Short Communication

Economic analysis of major crop production systems in Iran: A case study from Kermanshah province

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The purpose of this study was to explain analysis of major crop production systems in Kermanshah province of Iran. Data were collected from 180 farms in Kermanshah province using a face to face questionnaire performed in 2011. Farms were selected based on random sampling method. Economic analysis was carried out by taking various cost components into consideration, including production costs and the total production value for wheat, maize and alfalfa production systems in a year production life. The result show that total production cost for wheat, maize and alfalfa production systems were about 845.95, 893.86 and 994.70 $ha^{-1}. The highest share of total cost in wheat and alfalfa production systems were diesel and machinery costs and in maize production systems chemical input cost was highest shear. Also, net return for wheat, maize and alfalfa production systems were about 1534.05, 1676.54 and 4138.51 $ha^{-1}. Accordingly, in Kermanshah province the high benefit/cost ratio and productivity was in alfalfa production systems.

Key words: Economic analysis, production costs, net return, benefit/cost ratio, productivity.

INTRODUCTION

A goal in sustainable agriculture is more productivity per production costs in crop production systems. The major crops of Kermanshah province under irrigated agroecosystems are wheat, maize and alfalfa production systems. The successful production of these crops is related to profitability of cultivation. On the other hand incomes are guaranteed and stabilization systems sustainability (Mahdavi et al., 2006). The economic analysis is the only tools, which compel the farmers to decide what to grow and what not to grow (khan et al., 2009). Therefore economical analysis of agroecosystems is necessary for good management.

Some researchers have been carrying out on economical analysis for crops production. Ghasemi et al. (2010) make an economical analysis for alfalfa production in Hamadan province of Iran. They indicate that total production cost was 14174.00 $ha^{-1} and total production return was 17936.00 $ha^{-1}. In this study the highest shear of total cost production was water for irrigation costs. Khan et al (2009) calculated input and output cost for rice production in Pakistan. Cost analysis

showed that the highest shear of rice cultivation costs was recorded for human labor (56%). In the other study Esengun et al. (2007) surveyed analysis in two types of dry apricot production in Turkey and reported that the benefit to cost ratios of the farms were 1.11 and 1.19. The aim of this study was economical analysis of major crop production systems in Kermanshah province of Iran. In this study important economical indicators as well, total costs production, gross return, net return, benefit to cost ratio and productivity were calculated to purpose successful management.

MATERIALS AND METHODS

This study was carried in summer 2011 in Kermanshah province (33° 4' and 35° 17' N and 45°25' and 48° 6' E), western of Iran. For this study data were collected from 180 wheat, maize and alfalfa agroecosystems by using a face to face questionnaire. Other information was collected from the Ministry of Agriculture (Anonymous, 2010).

The costs of inputs used in the production of wheat, maize and

Table 1. Economic analysis of wheat, maize and alfalfa production systems in Kermanshah province.

Cost and revenues	Quantity per unit area in wheat	Quantity per unit area in maize	Quantity per unit area in alfalfa
Yield (kgha^{-1})	7000	9180	13510
Sale price ($kg^{-1})	0.34	0.28	0.38
A. Costs ($ha^{-1})			
Diesel and machinery	252.52 (30)[a]	264.15 (30)	377.36(38)
Chemical input	216.95 (26)	283.02 (32)	141.51(15)
Human labor	105.66 (12)	113.21(12)	212.27(22)
Water and electricity	94.34 (11)	148.58(17)	160.38(16)
Seed	101.01 (12)	14.15 (1)	56.60(7)
Transporting	75.47 (9)	70.75 (8)	47.17(2)
Total cost of production	845.95(100)	893.86(100)	994.70(100)
B. Revenues ($ha^{-1})			
Gross return	2380	2570.40	5133.8
Net return	1534.05	1676.54	4138.51
Benefit/cost ratio	1.81	1.88	4.16
Productivity (kg$$^{-1}$)	8.27	10.27	13.57

[a]Numbers in parentheses indicate percentage of total cost production.

alfalfa were specified in order to calculate the production costs in the study. The costs of inputs in wheat, maize and alfalfa production were: diesel and machinery costs, chemical input costs, human labor costs, water and electricity costs, seeds costs, and transporting costs. The outputs were wheat, maize and alfalfa yield value. The input and output were calculated per hectare and then, these input and output data were multiplied by their costs. Net return, benefit/cost ratio and productivity were calculated as shown in Equation 1, 2 and 3 (Ozkan et al., 2004; Canakci et al., 2005):

Net return = Total Costs – Total Revenues   (1)

Benefits to Costs ratio = (Total Revenues) / (Total Costs)   (2)

Productivity = (Yield) / (Total Costs)   (3)

Where TC is the total production costs ($ ha^{-1}), TR, the Total production Revenues ($ ha^{-1}) and Y, the total wheat, maize and alfalfa yield (kg ha^{-1}). Basic information on the costs of inputs and output were entered into Excel's spreadsheet software.

RESULTS AND DISCUSSION

The costs of each input used and gross production values calculated in wheat, maize and alfalfa production systems are shown in the Table 1. The total cost product-ion of wheat, maize and alfalfa production systems were calculated at 845.95, 893.86 and 994.70 $ ha^{-1}, respectively. The diesel fuel and machinery cost was the highest shear of total cost in wheat and alfalfa production systems (30%) but in maize production systems chemical

input costs was highest shear (38%) of the total costs.

The price values per kilogram of wheat, maize and alfalfa production systems were found to be 0.34, 0.28, 0.38 $, respectively. Also the economical yield for wheat, maize and alfalfa production systems was 7000, 9180 and 13510 kgha^{-1} respectively. Accordingly, the gross return in wheat, maize and alfalfa production systems were 2380, 2570.40 and 5133.8 $ha^{-1} respectively. The comparison of the economic results revealed that the net return values of alfalfa production (4138.51 $ha^{-1}) in agroecosystems were higher than some other crops like maize and wheat. Net return values of citrus and apricot production were determined as 1788 to 3398 $ ha^{-1} and 415 to 496 $ ha-1, respectively (Ozkan et al., 2004; Esengun et al., 2007).

The benefit to cost ratio for the wheat, maize and alfalfa production systems were found at 1.81, 1.88 and 4.16, respectively. This amount have been reported for different crops such as 2.58 for cucumber (Mohammadi and Omid, 2010), 1.10 for soybean, 2.03 for wheat, 1.98 for mustard and 2.30 for chickpea (Mandal et al., 2002), 1.36 for garlic (Samavatean et al., 2010). Also in this study productivity index in wheat, maize and alfalfa production systems were 8.27, 10.27 and 13.57 kg$$^{-1}$. This amount have been reported 4.05 kgha^{-1} for kiwifruit production in Iran(Mohammadi et al., 2010), As seen in Table 1, the most investment intensive cultivation were done in alfalfa production systems, also the values of gross return, net return, benefit to cost ratio and

productivity were higher in alfalfa production systems compared to the other crops production systems. Finally, the economic indicators showed that the most efficient production system was for alfalfa cultivation in Kermanshah province.

Conclusion

In this study the economical analysis (costs return and, economical index) of wheat, maize and alfalfa production systems in Kermanshah province of Iran have been investigated. The following conclusions were drawn;

1. Total costs production in wheat, maize and alfalfa agroecosystems were 845.95, 893.86 and 994.70 $ha^{-1} respectively.
 2. The highest share of total costs production in these agroecosystems were reported for diesel and machinery cost in wheat and alfalfa production systems, and chemical input cost in maize production systems (30, 38, and 32%) respectively.
3. The net return in wheat, maize and alfalfa agroecosystems were 1534.05, 1676.54 and 4138.51 $ha^{-1} respectively.
4. Benefit to cost ratio and productivity index in alfalfa production systems were more than other production systems. Finally, minimizing costs production is necessary because in addition to increasing economic benefit as well as increased sustainability of these agroecosystems.

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