
An Econometric Analysis of the Effectiveness of Multi-Sectoral Farm Management

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Abstract: The article discusses the theoretical foundations, principles of work with the processing, storage and sale of agricultural products of specialized farms, industrial production, performance of works, provision of services and other activities not prohibited by law. Based on the theoretical basis, the method of econometric analysis ELECTRE was used to determine the effectiveness of management of diversified farms.

Keywords: Multidisciplinary agriculture, principles of food production and digestion, ELECTRE method.

Introduction

Effective formation of the structural units of the national economy, including the functioning of sectors and sectors of the economy, production associations of different sizes, balanced and appropriate economic relations between enterprises play an important role in ensuring the sustainable development of the world economy. . Especially in the context of increased competition and diversification of economic activity, the importance of diversified economic structures is growing, with special emphasis on the effective management of their activities.

Effective organization and management of diversified economic structures in Uzbekistan is an important part of economic development. In this regard, multi-sectoral farms, ie "along with the cultivation of agricultural products in the legislation on processing, storage and sale of agricultural products, industrial production, performance of works, provision of services and activities. Special attention is also paid to the activities of farms engaged in other non-prohibited activities "[1].

Literature review

A.V. Petrikov suggests considering three groups of diversified farming services. The first is related to manufacturing, and the author of this group produces food and raw materials for the food and processing industries, as well as biogas and biofuels. The second group reflects the satisfaction of the recreational needs of society, especially agrotourism. The third task of agriculture is to participate in the production of public goods: to ensure food security; social control of the territory [2].

Sh.I.Sharipov "The conditions that determine the need for the transition of agriculture to multi-sectoral activities should be agricultural production, services and other areas, and the need for effective management" "kidlagan [2].

In his scientific views, H. Daly states, "There are different approaches to determining the effectiveness of multi-sectoral farm management, but regardless of the type of activity, the

management efficiency of an entity that has been operating for many years will be high. , because experience is important in management ”[3].

While these scholars have highlighted the criteria that need to be considered in the theoretical framework for improving the management efficiency of diversified farms, the new econometric modeling does not take into account uncertainty, risk and risk limits, and modernization conditions in determining management efficiency.

Research methodology

The study used economic, comparative, analytical and sample observation, statistical and ELESTRE econometric analysis methods, forecasting and other methods.

Analysis and results

Ko‘p tarmoqli fermer xo‘jaliklari faoliyatining boshqarish samaradorligini baholash uchun birgina fermer xo‘jaligi faoliyatini emas balki, bir nechtasini taqqoslama tahlillarini olib borish bilan baholash maqsadga muvofiq bo‘lib, bu natijalar ishonchliligini oshiradi. Hozirgi noaniqlik va tavakkalchilik sharoitida to‘g‘ri va samarali qaror qabul qilish uchun albatta, ilmiy asos lozim. Chunki xo‘jalik istiqboli ana shu qabul qilingan qarorga bog‘liq bo‘lib, qarorlar majmuasi ko‘plab alternativlardan iboratligini nazarda tutadigan bo‘lsak, har bir alternativaning bahosi nisbiydir (boshqa alternativaga nisbatan). Tadqiqotda bunday murakkab jarayon uchun ELECTRE usuli (Elicitation Et Choix Traduisant la Realite- istisno va tanlov, haqiqatni aks ettiruvchi)dan foydalanib, ixtisoslashgan va ko‘p tarmoqli fermer xo‘jaliklari faoliyatining samarali boshqarilishini baholaymiz.

A number of methods of the ELECTRE family have now been developed, and ELECTRE methods are important in solving problems with multidimensional alternatives that have already been identified. This method is especially useful in assessing the differences, advantages, and management effectiveness of diversified farms from specialized farms. In these methods, the quality of each alternative is not considered, but only the condition that one alternative is superior to another. For this purpose, first of all, there are 3 specialized (Toshpolat ota, Ismail oglu Abdullajon and Azizbobo) and two (Gulhumor and Rais Sang) operating in Namangan region (economic indicators are given in Annex 1). p sector farms were selected (Table 1) Танланган фермер хўжаликларини шартли равишда:

A - Toshpolat ota, B - Ismail oglu Abdullajon, C - Azizbobo, D - Gulhumor, E - Rais Sang.

1-Table. Key economic indicators of farms¹

№	Indicators	Toshpolat ota	Ismail oglu Abdullajon	Azizbobo	Gulhumor	Rais Sang
1	Crop area, ha	52	52,5	69,2	69,3	62,6
2	Cotton yield, ha / ts	36,9	29,7	40	45,3	32,7
3	Grain yield, ha / ts	51,03	38,5	53,3	65,3	48,5
4	Plan completion,%	110,2	119,5	117,1	129,1	138,3
5	Net profit mln. sum	55,1	74,8	72	147,4	497,5
6	Equipment provided,%	75	60	65	100	85
7	Population employment, man	50	31	23	73	20
8	Types of products and services, pcs	Grain and cotton	Cereals, cotton and vegetables	Grain, cotton, poultry, vegetables	Grain, cotton, horticulture, vegetables,	Grain, cotton, cattle, milk

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					greenhouse and hospital	processing
9	Control volume, unit	13	16	14	18	18
10	Experience, years	19	20	20	19	15

Based on these values, the goal is to select the best alternatives (effectively managed farms) and evaluate their effective management.

N is related to the integer n, which describes the significance of each criterion. B. Rua suggested that the jury, which voted for the importance of this criterion, consider it as a "number of votes."

The hypothesis that alternative A is superior to alternative B is developed, and set I, consisting of N criteria, is divided into three subsections.

$I(x, y)$, a set of criteria that A is preferred to V: $x > y$;

$I-(x, y)$ A set of criteria exceeding A: $u > x$;

$I = (x, y)$ A set of criteria with the same values of A and B = x (Table 2)

2-Table. Experts' 20-point scale on farm economic performance²

Кўрсаткичлар	Farm Valuation (in points)					Parameter weight
	Toshpolat ota	Ismail oglu Abdullajon	Azizbobo	Gulhumor	Rais Sang	
Crop area	14	15	19	20	18	18
Cotton yield	16	13	17	20	14	13
Grain yield	16	12	17	20	15	11
Execution of the plan	16	17	17	19	20	19
Net profit	12	13	11	19	20	14
Equipped with equipment	15	12	13	20	19	15
Population employment	14	11	10	20	20	10
Types of products and services	9	10	13	20	17	15
Control volume	13	16	14	19	18	17
Experience (internship)	19	20	20	19	15	17
Σ	144	139	151	196	176	149

The study of the evaluation of the effective management of diversified farms begins with the definition of the purpose:

if it is necessary to determine the sequence of similarities of these farms, it is sufficient to compare them directly on the most important parameters;

if the purpose of the study is to assess the prospects of a particular economic category, the analysis will include information about the economy that will have a place in the future, as well as changes in country standards and legislation, and the use of data containing information on the dynamics of consumer demand is required.

Phase 1. Using the parameters of the farms, the values of the two alternatives are used to calculate the values of the two indices: consent and disagreement. Agreeing and disagreeing

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with the assumption that Alternative A is superior to Alternative B, the corresponding indicator values of each farm (if $A-V > 0$, “+”; if $A-V < 0$, “=”; “-”) Is calculated.

On the basis of Table 1, we replace the weight parameters in Table 2, respectively, and thus calculate the indices of “consent” and “disagreement” for each configuration of farms, D - Gulhumor Multidisciplinary Farm The predominance of 'jaliks was determined. Although the net profit of Rais Sang diversified farm is much higher than other farms, the advantage of Gulkhumor diversified farm is the development of services and products in addition to related production. It is reasonable to assume that the output range is at the top. A V - The low management efficiency of specialized farms compared to other diversified farms, ie only grain and cotton production, determines the insignificance of the configuration (Table 3).

3-Table. Compare farm configurations³

Indicators	A B	A C	A D	A E	B A	B C	B D	B E	C A	C B	C D	C E	D A	D B	D C	D E	E A	E B	E C	E D
Crop area	-	-	-	-	+	-	-	-	+	+	-	+	+	+	+	+	+	+	-	-
Cotton yield	+	-	-	+	-	-	-	-	+	+	-	+	+	+	+	+	-	+	-	-
Grain yield	+	-	-	+	-	-	-	-	+	+	-	+	+	+	+	+	-	+	-	-
Execution of the plan	-	-	-	-	+	=	-	-	+	=	-	-	+	+	+	-	+	+	+	+
Net profit	-	+	-	-	+	+	-	-	-	-	-	-	+	+	+	-	+	+	+	+
Equipped with equipment	+	+	-	-	-	-	-	-	-	+	-	-	+	+	+	+	+	+	+	-
Population employment	+	+	-	-	-	+	-	-	-	-	-	-	+	+	+	=	+	+	+	=
Types of products and services	-	-	-	-	+	-	-	-	+	+	-	-	+	+	+	+	+	+	+	-
Control volume	-	-	-	-	+	+	-	-	+	-	-	-	+	+	+	+	+	+	+	-
Experience (internship)	-	-	=	+	+	=	+	+	+	=	+	+	=	-	-	+	-	-	-	-

Phase 2. The indices calculated for each pair for the pair determine the degree of agreement and disagreement to be compared. If the consent index is higher than the set level and the disagreement index is lower, then one of the alternatives is superior to the other. Otherwise, the alternatives are incomparable. These calculations are determined on the basis of the following formula (1).

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$$d_{AB} = \max_{i \in I} \left| \frac{l_B^i - l_A^i}{L_i} \right| \quad (1)$$

Based on the data in Table 3, the results determined by formula (1) (with measurement length $L = 20$) are given in Table 4 below.

4-Table. Comparison of indices in the effective management of farm activities ⁴

Indicators	A B	A C	A D	A E	B A	B C	B D	B E	C A	C B	C D	C E	D A	D B	D C	D E	E A	E B	E C	E D
Crop area	0,05	0,25	0,30	0,20	0,00	0,20	0,25	0,15	0,00	0,00	0,05	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,05	0,10
Cotton yield	0,00	0,05	0,20	0,00	0,15	0,20	0,35	0,05	0,00	0,00	0,15	0,00	0,00	0,00	0,00	0,00	0,10	0,00	0,15	0,30
Grain yield	0,00	0,05	0,20	0,00	0,20	0,25	0,40	0,15	0,00	0,00	0,15	0,00	0,00	0,00	0,00	0,00	0,05	0,00	0,10	0,25
Execution of the plan	0,05	0,05	0,15	0,20	0,00	0,00	0,10	0,15	0,00	0,00	0,10	0,15	0,00	0,00	0,00	0,05	0,00	0,00	0,00	0,00
Net profit	0,05	0,00	0,35	0,40	0,00	0,00	0,30	0,35	0,05	0,10	0,40	0,45	0,00	0,00	0,00	0,05	0,00	0,00	0,00	0,00
Equipped with technology	0,00	0,00	0,25	0,20	0,15	0,05	0,40	0,35	0,10	0,00	0,35	0,30	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,05
Population employment	0,00	0,00	0,30	0,30	0,15	0,00	0,45	0,45	0,20	0,05	0,50	0,50	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Types of products and services	0,05	0,20	0,55	0,40	0,00	0,15	0,50	0,35	0,00	0,00	0,35	0,20	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,15
Control volume	0,15	0,05	0,30	0,25	0,00	0,00	0,15	0,10	0,00	0,10	0,25	0,20	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,05
Experience (internship)	0,05	0,05	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,05	0,05	0,00	0,20	0,25	0,25	0,20
MAX	0,15	0,25	0,55	0,40	0,20	0,25	0,50	0,45	0,20	0,10	0,50	0,50	0,00	0,05	0,05	0,05	0,20	0,25	0,25	0,30

From the calculation results and table values, it can be seen that the farm configurations $\sum d_{AB} \leq 1$ The most preferred farm under the terms of the contract is the D-farm, $\sum d_D = 0,15 \leq 1$ equality and E-farming in the next place $\sum d_D = 1 \leq 1$ detected. On other farms $\sum d_{AB} \leq 1$ they found that management efficiency was lower than that of diversified farms due to non-compliance.

Step 3. Dominants are excluded from the set of alternatives. The rest form the first core set. The alternatives embedded in the kernel can be equivalent or incomparable. In the ELECTRE I method, the agreement index is constructed with the assumption that criterion A is superior

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to criterion B. Also, the binary ratio of superiority in the method is determined by the degree of agreement and disagreement. If these levels of agreement and disagreement are present, alternative A is declared to be better than alternative B. If the alternatives fail at these levels, they are declared incomparable. This agreement matrix:

$$C_{AB} = \frac{\sum_{i \in J^+, J^-} W_i}{\sum_{i=1}^N W_i} \quad (2)$$

The subset of the set is determined using the values of $R^+(x, u)$, $R^-(x, u)$, $R^+(x, u)$ using formula (2.3), and the result is given in Table 5 below.

5-Table. Agreement matrix in ELECTRE I method

	A	B	C	D	E
A	-	0,32667	0,26	0,11333	0,27333
B	0,66667	-	0,73333	0,99333	0,72
C	0,32667	0,72	-	1,87333	1,71333
D	1,32	0,51333	0,88591	-	1,10667
E	1,72667	1,26667	0,11409	0,28667	-

From a methodological point of view, the introduction of the concept of incomparability is an important step in the development of decision theory. If the values of the alternatives are largely contradictory (by one criterion, one is better than the other, and vice versa), then such contradictions are not covered in any way, and such alternatives are not comparable. According to the table, farms D and Ye can be compared and moved on to the next stage.

Step 4. The “weaker” values of the levels of agreement and disagreement (low level of agreement and high level of disagreement) are introduced, from which fewer alternative cores are separated. By setting these levels and gradually lowering the required level of the agreement coefficient and increasing the required level of the disagreement ratio, many of the alternatives that are available are explored (Table 6).

6-Table. Increasing the required level of discrepancy coefficient⁵

	A	B	C	D	E
A	-	0,49	150	0	0,37963
B	2,04082	-	131	0,12879	0,12879
C	2,82051	1,7561	-	0,12879	0,65556
D	132	7,76471	7,76471	-	3,21212
E	2,63415	7,76471	1,52542	0,31132	-

At the same time, it is important to note that the coefficients of agreement and disagreement, in which the alternatives are compared, are an analytical tool in the hands of the decision maker and the consultant. Therefore, when increasing the required level of the discrepancy coefficient, it will be possible to distinguish comparable farms, ie, the presence of high levels of discrepancies (132; 7,764; 150, respectively) in the column of farms A, B, C. makes it not necessary to compare them.

Step 5. The latter kernel contains the best alternatives. The sequence of cores determines the order of quality alternatives. A set of alternatives for a given level separates the nuclei of elements that are not dominant in terms of disproportion or equivalence. As the levels

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change, a smaller nucleus separates from a particular nucleus, and so on. The analyst suggests to the decision maker a solution to the problem in the form of different cores. In the end, you can choose the better one. At the same time, the indicators of agreement and disagreement describe the degree of "priority" over the final conclusions (Table 7).

7-Table. Priorities for effective farm management

	A	B	C	D	E
A	-	+	-	+	+
B	-	-	+	+	+
C	-	+	-	+	-
D	+	-	+	+	+
E	+	+	-	+	+

Table 7 justifies the effectiveness of the decision made. According to the table, a pair comparison (with the highest number of "+" s) revealed that D - Gulhumor diversified farm management efficiency was a priority.

Conclusion

In most developed countries, the agricultural sector has been transformed into a diversified farm. The main reason for this is that the country can prevent repression by ensuring the stability of the agricultural sector, increasing production capacity and providing employment. At the same time, of course, it is necessary to organize effective management. The experience of business leaders with many years of experience in good governance needs to be disseminated. This is because a comparative analysis of 2 multi-sector and 3 specialized farms using the ELESTRE method above revealed that the management efficiency of the Gulhumor multi-sector farm, which has many years of operation and additional networks, is a priority.

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