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Financial and Economic Evaluation of Cultivar Barley Projects in Northwest Syria

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Abstract

Due to the rise in feed prices caused by global economic inflation, which had a significant impact on the northwestern region of Syria, as well as the decline in pasture area and the search for alternatives to dry feed, the research aimed to conduct a financial and economic evaluation of the sprouted barley production project in northwestern Syria as an alternative. Concerning concentrated dry feed, and to reach this purpose, the research depended on researching the financial and economic evaluation criteria for projects, and the study concluded with various findings, the most notable of which are: An increase in the selling price of the produced unit by 48.97 US dollars/ton, over the average total costs by a rate of 95.97%. The capital payback period was 20.28 months, and the rate of return on investment was 59.19%. The benefit-to-cost ratio was 1.72, and the present value of the net cash flows was 125,840.32 US dollars at a discount rate of 10%, and thus the project is accepted. The internal rate of return reached 52%, which is greater than the opportunity cost of capital, which amounts to 15%, and thus the decision was taken to accept the project. The added value of the project amounted to 3567.6 US dollars, and the customs protection rate for the project's products reached 10.57%, The factor productivity factor reached 1268.64 US dollars, while the productivity factor of capital amounted to 7.16 US dollars for each unit (US dollar) of capital units invested in this project. By calculating the capital density factor, it was found that it reached 0.14.

Key words: ley, culture, Evaluation, financial, economic.

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Introduction

The civilizational progress of people is measured by the products and services they obtain. If their per capita share is high, these people are considered advanced. Therefore, countries always work to improve and raise individuals' standards of living by providing all the products and services they need. Agricultural products in general and animal products in particular are considered to be among the most important. Countries are working to provide, animal products such as red and white meat, dairy, and eggs, which are foodstuffs of high biological value, so progress in the field of animal production helps to provide these products and thus raise the standard of living for individuals. (Animal Production Research Institute, 2014)

The number of cows in the study area reached 25,509 heads, while the number of sheep reached 551,357 heads, the number of goats was 112,499 heads, and the pasture area reached 15,665 hectares. (Directorate of Agriculture and Irrigation in Idlib, 2021 AD)

The variable production costs for raising ruminants represent 86% of the total costs, and feed costs constitute the largest percentage of them, reaching 58% of them. (Al-Abdullah et al., 2019)

Sprouted barley is characterized by its ease of production throughout the year, it saves manpower, and also saves water consumption, as it saves 80% of the amount of water needed for its production on permanent land, and does not need organic or chemical fertilizers. It saves on space investment and the possibility of implementing the project in areas not suitable for agriculture. It is also characterized by its high nutritional value. It contains 18% protein, increases milk production by 18%, increases digestibility to 80%, and reduces dry feed consumption. (Ministry of Agriculture and Land Reclamation, 2016)

Research Problem:

The northwestern region of Syria suffers from the effects of war, siege, and economic sanctions, which led to an increase in the prices of concentrated feed and dry hay due to its total dependence on imports, especially in light of the decline in pasture areas, as well as a decrease in the prices of animal products such as milk, meat, and wool due to the weak purchasing power of the consumer. This led to breeders suffering successive losses that led to the loss of a large portion of their herds to meet their breeding needs. It was necessary to search for means to reduce the costs of raising them, especially feeding costs, which are considered the largest part of the total costs, including projects to produce sprouted green fodder.

Projects for producing sprouted barley have many benefits. These projects did not receive the attention of sheep and goat breeders in the northwestern region of Syria, as well as investors in the animal production sector. Therefore, the problem of the study focuses on the economic and financial feasibility of these projects from the point of view of breeders, investors and the government, since sprouted barley will partially replace dry fodder in feeding ruminants.

Research Objectives:

The research aims to conduct a financial and economic evaluation of the project to cultivate sprouted barley in the northwestern region of Syria as one of the alternative production projects, and to use it as an alternative to dry fodder in feeding agricultural animals, especially ruminants, by studying the following objectives:

- Estimating investment costs.
- Estimating production costs for the project.
- Comparison between the average production costs and the average selling price of the product.
- Estimating revenues and fixed costs at the end of the project's life.
- Calculating the financial and economic evaluation indicators of the project to make a decision on the feasibility of this project or not.

Materials and Methods

To achieve its objectives, this study relied on data contained in the records of barley breeding projects, as well as primary data obtained through personal interviews with the managers of sprouted barley cultivation projects in the northwestern region of Syria in 2021 AD, and on secondary sources of published and unpublished data at the Directorate of Agriculture and Irrigation. In northwestern Syria and based on data from international agricultural organizations and international bodies, it was also assumed that the estimated life of the project is 20 years, according to capital costs.

This study also relied on achieving its objectives based on the criteria used in the financial and economic evaluation of the sprouted barley production project. The criteria used can be classified in financial evaluation, according to the inclusion of the time element in the accounts, there are two types of standards:

Non-discounted standards:

These standards do not take the time element into consideration or the inflation rate, the most important of which are the capital recovery period and the rate of return on investment.

Pay-Back Period:

The pay-back period is defined as the number of years necessary to recover the principal amount invested from the annual net cash flow, and the cash flow is added to each other year after year to reach the amount that is comparable to the investment principal. This criterion is often decisive in the field of investment. Comparison between investments where the goal is to recover the invested funds as soon as possible (Khaira, 2017).

According to this standard, the project that recovers its funds or investment costs in the shortest possible time period is the best and most desirable, and the method of calculating the recovery period is It varies depending on the cash flows, and we find equal and unequal cash flows (Zardak and Bassiouni, 2011).

If the annual cash flows are equal, then:

Payback period = (initial investment value) / (annual cash flows)

Rate of return on investment:

It is the interest rate that equates the value of the cash flows produced by the project with the costs required by the proposed project (Zardak and Bassiouni, 2011).

This standard is based on the concept of accounting profit, which results from comparing the expected revenues for each year of the project's economic life to the expected costs to obtain this revenue, and thus this rate measures the profitability. The investment project is calculated according to the following relationship:

Rate of return on investment = (expected total revenue) / (for the initial investment project) x 100

The decision rule under this method requires that the higher the accounting rate of return, the better, and in the event of a comparison between several Projects, the project with the expected rate of return is preferred (Khaira, 2017).

- Discounted standards:

are the standards by which the discount rate is calculated or the time value of the money unit is taken into account. The most important of these standards are the ratio of benefits to costs, net present value, and internal rate of return.

1- Benefit Cost Ratio

is the ratio of the present value of revenues to the present value of costs at a certain discount rate, and the ratio of benefits to costs for the project is calculated through the following law:

Benefits-to-costs ratio = (present value of revenues ÷ value of current costs) (Attiya, 2008)

2- Net Present Value: Net Present Value

The net present value standard is defined as the difference between the present value of the cash flows that will be achieved over the life of the project and the value of the project's initial investment (Abdel Hamid, 2002).

This standard is based on discounting the Cash flow, that is, calculating the net present value of the annual inflows and outflows and then finding the accumulated quantity of these values. By the accumulated quantity of net present cash flows, we mean the discounted value of positive and negative flow entitlements. This criterion is used to compare projects, the project that achieves the largest net present value being preferred. If it is only one project, it will be rejected if it achieves a negative or zero present value, while if its present value is positive, the project will be

initially accepted, by determining the project's acceptance at the ratio of net income to total investments (Aidoun and Chopin, 2018).

Net can be expressed the present value is as follows:

Net present value of the project = sum (net annual flows x discount rate for each year) (Boujemaa and Ghahraut, 2019)

3- Internal Rate of Return

The internal rate of return expresses the marginal adequacy of capital, and it is the discount rate that makes the present value of cash inflows (revenues) equal to the present value of cash outflows (costs), or it is the discount rate that it makes the ratio of benefits to costs equal to one, or the discount rate that makes the net present value equal to zero, and the internal rate of return is calculated through the following law:

Internal rate of return = minimum discount rate + [the difference between the two discount rates × (the present value of cash flows Net at the lower discount rate ÷ the sum of the two present values of the cash flows at the two discount rates)]. (Abdul Rasoul, 2004 AD)

- Economic evaluation criteria: It depends on several criteria, the most important of which are:

1- Value added:

It expresses the project's contribution to the gross domestic product, and the added value is represented by the total returns of the production factors in the project, which are rents, wages, and profits.

2- Customs protection rate:

It is the protection rate that the project's products are entitled to and is obtained by dividing the added value by the production value at the market price.

3- Worker productivity factor:

It is obtained by dividing the added value by the number of workers.

4- Capital productivity factor:

It expresses the amount of contribution of each unit of capital invested in the project to increase the gross domestic product, and the capital productivity factor is calculated by dividing the added value by the total investments of the project.

5- Capital intensity factor:

The capital density factor is measured by the reciprocal of the capital productivity factor and is called the output capital factor, and it expresses the number of capital units required to produce the equivalent of one monetary unit of production. (Zardak and Bassiouni, 2011 AD).

Results and Discussion

Study of fixed and variable costs and expected revenues:

The financial evaluation of the project requires calculating all of the fixed costs, variable costs, and expected revenues during the expected (economic) life of the project, after which the discounted and non-discounted financial evaluation criteria are calculated.

Fixed costs for the project:

Fixed costs include the price of the electricity source, whether by solar energy or through the electrical network, in addition to the culture room's equipment, including shelves, the air conditioning unit, trays, the irrigation and lighting network, and other meters, sensors, and the control unit. Investment costs also include costs. The value of machines and equipment after the end of their expected life, and finally, investment costs also include the cost of working capital, which is the amount of capital necessary to operate the project for a single production cycle of 7 days until the project begins with cash inflows so that the project owner can rely on it in practicing production activity.

Table (1): Fixed costs for the project.

Statement	Cost US dollars	Percentage %
Building and land rent	12000	44.06
Thermal insulated room	3000	11.02
air conditioner	600	2.20
Intake fan	20	0.07
Intake fan	12	0.04
Metal shelves	3000	11.02
Lighting network	200	0.73
Watering timer	200	0.73
Plastic trays	1000	3.67
Water pump	25	0.09
Misty sprinkler	250	0.92
Water tank	85	0.31
Control Panel	700	2.57
Electric water valves	100	0.37
Ordinary valves	100	0.37
Plastic pipes	30	0.11
Soaking tubs	30	0.11
Solar panels	1950	7.16
Bases for mobile electric power panels	150	0.55
Electrical savings	1440	5.29
Electrical cables	35	0.13
Electrical energy equipment	50	0.18
Voltage raiser	1200	4.41
Working capital	357	1.31
Backup generator	700	2.57
Total	27234	100.00

Source: Collected and calculated from the data contained in the initial records of the project, and the initial data collected through the questionnaire and personal interviews of the managers of these projects.

When reviewing the fixed costs of the project according to the data contained in Table No. (1), it is clear that the land and building rent costs ranked first at 44.06%, with an estimated cost of 12,000 US dollars, while the isolated cultivation room with dimensions of 4*8*3 m ranked second with shelves. Coated metal at a rate of 11.02% each at an estimated cost of US\$3,000 per item, followed by the costs of solar panels with savings with a voltage booster at (5.29, 4.41, 7.16) % respectively, with a total estimated cost of US\$4,590. Based on the above, it is clear that the previous costs were Its percentage is approximately 71.94% of the total investment costs.

Variable costs:

Variable costs include the value of the barley used, labour wages, the value of the water used in production, and the value of sterilization materials (soap, Clorox, and chlorine).

Table (2): The monthly variable costs of the project.

Statement	Cost US dollars	Percentage %
seeds	1155	78.04
Sterilizers	5	0.34
Water	20	1.35
Worker's wages	200	13.51
Maintenance	100	6.76
Total	1480	100.00

Source: Collected and calculated from the data contained in the initial records of the project; the initial data was collected through a questionnaire and personal interviews with the managers of these projects.

Based on the data presented in Table No. (2), it is clear that the total production costs amount to 1,180 US dollars, representing 79.73% of the total production and operating costs, amounting to 1,480 US dollars.

3- Calculating the expected revenues for the sprouted barley cultivation project:

The expected revenues for the project are represented by the value of the sprouted barley, and by studying the production reality of the project, it becomes clear that the daily production is estimated at 1 ton, at an average price of \$100 per ton, meaning the total monthly revenues are approximately 3000 US dollars.

Calculating the value of fixed assets at the end of the project's life:

The value of fixed assets at the end of the project's life was estimated using the straight-line method as follows: Depletion premium = (total depletion value/life of the capital asset).

The scrap value (book value) of the capital assets at the end of the project's life

= the purchase value of the capital asset - the year in which the book value is to be calculated x the annual depreciation instalment. (Al-Thinayan and Salem, 1992)

Through the expected life of fixed assets and comparing it to the expected life of the project, the book value of the fixed assets was calculated at the end of the project's 20-year lifespan, and by substituting in the previously mentioned law, the value of the fixed assets at the end of the project's life becomes approximately \$3046.8.

Table (3): The value of fixed assets at the end of the life span of the project.

Statement	The value upon purchase	the annual depreciation	the value at the end of the project	Percentage %
The room, the air conditioner, the metal shelves, the solar energy system, and the electricity generator	12125	485	2425	79.6
the rest of the assets	3109	124.36	621.8	20.4
total	15234	609.36	3046.8	100

Source: Collected and calculated from the data presented in Table (1).

Comparison between the selling price and the average total costs of sprouted barley:

Total production costs include fixed costs and variable costs. Fixed costs include each of the capital assets, while variable costs include the price of the barley used in the production process, the value of water, sterilization materials, electricity, workers' wages, and land. And construction.

Table (4): Average fixed and variable costs for annual sprouted barley production.

Statement	value US dollars	Percentage %
Annual fixed costs	609.36	6.38
Annual variable costs	17760	93.62
Annual total costs	18969.36	100.00
Total production	360	
Average fixed costs	1.69	3.2
average variable costs	49.33	96.8
average total costs	51.026	100

Source: Collected and calculated from the data in tables (1, 2, 3).

The data in Table No. (4) showed that the total fixed costs amounted to 609.36 US dollars, representing 3.32% of the total costs, while the total variable costs amounted to 17,760 US dollars, representing 96.68% of the total costs, which amounted to 18,369 US dollars. Compared to the average The total costs per unit produced amounted to 51,026 US dollars/ton with an average selling price of the unit produced amounting to 100 US dollars/ton. In light of the weak demand for purchasing sprouted barley, the unit selling price of the product can be reduced until it equals the average total cost of 51.03 US dollars/ton. tons. In this case, the project does not achieve any profits.

But if the average unit selling price of the product decreases from the average total costs, the project incurs a loss, and in light of this loss, will the producer continue to practice his production activity?

According to economic theory, the producer continues to practice his production activity as long as the unit selling price of output is greater than or equal to the lowest point of average variable costs of US\$49.3/ton, and under these conditions, the producer loses only average fixed costs, these are the costs incurred by the producer if he continues or does not continue to practice his production activity.

Criteria for the financial and economic evaluation of the project:

In light of the study of fixed costs, variable costs, and expected revenues, in addition to the value of fixed assets at the end of the project's life span, a table of cash inflows and outflows and net cash flows for the project during its life span of 20 years is prepared from the two tables (5, 6).

Estimating the project's financial evaluation criteria:

It is clear from the data in Table No. (5) in light of the net cash flows during the project's life span and the investment costs, the capital recovery period amounted to approximately 20.28 months, while the rate of return on investment reached 59.19. %.

Table (5): The project's cash inflows and outflows at present value.

The year	Fixed cost	variable cost	total cost	total revenues	Net cash flows
0	27234	0	27234	0	-27234
1	0	17760	17760	36000	18240
2	0	17760	17760	36000	18240
3	0	17760	17760	36000	18240
4	0	17760	17760	36000	18240
5	0	17760	17760	36000	18240
6	0	17760	17760	36000	18240
7	0	17760	17760	36000	18240
8	0	17760	17760	36000	18240
9	0	17760	17760	36000	18240
10	0	17760	17760	36000	18240
11	0	17760	17760	36000	18240
12	0	17760	17760	36000	18240
13	0	17760	17760	36000	18240
14	0	17760	17760	36000	18240
15	0	17760	17760	36000	18240
16	0	17760	17760	36000	18240
17	0	17760	17760	36000	18240
18	0	17760	17760	36000	18240
19	0	17760	17760	39046.8	21286.8
total	27234	337440	364674	687046.8	322372.8
mean	1361.7	16872	18233.7	34352.34	16118.64

Source: Collected and calculated from the data contained in Tables (1, 2, 3).

Table (6) Cash flows of the project at the future value at a discount rate of 10%.

The year	Present value of costs	Present value of revenues	present value of net cash flows
0	27234	0	-27234
1	16145.45	32727.27	16581.82

2	14677.69	29752.07	15074.38
3	13343.35	27047.33	13703.98
4	12130.32	24588.48	12458.17
5	11027.56	22353.17	11325.6
6	10025.06	20321.06	10296
7	9113.69	18473.69	9360
8	8285.17	16794.27	8509.09
9	7531.97	15267.51	7735.54
10	6847.25	13879.56	7032.31
11	6224.77	12617.78	6393.01
12	5658.88	11470.71	5811.83
13	5144.44	10427.92	5283.48
14	4676.76	9479.93	4803.16
15	4251.6	8618.11	4366.51
16	3865.09	7834.65	3969.56
17	3513.72	7122.41	3608.69
18	3194.29	6474.92	3280.62
19	2903.9	6384.46	3480.56
total	175794.98	301635.3	125840.32
mean	8789.75	15081.76	6292.02

Source: Collected and calculated from the data presented in Table (5).

From the data in Table No. 6 for calculating the discounted criteria at a 10% discount rate, it is clear that the total present value of revenues amounts to 301,635.30 US dollars, while the total present value of costs amounts to 175,794.98 US dollars, and then the ratio of benefits to costs is 1.72, and thus the project is accepted due to the ratio of benefits to costs being greater than the correct one. Based on the data contained in Table 6, it is clear that the present value of the net cash flows is 125,840.32 US dollars, which is a positive value, and therefore the project is accepted. As for the internal rate of return, it is clear that it is 52. %, which is greater than the opportunity cost of capital, which amounts to 15%, and thus the decision is made to accept the project.

Calculating the economic evaluation criteria for the project:

The economic evaluation of the sprouted barley cultivation project was based on several criteria, the most important of which are:

Value added: It expresses the project's contribution to the gross domestic product, and the added value is represented by the total returns of the production factors in the project, which are rents, wages, and profits.

By calculating the added value, it was found that it amounted to 3,567.6 US dollars according to the following equation:

Value added = rents + wages + profit = 2,400 + 600 + 805,932 = 3,805,932 US dollars.

Customs protection rate: It is the rate of protection that the project's products are entitled to and is obtained by dividing the value added to the value of production at market price.

Based on the above, it is clear that the production value of the project amounts to 36,000 US dollars, and the added value amounts to 3,805,932 US dollars, by calculating the customs protection rate for the project, it turns out that the protection rate reached 10.57%.

Worker productivity factor: It is obtained by dividing the added value by the number of workers, by calculating the factor productivity factor, it was found that it amounted to 1268.64 US dollars.

Capital productivity factor: It expresses the amount of contribution of each unit of capital invested in the project to increase the gross domestic product. The capital productivity factor is calculated by dividing the value added by the total investments of the project. It turns out that the capital productivity factor is 0.14 US dollars per year. A unit of capital was invested in this project.

Capital density factor: The capital density factor is measured by the reciprocal of the capital productivity factor and is called the output capital factor. It expresses the number of capital units required to produce the equivalent of one monetary unit of production. By calculating the capital density factor, it was found that it reached 7.16 according to the following equation: Capital density factor Capital intensity = (investments/value added)

Conclusion

Based on the above, we conclude the following:

The necessity of relying on green fodder breeding technology in conditions of the absence of pastures and the high costs of ready-made fodder. High values of financial evaluation criteria indicate the high profitability of this project. Increasing the productivity factor and capital density factor. Increasing the feasibility of projects by reducing construction costs and relying on leasing them.

Proposals:

The study recommends, based on the results of the economic and financial evaluation criteria for sprouted barley production projects: Expanding these projects and adopting them by the authorities, Government and economic activities in the region. Work to have farmers adopt such projects because they save significant money through agricultural extension agencies. Contract with companies specializing in implementing these projects to avoid technical errors that would increase costs. Propose plans for financing, such as projects provided by the Ministry of Agriculture and Irrigation, to overcome the poor cash flow of breeders.

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