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Marketing, Technical and Economic Feasibility of Pistachio Forest Cultivation in Al-Anbar Governorate

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Abstract. Pistachios are considered one of the trees that can withstand the desert conditions in Iraq , as their cultivation is spread in the countries neighboring Iraq.This study aimed to study the technical, economic and marketing feasibility of a project to grow an orchard of pistachios in the Anbar desert on an area of 50 acres, and the study indicated that the Iraqi market can absorb the production of about two million trees in its early ages and in the long run and after the expansion of agriculture can search for external markets. The technical indicators indicated the suitability of the desert environment in Al-Anbar Governorate for this type of investment to withstand drought on the one hand and the availability of an appropriate climate for fruit ripening on the other. The cultivation of pistachios in the deserts of Iraq is considered a long-term investment and can be considered as a saving for future generations as well as the role it plays in operating the labor force as a grove of 50 dunums can be considered a source "of future family income as it achieves an annual income of 40 million dinars Annually, investing in this type of project is based on achieving two goals at the same time. The first is additional job opportunities and the other is to take advantage of environmental impacts and as part of desertification control projects. And that this project, despite its long-term revenues, can contribute In the distant future to create additional sources of foreign currency, as well as achieving a net added value of up to 37 million dinars and its ability to recover the money invested in it in the absence of a discount in the nineteenth year and can convert the accumulated present value of its net cash flows to a positive value under a discount rate 5% up to 23 years old.

1. Introduction

Pistachios are considered one of the trees that can withstand the desert conditions in Iraq, as their cultivation is spread in the countries neighboring Iraq Pistachios are among the perennial trees that live for centuries and give their production, and they are among the trees that need a cold winter and a hot and dry summer, that is, not wet, especially during the flowering and ripening period of fruits. Perhaps they represent the features of the Iraqi climate, especially in the vast deserts of Iraq [1]. Pistachios are drought-resistant trees that need little irrigation and bear the quality of salty water to levels consistent with well water that can be found in the deserts of Iraq starting from "South Nineveh," through the deserts of Anbar province, which span vast areas and which can transform large areas of those Deserts to forests planted with pistachios and in quantities of water supplied from wells or from fisheries that are raised for such purposes or by taking advantage of water bodies or rivers and agriculture on nearby areas from which water can be delivered to these orchards by appropriate methods [2]. The pistachio crop is an important source of foreign and hard currencies in many countries surrounding Iraq, such as Iran, as its revenues from this crop reach about one billion dollars [3]. Likewise, its cultivation is spreading in Turkey is at the fourth rank [4], as well as in Syria and Jordan, and the success of its cultivation in the Anbar desert is borne by the conditions of neglect suffered by the terrorist organizations over the region for more than three years and the interruption of the authorities responsible for serving these trees, yet these trees continued to live despite their modernity and endurance Drought conditions, which indicates that this environment may be suitable for expanding the cultivation of this type of tree [5]. The investment in the crop of pistachios did not find sufficient care during the past years, perhaps because Iraq relied on financial resources obtained from oil, which led to neglecting agriculture in general and neglecting opportunities to expand investment in deserts in particular and under conditions of declining Iraqi financial revenues emerged, Iraq's need to think Seriously, with all the investment opportunities that can be provided in agriculture and industry, especially in this crop, to create orchards and forests from these trees, it may gradually expand to become one of the sources of income and contribute to the employment of labor on the one hand and contribute to changing the desert environment on



the other. Despite the availability of the appropriate environment for the cultivation of pistachios in Iraq and the countries surrounding Iraq occupying the first ranks in the production of this crop, its cultivation in Iraq has not received sufficient attention and there are no support for this productive activity, as it is considered a long-term investment, also investors are in dire need of expertise in the technical and economic side in the cultivation of pistachios trees. This study is based on a set of assumptions, the most important of them.

1. Pistachio trees are considered long-term investment opportunities and represent a form of savings for future generations
2. Pistachios orchards in the medium and long term contribute to supporting the local product in Iraq
3. The investment in these orchards contributes to providing additional job opportunities and is considered suitable to bring about environmental changes suitable for the desert, making them more suitable for living, which reduces the momentum in cities and rural areas.

This study aims to estimate the capital costs of establishing an orchard planted with pistachios in one of the high-yielding varieties in the areas near the edges of the deserts and to estimate the technical, financial and economic criteria for this farm during the stages of development of those farms in the construction stage and the primary production stage and the economic production stage.

2. Materials and methods

2.1. The marketing feasibility of pistachios grains

Iraq is at this time one of the countries importing the pistachios grains that are required by the Iraqi market, whether in nuts or in the production of sweets and large quantities of nuts are imported and perhaps some types of sweets that pistachios represent one of its basic components. The prices of pistachios are between 6 and 12 dollars. The local market in Iraq absorbs more than 5 thousand tons annually and this quantity represents the production of at least 2.5 million trees in the initial production stage and represents the production of about half a million trees when the trees reach the production stage within the limits of 5-15 kg per tree so we can say that we are still in the first steps of investing in this field, we need a long time to meet our local need for pistachios, so that we can then search for foreign markets [6]. The pistachio nuts are marketed by farmers as raw grains after harvesting, adding and packing its to the marketing centers. Any investment project must be expanded in order for us to move from small sizes to larger and larger in order to help establish factories based on the use of pistachio grains. Therefore, pistachio orchards need to spread the culture of cultivating this tree to reach a level that encourages the production of factories for pistachios Al-Halabi, and therefore, in the long term, to search for external markets, so that pistachios in that range could be converted into one of the sources of foreign currencies for the Iraqi economy [7]. The Pistachio nuts are marketed by farmers as raw grains, and the marketing costs represented by the costs of purification packaging, transportation, and the commission of sales agents, and it is estimated between 75-100 thousand dinars per ton.

2.2. The technical feasibility of cultivating pistachios

Pistachios belong to the genus *Pistacha* of the cashew family of the Anacardiaceae family. This tree is cultivated in the region extending east of the Mediterranean to Afghanistan and some see that its original homeland is Iran, while others see that its original homeland is the Levant, and is considered Ashuri Among the most important varieties of pistachios spread in Syria. Global production of pistachios has reached about 0.5 million tons, Iran leads the producing countries by about 0.312 million tons, and the economic importance of this tree comes from the nutritional content of its grains of fats, protein, sugar, vitamins, antioxidants and amino acids [5]. The provision of suitable cultivation conditions for pistachios requires an integrated study of the varieties that can suit the Iraqi environment and that have high production specifications, and a study of the location in which to invest in the establishment of a pistachio orchard in terms of soil, distance from the water source and the possibility of communication with it and caring for trees and taking into account what follows [5]:

1. That the region has a cold desert climate in a "hot summer" winter and this is available in most of the central regions of Iraq and that the land is high to prevent the gathering of rain water and that it is a pure land with deep soil that absorbs water and can be stored in its interior, and it can be inferred from the success of surface wells in it Depths of 5-10 m.
2. It is preferable in the current investments to be relatively close "to the paved roads, markets, water and population centers, in order to facilitate the process of caring for trees and providing requirements for their development and success during the coming years, and the future can be expanded towards the depth of the deserts.

3. That the area be safe and free from predators so that the orchards do not become a haven for them in the future and that they take appropriate precautions to ensure this, and that the above conditions are almost available at a good level and encourage the establishment of such productive activity in many locations in the desert of Anbar province [8].
4. The agricultural extension in Anbar governorate and the scientific researches at Anbar university have taken upon themselves the care and production of Pistachio seedlings and their cultivation with demonstration fields, and advanced steps have been made in this aspect.

2.3. Required supplies

The pistachio orchard needs deep plowing, especially for tree-cultivation lines with a plow under the soil, and then install a drip system and build water tanks to feed these systems and perhaps we need pumps to pump water from its sources, whether it is wells or water traps in dams that are built on valleys and pipes to transport water To these tanks, the other alternative could be a tank truck used to transport water from its sources and irrigate trees in the ponds that are designed around the seedling. And then creating seedlings with specifications that suit the need of the orchard and of the tested varieties in the region and with a number of 1/10 male to female, all of these costs are capital costs added to it annually operating costs represented by workers' wages and transportation costs, fuel, fertilizers, control materials, prevention, maintenance and repair in construction years and accumulate these costs Annually it determines the capital cost of the orchard, and this stage usually takes about 5 years [2]. As for when the orchard enters the primary production stage when it is 6-12 years old, in which production is within the range of 2-5 kg / tree, here are added to operating costs other costs related to harvesting and marketing and that the difference between operational costs and revenues will represent the net flows in these years, As long as the costs are more than the revenues, this will increase the capital cost of the project [9]. The pistachios orchards enter the stage of economic production when the trees have an age of more than 12 years, and here the tree will produce an average of 5-10 kg per tree and this age will last for centuries [8]. According to the foregoing, the basis for successful investment in this tree is the ability to wait, and that can help in investing a portion of the interstitial distances between the tree lines, which is preferable to be a distance that allows this for the first years, such as 10 m as a distance between one tree and another, and this opportunity Vary from site to site, depending on water quality and availability [10]. This study will take into consideration all of these alternatives and be designed on the basis of establishing a garden on an area of 50 acres and dimensions of 10 m between the two trees, on well water or on a dam in the valley to catch water and provide it to times of need and in all cases and on the basis that the tree needs 6 cubic meters By year, 1250 trees are planted in the orchard, and we need about 4000 m³ of water per year to supplement rain water that covers about 50% of the tree's need per year in the stages of reaching the tree [5].

2.4. The stages of the development of the pistachio grove

The pistachio grove passes through three stages during its life, which is the stage of establishing the grove, starting from its cultivation until its beginning in production, then the stage of primary production, the stage at which the grove begins production, but it is still not considered an economic production that extends from the age of 6 12 years, and finally "the stage of economic production that extends for years after the age of 12 years, and costs and financial flow can be estimated according to the stage that the garden is going through as follows [2]:

2.4.1. The establishment phase of the grove

This stage extends as from "studying the investment opportunity, preparing, cultivating and caring for seedlings until the age of five years as the initial age to start the initial production. We need at this stage to bear the costs of most of them in the first year [11], and other costs accrue to them during the years of this phase and the next Until production reaches an economic level that exceeds operating costs, those costs can be detailed as shown in Table (1).

Table 1. The costs of establishing the garden in the first year, in thousand dinars.

Cost type	Quantity	Price	Total	Age
• Site study and planning	-	3000		
• Tilling and setting	-	2500	2000	Open
• Purchase and installation of pumps	1	5000	1500	=
• Laying water pipelines	60	30	5000	=

• Building water storage basins	5	1000	1800	30years
• Installing drip irrigation systems	5	4000	5000	30years
• Purchase and transfer of seedlings	1250	3	20000	15years
• backrests for planted seedlings	1250	0.3	4000	Open
• Fertilization	50	40	375	
• Wages of agricultural workers	20	20	2000	
• Garden Care Workers	2	3600	400	
• Fuel and oils	4000 Liter	0.5	7200	
• Housing	1	4000	2000	
• Maintenance and repair	-	1000	4000	30 Year
			1000	
Total			56000	

During these years, the drip irrigation system can be modified by adding attachments to be used in cultivating interstitial distances of approximately 10 dunums. These will add to the cost about 4 million dinars during the first year, but it will help at least raise half of the costs of care workers from their profits, thereby reducing the annual costs to 3.6. One million dinars during the construction years, bringing the total cost to the investor in the first year to about 56 million dinars. As for the following years until the sixth year, which represents the construction years, the investor has to bear additional annual costs that represent the costs of fuel, fertilizing, workers' wages, maintenance costs for pumps and drip irrigation systems, estimated at 2 million dinars annually, and compensation for injured or dead seedlings, which is estimated at 5% of the original Seedlings annually and the total of those costs is about 13.6 million dinars annually, these decrease by half of the wages of care workers if the investor's option is to allow workers to grow vegetables to reach about 10 million dinars.

2.4.2. The second alternative

In the case of using a 10-15 15,000-liter basin car to transport irrigation water and enter between trees and irrigation, here we will dispense in the previous table on water ponds, water pipes and drip irrigation systems, and the cost of the tank car reaches about 15 million dinars, thereby reducing the capital costs in Table (1) to about 44.5 million dinars in the first year, and the costs are as shown in Table 2.

Table 2. The costs of establishing the garden in the first year in the case of the second alternative, in thousands of dinars.

Cost type	Quantity	Price	Total	Age
• Site study and planning	-	3000	2000	Open
• Tilling and setting	-	1500	1500	=
• Purchase and installation of pumps	1	5000	5000	=
• Trough vehicle	1	15000	15000	15 years
• Purchase and transfer of seedlings	1250	3	4000	Open
• backrests for planted seedlings	1250	0.3	375	
• Fertilization	50	40	2000	
• Wages of agricultural workers	20	20	400	
• Garden Care Workers	2	3600	7200	
• Fuel and oils	4000 Liter	0.5	2000	
• Housing	1	4000	4000	30 Year
• Maintenance and repair	-	1000	1000	
Total			44500	

2.5. Other construction years costs:-

Pistachio seedlings need care, especially during the construction phase of the orchard, as the seedlings need irrigation service, especially during the first five years of the tree's life until the roots of the tree deepen [2]. It

may remain in the production stage to supplemental irrigation in some years, and in the years following the year of cultivation until the sixth year, which represents the years of construction, the investor has to bear additional annual costs that represent the costs of fuel, fertilization, labor wages, and maintenance costs for drip pumps and irrigation systems estimated at 2 million Dinars per year and compensation for infected or dead seedlings, which is estimated at 5% of the original seedlings annually, and the total of these costs is about 13.6 million dinars per year. These are reduced by half of the wages of care workers if the investor's option is to allow workers to grow vegetables in the interstitial distances to reach about 10 million dinars [1].

2.6. Funding sources

The financing of this project is essential in the beginning with such projects and their financing during the production years because this project requires accumulative capital over several years until the project reaches the stage of economic production and that the sources of funding are either local or foreign and it can be assured that Foreign investment does not provide for this type of project that needs a long period of waiting. Therefore, the only source of this investment will be limited to local investment, and that local investment is achieved from three sources, which are firstly: "the family sector and what it can provide from family savings that it is ready to save for future generations [12]. Construction here may be gradual and can be done by the families living mainly in the desert and the second from private financing institutions. These institutions impose high discount rates that may not be suitable for investment in such projects that need a long waiting period that makes the present value of their future returns not cover the interest paid and the investment becomes It is not rewarding [13], and the third alternative is financing from public institutions whose goal is to bring about far-reaching economic transformations in addition to a Its interests in the environmental impacts of these projects, in addition to providing loans with no or easy discount rates, and this may be the best option for investors. Therefore, it is necessary to sharpen concerns in providing these sources of financing [14].

3. Results and discussion

3.1. Initial production stage

The initial production years that extend from the sixth year to the twelfth year in which the orchard begins with the production of fruits by 1.5 kg per tree and then increases by half kilograms each year [4], bringing the production in the twelfth year to about 5 kg per tree. The investor here cannot take advantage of the interstitial distances and continue to bear the previous costs with a decrease in fuel costs due to the decline in the tree's need for water, offset by an increase in the costs of harvesting and marketing, i.e. its costs are estimated at 13.7 million dinars starting with "the year of the sixth and increasing annually by about 300 thousand dinars to increase the costs of the harvesting and marketing with the increase in production. As for its revenues, it increases annually with increasing production. The price of 5 thousand dinars per kilogram has been adopted as a price for calculating the revenues. The project is estimated to enter the economic stage within the limits of the twelfth year [1].

3.2. The stage of economic production

This stage begins with the limits of the twelfth year, as the rate of tree production reaches about 5 kg and continues to increase, reaching about 10 kg when the orchard reaches the twenty years. The financial and economic evaluation of the project requires calculating the annual costs and revenues in the project and calculating the total and net added value of the project as well as the period during which the investor can recover its capital. Calculating the internal rate of return for the project in the long term and the long term, because this type of investment is considered a long-term investment project and may be considered one of the investment projects for future generations because investment in this type may not be profitable before a whole generation passes, that is, within the limits of 18-20 years. Among the most important criteria to be used are [12]:

Total added value = total revenue - production requirements

Net added value = total added value - extinctions

Capital recovery period = capital costs / (annual return + extinction premium)

Return on invested dinar = revenue / costs

The above criteria will be used by an orchard that has entered the economic production stage, and therefore it remains deficient because it did not take into account the waiting period that the investor incurred until reaching that stage, and therefore the internal rate of return will be used as an important economic standard and it represents the discount rate at which the investor can restore his capital during The life of the project, and since

this life is unlimited and far-reaching [15] we will consider the internal rate of return for the project as reflecting the "discount rate, which the investor can recover the present value of his capital costs within 25 years". The extraction of net cash flows, which represents the difference between revenues and costs, and calculating the present value of those flows, as well as the cumulative value of the present values of these flows. If these accumulations are converted from a negative value to a positive at a specific discount rate, then it indicated that the project recovered its capital at its present value at the time of spending. The following Table (3) shows the cash flows of the proposed project, according to the proposed alternatives [16]:

The present value of NPV flows is calculated by the following formula

$$\text{Present value of net inflows per year } t = \text{net influx} / (1 - \text{discount})^t$$

$$\text{NPV} = \text{NV} / (1 - P)^t$$

Whereas: NPV is the present value of net flows

$$\text{NV net flow} = \text{revenue} - \text{expenses}$$

P is the discount rate and t the age of the orchard

The discount rate is calculated at any price in the following formula:

$$\text{Discount rate} = (-1 \text{ discount rate})^n$$

It should be noted that the discount rate that enables the investor to recover the present value of the capital spent each time during the life of the project represents the internal rate of return, and since this project is open and spans for several centuries [17], three discount rates were chosen which are 0%, 5% and 10%. The present values were calculated according to those prices up to 25 years, as shown in Table 3 [9].

Table 3. Cash Flows in Million Dinars for the orchards by adopting irrigation with spots and cultivating the interiors according to several discount rates.

%5Discount		%10 Discount		%0.0 Discount						
Present cumulative value of net flows	Present cumulative value of net flows	Discount rate for a price 5 %	Present cumulative value of net flows	Present value of net flows	Discount rate for a price %10	The cumulative value of the discount net%0.0	Net flows	Revenues	Cost	Year
56-	56-	1.05	56-	56 -	1.1	56 -	56-	-	56	1
65.07-	9.07-	1.103	68.34 -	7.44 -	1.21	66-	10-	-	10	2
73.7-	8.63-	1.158	76.84 -	7.52 -	1.33	76 -	10-	-	10	3
81.92-	8.224-	1.216	84.56 -	6.83 -	1.464	86 -	10-	-	10	4
89.06-	7.14-	1.276	91.54 -	6.2 -	1.62	96 -	10-	-	10	5
95.09-	6.03-	1.34	96.67 -	4.56 -	1.772	104.08 -	8.08-	5.625	13.7	6
100.07-	4.98-	1.407	100.29 -	3.46 -	1.95	110.83 -	6.75-	8.250	15	7
102.98-	2.91-	1.477	102.53 -	2.01 -	2.144	115.13 -	4.3-	11	15.3	8
104.2-	1.2-	1.551	103.52 -	0.78 -	2.36	116.98 -	1.85-	13.75	15.6	9
103.81-	0.37	1.629	103.52 -	0.23	2.59	116.38 -	0.6	16.5	15.9	10
102.03-	1.78	1.71	102.73 -	1.07	2.85	112.88 -	3.05	19.25	16.2	11
98.97-	3.06	1.796	101.23 -	1.75	3.14	107.38 -	5.5	22	16.5	12
94.77-	4.2	1.887	99.13 -	3.3	3.45	99.43 -	7.95	24.75	16.8	13
89.57-	5.2	1.98	96.58 -	2.71	3.8	89.13 -	10.3	27.5	17.2	14

83.44-	6.13	2.08	93.67 -	3.05	4.18	76.38 -	12.75	30.25	17.5	15
76.48-	6.96	2.183	90.4 -	3.07	4.59	61.18 -	15.2	33	17.8	16
68.65-	7.83	2.292	87.28 -	3.55	5.05	43.23 -	17.95	35.75	17.8	17
60.54-	8.6	2.407	83.75 -	3.72	5.56	22.53-	20.7	38.5	17.8	18
50.774-	9.28	2.527	80.13 -	3.83	6.12	0.92 +	23.45	41.25	17.8	19
40.89-	9.88	2.653	76.47 -	3.89	6.73	27.12 +	26.2	44	17.8	20
30.49-	10.4	2.786	72.81	3.91	7.4	56.07 +	28.95	46.75	17.8	21
19.65-	10.84	2.925	69.19 -	3.89	8.14	87.77 +	31.7	49.5	17.8	22
8.434-	11.22	3.07	65.62 -	3.85	8.95	122.22 +	34.45	52.25	17.8	23
2.326+	10.76	3.225	62.35-	3.52	9.85	154.92 +	34.7	52.5	17.8	24
12.58+	10.25	3.386	59.38 -	3.2	10.83	189.62 +	34.7	52.5	17.8	25

It can be noted from this table that this investment opportunity requires long-term loans with low interest rates less than 5%, and the project can recover or repay the capital invested with it at the age of 23 years if the discount rate is within the 5%. If the loan is interest free, he can pay it back up to the nineteenth year. And that the project needs a long period of up to fifty years if the discount rate is 10%, and thus it can be said that this investment represents savings projects for future generations and must be supported by the state with soft loans recovered in installments starting after the twelfth year of the project's life. The total added value of this project amounts to between 3.250 - 47.5 million dinars during the production years of the seventh year to the twenty-fifth year, and the total added value stabilizes at the value of 47.5 million dinars in the years from 25 and above of the life of the project, and this project can operate An Iraqi family and pumping about 8.25 tons of pistachios into the market, and this quantity can add \$ 49,500 to Iraqi national income annually, given that its sale price is \$ 6 per kilogram. As for the net added value, which is equal to the total added value minus the share of investments, which is estimated at 4 million dinars annually, the total added value will range between 0.0 - 42.7 million dinars annually for the period between the twenty-eight and twenty-five years of the life of the garden. Al-Bustan can recover its investment capital up to twenty years of its life in the event that the capital used is from the private investor's money.

3.3. *The second alternative for investment*

The second proposed plan for investment was to use a basin car instead of installing drip systems moving in wide roads designed between every ten rows for workers to water trees on both sides of the car and for five lines on each side and as we indicated earlier that this alternative will help reduce costs The initial is represented by tanks and drip systems, as the car is used to move from the farm to other locations, and the useful life of this car reaches 15 years, after which it is sold as rubble at a price of 5 million dinars. Thus, its annual extinction will be in the range of 0.667 million dinars annually, and that the costs of establishing the garden in the first year according to this plan will be reduced to about 44.5 million dinars, and that the annual operating cost during the construction phase of work with this plan is 11.7 million dinars annually during the first five years of operation and then return to be As in other years of the project life. As for the project revenues, they will be the same as those estimated in the first alternative. Thus, the present values of the net flows can be extracted over 25 years of the project's life and according to several discount rates, thus evaluating the investment in this project according to basic feasibility criteria. Depending on the added values and the capital recovery period for this alternative, the best feasibility can be determined by using one of the alternatives presented to the investor, and specifying the year in which the investor can recover the capital invested in this project and according to the assumed interest rate levels. And by adopting the formulas adopted in calculating the discount rate, as follows:

$$\text{Discount rate} = (1 + \text{discount rate})^n$$

Where n = the age of the project, therefore the discount rate will be affected by both the discount rate or the interest rate on the one hand and the age of the project, and therefore the discount rates will be calculated according to three discount rates, which are 0%, 5%, 10%, and Table 4. explains the results of those accounts.

Table 4. The present values of cash flows in million dinars in the pistachio cultivated orchard, according to the second alternative

%5Discount			%10 Discount			0.% 0 Discount				
The cumulativ e value of the flow	Presen t value of net flow	Discoun t rate for a price 5 %	Presen t value of net flow	Presen t value of net flow	Discoun t rate for a price %10	The cumulativ e value of the discount net%0.0	Net flow s	Revenue s	Cos t	Yea r
44.5-	44.5-	1.05	44.5-	44.5 -	1.1	44.5 -	44.5-	-	44.5	1
55.1-	10.6-	1.103	51.17 -	9.67 -	1.21	55.2-	11.7-	-	11.7	2
65.2-	10.1-	1.158	59.97 -	8.8 -	1.33	66.9 -	11.7	-	11.7	3
74.82-	9.62-	1.216	67.97 -	8 -	1.464	78.6 -	11.7	-	11.7	4
83.99-	9.17-	1.276	75.19 -	7.22 -	1.62	90.3 -	11.7	-	11.7	5
90.02-	6.03-	1.34	79.75 -	4.56 -	1.772	98.38 -	8.08-	5.625	13.7	6
95-	4.98-	1.407	83.21 -	3.46 -	1.95	105.13 -	6.75-	8.250	15	7
97.91-	2.91-	1.477	85.22 -	2.01 -	2.144	109.43 -	4.3-	11	15.3	8
99.11-	1.2-	1.551	86 -	0.78 -	2.36	111.28 -	1.85-	13.75	15.6	9
98.74-	0.37	1.629	85.77 -	0.23	2.59	110.68 -	0.6	16.5	15.9	10
96.96-	1.78	1.71	84.7 -	1.07	2.85	107.63 -	3.05	19.25	16.2	11
93.9-	3.06	1.796	82.95 -	1.75	3.14	102.13 -	5.5	22	16.5	12
89.7-	4.2	1.887	79.65 -	3.3	3.45	94.18 -	7.95	24.75	16.8	13
84.5-	5.2	1.98	76.94 -	2.71	3.8	83.88 -	10.3	27.5	17.2	14
78.37-	6.13	2.08	73.89 -	3.05	4.18	71.13 -	12.7	30.25	17.5	15
							5			
71.74-	6.96	2.183	70.82 -	3.07	4.59	55.93 -	15.2	33	17.8	16
63.58-	7.83	2.292	67.27 -	3.55	5.05	37.98 -	17.9	35.75	17.8	17
							5			
54.98-	8.6	2.407	63.55 -	3.72	5.56	17.28-	20.7	38.5	17.8	18
45.7-	9.28	2.527	59.72 -	3.83	6.12	6.17 +	23.4	41.25	17.8	19
							5			
35.82-	9.88	2.653	55.83 -	3.89	6.73	32.37 +	26.2	44	17.8	20
25.42-	10.4	2.786	51.92-	3.91	7.4	61.32 +	28.9	46.75	17.8	21
							5			
14.58-	10.84	2.925	48.03 -	3.89	8.14	93.02 +	31.7	49.5	17.8	22
3.36-	11.22	3.07	44.18 -	3.85	8.95	127.47 +	34.4	52.25	17.8	23

										5
7.4+	10.76	3.225	40.66-	3.52	9.85	162.17 +	34.7	52.5	17.8	24
17.65+	10.25	3.386	37.46 -	3.2	10.83	196.87 +	34.7	52.5	17.8	25

It is noted from the above table that accumulation in the net value of flows in the absence of a discount turns into a positive value at the nineteenth year, but if we consider the discount rate of 5%, the accumulation of the present value does not turn into a positive value until after the twenty-fourth year of the project's life. When the discount rate is considered 10%, the project still requires an additional period of time over the 25 years to recover its capital. All of these indicators were close to what we obtained in the first alternative, although the second alternative is less than the first alternative in its initial need for capital. As for the total and net added value, it is the same in the two alternatives, given that the flows will stabilize after crossing the construction years and are equal in the two alternatives except for the extinctions that are less in the second alternative and therefore the net value will increase in the second alternative.

3.4. Sensitivity analysis

The sensitivity analysis relates to changes that are likely to happen in costs, production or prices, and this project is a long-term project that under the discount has a reduced impact of these changes, so a 10% change in operating costs, i.e. about 1.5 million dinars annually after the second year Ten and if deducted at a discount rate of 10%, it is accompanied by an increase in costs and a decrease in net flow of 450 thousand dinars, and it gradually decreases so that its value at year 25 becomes about 150 thousand dinars only. Such a limited change will not affect much the indicators of the economic feasibility study. This project represents a long-term investment and is considered a form of savings and investment for future generations, and the environmental impacts of the project can be considered in themselves as appropriate returns to encourage this type of investment. And that the economic feasibility study for this project did not take into consideration the current prices, but rather took into account the prices that can be guaranteed for future production, especially if we know that the price of pistachios reaches about 10 dollars per kg, and that the net rate is not less than 80%, which means that The price of raw pistachios is not less than 6 thousand dinars, while only 5,000 dinars have been approved for the study. The search for another alternative to run the process of pumping water by installing solar-to-electrical conversion cells and using them in the irrigation process and housing needs of electricity. It contributes greatly to improving the economic feasibility of this investment by saving part of the costs that may exceed 10% annually.

4. Conclusion

Investment in these projects requires a long waiting period, and therefore, the financing must be from sources that do not aspire to achieve quick profits, but rather their goal is to create a remote environmental and economic development, and therefore public financing institutions must embrace this task. It is preferable to choose the areas where the surface wells have been proven successful to ensure that tree roots reach in the long run to those layers that are about 6-10 meters deep to provide their long-term need for ground water and less need for irrigation. The investment achieves gross and net added values sufficient to operate and support a family after about 12 years of the project's life. The discount rates for funds invested in this type of project must not exceed 5% in order for the investor to recover its capital and provide for other investments or the expansion of investment itself. Searching for electric energy sources that secure the operation of water pumps and provide electrical energy for housing on the farm, which reduces operating costs by about 10% and improves the economic viability of the orchard, so we recommend going in that direction.

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