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The Syrian Crisis Impact on the Area and the Production: A Case Study of Vegetables Crop

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ABSTRACT

Vegetable crops cannot be dispensed with to meet the nutritional needs of the population in Syria, and it is suffering from large price fluctuations. The impact of the current crisis has a significant impact on these changes on the prices of the product itself, competing for crops, or production requirements, which is directly reflected in the areas cultivated and its production. In this research, a seek has been made to analyze the area and production of the vegetables crop in Syrian agriculture before and after the crisis. The results of the study show that for vegetables crop (irrigated and rain-fed) there has been a decrease in the cultivated area during the crisis compared to the period before it 302.299 and 427.760 hectares, respectively. Besides, in terms of production, we note that there has been a negative impact of the crisis on vegetables crop (irrigated and rain-fed) of 2911.522, 579.368 tons, respectively.

Keywords: Vegetable Crops, Syrian Crisis, Production, Area
JEL Classifications: M11, Q13

1. INTRODUCTION

Vegetable crops - both summer and winter- are important crops in the cropping pattern, as the area cultivated with vegetables amounted to 173.75 thousand hectares, which finances about 5.2% of the total cultivated areas of summer and winter crops of about 3.66 million hectares. It also finances about 3.75% of the total cultivated area in Syria, estimated at 4.64 million hectares, for the average period of 2011 (CBU, 2006; Directorate of Statistics and International Cooperation and Ministry of Agriculture and Agrarian Reform, 2011). Vegetable crops cannot be renunciates to meeting the nutrient needs of the population, including vitamins, mineral elements, dietary fibers, micronutrients, antioxidants and phytochemicals in our daily diet (Bagchi, 2008; Liu, 2013).

As in most Mediterranean countries, agricultural production in Syria substitutes an important economic sector, as it provides about 25% of the country's GDP (World Food Program and Food and Agriculture Organization of United Nations, 2018). Indeed, the investment allocated to the agricultural sector in Syria was effective in comparison to the rest of the country's total investments (Alobid et al., 2019). In 2005, the total area of arable land was 91.5 million hectares, whereas the total area of cultivated land was 74.5 million hectares (CBU, 2007).

During the war in Syria, food security obtained great importance as a result of the deterioration in agricultural production and the planted areas, the decline of natural land and water resources and the impact of economic sanctions imposed on Syria (WFP, 2018; World Food Program and Food and Agriculture Organization of United Nations, 2018). Accompanied by the change in supply and demand for food and as a consequence of the reduced implementation of public health and social security programs, crop production in Syria has been severely affected by the on going war (Bowles et al., 2015; Gleick, 2014).

In light of its great importance a vegetables variety at the Syrian table and its entry into many other uses (FAO, 1996), and to recognize the activity of the agricultural sector and the factors that have contributed to the increase in its production of the vegetables crop, or which have limited its production capacity and productivity during the recent period especially the crisis effect, it is necessary to focus on the conditions experienced by this sector and on the statistics and accurate figures that indicate the volume of agricultural production and productivity for vegetables crops in Syria during the recent period. In this research, we applied the dummy variables method to analyse the data which are utilized as a representative of some qualitative variables that affect economic phenomena such as gender, colour, religion, occupation, educational level, etc. These variables take two values zero and one and are used in regression models as explanatory variables or as dependent variables, but the greater emphasis on them as explanatory variables for many uses (Blaikie, 2003; Salkever, 1976). This study focused on the impact of the current crisis on the vegetables crop.

2. MATERIALS AND METHODS

2.1. Description of the Data Collection

In this paper, an attempt has been made to examine the area, the production and the productivity of irrigated and rainfed vegetables crop in Syrian agriculture during the period 2000-2017. This study is based exclusively on secondary data. The time series secondary data required for the study have been collected from the Central Bureau of Statistics in Syria, the Ministry of Agriculture of the Government of Syria, and also from the Aquastat FAO database year by year. Concerning the vegetables crop, we have had to study the area and the production explained in Figures 1 and 2.

Figure 1: Area and production of irrigated vegetables crop for the period 2000-2017 in Syrian agriculture

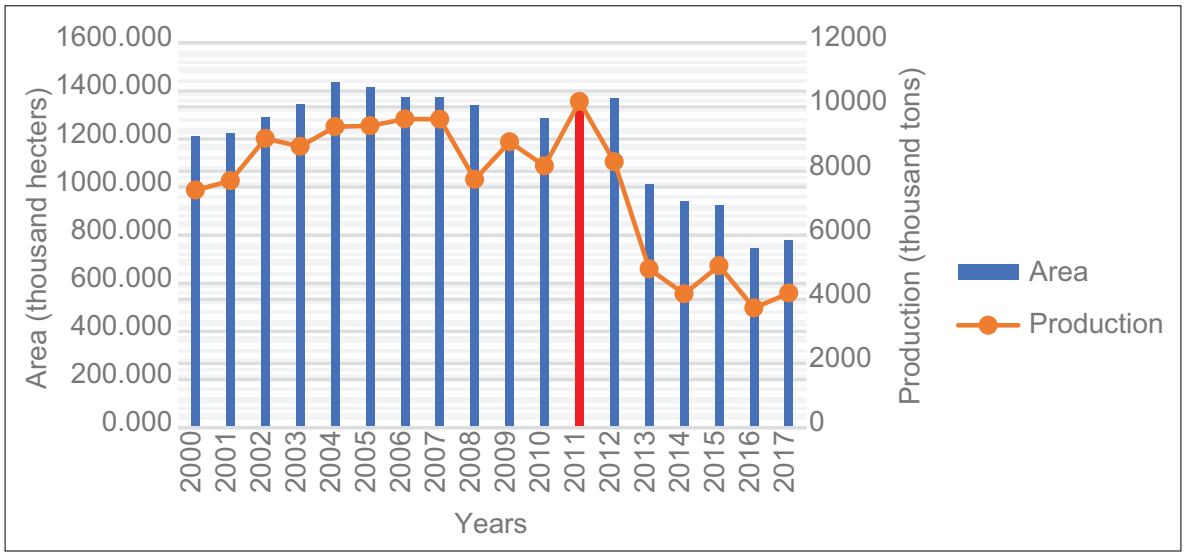
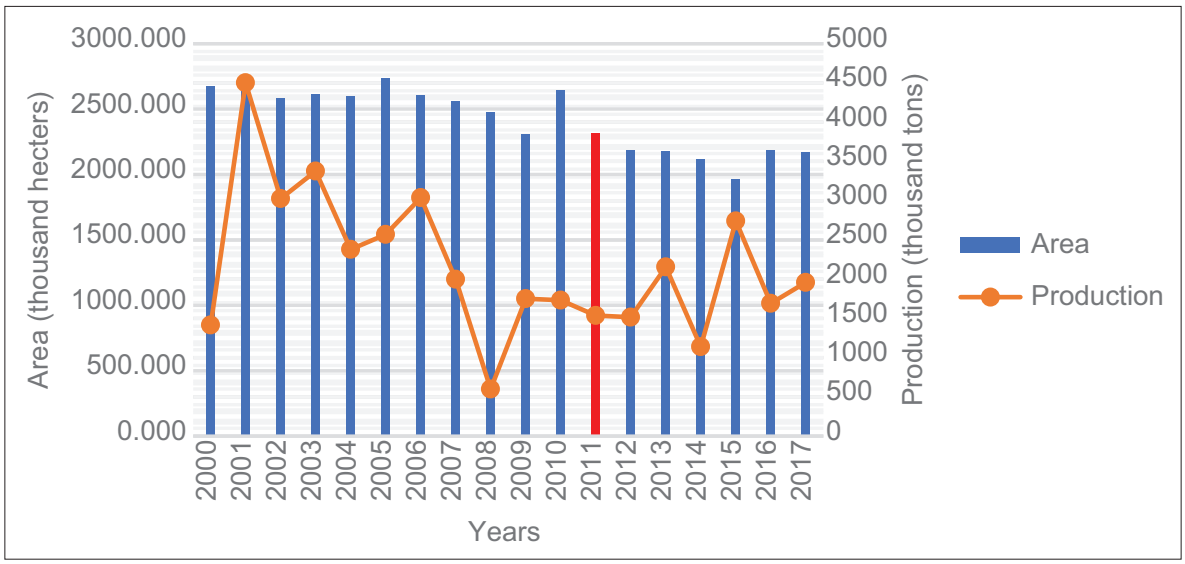


Figure 2: Area and production of rainfed vegetables crop for the period 2000-2017 in Syrian agriculture



2.2. Model Description

The study aims to explore the impact of the crisis on the most important crop grown in Syria, by identifying the impact of the crisis on the areas planted with these crop and its production. The study was divided into two periods:

- First period: before the crisis (0)
- Second period: after the crisis (1).

Dummy variables analysis has been employed in this study, to determine the impact of the crisis in Syria on the area and the production of vegetables crop, the simple linear regression model was adopted by using the ordinary least squares method (Gujarati, 2014). The relationship between area and production of the crop studied was described as a dependent variable, and the impact of the crisis was used as an independent variable, the model used can be formulated as follows:

$$Y_t=B_1 + B_2D_t + u_t$$

Y_t: Indicates the estimated values of the studied variable;
D_t: Represents the dummy variable and has the following values: Dt=0 before the crisis, and Dt=1 after the crisis;
B_1,B_2: Parameters;
U_t: Limit of error.

The data analysis was done with EViews 10th Edition.

2.3. Research Hypothesis

- Null hypothesis: There is no significant impact of the crisis on the area and the production of the crop studied
- Alternative hypothesis: The crisis has a significant impact on the area and the production of the crop studied.

3. RESULTS AND DISCUSSIONS

3.1. Vegetables Crop

Vegetables crop in Syria under both "irrigated and rainfed" cultivation are seen as very interesting for the government and farmers because they are important sources of income for both producers and workers and employ a large proportion of the labor force. Vegetables also occupy an important place in the strategy of alternative crops and foreign trade. The products of this group are known for their high nutritional value and therefore constitute an important component of food security policies (Hadid et al., 2004). The cultivation of Vegetables, like other crops, was affected by the circumstances that accompanied the crisis.

The results show there has been a significant negative effect on the cultivated area of both irrigated and rainfed vegetables crop (Table 1), with decreases amounting to 302.299 and 427.760 hectares in irrigated and rainfed areas, respectively.

As regards production, the results show that the production of irrigated crops and vegetables was negatively affected and these results were strongly significant, with the change amounting to 2,911.522 thousand tons. It was also found that there was a negative impact due to the crisis - although this was not proven to be of statistical significance - in the production of rainfed vegetables crop, and the amount of change in the production was about 579.368 thousand tons, as shown in Table 1.

In fact, there are other reasons for the deterioration in the area and production of vegetables crop other than the impact of the

Table 1: Analysis of the impact of the crisis on the area and production of vegetables crop in Syria during the period 2000-2017

Attribute	Sampling	R^2	F
Area			
Irrigated crop	(10) Yt=1320.076-302.299 Dt (26.404)*** (3.770)**	0.47	(14.218)**
Rainfed crop	(11) Yt=2585.318-427.760 Dt (77.104)*** (7.955)**	0.79	(63.293)**
Production			
Irrigated crop	(12) Yt=8702.682-2911.522 Dt (17.650)*** (3.682)**	0.45	(13.560)**
Rainfed crop	(13) Yt=2398.756-579.368 Dt (8.800)*** (1.325)**	0.09	(1.157)**

**Significant at 1%. ***Significant at 0.1%. () The number between brackets, under the Regression Coefficient, indicates the (t) calculated values. Resource: The results are calculated from a statistical analysis of Table 2a-d

Table 2a: Dependent variable: Irrigated area-vegetables crop

Variable	Coefficient	SE	t-Statistic	Prob.
C	1320.076	49.99527	26.40401	0
D_2011	−302.2994	80.17079	−3.770692	0.0017
R-squared	0.470516	Mean dependent var		1202.515
Adjusted R-squared	0.437424	S.D. dependent var		221.0724
SE of regression	165.8156	Akaike info criterion		13.16407
Sum squared resid	439916.8	Schwarz criterion		13.263
Log likelihood	−116.4766	Hannan-Quinn criter		13.17771
F-statistic	14.21812	Durbin-Watson stat		0.76539
Prob. (F-statistic)	0.001673			

SE: Standard error

Table 2b: Dependent variable: Irrigated production-vegetables crop

Variable	Coefficient	SE	t-Statistic	Prob.
C	8702.682	493.0528	17.65061	0
D_2011	−2911.522	790.6435	−3.682471	0.002
R-squared	0.458739	Mean dependent var		7570.424
Adjusted R-squared	0.42491	S.D. dependent var		2156.363
SE of regression	1635.271	Akaike info criterion		17.74144
Sum squared resid	42785794	Schwarz criterion		17.84037
Log likelihood	−157.673	Hannan-Quinn criter		17.75509
F-statistic	13.56059	Durbin-Watson stat		1.167575
Prob. (F-statistic)	0.002016			

SE: Standard error

Table 2c: Dependent Variable: Rainfed area-vegetables crop

Variable	Coefficient	SE	t-Statistic	Prob.
C	2398.756	272.5634	8.800728	0
D_2011	−579.3689	437.0738	−1.325563	0.2036
R-squared	0.098953	Mean dependent var		2173.446
Adjusted R-squared	0.042637	S.D. dependent var		923.9015
SE of regression	903.9906	Akaike info criterion		16.55595
Sum squared resid	13075184	Schwarz criterion		16.65488
Log likelihood	−147.0036	Hannan-Quinn criter.		16.5696
F-statistic	1.757118	Durbin-Watson stat		1.741481
Prob. (F-statistic)	0.203601			

SE: Standard error

Table 2d: Dependent Variable: Rainfed production-vegetables crop

Variable	Coefficient	SE	t-Statistic	Prob.
C	2585.318	33.53015	77.10428	0
D_2011	−427.7607	53.76785	−7.955696	0
R-squared	0.798217	Mean dependent var		2418.966
Adjusted R-squared	0.785606	S.D. dependent var		240.1735
SE of regression	111.2069	Akaike info criterion		12.3651
Sum squared resid	197871.6	Schwarz criterion		12.46403
Log likelihood	−109.2859	Hannan-Quinn criter.		12.37874
F-statistic	63.2931	Durbin-Watson stat		1.531767
Prob. (F-statistic)	0.000001			

SE: Standard error

current crisis in Syria, but it is not included in this study, some of these reasons are:

- To operate diesel water pumps, where farmers suffered greatly from the difficulty in providing fuel during the crisis and their high prices
- In addition, the high costs of maintenance and repair for these engines, all these conditions and others led to farmers reluctance to grow this crop significantly despite the profit that they can make from its cultivation.

4. CONCLUSIONS AND RECOMMENDATIONS

In this study, we have tried to emphasize two major factors in the Syrian agricultural sector "area and production" - over 17 years, i.e., before and after the crisis. The results showed that there was a negative effect that proved significant in the area and production of vegetables crop (irrigated and rainfed) during the crisis in Syria. The area planted with these important crops has decreased significantly since 2011 - the "starting point of the crisis," - as it is reflected by the significant decrease in production per unit area. Through the above, we can state that the agricultural sector in Syria began to decline gradually after the start of the crisis and we can accept the alternative hypotheses Ha (The crisis has a significant impact on the area, the productivity and the production of the crops studied).

Finally, and a quick look at the reality and march of the development of agricultural production in Syria. The agricultural sector remains one of the most important economic and productive sectors in the country. Therefore, we must work hard to improve the situation of this sector after stopping the ongoing war in the country. In order to improve the performance of this sector, it must be given greater attention by supporting the requirements necessary to increase and improve its efficiency. The use of modern technology in agricultural production processes and improving the situation of irrigation networks and agricultural infrastructure contributes effectively to improving and developing the performance of this sector. Also, supporting farmers and providing them with agricultural production requirements for seeds, fuel, fertilizers, and pesticides (at relatively low prices) may contribute to encouraging farmers to increase their agricultural production and push them to pay more attention to existing agricultural projects and the establishment of new agricultural projects in the future.

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