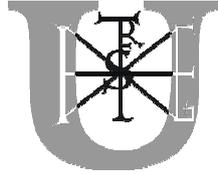


SZENT ISTVÁN UNIVERSITY  
GÖDÖLLŐ



THESES OF PhD DISSERTATION

**COMPLEX DECISION-PREPARATION OF  
AGRICULTURAL INVESTMENTS**

*DARÓCZI Miklós*

Gödöllő  
2004

Name of doctoral school: **Economics and Business Management**

Discipline of doctoral school: **Economics and Business Management**

Head of doctoral school: **Dr. Szűcs István  
Professor, Head of Institute  
DSc. in Economics,  
SZIE – GTK**

Supervisor: **Dr. Husti István  
Professor, Head of Department  
CSc. in Agriculture,  
SZIE - GÉK**

.....  
Head of doctoral school

.....  
Supervisor

## **1. Introduction**

### *Background of the research*

The competitiveness of the Hungarian agriculture can only be maintained and improved by continuous technical development. Essential social, economic and technical changes induced by the change of the political regime, the ownership relations, the possession structure the sustainable and environment friendly food production, and the continuously advancing quality standards set serious requirements against the **technical resources** of the sector. The uncertainty coming together with the transition, the decrease of the domestic consumption, the collapse of the traditional foreign markets had a negative influence on the profitability being low and the long-term scarcity of capital which has led to a **35 % fall** of the gross agricultural product and the **fail of investments**. For the cumulated negative effects of the above-mentioned reasons, the technical means of the sector need to be developed in many aspects.

The **rural development** and the tasks coming together with **joining the European Union** require the improvement of this unfavorable situation and negative tendencies. Rapid success, however, should not be expected, since the extent of development demands accumulated during several years, the narrow development resources available, the low profitability and the extreme weather conditions particularly in the recent years **make the sector less attractive** for the investors, too. For this reason, the **efficient utilization** of the amounts invested, the own capital invested, the credits and state compensations is of crucial importance.

The **Department of Technical Economics** (earlier Agricultural Department) has been doing **researches** for several decades **on agricultural investments** under the direction of the department head, István HUSTI. I joined the project approximately 10 years ago teaching the subjects “**Investments**” and “**Project management**” and taking part of the researches. My professional interest focuses on the decision-preparation process of investments, some methods for the efficiency calculations of investments, and the complex evaluation of the results of various indexes.

The primary **objectives** of my work are to overview and develop the decision-preparation processes, particularly focusing on the **investment efficiency** aspects.

***Importance of the subject***

Decisions on investments determine the activity and future success of an enterprise basically and for long term. Properly preparing the **investment decisions** and selecting the most favorable version are essential for both the enterprises and the national economy.

**Economic calculations of the investment** have been utilized in Hungary for decades. After 1968 the static calculations have been completed and replaced by the **dynamic indexes**. From the beginning of the 1980's the investments of the **World Bank** has brought a real breakthrough in the spreading, consequent application and the well-founded methodology of the calculations.

In these cases the investment has been analyzed embedded in the whole sector using different types of cost-benefit analysis. The analyses have already been carried out during the preparation phase, while their final synthesis and evaluation occurred during the credit rating analysis. Many small size agricultural enterprises, started in the early 1990's, tried to eliminate proper calculations due to high **inflation**, quickly changing **regulatory measures**, and the **environmental effects**, although banks required these even at that time.

Despite the uncertainty and hazard, belonging naturally to the investments, a dozen of well applicable **techniques** have been elaborated by the **company economics** and **management**, recently. Thanks to the development of **informatics**, the economic calculations and the sensibility analyses can be carried out much more thoroughly and rapidly than a couple of years ago.

The proper training of entrepreneurs and managers on the **theoretical background and the methodology** as well as the applicability of the subject can be extremely helpful in preparing and making decisions **related to agricultural investments**.

***Objectives of the dissertation***

Knowing the importance of the above topic, the following **objectives** were set during the preparation of the thesis:

- The analysis of the **investment preparation** and **decision-making** practice related to technical development in the agricultural enterprises.
  
- Elaborating the adaptability of the **projects forming methods based on the strategies of the enterprise**.

- Elaboration of a **theoretical model and methodology** of complex **decision-preparation** for agricultural investments.
- Evolving a **computer program** to support investment related decision-preparation.
- **Making suggestions** for the improvement of the domestic agricultural investments, the decision-preparation and verification, based on the calculations made with the above **model and computer program**.

The aimed **results** are expected to help to determine and systematize the external and internal factors of the agricultural enterprises and the tasks to be completed, having influence on the decision-preparation of the agricultural **investments** and the **technical development**. The **elaborated theoretical model** and a **computer program** will contribute to a more accurate foundation of the agricultural investments and a more efficient utilization of the development resources.

## **2. Methods of the research**

My study focuses on the **process of decision-preparation** related to agricultural investments. As a first step, I have examined the **decision-preparation** and **decision-making** practices related to the technical development in the Hungarian agricultural enterprises. By the help of my colleagues, I have put together 16 questionnaires consisting of closed and open questions, which have been filled out through personal interviews, with random, and arbitrary sampling. **73%** of the analyzed **102 enterprises** were **individual**, while the rest (**27%**) were **companies** carrying out agricultural production or service activities. **43%** of the enterprises owns **more than 200 ha**, 12% between 101 and 200 ha, 10% between 51 and 100 ha, 15% between 21 and 50 ha, while **20% less than 20 ha**.

The questionnaire was aimed primarily to find the answers for the following questions:

- On what basis a decision is made concerning the **necessity** of a development (*particular plan, intuition, etc.*),
- Is there any kind of **analysis** being applied before making a decision,
- Is it analyzed how a certain development **fit** into the future plan,
- Is there any **plan** related to the future (*strategic, business, etc.*),

- Is there any **relationship** with a technical advisor, village agronomist when working on developments,
- Is it necessary to **mechanize** the production,
- On what basis a decision is made concerning the **selection** of certain means (*own impression, other, etc.*)
- To what extent the current **subsidizations** influence their machine purchase,
- Is there any **method or analysis** being used for the development of the mechanization, and finally
- **Who prepares** the applications, loan applications, business plans?

The questions concern partly to the development of the mechanization, since the major part of the agricultural investments is related to this set of means. The questionnaires have been evaluated by means of the “**SPSS 7.0**” statistic software package.

According to the second objective of my work, I examine how the **strategy based project forming methods** can be utilized in agricultural investments.

I examine the process of project forming of the multifunctional agricultural enterprises using the “**structure-plans**”, well known in the project-management, and the “**weak-point analysis**” from the industry as a combined utilization of management methods. More exactly the methods for simple determination of the volume, the parameters of major quantities and qualities, the time and expenses related to a certain technical development.

The **main objective** of my work is to evolve a theoretical model or a method, which can be successfully applied in preparing decisions of investment. This dynamic and symbolic model can be capable of supporting investment decisions of a certain enterprise or a certain branch of business. During the elaboration of my model, I have focused on the **main steps** of the complicated process of decision-preparation.

The **functioning model** runs under MS EXCEL, which is widely known, can be accessed easily, and does not require deep knowledge in computer science.

### 3. MAIN STATEMENTS AND RESULTS

The **results** of my work, **according to the objectives**, support the examination of **investment-preparation** and **decision-making** practice of the Hungarian agricultural enterprises and serves to utilize **project-forming methods** in the agriculture. The **theoretical model** and the **methodology** have been completed. The computer-aided version is also finished, of which capabilities are certified by the calculations carried out.

#### 3.1. The decision-preparation and decision-making practice of the Hungarian agricultural enterprises

The prepared questionnaires are aimed to find answers for the following questions related to investment-practice of the Hungarian agricultural enterprises: to what extent the investment-decisions are **founded**; are there any **plans or analyses** prepared; do the enterprises consult external **professionals**; on what basis a decision is made when **selecting** the final investment version; and to what extent their decisions are influenced by the availability of the **state compensations**. The collected and evaluated data are interesting enough by themselves, but it is also practical to take them into consideration when creating the model of decision-preparation.

#### Results of the evaluated questionnaires

- The decision on the **need of a certain development is based on: a particular plan (62%)**, pressure of circumstances (38%), intuition (16%), and others advice (11%). Later on it can be seen from the results that a particular plan rather only means particular ideas that are not existing in a written form.
- **68%** of the asked enterprises **apply** a kind of **analysis** before making a decision on developments or investments. This is not a low value by itself. The problem is, however, that these analyses concern mainly for the expected **expenditures** (loan recovery) and **revenues**, sometimes also for the payback period of the investment, and in a couple of cases, only for the **economic indexes of the investment**, saying that theory never certifies practice.

- **80%** of the evaluated enterprises **analyze**, how a particular development, investment **fit into their future plans**. This is also quite a good rate, though only **17%** of the enterprises have **strategic plan** as it can be seen in the following results.
- Only **32%** of the enterprises taking part in the survey **have plan** for the future. The rate of the individual enterprises is higher among those who do not have any future plan. If we focus on the enterprises having plans, we will see, that **36%** of them have **business plan**, **17% strategic plan**, and **11%** of them have **marketing plan**. These low rates show us that the agricultural enterprises **do not consider important** to have written plans. They do not believe them, mainly because of the rapidly changing economic and environmental circumstances. The **project forming** and the **thorough preparation of the investments** are both disputable in the absence of the necessary plans.
- **79%** of the enterprises find that the **mechanization** of the production is necessary. This number significantly shows that the development of the mechanization represents an important role among the technical developments. The need of mechanization is mostly explained by reducing live labour, improving quality and efficiency.
- When purchasing machinery or other means the decisions are based in **77%** of the enterprises on their own impression, **31%** of them let themselves advised by the dealer, **28%** base their decision on others advices, while **9%** take also other aspects into consideration as for example a specific journal.
- The influence of the current state compensations is **significant** in **78%** of the enterprises, **moderate** in **16%**, while **8%** of the enterprises are **not influenced** by them at all. These numbers indicate evidently the motivating power of the state compensations for the investments.
- **50%** of the examined enterprises apply a kind of **method or analysis** before **developing mechanization**. This is not too low alone, but the examination of the applied methods and the prepared analysis shows that most of them concern to **expenses** related to the utilization of the means and the **machine utilization factor**. **Precise management method** or complex comparing technique for the selection of the means is rarely applied.
- **71 %** of the examined enterprises refer development questions to a **technical advisor** or a **village agronomist**. The exact distribution is not known but a significant proportion of the

individual enterprises and those with smaller farms maintain a relationship with a village agronomist for the different application possibilities. This high rate shows that the **entrepreneurs need technical support** even if they are not very keen on making sacrifices for them. The applications, loan applications, and business plans necessary for the developments are carried out in **66% of the cases by the entrepreneur himself**, in 33% by a technical advisor, in 21% by a bookkeeper, while 5% by village agronomist.

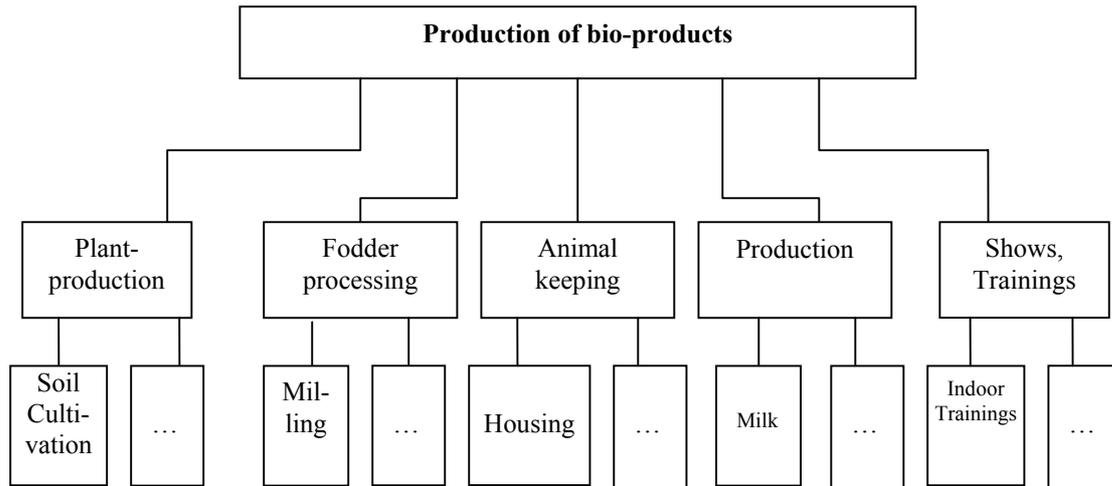
### **3.2. From the business strategy to the actual development plans**

One of the most difficult tasks of leading an enterprise is to **form** the actual **development versions** and to make the decisions related to their realization.

**Determining the content and the volume** of the result of the project, in case of a certain investment, requires great caution due to the agricultural particularities and the multifunctional character of the activities since it plays a significant role in the final success of the project and in achieving of the strategic target. The forming of the development projects to be carried out, to determine the content and the volume of the result of the project can be achieved by creating the function-target structure, which is **the hierarchic system of the targets** laid down in the result of the project.

In the peak is the **strategic target**, followed by the main function and target groups which can be further broken down to elementary levels. As an example, **Figure 1** shows a part of the function-target structure for the **production of bio-products** as strategic target. The function-target structure should be broken down to a depth, where the **capacity**, the **dimensions**, the **quality** and the **environmental requirements**, necessary for being able to accomplish the project, become evident related to certain abilities. The next step, after the exact determination of the functions, is creating the **structure of the function-carriers**. The function-carrier is the **means** itself, the result of the project to be created physically which contributes to set the function in action or to keep it in action. The targets incorporated by the result of the project can be realized owing to the function-carriers.

The elaborated **function-carrier structure** is capable of specifying the result of the project, in other words, to determine the required means for the enterprise.



**Figure 1:** Example for function-target structure: “Producing bio-products”

Source: *self-constructed*

The considerable part of the development projects are **not** realized as **green-field investments** but for modernization of the existing means, expansion of the existing functions, or creating new functions. Therefore, the planned developments should be fitted **to the existing technical background**, or rather examined if it is capable of serving its function. The “**weak-point analysis**”, a breaking-down method of the management techniques, aimed exactly to help this. The examination of different agricultural branches and complementary activities by means of the “**weak-point analysis**” is very useful for determining the current situation of a sector/branch and the **biological-, technological-, technical-, economical-, and human** related tasks of the development of the sector. The essence and also the advantage of the method is that the analysis can be extended to the complete **innovation chain**, or can be used just for a part of it. Complicated and complex activities can be observed more effectively at a necessary depth after breaking it down to smaller parts. The elaborated structure plans can be utilized for this as well.

To carry out a “**weak-point analysis**” or create structure plans, the required **breakdown depth** should be determined which needs a serious theoretical knowledge and practical experience as well. Since there is no general rule for this, it is always determined by the actual target and the circumstances (**Table 1**). The rows of the matrix contain the technical, ergonomic and environment related **reasons, causes** of the development, while the columns represent the economic **consequences** coming from the present situation.

**Table 1:** Application of the „weak-point analysis” as a breakdown method

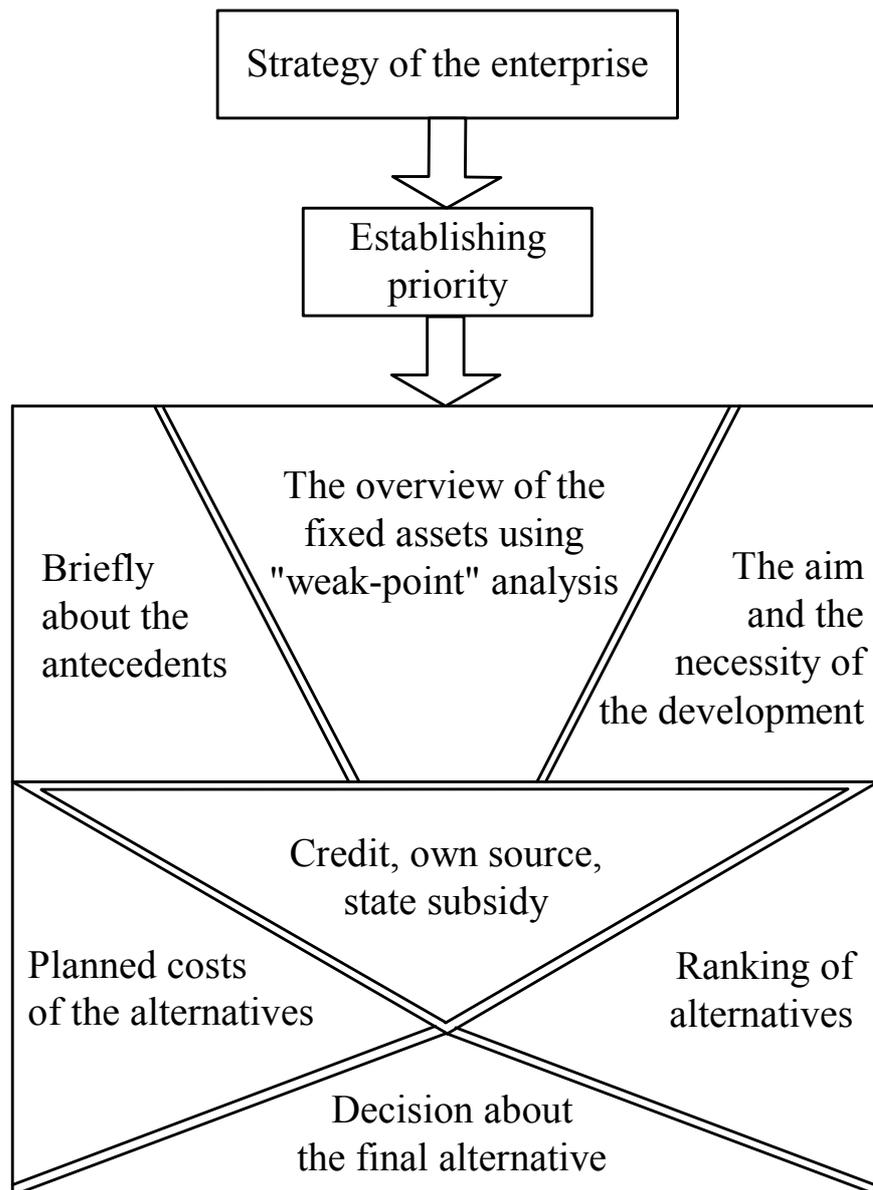
Consequence  Reason	Quantity loss	Quality problems	Change/ replace	Extra costs	Less income	..
<b>Hazardous</b>			$M_1$			
<b>No more operation</b>						
<b>Pollute Environment</b>						
<b>Technologically out of date</b>		$M_2$				
<b>High energy consumption</b>				$M_3, B_m$		
<b>Unreliable</b>					$M_n$	
<b>Economicly out of date</b>					$B_2$	
<b>Low capacity</b>	$B_1$					
...						

Source: *self-constructed*

*Where:  $M_1 - M_n$  machines,  $B_1 - B_m$  buildings*

For the successful **analysis** it should be extended to the whole range of means of an enterprise, including each sector, branch, all the growing technology, the activities and operations to be carried out.

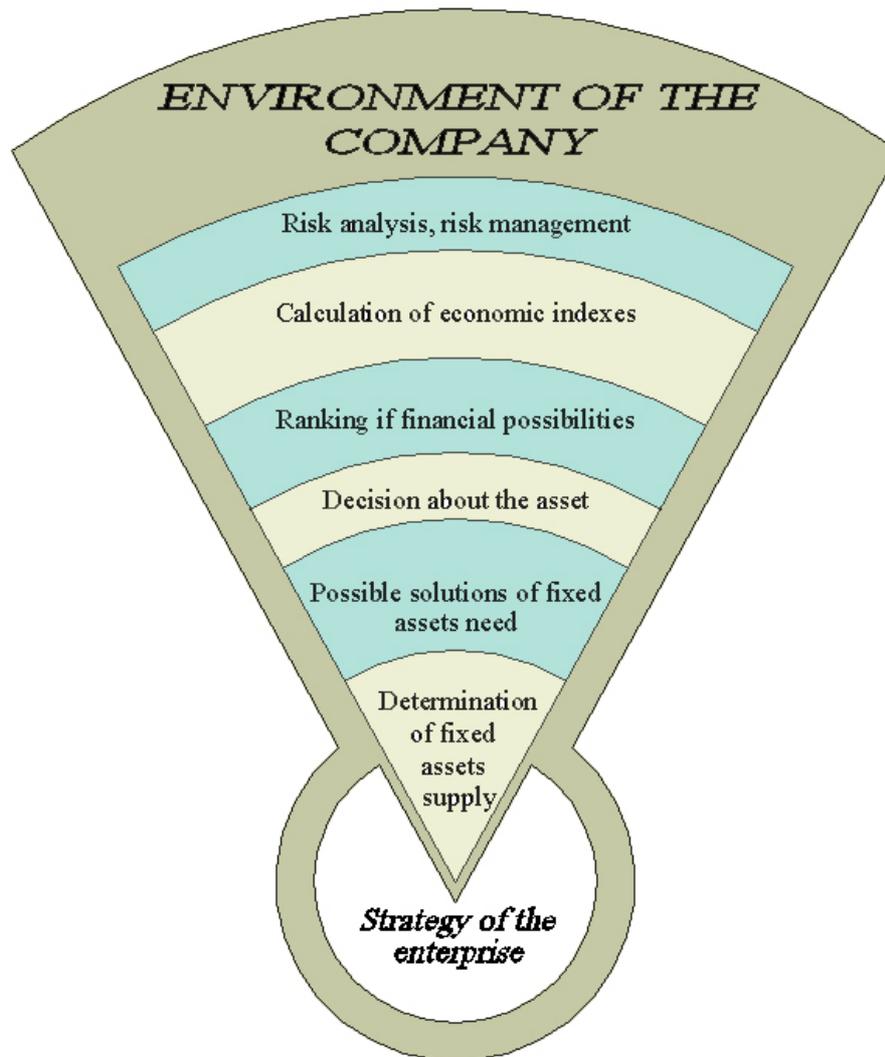
The weak-point analysis delivers the **available means**, while **structure plans** points out the **required physical means**. Comparing the two results makes clear which means (buildings, machines, and facilities) ought to be replaced, converted, renovated or obtained and built up. Then the actual projects and the development versions can be created. **Figure 2** summarizes the tasks which are practical to accomplish when working on the development versions. It is based on the **strategy** of the enterprise and taking both the own and external sources into consideration. After having declared the priorities concerning the development, the essentials of the investments can be specified. As a final step of drawing up and selecting an **investment version** it is suggested to describe the preliminaries, the necessity and the clear aim of the development, to determine the estimated costs and invite the development companies for a tender.



**Figure 2:** Process of drawing up and selecting the development versions

Source: *self-constructed*

The exact determination of the **supply of physical means**, or the methodology of the competition of the development versions that is the elaboration of the model has all been carried out to keep it capable of accomplishing every basic tasks related to a decision-preparation. The process of decision-preparation is straddled by the **strategy** and the **external environment** of the enterprise (**Figure 3**).



**Figure 3:** Basic tasks of the process of decision preparation

Source: *self-constructed*

### **3.3. Model for supporting the decision preparation of an investment**

One of the most important objectives among those laid down in the introduction of this study is the elaboration of the model and methodology for supporting the decision-preparation of an investment. Beside the theoretical model, I have also created an easy-to-use **application** for MS EXCEL, which performs the calculations of the decision-preparation of the investment and the sensibility analysis much faster as usual methods do. Great advantage of the elaborated version, that it seeks the answer **in a complex way** for every essential questions of a decision-preparation of an agricultural investment. Taking the results of the questionnaires also into consideration, the model was formed to be:

- a **well applicable** tool for the management of the enterprise,
- even with an **average** technical knowledge, and hardware-software background,
- and even on the **most different** production structure and plant size.
- The model was elaborated to **support** processes of complex decision-preparation,
- and to **serve** the effective utilization of development sources.

The model is based on the main steps of the technical development tasks and their general sequence (**Figure 3**).

#### 4.3.1. Specifying the degree of supply of physical means of the enterprises

Beside the former “**structure plan**” and “**weak-point**” analysis, I have also used the “**balance equation**” or rather inequality method, well known in the related papers, to determine the degree of supply of physical means (**Figure 4**). The calculation was based on the production structure and the applied production technologies. The proper elaboration of the latter indicates the quality and quantity of work which can be done through the planned means at a given time.

$$m \leq x \cdot h \cdot p$$

where:

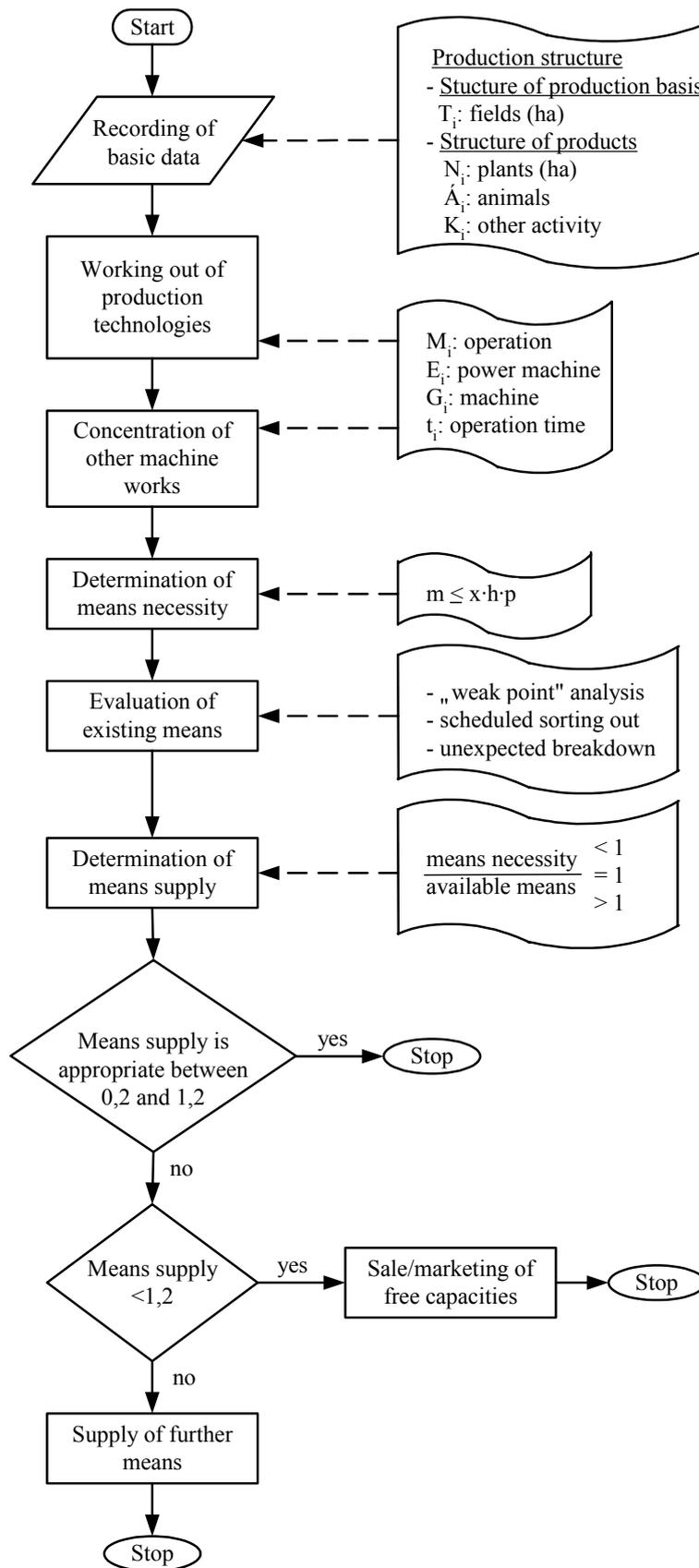
**m:** quantity of the work to be done [shift-hours, nha]

**x:** number of the machines [pcs]

**h:** term available for the accomplishment of the work [shift-day]

**p:** specific capacity of a given tool [ha/shift-hours].

The determined **resource utilization** must be compared for both quality and quantity with those **available**, already analyzed, applicable buildings and operable machines. The received “**rate of supply of physical means**” points out if new means are required (buildings, machines, equipments) or the available ones (perhaps after renovation, expansion or conversion) are capable of carrying out the task within optimal **biological** and **agrotechnical** time limits.



**Figure 4:** Determination of the physical means supply

Source: *self-constructed*

### **3.3.2. How to provide the required physical means**

If the **results of the physical means supply** indicate that further means are required for the enterprise, it should be examined which way they can be obtained. For a **long-term resource employment**, in case of machines, there are two solutions for the acquisition: the so-called “**machine ring**” and the **machine-cooperative society**. For **temporary resource employment**, on the other hand, either **machine renting** or **hiring contractors** can be the best solution.

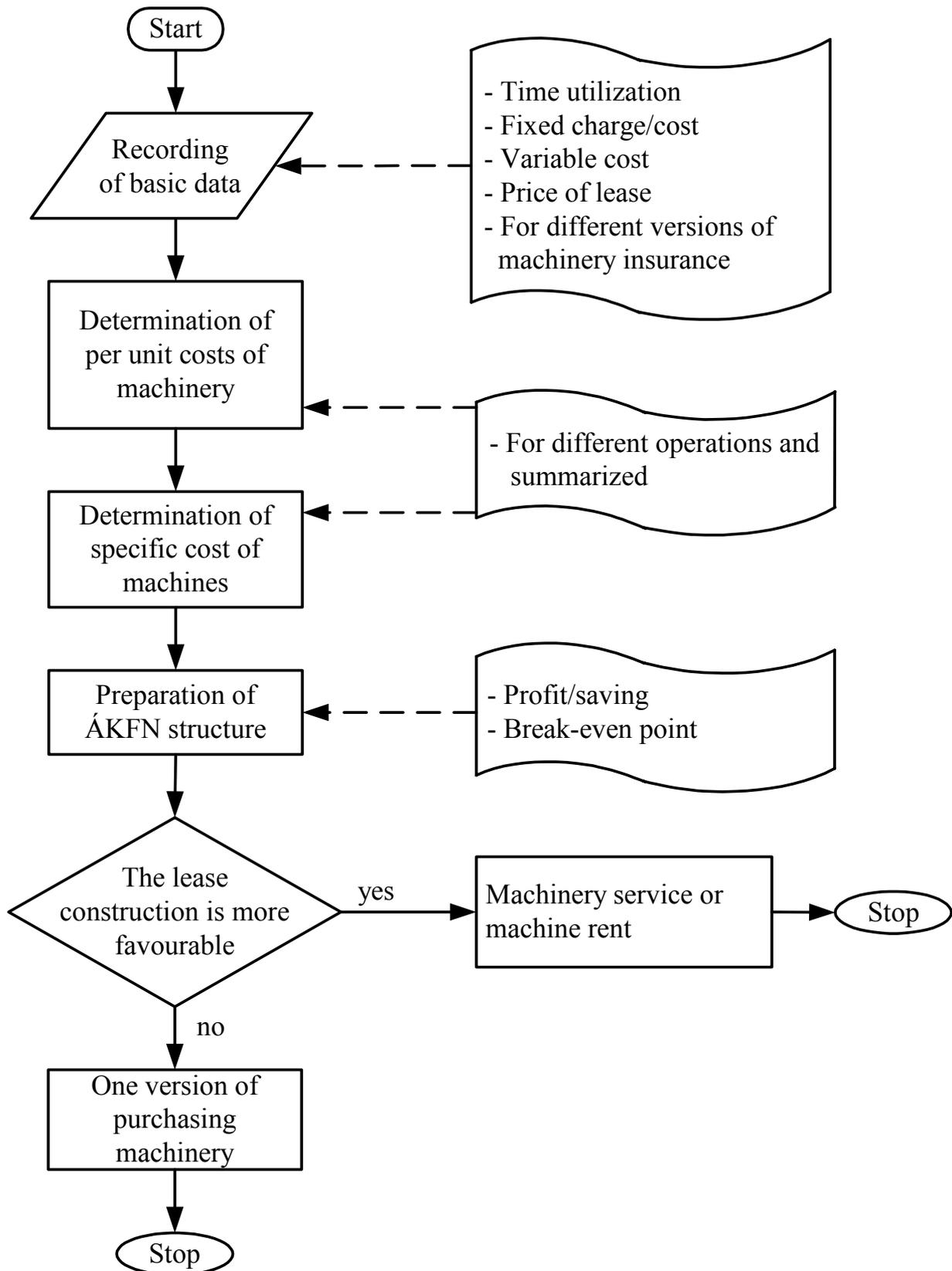
The simplified **break-even analysis structure** offers a solution for deciding between purchasing machines or hiring contractors. It indicates evidently the quantity range of work, above which the former, and under which the latter is more advantageous. Beside the arising constant and variable costs, the model shows the realized savings, too. **Figure 5** summarizes the process of **revealing of the possible ways to meet the demanded physical means**.

### **3.3.3. Selecting the actual means**

This part of the model is for selecting the **actual physical means** and development version. On the **buyers market** several dozens of means, equipments and technical solutions are available for the investor. Therefore, technical, technological, economical, ergonomic, environmental and other considerations have to be made before selecting an actual model.

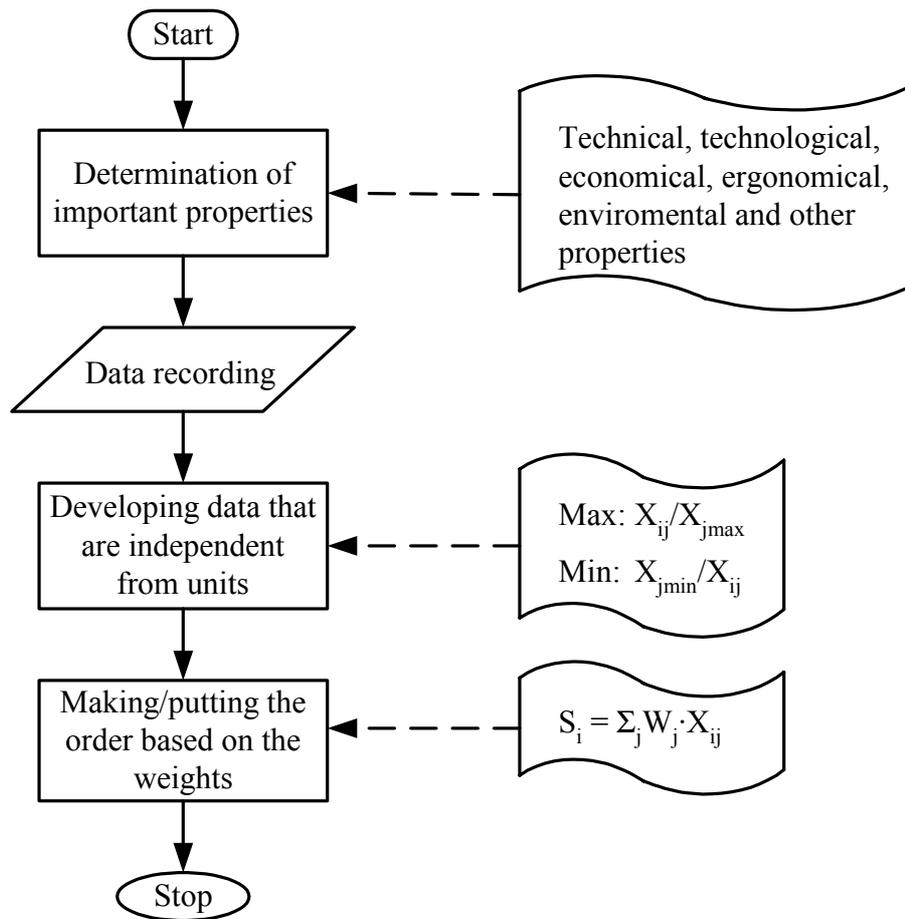
For the complex comparison, the various features have to be converted in order to be comparable, i.e. the units should be eliminated and they must have the same direction. Generally, half of the characteristics ( $X_1$ -  $X_n$ ) are correct if they reach the **maximum**, while the other half of them ( $X_n$ -  $X_m$ ) if they reach the **minimum** value. But it can also occur that correct values are others than the extreme ones. Different characteristics must be converted to have the same direction.

If the single aspects cannot only be put in order of importance, but they can also weighted according to their importance, then the **order** among the possibilities will be defined by **the weighted sum of the values (Figure 6)**.



**Figure 5:** Revealing how to meet the required physical means

Source: *self-constructed*



**Figure 6:** Complex evaluation of the development versions, putting them in order

Source: *self constructed*

### 3.3.4. Tendering of financing possibilities

This part of the model deals with the **financing possibilities** and their tendering which should be **acquisitioned** to provide the required means. There are more financing models that can be taken into account during the preparation of the investment decision (**Table 2**).

The following scheme of model calculation helps better understanding of the tendering process (**Table 3**).

**Table 2:** List and denotations of the essential financing versions

Denotation	Name of the version		Denotation
<b>A</b>	Investment from own resources	Using subsidizations	<b>E</b>
<b>B</b>	Investment from credit	Using subsidizations	<b>F</b>
<b>C</b>	Acquisition through financial leasing	Using subsidizations	<b>G</b>
<b>D</b>	Acquisition through financial leasing investing own sources		
<b>H</b>	Acquisition through financial leasing using subsidizations and investing own sources		

Source: *self-constructed*

**Table 3:** Basic data and quantities used in the calculations

<b>Bé:</b>	Market value (HUF)	<b>Lht:</b>	Repayment of leasing credit (HUF)
<b>Se:</b>	Own resource (HUF)	<b>Lhk:</b>	Interest rate of leasing (%)
<b>B<sub>0</sub>:</b>	Total expenses (HUF)	<b>Tn:</b>	Increase of capital (HUF)
<b>B<sub>0</sub>*:</b>	Present value of the total expenses (HUF)	<b>Tnk:</b>	Interest of the investments (%)
<b>D<sub>t</sub>:</b>	Discount rate (%)	<b>T:</b>	Subsidization (%)
<b>Ht:</b>	Capital redemption of credit (HUF)	<b>Hkt:</b>	Interest rate subsidization of credit (%)
<b>Hk:</b>	Redemption of interest of credit (HUF)	<b>Lhkt:</b>	Interest rate subsidization of leasing (%)
<b>Hkl:</b>	Interest rate of credit (%)		

Source: *self-constructed*

**The basic equations used in the calculations are summarized in Table 4.**

**Table 4:** Basic equations used in the calculations

Version	Equation	Version	Equation
<b>A</b>	$B_0 = Se$	<b>E</b>	$B_0 = Se + T$
<b>B</b>	$B_0 = Se + Ht + Hk$	<b>F</b>	$B_0 = Se + T + Ht + Hk - Hkt$
<b>C</b>	$B_0 = Se + Lht + Lhk$	<b>G</b>	$B_0 = Se + T + Lht + Lhk - Lhkt$

***Complex Decision-Preparation of Agricultural Investments***

---

<b>D</b>	$B_0 = Se + Lht + Lhk - Tn$	<b>H</b>	$B_0 = Se + T + Lht + Lhk - Lhkt + Tn$
----------	-----------------------------	----------	--

Source: *self-constructed*

The most favorable financing solution for the entrepreneur is the one having the lowest expenses in the given situation and bringing the highest increase of income and having the most beneficial features for the enterprise (**Figure 7**).

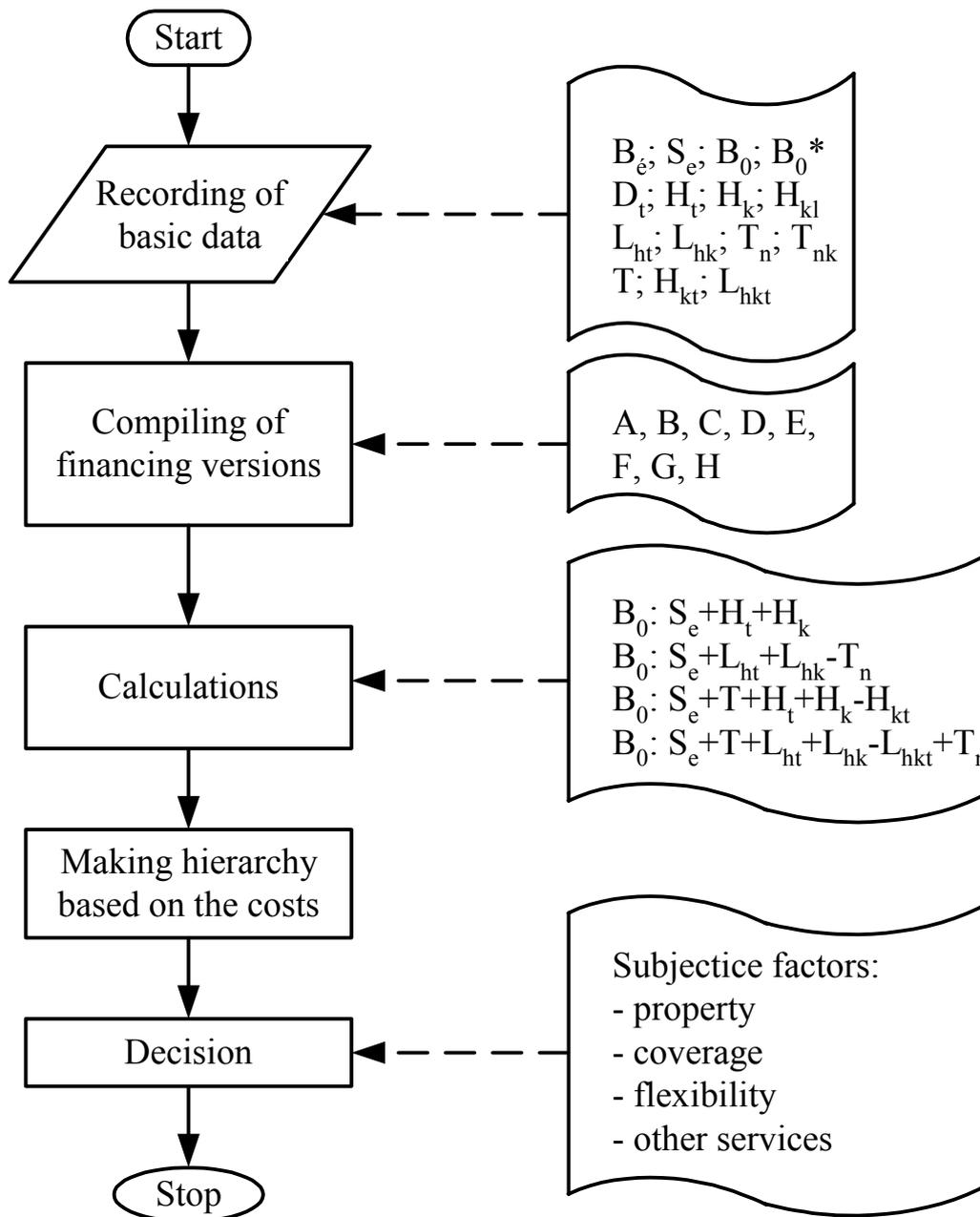


Figure 7: Determining the financing method for the acquisition of means

Source: self-constructed

### 3.3.5. Economic calculation of the investment

This element of the model helps to calculate the profitability indexes, determine the viability related to the **development possibilities** and the formed versions, and classifying them according to the calculated indexes.

There are several kinds of static or dynamic indexes to be calculated, for the sake of different features of the various profitability indexes of an investment, the differences among the indexes, and the **complex profitability evaluation**.

**Static indexes:**

Expenditure for each unit of capacity (K)  
Rate of profitability (J)  
Static payback period ( $T_{stat}$ )  
Profitability of foreign exchange ( $D_g$ )  
etc.

**Dynamic indexes:**

Net present value (NPV)  
Internal financial rate of return (IRR)  
Dynamic payback period ( $T_{din}$ )  
Benefit-cost rate (BCR)  
etc.

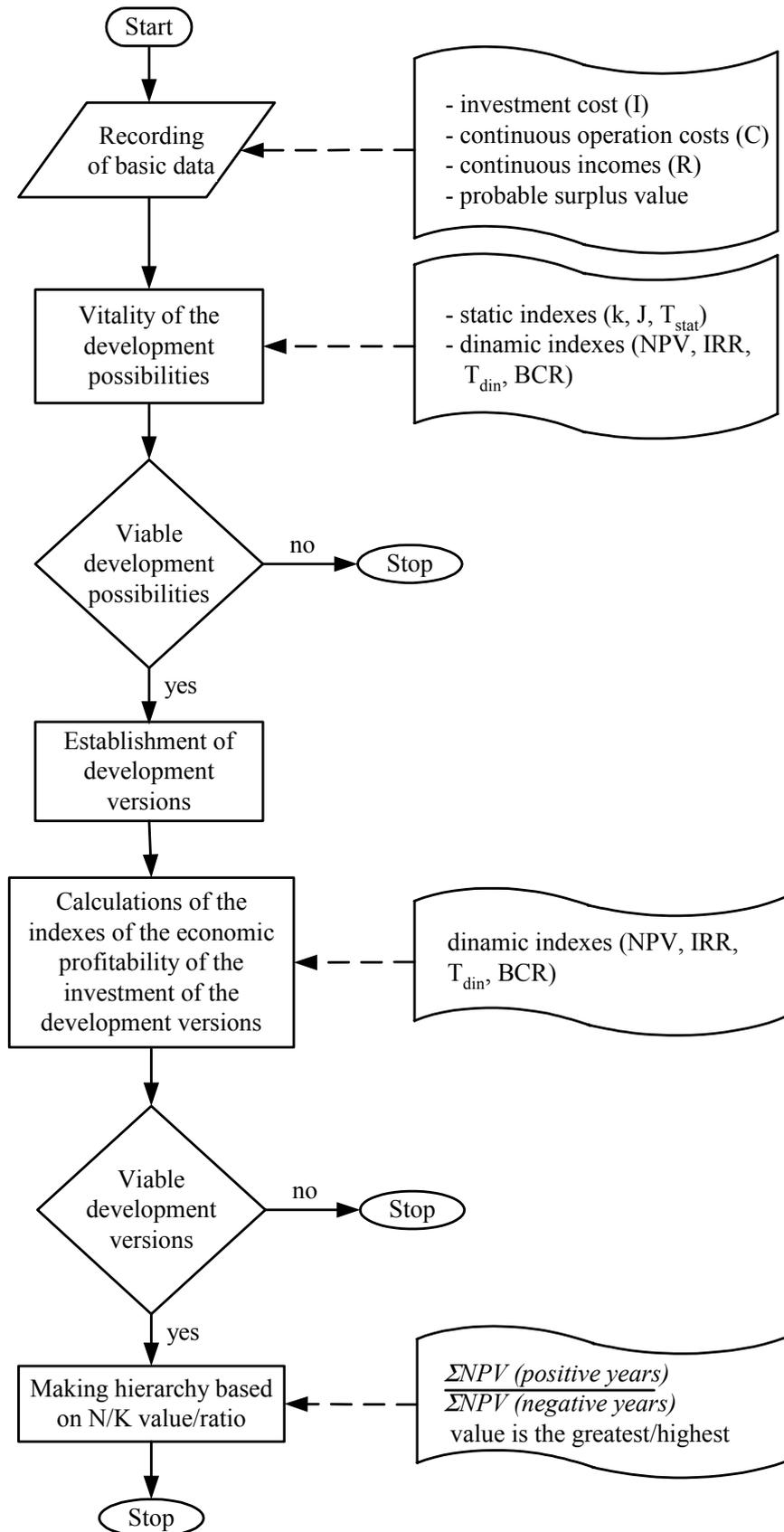
Classification of the investment versions is not possible based on the net present value, the internal financial rate of return, and the benefit-cost rates. The most suitable index for tendering is the **net profit – investment cost rate** (N/K), which is the net present value of the positive years divided by the net present value of the negative years of the post-investment period. The most beneficial version for the enterprise is the one having the highest N/K value.

The calculations and the presented tendering method can be widely applied in practice for tendering various investment versions (**Figure 8**).

### **3.3.6. Risk analysis, risk management**

The last part of the elaborated **model** deals with the final fit of selected development version into the economic management of the enterprise. Knowing the final numbers, it should be examined how the single and continuous expenditures affect the **cash-flow** and the **credit rating** of the enterprise as a whole. Another important question, which will be later examined, is that how the already realized development influences the strategy of the enterprise.

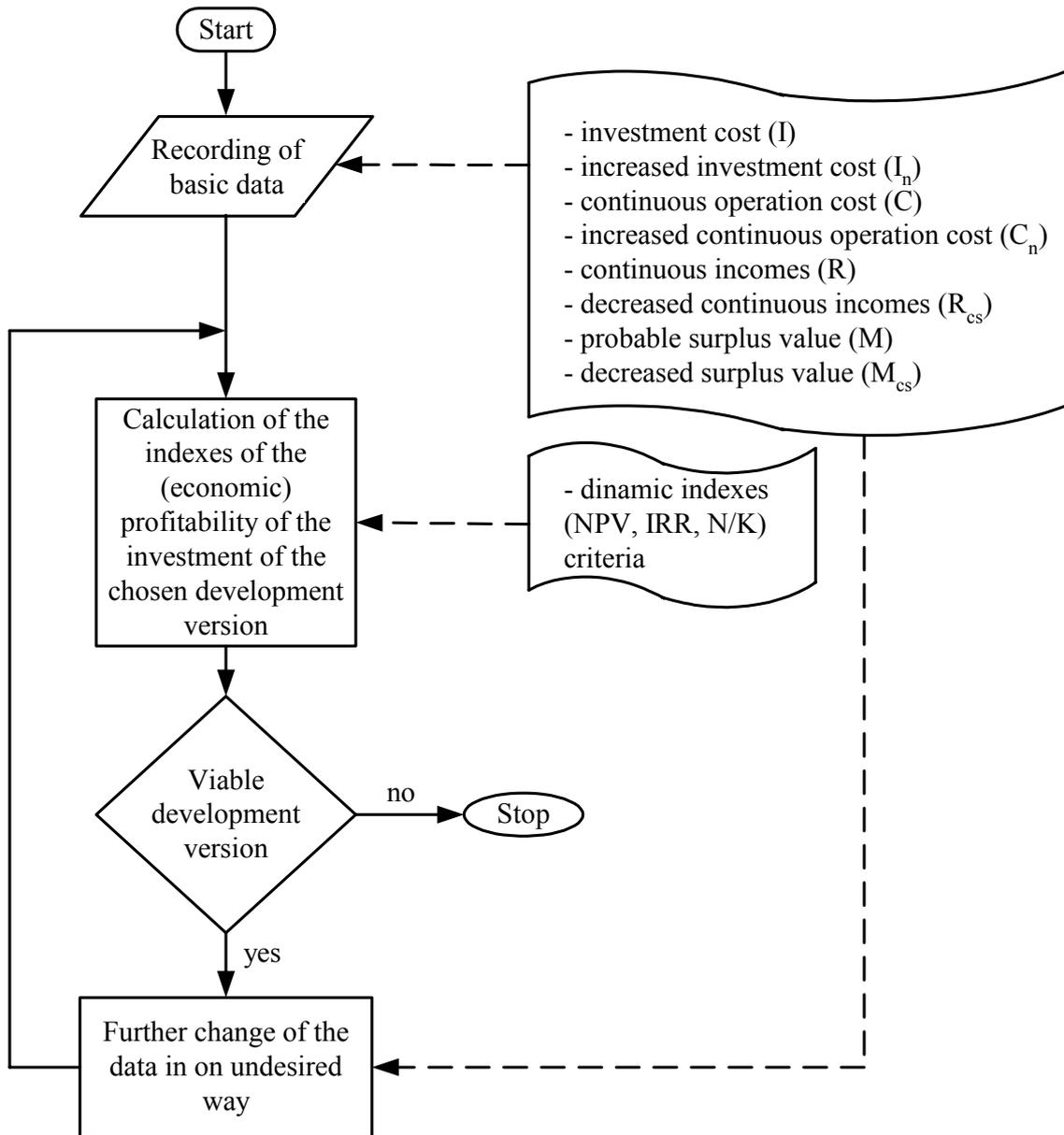
The most important aspect when drawing up the **cash-flow**, that each change of the revenues, expenditures, tax-payments of the enterprise, due to the investment, should be taken into account even the indirect effects, too. The costs, on the other hand, incurred before independent of the investment must not be taken into account. It is practical to break down the **cash-flow plan** to each month.



**Figure 8:** Tendering the development versions based on the indexes

Source: *self-constructed*

There are several methods for analyzing the **risk**. The relating part of the model (**Figure 9**) is based on the method of the **sensibility analysis** which breaks down the result-variable (e.g. internal financial rate of return) into components. It examines the effect of each components exerted on the result altering the variables particularly keeping the others unchanged.



**Figure 9:** Process of the risk analysis and risk management

Source: *self-constructed*

#### 4. NEW SCIENTIFIC RESULTS AND PRACTICAL BENEFITS OF THE DISSERTATION

Each new result of the research, based on the accomplished research project and the dissertation, is related to the current **tasks of the agricultural technical development** and the complex process of **preparing a decision of an investment**.

The new results can be grouped around the following three questions:

- examination of the **investment-preparation** and **decision-making** practice in the Hungarian agricultural enterprises;
- elaborating how to apply the **project forming methods based on the strategy** to the agricultural investments;
- developing a **theoretical model, methodology** and **computer program** for complex **decision-preparation** related to agricultural investments

##### *Investment- and decision-preparation practice of the Hungarian agricultural enterprises*

Questionnaires have been applied to find out how much the decision of investments in the practice of the Hungarian agricultural enterprises are **established**, whether **plans, evaluations** are being prepared, whether external **experts** are also included, how the final investment version is **selected**, and to what extent the availability of **state compensations** influence their decisions.

The gathered and evaluated data are quite meaningful alone, but I have also taken them into consideration when drawing up the decision-preparation model.

1. The methods for **economic calculations of the investment** are well known among professionals since they are integrated in the curriculum of training of various levels. On the other hand, based on the evaluation of the gathered data, I have pointed out that the enterprises **do not perform** any analysis of the required level or do not apply any appropriate method which could be capable of **technical and economic founding** of the investments regarding to the decision-preparation phase of an investment.

2. The results of my survey confirm that the major part of the enterprises are **considerably** influenced by the current state compensations which de-emphasize the aspects of **economic, returns and efficiency** related to the investments.

*Adaptability of project forming methods based on the strategy of the enterprise for the agricultural enterprises*

One of the most difficult tasks of managing an enterprise is to **form** the actual **development versions** and to make the decisions concerning to the realization.

The elaboration of a project means concretizing of the strategic plans creating a link between the activities of the **strategic** and the **operative management**. Special approach, knowledge of numerous management methods and a lot of experience are required for being able to solve this complicated task.

In my research I have examined how problems related to **forming of projects** emerge in typically **multifunctional agricultural enterprises**, which aspect should be taken into consideration and which methods can be applied to solve them.

Due to the **agricultural particularities** and the **multifunctional characteristic** of the activities determining the content and volume of the result of the project is not simple, but the prudentially created plans of **function-target** and **function-carrier structure** throw light on the **demanded physical means**.

Most of the development projects are **not** realized as **green-field investments**, thus the planned developments should be fitted to **the existing technical background** or rather its function-performing capability should be considerably examined. This can be accomplished by the **weak-point analysis** which examines the already **existing means**.

3. I proved that after the **simultaneous use** of the „**structure plans**” and „**weak-point analysis**” methods together with **confronting the results** will clearly show which assets (buildings, machines and facilities) should be replaced, converted, renovated or acquired or built up.

Next, it can be started the **tendering** of the actual projects or rather the **single technical development drafts**, of which the main steps I have systematized based on **strategy** of the enterprise.

*The theoretical model capable of preparing complex decisions related to agricultural investments, methodology and computer program*

The elaboration of the **methodology** and the **computer program** have been performed in order to support the complex decision preparation processes, serve the **efficient utilization of the development resources** and be a well-applicable tool for the management of the enterprises having even average professional skills, minimal computer facilities and knowledge, diverse production structure and plant size.

4. I set up a model for seeking answer for the **six basic questions** emerging in the phase of **preparation** of complex **decisions** of agricultural investments. It helps to evaluate or rather tender the different investment possibilities and versions. Certain elements of the model **can be altered in a flexible way** considering the current circumstances, and they can be utilized in different sequences or even separately.
  
5. I prepared the computer-aided version of the model for MS Excel, which supports the most rapid completion of the **versions, calculations** or even **sensibility analysis** related to the decision preparation. Based on the results of model-calculations, shown earlier as example, the program is suitable for not only the preparation of agricultural investments but also for the decision preparation of **other tasks of technical development**.

## 5. PUBLICATIONS IN THE SUBJECT OF THE DISSERTATION

### Scientific bulletins

#### In foreign language

1. *Husti I.- Daróczy M.*: Problems and Possibilities of Machinery Development in the Mirror of LISA-philosophy. Hungarian Agricultural Engineering. 7/1994. p.: 34-35.

#### In Hungarian

1. *Husti I.- Daróczy M.- Kiss J.*: Stratégiai szempontok a vállalkozói gépesítésfejlesztésben. (Strategic aspects in the machinery development of the enterprises.) Járművek, Építőipari és Mezőgazdasági Gépek Vol. 42. 1995. Issue 5. p.: 168-170. ISSN 1216-6391
2. *Daróczy M.- Koperniczky F.*: A mezőgazdasági beruházási projekt kialakításának általános szempontjai. (General aspects of forming agricultural investment projects.) Mezőgazdasági Technika XXXIX. évf. 1998. 1. szám p.: 28-29. ISSN 0026 1890
3. *Husti I.- Daróczy M.*: A vállalkozói gépbeszerzés lehetőségeinek versenyeztetése. (Tendering possibilities of machinery acquisitions for enterprises.) Mezőgazdasági Technika. Vol. XL. 1999. Issue 2. p.: 61-63. ISSN 0026 1890

### Scientific conference publications

#### In foreign language

1. *Husti I.- Daróczy M.*: The Possibilities and Problems of the Development of Agricultural Production in Hungary. International Scientific Conference on Agricultural Mechanisation for Environmental Protection. Mosonmagyaróvár, 1993. augusztus 31. – szeptember 1. p.: 69-73.

#### In Hungarian

1. *Husti I.- Daróczy M.*: Beruházási sajátosságok az átalakuló magyar mezőgazdaságban. (Particularities of investments in the changing Hungarian economy.) MTA-AMB K + F Conference. Gödöllő, 21-22. January 1992 p.: 6
2. *Husti I.- Daróczy M.*: A lízing új esélyei és buktatói 1992-ben. (New chances and drawbacks of the leasing in 1992.) MTA-AMB K+F Conference Gödöllő, 19-20. January 1993 p.: 6
3. *Husti I.- Daróczy M.*: Gépesítésfejlesztési gondok és lehetőségek a „LISA-filozófia” tükrében. (Problems and possibilities of developing the machinery in the mirror of

- the LISA philosophy.) MTA-AMB K + F Conference. Gödöllő, 18-19. January 1994 p.: 6
4. *Husti I.- Kiss J.- Daróczy M.*: Stratégiai szempontok a vállalkozói gépesítés-fejlesztésben. (Strategic view-points in the machinery development of the enterprises.) MTA-AMB K + F Conference. Gödöllő, 17-18. January 1995 p.: 6
  5. **Daróczy M.**: A szárazbab-termesztés hatékonyságának javítása a „gyengepont-elemzés” módszerével. (Improving the efficiency of bean-growing by means of the „weak-point analysis”.) MTA-AMB K + F Conference. Gödöllő, 16-17. January 1996 p.: 4
  6. **Daróczy M.**: A „Gyengepont-elemzés” alkalmazása az ágazati versenyképesség javítására. (Applying the „weak-point analysis” for improving the sectoral competitiveness.) V. Agrárökonómiai Tudományos Napok. Gyöngyös, 26-27. March 1996 p.: 108-110.
  7. **Daróczy M.- Koperniczky F.**: A mezőgazdasági beruházási projektek kialakításának általános szempontjai. (General aspects of forming agricultural investment projects.) MTA-AMB K + F Conference. Gödöllő, 21-22. January 1997 p.: 5
  8. **Daróczy M.**: Mezőgazdasági projektek a minőségi termelés szolgálatában. (Agricultural projects as supporting the quality production.) GATE GTK Vállalati környezet és alkalmazkodás az élelmiszertermelésben c. konferencia (Conference) Octobre 1997. 9-10. p.: 7
  9. **Daróczy M.**: Az ágazatfejlesztési változatok versenyeztetésének módszertana. (Methodology for tendering versions of sector-development.) MTA-AMB K + F Conference. Gödöllő, 20-21. January 1998 p.: 5
  10. *Husti I.-Daróczy M.- Molnár A.- Peszkei Z.*: A vállalkozói gépesítés alternatív lehetőségeinek versenyeztetése. (Tendering the alternatives of mechanization of the entrepreneurs.) MTA-AMB K + F Conference. Gödöllő, 20-21. January 1998 p.: 5
  11. **Daróczy M.- Koperniczky F.**: A projektek szerepe a vidékfejlesztésben. (The role of projects in the rural development.) VI. Nemzetközi Agrárökonómiai Tudományos Napok. Mezőgazdaság és vidékfejlesztés (Conference) Gyöngyös, 24-25. March 1998 Vol. I. p.: 215-220.
  12. **Daróczy M.**: A pénzintézetek szerepe a mezőgazdasági beruházások finanszírozásában. (The role of the financial institutions in financing of the agricultural investments.) „VISION-2000 II. Az intézményrendszer helyzete és fejlesztése az agrárgazdaságban, az EU-csatlakozás tükrében” c. tudományos

- konferencia. (Conference) GATE. Gödöllő, Novembre 1999. 11-12. Vol. I. p.: 261-269.
13. **Daróczy M.:** Beruházás-gazdaságossági számítások szerepe mezőgazdasági projektek állami támogatásban. (The role of investment-profitability calculations in the state compensations of the agricultural projects.) MTA-AMB XXIV. K+F Tanácskozás. (Conference) Gödöllő, 18-19. January 2000 p.: 5
  14. **Daróczy M.:** A beruházás-gazdaságossági számítások modellezése. (Modeling investment-profitability calculations.) VII. Nemzetközi Agrárökonómiai Tudományos Napok. (VII.<sup>th</sup> International Agro-Economic Conference) Gyöngyös, 28-29. March 2000, Volume I. p.: 221-226
  15. *Husti I., Benkő J., Daróczy M., Feth G., Hatala M., Hős J., Kovács M.:* Számítógépes tervezési és információs rendszer bevezetésének tapasztalatai. (Experiences of introducing computer-aided planning and informatics system.) MTA AMB XXV. K+F Conference. Gödöllő, 23-24. January 2001 p.: 5
  16. **Daróczy M.:** A fontosabb beruházás-gazdaságossági mutatók jellemzése. (Characterization of the most important investment-profitability indexes.) MTA AMB XXVI. K+F Conference. Gödöllő, 15-16. January 2002 p.: 5
  17. **Daróczy M.:** Gépberuházási változatok gazdaságossági versenyeztetése. (Efficiency tendering of versions for machinery development.) VIII. Nemzetközi Agrárökonómiai Tudományos Napok. (VIII.<sup>th</sup> International Agro-Economical Conference) Gyöngyös, 26-27. March 2002, Volume I. p.: 219-224
  18. **Daróczy M.:** Mezőgazdasági gépberuházások döntés-előkészítése. (Decision-preparation of agricultural machinery investments.) „BME IMVT Konferencia (Conference) 2002” Balatonfüred 22-24. August 2002 p.: 7
  19. **Daróczy M.:** Gépbeszerzési döntések támogatása. (Supporting decisions on machine acquisitions.) MTA AMB XXVII. K+F Conference. Gödöllő, 21-22. January 2003 p.: 5
  20. **Daróczy M.:** Beruházási döntések előkészítése a tárgyeszköz-ellátottság vizsgálata alapján. (Preparing investment decisions based on the examination of the existing physical means.) MTA AMB XXVIII. K+F Conference. Gödöllő, 20-21. January 2004 p.: 5
  21. **Daróczy M.:** Út a stratégiától a konkrét fejlesztési projektekig. (From the strategy to the actual development projects.) IX. Nemzetközi Agrárökonómiai Tudományos Napok. (IX.<sup>th</sup> International Agro-Economic Conference) Gyöngyös, 25-26. March 2004 p.: 6 CD

**Book, Part of books**

1. **Daróczy M.:** Beruházási kézikönyv vállalkozóknak, vállalatoknak. (Investment handbook for entrepreneurs, enterprises.) (co-author) (Edited by Husti István) Műszaki Könyvkiadó. Budapest, 1999. P.: 366-379. ISBN: 963 163052 8
2. **Daróczy M.:** A mezőgazdasági gépesítés ökonómiája és menedzsmentje. (The economy and management of the agricultural mechanization.) (co-author) (Edited by Husti István) Műszaki Könyvkiadó. Budapest, 1999. p.: 100-137.; 184-206. ISBN 963 356265 1
3. **Daróczy M.:** A Kft gyakorlati kézikönyve. (The practical handbook of the Ltd.) (co-author) (Edited by Illés B. Csaba) VERLAG DASHÖFER Szakkiadó Kft. Budapest. 2002. p.: 1-30. 8. rész, Chapter 10. ISBN 963 9313 16 5

**Student-books, Part of student-books**

1. *Husti I.- Kiss J.- Daróczy M.:* A mezőgazdasági termelés és gépesítés gazdaságtana (Economy of the agricultural production and mechanization.) II. Egyetemi jegyzet. Gödöllő, 1993. p.: 66-90.

**Research reports**

1. **Daróczy M.:** A növénytermelés ráfordításainak optimalálása. (Optimization of expenditures of plant-growing.) (co-author) (Edited by Husti I.) Evaluation of situation. OMFB Application. SZIE MŰGT Gödöllő, 1998. p.: 44
2. **Daróczy M.:** A növénytermelés ráfordításainak optimalálása. (Optimization of expenditures of plant-growing.) (Production management software) (co-author) szerk.: Husti István, Development study. OMFB Application. SZIE MŰGT Gödöllő, 2000. p.: 60
3. **Daróczy M.:** A szántóföldi növénytermesztés ráfordításainak optimalizálását elősegítő irányítási rendszer kidolgozása. (Elaboration of the system of guidance for helping the optimization of expenditures of growing field plants.) (co-author) (Edited by Husti István) Research summary report. SZIE MŰGT Gödöllő, September 2000. p.: 37

**Other publications**

1. **Daróczy M.:** Műszaki-ökonómiai feltételek és feladatok a szárazabb termesztésben (Technical-economical conditions and tasks in the bean production.) (doctoral dissertation) GATE, MGK. Gödöllő, 1990. p.121.
2. **Daróczy M.-Husti I.- Kiss J.:** A gépigény kielégítésének lehetőségei a mezőgazdasági vállalkozásokban. (Possible ways for meeting the machinery demand in the agricultural enterprises.) Szaktanácsadási füzetek 1. Gödöllő, 1994. p.: 16
3. **Husti I.- Daróczy M.- Kiss J.- Molnár A.- Kántor J.- Kovács I.:** Tanácsok a mezőgazdasági (kis)üzemek gépparkjának összeállításához. (Advices for setting up machinery system of the agricultural (small-size) enterprises.) Szaktanácsadási füzetek 2. Gödöllő, 1995. p.: 16
4. **Husti I.- Daróczy M.- Koperniczky F.:** A vállalkozási beruházások gazdaságossági kalkulációi. (Economic calculations of the investments of enterprises.) Szaktanácsadási füzetek 3. Gödöllő, 1995. p.: 16
5. **Husti I.- Daróczy M.:** A gépkihasználás jelentősége és gazdasági hatásai. (The significance of the efficiency of machine utilization and its economic effects.) Őstermelő. Tájékoztató összeállítás gazdálkodóknak. 1999/4. p.: 53-56. ISSN 1418-088X