Al Najjar

STADY THE TECHNICAL AND ECONOMIC FEASIBILITY AND ENVIRONMENTAL IMPACT FOR A PROJECT OF RAISING MILK COWS IN GOGJALI REGION NINEVEH GOVERNORATE

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ABSTRACT
This study was aimed to determined by number of dairy cows breeding projects to produce milk using high productivity cows in Nineveh Governorate. The research aims to study the economic feasibility and environmental impact of the proposed project to be established in Nineveh Governorate using financial evaluation criteria. In order to prove the research hypothesis, the criteria of commercial profitability were used under the condition of certainty and uncertainty. It was found from the results of the research that the value of the net present value, the benefit-cost ratio, and the internal rate of return were 2911447, 1.74, and .18%, respectively. While the time period for recovering the project's investment costs is 5 years and two months. The research concluded that the proposed project is economically acceptable, and that making the investment decision regarding its implementation does not accept hesitation even in the event of negative changes in the components of the evaluation model. By testing the sensitivity of the project to changes in its components, the negative effects of the project on the environment can be mitigated. Therefore, the research recommends financing the project because, the project does not involve environmental risks, the acceptable profits that it will achieve, and to encourage investment in establishing dairy cow breeding projects to contribute to limiting the import of fresh milk.

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دراسة الجدوى الفنية والاقتصادية والاثر البيئي لمشروع تربية ابقار الحليب في منطقة كوكجلي محافظة نينوى

ايمان يونس النجار

مدرس

جامعة الموصل كلية الزراعة والغابات

المستخلص

تتحدد مشكلة البحث في قلة اعداد مشاريع تربية الابقار المتخصصة في انتاج الحليب كمنتج رئيسي بالاعتماد على ابقار عالية الإنتاجية في محافظة نينوى. يهدف البحث الى دراسة الجدوى الاقتصادية الاثر البيئي للمشروع المقترح انشاءه في محافظة نينوى باستخدام معايير التقييم المالي، ومن اجل اثبات فرضية البحث استخدمت معايير الربحية التجارية في ظل حالة التأكد وعدم التأكد اذ تبين من نتائج البحث ان قيمة كل من صافي القيمة الحالية ونسبة المنفعة الى الكلفة ومعدل العائد الداخلي بلغت 2911447 , 1.74 , ..18% على الترتيب، والمدة الزمنية التي يستغرقها المشروع لاسترداد تكاليفه الاستثمارية هي 5 سنوات وشهران ، خلص البحث ان المشروع المقترح إنشاؤه مجدي اقتصاديا مما يجعل اتخاذ القرار الاستثماري بشأن تنفيذه لا يقبل التردد حتى في حالة حدوث تغيرات سلبية في مكونات نموذج التقييم وذلك من خلال اختبار حساسية المشروع للتغيرات في مكوناته , يمكن التخفيف من الآثار السلبية للمشروع في البيئة، لذا يوص البحث بتمويل المشروع لكونه لا يتسم باي مخاطر في ظل الأرباح التي سيحققها, تشجيع الاستثمار في انشاء مشاريع متخصصة لتربية ابقار الحليب للمساهمة في الحد من استيراد الحليب الخام.

الكلمات المفتاحية: معايير التفضيل الزمني، تحليل الحساسية، التحليل المالي

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INTRODUCTION

The economic feasibility of a new project is a systematic method used to identify the extent of the benefit that will be achieved through the expected investment decision (4). The prior evaluation provides the investment decision maker with a comprehensive vision of what the proposed project and its economic life will be. So that a specific decision can be taken regarding the establishment of the project or not, according to specific financial, economic and environmental criteria. Thus, the decision maker can address any shortcomings or financial obstacles that the project may face in the future. The economic feasibility study is an effective scientific and practical tool for evaluating investments and according to the point of view of society or from the point of view of the project itself (9). Although Iraq possesses the ingredients for establishing livestock projects, including cow breeding projects, which are one of the important tributaries in the global economy and provide products of great economic value (17). These projects suffer from problems due to natural, human and life reasons as a result of neglect or shortcomings in their implementation. Reports of the Iraqi Ministry of Agriculture indicate a decrease in milk production. This is a result of the cessation of government support for milk producers on the one hand, and the decline in productivity that is attributed to the primitive method of raising milk cows based on local cows with low productivity, on the other (27).Summarize the research problem is that the abundance of local milk cows , which are the main source of raw milk production in Nineveh Governorate, the production of raw milk is still low and does not meet the need. This is due to the primitive traditional system of dairy cow breeding projects, the lack of application of modern methods (specialized breeding) in raising milk cows related to the level of milk production and quality, and the low production efficiency of local cows compared to imported cows. Therefore,. It has become necessary to establish the suggested project to breed the foreign imported dairy cows because the local breed are characterized with poor milk productivity, while the foreign ones are with high milk productivity. In addition to that, selecting the most successful and most secure investment opportunity to raise the efficiency of using the economic resources available in this field in order to meet the increasing local demand on milk .The dairy cows breeding project is considered one of the necessary projects for its economic and social importance, as it is a project that represents the import substitution strategy. The importance of the project increases as the number of dairy derivatives industry increases. Therefore, the focus was on the technical and economic feasibility study and the environmental impact of this project, because there is a close relationship between the economic and environmental feasibility studies and the nature of investment decisions .The research aims to study the technical and economic feasibility and analyze the environmental impacts resulting from the establishment of the project under study. This will be done using financial and environmental assessment criteria to avoid the project from faltering, and in order to advance the reality of dairy cow breeding projects in the province. The research is based on the hypothesis that the . The projects of breeding foreign dairy cows in general and the Holstein Friesian breed in particular are considered of the projects in that accomplish economic and financial feasibility, which result in a high cash flows to the investors. Also, the undesirable environmental effects of this type of projects can be studied in order to take the necessary measures to deal with the causes of these effects and to limit them. Among the studies and research that have been reached and benefit from them in the research methodology, including the study (14,11,15).

MATERIALS AND METHODS

This research was carried out in cooperation with the Nineveh Agriculture Directorate - Animal Production Department, preparing an economic feasibility study for the purpose of establishing dairy cows breeding projects in Nineveh Governorate. Being projects that will achieve economic savings for the investor and other productive units, and thus the sustainability of the production process and the achievement of technical and economic efficiency at the level of the national economy. To achieve the objectives of the research, the project was formulated in its main stages,

which included the diagnosis of the project, the marketing and technical study, the financial evaluation of the project before implementation, the project's impact on the environment in which it is active, and finally, a sensitivity analysis. The research relied on primary data from its field sources, and the data on the proposed project was guided by repeated field visits to the relevant agricultural departments, from the proposed project area, and secondary data - office. To reach the economic feasibility indicators for the proposed project, the research required a financial evaluation using a number of commercial profitability criteria under conditions of uncertainty, uncertainty and risk, leading to the final report that includes a recommendation to accept or reject the proposed project. To prove the hypothesis of the research requires carrying out several studies included in the economic feasibility study for this project

First- Marketing study The marketing feasibility study and its results is considered the basis of making the decision of the project establishment. The marketing study of the proposed project involved identifying its production capacity in accordance with the data obtained. The estimations of the Iraqi Ministry of agriculture indicated that the domestic production of raw milk did not meet the required domestic demand of this product and this motivated Iraq to depend on the external markets to deal with this shortage

(27). It is expected that this shortage will continue if the investors did not head to investment in the field of milk production. Therefore, the most important requirements of the marketing study of this project is to forecast the volume of food gap between the expected production and the expected available consumption on the level of Iraq in terms of raw milk production within the virtual age of the project, depending on the time series for the period (1990-2020) for the production and available consumption (26). The predicted quantities in table (1) showed the food gap of raw milk for the period 2023-2032 if the local production of raw milk is not increased. In addition to that the results of the same table refer to the average for gap volume between the expected production and the expected available consumption which was (16896.4) hundred tons annually. This means that the investors have an opportunity to establish dairy cow breeding projects. Therefore, the proposed project can contribute a percentage (%0.005) to fill part of the deficit for this product, and provide its percentage (%0.150) of the local production .The food gap of the raw milk was estimated and predicted for the period 2023-2032 using Box-Jenkins ARIMA Model for prediction (8 ,22). according to the Eviews10 program. The model chosen for forecasting is (2,1,2) , (1,1,1) for both production and consumption available, respectively

Table 1. the predicted values of the quantity of production available consumption and the volume of the gap for milk in Iraq for the period 2023 – 2032

years	Quantity of production 100 ton	available consumption 100 ton	the volume of GAP 100 ton
2023	7499	22221	14722
2024	7462	22622	15160
2025	7225	23023	15798
2026	7216	23424	16208
2027	7049	23826	16777
2028	7061	24227	17166
2029	6949	24629	17680
2030	6979	25031	18052
2031	6911	25432	18521
2032	6954	25834	18880
Total	71305	240269	168964
Average	7130,5	24026,9	16896,4

Source: Prepared by the researcher based on the outputs of the Eviews10 program.

Second-Technical study:

The technical study is one of the basic studies in drafting the project, and the technical study of the project includes everything related to the establishment of the project, its location, method of operation, design pattern and provision of production requirements (13). The technical feasibility study for the proposed project dealt with the following aspects: **- Project location**: The proposed project for raising dairy cows is located in the Gokgeli area, north of the city of Mosul, 12 kilometers from the city center. It is an area specialized in raising sheep and cows. The total area of the project is 13.61 dunums, and an area of 1.61 dunums has been allocated for the construction of buildings and facilities for the project in addition to the project's roads, while the rest of the land is allocated for the production of green fodder. In general, the project land is suitable for growing fodder crops and the project is located outside the boundaries of the Mosul municipality, in order to avoid the negative effects of the project on the environment.

Requirements for setting up a dairy cow breeding project:

Based on the expected activities, the project requirements have been identified, which include: 1- Buildings and constructions for the herd. The constructions for the herd were taken into consideration to meet the animals' biological necessities and facilitate managing the work of the project table (2).

Table 2. Buildings and constructions required for the dairy cattle breeding project

	Constructions	Required No.	Value/thousand IQD
1	Administration building and technical and administrative affairs	1	30000
2	dairy cows barns	5	35000
3	birth sheds	2	25000
4	calves sheds	2	10000
5	insulation sheds	1	5000
6	artificial insemination shed	2	4000
7	fodder store	2	40000
8	Milk collection and cooling unit	1	6500
9	veterinary clinic	1	15000
10	project fence	600m	214665
11	spare tool store	1	1250
12	automatic milking unit	1	5000
13	biogas production unit	1	24999
	Total		416414

Source: Prepared by the researcher based on the technical study and local market prices for the year 2021

2- The machinery and equipment needed to manage the cow herd for the project table (3)

Table 3. Machinery and equipment needed for the project

	Detail	Required No.	Value/thousand IQD
1	milking machine	10	7500
2	Biogas generator	1	26000
3	cow litter scavenging device	1	750
4	70 hp farm tractor	1	15000
5	Moor Deck	1	250
6	Trailer For Feed Distribution	1	1000
7	10000L drinking water tank	5	5000
8	250 liter stainless steel milk tank	5	12000
9	3 ton loading car	1	18000
	Total		85500

Source: Prepared by the researcher based on the technical study and local market prices for the year 2021

3-The project's needs of technical, administrative and labor manpower were also estimated table(4)

Table 4. Project's needs of manpower

	Man power	Required No.	Annual wages / thousand dinars
1	Project manager	1	5100
2	Agricultural engineer	1	3600
3	veterinary doctor	1	4200
4	Accountant	1	2400
5	loading truck driver	1	2400
6	farm tractor driver	1	1800
7	permanent workers	7	12600
8	temporary workers	10	3240
9	Foreman	1	2100
10	Guard	2	3369
	Total		40809

Source: Prepared by the researcher based on the technical study and labor prices for the year 2021

The main features of the dairy cow breeding project and its production plan

The economic life of the project: for the requirements of the financial analysis of the project, it was determined at the age of 11 years in the light of the general average of the productive life of the imported Holstein Friesian milk cows (10). The project's production plan includes the establishment and operation of a project to produce raw milk as a main product, in addition to the by-products that include calves resulting from the births of herd cows according to the years of the project, biogas, bio fertilizer, in addition to production green fodder production (jet, alfalfa, yellow corn).

Production capacity/size of the project:
After the year of construction, the project begins with raising a herd of milk cows by purchasing 100 pregnant milk cows, imported from the pure Holstein Friesian breed, to give birth and give milk in the second year of the economic life of the project. Determine the project size (herd size of milk cows) to produce raw milk according to the results of predicting the volume of the nutritional gap for raw milk, which constitutes (0.150%) of this volume during the period (2023-2032). This is based on personal interviews for Holstein Friesian cows breeders in the project region, and (6). Study of the average length of the milk season of 305 days, and their average daily milk production of 25 L /day per cow.

Evolution of herd size : The growth rate of the milk cows herd for the proposed project was estimated using the parameters that included: 98% birth rate annually, 60% of births are male calves, 40% of births are female calves. The general average age at the first fertilized vaccination was estimated to be 20.4 months, the average age at first birth was 29.5 months, and the average period between two births was 428 (63 days) (1).

- Calves are sold annually and throughout the life of the project, with an average age of 10 months an average weight of 350 kg. Based on the rates shown previously, the movement of the herd during the economic life of the proposed project (project years) is shown in table (5)

Table 5. Movement of the animal herd of the dairy cow breeding project during the life of the project

Year	No. of female calves				Total number at the end of the year	No. of male calves				Total number at the end of the year	Lactating cows
2023	-	-	-	-		-	-	-	-		100
2024	39	-	-	-	39	59	-	-	-	59	100
2025	39	15	-	-	54	59	23	-	-	82	100
2026	39	15	-	-	54	59	23	-	-	82	139
2027	39	15	5	-	59	59	23	8	-	90	139
2028	39	15	5	-	59	59	23	8	-	90	154
2029	39	15	5	2	61	59	23	8	3	93	154
2030	39	15	5	2	61	59	23	8	3	93	159
2031	39	15	5	2	61	59	23	8	3	93	159
2032	39	15	5	2	61	59	23	8	3	93	161

Source: 1- Prepared by the researcher based on the personal interview; 2- Research Center of the Livestock Department, Nineveh Agriculture Directorate; 3- Study (1).

- production cycle : The productive cycle of a Friesian dairy cow extends throughout the year. It begins with calving that releases milk production and gradually increases to its peak after the forty-fifth day after birth. The productivity of a Friesian cow of milk ranges between 30-40 liters / day and over a period of

280-305 days / year. Dry period up to 60-65 days/year (7).

Production plan requirements : The project requires the provision of production requirements according to the production capacity of the project, which are:

1- Concentrated feed: Holstein Friesian dairy cow consumes about 10 kg/day of feed throughout the year. The size of the herd increases annually according to the birth rate, thus calves of 6-12 months old consume 3-5 kg / day.

2- Green fodder: The herd of cows depends on green fodder that is provided from the cultivation of fodder crops such as jet, alfalfa, and yellow corn, on the project land. Green fodder is distinguished by its good nutritional value and cost savings. The average consumption of green fodder by a dairy cow is 10 kg / day, and a calf at the age of (3-10) months consumes a quantity of green fodder ranging from 3-5 kg / day.

3- Dry fodder: Milk cows are fed on hay. The average requirement of one cow is 7 kg/day as a main meal. Based on that, the amount of hay needed by a herd of dairy cows is estimated based on the size of the herd and the production plan.

4- Mineral requirements of the project herd: The required quantities of basic minerals were determined according to the average weight of a dairy cow 450 kg (1). Accordingly, the average daily requirement for a dairy cow of sodium, magnesium, calcium and phosphorous was estimated to be 11 g, 17.5 g, 9.5 g, and 8 g, respectively.

5- Fuel and oils: The fuel consumption rate for the project's machines is estimated at (4 liters / hour) and at an operating rate of 8 hours / day), and thus the required amount of fuel is 37,960 liters / year, and up to 6660 liters/year of oil for the project's machinery.

6- Artificial insemination: The project depends on artificial insemination, by importing frozen semen, the use of artificial insemination will lead to the sale of calves and save the cost of their care (6).

Third: Environmental Feasibility Study
It aims to assess the environmental impact of the proposed investment project and includes identifying the potential effects of the project (negative or positive) on the environment, in order to ensure human safety and health (2). Livestock projects produce many undesirable environmental impacts. It may contribute to environmental problems, including global warming, air and water pollution, in addition to the loss of biodiversity. Globally, livestock raised for the purpose of producing beef or dairy products has been found to be the largest source of GHG emissions from livestock and is responsible for 77% of the total emissions (28). Among the most important greenhouse gases that affect the environment are carbon dioxide, CO_2, and methane, CH_4. The latter is characterized as having the highest concentrations of greenhouse gases, contributing by 20% to global warming, with a rate that exceeds the effect of CO_2 by about 25 times (3). Intestinal fermentation is a source of methane produced during the digestive process of cows by belching as well as anaerobic decomposition of organic matter. According to the report issued by the Food and Agriculture Organization (FAO), it was found that among the main greenhouse gases is methane, which constitutes 44% of the total amount of gases emitted by livestock (29). This requires conducting an environmental feasibility study to assess the environmental impact of the proposed project . The negative effects of the proposed project In order to identify the negative impacts of this project, the quality and quantity of the wastes and emissions that are expected to result from operating the project were identified according to the technical study of the project. Therefore, the wastes of the project include the solid wastes represented by the cow dung and the liquid wastes that are a source of Methane that causes global warming, which results from the anaerobic fermentation of the cow dung. The quantity of these wastes were estimated according to the size of the herd in the project within the economic age. Negative environmental impacts of the proposed project: Through the analysis of the expected negative environmental impacts from the operation of the project, it was found that there is a quantity of residues and emissions resulting from raising the project's cows table (6) Which can be treated using biogas technology by establishing a biogas unit in the project. In it, the biomass of cow dung is

converted into biogas used to generate electric power which has been estimated at a rate of 4,630 kilowatt-hours per year (23). This energy can be used as a source to operate the electrical appliances of the project. As well as the production of 3563 tons of bio- fertilizer resulting from the remaining mass after fermentation (organic waste), which is clean compost and free from odors, insects, pathogens and weed seeds fertilizer resulting from the remaining mass after fermentation (organic waste),

Table 6. Residues generated from dairy cows of the project during its economic life

Types of waste	Quantity
solid waste (dung)	9186 ton
liquid waste (urine)	11400m³
methane gas	2572m³

Source: Prepared by the researcher based on the information provided by IPPC report

Fourth: Financial feasibility: The financial feasibility study deals with determining the commercial profitability of the project by analyzing the cost-benefit structure of the proposed project(20). which is evaluated on the basis of market prices, as follows:

- Total estimated costs: Table (7) shows the total costs of the project, which included the items of investment costs and operational costs and their relative importance during the project's economic life.

1- Investment costs: The value of investment costs during the economic life of the project amounted to (548009 thousand dinars), which represents 8.4% of the total costs.

2- Operational costs: The value of operational costs during the economic life of the project amounted to (5927757) thousand dinars, which represents (91.5%) of the total costs.

Table 7. Cost structure items (thousand IQD) and their relative importance

investment costs	Value thousand IQD	Relative importance %	operational costs	Value thousand IQD	Relative importance %
Administration and Technical Affairs Building	30000	4.91	Alfalfa seeds	80	0.001
Cow and calf barn building	199000	32.72	Clover seeds	102	0.002
fodder store	20000	3.3	yellow corn seeds	58	0.001
milk collection unit	6500	1.07	chemical fertilizers	210	0.004
veterinary clinic	15000	2.44	imported cows	500000	8.43
well with pump	3000	0.49	artificial insemination	14880	0.25
project fence	214665	35.4	land rent	89826	1.51
irrigation network	1000	0.17	Salaries and wages	375600	6.33
3 ton tonnage car	18000	2.97	fuel	57560	0.97
10000L drinking water tank	5000	0.82	Fats and oils	1456	0.025
250 liter stainless steel milk tank	12000	1.96	dry fodder	1044030	17.61
spare tool store	1250	0.21	concentrated feed	2205000	37.19
Mahlab to me	7500	1.24	base metals	8371	0.14
automatic milking unit	5000	0.82	feeders	413269	6.97
Biogas generator	26000	4.21	Medicines and veterinary supplies	735600	12.40
cow litter scavenging device	750	0.12	Other supplies	481654	8.125
70 hp farm tractor	15000	2.45	-	-	-
Mor	250	0.41	-	-	-
Deck Trailer For Feed Distribution	1000	0.16	-	-	-
Oujda biogas production	24999	4.12	-	-	-
yellow corn seeds	9	0.001	-	-	-
Green fodder seeds	20	0.003	-	-	-
chemical fertilizers	30	0.005			
Total	605973	100		5927696	100
		Total costs: 6533669 thousand Iraqi dinars			

Source: Prepared by the researcher based on the technical study and local market prices for the year 2021

Estimated total revenue

The total value of the revenues generated for the project, which was (12596677) thousand dinars during the economic life of the project from multiple sources.

Table (8) shows the revenue items and their relative importance, which included each of the total value of raw milk, sale of male calves, bio fertilizer, sale of milk cows in the last year of life for a project whose values were (10702500, 789000, 281520, 602800)

thousand dinars, respectively, with a percentage of (84.96%, 6.26%, 2.23%, 4.78%) of the total revenues. In the eleventh year (the last of the economic life of the project), the estimated values of some of the project's assets (scrap) usable after the end of its economic life were added with a value of (220,857) thousand dinars, which constitutes 1.75% of the total revenues.

Table 8. Items of revenue structure and their relative importance expected to be obtained for the proposed project during its economic life

	revenue items	Quantity	Unit	Price average IQD	SUM/Thousand IQD	Relative importance%
1	raw milk	10702500	Liter	1000	10702500	84.96
2	calves	775	Animal	1018064	789000	6.26
3	bio fertilizer	3312	Ton	85000	281520	2.23
4	Selling milk cows	643	Animal	937420	602800	4.78
5	scrap	-	-	-	220857	1.75
	Total				12596677	100

Source: Calculated by the researcher based on the questionnaire form, market prices for the year 2021

The Financial study of the project: This study aims to ascertain the availability of the financial resources necessary for the establishment and operation of the project. Also to determine the extent of the project's ability to fulfill its obligations towards financial institutions in the event that the money it obtains through external financing. Accordingly, the costs incurred by the project during its economic years were estimated, which amounted to (6475766) thousand dinars, which represents the value of the loan obtained by the project from a government bank at an interest rate of 8%.

Financial evaluation of the project: The evaluation process is considered as a subsequent stage for the economic feasibility studies of the project, so the result of the financial evaluation is a basis for taking the decision to accept or reject the proposed investment project, based on scientific bases (12). Therefore, the financial evaluation of the proposed project was carried out based on a set of criteria, which differ according to the circumstances of the investment decision-making(4).

First- Criteria for financial evaluation under conditions of certainty:

1- Standards for measuring undiscounted commercial profitability: They are characterized by their neglect of the time value of money, the most important of which are:

- **Payback period criterion, the period** required to recover the funds invested in the project through the net cash flows that the project generates (5). Since the cash inflows of the proposed project are different and varied from year to year, so the equation for calculating the payback period for the proposed project (30). is:

$$Project\ capital\ payback\ period = \frac{total\ costs}{(total\ outflows)/(project\ life)}$$

$$Project\ capital\ payback\ period = \frac{total\ costs}{average\ flow}$$

- Annual profit: It is the difference between the total annual revenues and the total annual operating costs , It can be calculated according to equation(24). annual : profit = total annual revenue - total operating costs

Avareg Return on capital = annual profit ÷ initial investment value (18).

Capital Return : to calculate capital return we can use the following form (21).

Capital Return = (Annual Profit ÷ Fixed Capital) x 100

2- Time preference criteria: To reach confirmed indicators of the feasibility of the project, the research required conducting a financial analysis using the criteria of time preference (9). which are:

Benefit / Cost Ratio: B/C Ratio: It is the ratio of the present value of benefits to the present value of costs, and the present value represents the cash flow of values in different years after making an appropriate discount rate Benefit/Cost Ratio = Total present value of benefits / Total present value of Costs*100

Net Present Value (NPV): It refers to the difference between the present value of cash inflows and the present value of cash outflows. The general rule of this criterion is to accept the proposal economically when it achieves a positive NPV.

Net present value of income =Total present value of cash inflows -Total present value of cash outflows

The internal rate of return (IRR): according to (19). The internal rate of return IRR is the discount rate that reduces the net present value to zero, and the main idea of it is to find the discount rate using which the investment value is equal to the present value of the net cash flow over the life of the project.

Internal Rate of Return = Lower discount rate + different between the discounts*Cash flow at the two discounts rate

Second - Criteria for financial evaluation under conditions of risk: In order for the investment decision to be correct and accurate, it must take into account the negative changes in the components of the evaluation criteria that may occur. Among the methods that enable the evaluation of investment projects in light of risk and uncertainty (24).

1- **Sensitivity analysis**: studying the effect of increasing the actual costs of the project over the estimated costs by 10% when the estimated revenues are fixed, the increase in the actual costs of the project over the estimated costs by 10% with the stability of the estimated revenues. A decrease in actual revenues from the estimated revenues by 10% with the stability of the estimated costs. Reducing the economic life of the project from 11-9 years by imposing its occurrence on the profitability of the project, that is, testing the sensitivity of the proposed project to changes in its components (16). through the life of the economic project using the criteria of time preference .

2- Break-Even Point: This analysis is conducted with the aim of determining the lowest level of productivity or levels of sales at which the project can operate without endangering its financial continuity .

The break-even point is calculated according to the following formula (4).

$$Break - even\ point = \frac{fixed\ costs}{selling\ average\ price\ -\ per\ unit\ variable\ cost}$$

As for the break-even ratio, it can be obtained according to the following formula:

$$Equivalent\ ratio\% = \frac{Equivalent\ amount}{project\prime s\ total\ production\ capacity} ⊡ 100$$

Safety margin= project's total production capacity - the break-even quantity

The monetary value of the break-even is also expressed by the following formula:

$$cash\ breakeven\ value = \frac{fixed\ costs}{\frac{The\ variable\ costs\ of\ one\ unit}{Unit\prime s price} - 1}$$

RESULTS AND DISCUSSION
Financial evaluation of the proposed project: It is clear from the results of the analysis using the criteria of commercial profitability under certain conditions, table (9), that the capital recovery period for this project is the fifth year, not including the year of construction. Therefore, all outflows are completely covered by the revenues, and this shows the extent of profitability of this project. The same table also shows that the average rate of return exceeds the interest rate imposed on the project by the financing entity, so it is economically acceptable. It can be said that this rate is the true expression of the marginal sufficiency of capital. Also, the value of the annual profit and the annual profit rate indicate the profitability of the project.

Table 9. Results of financial evaluation using traditional criteria

standard used	Standard value	Unit
Payback period	5.2	5 years and 2 months
annual profit	6940251	Thousand IQD
annual profit rate	56%	%
Average rate of return	% 210	%

Source: Prepared by the researcher based on the information in table 7 and 8

The results of table (10) showed that the proposed dairy cow breeding project can be established according to the results of the financial analysis. It was found that the B/C ratio of the project amounted to (1.74%) dinars, at a discount rate of (12%), and this means that the dinar that the project will pay will achieve a net income of (0.74) dinars, and

thus achieve financial profitability throughout its economic life. As it is clear from the data of table (10) that the net present value of the project at a discount rate of 12% amounted to (2911447) thousand dinars. As a result of the financial analysis, it was found that the net present value is positive, meaning that the project is profitable at the discount rate of 12%. This means that this project can be established, and the addition of one Iraqi dinar affects the NPV. Therefore, the present value of revenue is greater than the present value of costs. This is in contrast to the results of the study (14). where the negative value of this criterion. This indicates low milk production for local dairy cows breeding projects, and supports the problem mentioned by the research. The results also showed that the project's internal rate of return amounted to (18%) at the discount rates of 15% and 20%, which means that the proposed project has a profit rate of (10%), given the prevailing interest rate set by the funder of this project of 8%.

Table 10. Financial Evaluation of the Proposed Project

No.	Standards used	Standard's value	Discounting price
1	B/C ratio	1.74%	12%
2	NPV: Net Present Value	2911447 Thou. IQD	12%
3	IRR: Internal rate of Return	18%	15% and 20%

Source: Data analysis by the researcher using time preference criteria and data of Table 7 and 8

Sensitivity analysis: The sensitivity of the proposed project to changes in its components, through its economic life, was tested using the criteria of time preference as shown in table (11)

1- Assuming that the actual outflows of the project exceed the estimated costs by 10%, with the stability of the estimated revenues. A 12% decrease in the B/C ratio at the discount rate from (1.74) dinars to (1.6) dinars, i.e. by (0.14) dinars, a decrease in NPV at the same discount rate from (2911) thousand dinars to (2503) thousand dinars, i.e. by (408) One thousand dinars, while the IRR at the discount rates of 15% and 20% decreased from (18.05%) to (18.04%) with a difference of (1.01).

2- Assuming a decrease in actual inflows from the estimated revenues by 10% with the stability of the estimated costs. A decrease in the B/C ratio at the discount rate 12% from (1.74) dinars to (1.5) dinars, i.e. a difference of 0.24 dinars. The net present value (NPV) decreased at the same discount factor from (2911) to (2212) thousand dinars, with a difference of (699) thousand dinars. The internal rate of return (IRR) also decreased at the discount rates of 15% and 20%, from (18.05%) to (18.02%), with a difference of (0.03%).

3 - As for the sensitivity of the project, assuming a short economic life of the project from 11- 9 years, the results show table (11), that the project's B/C ratio is 1.61 dinars at a discount rate of 12%, which decreased by 0.13 dinars compared to the estimated B/C ratio before the project's short life of 1.74 Dinar. The net present value of the project at a discount rate of 12% decreased by a small amount from 2,911 thousand dinars to 2,289 thousand dinars, a difference of 2,682 thousand dinars. The internal rate of return (IRR) at the discount rates of 15% and 20% is 17.9%, and it decreased by 0.5% compared to the internal rate of return before conducting the sensitivity analysis for the project. It is also clear table (11) that the project is more sensitive to the second variable, which is the decrease in actual revenues from the estimated by 10% compared to the first and third variables, which is reflected in the value of B/C, NPV, IRR by 0.24%, 699 thousand dinars, 0.03 thousand dinars, respectively. . When comparing the lowest value of the realized internal rate of return after conducting a sensitivity analysis for the proposed project (18.02%) with the interest rate specified by the entity financing the project, it becomes clear that the project still enjoys profitable economic feasibility. And that the project, during its economic life, achieves a net capital return of 10.02%, which means that the project is characterized by low risk.

Table 11. Sensitivity analysis test for the financial evaluation of the proposed project during its economic life

Negative changes	Time preference criteria value			The effect of negative changes		
	B/C at 12% discount	NPV at 12% discount	IRR at 15% and 20% discount	B/C at 12% discount	NPV at 12% discount	IRR at 15% and 20% discount
Actual costs over the estimated by 10%	1.6 I.D	2503 Thous. IQD	18.04%	0.54	408 Thous. IQD	1.01%
Actual revenue less than estimated by 10%	1.5	2212	18.02%	0.24	699	0.03%
Shorten economic life of the project from 11-9 years	1.61	2289	18.03%	0.25	622	0.5%

Source: Prepared by the researcher based on the results of project's financial evaluation

Break-even point analysis: It is clear from table (12) that this project, based on the available information, achieves a break-even point when its production capacity reaches 87,994 liters / year ,and with this level of production, it will achieve neither profit nor loss). With this project, it exceeds the break-even point with an estimated annual production of 1070250 liters / year. It is also clear from the same table that the project is characterized by low risk as it has an appropriate margin of safety, which represents the difference between the level of operation at the break-even point and the expected production capacity of the project (the safety zone). From the break-even value, it is clear that the project achieves its monetary break-even point when it produces a level of production valued at 1,095,929 thousand dinars / year, and at this level of production value, it neither achieves profit nor loss.

Table 12. Break-even analysis of the financial evaluation of the proposed project during its economic life

Indications	Value	Unit
Breakeven	87994	Liter/year
break even ratio	0.08	Year%
safety margin	982256	Liter
cash breakeven value	1095929	Thou. IQD/year

Source: Prepared by the researcher based on the   information in table 1 and 8

The research concluded through the marketing study of the proposed project ,the specialist in raising imported foreign dairy cows, showed its ability to produce a quantity of milk that constitutes 0.150% of the Predicting the volume of the nutritional gap for raw milk for the period 2023-2032, which amounted to 168964 hundred tons to contribute to filling part of this quantity. There are expected negative environmental effects from the operation of this project, Produced from cow waste, that contribute to the occurrence of global warming, which can be processed, through the use of anaerobic fermentation technology . And through the results of the financial evaluation of the project showed that the payback period for this project is the fifth year, not including the year of construction. This is fully covered by the revenue for all outflows. In addition, this project is economically feasible, as all criteria of commercial profitability authorized the establishment of this project, and it is characterized by a low degree of risk. From the results obtained through project feasibility studies, The research reached many of recommendations ,encouraging investment in establishing specialized projects for raising high-productivity imported foreign dairy cows. This is possible by providing the necessary support to investors, protecting the local product and limiting foreign imports. Assessment of the negative environmental impact of livestock projects in order to ensure human safety and health. At the same time, ensuring the optimal use of nature's resources by identifying the main effects harmful to nature and striving to overcome and reduce them as much as possible. Re-assessment of the financial project after implementation Ex-

ante, because the evaluation at this stage depends on the actual values and not the estimated values, to identify the obstacles or bottlenecks that accompany the implementation process and try to find solutions or take the necessary decisions to overcome such difficulties.

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