ECONOMIC AND FINANCIAL ANALYSIS OF PEANUT PRODUCTION IN BULGARIA
ФИНАНСОВО ИКОНОМИЧЕСКИ АНАЛИЗ НА ПРОИЗВОДСТВОТО НА ФЪСТЪЦИ В БЪЛГАРИЯ

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Manuscript received: February 11, 2008; Reviewed: May 26, 2008; Accepted for publication: June 02, 2008

ABSTRACT

Peanut is not listed as one of the major crops in the Bulgarian agricultural sector, but its economic and financial viability is promising, but unknown. We use enterprise budgets, capital budgeting techniques, risk analysis and logistic regression models to examine the financial and economic structure of peanut farms and to evaluate the factors influencing short and long-term profitability. The results show that peanut production is a profitable venture for most peanut farmers in Bulgaria. Long-run analyses show that peanut production may be economically feasible and producers engaged in production for a period of seven years, and at a discount rate of 13%, may generate internal rates of return (IRR) that vary from -20.57% to 67.39%. About 70% of the farms studied had IRRs greater than the discount rate. Sensitivity analyses show that profitability of peanut production was influenced by yield and variable costs. There were risks at the village level associated with peanut production.

Key words: Economic, Financial, Peanut, Production, Bulgaria

РЕЗЮМЕ

Въпреки, че фъстъците не са основна култура за България, те имат значителен икономически и финансов потенциал, който не е достатъчно проучен. За изследване на икономическото и финансово състояние на стопанствата произвеждащи фъстъци, както и за оценка на факторите, които влияят върху ефективността в кратко срочен и дългосрочен аспект бяха използвани техниките на производствените и капиталови бюджети, анализ на риска и логистични регресионни модели. Получените резултати показаха, че за повечето стопанства отглеждащи фъстъци в България производството е рентабилно. Анализите в дългосрочен план показват, че производството на фъстъци за период от седем години може да бъде икономическо оправдано при дисконтов фактор от 13%, като вътрешната норма на възвращаемост (IRR) варира от 20.57% до 67.39%. За около 70% от изследваните стопанства IRR превишава дискантовия фактор. Резултатите от анализа на чувствителността показват, че ефективността на производството на фъстъци се влияе от средните добиви и променливите разходи. На равнище селище съществуват някои рискове на производство на фъстъци.

INTRODUCTION

The agricultural sector is the backbone of the Bulgarian economy. Like most of the Central Eastern European (CEE) countries, agriculture is a major contributor to the economy (17.3% of GDP in 1999), and employed 26.2% of the labor force in 1999 [10]. In Bulgaria, subsistence agriculture is widely practiced where most of the farms are small and vary in size from 0.9 hectare (ha) to about 11.5 ha [9]. According to Bachev and Tsuji [1], about 50% of the farms resemble garden plots instead of commercial farms. Most crops are consumed at the farm level with only a small portion of production traded at domestic and export markets [9]. While all other crops have experienced a decline in agricultural production from 1989 to 2002 [8], peanut production has experienced growth in output. Peanut seems to be a crop with a potential for farm income enhancement and an increase in foreign exchange earnings for Bulgaria.

Bulgaria is an ideal place for growing high-quality peanuts in Europe [5]. The country is situated on the northern boundary of the ecological zone, with temperatures and a growing season permissible for the growth and development of peanuts. These factors have established Bulgaria as a main peanut producer in Europe. Prior to 1989, the country cultivated 65% of Europe's peanut acreage. Bulgaria now is the leading producer of peanuts in Europe [2] and is responsible for 95% of the peanuts grown there. Most of the nuts are edible and generate value-added income to farmers. In spite of the rapid expansion experienced in the area planted, there are only a few studies conducted on the economic and financial viability of producing peanuts on limited resource farms.

In a study conducted by Bencheva and Georgiev [3], they examined the economic aspects of the peanut sector development in Bulgaria during the transition period. During the transition period, Bulgaria's peanut acreage escalated to 80%, and the country was responsible for most of the peanuts produced in Europe [4]. The expansion of peanut acreage was due mainly to the extensive introduction, diffusion, and adoption of new and high-yielding varieties [6]. The introduction and adoption of these peanut varieties in Europe enhanced the profit margins of peanuts relative to other competing crops, and made peanut production more attractive as an alternative farm enterprise [3].

During the years of transition, peanut production was primarily concentrated on private farms. In the period 1992-1995, private farmers were in charge of 83.8% of the land used for peanut production, and produced 81.6% of the total output. There has been a marked positive trend toward private farm concentration in the peanut market in Bulgaria; however, production increases have mainly been attained through acreage expansion from 1992 to 1995. During that period, private farm involvement in area planted increased by 3.2 fold. In spite of the observed increasing trend in area planted, yields for the whole country declined [7].

With tremendous market opportunities for peanut as an alternative crop and with an unrealized market potential, little is known about its financial profitability and the levels of risk associated with production. In this paper, we conduct a financial and economic analysis of peanut production in Bulgaria. The factors influencing yield and net returns were evaluated. We also conduct sensitivity analyses to determine how peanut profitability is affected by changes in selected farm parameters.

MATERIALS AND METHODS

The data on peanut production were collected from 205 farmers in 18 villages during the period 2000 to 2001 in Bulgaria. Demographic, socioeconomic, production, and marketing data were collected. The data were analyzed using SAS and the EXCEL add-in program StatPro. Descriptive statistics were obtained, and the factors affecting the production of peanuts in Bulgaria were analyzed. Enterprise budgets were developed for farmers and villages. These enterprise budgets were used to evaluate break-even costs and quantities. Net returns above all costs were calculated, and returns to the most limiting factor—land—were determined. Capital budgeting techniques were used to calculate net present values (NPV), internal rates of return (IRR), and profitability index (PI) for investing in peanut production for a period of seven years at a discount rate of 13%.

Logistic models were developed to investigate the factors influencing the yields and net returns of individual peanut farms in the short run. The dependent variable (Y) in this case is a dichotomous variable with a value of 1 for negative yield or net returns and 2 for positive. The model is represented as follows:

$$(1) \quad P(Y_i=1) = F(_iX_i)$$

where P is the probability of obtaining positive or negative net returns, or yields equal or greater or less than average, F is a cumulative density function, X_i represent a vector of the explanatory variables, and $_i$ ($i = 0,\ldots.n$) are parameter coefficients.

For the logistic dichotomous model the dependent variable is created with a value of 1 for returns ($Y > 0$) and zero for negative returns ($Y = 0$) per farm per year. The model link is represented as follows:

Table 1: Demographic and farm characteristics of peanut producers in Bulgaria, 2001 to 2002
Таблица 1 Характеристика на производителите на фъстъци в България 2001/2002

Characteristics	Frequencies (Numbers) Total N=211	Percent (%)
Age		
Less than 30 years	4	1.9
Between 30 and 40 years	53	25.1
Between 45 and 60 years	91	43.1
Over 60 years	56	26.5
Total	204	96.7
Education		
Elementary education	86	40.8
Secondary education	105	49.8
Secondary agricultural education	3	1.4
Post-secondary education	8	3.9
Total	202	95.7
Peanut Areas		
0.1 to 0.5 hectare	108	51.2
0.51 to 1.1 hectares	47	22.3
1.11 to 1.60 hectares	21	10.0
1.61 to 2.1 hectares	18	8.5
Greater than 2.1 hectares	10	4.7
Total	204	96.7
Seeds		
25 to 80 kg/ha	36	17.1
81 to 130 kg/ha	47	22.3
131 to 181 kg/ha	34	16.1
182 to 230 kg/ha	7	3.3
Greater than 230	80	37.9
Total	204	96.7
Yield		
1,350 to 1,800 kg/ha	13	6.2
1,801 to 2,300 kg/ha	94	44.5
2,301 to 2,800 kg/ha	80	37.9
2,801 to 3,300 kg/ha	14	6.6
Greater than 3,300	3	1.4
Total	204	96.7

9 missing observations

$$(2)\quad \log\frac{P(Y_i>0)}{1-P(Y_i>0)} = x_i^t\beta$$

Risk analyses were conducted using the special statistical software @ RISK from Palisade. Sensitivity analyses were conducted by varying parameters we noted that may influence the profitability of peanut production. A simulation technique was used to simulate the probability of farmers in a village obtaining a P.I. greater or less than one was evaluated.

RESULTS AND DISCUSSION

Production System

Most of the farmers studied operated farms on lands they owned. However, the use of rented land for peanut production is fairly common. Peanuts are produced on farms that are relatively small, and averaged about 0.81 ha in size. The farms of less than 0.6 ha of peanut acreage are most numerous (table 1). These farms are self-sufficient and produce mainly for home consumption with any excess being traded on local markets.

For the period 2000-2002, the average peanut yield was 1,956 kg/ha. The highest yields are noted in the villages of Izbegli (2784 kg/ha), Kozanovo (2,636 kg/ha), Zlatovrah (2,599 kg/ha), and P. Evtimovo (2,491 kg/ha). The lowest yields were obtained in the villages of D. Voden, D.Izvor, and Mominsko (table 2). The highest peanut yields obtained are from farms with an average size of 1.5 to 2 ha. Farmers experience low yields due in part to their

Table 2 Number of farms, peanut area planked, yields &net returns in Bulgaria
Таблица 2 Стопанства, площи, средни добиви и чист доход от фъстъци в България

Village		Peanut Area (ha)	Peanut Area (%)	Average yield per ha.	Average size of Peanut farm	Peanut Price ($/kg)	Nets Return ($/ha)
Asenovgrad	(21)*	108.9	8.7	1949.2	1.1	0.79	172.17
P. Evtimovo	(12)	24.6	2.0	1986.6	0.41	0.73	-53.66
Kozanovo	(11)	90.8	7.3	2351.8	1.7	0.88	469.61
Muldava	(10)	19.8	1.6	1898.6	0.41	0.81	94.96
D. Voden	(10)	248.3	19.9	1357.4	5.1	0.88	-10.10
Zlatovrah	(10)	23.1	1.8	2301.2	0.5	0.73	168.34
Konush	(11)	139.7	11.2	2288.0	2.6	0.73	262.94
Izbegli	(15)	70.4	5.6	2175.8	0.1	0.83	269.57
Karadzhovo	(11)	91.3	7.3	2538.8	1.7	0.89	418.75
Hr. Milevo	(10)	19.3	1.5	2037.2	0.41	0.75	231.62
Katunitsa	(2)	17.6	1.4	2200.0	1.8	0.86	3519.10
Kochevo	(10)	42.9	3.4	2301.2	0.91	0.66	-28.42
Popovitsa	(10)	42.9	3.4	2362.8	0.91	0.70	161.44
Mominsko	(14)	71.0	5.7	1784.2	1.0	0.84	361.37
Boljrtsi	(10)	80.8	6.5	2565.2	1.7	0.70	-110.15
D. Izvor	(14)	96.2	7.7	1735.8	1.4	0.80	185.15
Debar	(10)	27.5	2.2	2048.2	.06	0.72	-51.28
Gradina	(14)	34.1	2.7	2061.4	.05	0.89	316.42
Bulgaria	(205)			2010.8		0.71	135.34
Total	(205)	1249.3	100				

* The numbers in the column represent the number of farms surveyed

Table3:Economic results of peanut production in different villagies inBulgaria
Таблица 3 Икономически резултати от производстото на фъстъци по селища в България

Region	Gross Receipts ($/ha)	Total Costs ($/ha)	Net Return ($/ha)	Break Even Total Cost ($/kg)	Peanut Price ($/kg)	NPV ($/ha)	IRR (%)	Profitability Index (PI)
Bulgaria	1,119.36	947.19	172.17	0.67	0.79	563.05	34.39%	1.68
Asenovgrad	995.94	1,049.60	-53.66	0.77	0.73	-338.56	-4.22%	0.59
Boljrtsi	1,568.51	1,098.90	469.61	0.61	0.88	1,750.96	73.87%	3.12
D.Izvor	982.67	887.71	94.96	0.72	0.81	294.89	24.47%	1.36
D.Voden	840.11	850.21	-10.10	0.89	0.88	-164.63	4.97%	0.80
Debar	1,053.07	884.73	168.34	0.62	0.73	547.80	33.84%	1.66
Gradina	1,198.56	935.62	262.94	0.65	0.73	925.87	46.98%	2.12
Hr.Milevo	1,175.46	905.87	269.57	0.64	0.83	952.27	47.87%	2.15
Izbegli	1,356.15	937.40	418.75	0.62	0.89	1,547.84	67.39%	2.88
Karadzhov	1,330.56	1,098.94	231.62	0.62	0.75	800.56	42.71%	1.97
Katunitsa	1,330.76	979.66	3519.10	0.64	0.86	1,277.72	58.65%	2.55
Kochevo	1,065.99	1,094.41	-28.42	0.68	0.66	-237.69	1.30%	0.71
Konush	1,122.86	961.42	161.44	0.60	0.70	519.53	32.82%	1.63
Kozanovo	1,376.58	1,015.21	361.37	0.62	0.84	1,318.61	59.99%	2.60
Mominsko	876.70	986.85	-110.15	0.79	0.70	-564.15	-2.57%	0.32
Muldava	1,058.11	872.96	185.15	0.66	0.80	614.90	36.24%	1.75
P.Evtimovo	1,001.86	1,053.14	-51.28	0.76	0.72	-329.09	-3.67%	0.60
Popovitsa	1,462.47	1,146.05	316.42	0.69	0.89	1,139.12	54.10%	2.35
Zlatovrah	1,144.66	1,009.32	135.34	0.63	0.71	416.13	29.04%	1.5

failure to follow recommended production practices.

The age distribution of farmers is skewed towards that beyond retirement. A large percent of farmers (26.5%) are older than 60 years. Only about 27% of farmers are less than 40 years. The education level is low, with 40.8% of head-of-farm households attaining a primary education. Only about 4.0% of farmers received a technical or post-secondary education.

Almost 60% of the soils under peanuts are sandy or sandy-loam, which are ideal for peanut production. Cropping patterns and crop rotation practices also influence crop yields. About 15% of peanuts grown are rotated and follow a particular rotation sequence. Peanuts are grown in rotation with wheat and barley.

Irrigation and fertilization are intensive factors that exerted decisive influence on the average yields of peanuts. According to the survey data, more than 90% of the peanut producers apply nitrogen fertilizers, 17% apply phosphates, and only 5% apply potassium fertilizers. A large percentage of farmers use less than the recommended dose of nitrogen fertilizer (recommended dosage is 400 kg/ha). In terms of seeding rate, only about 22.3% of farmers apply between 80 and 130 kg of seeds per ha (120 kg is the recommended seeding rate).

Short-term profitability

The gross receipts, total costs, net return, break even costs for one ha of peanuts, and the price per kg of peanuts were also different for the various villages (table 3). The gross receipts for an average peanut farm in Bulgaria was $1119 dollars per ha while the total cost was $947. This resulted in a net return of $172. Farmers from the villages Asenovgrad, D.Voden, Kochevo, Mominsko, and P.Evtimo, on the average, experienced negative net returns that ranged from -$10 to -$110. The villages Boljrtsi, Izbegli, and Kozanovo experienced the highest net returns, $468, $469, and $361 respectively. Total production costs ranged from$840 per ha in D.Voden to $1462 in Popovitsa. The break-even cost per ha of peanut in these three villages was, on average, $0.61, while the average price for one kg of peanut in these villages was $0.87.

There seemed to be no correlation between break-even price and total costs. There is a negative correlation (-0.15) between peanut area and net returns (Figure 1). This indicates that larger-sized farms might not be as profitable as the smaller-sized farms. Yield and net returns were positively correlated (r=0.59; Figure 2). Higher yield resulted in higher net returns. There was no directional relationship between the total costs and net returns (Figure 3).

The logistic regression model for yield had a Cox and Snell R^2 of 0.15 and a Nagelkerke R^2 of 0.21.The overall correct prediction was 65% with a prediction of less than average yield of 66% and a correct prediction of average, or above average yield of 66%. The model results show that, seed application, phosphorous level, and manual labor influence yield (table 4).

The factors affecting net returns were nitrogen, seeds, and education. The Cox and Snell R^2 is 0.48 and the Nagelkerke R^2 is 0.64 (table 5). The model had an 88 percent correct prediction of negative net returns and an 81.5 percent predicted positive net returns, giving an overall correct prediction of 85%. There is a 0.34 chance that an increase in nitrogen will result in negative net returns from peanuts while an increase in seeds has an odds of 0.4 of generating negative net returns. The effect of education on net returns is marginal since having an education above primary has 0.4 odds of generating negative net returns.

Long-term profitability

The net present value (NPV) and internal rate of returns (IRR) for seven years and at a 13% discount rate are presented in table 3. The NPV for a farm in Bulgaria producing only peanuts was $563 with an IRR of 34%. The villages Asenovgrad, D.Voden, Kochevo, Mominsko, and P.Evtimovo were also the villages with negative NPVs, which ranged from -$164 to -$564, while the IRR in these villages ranged from -21% to 5%, which are far below the average interest rate of 13% in Bulgaria. The villages Boljrtsi, Izbegli, and Kozanovo were also the villages with the three highest NPVs. The NPV for Boljrtsi was $1751, $1548 for Izbegli, and $1315 for Kozanovo. The IRRs for these three villages were 74%, 67%, and 60% for Boljrtsi, Izbegli, and Kozanovo, respectively.

The profitability index (PI) was calculated for peanut farms in the 18 villages; 13 of these villages had PI indices greater than one (Table 3), indicating that for every dollar invested in peanut production, the return for that investment would be greater than one. The profitability index for Bulgaria was on average 1.68, indicating that a $1 investment in a peanut farm would result in returns of $1.68. The five villages with profitability indices less than one were P.Evtimovo, Mominsko, Kochevo, D.Voden, and Asenovgrad.

Sensitivity analysis

Sensitivity analyses were also conducted using the observed parameters for yield and variable costs (table 6), which appeared to affect the profitability of peanuts.

For the average peanut farm in Bulgaria, a 10% reduction in the peanut yield resulted in a 65% reduction in the net returns, a 79% reduction in the NPV, and 32% reduction

Table 4: Odds for having a yield greater or less than the average
Таблица 4 Оценка на вероятните средни добиви

	Variable	Parameter Estimates	Wald Test	Df	Sig	Exp(B)	Measure of Fit
Step 1a	Age	-0.119	0.238	1	0.626	0.888	
	Ed1	-0.269	0.529	1	0.467	0.764	
	Nitrogen	-0.571	3.196	1	0.074	0.565	
	Seeds	0.076	0.06	1	0.806	1.079	
	Phosp	1.39	16.247	1	0	4.013	
	Manlab	0.961	10.002	1	0.002	2.613	
	Constant	-2.426	11.235	1	0.001	0.088	
	-2 Log Likelihood						244.571a
	Cox & Snell R Square						0.158
	Nagelkerke R Square						0.211

Table 5: The odds of making positive net returns per ha.
Таблица 5 Вероятност за получаване на чист доход на ха

	Variable	Parameter Estimates	Wald Test	Df	pr > |t|	Exp(B)	Measure of Fit
Step 1[a]	Age	0.456	1.671	1	0.196	1.577	
	Ed1	-0.993	3.512	1	0.061	0.370	
	Nitrogen	-1.041	6.378	1	0.012	0.353	
	Seeds	-0.947	5.245	1	0.022	0.388	
	Phosp	0.36	0.609	1	0.435	1.433	
	Manlab	-0.509	1.565	1	0.211	0.601	
	Mechl	-0.685	2.55	1	.110	0.504	
	Constant	6.033	25.337	1	.000	416.774	
	-2 Log Likelihood						1446.691[a]
	Cox & Snell R Square						0.481
	Nagelkerke Square						0.642

in the profitability index. Reducing the variable costs by 10% resulted in a 46% increase in net returns, a 56% increase in the NPV, and a 23% increase in the profitability index. Examining D.Voden, a village with a low profitability index, a 10% reduction in yield resulted in a 94% reduction in the net returns, a 133% reduction in the NPV, and a 35% reduction in the profitability index. Sensitivity analyses for Izbegli, one of the villages with a high profitability index, showed that a reduction of 10% in the yield resulted in a 32% reduction in the net returns, a 35% reduction in the NPV, and a 23% reduction in the profitability index. A 10% reduction in variable cost resulted in a 19% increase in the net returns, a 20% increase in the NPV, and a 13% increase in the profitability index.

Simulations were also conducted to evaluate changes in various production and economic parameters affecting the net returns and profitability index for the different villages. The different production and economic parameters were simulated 1,000 times using the normal and triangle distribution. The results of these simulations of villages are summarized in table 7. These two tables show the mean, the standard deviation, the mode, and the percentile for values being greater than zero (positive) for net returns, and greater than one for the profitability index. The simulations for the profitability index show that 12 villages had a percentile that ranged from 55% to 100% probability distribution for profitability indices being greater than one. This implies that there is at least a 50% probability that peanut farms in these 12 villages may have profitability indices greater than one. The simulations for the net returns show that 13 villages had a percentile that ranged from 55% to 99% for positive net returns. This indicates that there is at least a 50% probability that peanut farms in these 13 villages will have positive net present values.

Table 6. Sensitivity analyses for changes in yield and variable costs
Таблица 6 Анализ на чувствителността на средните добиви и променливите разходи

Bulgaria							
yield	Net Return	NPV	P.I.	var. costs	Net Return	NPV	P.I.
-10%	27.698	53.394	2.508	-10%	115.742	404.976	4.554
-20%	-23.804	-152.196	1.32	-20%	152.284	550.968	5.39
0%	79.178	259.006	3.696	0%	79.178	259.006	3.696
10%	130.658	464.596	4.884	10%	42.614	113.014	2.86
20%	182.16	670.208	6.094	20%	6.05	32.978	2.002
D.Voden							
yield	Net Return	NPV	P.I.	var. costs	Net Return	NPV	P.I.
-10%	3.08	-44.858	1.936	-10%	81.642	268.884	3.762
-20%	-42.13	-225.28	0.902	-20%	115.016	402.094	4.532
0%	48.29	135.652	2.992	0%	48.29	135.652	2.992
10%	93.478	316.162	4.026	10%	14.916	2.42	2.222
20%	138.688	496.65	5.082	20%	-18.436	-130.812	1.452
Izbegli							
yield	Net Return	NPV	P.I.	var. costs	Net Return	NPV	P.I.
-10%	130.24	462.902	4.884	-10%	228.734	856.196	7.172
-20%	67.848	213.796	3.432	-20%	264.836	1000.384	8.008
0%	192.632	712.008	6.336	0%	192.632	712.008	6.336
10%	255.002	961.114	7.766	10%	156.508	567.82	5.5
20%	317.394	1210.22	9.218	20%	120.406	423.632	4.664

Table 7. Simulation results for the net returns and profitability index for different villages in Bulgaria
Net Returns ($/acre)
Таблица 7 Симулиране на резултати за чистия доход и индекса на рентабилност по селища в България

Village	Mean Net returns ($/acre)	S.D. ($/acre) Net returns	Mode ($/acre) Net returns	Percentage of simulations with net returns greater than zero P.I.	Mean ($/acre) P.I.	S.D. ($/acre) P.I	Mode ($/acre) P.I.	Percentage of simulations with profitability index greater than one
Bulgaria	19.20	120.89	-13.04	53%	1.05	1.29	0.71	49%
Asenovgrad	-32.70	51.70	-22.96	26%	0.50	0.55	0.60	19%
Boljrtsi	15.65	117.27	8.27	60%	1.02	1.25	0.94	55%
D. Izvor	-46.15	53.92	-26.31	19%	0.36	0.57	0.57	12%
Debar	100.61	37.42	99.67	99%	1.92	0.40	1.91	99%
D. Voden	12.46	67.30	23.82	57%	0.98	0.72	1.10	48%
Gradina	99.54	51.94	107.19	97%	1.91	0.55	1.99	95%
HrMilevo	117.76	67.62	125.61	96%	2.10	0.72	2.19	94%
Izbegli	76.62	84.34	120.99	81%	1.67	0.90	2.14	77%
Karadzhov	73.48	124.99	35.42	72%	1.63	1.33	1.23	68%
Katunitsa	177.42	10.82	173.84	100%	2.74	0.12	2.70	100%
Kochevo	2.48	87.30	5.51	50%	0.88	0.93	0.91	43%
Konush	56.67	63.75	61.08	82%	2.50	1.27	2.46	75%
Kozanova	155.33	118.79	151.22	91%	0.72	0.44	0.90	89%
Mominsko	-12.29	41.64	4.47	37%	0.72	0.44	0.90	26%
Muldava	56.37	32.04	57.26	96%	1.45	0.34	1.46	90%
Pevtimovo	-33.22	45.86	-16.16	23%	0.50	0.49	0.68	15%
Popovitsa	124.34	141.92	75.77	82%	2.17	1.51	1.66	79%
Zlatovrah	44.93	56.85	72.14	79%	1.33	0.61	1.62	70%

*SD= Standard deviation

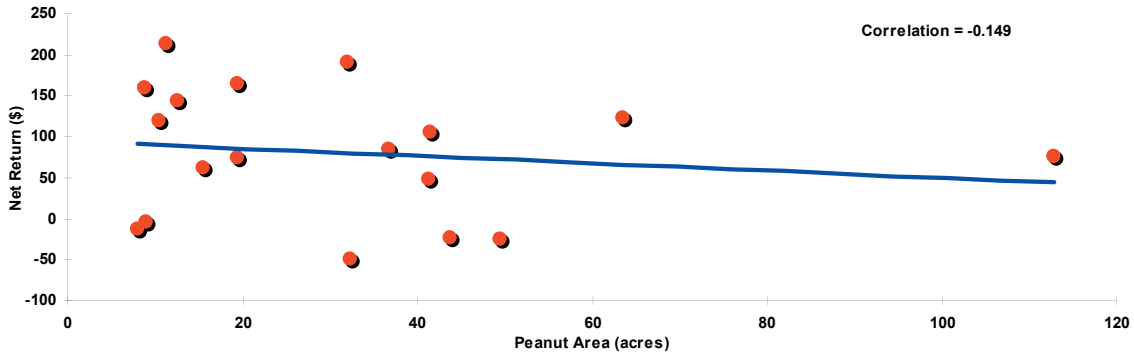

Figure 1. Relationship between net returns and peanut area
Фиг. 1 Връзка между чистия доход и площта на фъстъците

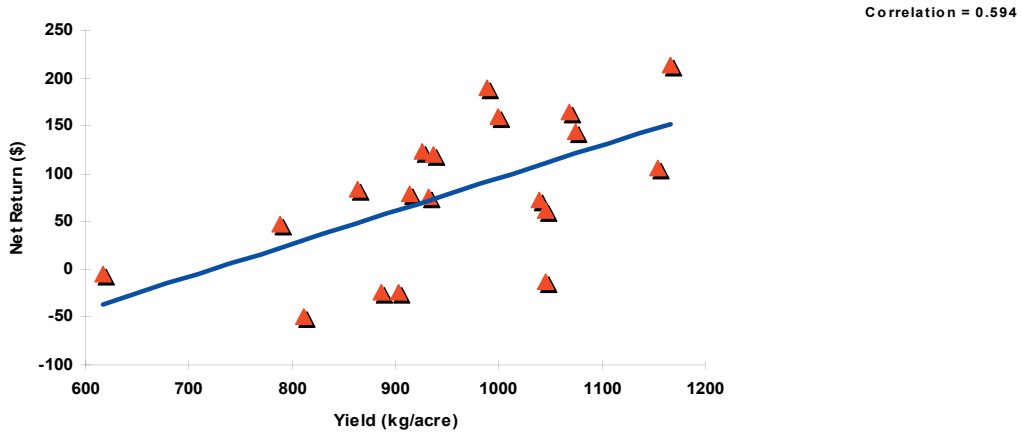

Figure 2. Relationship between yield and net returns
Fig. 2 Връзка между добив и чисти приходи

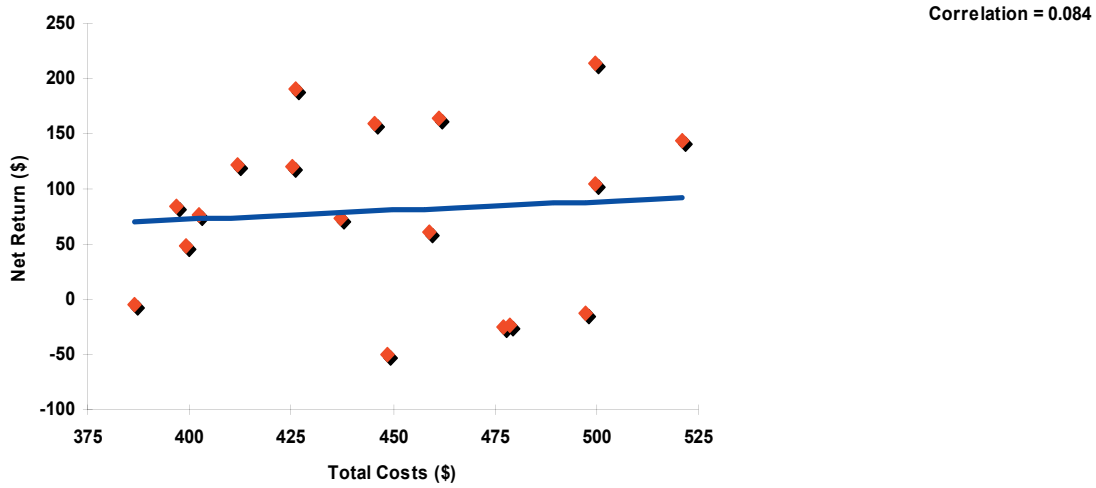

Figure 3. Relationships between total costs and net returns
Фиг. 3 Връзка между общи разходи и чисти приходи

CONCLUSION

Peanut production is a profitable venture for most peanut farmers in Bulgaria. The net returns above all costs are positive in 70% of all villages. Production costs are influenced by the amount of capital and inorganic inputs used on the farms. The net returns are negatively correlated to the acreage planted, but positively correlated to yield. It can be concluded that increasing the area planted may not be absolutely necessary for efficiency enhancement and profit improvement, given the levels of technology and inputs. Hence, the most lucrative option available to peanut farmers is to increase profits by increasing yields per hectare. This means that inputs, such as seed, phosphorus application and increased manual labor should be important considerations in an endeavor to obtain higher yields. However, only manual labor and the application of phosphorus will have a positive effect on yields. The factors that influence yields may not necessarily positively affect net returns. Farmers in most villages seem to be applying more than the optimal levels of seeds and nitrogen since an increase in both inputs have an odds ratio that will reduce net returns.

There is no directional relationship between net returns per ha of peanuts and the total costs. The production of peanuts by farmers in many villages can be increased through the improvement of allocative efficiency in order to obtain an appropriate mix of inputs. The blanket reduction of costs or increase in yield may not necessarily be the solution for increasing net returns but each farm would have to examine its situation separately to determine when and where costs should be decrease and whether yield should be increased or decreased to maximize net returns. Simplistic mechanisms to maximize net returns as cost reduction may be less than appropriate to means to solve the problem. Cost increases in irrigation, for an example, may increase production efficiency and yield and increase net returns.

Long- run analyses show that peanut production may be feasible. More than 50% of the farms have positive net returns and a profitability index greater than one. Farms with high total costs or gross revenues did not necessarily generate high net present values. The IRR for growing peanuts for a period of seven years and with a discount rate of 13% show that the internal rates of return varied from -20.57% to 67.39%, with 70% of the farms having an IRR greater than the discount rate.

Sensitivity analyses show that profits from peanut production were influenced by yield and variable costs. When yield decreased by 20% for the villages showing the highest profitability the net returns became negative. Net returns were less sensitive to changes in variable costs than yield. For farms with average profitability when variable costs increased by 20% the net returns were negative.

There were risks associated with peanut production, but most farmers had a greater than 50% chance of having positive net returns or profitability index greater than one. The chances of having a profitability index greater than one was not associated to costs or size of farm.

The results show that peanut production is a profitable and feasible venture for Bulgarian agricultural production. Even with small areas planted peanut production generates significant levels of revenues to Bulgarian farmers. Hence, peanut is a likely crop that may find a market niche in Bulgaria and contribute to export earnings.

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