Comparative economic analysis of farms in Turkey and a critical assessment of the annual profitability: The case of Yozgat Province

Recebimento dos originais: 28/07/2020
Aceitação para publicação: 08/05/2021

Nizamettin Erbaş (Corresponding Author)
Asst.Prof in Yozgat Bozok University
Institution: Yozgat Bozok University, Vocational School of Social Sciences
Adress: Vocational School of Social Sciences, Yozgat Bozok University, 66200, Yozgat, Turkey.
E-mail: **nizamettin.erbas@bozok.edu.tr**

Abstract

In this research, economic analysis of farms and their annual operating results were analyzed in Yozgat province holding great significance in agricultural potential in Turkey, and various evaluations were made regarding their agricultural income. The research was conducted via surveys applied to 181 farms identified through a stratified random sampling method. Farms were ranked with respect to farmland sizes and divided into three strata (1-50 decares, 50.01-150 decares, and 150.01-500 decares). Farms were considered as a whole and analyzed comparatively with respect to the strata. In the study, it was observed that 82.70% of active capital consisted of farm capital, and 17.30% of it also operating capital. The annual average operating income of farms was $ 4 493.81, and it was lower than the annual minimum wage income ($ 5 859.89). 68.46% of gross production value was plant production and 31.54% of it also animal production. The economic profitability rate was 1.60%, and it was lower than the returns of the capital market. It was tested by Chi-square if there were differences among strata in terms of operating results, and it was determined there were significant differences among the strata. In that respect, the manuscript is important in developing and guiding effective agricultural policies regarding the agricultural sector in Turkey.

Keywords: Operating capital, Economic analysis, Profitability, Turkey

1. Introduction

Agriculture is the first sector of the history of humanity. The existence of societies depends on agriculture. Thus, it is a realistic approach to express that agriculture is the most important of sectors. In particular, a continuous increase of the world's population and the increasing depletion of production resources are increasing more and more the importance of the agricultural sector (Dıao et al., 2010). In general, when a livelihood of a large part of a country's population depends on agriculture, it can be expressed that the total income of that country is low. But, this doesn't mean it is a poor country, for, most of the active population has been employed in agriculture, and there is no problem in supplying food requirements of

the population. Since a country is poor, it is a more logical approach to express that it should rely on agriculture for livelihood (Anonymous, 2002).

In addition to feeding human beings, agriculture also contributes to the economy by transferring capital, labor, and raw materials for other sectors. Agriculture is the main driving force of economic development. But, in the meantime, production resources ought to be also used rationally in production. For, development of the countries is possible with efficient use of production resources (Erkuş and Demirci, 1985). In a study made by Lovell (1993), it was stated that economic development could be measured by "productivity" or "efficiency" of the production resources. Zakaria et al., (2019) stated agricultural productivity increases with an increase in both physical and human capital.

Yozgat province that is an important potential in the Turkish agricultural sector constitutes 2.56% of the total agricultural land of Turkey (Anonymous, 2019a). It is between $34^{0}05'$-$36^{0}10'$ eastern meridians and $38^{0}40'$-$40^{0}18'$ north parallels as latitude. It was located on the Bozok Plateau of Central Kızılırmak part of the Central Anatolia Region. The northern part of its territories extends to southern parts of the Central Black Sea Region (Bulut, 2003). The surface area of the research area is 14 123 km^2 (1 412 300 hectares), and it is 15th among all provinces (Anonymous, 2005). It is farmed on 44.47% of surface area (598.059 hectares). Despite migrations from rural towards urban, for over 1/3 of the population still lives in rural. 26.5% of the active population was employed in agriculture (Anonymous, 2016). The share that it received in the cereal production of Turkey was 2.65% (Anonymous, 2017). These data show that its economy is still based on agriculture (Erbas, 2016).

In the research area, it is seen that agricultural resources and potentials haven't been used sufficiently and they have been abandoned to their fate. Statistical data of the last 15 years already confirm this. Such that, total agricultural land, which was 1 039 593 hectares in 2002, decreased up to 837 333 hectares in 2017 (Anonymous, 2019b). In other words, in the area, total agricultural land decreased by 19.46% in the last 15 years. In the same period, the rural population diminished by 56.87% and the number of farms by 32.25%. Even though grain production increased partially, legume production decreased by 17.09%. These developments in agriculture of the area were effective in making such research.

In order that decisions aimed at increasing agricultural production should be to point, correct data ought to be primarily obtained and current conditions ought to be analyzed well. The data of this research was obtained from the farms via surveys and annual activity results of the farms were reached up by analysis of these data. Thus, in agricultural researches, original data play an important part in reaching a goal (Maiangwa, 2010).

Although there were a lot of studies on the structure of the agricultural sector of the area, there were no studies regarding the economic analysis of farms. Therefore, this study is of great importance in determining the sufficiency of income and reorienting farms.

2. Literature Review

One of the staple topics of the agricultural economics is also to measure the economic analysis of farms. A lot of studies have been done to measure the economic analysis of farms. To measure the economic analysis of farms, various ratios and equalities are used. There are various literature studies on the calculation of these equalities and financial ratios. In this research, it was benefited from various literature studies regarding measuring the economic analysis of farms (Erkuş et al. 1995, Kızılaslan and Adigüzel 2009, Wajszczuk 2002, Kocaköse and Aktürk 2019, Karadaş 2007, Firth 2002, Offermann and Nieberg 2000, Nemes 2009, Altıntaş nad Akçay 2007, Aydın ve Unakıtan, 2016, Dağlıoğlu 2005, İnan 2016, Karagölge 1996, Bal 2005, Erkuş and Demirci 1996, Paksoy and Karlı 2000, C.A. Rama et al. 2017, Dinler 2914, Özçelik 2019).

When these studies are examined, it is seen that various equalities and ratios are used to measure the economic analysis of agricultural enterprises; product unit cost, production costs, profitability, gross production value, agricultural income, gross profit, product price, profit margin, and pure income per farm. In this study also, these basic indicators and ratios were used.

In the study entitled "Economic Analysis of Agricultural Enterprises in Çanakkale", Kocaköse and Aktürk (2019) specified that the average farmland size is 125.32 decare, gross production value (GPV) was found to be TRY 191 766.73, gross product (GSH) was TRY 197 041.98, gross profit was 756.73 TRY/ha, pure product was 412.23 TRY/ha and the annual value was 367.77 TRY/ha. Aydın and Unakıtan (2016), in the study entitled "comparatively economical analysis of farms in Trakya Region" demonstrated that the active capital according to the farms average was determined to TRY 621 052/decares. Gross Output value, Gross Product, Net Product, and Agricultural Income were found, respectively, to be TRY 56 825, TRY 66 571, TRY 15 951 and TRY 22 977. As a result of the economical analysis, the farms with an area of 1-50 decares and 51-200 decares were found economically unprofitable while farms with an area of 200 decares and above were determined to be economically profitable. According to the farms average, economical profitability and return on equity rates were found, respectively, to be 2.57 and 2.58, while the profitability factor was

found to be 23.96. Kızılaslan and Adigüzel (2009) calculated that the rate of the net product to the active capital is 3.45% in successful enterprises, 0.57% in those with moderate success, and for the unsuccessful ones, it has a negative value of -2.22%. Nemes (2009) stated that production costs of farms are consisted operating/variable costs (all production practices including planting, pest, and weed management, harvesting, etc.) and fixed costs (rental, property taxes, depreciation, opportunity costs etc.). Wajszczuk (2002) stated in a study entitled "The Economic Analysis of Agricultural Enterprises in Sustainable Development Aspect", that the results of the research indicated, that it is possible to use environmentally friendly technologies if the economic motivation system stimulating their development is created. These technologies can be characterized by a low level of direct costs with profitable indexes at the same time.

3. Material and Methods

3.1. Material

This research was conducted via surveys applied to the farms of Yozgat province, identified through the stratified random sampling. The surveys containing the data of the production period 2017 were implemented in 2018. Therefore, these data obtained via the surveys were primary data resources of this research. In addition, some notes also taken as a result of the researcher's observations were used as the main material in this research.

In this study, it was also benefited from the data of other national and international organizations, and particularly the data of Turkey Statistical Institute (TSI). These were secondary data resources of the study.

3.2. Method

The methods used in this research were as follows:

3.2.1. The method used in sampling

Total unit number belonging to the sampling frame was determined by records of Provincial and District Directorates of Agriculture and Forestry. Later, by taking into account the opinions of technical staff and especially subject experts in these institutions, villages

included in the research area were determined. Information exchange with some institutions was effective in the determination of the socioeconomic aspect of the research area.

The farms were divided into three strata with respect to farmland sizes. According to this, the number of farms was calculated as 53 for the first strata, as 84 for the second strata, and as 44 for the third strata. The standard deviation of the first group was found as 11.98 and that of the second group as 27.39, and that of the third group as 85.05.

The number of farms to be included in the sample was identified through a stratified random sampling method. According to the Neyman method, in determination the sample volume the following formulas were used (Yamane, 1967).

$$n = \frac{N.\sum N_h.S_h^2}{N^2.D^2 + \sum N_h.S_h^2}$$

$$n_h = \frac{Nh}{\sum Nh} \cdot n$$

$$D^2 = d^2 / Z^2$$

The terms in the formulas were explained as below.

d: Derivation from the average error probability,

Z: Standard normal distribution value according to error probability,

N: Total unit number belonging to the sampling frame,

S_h^2: Variance of strata,

S_h: Standard deviation of strata,

N_h: Distribution of total unit number to strata,

n: Sample size and

n_h: Distribution of sample volume to strata.

In stratified random sampling, farms (very small or very big farms) that were against distribution were excluded from sampling. The sample size was calculated as 181 for an error margin of 5% and a confidence interval of 95%:

N=3 938

Nh_1 (1-50 decares)= 1 152

Nh_2 (50.01-150 decares)= 1 829

Nh_3 (150.01-500 decares)= 957

Sh^2_1(1-50 decares)= $(11,98266)^2$ = 141.6

Sh^2_2(50.01-150 decares)= $(27,39426)^2$ = 750.7

Sh^2_3(150.01-500 decares)= $(85)^2$ = 7 225

For an error margin of 5%,

$d = 110.6 \times 0.05 = 5.53$

$d^2 = 30.6$

For a confidence interval of 95% (t = 1,646)

$t^2 = 2.71$

$D^2 = d^2/t^2 = 30.6/2.71 = 11.3$

$\sum Nh.Sh^2 = Nh_1 x\ Sh^2_1 + Nh_2 x\ Sh^2_2 + Nh_3 x\ Sh^2_3$

$= 1152 x 141.6 + 1829 x 750.7 + 957 x\ 7225$

$= 8450478$

Sample size;

$n = 181$

The sample volüme was given in Table 1 according to strata.

Table 1: Distribution of the sample size according to the strata

Farmland size groups (decares)	Distribution	
	Population (N)	Sample (n)
1-50	1.152	53
50.01-150	1.829	84
150.01-500	957	44
Total	N_h: 3.938	n_h: 181

3.2.2.The method used in conducting the surveys

Before conducting surveys, farmers were reminded that surveys were conducted through Yozgat Bozok University Research Project. Thus, it was aimed at the reliability of the surveys. The surveys were filled by meeting face to face with farm management. Some notes also were taken as a result of the researcher's observations and added to the survey form. Survey forms contained information on population and labor force, farmland size and land use, capital, annual activity results, physical input use, and operating costs and profitability of farms.

3.2.3. The method used in the calculation economic analysis components

In the analysis, summary tables were constituted and they were separately evaluated according to strata. Moreover, descriptive statistics were used.

• Productive Stock Value (PSV) = (year end stock value + value of the sold stock + value of the stock slaughtered) – (value of the stock at the beginning of year + value of the stock bought)

• Animal Production Value (APV)= (Milk Production Amount * Milk Price Paid to the Farmer) + Productive Stock Value (PSV) + Animal Manure Income

• Plant Production Value (PPV) = Plant Production Value (sold and used product values) + Productive Stock Value (PSV)

• Gross Production Value (GPV) = APV + PPV

• Total Production Costs (TPC) = Total Variables Costs (TVC) + Total Fixed Costs (TFC)

• Gross Profit = GPV – TVC

• Agricultural Income = Gross Revenue – (Debit Interests and Rental) + Family Labor Cost

$$\bullet\ \textbf{Economic profitability} = \frac{\textbf{Pure income}}{\textbf{Active capital}} \textbf{x 100}$$

$$\bullet\ \textbf{Financial profitability} = \frac{(\textbf{Pure income} - (\textbf{debit interests} + \textbf{rental and shared land' share}))}{\textbf{Equity capital}} \textbf{x 100}$$

4. Results and Discussion

4.1. Farmland size

In Table 2, total farmland was given in terms of strata and farms average. As also seen from Table, farmland size per farm was 130.83 decare and it was more than double that of Turkey (61 decares) (Mut and Köse, 2015). 82.09% of the farmland was private ownership, 6.44% of it was shared land and 11.47% of it was rental land. In the research, it was observed there was an agricultural structure based on private ownership in the area. The share of privately owned land in total farmland was between 78.34% and 86.45%.

Table 2: Farmland size

Strata (decares)	Owned land		Shared land		Rental land		Total farmland	
	(dec.)	(%)	(dec.)	(%)	(dec.)	(%)	(dec.)	(%)
1-50	37.28	84.06	2.29	5.16	4.78	10.78	44.35	100.0
50.01-150	95.68	86.45	5.87	5.30	9.13	8.25	110.68	100.0
150.01-500	214.24	78.34	20.71	7.57	38.52	14.09	273.47	100.0
Farms	107.40	82.09	8.43	6.44	15.00	11.47	130.83	100.0

average

4.2. The number of parcels and average parcel size

In the study, the average number of parcels and average parcel size were also examined, and the average number of the parcels was found as 5.13 and average parcel size as 23.09 decares (Table 3). When Table 4 is examined, as the sizes of strata enlarged, it was seen there was an increase both in the number of parcels and parcel size.

Tablo 3: Average number of parcels and parcel size

Strata (decares)	Farmland (decare)	Average number of the parcels	Average parcel size (decare)
1-50	44.35	2.78	15.95
50.01-150	110.68	4.87	22.73
150.01-500	273.47	8.45	32.36
Farms average	130.83	5.13	23.09

4.3. Capital structure of farms

4.3.1. Active capital

Active Capital is a capital that consists of business assets and is directly used for production on the farm (Açıl and Demirci, 1984; İnan, 2016). Active capital consists of farm capital and operating capital. The farm capital was examined as soil capital, land reclamation capital, building capital, and plant capital; operating capital was also examined as animal capital, agricultural tool and machinery capital, money capital, and material capital (Table 4).

The ratio of farm capital to total active capital was 82.70%. Soil capital which constituted 63.43% of farm capital was 55.46% of total active capital. In total active capital, while land reclamation capital had a share of 0.26%, the share of the building capital was 23.36%, and that of plant capital was 6.62%. In the research area, the reason why plant capital was low, it was that farms lacked fruit-vegetable farming.

The ratio of the operating capital to total active capital was 17.30%. In total active capital, while the share of agricultural tool and machinery capital was 10.98%, that of the animal capital was 4.82%, that of material capital was 0.70%, and that of money capital was 0.80%. In an ideal farm, it is expected that the ratio of tool and machinery capital in the total active capital should be 10% (Bal, 2005). We could express that this ratio was balanced in farms examined.

4.3.2. Passive capital

Passive capital consists of foreign capital and equity capital.

4.3.2.1. Foreign capital

The foreign capital of farms examined consisted of a total of real debts and nominal debts. While real debts were bank and cooperative debts of farms, nominal debts were shared and rental land values.

The foreign capital amount of farms differed according to strata. As the sizes of strata enlarged, the foreign capital amount also increased. Its rate to the total passive capital was 13.22% (Table 5).

4.3.2.2. Equity capital

Equity capital of the farms was found by subtraction of foreign capital from total active capital, and their divisions according to strata were given in Tablo 5. As seen in Table, as as the sizes of strata enlarged, the equity capital amount per decare decreased. The ratio of equity capital to total passive capital was 86.78%.

4.4. Operating results of farms

Annual activity results of farms were given in the following:

4.4.1. Gross production value (GPV)

Gross production value consists of plant and animal production values and their increase of value during the year (Açıl and Demirci, 1984; Erkuş *et al.* 1995). In the research, GPV of farms was calculated separately for plant production value and animal products' production. In the area, because fruit and vegetable farming didn't take an important place in agricultural activity, it was only mentioned field crops as plant production.

Per farm, 68.46% of GPV belonged to plant production, and 31.54% of it to animal products' production. As the sizes of strata enlarged, the ratio of plant production value to

GPV increased (Table 6). This situation showed that animal husbandry was more important in the initial group.

It was tested by Chi-square if there were differences between strata in terms of gross agricultural production value.

As a result of test, due to $\chi^2_{test} > \chi^2_{table,}$ H_0 was rejected. It was determined there were significant differences among strata in terms of GPV (χ^2_{test} =27,7730; p<0,05).

4.4.2. Gross income

Gross income is quantity and value of the increase in capital and products produced newly as a result of economic activity in an agricultural enterprise considered as an economic whole during the operating period (Açıl and Demirci, 1984) (Erkuş and Demirci, 1996). According to this, gross income was found by the addition of the gross production value, non-farm agricultural income, and housing rental amount.

Gross income per farm increased in parallel with strata. It was tested by Chi-square if there were differences among strata in terms of gross income, and it was seen significant differences (χ^2_{test} =25,3434; p<0,05).

88.11% of gross income consisted of gross production value and 5.99% of it non-farm agricultural income (Table 7).

Table 4: Capital structure of farms

Capital types	Strata (decares)						Farms average	
	1-50		50.01-150		150.01-500			
	($)	(%)	($)	(%)	($)	(%)	($)	(%)
I. ACTIVE CAPITAL	65 751.39	100.00	138 096.65	100.00	288 953.85	100.00	153 585.15	100.00
1. Farm capital	51 479.10	78.29	112 449.40	81.43	246 430.10	85.28	127 014.33	82.70
a) Soil capital	27 414.15	41.69	68 414.84	49.54	168 422.39	58.29	80 568.56	55.46
b) Land reclamation	-	-	515.11	0.37	647.25	0.22	396.40	0.26
c) Building capital	20 483.58	31.15	34 829.79	25.22	56 423.13	19.53	35 878.18	23.36
d) Plant capital	3 581.37	0.54	8 689.66	1.56	20 937.33	7.25	10 171.32	6.62
2. Operating capital	14 272.29	21.71	25 647.25	18.57	42 523.75	14.72	26 570.82	17.30
a) Agricultural tool and machinery	9 147.89	13.91	15 833.02	11.46	28 147.98	9.74	16 869.18	10.98
b) Animal capital	4 777.36	7.26	7 381.71	5.34	10 579.47	3.67	7 396.47	4.82
c) Material capital(product and input stocks)	347.04	0.53	1 196.26	0.87	1 735.86	0.60	1 078.77	0.70
d) Money capital	-	-	1 236.26	0.89	2 060.44	0.71	1 226.40	0.80
II. PASSIVE CAPITAL	65 751.39	100.00	138.096.65	100.00	288 953.85	100.00	153 585.15	100.00
1. Foreign capital	6 694.55	10.18	13 459.68	9.75	49 782.84	17.23	20 308.67	13.22
2. Equity capital	59 056.84	89.82	124 636.97	90.25	239 171.01	82.77	133 276.48	86.78
Active capital per decare	1 482.56		1 247.71		1 056.62		1 173.93	

Table 5: Passive and equity capital

Passive and Equity capital	Strata (decares)			Farms average ($)
	1-50 ($)	50.01-150 ($)	150.01-500 ($)	
PASSIVE CAPITAL	65 751.39	138.096.65	288 953.85	153 585.15
-Foreign capital	6 694.55	13 459.68	49 782.84	20 308.67
Real depts	2 324.36	4 187.70	13 170.86	5 825.83
Nominal depts	4 370.19	9 271.98	36 611.98	14 482.84
-Equity capital	59 056.84	124 636.97	239 171.01	133 276.48
Equity capital per decare	1 331.61	1 126.10	874.58	1 018.70
The ratio of equity capital to total passive capital (%)	89.82	90.25	82.77	86.78

Table 6: Gross production value

Strata (decares)	Plant production value		Animal production value		Total GPV	
	($)	(%)	($)	(%)	($)	(%)
1-50	3 581.36	70.92	1 468.85	29.08	5 050.21	100.0
50.01-150	8 689.66	78.18	2 425.35	21.82	11 115.01	100.0
150.01-500	20 937.33	83.50	4 137.53	16.50	25 074.86	100.0
Farms average	10 171.20	79.88	2 561.49	20.12	12 732.69	100.0

Table 7: Gross income

Strata (decares)	Gross production value		Non-farm agricultural income		Housing rental amount		Total gross income	
	($)	(%)	($)	(%)	($)	(%)	($)	(%)
1-50	5 050.21	80.32	610.37	9.71	627.30	9.97	6 287.88	100.0
50.01-150	11 115.01	84.77	902.92	6.89	1 079.11	8.24	13 097.04	100.0
150.01-500	25 074.86	89.41	1 698.24	6.06	1 271.46	4.53	28 044.56	100.0
Farms average	12 732.69	86.40	1 010.60	6.86	993.57	6.74	14 736.86	100.0

4.4.3. Operating costs

Total operating costs were examined in two groups as fixed and variable costs. While 56.60% of total operating costs were variable cost, 43.40% of them were fixed costs (Table 8). While the ratio of fixed costs was high in the first group, the ratio of the variable costs was high in the second and third groups.

It was tested by Chi-square if there were differences between strata in terms of total operating costs, and it was determined there were differences among strata (χ^2_{test} =15,0148; p=0,05).

Table 8: Total operating costs

Strata (decares)	Fixed costs		Variable costs		Total operating costs	
	($)	(%)	($)	(%)	($)	(%)
1-50	4 199.71	60.00	2 798.68	40.00	6 998.39	100.0
50.01-150	5 424.34	45.84	6 409.63	54.16	11 833.97	100.0
150.01-500	6 503.75	33.38	12 981.91	66.62	19 485.66	100.0
Farms average	5 328.14	43.40	6 949.96	56.60	12 278.10	100.0

Gross profit: Gross profit of farms was found by subtraction of variable costs from gross production value (Table 9).

The total gross profit of farms examined was between ($) 2 251.53 and ($) 12 092.95, and that was $ 5 782.73 according to farms average. Gross profit per farm was 45.42% of gross production value.

It was tested by Chi-square if there were differences between strata in terms of gross profit, and it was determined there were significant differences among strata (χ^2_{test} =31,5060; p<0,05).

Table 9: Gross profit

Strata (decares)	Total gross agricultural production value (I)		Total variable costs (II)		Total gross profit (I-II)		Total gross profit per decare
	($)	(%)	($)	(%)	($)	(%)	($)
1-50	5 050.21	100.0	2 798.68	55.42	2 251.53	44.58	50.77
50.01-150	11 115.01	100.0	6 409.63	57.67	4 705.38	42.33	42.51
150.01-500	25 074.86	100.0	12 981.91	51.77	12 092.95	48.23	44.22
Farms average	12 732.69	100.0	6 949.96	54.58	5 782.73	45.42	44.20

4.4.4. Pure income

Pure income of farms was found by subtraction of total operating costs from the gross income. Pure income is an important indicator that best measures the success of farms (Açıl ve Demirci, 1984; Erkuş *et al.* 1995). If operating costs is higher than gross income, it can be made mention of a negative pure income, and if they are lower than it, a positive pure income.

In the research area, in other groups except for the first group, pure income was found as positive. Pure income with respect to strata and per farm was given in Table 10. As the sizes of strata increased, pure income also increased.

Table 10: Pure income

Strata (decares)	Gross income (I)		Operating costs (II)		Pure income (I-II)	
	($)	(%)	($)	(%)	($)	(%)
1-50	6 287.88	100.0	6 998.39	111.30	(-) 710.50	(-) 11.30
50.01-150	13 097.04	100.0	11 833.97	90.36	1 263.08	9.64
150.01-500	28 044.56	100.0	19 485.66	69.48	8 558.91	30.52
Farms average	14 736.86	100.0	12 278.10	83.32	2 458.75	16.68

4.4.5. Agricultural income

Agricultural income was calculated by addition of pure income and wage equivalent of the family labor force, and by subtraction of dept interests and amounts paid for rental and shared lands. Agricultural income is one of the best criteria used to measure the success of entrepreneurs (Erkuş and Demirci, 1985; Karagölge, 1996). It is the real income of entrepreneurs.

As seen in Table 11, as the sizes of strata increased, agricultural income also increased. It was tested by Chi-square if there were differences among strata in terms of agricultural income, and it was determined that there were significant differences (χ^2_{test} =37,1414; p<0,05).

.

Table 11: Agricultural income

Strata (decares)	Pure income ($) (I)	Wage equivalent of family labor force ($) (II)	Dept interests, amounts paid for rental and shared lands ($) (III)	Agricultural income ($) (I+II-III)	Agricultural income per decare ($)
1-50	(-) 710.50	2 678.57	298.47	1 669.60	37.64
50.01-150	1 263.08	2 604.39	558.88	3 308.59	29.81
150.01-500	8 558.91	3 469.78	1 870.33	10 158.36	37.14
Farms average	2 458.75	2 836.49	801.43	4 493.81	34.35

4.4.6. Profitability

Profitability is the ratio of the profit acquired by agricultural enterprises in a certain period to the total capital used in a farm in that period. The profitability is the best criterion used in the success of agricultural enterprises and the comparison of enterprises.

The financial and economic profitability ratios of farms examined were 1.24% and 1.60% (Table 12). These ratios were lower than the deposit interest ratio for the period 2017 (11.69%). High operating costs and a high fixed capital ratio (82.57%) were effective on low profitability. These matters caused income insufficiency. In Table 12, financial and economic profitability ratios were given respect to strata. The profitability factor was the ratio of pure income to gross income. According to farms average, it was 16.68%. In other words, $ 16.68 of every $ 100 of gross income acquired was pure income.

It was tested by Chi-square if there were differences among strata in terms of economic profitability, and it was determined that there were significant difference (χ^2_{test} =28,1992; p<0,05)

Table 12: Profitability rate

Strata (decares)	Financial profitability (%)	Economic profitability (%)
1-50	(-) 0.69	(-) 1.08
50.01-150	0.56	0.91
150.01-500	2.80	2.96
Farms average	1.24	1.60

In the study, the annual profitability of farms was compared with the annual yields of some alternative investments and so, clear information about the economic situation of the farms was obtained (Erkuş *et al.* 1995). First, the profitability rate was compared with the average deposit interest rate and it was seen that the profitability rate was lower than the deposit interest rate. The average deposit interest rate was 11.69% in the related period.

On the other hand, the fact that profitability ratios are lower than the annual interest rates is normally accepted (İnan, 2016). In cases of inflation, because fixed capital gains value depending upon runaway inflation, farmers could have low profitability on such an occasion. Secondly, in the study, the profitability rate was compared with the annual yields of the stock

exchange and foreign currency. In the period 2017, the annual yield of the stock exchange was 25.37%, and that of foreign currency 10.36% (Anonymous, 2019c). However, given long-term aims, the profitability rate of farms was calculated positive. Farmlands are one of the factors of production and have an investment feature. It is directly effective in production increase, productivity, and economic growth. Securities are a change of an aspect of money. There is no contribution to production and economic growth. Therefore, long-term aims should be taken into consideration in the investment.

5. Conclusions

In this study, obtained from the surveys conducted to farms of Yozgat province, the annual operating results of farms were examined and farms were comparatively analyzed according to strata.

The average farmland size was 130.83 decares. 82.09% of it was owned land and 17.91% of it rental and shared lands. The household was 4.70 persons in small farms, 4.23 persons in medium-sized farms, and 5.53 persons on big farms. That was 4.65 persons per farm. 51.18% of the household was male and 48.82% of it was female. 57.89% of the household in working age is male and 42.11% of it was female.

82.57% of the active capital was the farm capital, and 86.78% of the passive capital was the equity capital. 43.40% of the total operating costs were the fixed cost and 56.60% of them were variable cost. The annual agricultural income per farm was $ 4 493.81. The annual minimum wage income for the same period was $ 5 859.89. Agricultural income was lower than minimum wage income. The reason why agricultural income was lower than minimum wage income was high operating costs. Profitability ratios were lower than the deposit interest ratio. Profitability ratios were 1.24% and 1.60%, and the deposit interest ratio of the related period was 11.69%. The reason was the high ratio of fixed capital in total capital and high operating costs. Thus, it was determined that farming was not an economic sector.

Solving of factors increasing operating costs and usage sufficiently of farmland resources are important in increasing income. Meanwhile, the increase in operating capital investments and usage in full capacity of the farmlands will be of distinct importance in increasing profitability. But, it is clear that this can be solved by the government's motive force and support.

These efforts regarding increasing profitability in the agricultural sector are virtually equivalent to economic development. For this reason, it can be advised to a country wishing

to improve its economy that it should give priority to agriculture. Because, when the history of developed countries is investigated, it is seen that farming has played an important role in their enrichment process. It isn't possible for a country to develop normally without making agricultural production or producing food. When viewed from this aspect, farming should be considered as a bridge between economic development and nutrition of the population.

6. References

ACIL, A. F., DEMIRCI, R. *Agricultural Economics Courses.* Ankara University Faculty of Agriculture, Edition Number: 880, Ankara, 1984.

ALTİNTAS, G., AKCAY, Y. A. Research on the Determination of and Economic Analysis of the Farms in the Plain of Erbaa-Tokat Province. Gaziosman Pasa University, *Journal of Faculty of Agriculture*, v. 24, n. 2, p. 33-42, 2007.

ANONYMOUS. *The Role of Agriculture in the Development of least-Developed Countries and Their Integration into the World Economy*, 2002.

ANONYMOUS. Support Project for Preparation of the Planning and Rural Development Master Plans of the Ministry of Agriculture and Forestry and Province Directorate of Agriculture and Forestry, 2005.

ANONYMOUS. *Yozgat Social Profile Research,* 2016.

ANONYMOUS. *Economic Report-2017,* 2017.

ANONYMOUS. http://www.tuik.gov.tr/Start.do, 2019c.

ANONYMOUS. https://www.dunya.com/finans/haberler/2019-yilinda-en-cok-altin-kazandirdi-haberi-59714, 2019c.

AYDİN, B., ÜNAKİTAN, G. *Comparatively economical analysis of farms in Trakya Region*. Anadolu J Agr Sci, 31, 2016.

BAL, T. *Economic Analysis and Supply Response Estimation of Major Field Crops in Lakes Region.* University of Çukurova Institute of Natural and Applied Sciences Department of Agricultural Economics, Ph.D. Thesis, Adana, 2005.

BULUT, I. The Features of Population Geography of the Yozgat. *Eastern Geographical Review*, Issue 4, p. 20-54, 2003.

DAĞLİOĞLU, D. *Economic Analysis of Enterprises Cultivating Grape in the Center District of Kilis Province.* Ankara University Institute of Science and Technology Master Thesis, Dept. of Agricultural Economics, 2005.

DIAO, X., HAZELL P., TUHURLOW, J. The Role of Agriculture in African Development. *World Development*, v. 38, n. 10, p. 1375-1383, 2010.

DINLER, Z. *Agriculture Economics.* Ekin Edition-Publication Revised 7th Edition, pp 402, 2014.

ERBAS, N. *Role and Importance of Agricultural Sector in Yozgat Economy.* I. International Bozok Symposium, 05-07 May 2016 Symposium Book, 205-215, Yozgat, 2016.

ERKUS, A., DEMIRCI, R. *Agricultural Business Administration and Planning.* Ankara University Faculty of Agriculture Edition Number: 709, Ankara, 1985.

ERKUS, A., BULBUL, M., KIRAL, T., ACIL, A. F., DEMIRCI, R. *Agricultural Economics.* Ankara University Faculty of Agriculture Education, Research and Development Foundation Publication No: 5, Ankara, 1995.

ERKUS, A., DEMIRCI, R. *Agricultural Business Administration and Planning.* Ankara University Faculty of Agriculture Edition Number: 1435, Course Book: 417, Ankara, 1996.

FIRTH, C. *The Use of Gross and Net Margins in the Economic Analysis of Organic Farms.* Proceedings of the UK Organic Research 2002 Conference, Organic Centre Wales, Institute of Rural Studies, University of Wales Aberystwyth, pp. 285-288, 2002.

INAN I. H. *Agricultural Economics and Business Administration.* Trakya University Tekirdağ Faculty of Agriculture, İdeal Kültür Publishing, Tekirdağ, 2016.

KARADAS, K. *Economic analysis of agricultural enterprises that perform organic agriculture and of those that do not perform organic agriculture in the period of adaptation to EU agricultural sector in the city of Erzurum.* East Anatolian Agricultural Research Institute, Erzurum (Turkey) Atatürk University, Graduate School of Natural and Applied Sciences, Erzurum, 2007.

KARAGÖLGE C. *Agricultural Business Administration Analysis and Planning of Agricultural Enterprises.* Atatürk University Faculty of Agriculture Edition Number: 326, Course Book: 74, Erzurum, 1996.

KİZİLASLAN, H., ADİGÜZEL, O. *Economic Analysis of Agricultural Enterprises in Turkey According To Their Level Of Success*. Sci. Agric. (Piracicaba, Braz.), v. 66, n. 2, p. 164-173, March/April, 2009.

KOCAKOSE, B., AKTURK, D. Economic Analysis of Agricultural Enterprises in Çanakkale. *Turkish Journal of Agriculture - Food Science and Technology*, v. 7, n. 11, p. 2001-2011, 2019.

MAIANGWA M. G. *Importance, problems, and reform of agricultural research in Africa*, 2010.

MUT, Z. KOSE Ö. D. The Importance of Cereals and Legumes in Plant Production of Yozgat Province. I. *International Bozok Symposium*, 05-07 May 2016, v. 4, p. 103-109, Yozgat, 2015.

OFFERMANN, F., NIEBERG, H. *Economic Performance of Organic Farms in Europe*, 2000.

NEMES, N. *Comparative Analysis of Organic and Non-Organic Farming Systems: A Critical Assesment of Farm Profitability*, 2009.

OZCELİK, A. *Agricultural Management and Enterprise Planning.* 1st Edition, pp 318, 2019.

PAKSOY, S., KARLI, B. Economic Analysis of Farms in the Harran Plain İrrigated Under the South Eastern Anatolıa Project. *Balikesir University Journal of Institute of Social,* v. 3 n. 4, 2000.

RAO, C. A. R., RAJU, B. M. K., SAMUEL, J., DUPDAL, R., REDDY, P. S., REDDY, D. Y., RAVINDRANATH, E., RAJESHWAR, M., RAO, C. R. Economic Analysis of Farming Systems:Capturing the Systemic Aspects. Ol. 30 (No.1) January-June 2017, p. 37-45, 2017.

WAJSZCZUK, K. *The Economic Analysis of Agricultural Enterprises in Sustainable Development Aspect.* Paper prepared for presentation at the 13th International Farm Management Congress, 2002.

YAMANE T. *Elementary Sampling Theory Prentice.* Hall Inc., Englewood Cliffs, N.J., 1967.

ZAKARIA, M., JUN, W., KHAN, M. F. Impact of financial development on agricultural productivity in South Asia. Agricultural Economics – Czech, v. 65, n. 5, p. 232–239, 2019.

7. Acknowledgements

I would like to thank Yozgat Bozok University Scientific Research Projects Coordination Unit for supporting project numbered 6602a-SBMYO-18-167.