



# Aquatic Science and Fish Resources

<http://asfr.journals.ekb.eg>

Print ISSN: 2682-4086

Online ISSN: 2682-4108



## Financial and Economic Analysis of Grape Crop Production in South Sinai Governorate

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### ARTICLE INFO

Article history:

Received Mar. 28, 2023

Received in revised form Jun. 20, 2023

Accepted Jul. 2, 2023

Available online Jul. 3, 2023

### Keywords

Financial Analysis

Economic Analysis

Grapes Harvest

Wadi Tur

South Sinai Governorate

### ABSTRACT

The main objective of the research was to study the financial and economic analysis of the production of grapes in South Sinai Governorate as an investment project, by achieving several sub-objectives, which are: (1) studying and analyzing the structure of the production costs and revenues of the grapes crop in South Sinai governorate. (2) Estimating the Standards of financial and economic analysis for this activity to demonstrate its financial and economic feasibility in accordance with current production conditions, and according to the sensitivity analysis to identify the activity's ability to avoid the risks it can face. (3) Identify the most important problems facing grape producers in South Sinai governorate and proposals to solve them.

the research findings are several and from them the following: (1) The average investment costs for the production season 2018/2019 were about 4.7 thousand pounds, representing about 43.76% of the total costs for the grape acre in the study sample for the production season 2018/2019. (2) The average variable costs were about Pound6.04 thousand, representing about 56.24% of all grape acre costs. (3) Average of Fadden production revenue from the grape crop was approximately 40 thousand pounds. (4) The feasibility of investing in the production of grapes in South Sinai Governorate at an 18% discount rate, where the net value of the current cash flow is about 18.12 thousand pounds, and the internal return rate is about 35% according to the current situation. (5) The vineyard project in the Wadi Tur Sinai region of South Sinai Governorate can continue its economic utility as operating costs increase and yield decrease separately by 10%, and happen together by 10%. (6) The positive contribution of the production of grapes in the Sinai Valley in South Sinai governorate to the national income. The present value of the value added was about 87.25 thousand pounds. The present value of the net value added was about 65.71 thousand pounds, and the social surplus was about 54.61 thousand pounds. (7) There are many problems facing grape producers in South Sinai wallet. The research concluded with several recommendations to promote the production and productivity of grapes in South Sinai governorate.

### INTRODUCTION

The grape crop is one of the main fruit crops in the Arab Republic of Egypt, where it is ranked second after Citrus crops in terms of the total area of cultivation amounting to about 187,356 Faddan represents about 11.48% of the total fruit area of the Republic, which is estimated at 1,63 million Faddan in 2020. The fruitful area is about

133.81 thousand Faddan producing about 1.734 million tons for the same year (**Ministry of Agriculture and Land Rehabilitation, 2020**).

Grapes are important export crops, with exports with exports are estimated at about 77.32 thousand tons worth about \$ 141.296 million, representing about 27%, 60% from the total quantity and value of Egyptian agricultural exports of about 288 thousand tons of vegetables and fruit, worth \$ 236

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doi: [10.21608/ASFR.2023.202571.1038](https://doi.org/10.21608/ASFR.2023.202571.1038)

million respectively (**Export Council for Agricultural Earners, 2019**).

Grapes are one of the most successful fruit crops grown in sand and reclaimed lands where they are grown for export and local production. There are many seed varieties, include early, medium and late maturity. This publication includes the cultivation and production of grapes, the most important varieties, agricultural processes and transactions for the production of a high quality grape crop for export to the global market and the local market (**Ministry of Agriculture and Land Reclamation, 2004**).

South Sinai Governorate is one of the most promising desert border governorates The highest priority in Egypt's economic development strategy, where the State seeks to develop and advance it through the national project for the development of Sinai, which is largely based on the development of agriculture through the reclamation and cultivation of new areas and the development of agricultural production methods. Agriculture is one of the main pillars of the overall development of the Sinai Peninsula with its production and income, as well as establishing new and stable urban communities, exploiting the long experience of its to deal with land and water shortages using drip irrigation methods and the cultivation of seeds. (lowlands) and agriculture under plastic tunnels and plastic aims which characterize the conservation production in vegetables and fruit. which is produced in the non-traditional production season, giving it a comparative advantage over the rest of the productive areas, with which it can be sold at high prices, thereby generating high incomes for farmers.

#### **The importance of research and justifications for choosing the area of its conduct:**

The research draws its importance from the economic, food and export importance of grapes

in Egypt and its high profitability, on the one hand (**Abu al-Naja and Zaki, 2018**), which necessitates the transfer of modern technology from the cultivation and production of this important crop for producers to increase its productivity and improve its quality on the other hand (**Al-Qadi, 2005**). In addition, South Sinai Governorate is one of the most promising governorates of the Saharan border, the highest priority in Egypt's economic development strategy. The State seeks to develop and promote it through the national project for the development of Sinai, which is largely based on the development of agriculture through the reclamation and cultivation of new areas and the development of agricultural production methods. The quality and relative absence of residual pesticides and chemicals harmful to human health.

#### **Research Problem**

Although environmental conditions are appropriate and there is a comparative advantage to the production of grapes in South Sinai It results early from its counterpart in other governorates, and the presence of marketing demand on it in the local market and Arab markets However, the area of grapes remains low and is not commensurate with that potential, with only 465 Faddan for 2021, which indicates that there are productive and marketing problems facing grape producers in the governorate. and the scarcity of economic studies highlighting small and large investors and beneficiaries of agricultural land in the governorate The financial and economic feasibility of investing in the production of horticultural crops in general and grape crops in particular.

#### **Research Objective**

The objective of the research is to study and analyze the structure of the production costs

and revenues of the grape crop in South Sinai Governorate and assess the criteria for financial and economic analysis of this activity as an investment project, to demonstrate its financial viability in accordance with current production conditions and according to the sensitivity analysis to recognize the activity's ability to withstand the risks it can face resulting from changing input and production prices, In addition to identifying the most important problems facing grape producers in South Sinai governorate and proposals to solve them.

### **Research Method and Data Sources**

To achieve its objectives, the research relied on using the method of statistical qualitative and quantitative analysis of the data obtained using some mathematical equations and models. The research also relied on the use of financial and economic analysis standards as prepared by the World Bank for use and application to judge the profitability of the study area's grape crop production, which is represented by discounted financial analysis standards that are the net present value of cash flows, the internal rate of return, the ratio of benefits to costs and the payback period of capital, as well as sensitivity analysis to identify the project's ability to withstand price changes in cost and income components. Economic analysis criteria, value added, net of value added and social surplus.

The research relied mainly on the primary data collected through a questionnaire form that included all the variables needed to achieve the objectives of the study of the vineyard farmer sample in Wadi Al-Tur in the center of Al-Tur in Southern Governorate during the production season (2021/2022), with a grape area of about 407.7 Fadden representing about 87.71% of the total grape area of South Sinai governorate of about 465 Fadden for 2021, distributed to about

33 farms representing about 87.57% of the total number of grape farms of about 42 in South Sinai governorate (**Directorate of Agriculture, 2021**) studied in the Comprehensive Accounting Season (2021/2022). Secondary data published from official sources, such as the Ministry of Agriculture and Land Rehabilitation, the Central Agency for Public Mobilization and Statistics, were also drawn upon and used some official scientific publications, books and studies relevant to the subject matter of research.

### **Results and Discussion**

The grapes produced in South Sinai governorate are almost completely free of pesticides, the non-use of chemical fertilizer and the total reliance on the use of organic fertilizer, which comes from livestock fattening farms in the valley of the phase, hence the quality of productive fruits and their high sugar, the strength of clusters and the hardness of grapes (**South Sinai Governorate, 2021**) It is worth mentioning that the fruit produced in South Sinai in general and grapes and mango in particular reach maturity and shop for a period of approximately one month more than the same as that produced with the consent of the sea face and valley in general, which gives it a comparative advantage in price.

#### **First: Economic features of grape orchards with study sample**

##### **1- Investment and fixed costs**

The data provided in table (1) for average investment and fixed costs of grape Fadden indicate the research sample of the 2021/2022 production season, which shows that the average investment costs were about 4.7 thousand pounds representing about

43.76% of the total total costs of grape Faddan of the study sample for the same season, including both construction costs (warehouses for storage of supplies and tools), cost of reclamation of land (reclamation process), cost of Faddan' share of well and student.

While fixed costs included the cost of the irrigation system, the opportunity cost (rent) of the grape-grown land and the cost of maintenance and repair amounted to approximately 50,200,150,100,000 3,000,300 pounds with rates of about 1.06%, 4.26%, 3.19%, 21.28%, 63.83%, and 6.38%, respectively, of the total investment and fixed costs of the grapes.

**Table 1.** Relative Importance of Average Investment and Fixed Costs of Grapes Faddan at Wadi Tur Sinai in South Sinai Governorate 2021/2022 Production Season

Statement	Value (pounds)	% Investment & Fixed	% Total costs
Construction Rehabilitation and	50	1.06	0.47
Infrastructure	200	4.26	1.86
Well and pamb	150	3.19	1.40
Irrigation Network	1000	21.28	9.31
Rental value	3000	63.83	27.93
Maintenance and repair	300	6.38	2.79
Total investment and fixed costs	4700	100	43.76

**Source:** Compiled and calculated from the questionnaire form for the field study in Wadi Tur Sinai in South Sinai Governorate 2021/2022 production season.

**2- Variable costs**

Table (2) indicates the relative importance of the average variable costs of grape Faddan with the research sample 2021/2022 production season, totaling approximately 6.04 thousand Pounds representing about 56.24% of the total costs of

grape Fadden, including the costs of municipal fertilizer, nutrients and paper fertilizer, pesticides, motor spraying, wages of crop service work, supervision salaries, and Collection and packaging cost, packaging cost, periodic maintenance cost, irrigation cost. These costs amounted to 1750, 150, 120, 100, 100, 100, 2000, 800, 150,720 pounds with rates of 28.97%, 2.48%, 1.99%, 1.66%, 2.48%, 1.66%, 33.11%, 13.25%, 2.48%, 11.61%.

**Table 2.** Relative Importance of Average Operating Costs for Grapes Faddan in the Sinai Valley in South Sinai Governorate 2021/2022 Production Season

Statement	Value (pound)	% Variable costs	% Total costs
Composting My Country	1750	28.97	16.29
Chemical (paper feeders and fertilizers)	150	2.48	1.40
Pesticides	120	1.99	1.12
spray pesticides	100	1.66	0.93
Employment Service	150	2.48	1.40
Supervision	100	1.66	0.93
Crop Collection (0.30/kg)	2000	33.11	18.62
Packaging (10kg * 2C carton capacity)	800	13.25	7.45
Maintenance	150	2.48	1.40
Irrigation	720	11.92	6.70
Total Variable costs	6040	100	56.24

**Source:** Compiled and calculated from the questionnaire form for the field study in Wadi Tur Sinai in South Sinai Governorate 2021/2022 production season.

**3- Grape crop production revenues**

Table (3) data is shown in. The average production revenue of Fadden of grapes from the Valley of Tur Sinai in South Sinai Governorate during the agricultural season (2018/2019) was about 18 thousand pounds. Production averaged about 4 tons per acre

and the average sale price was about 4500 pounds/tons.

**Table 3.** Average Revenue for Grapes Fadden in the Valley of Tor Sinai in South Sinai Governorate 2021/2022 Production Season

Statement	Unit	Value/Quantity
Average Fadden production	Ton	4
Unit / Price	Pound	4500
Total revenues	Pound	18000

**Source:** Compiled and calculated from the questionnaire form for the field study in Wadi Tur Sinai in South Sinai Governorate 2021/2022 production season.

**Second: Financial and Economic Analysis and Sensitivity Analysis of Grape Production in the Sinai Valley in South Sinai Governorate:**

In South Sinai Governorate, financial and economic analysis and sensitivity analysis of grape crop production in the Sinai Valley depend on the use of discounted criteria (**Abdel-Azim, 1999**) and the number of hypotheses consistent with economic logic:

1. The duration of the project is 10 years based on the fact that grapes are durable plants with a productive life of more than 10 years.

The volume of production varies from year to year according to the age of the trees and the beginning of the farm's production during the third year of agriculture.

3- The 18% discount rate (the rate prevailing on the Treasury's authorizations from the Central Bank), which represents the best alternative opportunity expense available to invest capital in society for an average of 2021-2022 (**www.cbe.org.eg/ar**) years, was used to estimate the present and future value of both the revenue and the cost of the project.

4- The rental value of the land has been calculated at 3000 pounds per acre, as in the study area.

5- The cost of periodic maintenance of the irrigation equipment and network has been calculated at a constant rate throughout the life of the project. The irrigation system is replaced according to the estimated 6-year life span of the grape orchards. The replacement is sold and interferes with the project's abstract value in the replacement year.

6. The prices of both the product and the production items are fixed during the life of the project.

In the light of the potential exposure to agricultural investment, whether in production or marketing or the consequent higher cost value, lower yield or increased costs at the same time, the study relied on the use of a sensitivity analysis method to measure the enterprise's sensitivity to it.

**(A) Financial Analysis of Grapes Production in the Valley of the Sinai Phase in South Sinai Governorate:**

1. Financial evaluation criteria for the production of grapes in the Sinai Valley in South Sinai Governorate:

Table 4 data indicate the results of the financial analysis of grape crop production with the research sample, and show that Net Present Value is net of present value. (NPV) at a positive 18% discount rate estimated at approximately 18.12 thousand pounds, indicating the feasibility of investing in this activity, and the internal rate of return. (IRR) about 35% more than the capital interest of borrowing represented by the prevailing commercial interest rate emphasizes the feasibility of investing in vineyard activity, and the ratio of current benefits to current costs (P/C) Benefit/Cost Ratio is about 1.3533 greater than the correct one, which indicates

the feasibility of investing for the project, and the period of capital recovery has reached CPBP Capital Pay Back is about 2.86 years from the beginning of production, indicating that invested capital can be recovered within three years from the beginning of production, i.e. this activity is financially viable.

**Table 4.** Results of the financial analysis of the production of grapes crop by sample research in Sinai Valley according to the current situation in South Sinai Governorate

Financial analysis indicators	Value/Ratio
Net present value NPV (pound)	18138.53
Internal Rate of Return (IRR) (%)	35
Benefit-to-cost ratio (P/C) (pound)	1.35
Capital Pay Pack Period (CPBP) (year)	2.86

**Source:** Results of the analysis of field study data using **Cost Benefit Analysis Prog.**

**2. Financial evaluation criteria for the production of grapes in the Sinai Valley in South Sinai governorate.**

(1): An increase in operating costs: It is clear from the data contained in table (5) that the vineyard project in the Valley of Tor Sinai in South Sinai Governorate can continue its financial usefulness as operating costs increase by 10% with the same revenue constant, as the present net value of cash flows is about 13.04 thousand pounds. The rate of internal return is about 29% greater than the opportunity cost of investing capital in society, the capacity of the benefit-to-cost ratio is about 1.23% greater than the correct one, and for the invested capital recovery period is estimated at about 3.41 years, indicating that this activity is financially viable.

**Table 5.** Results of Financial Analysis of Grape Crop Production with Research Sample in Sinai Valley According to Sensitivity Analysis by Increasing Operating Costs by 10% in South Sinai Governorate

Financial analysis indicators	Value/Ratio
Net present value NPV (pound)	13036.77
Internal Rate of Return (IRR)(%)	29
Benefit-to-cost ratio (P/C) (pound)	1.23
Capital PAY PACK Period (CPBP) (year)	3.41

**Source:** Results of the analysis of field study data using **Cost Benefit Analysis Prog.**

(2) Decrease in revenues: It is clear from the data contained in table (6) that the vineyard project in the Valley of Tor Sinai in South Sinai Governorate can continue its financial usefulness in the light of an increase in revenues decrease by 10% as revenue remains unchanged value of the net present value of cash flows is approximately Pound11.22 thousand, The rate of internal return is also about 29% or greater than the opportunity cost of investing capital in society. And the benefit-to-cost ratio capacity is about 1.22 times greater than the right one, For the invested capital recovery period criterion, an estimated 3.47 years, indicating that this activity is financially viable.

**Table 6.** Results of the financial analysis of the production of grapes crop by research sample in Sinai Valley According to the sensitivity analysis, revenue decreased by 10% in South Sinai governorate

Financial analysis indicators	Value/Ratio
Net present value NPV (pound)	11218.41
Internal Rate of Return (IRR) (%)	29
Benefit-to-cost ratio (P/C) (pound)	1.22
Capital PAY PACK Period (CPBP) (year)	3.474

**Source:** Results of the analysis of field study data using **Cost Benefit Analysis Prog.**

(3) Increased operating costs and reduced revenues: data in table (7) shown that The vineyard project in the Wadi Tur Sinai region



of South Sinai Province can continue its economic usefulness in the light of increased operating costs and decreased yield together by 10% The net present value is about 6.1 thousand pounds, and the benefit-to-cost ratio is greater than the correct one and is about 1.12. In addition, the internal rate of return is about 23%, For the invested capital recovery period criterion up to 2.26 years, which indicates that this activity is financially viable.

**Table 7.** Results of financial analysis of grape crop production by research sample at Sinai Valley according to sensitivity analysis by increasing operating costs and decreasing yield together by 10% in South Sinai Governorate

Financial analysis indicators	Value/Ratio
Net present value NPV (pound)(%)	6071.65
Internal Rate of Return (IRR)	23
Benefit-to-cost ratio (P/C) (pound)	1.12
Capital PAY PACK Period (CPBP) (year)	4.26

**Source:** Results of the analysis of field study data using Cost Benefit Analysis Prog.

**Third: Economic Analysis of Grape Production in the Valley of Tor Sinai in South Sinai Governorate:**

Economic analysis aims to assess the extent to which the project contributes to the achievement of all basic development goals, whether economic or non-economic, taking into account the indirect and non-measurable effects of economic prices, and depends on the same financial analysis assumptions but using economic prices (**Abdel Aziz, 1987**).

**Criteria for economic assessment of grape production in the Sinai Valley in South Sinai Governorate:**

By Using mathematical relationships between current revenue and cost values, the criteria for economic evaluation were estimated **through the table No.8** of the results of the economic analysis of grape production indicates a sample of

research in the Sinai Valley in South Sinai Governorate. It shows that the present value added was about 87.25 thousand pounds s value ", while the present value of net value added was approximately Pound65.71, The social surplus amounted to 54.61 thousand pounds, indicating the positive contribution of the production of grapes in the valley of Tor Sinai in South Yinnah governorate to the national income.

**Table 8.** Results of the Economic Analysis of Grape Production with Research Sample in Tor Sinai Valley in South Sinai Governorate

Economic analysis indicators	Value(1000 LE)
Total present value of income	92232.13
Total present value of investment and fixed costs	21540.26
Total current value of production supplies	4978.14
Total present value of wages	11103.64
Present Value Added Value <sup>(1)</sup>	87253.99
Present value of net value added <sup>(2)</sup>	65713.73
Social Surplus <sup>(3)</sup>	54610.09

(1) present value added = gross present value of revenue - total present value of production supplies.

(2) present value of net value added = present value added value - total present value of investment and fixed costs.

(3) Social surplus = present value of net value added - gross present value of wages.

**Source:** Results of the analysis of field study data using Cost Benefit Analysis Prog.

**Fourth:** The most important problems facing grape producers in the Sinai Valley in South Sinai Governorate

The main problems facing grape producers in South Sinai portfolio were:

1. High prices of production accessories.
2. No approved **seedlings** are available to provide high productivity foreign items in the governorate.

Salinization of soil, water of wells and dryness of wells.

4. Difficulty in obtaining permits for boreholes and the high cost of boreholes due to the great depths of their existence.

The exploitation of traders from inside and outside the governorate, in the absence of markets or residential gatherings in the valley.

The producers have demanded the following:

1. The relevant organs, under the authority of the National Service of the Ministry of Agriculture, must provide production requirements and drill and operate wells in accordance with technical studies on groundwater in the Sinai Valley.

2. Work to provide seedlings of highly productive fetal items in the region.

3. Issuance of licences to producers to drill and operate wells in the area.

Fifth: Recommendations: According to the research findings, the research recommends several recommendations, the most important of which is the need to invest in horticultural crops, especially grapes, due to its financial and economic feasibility by encouraging farmers, young graduates and investors in South Sinai governorate to grow this crop. by introducing them to the economic importance of growing grapes, providing seedlings from reliable sources and marketing production, This has the effect of increasing production and the possibility of establishing plants for packing and drying grapes, thereby increasing income, creating new jobs and other industries on the production of grapes.

## CONCLUSION

The problem of research has been the paucity of economic studies that highlight the financial and economic feasibility of investing in the production of horticultural crops in general and grape crops in particular. It aimed to study and analyze the structure of productive costs and revenues, and assess the criteria for financial and economic analysis of the grape crop in South Sinai Governorate as an investment project.

The research reached several conclusions, the most important of which were: The feasibility of

investing in the production of grapes in South Sinai Governorate at an 18% discount rate. The vineyard project in the Wadi Tur Sinai region of South Sinai Governorate can continue its economic utility as operating costs increase and yield decrease separately by 10%, and happen together by 10%. There are several problems facing grape producers in South Sinai governorate. There are many problems facing grape producers in South Sinai governorate.

The research concluded with several recommendations, the most important of which was the need for the direction of agricultural investment in grape orchards due to their financial and economic feasibility. Providing seedlings from reliable sources and marketing production, establishing plants to pack and dry grapes and thereby increase income and provide new jobs

## REFERENCES

- Abdel Aziz S. M. (1987).** Economic Feasibility Studies and Project Evaluation (Foundation, Procedures, Cases). University Youth Foundation, Alexandria.
- Abdel-Azim, H. (1999).** Economic Feasibility Studies and Project Evaluations, Dar al-Shorouk, Cairo.
- Abu al-Naja, M. A. A. and Zaki, Z. I. (2018).** Economic study of the technological methods used in the production of grapes in the new lands. Scientific Journal, Faculty of Agriculture, Cairo University, 69 (1).
- Al Qadi S. M. (2005).** Analytical study of the production and export of table grapes in light of the technology of production systems and varieties in the new lands. Egyptian Journal of Agricultural Economics, 15 (2).
- Directorate of Agriculture, (2021).** South Sinai Governorate, Horticultural Administration, Statistics Records, Unpublished Data.
- Export Council for Agricultural Earners, (2019).** Database.  
<https://www.cbe.org.ar/EconomicResearch/Statistics/Pages/Disconrates.aspx>
- Ministry of Agriculture and Land Rehabilitation, (2004).** General Directorate of Agricultural Culture, Grapes, Bulletin No. 1/2004.
- Ministry of Agriculture and Land Rehabilitation, (2020).** Central Department of Agricultural Economy, Agricultural Economy Bulletin.