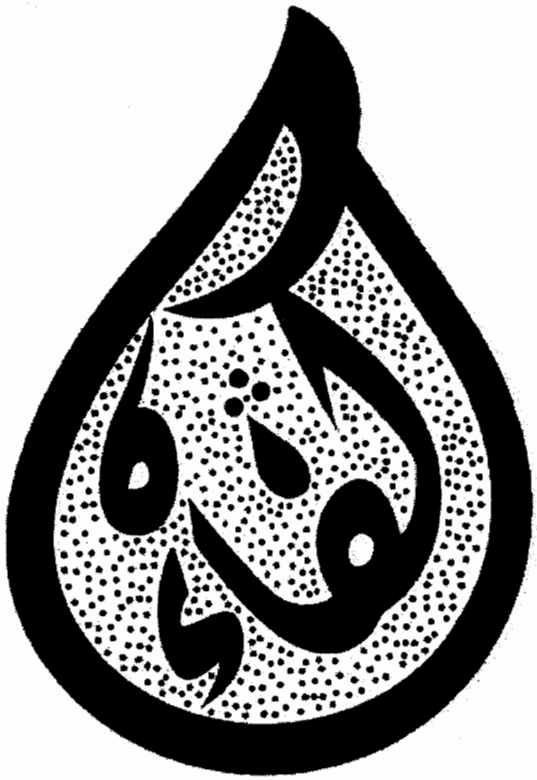
Future/Potential Markets and Non-traditional On-farm Activities

KAFA'A Assessment



KAFA'A
Knowledge and Action
Fostering Advances in Agriculture

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Future/Potential Markets
and
Non-traditional On-farm Activities

In compliance with Task #5 of Component 1 (marketing opportunities) which is the same as Task #1 of Component 2, KAFA'A has conducted a marketing assessment of the future/potential markets and possible non-traditional on-farm activities. Below is an account of the findings. It must be noted that the marketing assessment is still on-going at the time of writing this report and a complete marketing assessment report is expected to be made available in June 2004.

Markets

Jordan has the opportunity to improve its agriculture sector and develop the necessary institutions in order to take advantage of potential local and international markets for traditional and non-traditional farm products. Traditional products could expand the current markets by improving the quality through such activities as post-harvesting grading and handling. KAFA'A is currently conducting a feasibility study on non-traditional crops such as exotic ornamentals. The project is also creating a crop suitability map. This feasibility study and the map is expected to be ready by the end of May.

The recently expanded European Union represents an increasingly attractive market for which numerous crop opportunities are available. Jordan benefits from climatic conditions that allow the production of "off-season" high-quality exportable produce for the EU. These crops include strawberries, seedless table grapes, galia melons, cherry tomatoes, asparagus, okra, fine green beans, and snow/snap peas to name a few.

The Arab gulf countries (GCC) represent readily available and reachable opportunities for similar products. Profit potential will vary dramatically depending, in large part, on the timing of shipments during the marketing window and the position of competitive exporters during these time periods. Volumes and profits will rise to the extent that Jordanian farmers and exporters can capitalize on early (or late) harvest periods before (or after) competitors enter the markets.

KAFA'A predicts that as many as 20 medium to large exporters of high quality produce may emerge if certain constraints can be resolved (for details see KAFA'A Marketing Assessment Report – Phase One). These exporters have the potential of spreading the benefits to many other small farmers who have the willingness and capacity to join in production agreements with exporters.

Non-traditional On-farm Activities

KAFA'A has started fish farming activities with approximately 56 farmers in Ghor Essafi (Jordan Valley South of the Dead Sea). This non-traditional farm activity will bring supplemental income to farmers in a short period of time. By the end of April, fish fingerlings were introduced into the irrigation water collection reservoirs on 46 farms in Ghor Essafi, and in 10 reservoirs on Ghor Madsous. Ghor Essafi Ag Cooperative and Ghor Madsous Ag Cooperative have signed contracts with farmers under the supervision of the KAFA'A technical team. Attached is the program description for this activitiy.

After studying other potential non-traditional on-farm activities, KAFA'A has prepared a proposal for a Date Palm nursery complete with a feasibility study demonstrating sustainability and profits to be generated within four years. Attached is this proposal and economic analysis.

Small Scale Fish Farming - Program Description

Introduction

Jordan is a desert country with agricultural capacity. Farmers are under constant pressure to use arable land to generate sufficient income and contribute to domestic food production. Fish farming represents an opportunity to add value and diversity to existing agricultural activities with a minimum additional input. By practicing an integrated approach, reservoirs used for irrigating fruit and vegetables double as fish ponds; the same water not only supports crops but also carries organic fish fertilizer to the fields and incubates the production of fish for sale or consumption. When farmers harvest fish, they have a ready cash crop and a new local source of protein for their families. Small farmers then make use of the profits to improve their livelihood.

The EIP/KAFA'A Project is attempting to increase the value of water used for agricultural purposes. In Component 1 Task 12e, KAFA'A proposes to develop and implement sustainable support activities linking to the community grant component. Thus, EIP/KAFA'A has decided to work with small farmers in the Ghor Essafi and Ghor Madsous area. This area, located south of the Dead Sea, was chosen because it is ideal for small scale fish farming bdue to the stable climate and the existing high quality water. As many of the farmers already have water reservoirs on their land, the project could be implemented without a great deal of start-up costs. Additionally, small-scale fish farming was tested in this region several years ago on an individual basis with good results. To integrate fish farming into existing agricultural activities, EIP/KAFA'a will work through the Ghor Essafi Agriculture Cooperative and the Ghor Madsous Agriculture Cooperative. This project will build on the previous experience of the Near East Foundation (NEF) to provide fish farming management support while addressing problems encountered in previous attempts at small-scale fish farming in Jordan.

Project Concept

EIP/KAFA'A will work with farmers to integrate fish farming into their existing operations. The sixty farmers will be selected by EIP/KAFA'A in collaboration with NEF based on the developed and agreed upon selection criteria. Minor modifications to irrigation ponds will be the responsibility of the local farmers, and a prerequisite for participation in the program. The cooperatives will sign letters of agreement with the participating farmers and obtain some form of security of repayment of the cost for participation (the cost of the fingerlings and feed, covered initially by the cooperatives). The fingerlings will be introduced before the end of April. Training activities will take place on-site from April to December and will include feeding schedules, record keeping, and maintenance. EIP/KAFA'A and the Ministry of Agriculture (MOA) technicians will make weekly visits to each local farm to provide technical assistance until fish reach market size. The project will then assist the cooperatives in establishing marketing support activities, something that can generate income for the institution while providing a necessary service to the project participants. At the end of the first cycle, farmers will

be encouraged to purchase fingerlings and feed for the next cycle with profits from this activity.

The sale of fish on local markets will generate additional income for farmers as well as create potential employment for local laborers. As a new source of available protein, farming families and other community residents will benefit from growing and harvesting fish. EIP/KAFA'A intends to work with NEF and the local agriculture cooperative to design, implement, and monitor the project. In this activity, the linkage of farmers to the agriculture cooperatives will enhance local extension efforts, encourage governmental support and cooperation, and increase the potential for later expansion into new areas such as Karameh, other parts of the Jordan Valley or the Amman Zarqa Bassin.

An initial assessment conducted by EIP/KAFA'A has revealed that farmers in the Ghor Essafi and Ghor Madsous area are receptive to both the introduction of fish farming and to EIP/KAFA'A participation in the design and implementation of the project. They have agreed to participate in a program in which the inputs are provided to them through a loan from a local cooperative. They understand that raising fish means feeding them three times per day over a period of six to eight months. Farmers have expressed concern with the supply of the fingerlings and the availability of the feed. Within the EIP/KAFA'A fish farming initiative, the cooperatives, with the support and technical assistance from experts of the Near East Foundation (NEF), will take responsibility for assuring the availability of inputs.

Selection of Beneficiaries

The primary beneficiaries in this ten-month activity will be an estimated sixty farmers and their families. EIP/KAFA'A, in cooperation with the Ghor Essafi Agricultural Cooperation and the Ghor Madsous Cooperative will select sixty farmers, 50 from Ghor Essafi and 10 from Ghor Madsous, with priority given to less privileged ones, to participate in this project from a pool of candidates who have expressed interest in establishing their own fish farms. EIP/KAFA'A will then conduct a workshop presenting an overview of fish farming, including minimal requirements for start up and optimal operations. Farmers will provide feedback on their concerns, expectations and the suitability of their own sites.

Technical Assistance - The Near East Foundation

Over the past decade, NEF has played a key role in promoting fish farming in Jordan. The NEF has sought to ensure the future of fish farming as a valuable supplement to traditional agriculture. Inputs have included technical support, promotion of fingerling production, fish feed distribution, and marketing assistance.

The NEF will be contracted by EIP/KAFA'A to oversee this program. NEF's experienced technical specialists will provide support to the Essafi Agriculture Cooperative, the Ghor Madsous Agriculture Cooperative, and the participating small farmers. NEF will work with the MOA extension agents to develop the MOA's overall capacity, providing both theoretical and on-the-job assistance. NEF will conduct all

negotiations with the supplier of fingerlings and feed to assure that the fingerlings are delivered on time and the cooperatives maintain a sufficient amount of feed for program operation.

Sustainability

Sustainability will be achieved by strengthening the capacity of and providing technical support to local cooperatives that focuses on maintaining a revolving fund. It is estimated that each farmer will be able to earn an additional $1000.00 per year from this activity, after paying back the loan that covered the costs of the inputs. Participating farmers will be encouraged to purchase fingerlings and feed for the next cycle with profits from the first cycle. Through the repayment of grants, the cooperatives will have the funds available to apply their new skills to continue the program the following year.

Granting Mechanism

The Ghor Essafi Agriculture Cooperative and the Ghor Madsous Agriculture Cooperative will supply the program inputs: fish feed, fingerlings, technical and management services to the participating farmers as a grant. Each farmer will be required to pay back 100% of the grant, which will cover the following items:

Exchange rate .708 JD = 1 USD

Fingerlings

Cost per fingerling	**Total fingerlings per farm**	**Total cost per farm**
0.06 JD / .085 USD	2100	126 JD / 178.50 USD

Feed

Total cost per farm	
400 JD / 565.00 USD	

Technical and Management Services

Total cost per farm	
40 JD / 56.50 USD	

Total Cost Per Farm	**566 JD / 800 USD**

The grant cycle will cover eight months. The farmers will be required to repay the cooperatives smaller amounts in the initial five months and the remaining amounts in the last three months. The recommended granting mechanism is as follows:

First five months: (May 31 to September 30) each beneficiary pays 21JD ($29.66 US) per month.

Last three months: (October 31, November 30, and December 31) each beneficiary pays 155 JD ($218.93 US) per month.

Program Duration and Budget

The project will last one fish-raising cycle of nine months from April to December 2004. Fingerlings will be introduced to ponds in late April in order to maximize production and minimize the higher mortality rates of winter.

The total funds required for the NEF to oversee this project are $45,558.26 (forty five thousand five hundred fifty eight US dollars and 26 cents). For review, a detailed budget is attached. Participating local farmers will provide their time, labor, and land. The MOA will provide for payment of the time of its extension agents. EIP/KAFA'A will assist the extension agents with their transportation needs.

Date Palm Trees Nursery

Background

Jordan is relatively a small country, yet the variety of its terrain offers wide and variable climates (including the Jordan rift around 300 m below sea level) allowing suitable conditions for a large range of fruit tree plantations (Tropical and Subtropical trees). Among these fruit trees is the date palm, which has strongly acquired a spiritual significance for the Muslim and Christian community. In addition to its fruit, the nutritional value and the large quantity production (average about 150 Kg/tree) makes the crop commercially attractive to agricultural investors. Despite that it is relatively new introduced to Jordan (started in early eighties), date palm trees nowadays occupy about 8,000 dunums of area constituting 0.5 % of the total area planted to fruit trees (MoA, 2003) and is still expanding.

Date palm tree needs heat unit accumulation of more than 18^{o} to mature. This heat accumulation requirement differs according to the variety, ranged from 1,150 units for early varieties to about 2,600 units or more for late maturing varieties. According to the meteorological information in Jordan, these ranges of heat units are quiet available in the Jordan Rift Valley (North to South areas). This type of trees is mainly propagated asexually either by their offshoots or by tissue culture technique. Jordanian interested farmers purchase their trees locally from each other (farm to farm) and from local marketing agents, for tissue culture from abroad.

New planted date palm tree needs about 4-5 years to bear its first commercial yield and nearly 3 years to produce the first good sized and viable offshoot, with an average of 5-7 offshoots from a period of 3 to 15 years of commercial life.

Justification

The environmental conditions at some regions in Jordan are suitable for date palm cultivation especially in the Jordan Valley (below sea level to about 400 m), Wadi Araba Basin and southern deserts. Date palm trees can tolerate a wide range of temperature from 9 to 54 ^{o}C without effecting the growth.

There are around 11,400 ha of saline soil lands in Jordan, mainly in Jordan Rift Valley and Wadi Araba Basin, on average the salt contents of these soils are measured as 6-9 dS/ m. In addition there are more than 50 million m3 of marginal water (EC more than 3 dS/m). Date palm soil salinity toleration reaches 11 dS/m above which the quantity and quality of the fruit yield progressively decrease. This tolerance is the highest among all other fruit trees (e.g. citrus can only grown in soil condition of up to 4.5 dS/m).

Jordan imports more than 4,000 tons of date palm fruits and produces only 1,200 tons. In the year 2,015 the requirements for Jordan are expected to reach 8,000 tons (Rabeh Salama).

Depending on varieties, there is a great difference in harvested amount and prices that can be fetched (between ¼ JD and 2 JD per Kg of fresh fruits, which may reach to about 7 JD per Kg for certain good quality fruits like (Medjoul).

In Jordan most old Date Palm farms are small and medium farms with an average of 2-3 ha. The new and modern farms are ranging from 10-150 ha. The new Date Palm farms are planting the high quality varieties like Barhee, Medjoul, Dejlet noor, Khalas, etc. Expansion of date palm farming represents an alternative crop to the low profitability of the traditional species, and the potential high water consumption of some crops like Citrus and Banana.

The small farmers lack sufficient experience to deal with this new crop in order to attain quality and yield (lack of information for farmers about cultivation techniques, appropriate varieties, pest and disease control, tending, post-harvest handling and treatment, marketing etc.). On the other hand, large farms have good experience in dealing with Date Palm trees from planting, producing to harvesting, packaging and marketing (for domestic and export).

Irrigation Water Requirements:

Like any other fruit tree, date palm needs sufficient water of acceptable quality to reach its potential yield. In the following table, quantities of water made available to date palm around the world can be seen. It is worth mentioning that all these countries use flood irrigation, except for Israel, which uses drip irrigation. In the economic analysis for water cost the figure of 150,000 m^3 of water is used base on 25,000 m^3 /ha/year for date palm in the Jordan Valley, table 1.

Date palm irrigation around the world

Place	**Quantity (m^3/ha)**
Algeria	15,000 - 35,000
California, USA	27,000 - 36,000
Egypt	22,300
India	22,000 - 25,000
Iraq	15,000 - 20,000
Jordan Valley, Israel	25,000 - 32,000
Morocco	13,000 - 20,000
South Africa	25,000
Tunisia	23,600

Objectives:

Long-term activity based on production of date palm nursery trees (offshoots) and fruits and adopting a revolving system of date palm propagation material (offshoots) between the established project and local farmers.

General Expected Outputs:

Socio-Economical:

- Generating jobs and a source of specific crop training for workers and farmers.
- Improve farmer's income from their new-planted areas.
- Financial sustainability for the association through the revolving system of plant propagation material and fruit production.

Environmental:

- Increase date palm plantation area in the Jordan valley by providing offshoots for the local farmers, thus promoting change in cropping patterns.

Scientific:

- Center of scientific and practical agricultural guidance in the project farm. Implementing research and extension activities in cooperation with scientific institutions in the kingdom and pioneer farmers in that field.

Final Overall Output:

A well-constructed sustainable project-farm based on date palm nursery trees (offshoots) and fruits productions, utilizes a revolving system of date palm propagation material (offshoots). Will provide practical knowledge through interaction activity with local experts, extension institutions, and pioneer farmers.

Methodology:

This activity is planned to be carried out in jointly between KAFA'A and the Jordan Valley Farmers Association (JVFA). JVFA will be responsible for running the project and NCARTT will provide technical support and supervision. The project will have three phases:

Phase I: KAFA'A will support the project during the first phase, which will last 3 years. At the end of three years (from establishment) the project is supposed to cover its costs, see tables (1,). Three varieties totaling 2,100 offshoots (to become mother plants) will be planted over 6 ha (60 dunums) area.

The planting space will be on a density 8X4 m, at the first three years. At the end of the third year offshoot from the same project will planted in the inter space between the 8 m distance tree lines of 75% of the project area (a density 4X4 m).

The higher density will produce a large number of offshoots for a period of 0-6 years; then plants of 75% of the old orchard (45 dunums) will be removed and replaced by part of the second generation of offshoots from the same project. This process will be

repeated each fourth year. Only, the inner plants of the remaining 25% of the project area (15 dunums) will be removed to allow normal production of fruits (spacing 8X8). During this 0-6 year period, intensive management will be provided during the offshoot production period to compensate for higher planting density. The removed plants will be another source of income. They are marketable at higher price than the offshoots.

Guideline for the transfer (selling) of date offshoots.

- Three years after planting are required to produce a good size plantable offshoot, and 4 years for starting fruit production.
- The expected yield of offshoots should be sold to the farmers in the targeted area (middle and south JV) at 5 JD each to a maximum of 50 offshoots/farmer.
- The farmer should sign a contract with JVFA guarantying the return of one offshoot for each one sold to him. The details of the contract will be set up by KAFA'A and JVFA.
- JVFA will supervise the planting and provide technical information and advice with the help of specialists of NCARTT and date pioneer farmers; these farmers have been contacted and are willing to provide assistance.

Phase II: this phase will start at year 4 with the removal of first offshoots and first fruit commercial harvesting. This phase is to be financially self sustained see table ( ). At the end of this phase the second generation of offshoot planted in the nursery at the third year, will start to produced offshoots and some of them will be used to replace the first generation mother plants.

Phase III: year 7 and on the revolving system starts, the first offshoots sold to farmers have become mother plants, and are producing offshoots the farmer will return 50 of those to the nursery; which could be planted or for resale to other farmers and so on.

Date Palm varieties as follows:

Variety	**Sex**	**QTY**
Berhi	Female	1000
Medjoul	Female	500
Deglet Nour	Female	500
	Male	100

Targeted Areas

The targeted areas are from DA 24 up to north of the Dead Sea. These areas are characterized by saline soil and low quality water sources.

Phase I (Year 1-3): Establishment

Activities:

1. Land preparation including blowing, leveling, holes preparation, manure and fertilizers application.
2. Irrigation system construction.

3. Plants (offshoots) supply to project site.
4. Planting (8 m x 4 m) spacing (32 plants/dun) males and females.
5. Plants support, protect, irrigate, and fertilize.
6. Cleaning and pruning as needed.
7. Protection and monitoring program.
8. New growths (offshoots) care.
9. Planting offshoots in the inter space of 75% of the orchard area (second generation).

Phase II; (Year 4-6): First Production Management:

Activities:

1. First offshoots removal.
2. First commercial fruits picking and marketing.
3. Offshoots marketing activity for local farmers (affordable price). Conditioned by contract as one free offshoot given back to the project when reproduced by each one sold for farmer.
4. Extension cooperative activities.
5. Plant managements including:
    - Irrigation, fertilization, cultivation and weeding programs.
    - Manual pollination practice.
    - Cleaning and pruning managements as needed.
    - Protection and monitoring program.
6. Second generation of offshoot planted in the nursery at the third year, will start to produced offshoots and some of them will used to replace the first generation mother plants (spacing 4X4).

Phase III; (Year 7 -): Commercial and Revolving System Starts:

Activities:

1. First offshoots returned from farmers.
2. Commercial yield pick and marketing.
3. New offshoots removal.
4. Offshoots marketing activity for local farmers (affordable price). Conditioned by contract as one free offshoot revolved back to the project when reproduced by each one sold for farmer.
5. Extension cooperative activities.
6. Plant managements including:
    - Irrigation, fertilization, cultivation, and weeding programs.
    - Manual pollination practice.
    - Cleaning and pruning managements as needed.
    - Protection and monitoring program.
7. Offshoots marketing of the second generation planted offshoots
8. The removal and marketing of the first mother plants.

Financial Analysis for Date Palm Nursery/Farm

The analysis in the following table shows the project is feasible since the Net Present Value (NPV) at discount rate 12% is positive, the Benefit/Cost Ratio (B/C) is greater than one, and the Internal Rate of Return is 16.3% which is greater than the Opportunity Cost of Capital (i.e. 12%).

The sensitivity analysis shows that in the case of an increase of costs or decrease of returns by 10%, the project will still be feasible, But an increase of costs, and a decrease of returns by 20% will cause the project in feasible in the financial context. On the other hand, since the project is considered a development one, so the project could be considered feasible in all cases.

The return to water was calculated in two ways, the first by dividing the cash flow (net return) by the quantity of water consumed each year, the calculated average was about 0.16 JD/CM. The second way, which is more appropriate, the NPV of cash flow is divided on the annual average consumption of water; the result was 0.296 JD/CM. Both results indicate the return to water is higher than its cost.

Table 1. Financial Analysis for Date Palm Nursery/Farm

year	Costs	Returns	Cash Flow	CF				Water Consumption	Returns to Water
				Increase costs by		Decrease returns by			
				10%	20%	10%	40%	CM	JD/CM
1	89320	0	-89320	-98252	-107184	-89320	-89320	80000	-1.1165
2	25990	0	-25990	-28589	-31188	-25990	-25990	80000	-0.32488
3	28140	0	-28140	-30954	-33768	-28140	-28140	80000	-0.35175
4	33890	35000	1110	-2279	-5668	-2390	-5890	150000	0.0074
5	32590	42000	9410	6151	2892	5210	1010	150000	0.062733
6	32590	49000	16410	13151	9892	11510	6610	150000	0.1094
7	35090	106750	71660	68151	64642	60985	50310	150000	0.477733
8	34790	66500	31710	28231	24752	25060	18410	150000	0.2114
9	35490	66500	31010	27461	23912	24360	17710	150000	0.206733
10	35990	70000	34010	30411	26812	27010	20010	150000	0.226733
11	35090	119000	83910	80401	76892	72010	60110	150000	0.5594
12	34790	84000	49210	45731	42252	40810	32410	150000	0.328067
13	35490	87500	52010	48461	44912	43260	34510	150000	0.346733
14	35990	91000	55010	51411	47812	45910	36810	150000	0.366733
15	35090	140000	104910	101401	97892	90910	76910	150000	0.6994
NPV	272,275	312,586	40,311				Average	136000	
B/C	1.15								
IRR			16.3%	13.2%	10.7%	12.9%	9.6%		

Table 2. Estimated Budget, Three Phases.

Main Items	Unit	Unit Cost ($)	QTY	Estimated Cost ($) Phase I		
				Year		
				1	2	3
Man Power						
Consultants (from NCARTT)	Person	200&150	2	4,200	4,200	4,200
Field Engineers	--		--	---	---	---
Constant Field Labor	Person	210	2	5,040	5,040	5,040
Temporary Field Labor	Days		350	1,400	700	1,400
Accountant (JVFA)	Person	350	1	4,200	4,200	4,200
Administration (JVFA)	Person	250	1	3,000	3,000	3,000
Field Materials and Needs						
Land Cost (JVFA)	Dun.	70	60	4,200	4,200	4,200
Land Preparation	Dun.	8	60	480	---	---
Plants (Offshoots)	Offshoot	22	2100	46,200	---	----
Tools	--		--	700		
Irrigation system + Pump	--		1	11,300	---	---
Planting + Holes digging	--		--	1,800	---	---
Water Cost (JVFA)	M^3	0.01	80,000	800	800	800
Fertilizers (organic & inorganic)	Ton		--	2,400	700	700
Pesticides + monitor Needs	--		--	350	350	700
Pollination Needs	--		--	--	--	--
Yield Pick + Marketing	--		--	--	--	--
Offshoot removal + Nursery Needs	--		--	---	--	1,100
Revolved Offshoot Planting	--		--	--	--	--
Extension Activities	--		--			
Transportation (JVFA)	**Car**	2,100	1	2,100	2,100	2,100
Miscellaneous (tissue)				450	--	--
Fuel				700	700	700
Yearly cost				**89,320**	**25,990**	**28,140**
Phase Cost				**143,450**		

Table 2. Continuation

Main Items	Unit	Unit Cost ($)	QTY	Estimated Cost ($) Phase II		
				Year		
				4	5	6
Man Power						
Consultants	Person	200&150	2	4,200	4,200	4,200
Field Engineers	--		--	---	---	---
Constant Field Labor	Person	210	2	5,040	5,040	5,040
Temporary Field Labor	--		--	1,800	2,100	2,100
Accountant (JVFA)	Person	350	1	4,200	4,200	4,200
Administration (JVFA)	Person	250	1	3,000	3,000	3,000
Field Materials and Needs						
Land Cost (JVFA)	Dun.	70	60	4,200	4,200	4,200
Land Preparation	--		---	---	---	---
Plants (Offshoots) + transport	Offshoot		---	---	---	---
Tools	--		--	700	700	700
Irrigation system maintenance.	--		1	1500	700	700
Planting the first generation	Offshoot	0.8	1500	1200	---	--
Water Cost (JVFA)	M^3	0.01	150,000	1500	1500	1500
Fertilizers	Ton		--	1,400	1,400	1,400
Pesticides + monitor Needs	--		--	850	850	850
Pollination Needs	--		--	300	300	300
Yield Pick + Marketing	--		--	300	700	700
Offshoot Pull-out + Nursery Needs	--		--	450	450	450
Revolved Offshoot Planting	--		--			
Extension Activities	--		--			
Transportation (JVFA)	Car	2,100	1	2,100	2,100	2,100
Miscellaneous				450	450	450
Fuel				700	700	700
Yearly cost				**33,890**	**32,590**	**32,590**

Table 2. Continuation

Main Items	Unit	Unit Cost ($)	QTY	Estimated Cost ($) Phase III			
				Year			
				7	8	9	10
Man Power							
Consultants	Person	200&150	2	4,200	4,200	4,200	4,200
Field Engineers	--		--	---	---	---	---
Constant Field Labor	Person	210	2	5,040	5,040	5,040	5,040
Temporary Field Labor	--		--	3,100	3,400	3800	3800
Accountant (JVFA)	Person	350	1	4,200	4,200	4,200	4,200
Administration (JVFA)	Person	250	1	3,000	3,000	3,000	3,000
Field Materials and Needs							
Land Cost (JVFA)	Dun.	70	60	4,200	4,200	4,200	4,200
Land Preparation	--		--	---	---	---	---
Plants (Offshoots)	Offshoot		---	---	---	---	
Tools	---		---	700	700	700	700
Irrigation system maintenance.	--		1	700	700	700	700
Planting the second generation		0.8	1500	1200	---	--	---
Water Cost (JVFA)	M^3	0.01	150,000	1500	1500	1500	1500
Fertilizers	Ton		--	1,500	1,700	1,800	2,000
Pesticides + monitor Needs	--		--	800	900	1,000	1,100
Pollination Needs	--		--	300	300	300	300
Yield Pick + Marketing	--		--	700	1,000	1,100	1,300
Offshoot Pull-out + Nursery Needs	--		--	450	450	450	450
Revolved Offshoot Planting	--		---	---	---	---	---
Extension Activities	--		--				
Transportation (JVFA)	Car	2100	1	2,100	2,100	2,100	2,100
Miscellaneous				700	700	700	700
Fuel				700	700	700	700
Yearly cost				**35,090**	**34,790**	**35,490**	**35,990**

Table 2. Continuation

Main Items	Unit	Unit Cost ($)	QTY	Estimated Cost ($) Phase III				
				Year				
				11	12	13	14	15
Man Power								
Consultants	Person	200& 150	2	4,200	4,200	4,200	4,200	4,200
Field Engineers	--		--	---	---	---	---	---
Constant Field Labor	Person	210	2	5,040	5,040	5,040	5,040	5,040
Temporary Field Labor	--		--	3,100	3,400	3800	3800	3,100
Accountant (JVFA)	Person	350	1	4,200	4,200	4,200	4,200	4,200
Administration (JVFA)	Person	250	1	3,000	3,000	3,000	3,000	3,000
Field Materials and Needs								
Land Cost (JVFA)	Dun.	70	60	4,200	4,200	4,200	4,200	4,200
Land Preparation	--		--	---	---	---	---	---
Plants (Offshoots)			---	---	---	---		---
Tools	---		---	700	700	700	700	700
Irrigation system maintenance.	--		1	700	700	700	700	700
Planting the third generation *	--		1500	1200	---	--		1200
Water Cost (JVFA)	M^3	0.01	150,000	1500	1500	1500	1500	1500
Fertilizers	Ton		--	1,500	1,700	1,800	2,000	1,500
Pesticides + monitor Needs	--		--	800	900	1,000	1,100	800
Pollination Needs	--		--	300	300	300	300	300
Yield Pick + Marketing	--		--	700	1,000	1,100	1,300	700
Offshoot Pull-out + Nursery Needs	--		--	450	450	450	450	450
Revolved Offshoot Planting	--		---	---	---	---	---	---
Extension activities	--		--					
Transportation (JVFA)	Car	2100	1	2,100	2,100	2,100	2,100	2,100
Miscellaneous				700	700	700	700	700
Fuel				700	700	700	700	700
Yearly cost				**35,090**	**34,790**	**35,490**	**35,990**	**35,090**

* Year 15, the fourth generation

Table 3. Estimated Returns USD/Year

	Year 4		Year 5		Year 6		Year 7		Year 8		Year 9		Year 10	
	QTY	Price	QTY	Price	QTY	Price	QTY	Price	QTY	Price	QTY	Price	QTY	Price
Offshoots Production	4,000	7	4000	7	4000	7	3000	7	3000	7	3000	7	3000	7
Fruits Production	20,000	0.35	40000	0.35	60000	0.35	70000	0.35	40000	0.35	50000	0.35	60000	0.35
Revolved Offshoots	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4000	7	4000	7	4000	7
Mother Offshoots	0.0	0.0	0.0	0.0	0.0	0.0	1750	35	0.0	0.0	0.0	0.0	0.0	0.0
Total	**35,000**		**42,000**		**49,000**		**106,750**		**63,000**		**66,500**		**70,000**	

	Year 11		Year 12		Year 13		Year 14		Year 15	
	QTY	Price	QTY	Price	QTY	Price	QTY	Price	QTY	Price
Offshoots Production	3000	7	3000	7	3000	7	3000	7	3000	7
Fruits Production	70000	0.35	40000	0.35	50000	0.35	60000	0.35	70000	0.35
Revolved Offshoots	3000	7	7000	7	7000	7	7000	7	6000	7
Mother Offshoots	1500	35	0.0	0.0	0.0	0.0	0.0	0.0	1500	35
Total	**119,000**		**84,000**		**87,500**		**91,000**		**140,000**	

Table 4. Budget Summary (USD)

	Year1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Cost	89,320	25,990	28,140	33,890	32,590	32,590	35,090	34,790	35,490	35,990
Return	0.000	0.000	0.000	35,000	42,000	49,000	106,750	63,000	66,500	70,000
Net Profit	**0.000**	**0.000**	**0.000**	**1,110**	**9,410**	**16,410**	**71,660**	**28,210**	**31,010**	**34,010**

	Year11	Year 12	Year 13	Year 14	Year 15
Cost	35,090	34,790	35,490	35,990	35,090
Return	119,000	84,000	87,500	91,000	140,000
Net Profit	**83,910**	**49,210**	**52,010**	**55,010**	**104,910**