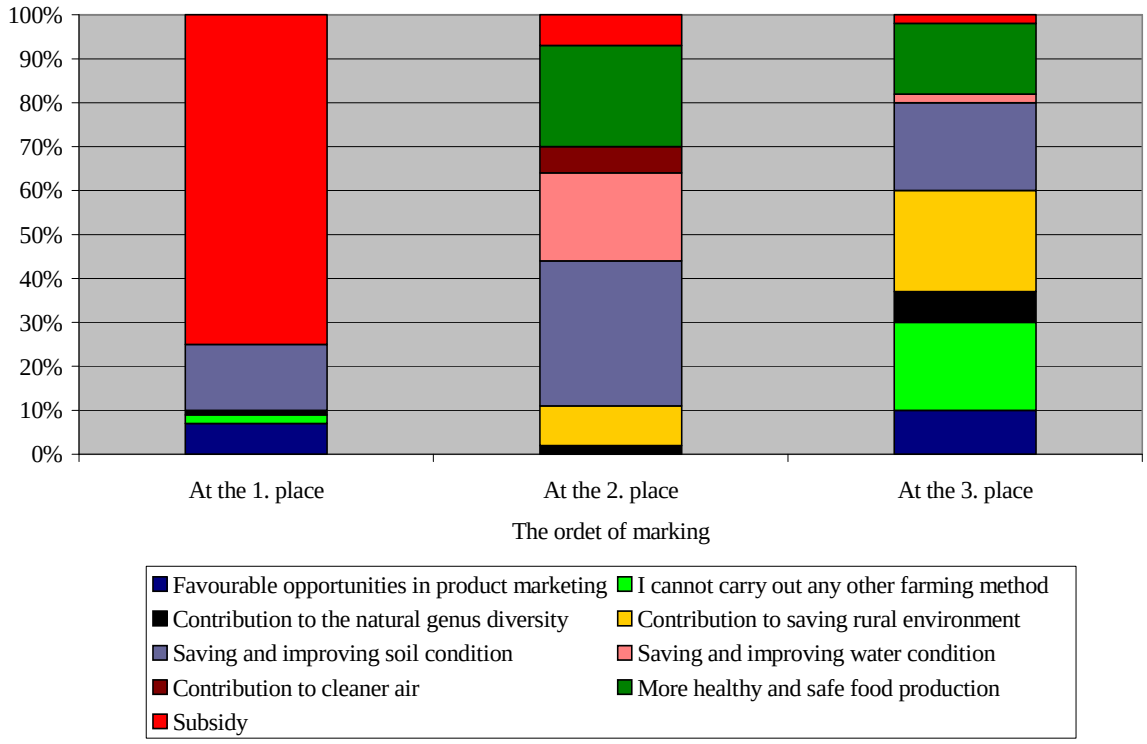
environmentally conscious waste management behavior. Based on the results of the Tukey test, the agricultural farmers who carry on producing activity on their residence reflect a significant higher (P=5%) waste management behavior.

I used Spearman's correlation analysis to reveal the connection between psychographic variables and waste management behavior. Based on the results I found that the other inner so-called psychographic[6] variables determined by the literature do not or hardly explain the tendency of the standard of waste management behavior. From the examined variables, primarily the sensed efficiency has a weak but detectable correlation with the waste management behavior. The sensed efficiency is not only an environmentally conscious consumer factor but also an explanatory variable even in the dimension of production behavior. Similar to the sensed efficiency, the procedural[7] environmental knowledge also reflects a weak but reliable correlation with the examined behavior (r=3,13).

The fact that contrary to consumer research the economic factors in much cases overtake the psychological factors attaching to the personality is not a surprise as the research focuses on agricultural production as the field of an economic activity, wished to study the environmental friendly feature of a part of it and strived to reveal the relevant correlated factors. When forming the producing activity it is obvious that it is not the personality of the farmers but the profit-oriented decisions necessary for making a living that come forward. This result is justified by several other questions in the questionnaire. One of these questions focused on the most important reasons of carrying out environmental friendly farming (three answers had to be chosen and graded from the previously set ones). The results (*Figure 3*.) unambiguously prove that the main reason for farmers to choose environmental friendly production practices is to call subsidy and other financial aspects, which means that aspects concerning directly environmental protection stand only in the second or third places in the gradation.

According to the results of investigating environmentally conscious production behavior I conclude that farmers do not regard aspects of environmental protection when making decisions with respect to waste handling. The fact that taking part in agri-environmental programs has still favourable effects on the waste management behavior is explained by the control attached to subsidies of AEF covering even administrative controlling of handling dangerous wastes. On the basis of the results I made a consequence that the level of environmentally conscious production behavior may be considerably improved by a consequent control together with financial stimulation.

[6] Characteristics of an individual's personality
[7] Knowledge of environment-friendly waste management practises



Source: *Own data gathering and calculation*

Figure 3.: **Reasons for Environmental Sound Farming – According to the Opinion of Private Farmers in the Sample**

Summarizing the results of investigating environmentally conscious production behavior

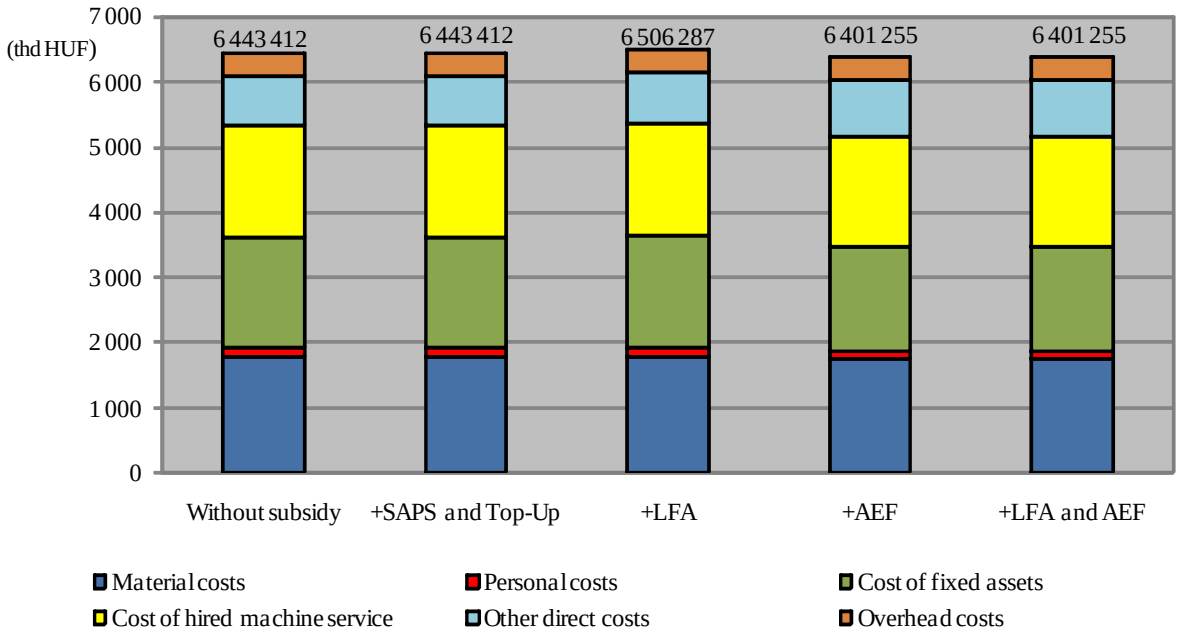
According to the results I concluded that ***the hypothesis of investigating environmentally conscious production behavior is partly true. Though the waste management behavior of the controlled organic farmers is not higher than that of other agricultural farmers, the participation in agri-environmental programs has an unambiguously positive effect on the examined behavior***. In order to develop the environmentally conscious behavior, a long-term participation in the agri-environmental farming program and financial support are required as the examined behavior is not so developed among the farmers that without any incentives significant improvement could be expected.

3.3. Examining the Long-Term Viability of Organic Farming

In course of the investigation I deeply analised the production cost, the production value and the profit. *Figure 4* reflects the annual average total production cost and its structure of the model farm at the examined subsidy levels. During analyzing production costs I found that the total annual average production cost is 6,4 million HUF to the whole agricultural area of 60 hectares regardless the subsidy levels, from which after subtracting overhead costs (6%), the annual

average direct cost totals up to 6,1 million HUF. The shares of the arable plant production and sheep breeding from the annual direct cost are 82% and 18%, respectively. The SAPS and Top-Up payments do not cause any change in the production cost of the farm as the modeled farm has already met the entitlement criteria of the payment.

At the level of subsidy considering LFA payments the direct production costs increase by only 1%, regarding the cost of the obligation to keep a farming register necessary for getting rural development subsidies. This extra requirement concerns only the other direct costs; it causes an increase of 8% comparing to the previous subsidy levels.

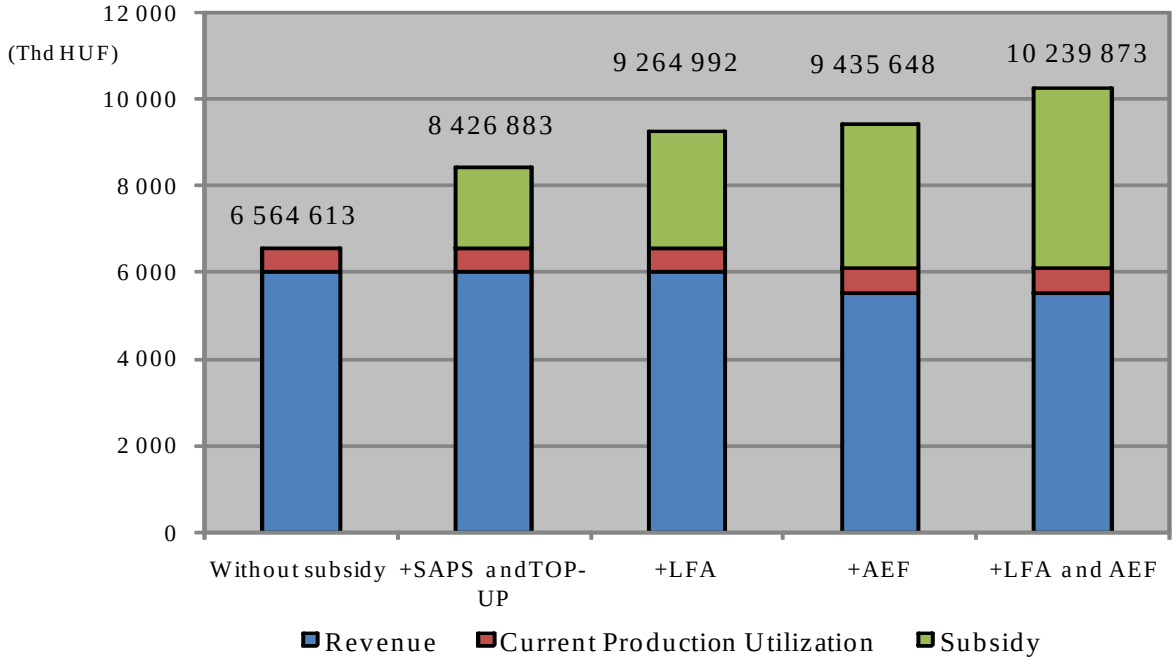


Source: *Own calculation*

Figure 4: **The Annual Average Total Production Cost and its Structure by Pre-Calculating Cost Elements of the Model Farm at the Examined Subsidy Levels**

The extra requirements necessary for AEF payments cause a minimal reduction in the whole production cost of the farm, which ratio is slightly 1% comparing to the first two subsidy levels and 2% in comparing to the LFA payments. The reason of cost reduction is the orders relating to establishing and maintaining "organic compensation area" in the scheme organic arable plant production of AEF, which results in a decreasing cropping area by 8% under the modeled conditions. This decreases all of the costs by 2 to 7% except for other direct cost, comparing to the costs measured at the level of LFA payments. The increase of 9% of other direct cost may be justified by the costs of extra requirements (whole soil test, preparing a plan for nutrient supply) of nutrient supply ordered in the scheme in the organic arable plant production. On the basis of analyzing production costs, I concluded that the certain subsidy levels do not affect the tendency of the annual average production costs of organic farming.

Under the modeled conditions, in case of organic farming cultivating on arable land of 40 hectares and grassland of 20 hectares the production value is 6,6 million HUF without any subsidy (*Figure 5*), from which revenue from selling products constitutes the significant part (91%), the remaining 9% includes the value of the current producing utilization coming from the enterprises based on each other. In the average of the examined year 89% of the calculated revenue originates from arable plant production and 11% from organic sheep keeping.



Source: *Own calculation*

Figure 5: **The Annual Average Gross Production Value and its Structure of the Modeled Farm at the Examined Subsidy Levels**

The received subsidies increase the production value by 28% to 8,4 million HUF at the levels of SAPS and Top-Up, thus the share of the yield value from the whole production value is 78% at this level. Beside SAPS and Top-Up, calling LFA payments results in a further increase of 10% in the annual average production value. Supposing the call of LFA payments, the share of the received subsidies reaches 29% of the whole production value, from which the subsidy of the arable plant production constitutes the major portion (61%). If the farm is entitled to gain subsidies of organic arable land and organic grassland schemes beside single area payment, the annual average production value is higher by 2% than that at the subsidy level of LFA and by 12% than the production value measured at the level of SAPS and Top-Up, and exceeds 9,4 million HUF to a small degree. At this subsidy level the share of the achieved subsidies is 32% of the whole annual production value in average, from which the subsidy of arable plant production constitutes 73%.

When calling wholly both of the modeled rural development subsidies (LFA and AEF) the annual average production value is higher by 9% than that at the pervious subsidy level; it is higher by 22% than the production value measured at the subsidy level of SAPS and Top-Up and exceeds 10,2 million HUF to a small degree. At the highest subsidy level examining the structure of the annual average production value the value of the yields takes up of only 60%, the received subsidies are responsible for the remaining 40%. Based on analyzing production value, I concluded that certain subsidies play outstanding roles in forming the reachable production value.

The results of the analyzing work reveals that under the modeled conditions, calling the examined subsidies influences the reachable gross profit in a very favourable way (*Table 3*). While the calculated annual average gross profit is slightly 100 thousand HUF without the modeled subsidies, at the level of SAPS and Top-Up the gross profit of the farm is near 2 million HUF. AEF payments of the modeled rural development subsidies results in an annual average gross profit of over 3 million HUF.

Table 3: **The Annual Average Profit of the Farm at the Examined Subsidy Levels**

Unit: HUF/year

Denomination	**Subsidy levels**				
	Without subsidy	*+SAPS and Top-Up*	*+LFA*	*+AEF*	*+LFA and AEF*
1. Production value	**6 564 613**	**8 426 883**	**9 264 992**	**9 435 648**	**10 239 873**
2.1. Direct production cost	*6 081 412*	*6 081 412*	*6 144 287*	*6 039 255*	*6 039 255*
2.2. Overhead cost	*362 000*	*362 000*	*362 000*	*362 000*	*362 000*
2. Production cost	**6 443 412**	**6 443 412**	**6 506 287**	**6 401 255**	**6 401 255**
Gross value	*483 201*	*2 345 471*	*3 120 705*	*3 396 393*	*4 200 618*
Gross profit (1-2)	**121 201**	**1 983 471**	**2 758 705**	**3 034 393**	**3 838 618**

Source: *Own calculation*

The annual average gross profit of the model farm was evaluated on the basis of the criteria of long-term economic viability. Three versions were created relating to the annual profit need (*Table 4*). In the first case ("profit need 1") beside the minimal wage of the entrepreneur, the annual capital need[8] of fixed assets without land as well as 10% of the values of buildings and machines[9] for the sake of technological development of production were taken into consideration. The "profit need 2" calculated even the opportunity cost of land capital (in a minimal way, calculating land rent) beside the previously mentioned factors. Based on my data gathering, the average amount of land rent in the in the examined area in 2007, the annual profit need of land

[8] Calculated by the average of reference yields of five-year-long state bonds in the period of 2004 and 2007 (7,71%).

[9] Determined by consultations with farmers.

capital is 324 thousand HUF, so the total sum of the "profit need 2" is approximately 3250 HUF. The "profit need 3" calculation involves even the minimal expansion (10%) of the producing capacities (agricultural land area, livestock) beside the source requirement of the technological development. Thus the annual profit need increases significantly compared to the previous calculations, it is near 4260 thousand HUF annually.

Table 4: **The Annual Profit Need of the Model Farm**

Denomination	Profit need 1 (HUF/year)	Profit need 2 (HUF/year)	Profit need 3 (HUF/year)
Personal cost of the entrepreneur	1 068 780	1 068 780	1 068 780
Capital need of fixed assets without land (7,71%)	882 024	882 024	882 024
Profit need of land capital (land rent)	0	324 000	324 000
Annual source requirement of technological development	969 000	969 000	969 000
Annual source requirement of expanding production size	0	0	1 015 000
TOTAL	**2 919 804**	**3 243 804**	**4 258 804**

Source: Own calculation

I compared the results of profit need calculations relating to the model farm to the annual average gross profit generating at the modeled subsidy levels (*Table 5*). On the basis of the data in the table I found that only SAPS and Top-Up payment itself makes only a short-term viability possible, sometimes only to a small degree, as the generating annual average gross profit covers wholly only the minimal wages of the entrepreneur as well as the minimal normal profit (neglecting land capital). The profit necessary for long-term viability and financing technological development falls off almost to the full, the own finance of expanding production capacities may not be arisen at all.

Due to the modeled LFA subsidies the gross profit realized during farming already approaches the minimal annual profit need ("profit need 1"), on the other hand the farm cannot finance the whole technological development from own sources, the expansion of production from own sources legs behind again even in this case.

Table 5: **The Annual Average Gross Profit and Profit Need of the Modeled Farm at the Examined Subsidy Levels**

Unit: HUF/year

Denomination	Subsidy levels				
	Without subsidy	*+SAPS and Top-Up*	*+LFA*	*+AEF*	*+LFA and AEF*
Average gross profit	**121 201**	**1 983 471**	**2 758 705**	**3 034 393**	**3 838 618**
„Profit need 1"	**2 919 804**	**2 919 804**	**2 919 804**	**2 919 804**	**2 919 804**
„Profit need 2"	**3 243 804**	**3 243 804**	**3 243 804**	**3 243 804**	**3 243 804**
„Profit need 3"	**4 258 804**	**4 258 804**	**4 258 804**	**4 258 804**	**4 258 804**

Source: *Own calculation*

If the farm can call not only the SAPS and Top-Up payments but even subsidies considered in the AEF model, the generating annual average gross profit reaches the annual minimal profit need ("profit need 1"), moreover it even exceeds that by 100 thousand HUF. The minimal profit need of land capital, however, does not recover and the expansion of producing capacities cannot be financed from own sources.

Beside SAPS and Top-Up payments assuming that the farms receives 100% of both of the modeled rural development subsidies (+ LFA and AEF subsidy level), the annual gross profit exceeds not only the minimal profit need ("profit need 1") but the expected profit ("profit need 2") by 600 thousand HUF which regards even the opportunity cost of land capital. In this way the expansion of producing capacities may be partly financed from own sources. The profit need ("profit need 3") calculating by an expansion of producing capacities of 10% cannot be financed from the annual average gross profit from organic farming even at the level of the highest modeled subsidy.

During summarizing all these I concluded that private farms in less-favoured areas dealing with organic arable land production and animal keeping are only able to survive for a long run if they use up wholly at least the subsidies of AEF program besides SAPS and Top-Up payments.

Regarding the fact that the modeled AEF subsidies may be achieved by applications, and there are strict extra conditions for farmers, higher level knowledge of laws and technical awareness are necessary, the work of extension workers and settlement managers is especially important, which helps farmers in preparing successful applications and strengthening the professional background of the production.

Subsidies of the current operative AEF program aiming at organic farming are available for farmers who competed and won subsidy entitlement in 2004 when announcing the program. All of the subsidized territory in the organic scheme of AEF is 75 thousand hectares, which constitutes 60% of the area of all controlled organic farming. Thus the participation in the

program is not and expectedly will not be guaranteed for every organic farmer because of the available limited financial sources. Based on the results of the analyzing work I conclude that farmers who dropped out of the modeled subsidies of AEF, cannot count on long-term existence under the present market conditions. Accordingly, they will turn to other agricultural producing methods as it was experienced during the last years.

Summarizing the results of investigating the viability of organic farming:

I proved the hypothesis of the examination focusing on the viability of organic farming, the reachable AEF subsidies have an outstanding role in the long-term viability of organic farming under the modeled conditions. Organic farming units under the modeled circumstances cannot count on long-term viability without AEF subsidies. It is necessary to develop the enterprise policy with respect to the national development of organic farming. Making joining the AEF program yearly possible that is developing a more wider subsidized farming group by the AEF may lead to the strengthening of the environmental, economic and in the end the social roles of organic farming.

4. THE NEW AND NOVEL SCIENTIFIC RESULTS OF THE DISSERTATION

1. I consider defining the concept of environmentally conscious production (farming) behavior as a novel scientific result of my dissertation.
2. I consider the investigation of environmentally conscious production (farming) behavior based on primer research among private farmers carrying out agricultural production in Hajdú-Bihar county as a novel scientific result of my dissertation.
3. My conclusion relating to the results of investigating environmentally conscious production behavior by which there is not any detected difference between the standard of waste management behavior of organic and conventional agricultural farmers (private farmers) is regarded as a new scientific result.
4. My conclusion relating to the results of investigating environmentally conscious production behavior by which participation in AEF program has favourable effect on the environmentally conscious (waste management) behavior of participating farmers in a proven way is regarded as a novel result.
5. My conclusion relating to the results of investigating the viability of organic farming by which private farms in less-favoured areas dealing with organic arable land production and animal keeping are only able to survive for a long run if they use up wholly at least the subsidies of AEF program besides SAPS and Top-Up payments is regarded as a novel result.

5. THE PRACTICAL USE OF THE RESULTS

I consider surveying the environmentally conscious production behavior among agricultural farmers and economic modeling of organic farming at a farm level as a suppletory study in the field of the Hungarian agri-economic researches. The results of the investigation contribute to studying organic farming from economic aspects and set the tendency of further researches.

My results provide guidance for decision makers in the relevant political field for setting the developmental tendencies of the enterprise regarding the fact that the ministry has been considering the development of organic farming as one of its tasks for more than one decade. Inspite of this, however, the development seems to stop, moreover the signs of legging behind appear.

The results of the dissertation may be well utilized in the field of education; especially enterprise analysis focusing on the viability of organic farming may be fit into the subject of Enterprise Economics. The modeled farm illustrated the principles and the current domestic practice of organic farming by this the results of the investigation may be well used in several fields of education.

The results of the research examining the profitability of organic farming at presently available subsidy levels neglecting investment in a realistic way may be valuable for producing enterprises. The results may provide useful information mainly for farmers who are interested in organic farming and think of introducing it in their producing unit.

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