

ECONOMIC PERFORMANCE OF PRE-CROPS IN A THREE-YEAR ROTATION PROGRAM FOR ORGANIC VEGETABLE PRODUCTION

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I. INTRODUCTION

I. INTRODUCTION

- Turkey is the fourth biggest vegetable producer after China, India and United States and a big exporter of vegetable products (FAOSTAT, 2009).
- As a Mediterranean country, vegetable is also an important part of the Turkish diet.
- Vegetable production has higher demands for inputs like pesticides and fertilizers which creates a risk of contamination of the food and environment if the production is not done in proper ways. As an important commodity for export and consumption it may also create risks for health of the humans and the earth,
- Organic vegetable is an important option to avoid such risks. Besides there is a high demand from the markets.

I. INTRODUCTION

- Many farmers and agricultural professionals, however, are uncertain about the profitability and risks associated with organic vegetable production
- In almost all cases, when organic price premiums were included in the analyses, organic systems outperformed conventional systems

i. Objectives



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- A research program is initiated jointly in Turkey, Italy, Morocco and Tunisia to test pre-crops in a rotation of vegetables between 2006-2010.
- General aim of this common research program is to test and finally recommend sustainable rotation models which are economically and technically feasible for Mediterranean conditions.

i. Objectives



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- The specific objective of the research in Turkey is to analyze the most suitable and profitable crop rotation model for open field vegetable production under organic management conditions prevailing in western Turkey in order to recommend farmers.
- The paper evaluates the economic performance of the tested pre and main crops for three years.

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II. EXPERIMENTAL



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General view of the experimental site

Experimental Fields of Ege University Izmir TURKEY

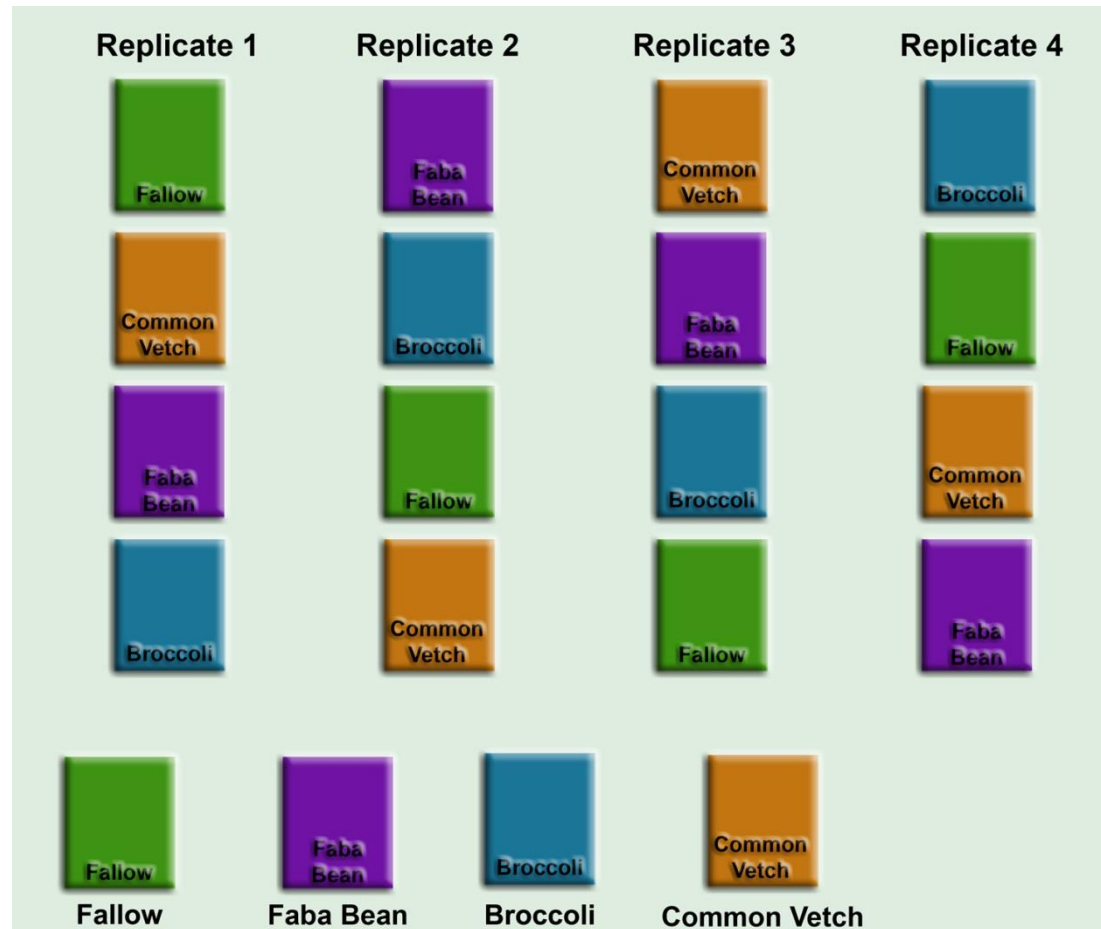
Experimental Site:

Experimental design

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Three pre-crops and the fallow as control.

4 replicates



PRE-CROPS



Common Vetch



Broccoli



Faba Bean



Fallow

Main Crops

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II. EXPERIMENT

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1 st year 2006-2007		2 nd year 2007-2008		3 rd year 2008-2009	
Pre-crops	Main Crop	Pre-crops	Main Crop	Pre-crops	Main Crop
<ul style="list-style-type: none">• Fallow• Faba bean• Vetch• Broccoli	Tomato	<ul style="list-style-type: none">• Fallow• Faba bean• Vetch• Broccoli	Zucchini	<ul style="list-style-type: none">• Fallow• Faba bean• Vetch• Broccoli	Pepper

Experiment is on going

Research Methodology:



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- Economic analysis is important to determine the cost and profitability of organic vegetable production and thus recommend a suitable rotation program to the farmer.
- All the field operations and harvests (dates and description of the operations, input and output amounts, unit prices) are registered during the experiment.
- $\text{Gross Margin (GM)} = \text{gross revenue (total gross income)} - \text{total variable costs}$ (Kay and Edwards, 1999).
- Gross margin is calculated with these data and a comparison is done between the treatments.
- Analysis of variance was done using the statistical analysis SPSS V18.



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III. RESULTS

Variable costs (€·ha⁻¹)



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	Pre-Crop	2006-2007	2007-2008	2008-2009	Total
Variable costs for winter (pre-crops)	Broccoli	11364	10741	11268	33372
	Faba Bean	3238	2486	2404	8127
	Vetch	3454	1374	1542	6370
	Fallow	1161	250	406	1817
Variable costs for main crop (following four pre-crops)	Broccoli	10417	6018	6211	22646
	Faba Bean	10394	5499	6266	22159
	Vetch	10363	5311	6234	21908
	Fallow	10348	5458	6243	22048

Variable costs (€·ha⁻¹)



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	Pre-Crop	2006-2007	2007-2008	2008-2009	Total
Total Variable Costs	Broccoli	21780	16759	17479	56018
	Faba Bean	13601	7984	8670	30255
	Vetch	13847	6685	7776	28309
	Fallow	11509	5708	5708	22925

Revenues for pre-crops (€·ha⁻¹)



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Pre-Crop	2006-2007	2007-2008	2008-2009	Total
Broccoli	8168	16473	27033	51673
Faba Bean	0	575	19108	19683
Vetch	0	0	0	0
Fallow	0	0	0	0

Revenues for main crops (€·ha⁻¹)



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Pre-Crop	2006-2007	2007-2008	2008-2009	Total
Broccoli	33175	23614	9642 b	66431
Faba Bean	29393	22940	14064 a	66398
Vetch	30849	23848	10611 b	65307
Fallow	29153	21288	8703 b	59143
Mean	30642	22922	10755	64320
LSD	0,584ns	1,062ns	6,830 **	1,213ns

NB: ns indicates non significance, * and ** indicate significance at 5% and 1% respectively.

Total gross margin (€·ha⁻¹)



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Pre-Crop	2006-2007	2007-2008	2008-2009	Total
Broccoli	19562	23328 a	19196 b	62085 a
Faba Bean	15792	15531 b	24503 a	55826 a
Vetch	17001	17162 b	2835 c	36998 b
Fallow	17644	15580 b	2055 c	35278 b
Mean	17500	17900	12147	47547
LSD	0,424ns	10,868**	162,641**	17,986**

NB: ns indicates non significance, * and ** indicate significance at 5% and 1% respectively.

IV. DISCUSSION AND CONCLUSIONS

Discussion

- The economic analysis showed that the most profitable rotation was broccoli- as cumulative for the total duration of three years. Since this rotation had two commercial crops, it gave two crop harvests and resulted in higher income for the first two years of the experiment. As farmers get two different products in one year this also reduce the risks of price fluctuations or changing demands of the market. For the third year, yield was obtained from faba bean. Gross margin received from faba bean was higher which was mainly related to the lower variable costs compare to broccoli.

Discussion

- These results suggests that growing pre-crops only which has significant organic premiums rather than soil building crops may offer economic advantages in the short term. However, these crops (broccoli in this experiment) also had the highest variable costs and highest risk among the other treatments. As seen in the third year of the experiment, rotations with cover crops may become more profitable in some years. This must be further evaluated for the coming years of the experiment. The least profitable rotation plan was fallow – main crop rotation.

Discussion

- Climatic conditions had important effects on crop production especially on pre-crops due to wet autumn weather. This limited ability to cultivate or transplant in a timely manner so the production period of the pre-crops were limited which directly affect the yields.
- In the first and second years of the experiment, little or no pods were harvested from faba bean.
- Even if it was planned to get yield from this crop, time concerns for the main crop changed our plans. In the third year faba bean and broccoli yields were good but main crop cycle's time was limited affecting the pepper yield.

Conclusions

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- For the first two years of the experiment, Broccoli-main crop was the best performing choice but in the third year faba bean ranked the top.
- If the climatic conditions allow rapid plant growth and complete harvest of pods- faba bean as a soil building crop with lower variable costs it is the best rotation program with summer vegetables. However it must be further evaluated during the coming years.
- Broccoli has additional benefits like the high biomass, high revenues and positive effects on weed control.

Thank you...