



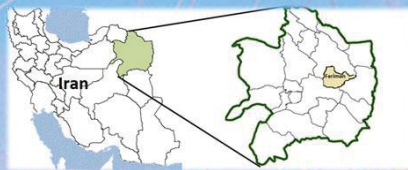
# Comparison of ecosystem services value of conventional and organic farms in Fariman city, Iran

\*Naghmeh Mobarghaee Dinan, Mansoure Mahlouji rad, Hooman Liaghati, Reihaneh Rasoolzadeh

\* Contact Information: N\_mobarghaee@sbu.ac.ir

## INTRODUCTION

Valuation of ecosystem services is one of the most effective ways to focus on these services and to help planners adopt appropriate approaches to sustain these services. Although organic farming concentrates on maintaining and protecting the ecological balances of agro-ecosystems, the share of organic agriculture is insignificant in Iran (less than 1%). Therefore, the present study aims to evaluate the value of agro-ecosystem services under two different conditions - conventional and organic management - in Fariman city locating in northeastern Iran.



## METHODS

The value of agro-ecosystem services was evaluated under two different management systems namely conventional and organic for wheat and potato according to three different scenarios.

In these scenarios it was assumed that 10%, 25% and 50% of the conventional farm area (total cultivated area of wheat was 10,000 ha and of potato 800 ha) would be replaced by an organic production system.

Agro-ecosystem services were divided into two main groups;

- 1) market services (primary and secondary productions)
- 2) non-market services (pest control, soil production, carbon sequestration and soil fertility).

Note: Data is collected from executed experiments under real conditions during the growing seasons of 2011 and 2012.

## RESULTS

From the results, the conventional potato system had a higher market value than the organic system (3,000 \$/Y/ha Vs. 2,800 \$/Y/ha), but the value of non-market services in the conventional system (42 \$/Y/ha) was less than for the organic one (113.66 \$/Y/ha).

Table 1. The amount and estimated prices of required factors for valuating ecosystem services in conventional and organic potato farms

Parameter	Amount		Unit price (\$)	Value (\$ ha <sup>-1</sup> year <sup>-1</sup> )	
	Conventional	Organic		Conventional	Organic
Yield (kg/ha)	5600	6000	0.1	3,000	2,800
Herbicide (kg/ha)	1	0	0.55	0.66	0
Pesticide (lit/ha)	1.5	0	0.50	1,000	0
Urea (kg/ha)	5	18	0.02	18	0
Labor(Day)	400	0	1	15	20
Manure (ton/ha)	20	20	0.22	4.15	4.17
Earthworm(kg/ha)	3222	3666	0.06	20	23.7
Straw yield (ton/ha)	6844	7333	2.24	3.45	3.22
Straw Carbone (ton/ha)	0.41	0.44	0.03	0	0.66
Water for pest control(m <sup>3</sup> )	0	100	0.05	2.35	66.39
N (kg/ha)	0	828.30	0.06	0.06	0.7
P (kg/ha)	3.08	18.67	0.06	2.15	1.75
K (kg/ha)	25.05	35.91	0.066	16.697	23.93

Table 2. Estimated value of ecosystem services for potato farms in one hectare (\$)

Factors	organic	conventional
Primary production	2,800	3,000
Secondary production	0	0
Pest control	0	14
Soil production	23.56	20
Carbon sequestration	3.10	3.36
Nutrient supply and Soil fertility	87	4.64
market	2,800	3,000
Non-market	113.66	42
total	2,913.66	3,042

Table 3. The amount and estimated prices of required factors for valuating ecosystem services in conventional and organic wheat farms

Yield (kg/ha)	Amount		Unit price (\$)	Value (\$ ha <sup>-1</sup> year <sup>-1</sup> )	
	Conventional	Organic		Conventional	Organic
Herbicide (kg/ha)	1	0	0.13	0.13	0
Pesticide(lit/ha)	1.5	0	0.14	0.21	0
Urea (kg/ha)	5	18	1	5	18
Labor (day)	400	0	0.02	10.66	0
Manure (ton/ha)	20	20	0.20	4.173	4.17
Earthworm (kg/ha)	3222	3666	0.006	21.48	24.44
Straw yield (kg/ha)	6844	7333	0.005	29.088	31.16
straw carbon (ton/ha)	0.41	0.44	2.24	0.919	0.98
water to pest control (m <sup>3</sup> )	0	100	0.003	0	0.33
N (kg/ha)	0	828.30	0.05	0	44.17
P(kg/ha)	3.08	18.67	0.06	0.20	1.24
K(kg/ha)	25.05	35.91	0.06	1.66	2.39

Table 4. Estimated value of ecosystem services for wheat farms in one hectare (\$)

Factors	Organic	Conventional
Primary production	184	70
Secondary production	21.66	9
Pest control	0	13
Soil production	13	12
Carbon sequestration	1.01	0.8
Nutrient supply and Soil fertility	40.33	1.2
market	205.66	79
Non-market	54.34	27
total	260	106

for wheat, market and non-market values of organic farms were higher than for conventional farms. So, the total value of ecosystem services of organic and conventional systems were about 260 \$/ha/year and 106 \$/ha/year, respectively. Results illustrate that the value of non-market services rises along with the increasing area of organic farms. When 50% of farm area is cultivated under organic system, total non-market values of potato and wheat will reach to 22,960 \$/y and 186,613 \$/y, respectively.

Finally, according to the results and obtained benefits, developing and promoting organic agriculture in Iran is extremely recommended.



Figures: The farms

## CONCLUSIONS

This study showed that organic management systems of potato and wheat farms provide more ecosystem services, especially non-market services, in comparison with conventional systems. However, in some cases, loss of yield and market value reduced the total value of organic agricultural services, but it should be noted that the movement towards organic and sustainable farming provides both non-market services as well as market services such as environmental protection and healthy food production.

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